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Atlas of Neutron Capture Cross Sections

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Abstract

This report describes neutron capture cross sections in the range 10^{-5} eV - 20 MeV as evaluated and compiled in recent activation libraries. The selected subset comprises the (n, γ) cross sections for a total of 739 targets for the elements H ($Z=1$, $A=1$) to Cm ($Z=96$, $A=248$) totalling 972 reactions. Plots of the point-wise data are shown and comparisons are made with the available experimental values at thermal energy, 30 keV and 14.5 MeV.

April 1997

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1 INTRODUCTION

This work has been initiated within the IAEA Research Co-ordination (RC) Programme on Measurement, Calculation and Evaluation of Photon Production Data. During the two RC Meetings (Bologna - 11/1994 and Vienna - 5/1996) the participants acknowledged the high practical value of a comprehensive compilation of (n,γ) cross sections for a complete set of targets in the whole energy range and recommended it for publication. The best sources of such data can be found among the recent activation libraries for fusion applications, such as ADL-3, EAF-4.1, JENDL/A-3 and FENDL/A-2, because they contain the largest number of target materials.

This report gives a detailed description of the data base of neutron capture cross sections for neutron energies in the 0-20 MeV range selected for this compilation. The recently released European Activation File, EAF-4.1 [1], has been chosen as the main source of data presented in this atlas. Further, some improved and newly evaluated data have been included. This report presents a graphical description of the selected (n,γ) reactions including comparisons against available experimental data.

The Atlas of Neutron Capture Cross Sections (NGATLAS) contains cross sections data of neutron induced reactions for targets up to, and including, curium ($Z=96$). It comprises 739 target isotopes with half-lives above 0.5 day. Cross sections to ground, first and second isomers are listed separately. This gives a total of 972 reaction channels, with data available in point-wise format. Energy dependent isomeric branching ratios are based on a combination of experimental information and data based on systematics at thermal and 14.5 MeV neutron energies.

During the creation of the NGATLAS several checks were made to monitor the quality of the selected data (from other libraries). In particular a large number of new evaluations have been performed in EAF-4.1 for target nuclides not considered in other libraries, such as radioactive targets. These procedures include:

- general accounting of the different reaction channels,
- cross section renormalisation to experiment ($1/v$ region) or systematics (pre-equilibrium component around 14 MeV),
- energy dependent library to experimental (C/E) and library to systematics (C/S) comparisons [2],
- itemized parameter reporting for each reaction,
- visualisation of the data by plotting.

All procedures for monitoring, data evaluations and renormalizations are described in Refs. [1,3,10].

Table 2: Numbers of different final states in the NGATLAS file.

Reaction	FS=0	FS=1	FS=2	Total
(n, γ)	738	216	18	972

with every target leading to an FS=0 state. Note that there are 739 targets in the EAF-4.1 library, however there is no (n, γ) reaction for H (A=3). Hence a total of 738 target isotopes in the library undergo (n, γ) reactions.

The (n, γ) cross-section data are from a range of sources, and the number of reactions from each source is shown by the following table. The entries up to the ADL-3 refer to evaluated libraries. The remainder were calculated and evaluated with model codes such as FISPRO, MASGAM, SIG-ECN and NGAMMA within the EAF programme. Details on these calculations, renormalisations, data corrections and generation of point-wise files can be found in Refs. [1,3].

Table 3: The number of capture reactions from each data source in the NGATLAS file. The source name refers to the library or processing code used to calculate the cross section, and a full description of each one can be found from Ref. [1].

(n, γ) Data Source	Number of Reactions
JEF-2.2	390
EFF-2.4	11
ENDF/B-VI	16
JENDL-3.1	38
JENDL-3.2	3
LANL	9
ADL-3	7
FISPRO	9
SIGECN-MASGAM	73
MASGAM	411
NGAMMA	1
SIG-ECN	1
ESTIMATE	3
Total	972

All renormalisations made by SYMPAL [4] for (n, γ) reactions concern isomeric branching ratio and are made according to systematics (the title line will therefore contain RN - -- -/SYS). Detailed description of the adopted branching-ratio systematics can be found in Ref. [1]. These renormalised reactions are split between the different data sources as shown in Table 4,

Table 4: Data origins of the renormalised reactions.

Data Source	Number
JEF-2.2	203
ENDF/B-VI	6
JENDL-3.1	2
ADL-3	2
FISPRO	8
SIGECN-MASGAM	37
MASGAM	183
Total	441

and between the final states as shown in Table 5.

Table 5: Distribution of final states of the renormalised reactions.

State	Number
FS = 0	212
FS = 1	212
FS = 2	17
Total	441

Thus 212 targets (which initially had data for the total cross section) have been renormalised according to systematics into appropriate final state branches. Of these 17 lead to FS=0, FS=1 and FS=2 while 195 (= 212 - 17) produce FS=0 and FS=1 only.

2.3 Experimental validation

Experimental data at three distinct energies are particularly useful for the validation of data. Such comparisons are made at thermal energy, 30 keV and close to 14.5 MeV and are based on a compilation of Refs. [5-10]. The number of experimental values available are shown in the following table, together with the appropriate references.

Table 6: Number of experimental values available at specific energies with their references.

Energy	Number of experimental measurements	References
Thermal (0.0253 eV)	617	[5], [6], [7],[8]
30 keV	336	[9]
14.5 MeV	72	[10]
Total	1025	

The experimental data are used for validation purposes in the NGATLAS file by calculating the ratio of the cross section to the experimental value (the C/E value). An ideal C/E ratio would clearly be 1, but in practice there is a distribution of C/E about this value. The number of C/E ratios available in NGATLAS is shown in Table 7.

Table 7: Number of experimental values available for each final state. FS=99 indicates that the value is for the total cross section.

FS	Thermal	30keV	14.5MeV	Total
99	409	326	47	782
0	96	9	0	105
1	7	0	0	7
2	0	0	0	0
Total	512	335	47	894

A histogram may be formed from the distribution of C/E values, and plots at each energy for the (n, γ) reactions are shown in Appendix A. Note that the total number of reactions for which C/E ratios can be calculated is less than the number of experimental values available (by approximately 100 cross sections) due to a certain amount of repeated experimental information. Table 7 gives the number of experimental data points *used* for comparisons, whereas the Table 6 (giving the total numbers of experimental data) lists *all* data currently available.

The experimental data, adopted for validation in Appendix A, are compiled in a tabular form in Ref. [2]. These data are also plotted on the cross section graphs in Appendix B (using a diamond symbol) and are shown together with the available uncertainties. This allows comparison between the adopted data and experimental values to be made directly.

The graphs in Appendix B show close agreement between the experimental values and the point-wise data, with most C/E values found close to a value of 1. This confirms the high quality of the (n, γ) cross-section data available from the EAF-4.1 library.

2.4 Data availability

Cross section data in point-wise ENDF-5 format, with EAF extensions (see Ref. [1]), are available from the IAEA Nuclear Data Section. The data can also be retrieved online through the World Wide Web using

<http://www-nds.iaea.or.at/ngatlas/main.htm>

3 REFERENCES

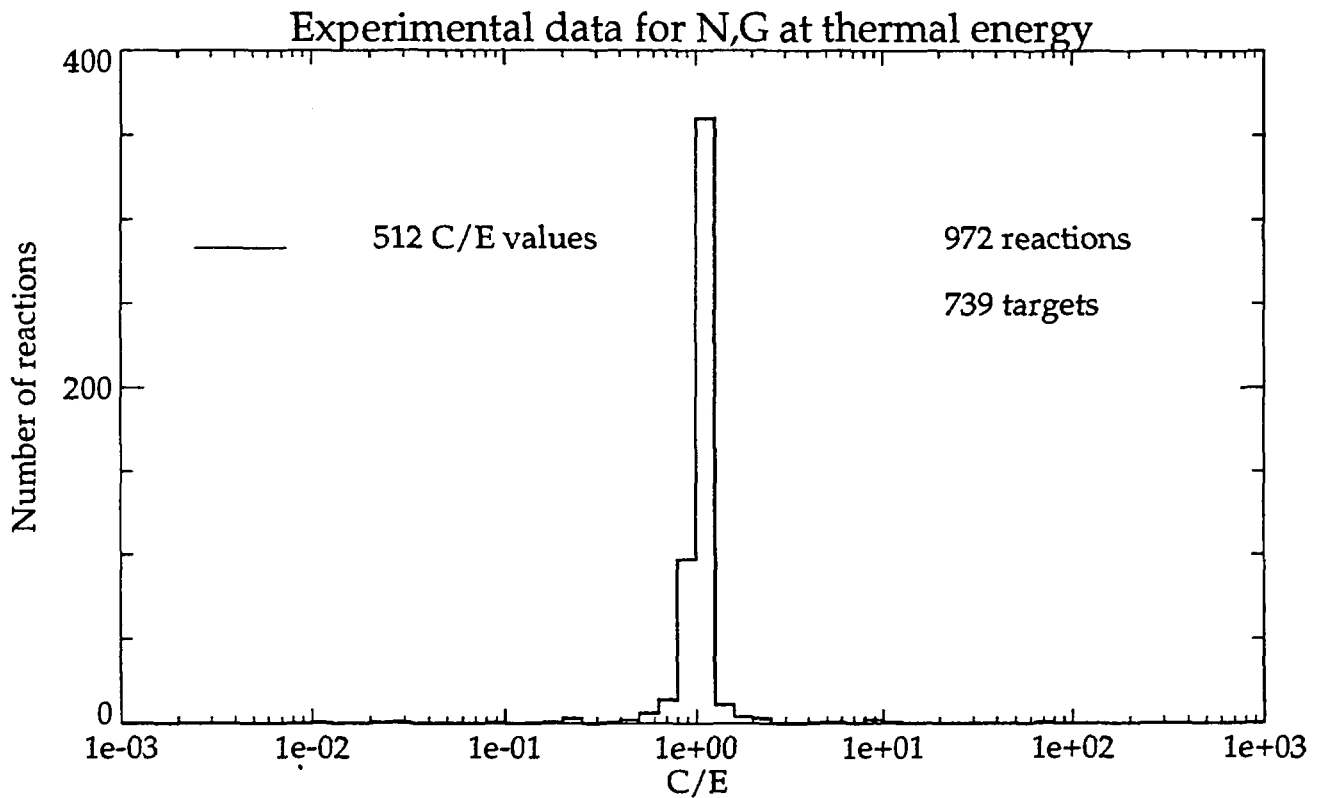
- [1] J. Kopecky and D. Nierop, *The European Activation File EAF-4 Summary Documentation*, ECN-C--95-075, (ECN Report, Petten, The Netherlands, December 1995).
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- [10] M. Wagner and H. Warhanek, *Acta Physics Austriaca*, 52, 23, 1980.

Appendix A Validation plots

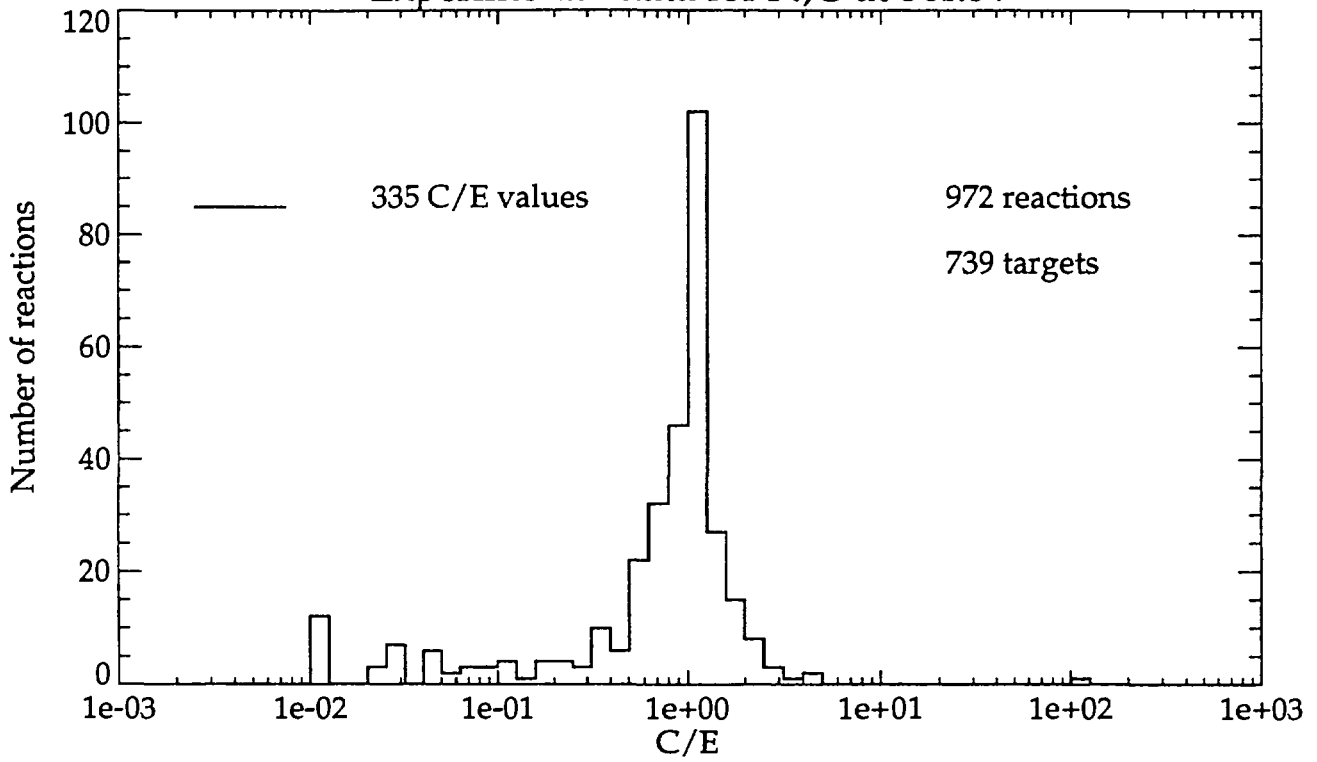
This appendix shows the distribution of evaluation to experiment (C/E) ratios for the (n,γ) reactions of the NGATLAS file. The graphs show the number of C/E values in a particular range. C/E values are available for energies of:

- thermal (0.0253eV)
- 30 keV
- 14.5 MeV

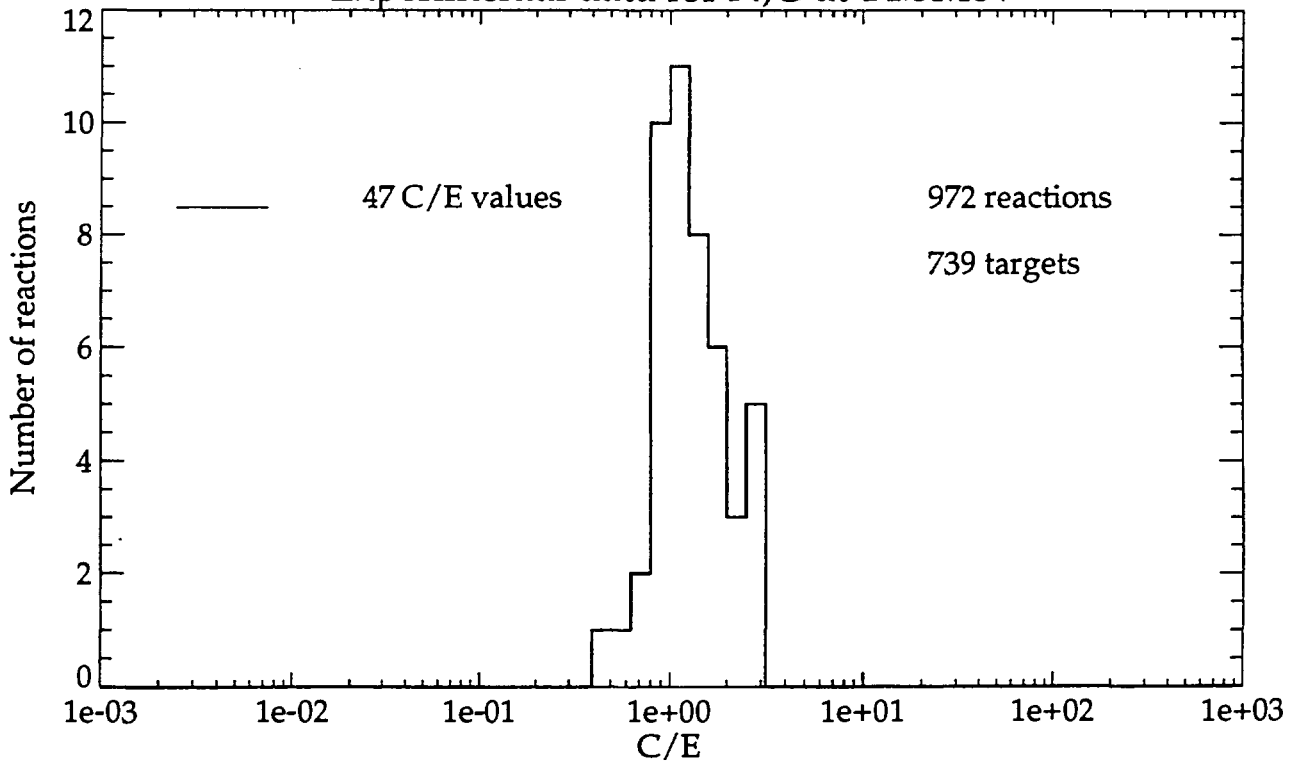
Most C/E ratios lie close to the ideal value of 1, indicating the consistency between the point-wise data and the available experimental information.



Experimental data for N,G at 30keV



Experimental data for N,G at 14.5MeV



Appendix B: Plots of NGATLAS cross sections

This appendix shows graphs of each cross section as a function of incident neutron energy, one for each target isotope which undergoes a (n, γ) reaction. Thus 738 graphs are plotted. Data for excited final states of a particular target are shown on the same graph where appropriate. The plots also show the number of points in the point-wise data for the ground state product. An index of the reactions and their data origin is provided for quick reference.

Number	Target	Reaction	Origin	
1	H-1	N	JEF-2.2	Page 1
	H-2	N	JEF-2.2	
	HE-3	N	JENDL-3.2	Page 2
	LI-6	N	JEF-2.2	
	LI-7	N	EFF-2.4	Page 3
	BE-9	N	JEF-2.2	
	BE-9	N	EFF-2.4	Page 4
	BE-10	N	ESTIMATE, BE9 REVISED	
	B-10	N	JEF-2.2	Page 5
	B-11	N	JEF-2.2	
	C-12	N	ENDF/B-VI	Page 6
	C-13	N	SIG-ECN	
	C-14	N	ESTIMATE, C12 REVISED	Page 7
	N-14	N	JEF-2.2	
	N-15	N	JENDL-3.2	Page 8
	O-16	N	JENDL-3.2	
	O-17	N	ENDF/B-VI	Page 9
	O-18	N	ESTIMATE, O16	
	F-19	N	JEF-2.2	Page 10
	NE-20	N	SIGECN-MASGAM	
	NE-21	N	SIGECN-MASGAM	Page 11
	NE-22	N	SIGECN-MASGAM	
	NA-23	N	JEF-2.2	Page 12
	NA-23	N	JEF-2.2; RN - ---/SYS	
	NA-24	N	MASGAM	Page 13
	MG-24	N	JENDL-3.1	
	MG-25	N	JENDL-3.1	Page 14
	MG-26	N	JENDL-3.1	
	MG-28	N	MASGAM	Page 15
	AL-28	N	MASGAM	
	AL-27	N	JEF-2.2	Page 16
	SI-28	N	JENDL-3.1	
	SI-29	N	JENDL-3.1	Page 17
	SI-30	N	JENDL-3.1	
	SI-31	N	MASGAM	Page 18
	SI-32	N	MASGAM	
	F-31	N	JEF-2.2	Page 19
	F-32	N	MASGAM	
	F-33	N	MASGAM	Page 20
	S-32	N	JEF-2.2	
	S-33	N	JEF-2.2	Page 21
	S-34	N	JEF-2.2	
	S-35	N	MASGAM	Page 22
	S-36	N	JEF-2.2	
	CL-35	N	SIGECN-MASGAM	Page 23
	CL-36	N	MASGAM	
	CL-37	N	SIGECN-MASGAM; RN - ---/SYS	Page 24
	AR-36	N	JEF-2.2	
	AR-37	N	MASGAM	Page 25
	AR-38	N	JEF-2.2	
	AR-39	N	MASGAM	Page 26
	AR-40	N	JEF-2.2	
	AR-41	N	MASGAM	Page 27
	AR-42	N	MASGAM	
	K-39	N	JENDL-3.1	Page 28
	K-40	N	MASGAM	
	K-41	N	JENDL-3.1	Page 29
	K-42	N	MASGAM	
	K-43	N	MASGAM	Page 30
	CA-40	N	JENDL-3.1	
	CA-41	N	MASGAM	Page 31
	CA-42	N	JENDL-3.1	
	CA-43	N	JENDL-3.1	Page 32
	CA-44	N	JENDL-3.1	
	CA-45	N	MASGAM	Page 33
	CA-46	N	JENDL-3.1	
	CA-47	N	MASGAM	Page 34
	CA-48	N	JENDL-3.1	
	SC-44 -IS=1	N	MASGAM; RN - ---/SYS	Page 35
	SC-45	N	ENDF/B-VI; RN - ---/SYS	
	SC-46	N	MASGAM	Page 36
	SC-47	N	MASGAM	
	SC-48	N	MASGAM	Page 37
	TI-44	N	MASGAM	
	TI-45	N	MASGAM	Page 38
	TI-46	N	JENDL-3.1	
	TI-47	N	JENDL-3.1	Page 39
	TI-48	N	JENDL-3.1	
	TI-49	N	JENDL-3.1	Page 40
	TI-50	N	JENDL-3.1	
	V-48	N	MASGAM	Page 41
	V-49	N	MASGAM	
	V-50	N	SIGECN-MASGAM	Page 42
	V-51	N	JENDL-3.1	
	CR-48	N	ADL-3	Page 43

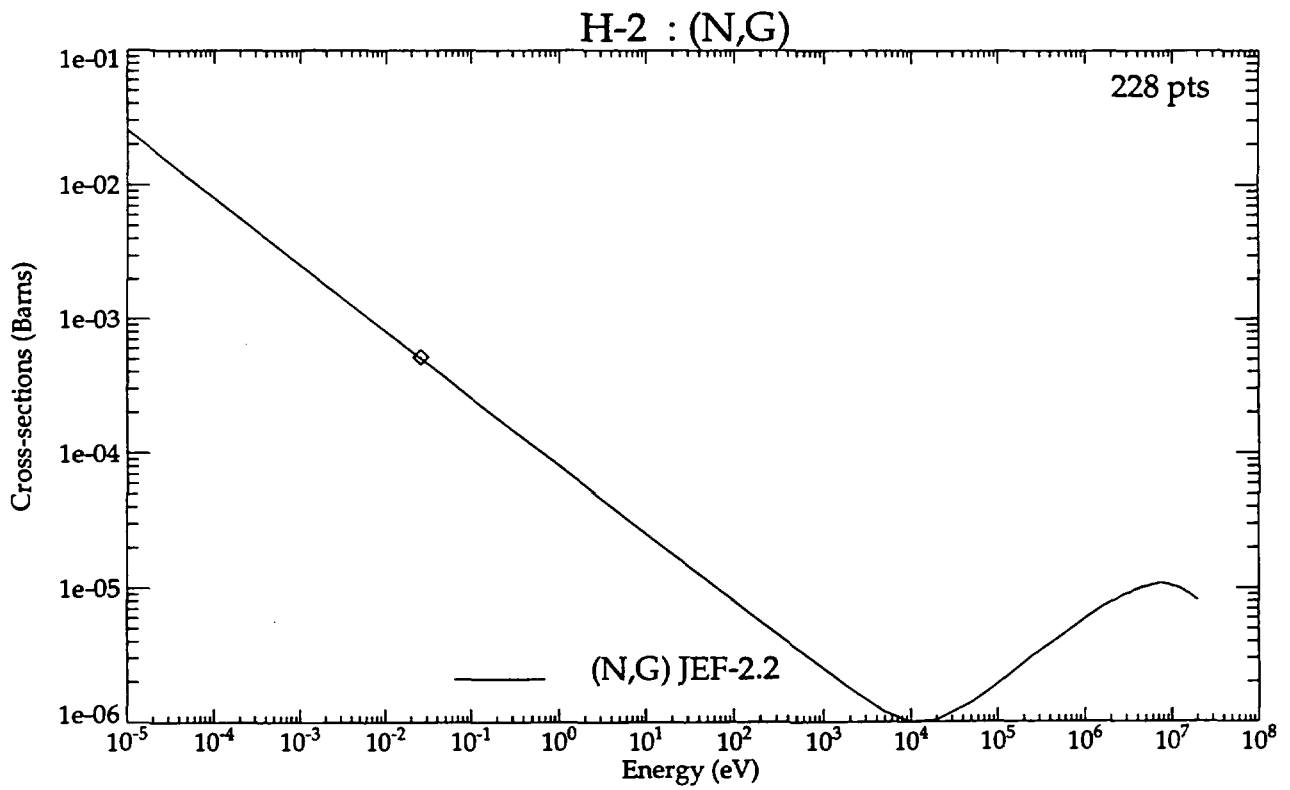
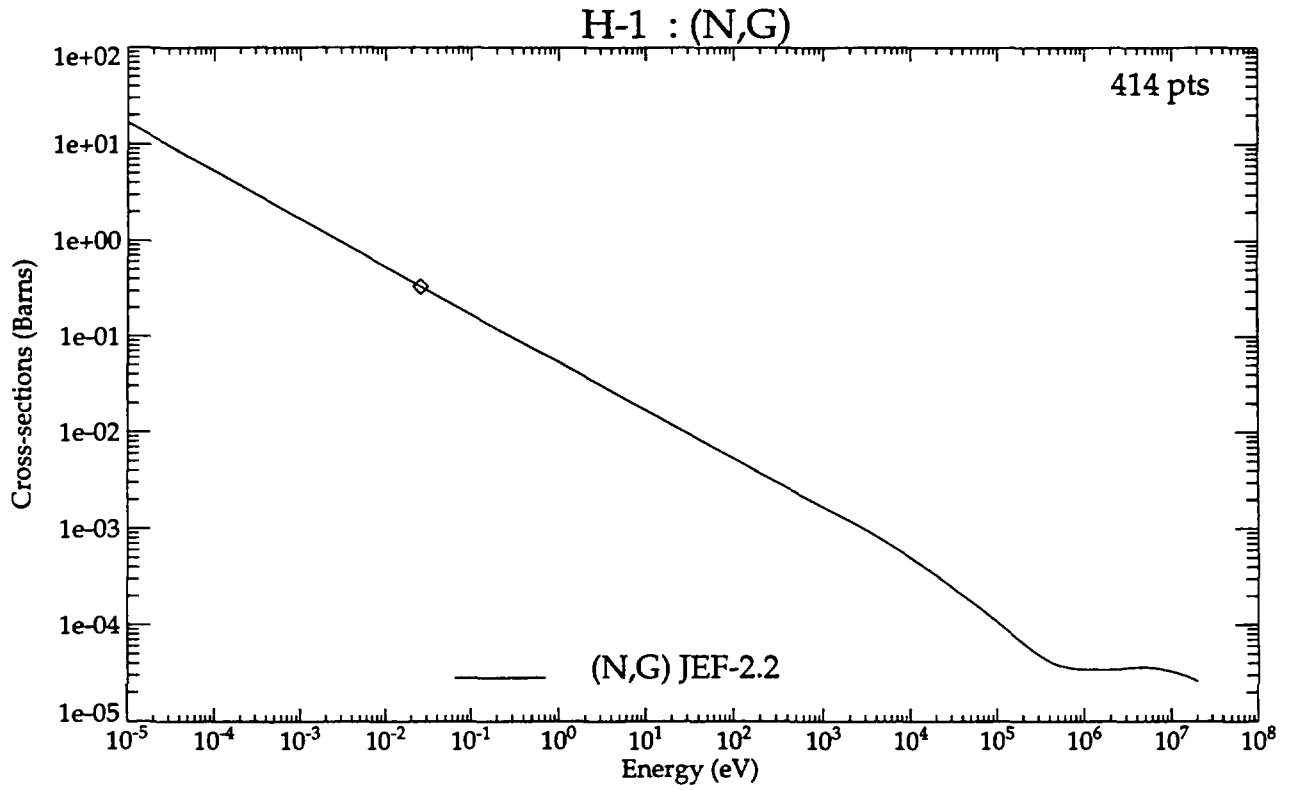
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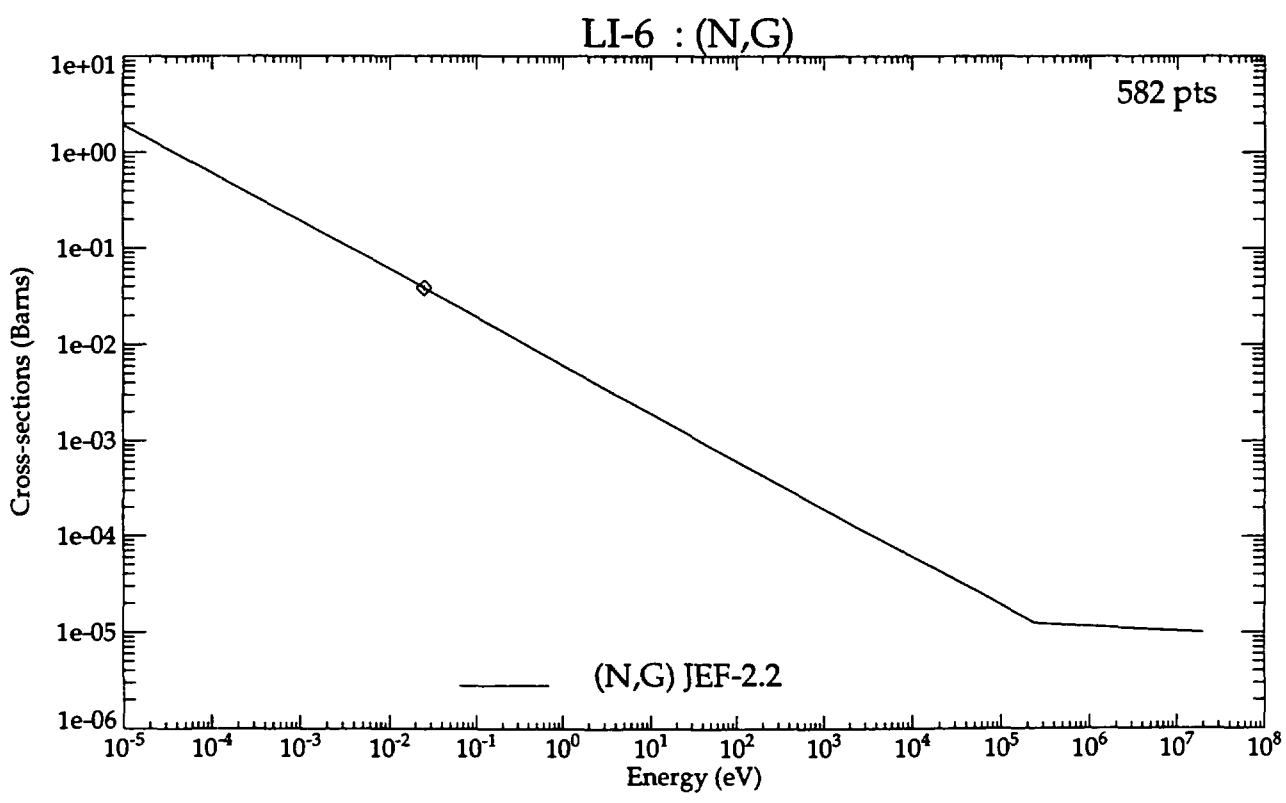
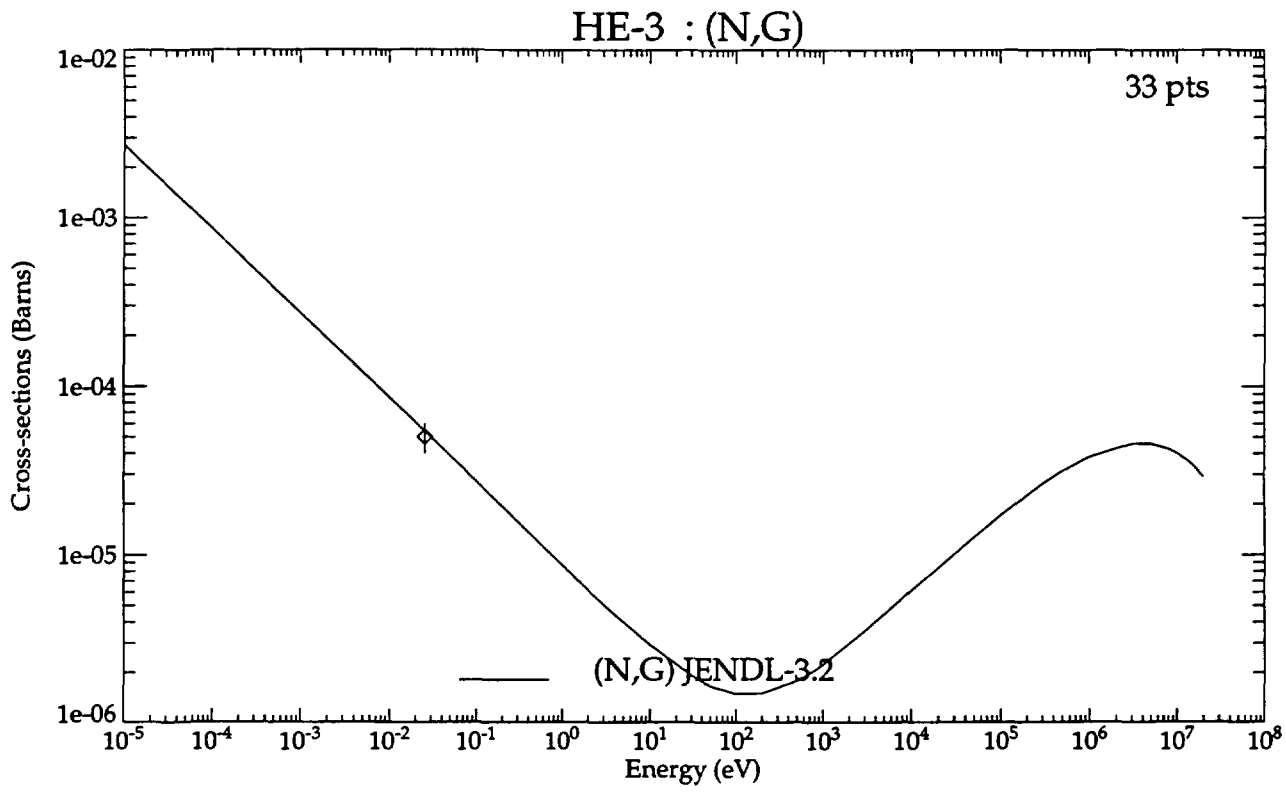
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201	ZR-92		JEF-2.2.2	Page 101
202	ZR-93		JEF-2.2.2	
203	ZR-94		JEF-2.2.2	Page 102
204	ZR-95		JEF-2.2.2	
205	ZR-96		JEF-2.2.2	Page 103
206	ZR-97		MASGAM	
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208	NB-91		MASGAM; RN - ---/SYS	
209	NB-91-IS=1		MASGAM; RN - ---/SYS	Page 105
210	NB-92		MASGAM; RN - ---/SYS	
211	NB-92-IS=1		MASGAM; RN - ---/SYS	Page 106
212	NB-93		JEF-2.2.2; RN - ---/SYS	
213	NB-93-IS=1		ENDF/B-VI; RN - ---/SYS	Page 107
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215	NB-95		JEF-2.2.2	Page 108
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217	NB-96		MASGAM; RN - ---/SYS	Page 109
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221	MO-95		JEF-2.2.2	Page 111
222	MO-96		JEF-2.2.2	
223	MO-97		JEF-2.2.2	Page 112
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225	MO-99		JEF-2.2.2	Page 113
226	MO-100		JEF-2.2.2	
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229	TC-96		MASGAM; RN - ---/SYS	Page 115
230	TC-97		MASGAM	
231	TC-97-IS=1		MASGAM	Page 116
232	TC-98		MASGAM; RN - ---/SYS	
233	TC-99		JEF-2.2.2	Page 117
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235	RU-97		MASGAM	Page 118
236	RU-98		JEF-2.2.2	
237	RU-99		JEF-2.2.2	Page 119
238	RU-100		JEF-2.2.2	
239	RU-101		JEF-2.2.2	Page 120
240	RU-102		JEF-2.2.2	
241	RU-103		JEF-2.2.2	Page 121
242	RU-104		JEF-2.2.2	
243	RU-105		JEF-2.2.2	Page 122
244	RU-106		JEF-2.2.2	
245	RH-99		MASGAM; RN - ---/SYS	Page 123
246	RH-99-IS=1		MASGAM; RN - ---/SYS	
247	RH-100		MASGAM; RN - ---/SYS	Page 124
248	RH-101		MASGAM; RN - ---/SYS	
249	RH-101-IS=1		MASGAM; RN - ---/SYS	Page 125
250	RH-102		MASGAM; RN - ---/SYS	
251	RH-102-IS=1		MASGAM; RN - ---/SYS	Page 126
252	RH-103		JEF-2.2.2; RN - ---/SYS	
253	RH-105		JEF-2.2.2; RN - ---/SYS	Page 127
254	PD-100		MASGAM	
255	PD-101		MASGAM	Page 128
256	PD-102		JEF-2.2.2	
257	PD-103		MASGAM	Page 129
258	PD-104		JEF-2.2.2	
259	PD-105		JEF-2.2.2	Page 130
260	PD-106		JEF-2.2.2; RN - ---/SYS	
261	PD-107		JEF-2.2.2	Page 131
262	PD-108		JEF-2.2.2; RN - ---/SYS	
263	PD-109		MASGAM	Page 132
264	PD-110		JEF-2.2.2; RN - ---/SYS	
265	PD-112		MASGAM; RN - ---/SYS	Page 133
266	AG-105		MASGAM; RN - ---/SYS	
267	AG-106-IS=1		MASGAM; RN - ---/SYS	Page 134
268	AG-107		JEF-2.2.2; RN - ---/SYS	
269	AG-108-IS=1		MASGAM; RN - ---/SYS	Page 135
270	AG-109		JEF-2.2.2; RN - ---/SYS	
271	AG-110-IS=1		MASGAM; RN - ---/SYS	Page 136
272	AG-111		JEF-2.2.2	
273	CU-106		JEF-2.2.2	Page 137
274	CU-108		JEF-2.2.2	
275	CU-109		JENDL-3.1	Page 138
276	CU-110		MASGAM	
277	CU-111		JEF-2.2.2; RN - ---/SYS	Page 139
278	CU-112		JEF-2.2.2; RN - ---/SYS	
279	CU-113		JEF-2.2.2	Page 140
280	CU-113-IS=1		JEF-2.2.2	
281	CU-114		JEF-2.2.2; RN - ---/SYS	Page 141
282	CU-115		JEF-2.2.2	
283	CU-115-IS=1		JEF-2.2.2	Page 142
284	CU-116		JEF-2.2.2; RN - ---/SYS	
285	IN-111		MASGAM; RN - ---/SYS	Page 143
286	IN-113		JEF-2.2.2; RN - ---/SYS	
287	IN-114-IS=1		MASGAM; RN - ---/SYS	Page 144
288	IN-115		JEF-2.2.2; RN - ---/SYS	
289	SN-112		JEF-2.2.2; RN - ---/SYS	Page 145
290	SN-113		MASGAM	
291	SN-114		JEF-2.2.2	Page 146
292	SN-115		JEF-2.2.2	
293	SN-116		JEF-2.2.2; RN - ---/SYS	Page 147
294	SN-117		JEF-2.2.2	
295	SN-117-IS=1		JEF-2.2.2	Page 148
296	SN-118		JEF-2.2.2; RN - ---/SYS	
297	SN-119		JEF-2.2.2	Page 149
298	SN-119-IS=1		JEF-2.2.2	
299	SN-120		JEF-2.2.2; RN - ---/SYS	Page 150
300	SN-121		MASGAM	
301	SN-121-IS=1		MASGAM	Page 151
302	SN-122		JEF-2.2.2; RN - ---/SYS	
303	SN-123		JEF-2.2.2	Page 152
304	SN-124		JEF-2.2.2; RN - ---/SYS	
305	SN-125		JEF-2.2.2	Page 153
306	SN-126		JEF-2.2.2; RN - ---/SYS	
307	SB-119		MASGAM; RN - ---/SYS	Page 154
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309	SB-121		JEF-2.2.2; RN - ---/SYS	Page 155

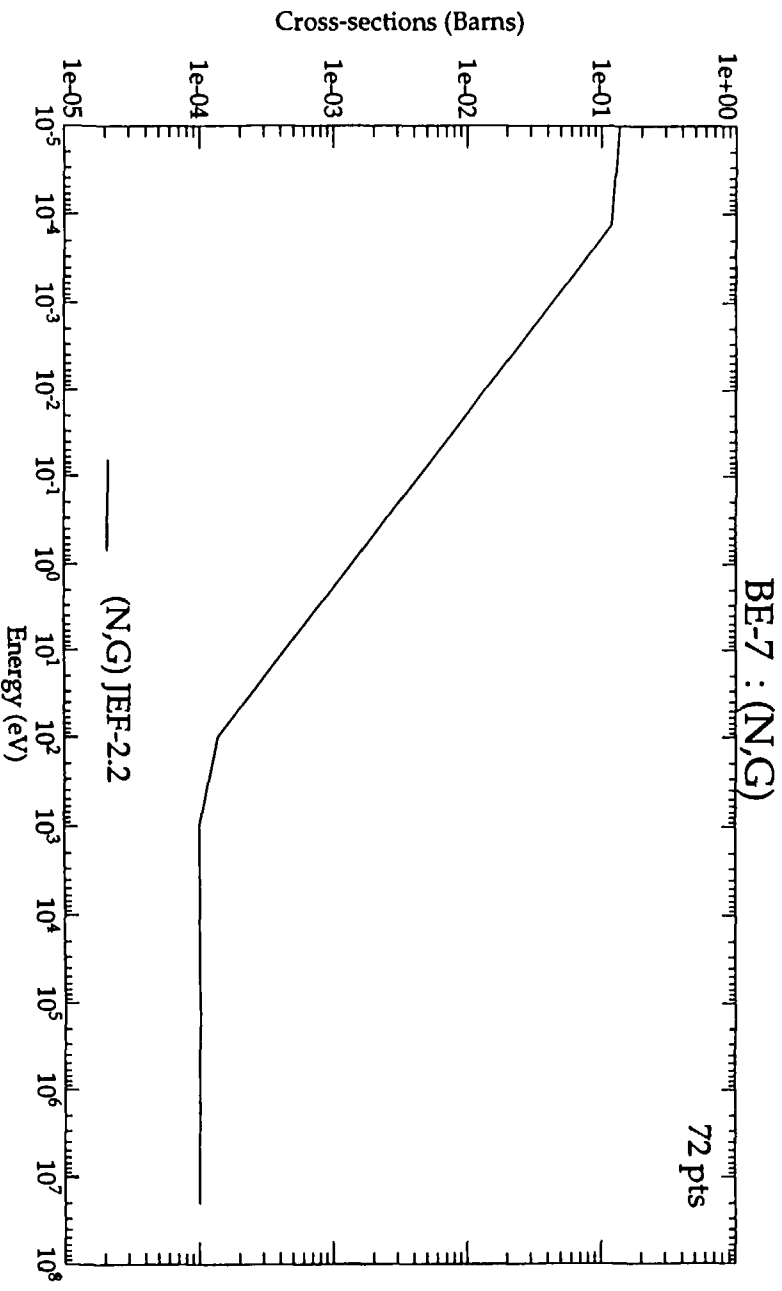
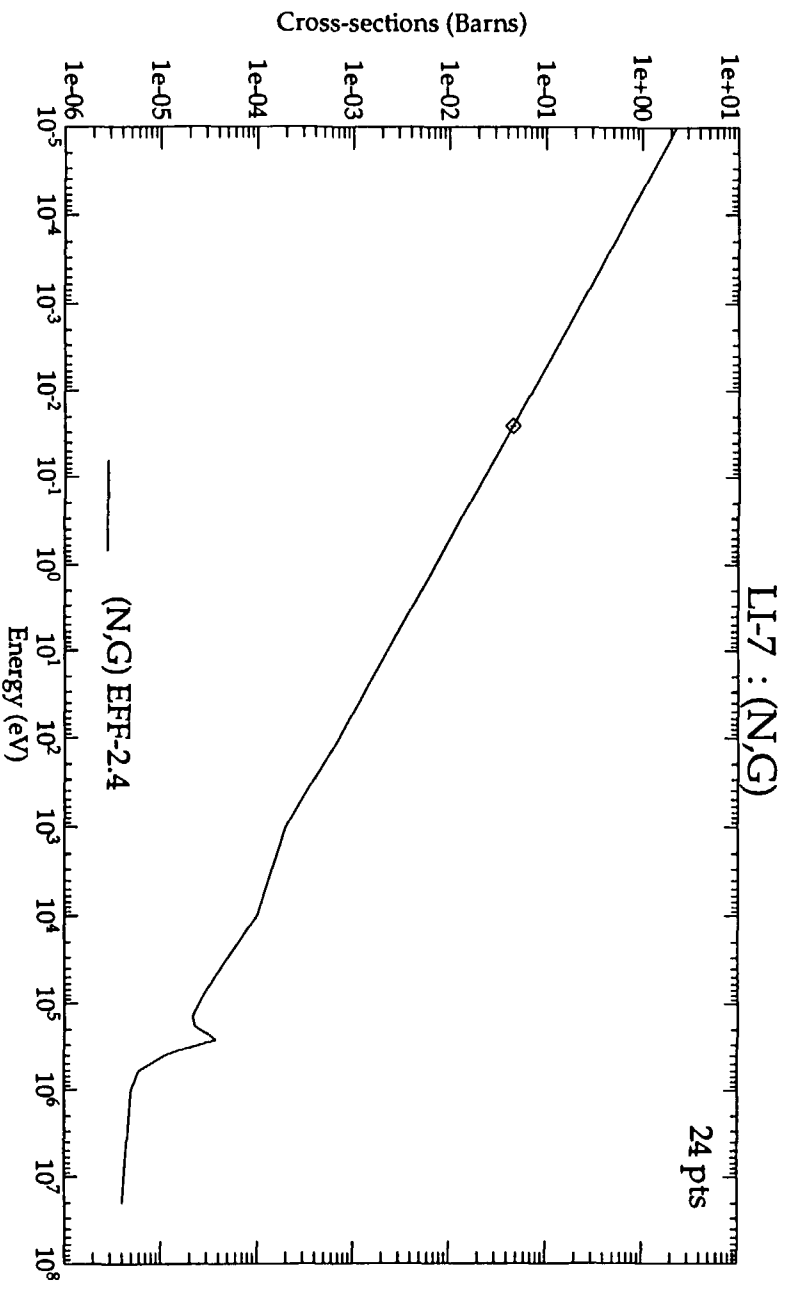
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430	SM-146	N	MASGAM		Page 219
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443	EG-149	N	MASGAM; RN - ---/SYS		Page 232
444	EG-150	N	MASGAM		Page 233
445	EG-150	-IS=1	MASGAM		Page 234
446	EG-151	N	JEF-2.2	; RN - ---/SYS	Page 235
447	EG-152	N	JEF-2.2		Page 236
448	EG-152	-IS=1	JEF-2.2		Page 237
449	EG-153	N	JEF-2.2	; RN - ---/SYS	Page 238
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452	EG-156	N	JEF-2.2		Page 241
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454	GD-146	N	MASGAM		Page 243
455	GD-147	N	MASGAM		Page 244
456	GD-148	N	MASGAM		Page 245
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458	GD-150	N	MASGAM		Page 247
459	GD-151	N	MASGAM		Page 248
460	GD-152	N	JENDL-3.1		Page 249
461	GD-153	N	MASGAM		Page 250
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466	GD-158	N	JEF-2.2		Page 255
467	GD-159	N	MASGAM		Page 256
468	GD-160	N	JEF-2.2		Page 257
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470	TB-152	N	MASGAM		Page 259
471	TB-153	N	MASGAM; RN - ---/SYS		Page 260
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473	TB-155	N	MASGAM; RN - ---/SYS		Page 262
474	TB-156	N	MASGAM		Page 263
475	TB-156	-IS=2	MASGAM		Page 264
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477	TB-158	N	MASGAM		Page 266
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485	DY-158	N	SIGECN-MASGAM		Page 274
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492	DY-165	N	MASGAM		Page 281
493	DY-166	N	MASGAM		Page 282
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495	HO-164	N	ADL-3		Page 284
496	HO-164	-IS=1	ADL-3		Page 285
497	HO-165	N	JEF-2.2; RN - ---/SYS		Page 286
498	HO-166	N	MASGAM		Page 287
499	HO-166	-IS=1	MASGAM		Page 288
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501	ER-162	N	SIGECN-MASGAM		Page 290
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509	ER-171	N	MASGAM		Page 298
510	ER-172	N	MASGAM		Page 299
511	TM-165	N	MASGAM		Page 300
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519	YB-166	N	MASGAM		Page 308
520	YB-168	N	SIGECN-MASGAM; RN - ---/SYS		Page 309
521	YB-169	N	SIGECN-MASGAM		Page 310
522	YB-170	N	SIGECN-MASGAM		Page 311
523	YB-171	N	SIGECN-MASGAM		Page 312
524	YB-172	N	SIGECN-MASGAM		Page 313
525	YB-173	N	SIGECN-MASGAM		Page 314
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527	YB-175	N	MASGAM; RN - ---/SYS		Page 316
528	YB-176	N	SIGECN-MASGAM; RN - ---/SYS		Page 317
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530	LU-170	N	MASGAM; RN - ---/SYS		Page 319
531	LU-171	N	MASGAM; RN - ---/SYS		Page 320
532	LU-172	N	MASGAM		Page 321
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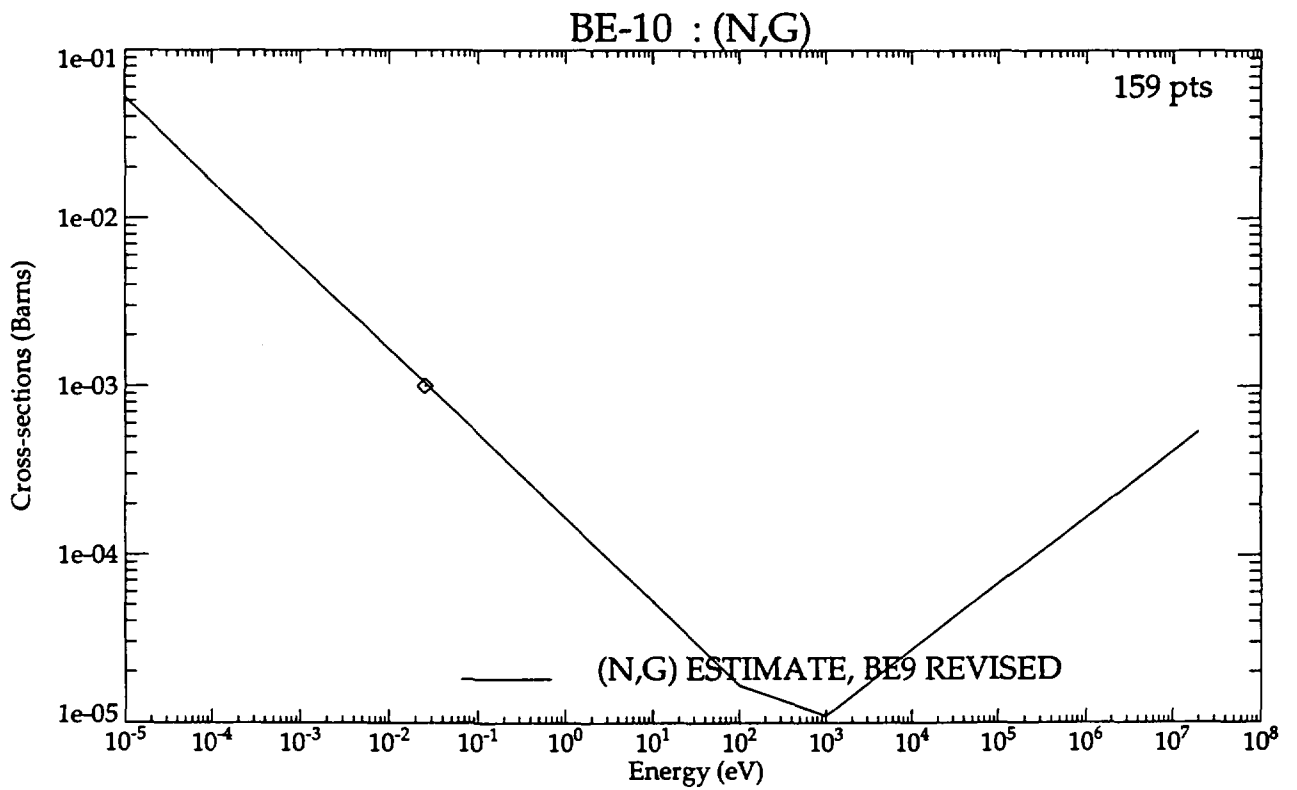
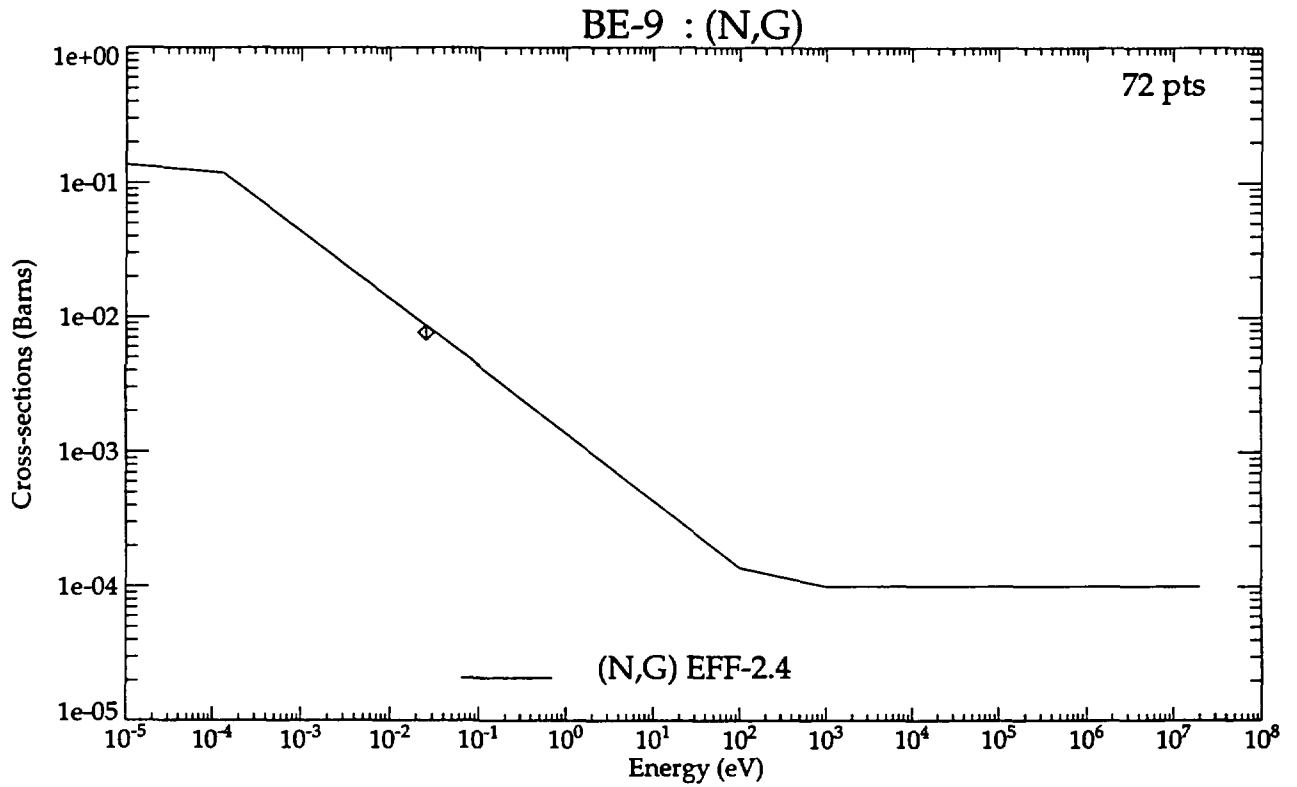
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1	LU-177-1S=1	N	MASGAM; RN - ---/SYS	Page 272
2	LU-170	N	MASGAM	Page 273
3	HF-171	N	MASGAM	Page 274
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1	HF-178-1S=2	N	JEF-2.2; RN - ---/SYS	Page 282
2	HF-179	N	JEF-2.2; RN - ---/SYS	Page 283
3	HF-179-1S=2	N	JEF-2.2; RN - ---/SYS	Page 284
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9	TA-179	N	MASGAM; RN - ---/SYS	Page 290
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1	TA-180-1S=1	N	MASGAM	Page 292
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8	W-182	N	JEF-2.2; RN - ---/SYS	Page 299
9	W-183	N	JEF-2.2	Page 300
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1	W-185	N	MASGAM	Page 302
2	W-186	N	JEF-2.2	Page 303
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9	RE-184-1S=1	N	MASGAM	Page 310
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2	RE-186-1S=1	N	MASGAM	Page 313
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6	OS-182	N	MASGAM; RN - ---/SYS	Page 317
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6	OS-191-1S=1	N	MASGAM; RN - ---/SYS	Page 327
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8	IR-193-1S=2	N	SIGECCN-MASGAM; RN - ---/SYS	Page 339
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2	PT-193-1S=1	N	MASGAM	Page 353
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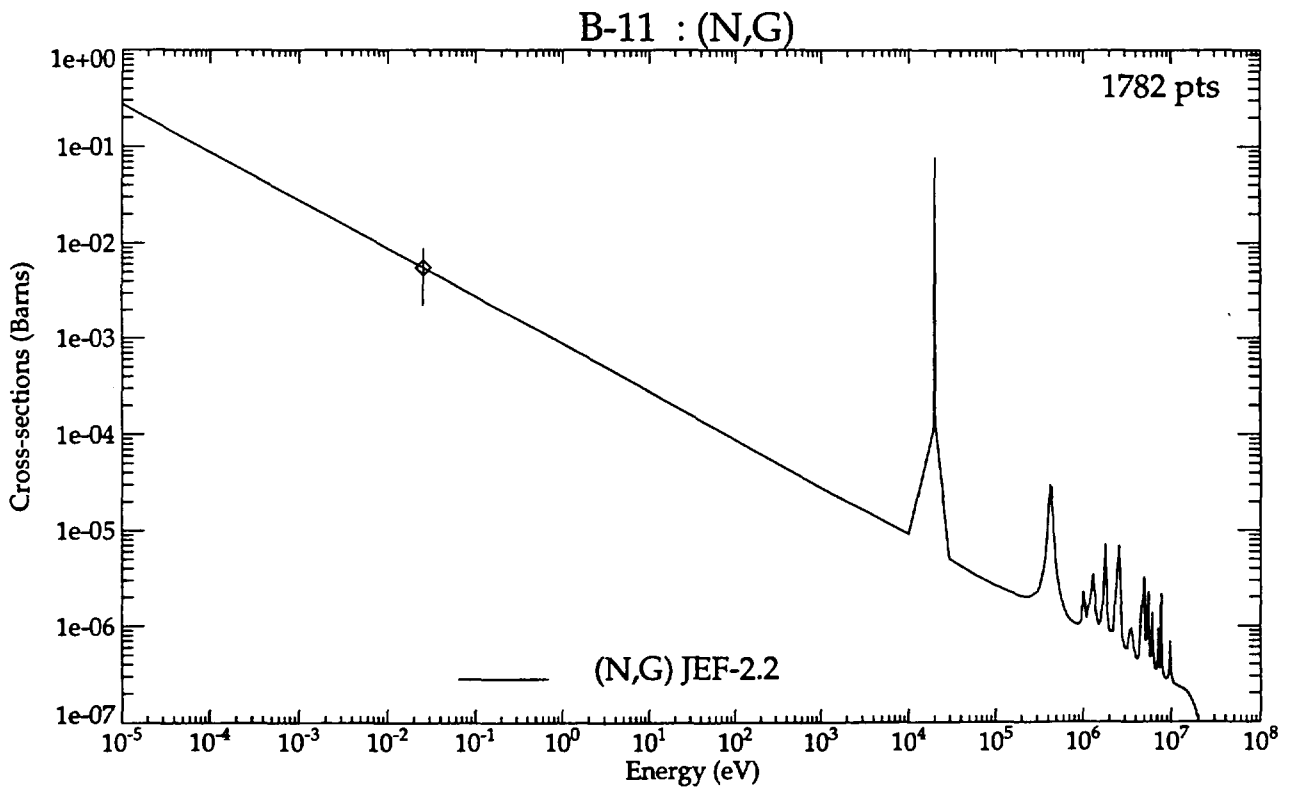
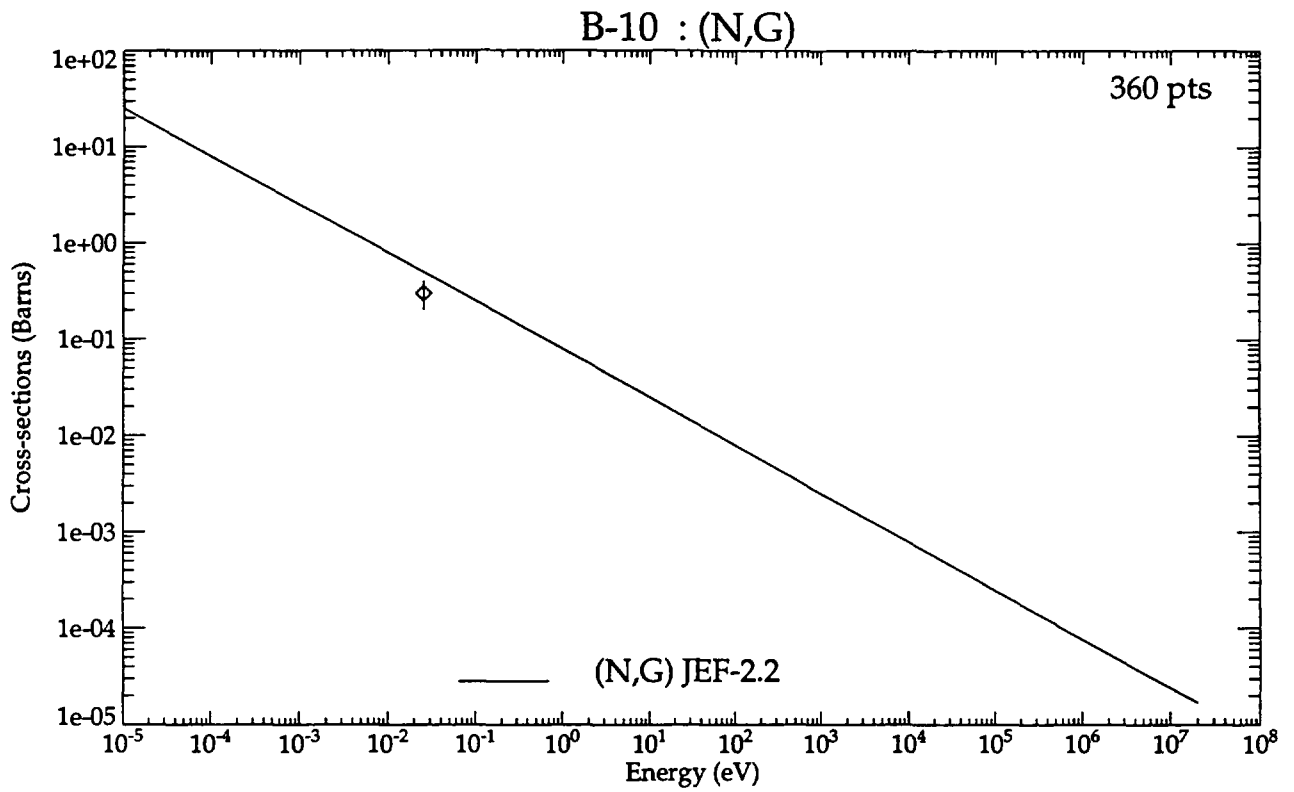
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711	NP-235	N,N,G	MASGAM; RN - ---/SYS	Page 356
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714	NP-238	N,N,G	JEF-2.2	
715	NP-239	N,N,G	JEF-2.2; RN - ---/SYS	Page 358
716	PU-236	N,N,G	JEF-2.2; RN - ---/SYS	
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718	PU-238	N,N,G	JEF-2.2	
719	PU-239	N,N,G	JEF-2.2	Page 360
720	PU-240	N,N,G	JEF-2.2	
721	PU-241	N,N,G	JEF-2.2	Page 361
722	PU-242	N,N,G	JEF-2.2	
723	PU-244	N,N,G	JEF-2.2	Page 362
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725	AM-240	N,N,G	MASGAM	Page 363
726	AM-241	N,N,G	JEF-2.2; RN - ---/SYS	
727	AM-242	N,N,G	JEF-2.2	Page 364
728	AM-242	-IS=1 N,N,G	JEF-2.2	
729	AM-243	N,N,G	JEF-2.2; RN - ---/SYS	Page 365
730	CM-240	N,N,G	MASGAM	
731	CM-241	N,N,G	JEF-2.2	Page 366
732	CM-242	N,N,G	JEF-2.2	
733	CM-243	N,N,G	JEF-2.2	Page 367
734	CM-244	N,N,G	JEF-2.2	
735	CM-245	N,N,G	JEF-2.2	Page 368
736	CM-246	N,N,G	JEF-2.2	
737	CM-247	N,N,G	JEF-2.2	Page 369
738	CM-248	N,G	JEF-2.2	

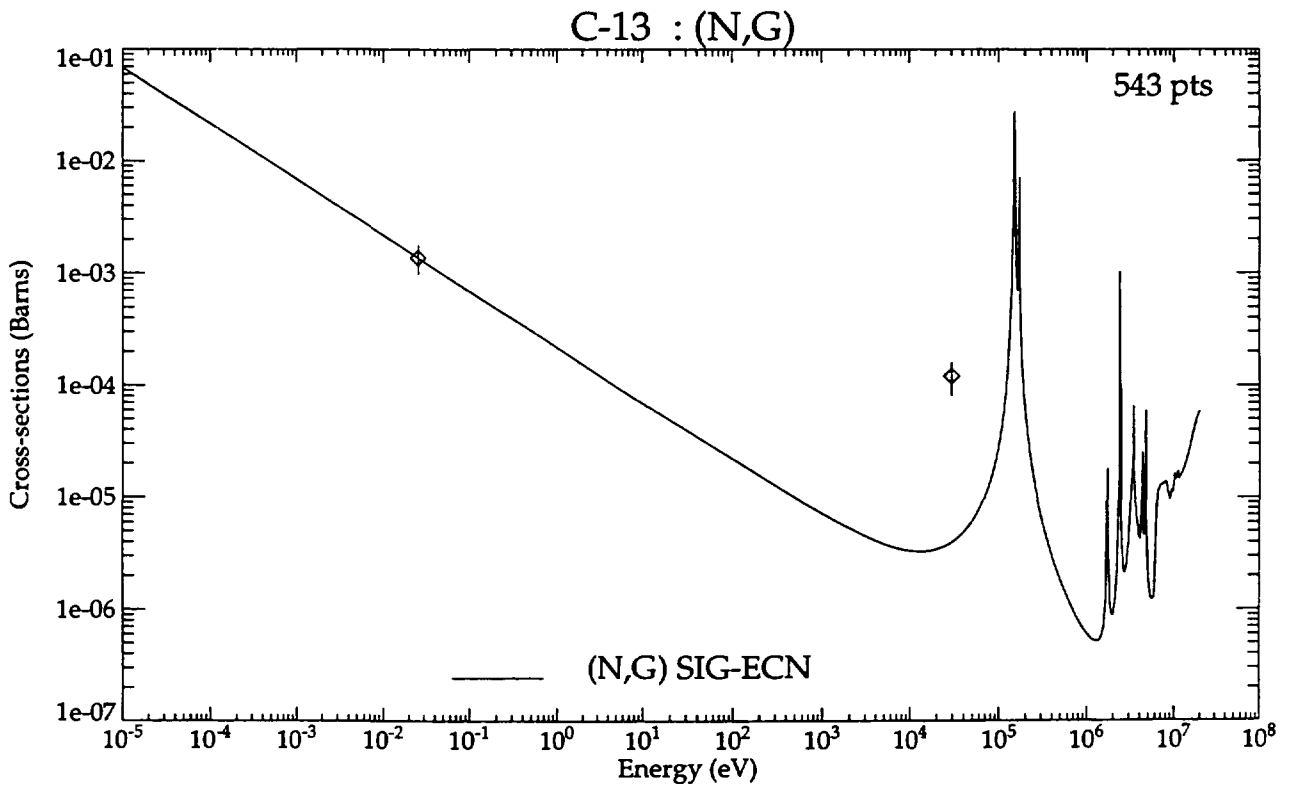
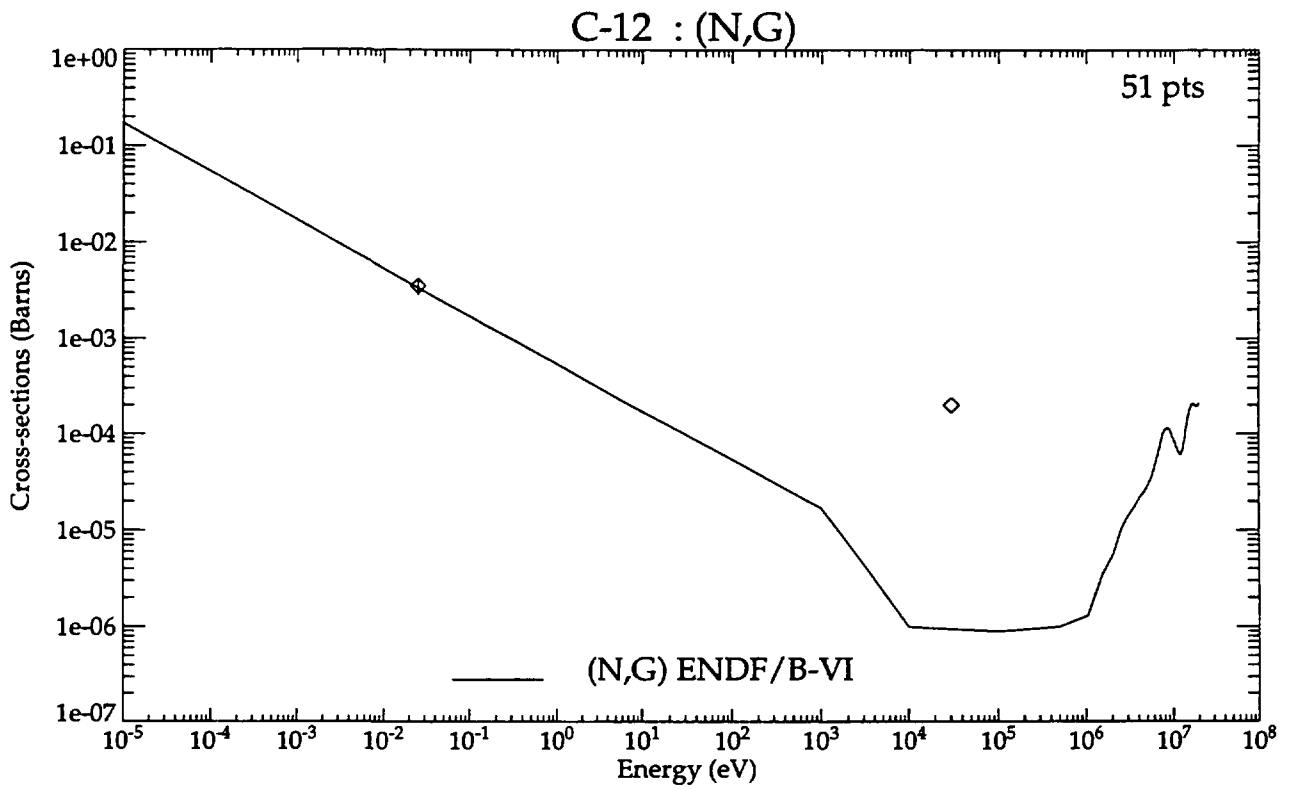


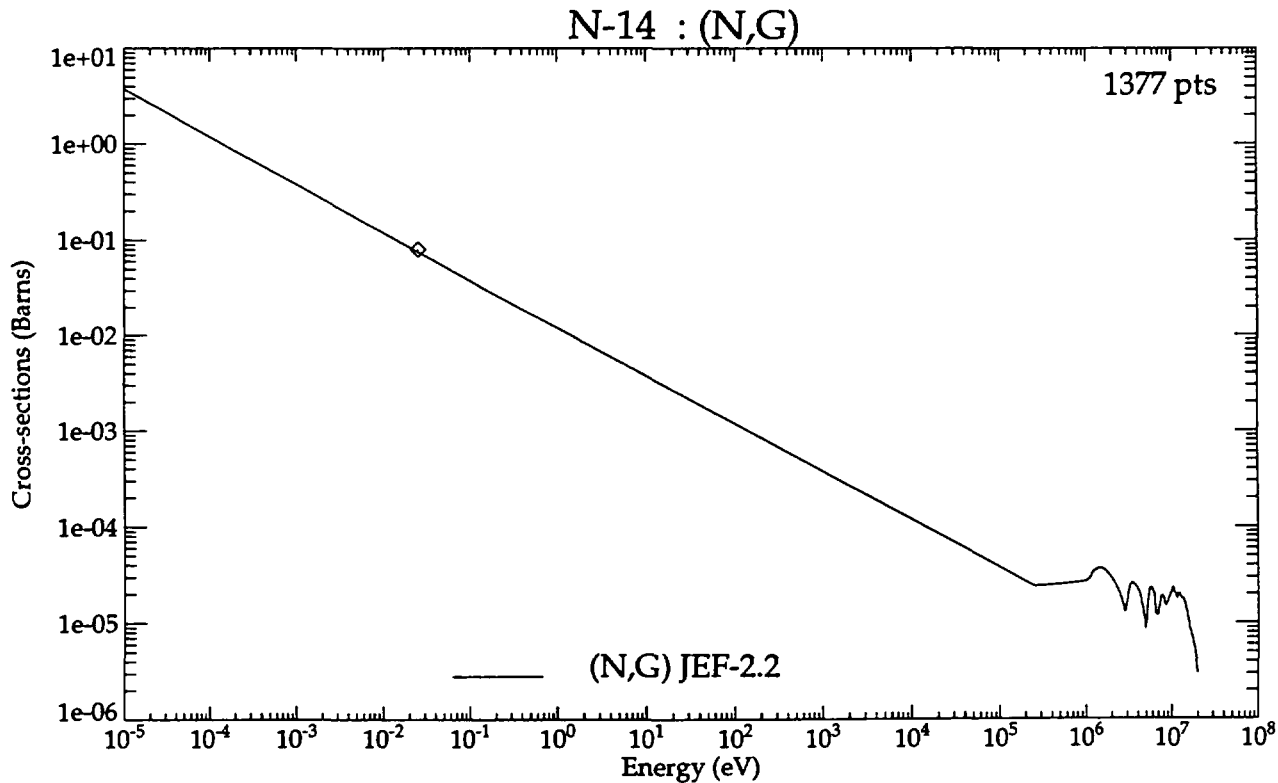
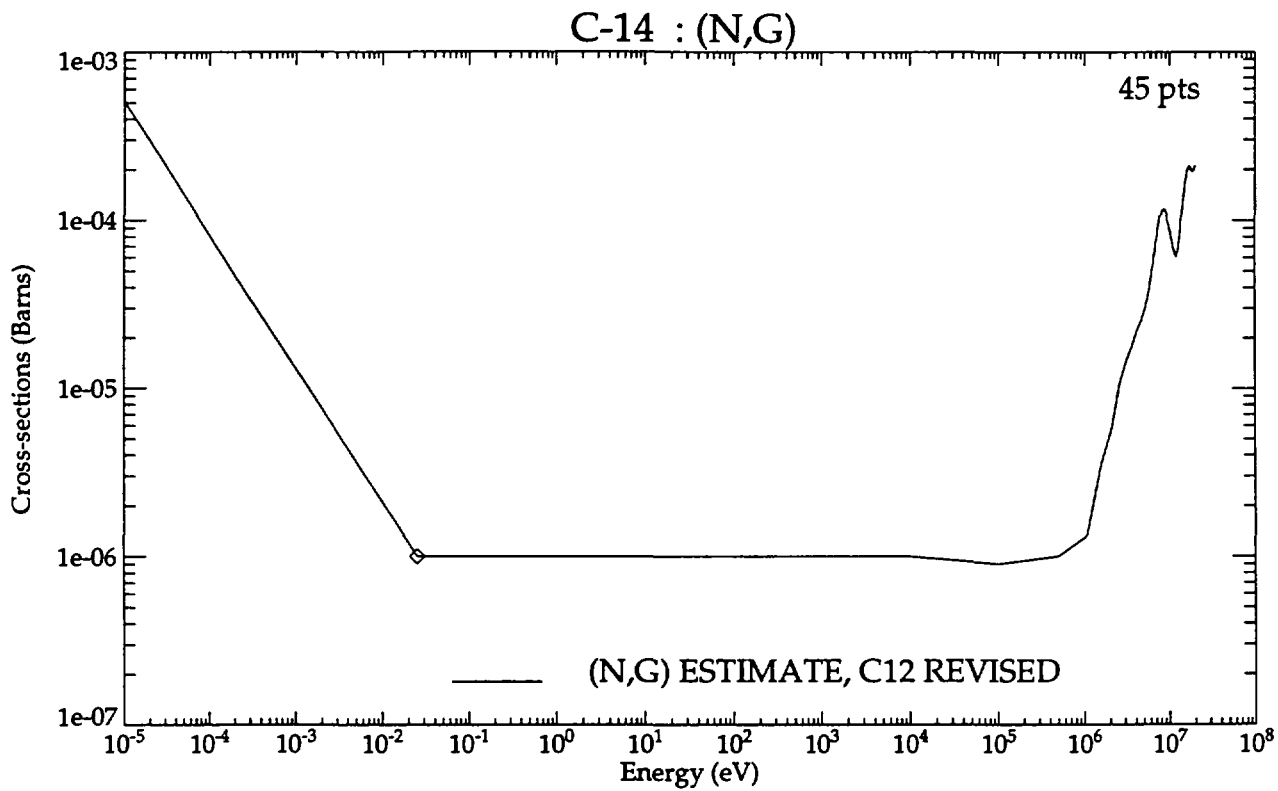


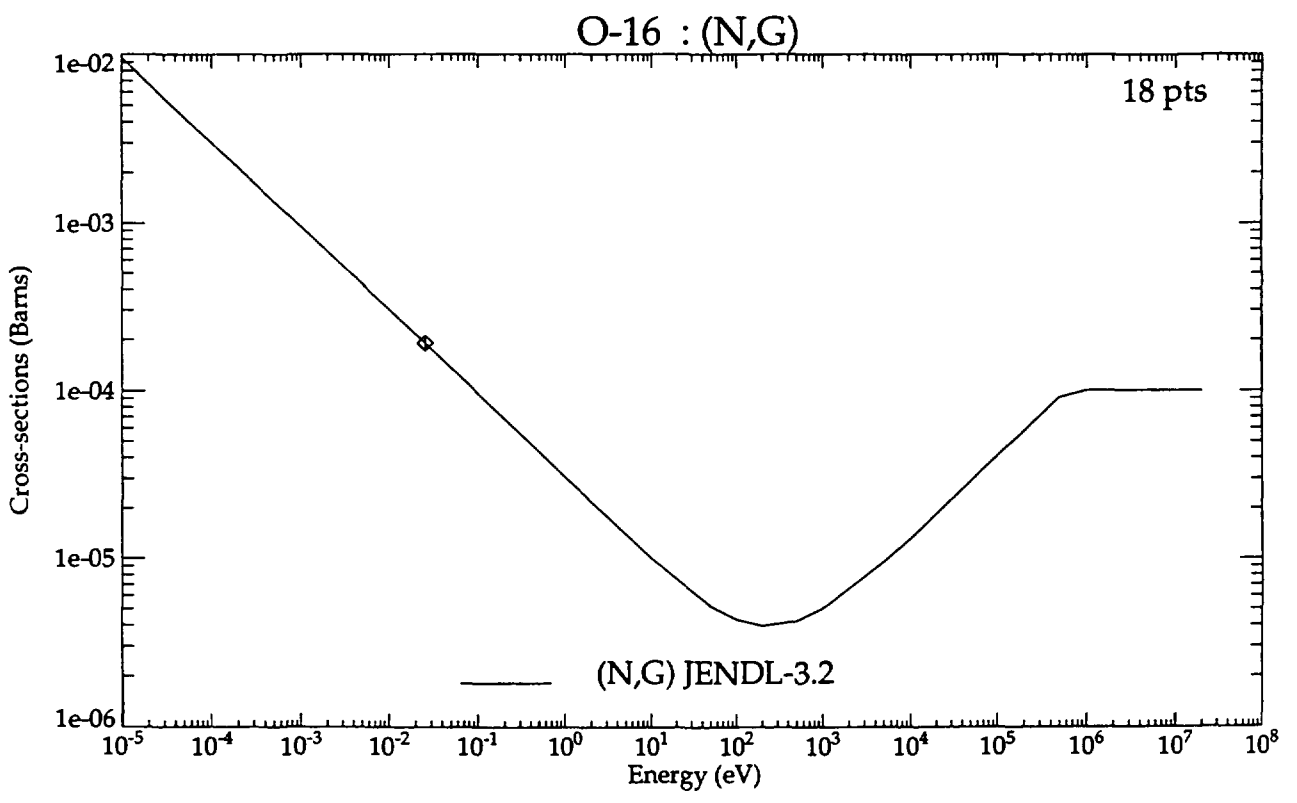
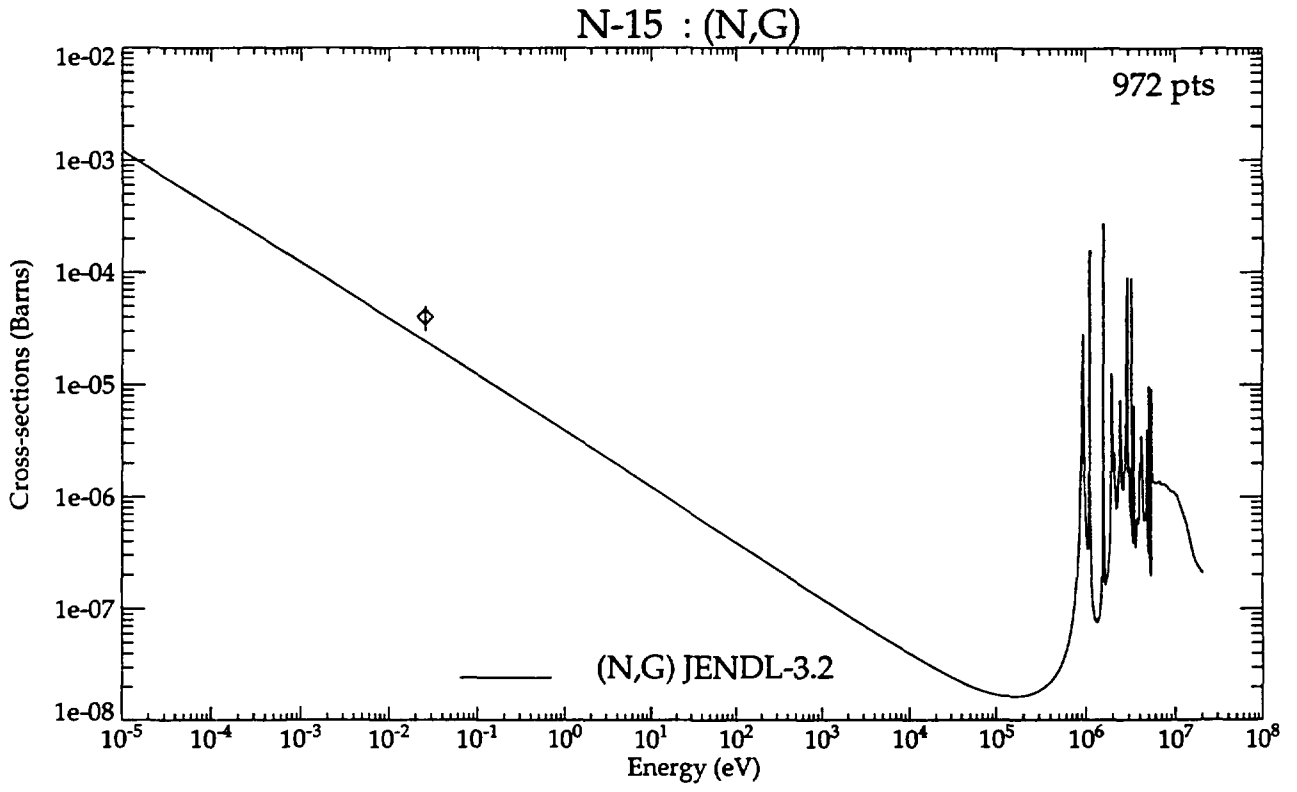


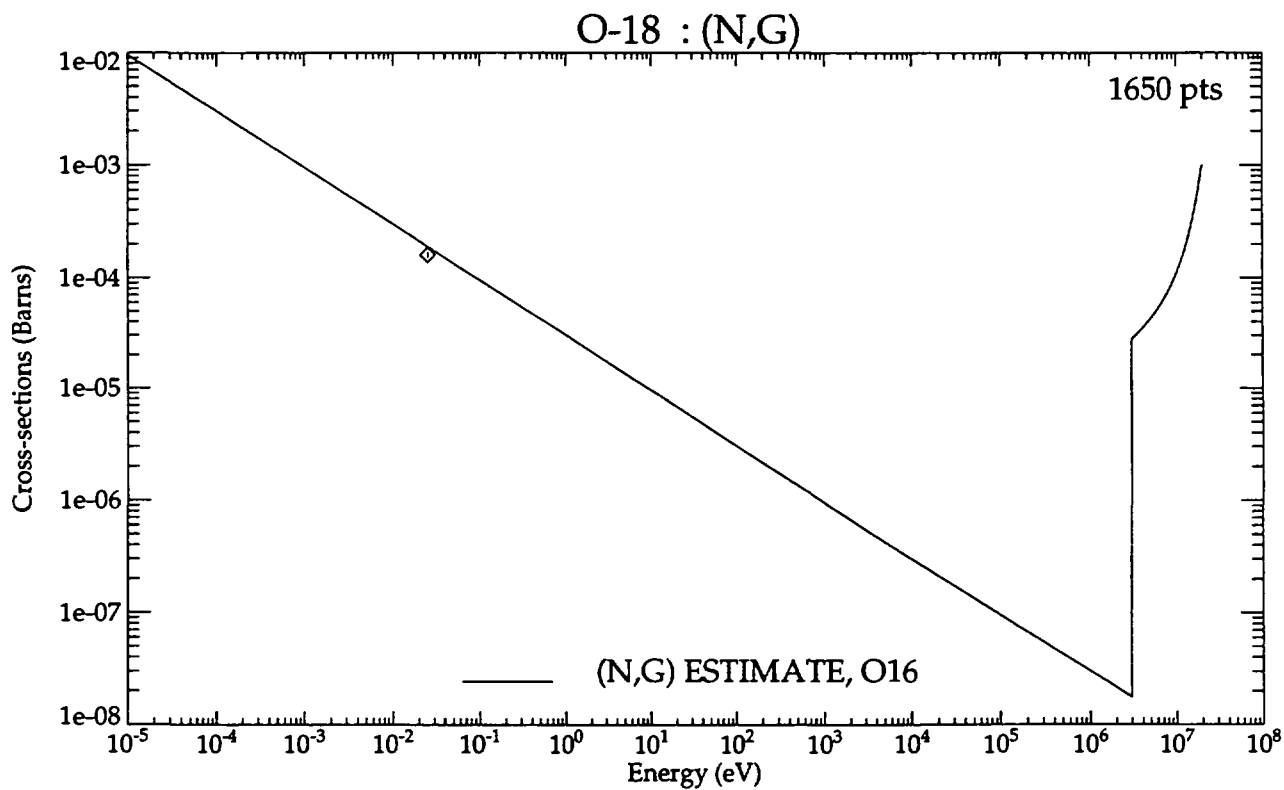
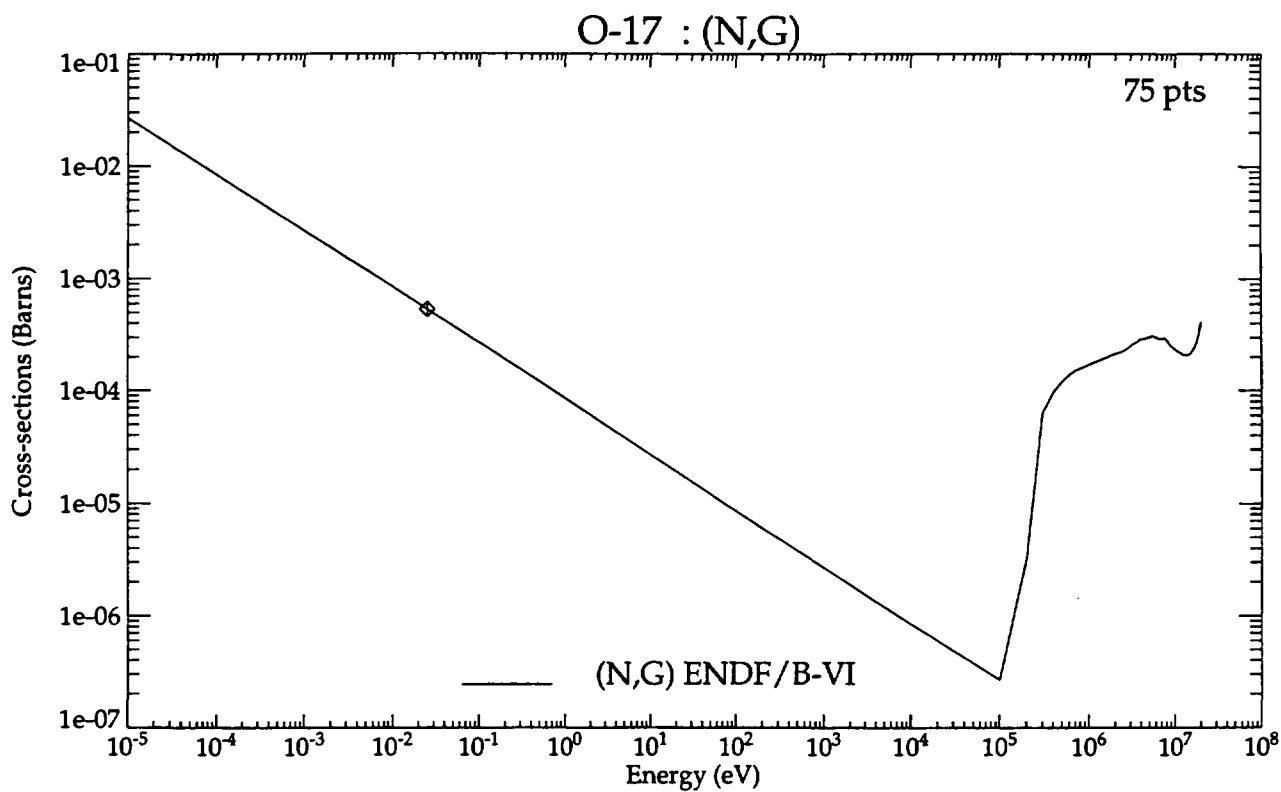


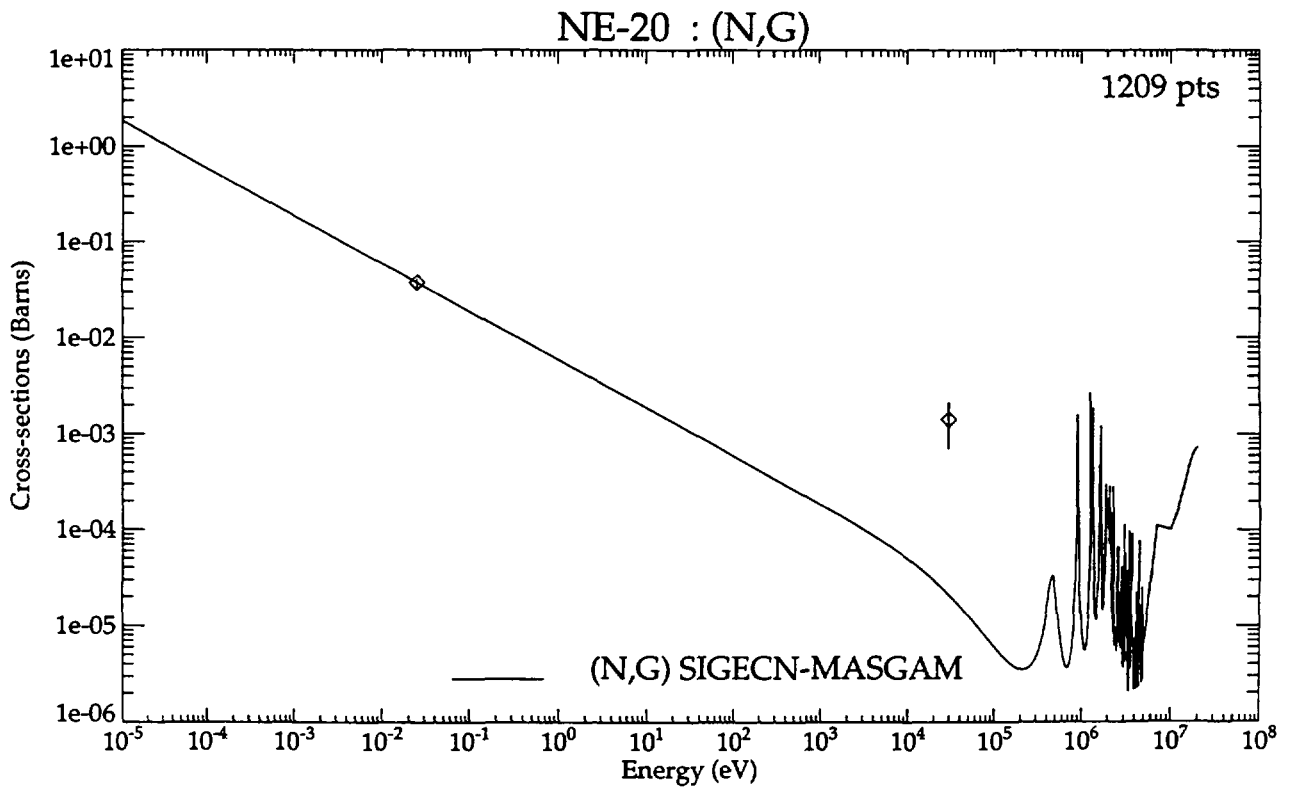
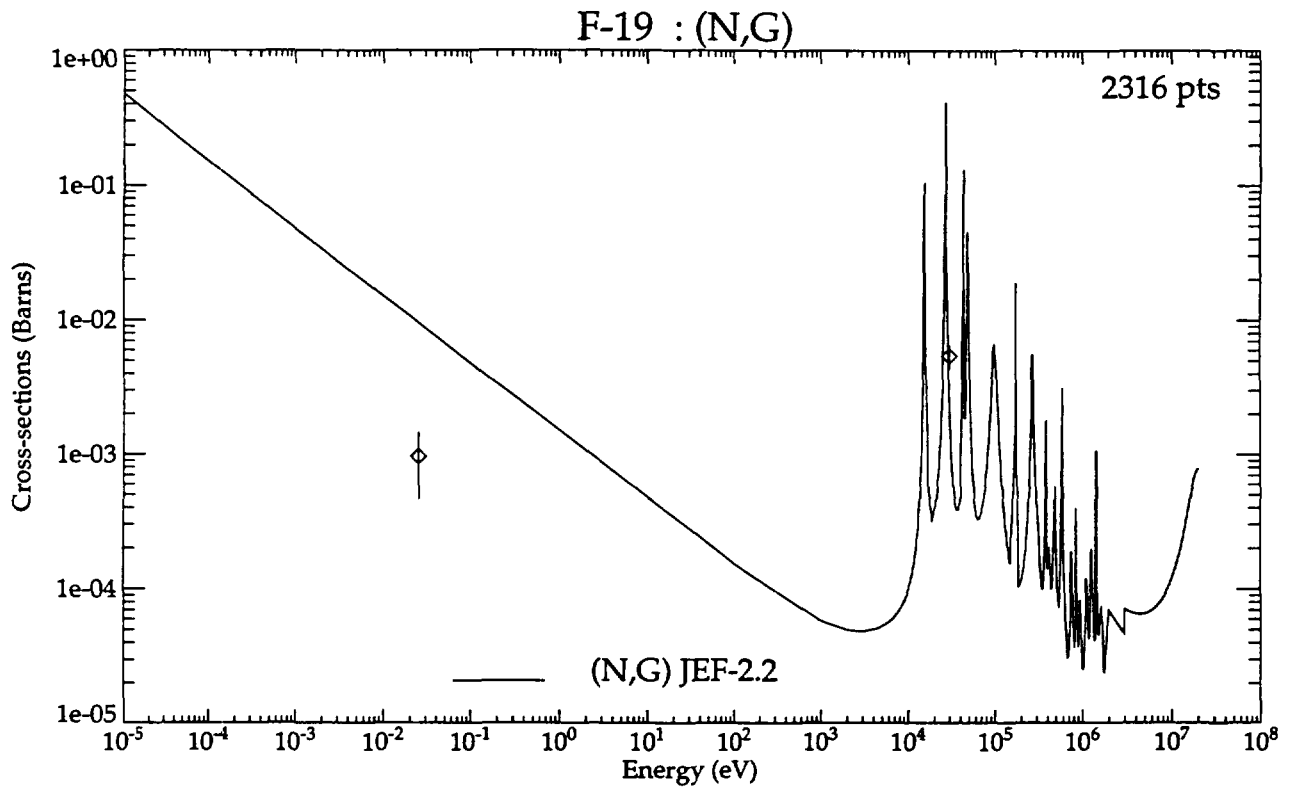


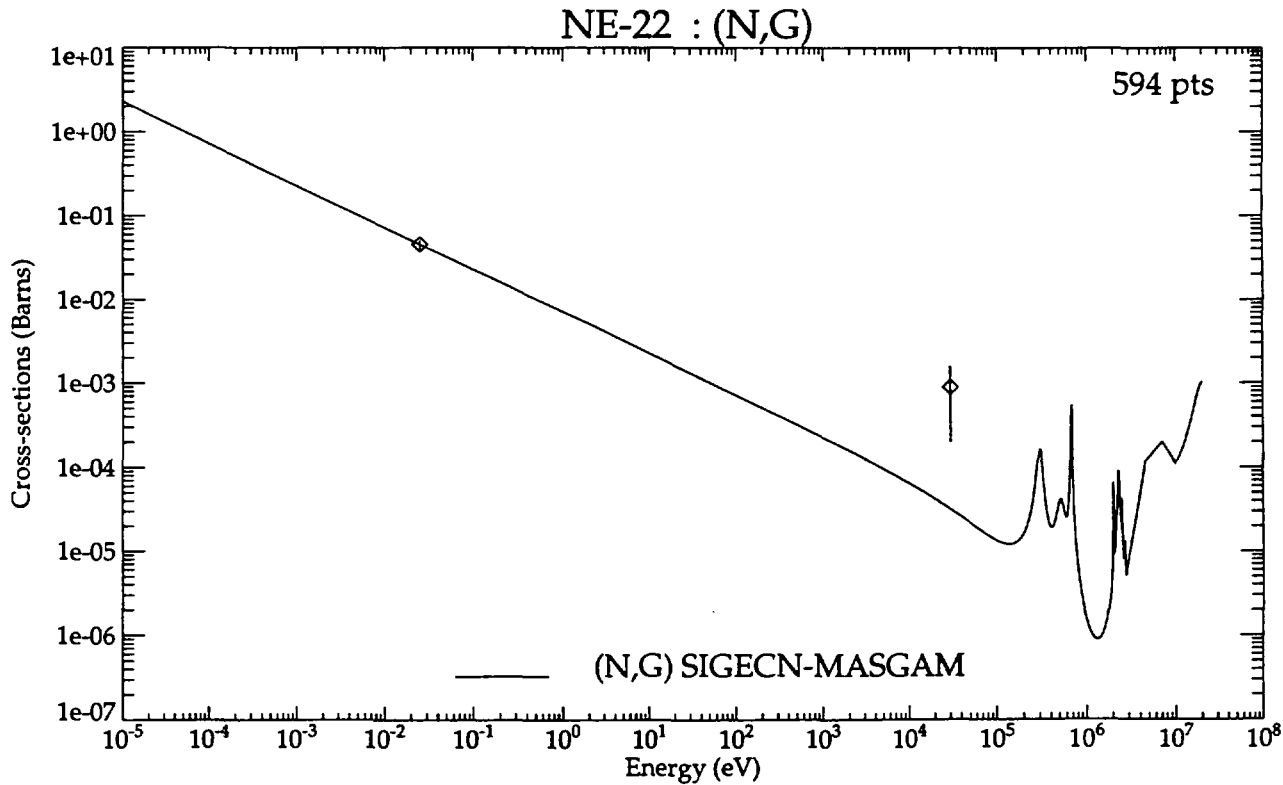
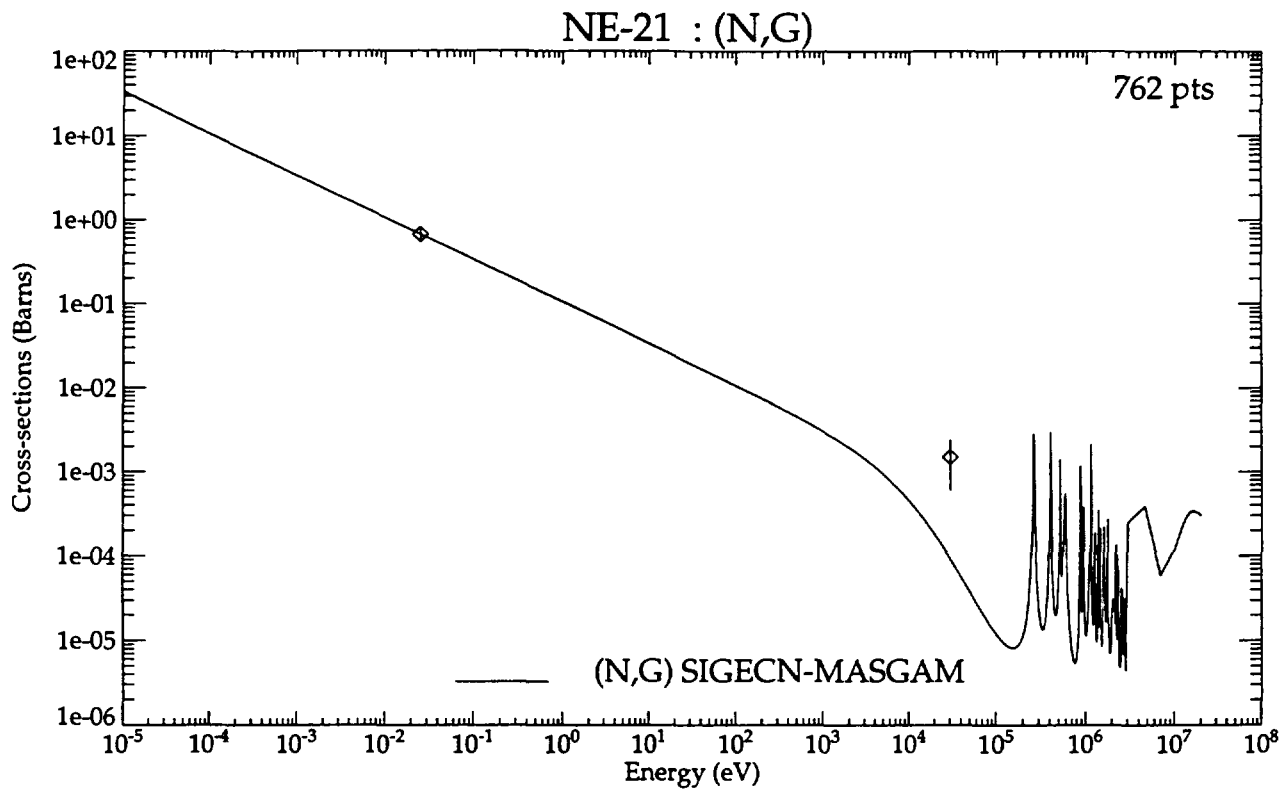


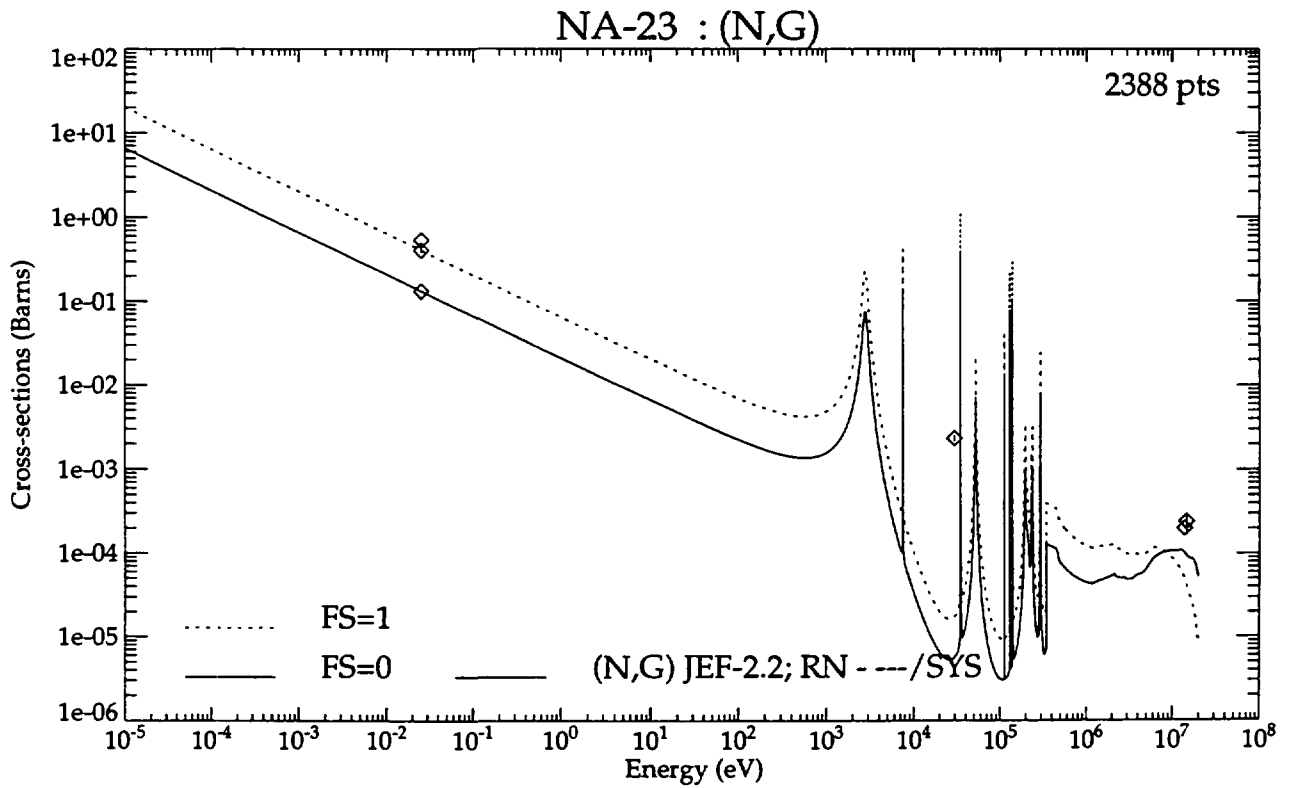
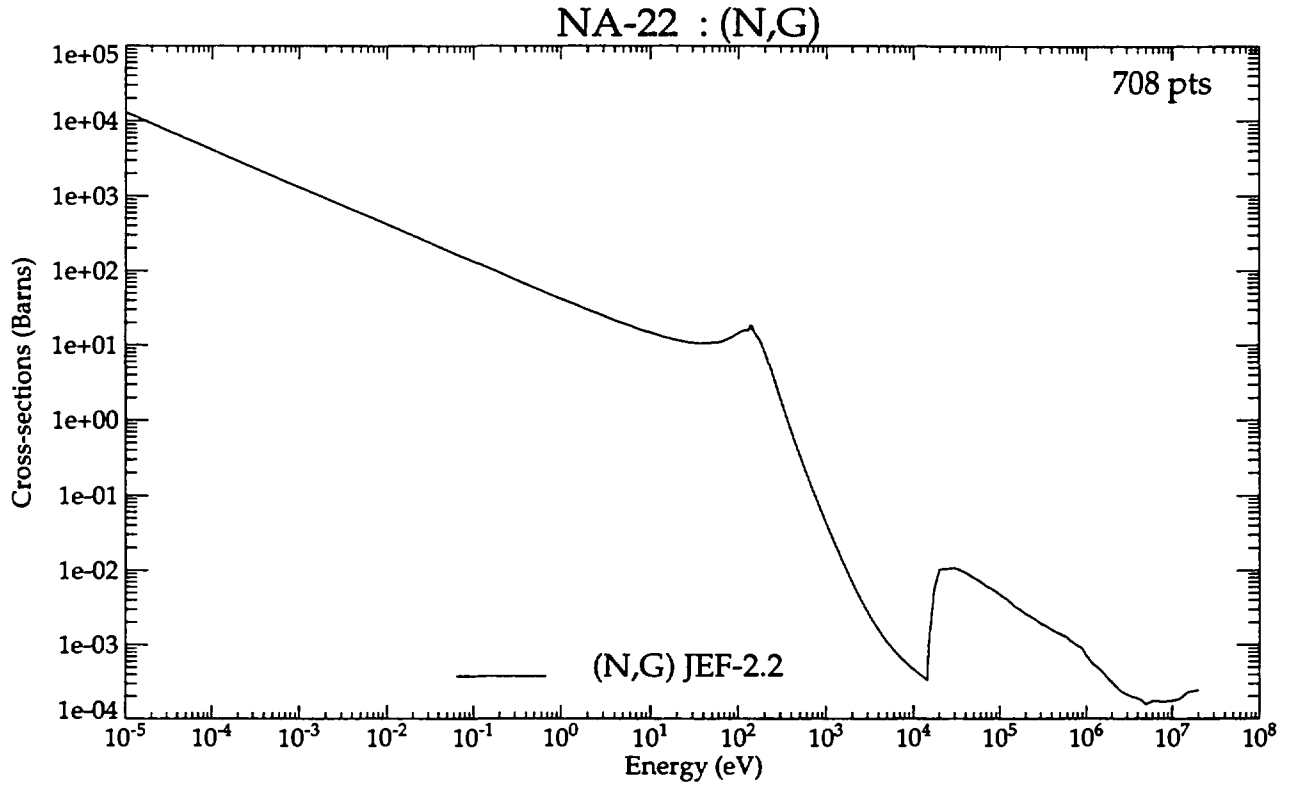


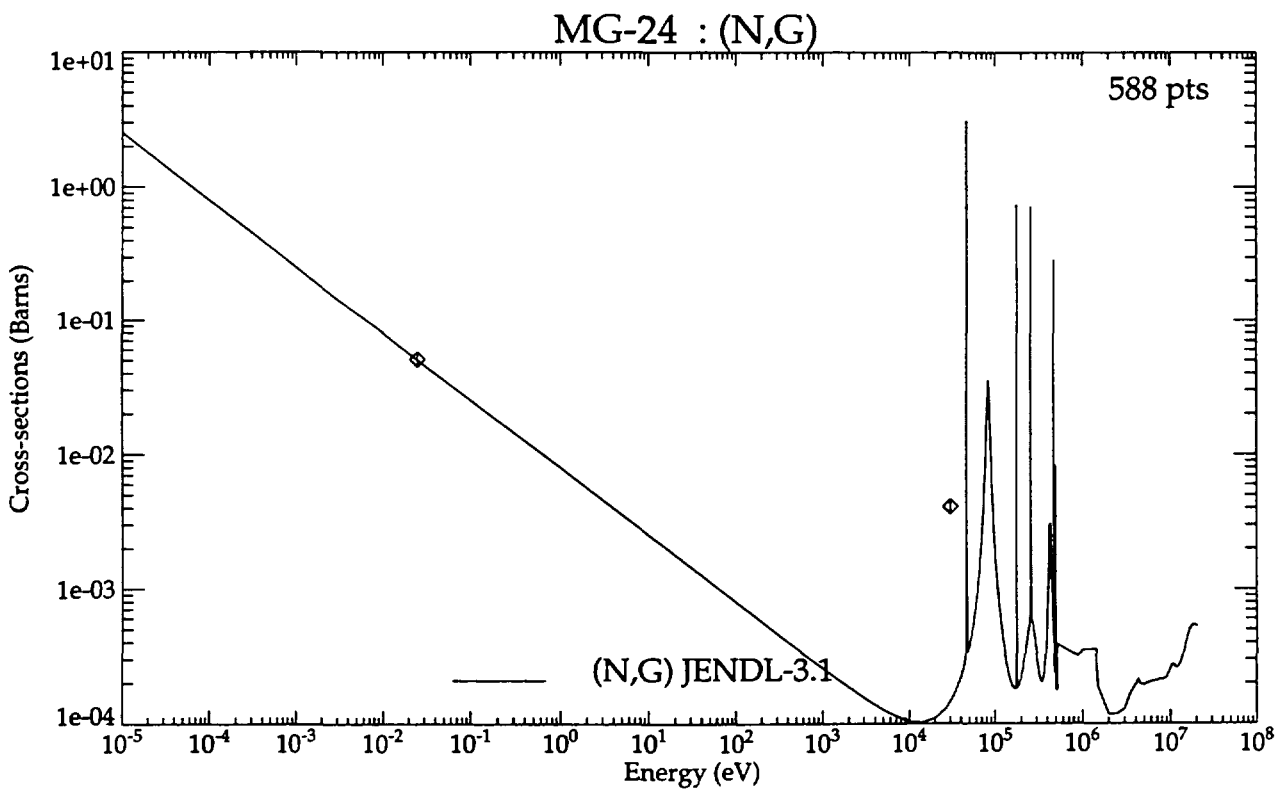
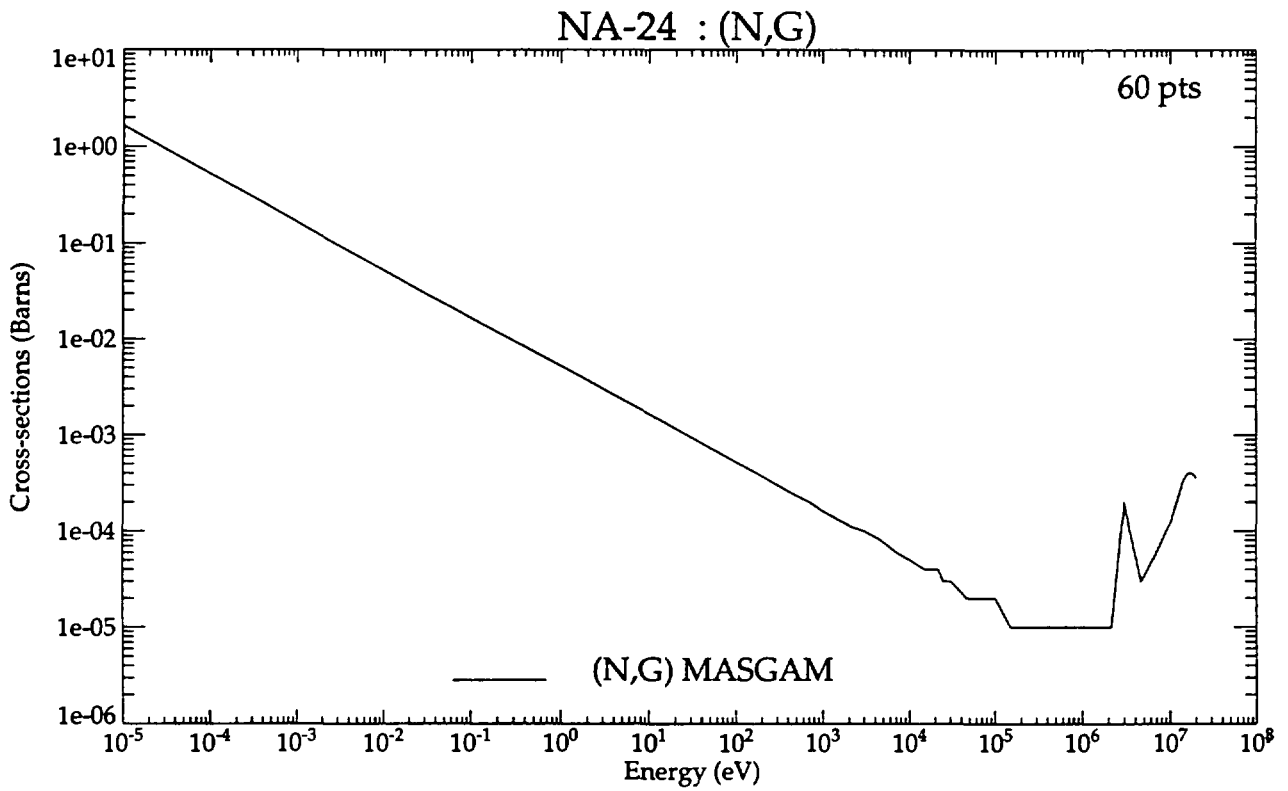


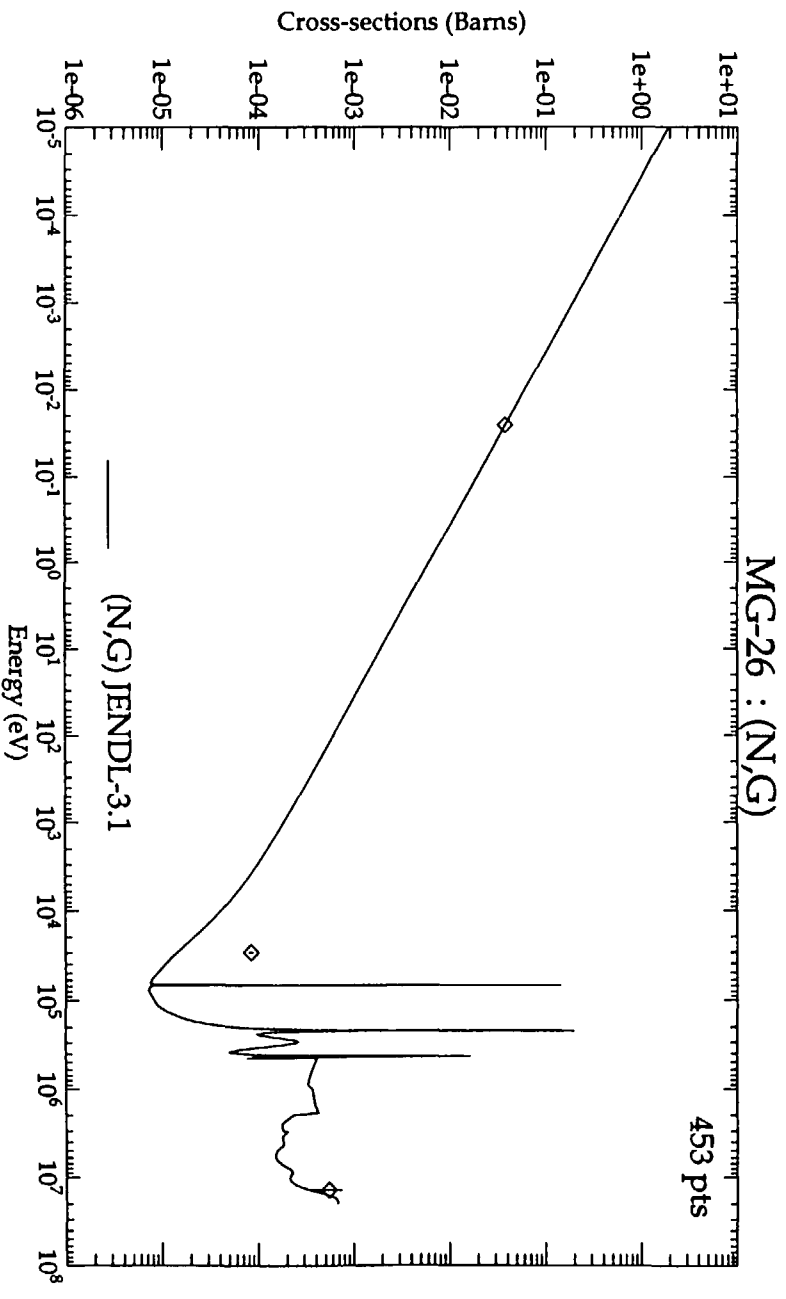
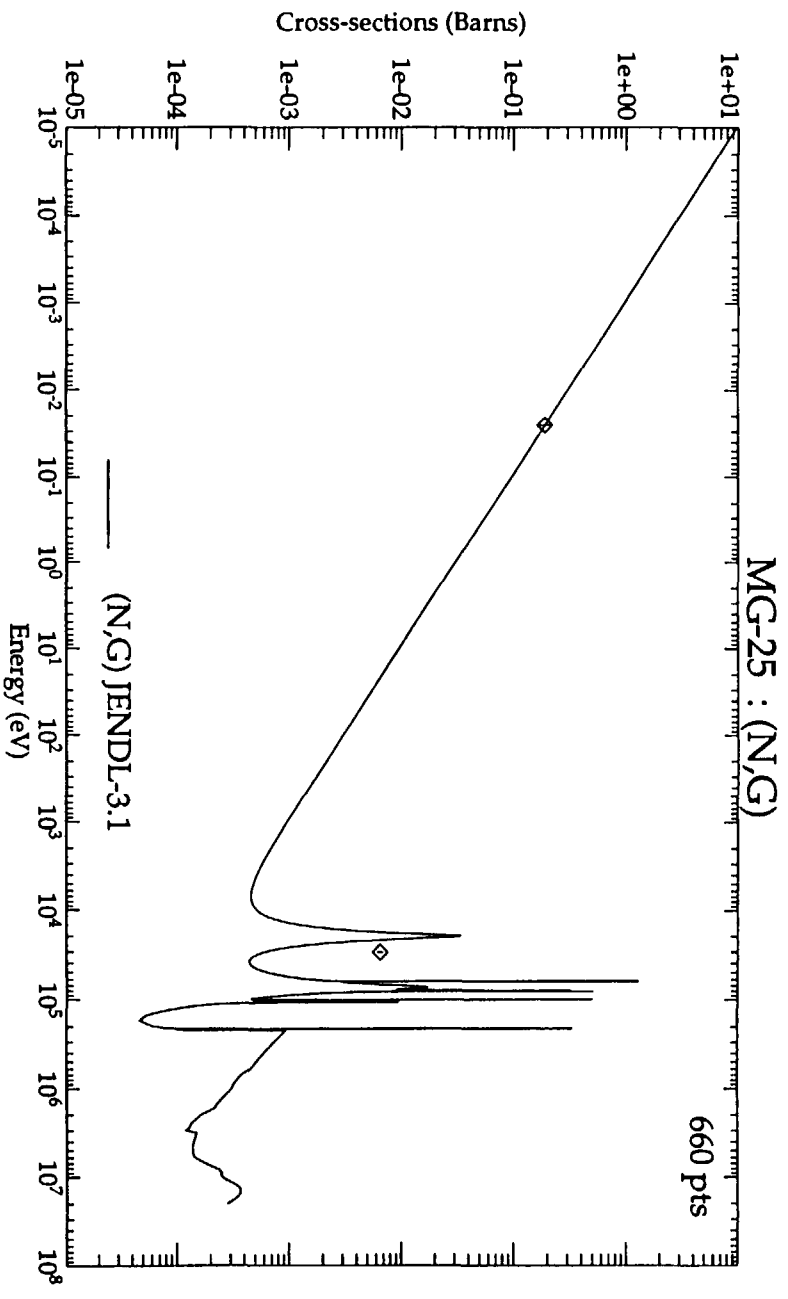


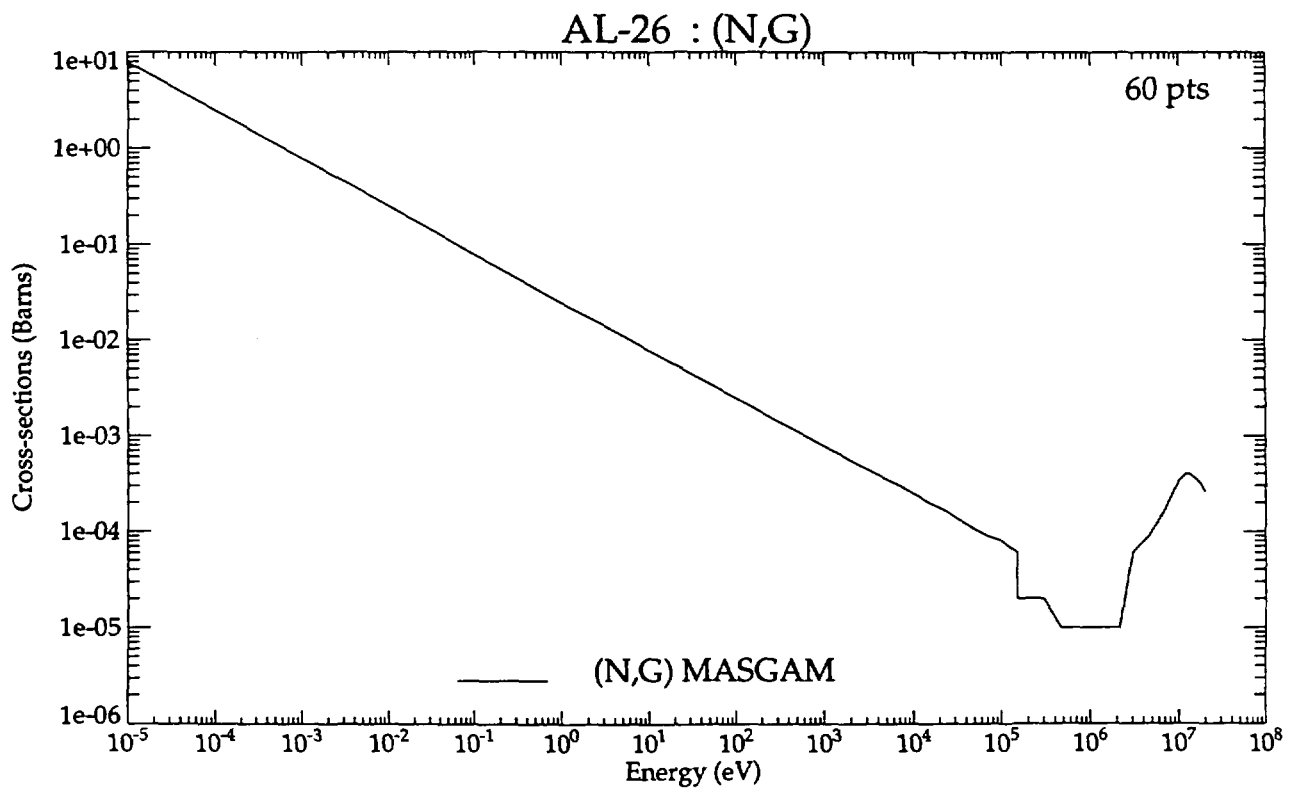
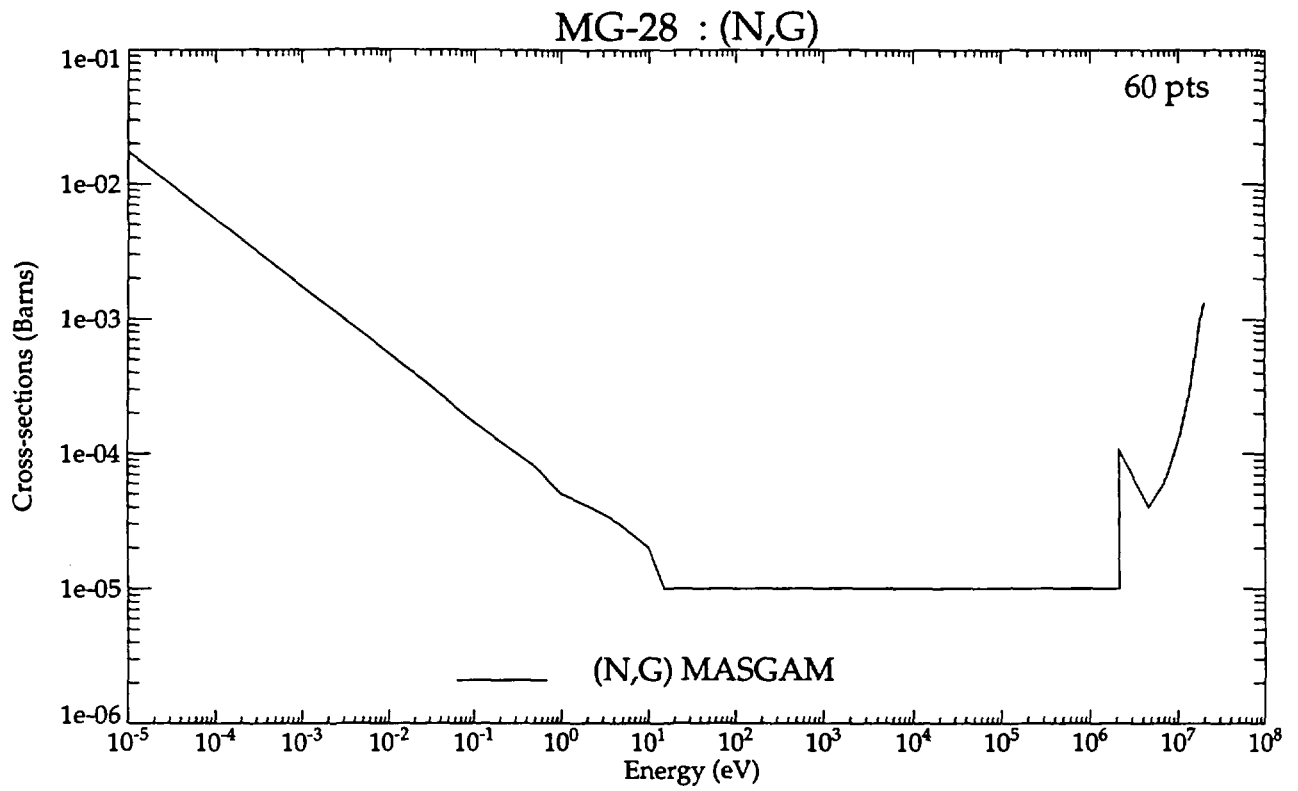


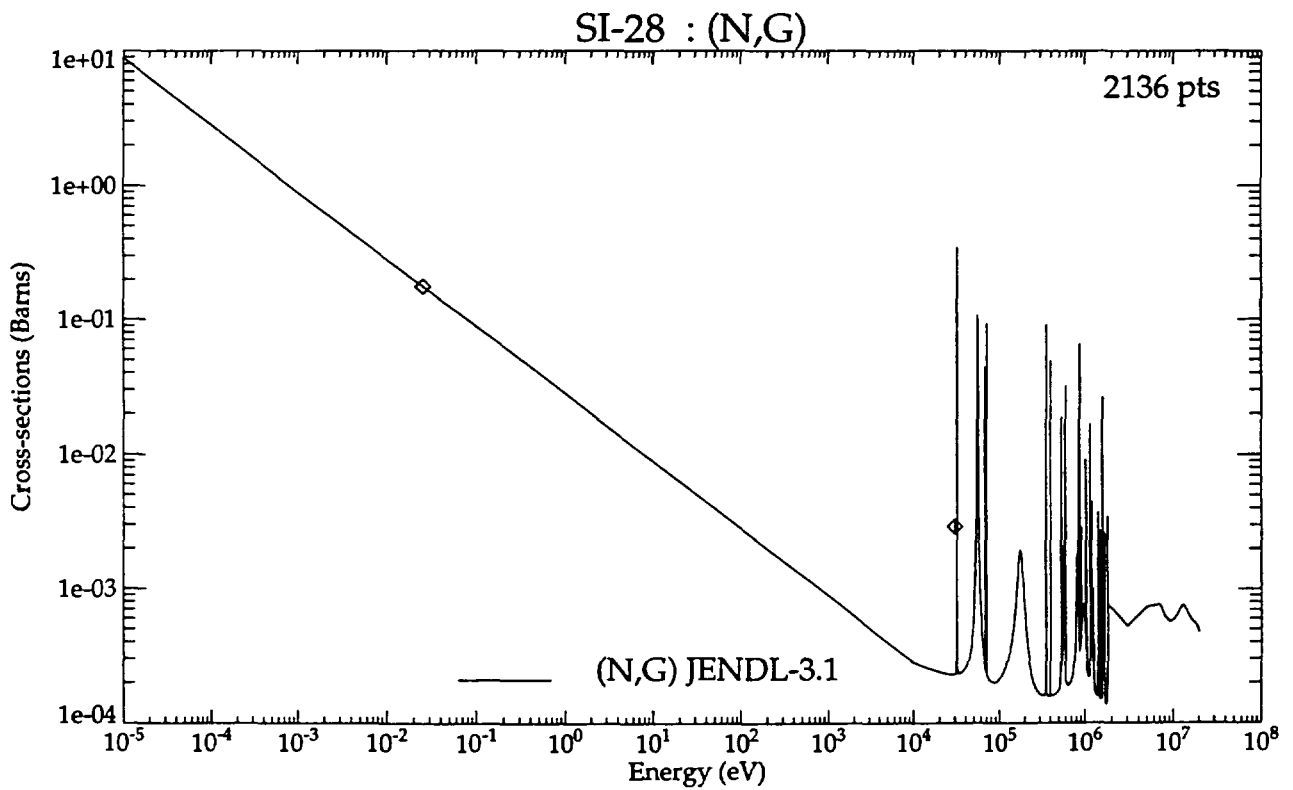
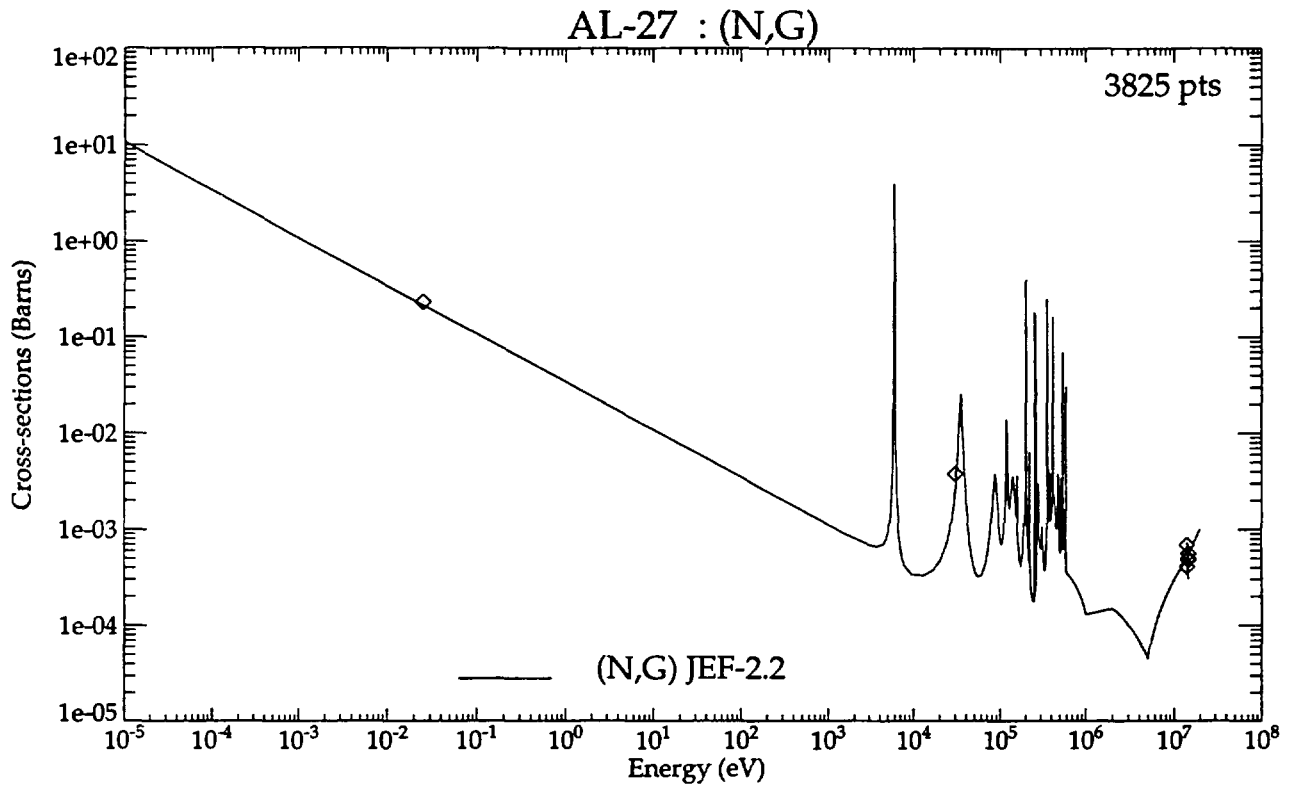


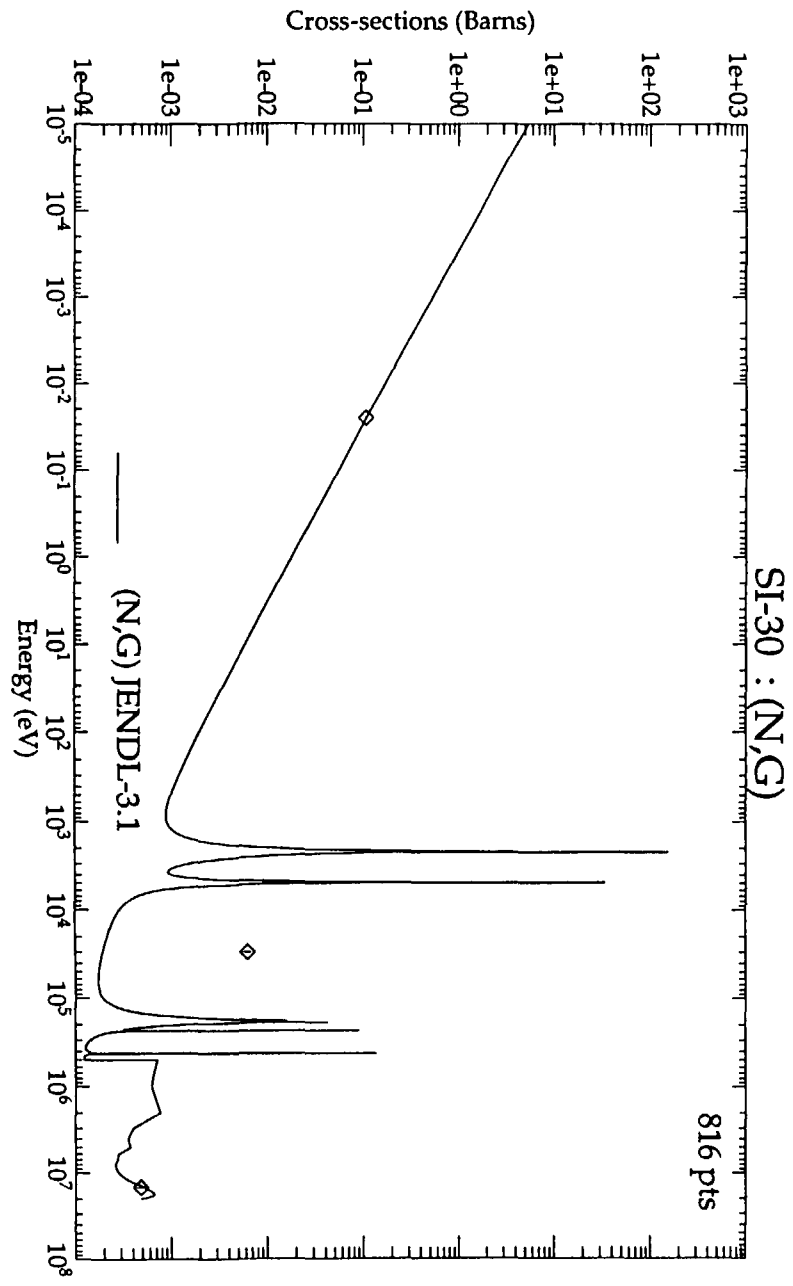
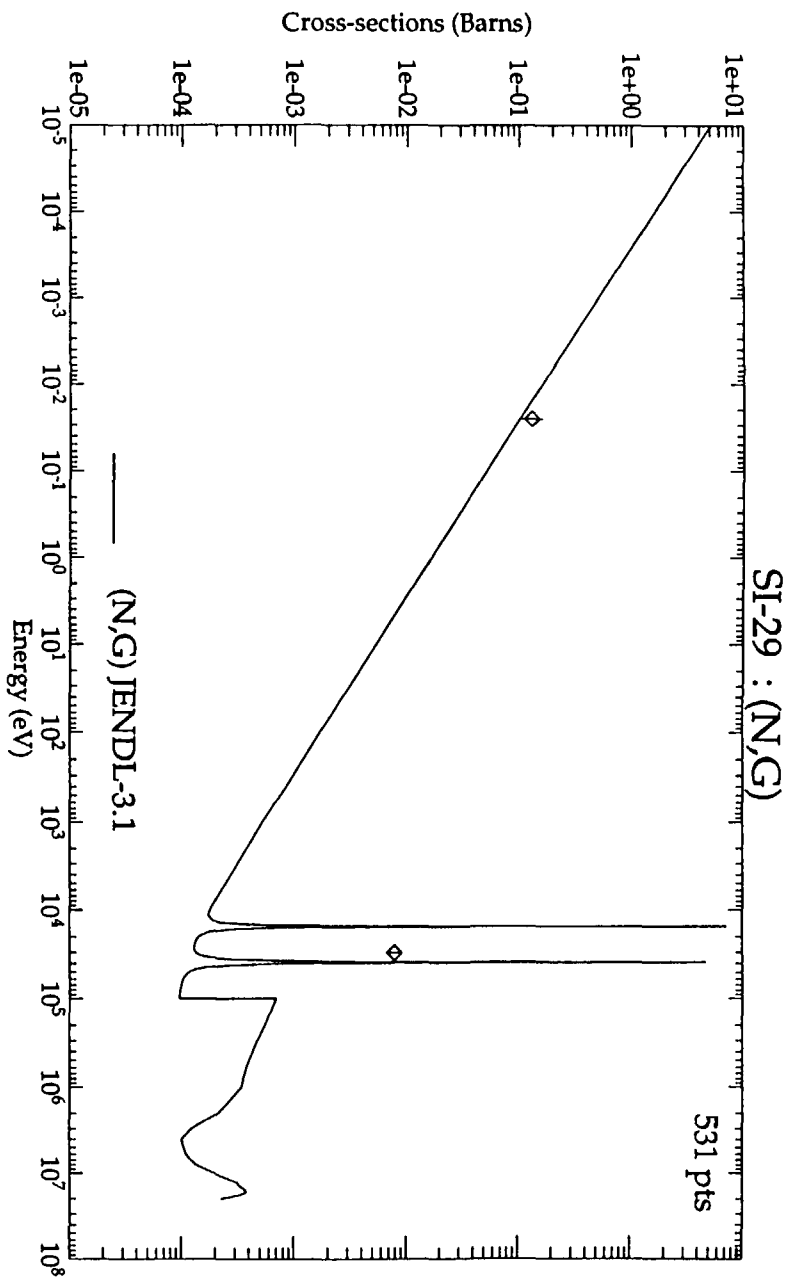


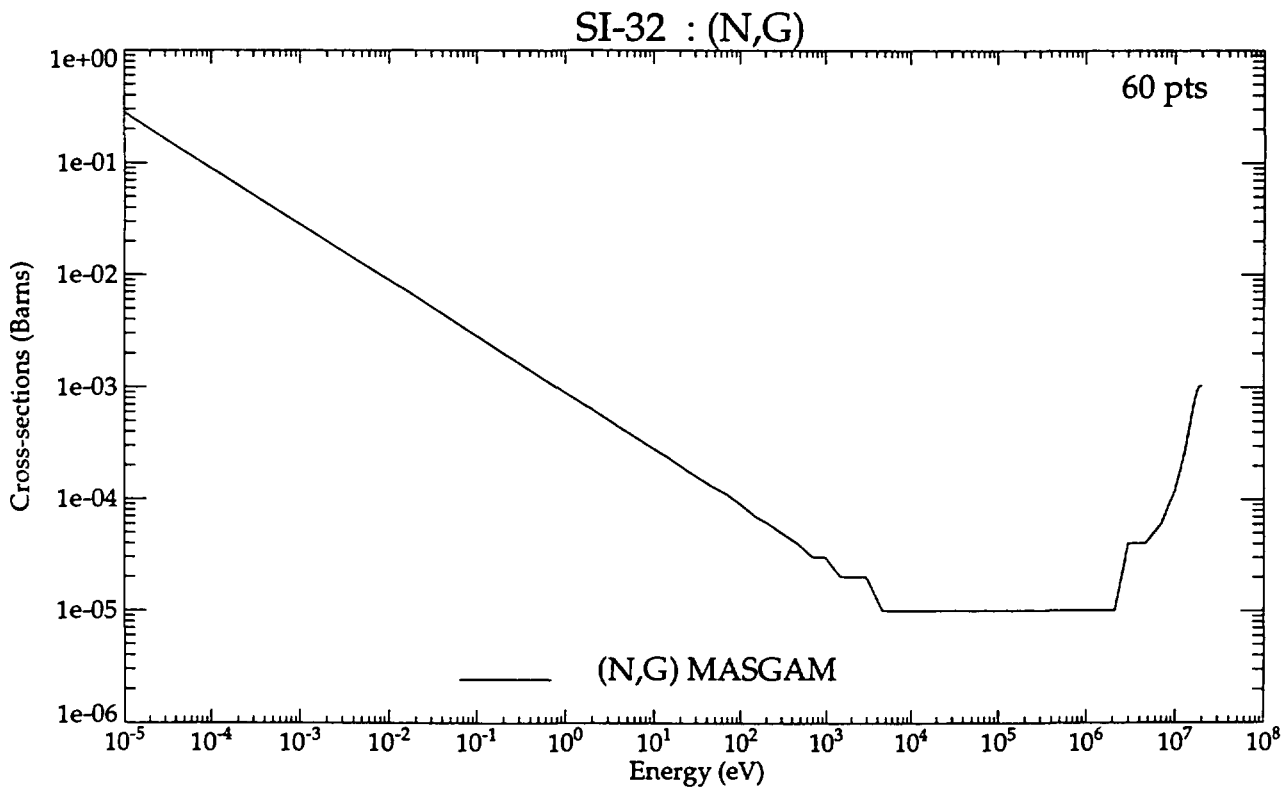
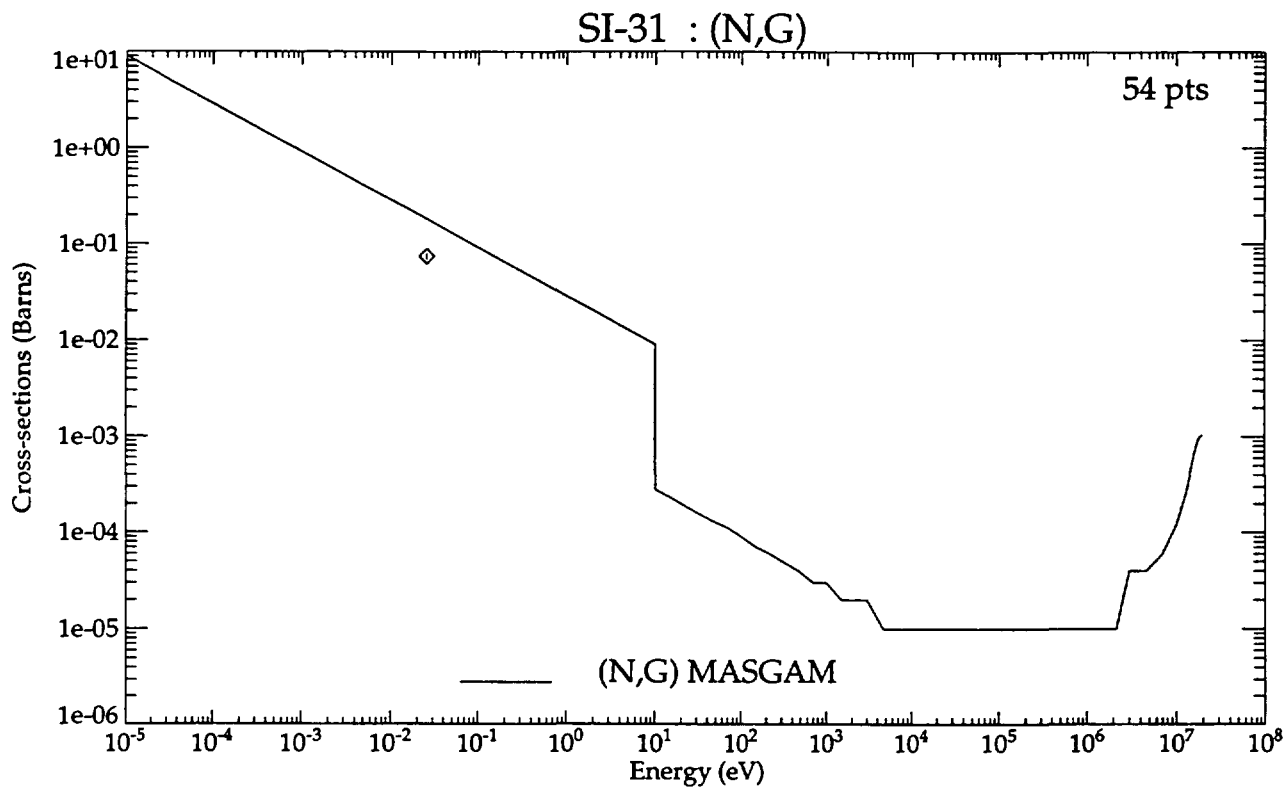


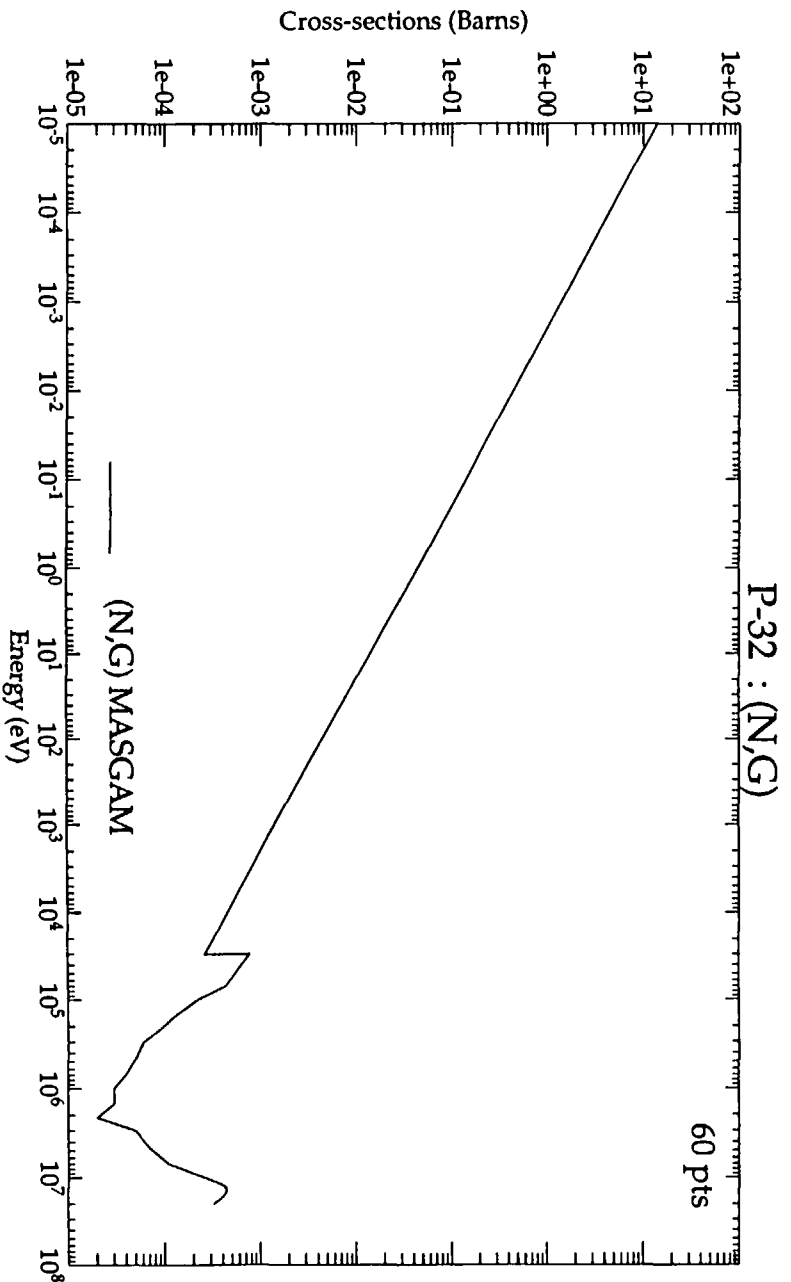
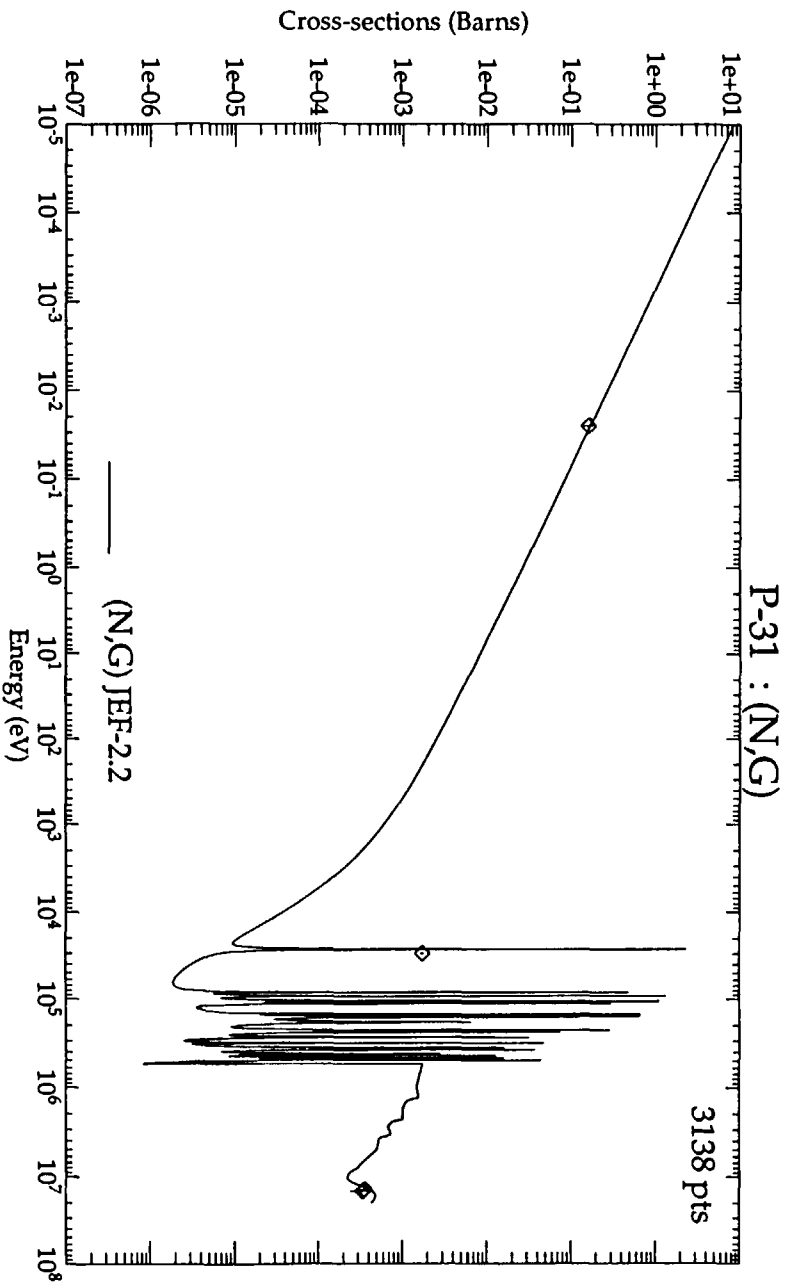


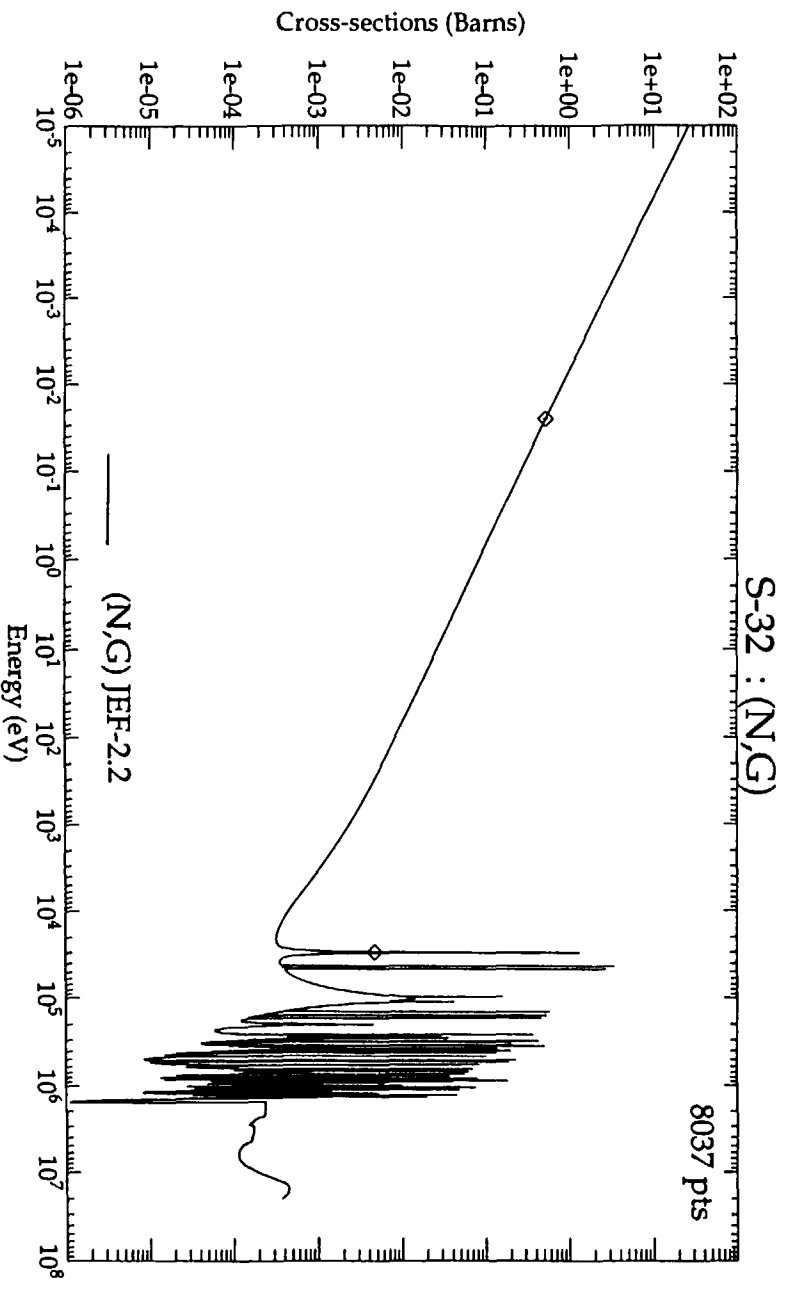
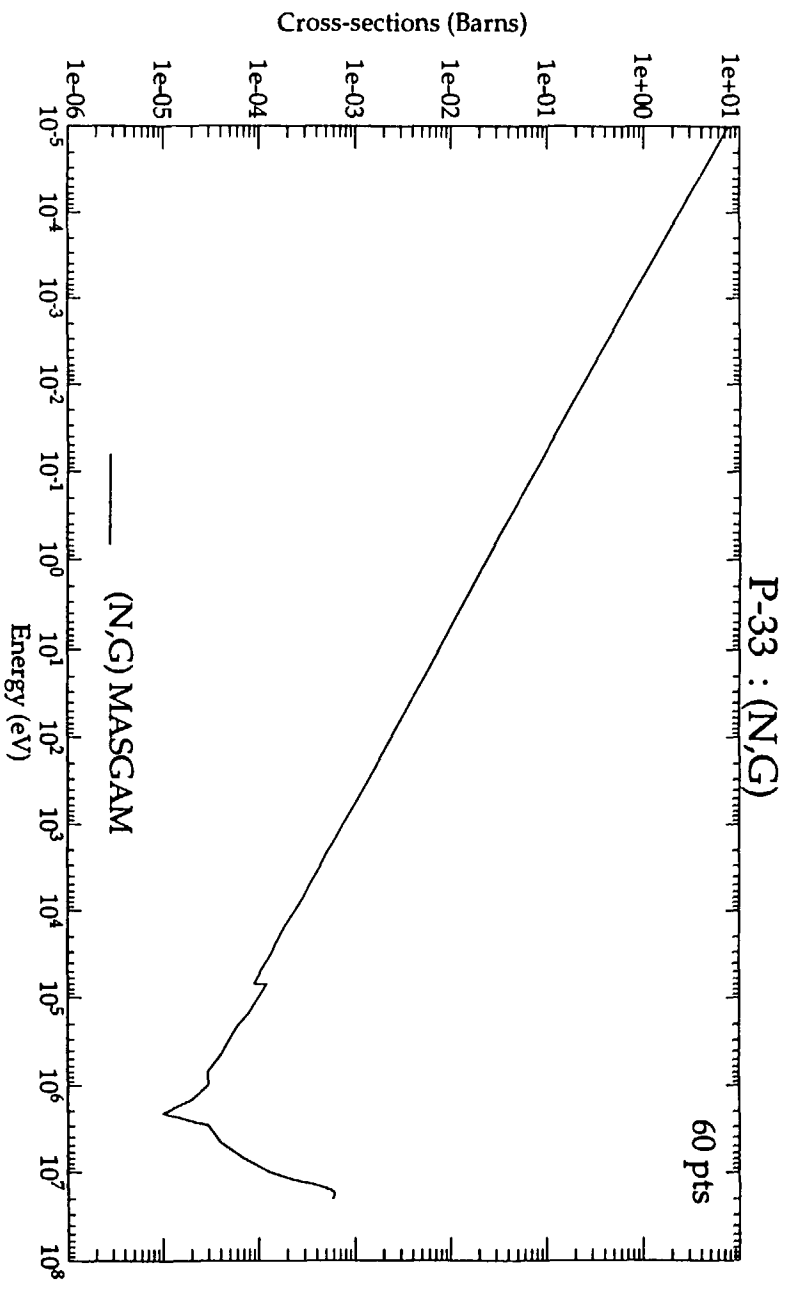


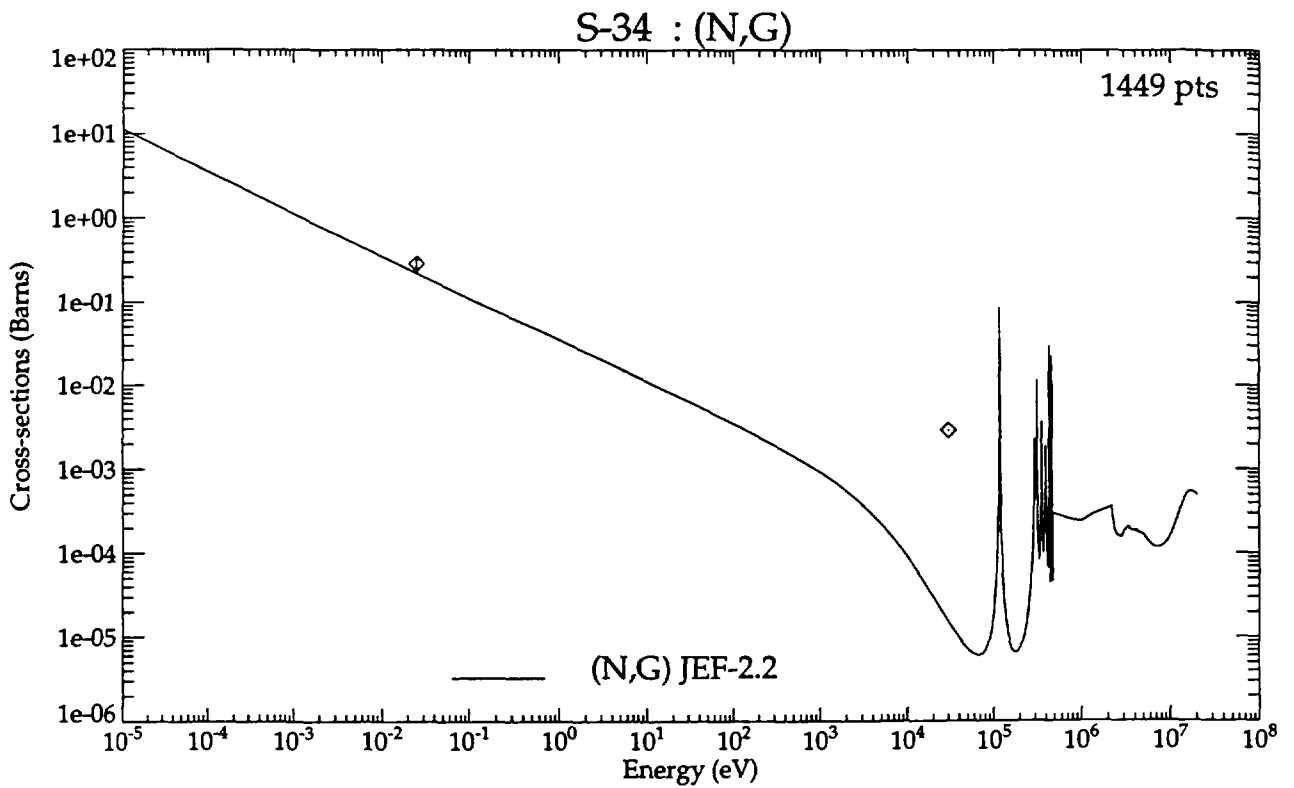
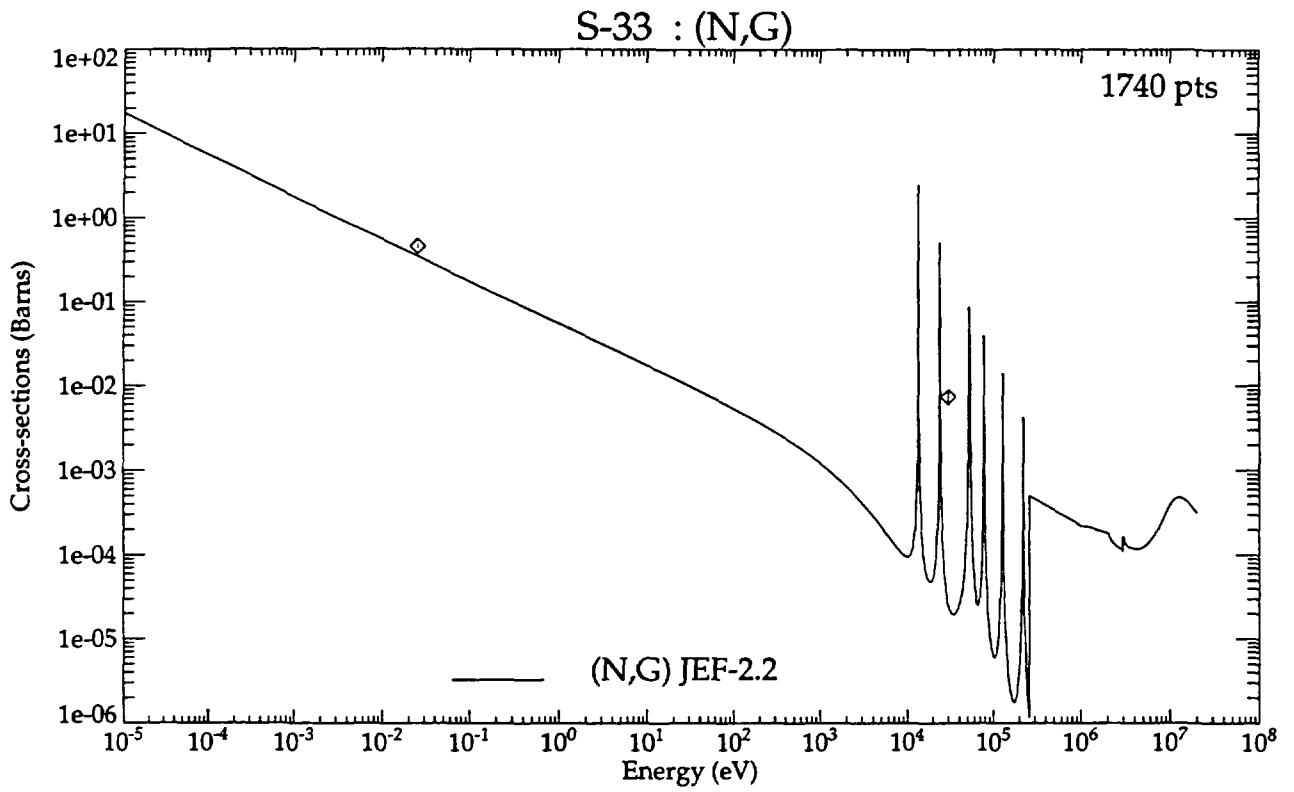


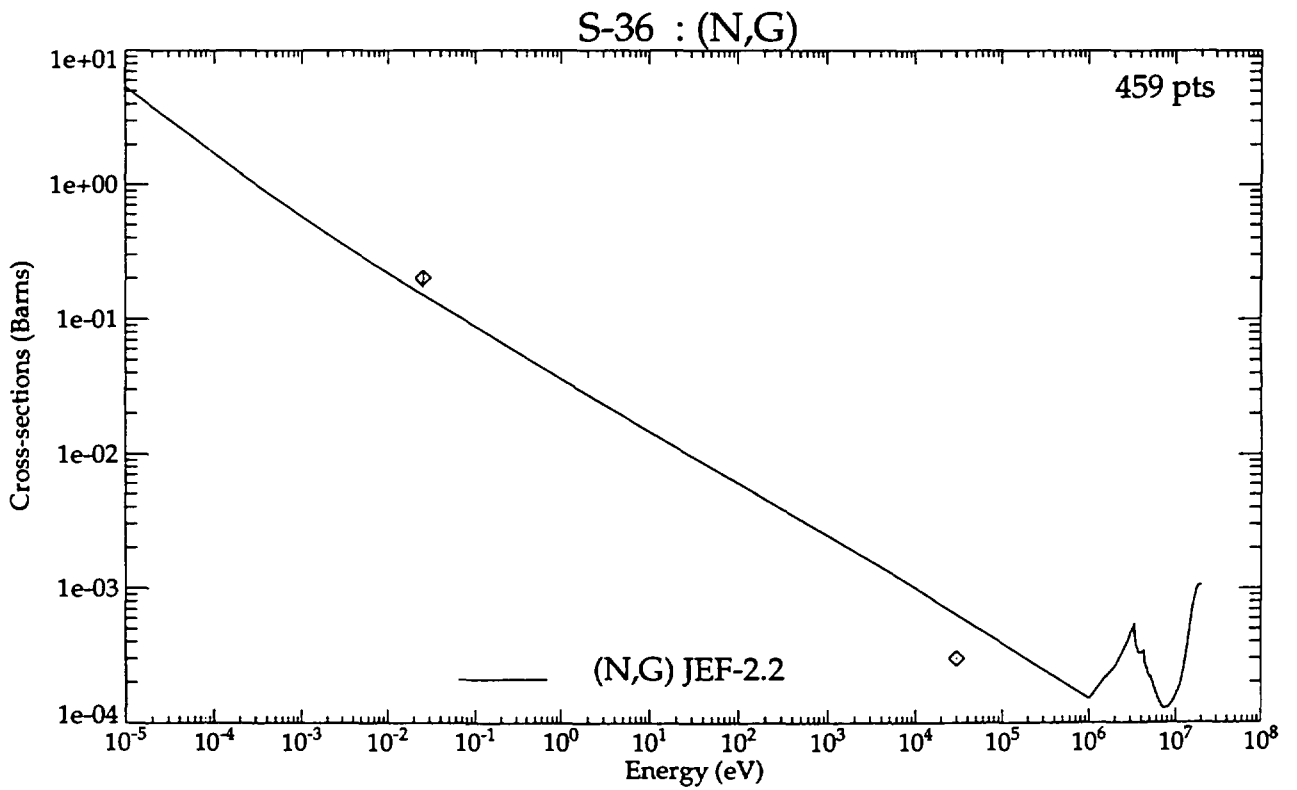
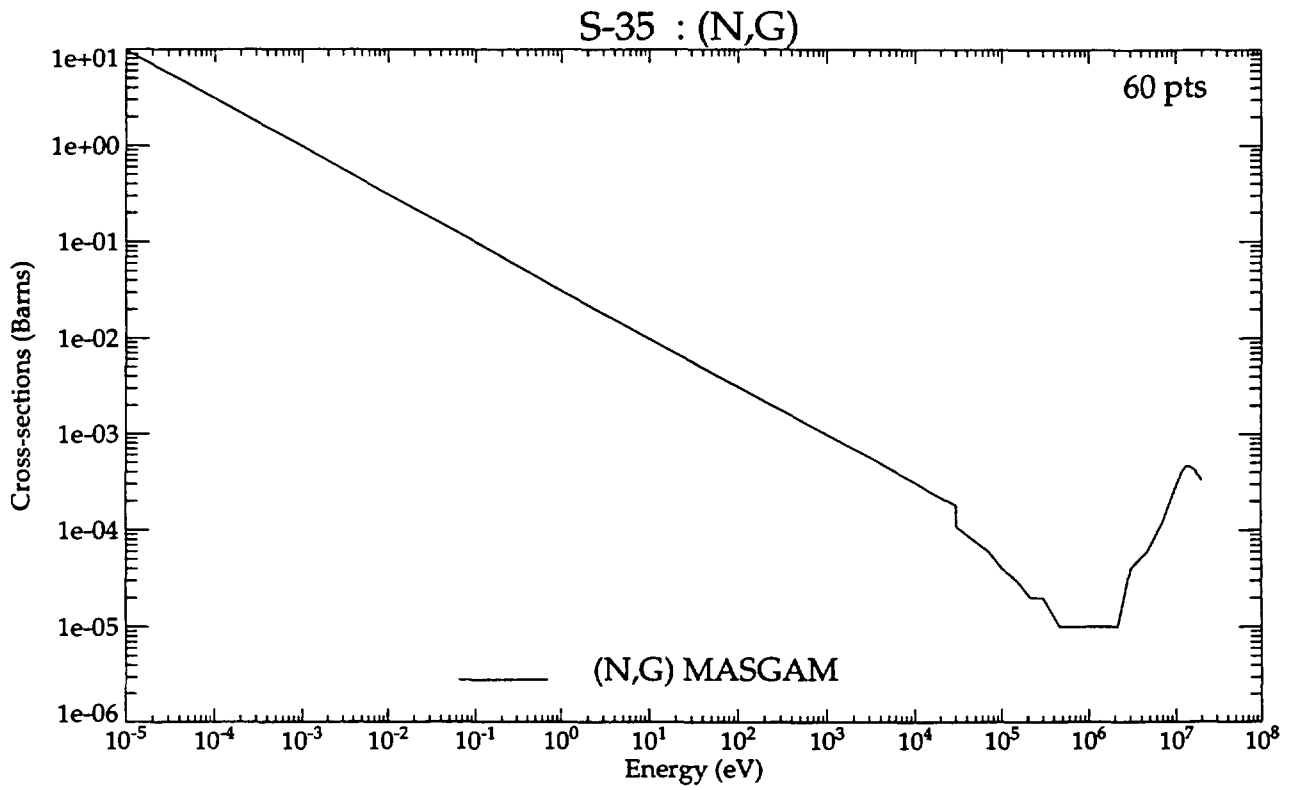


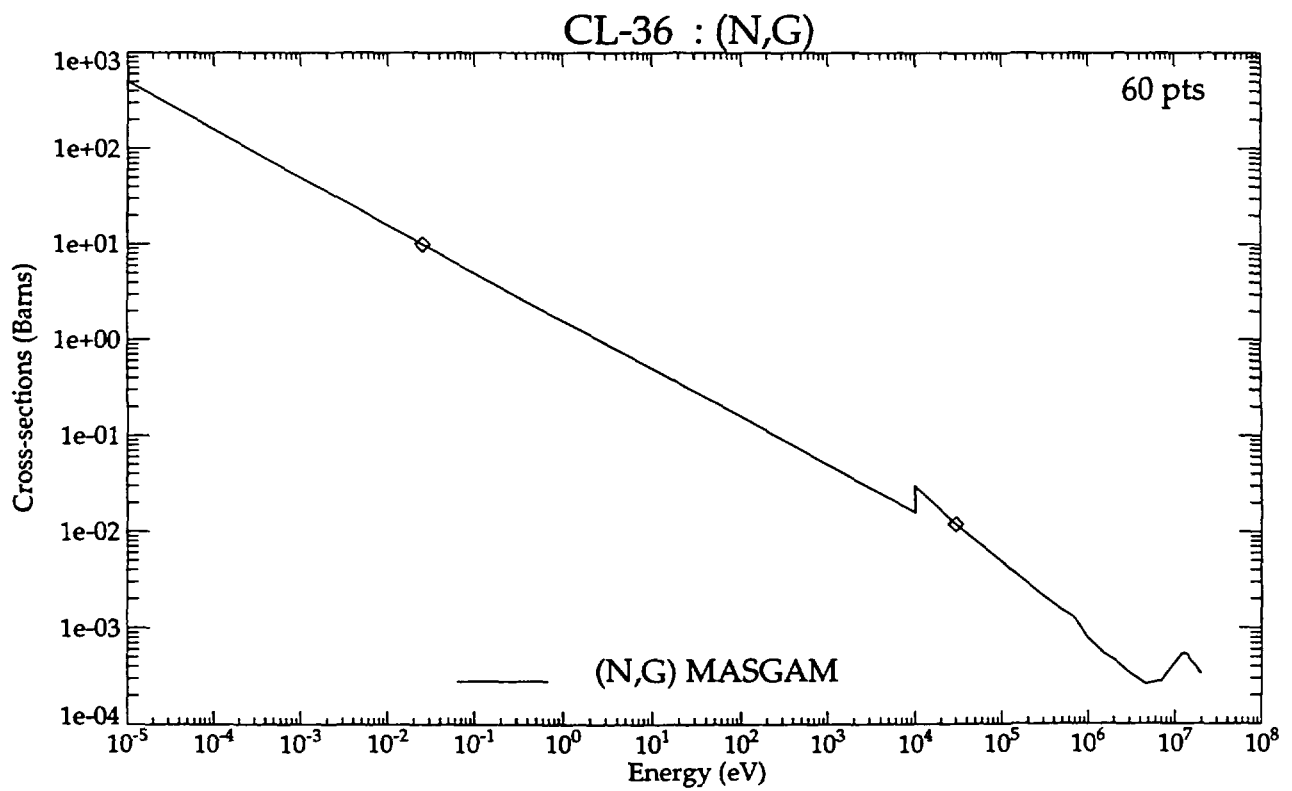
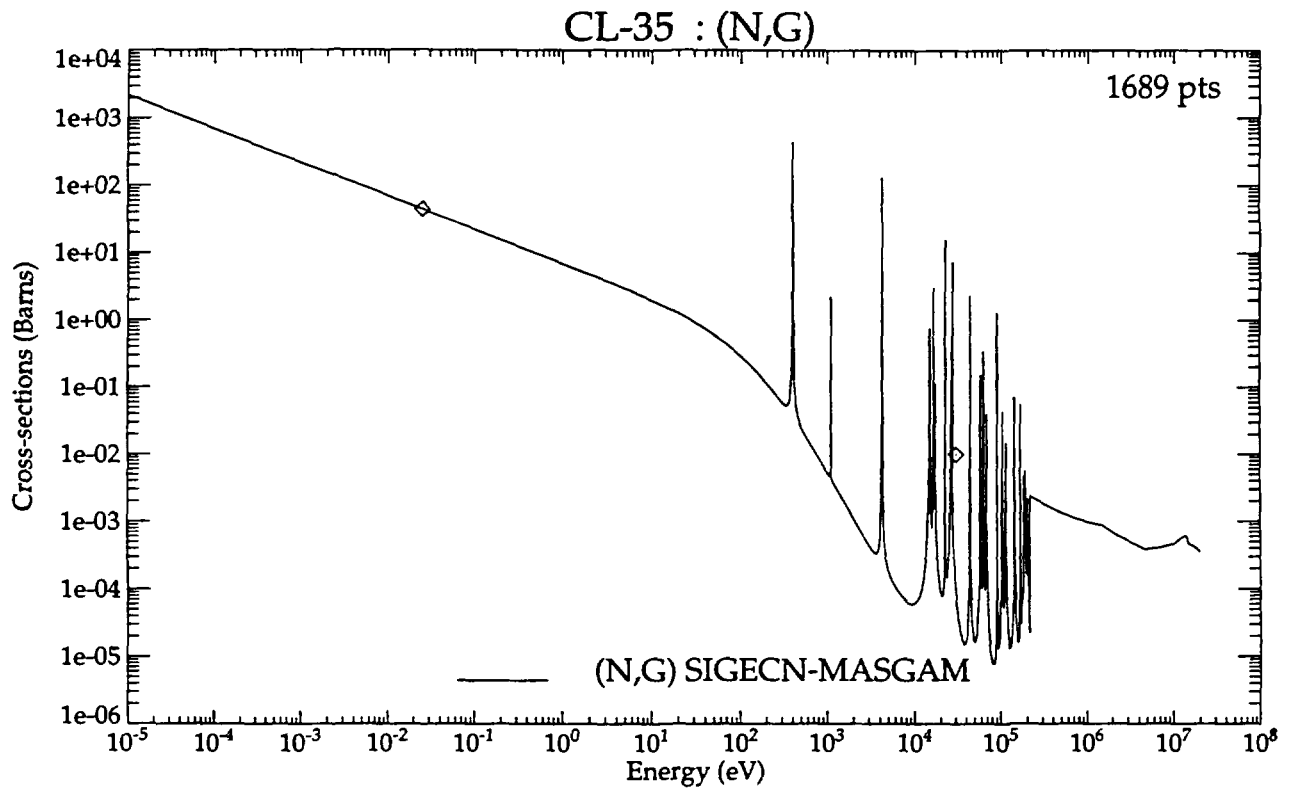


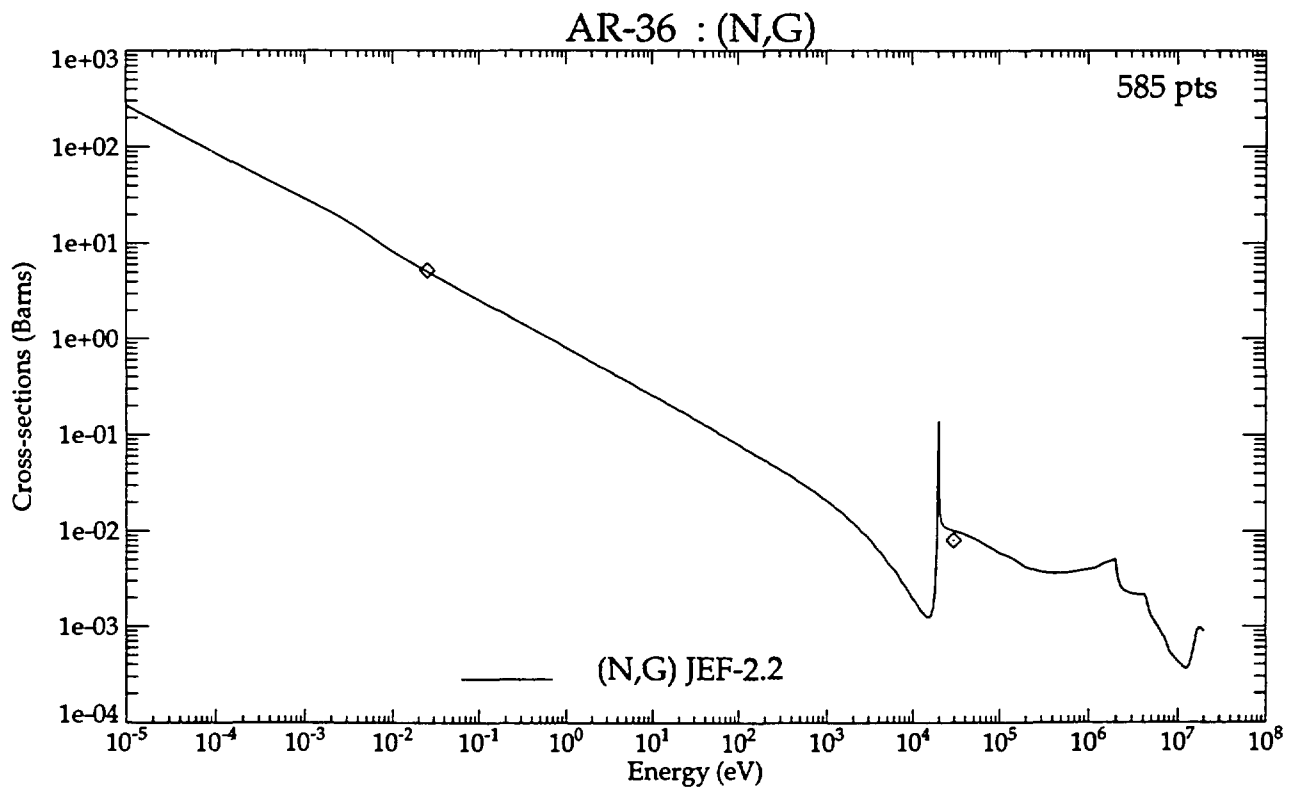
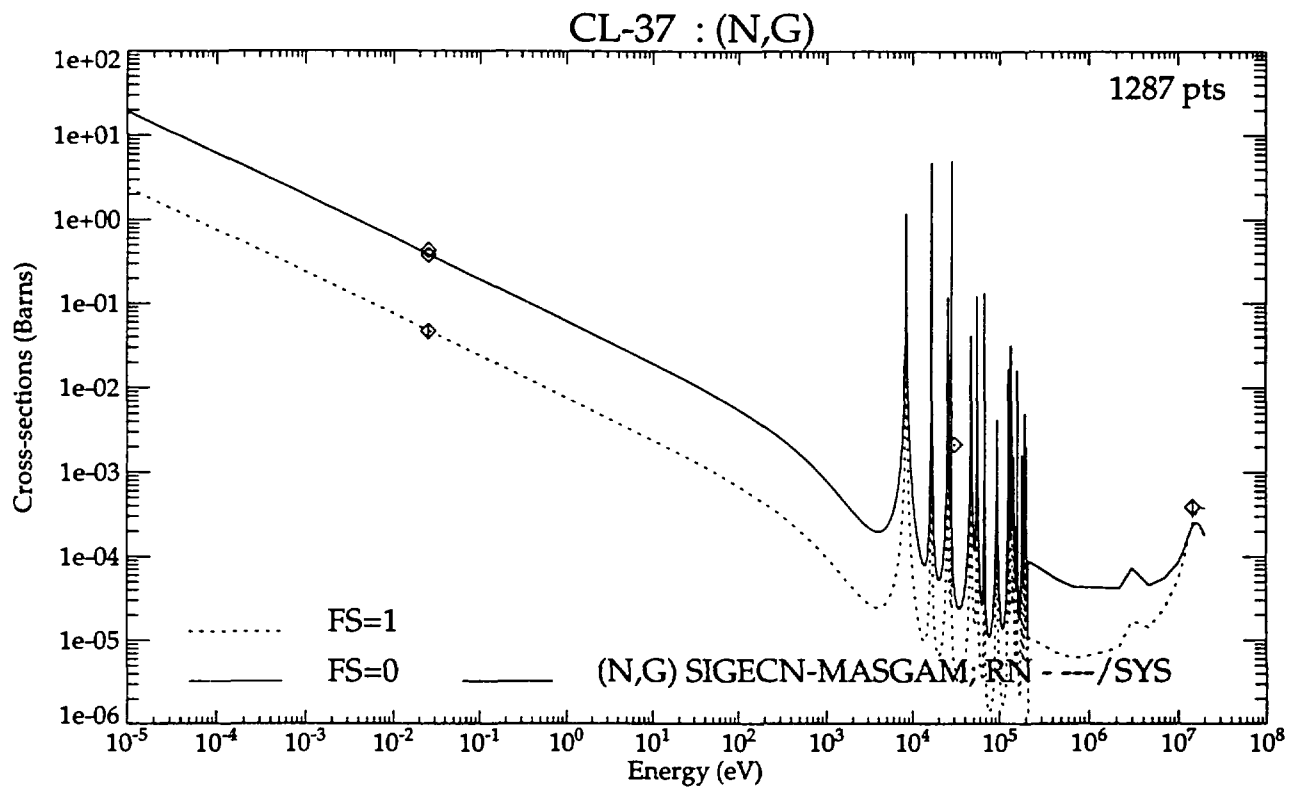


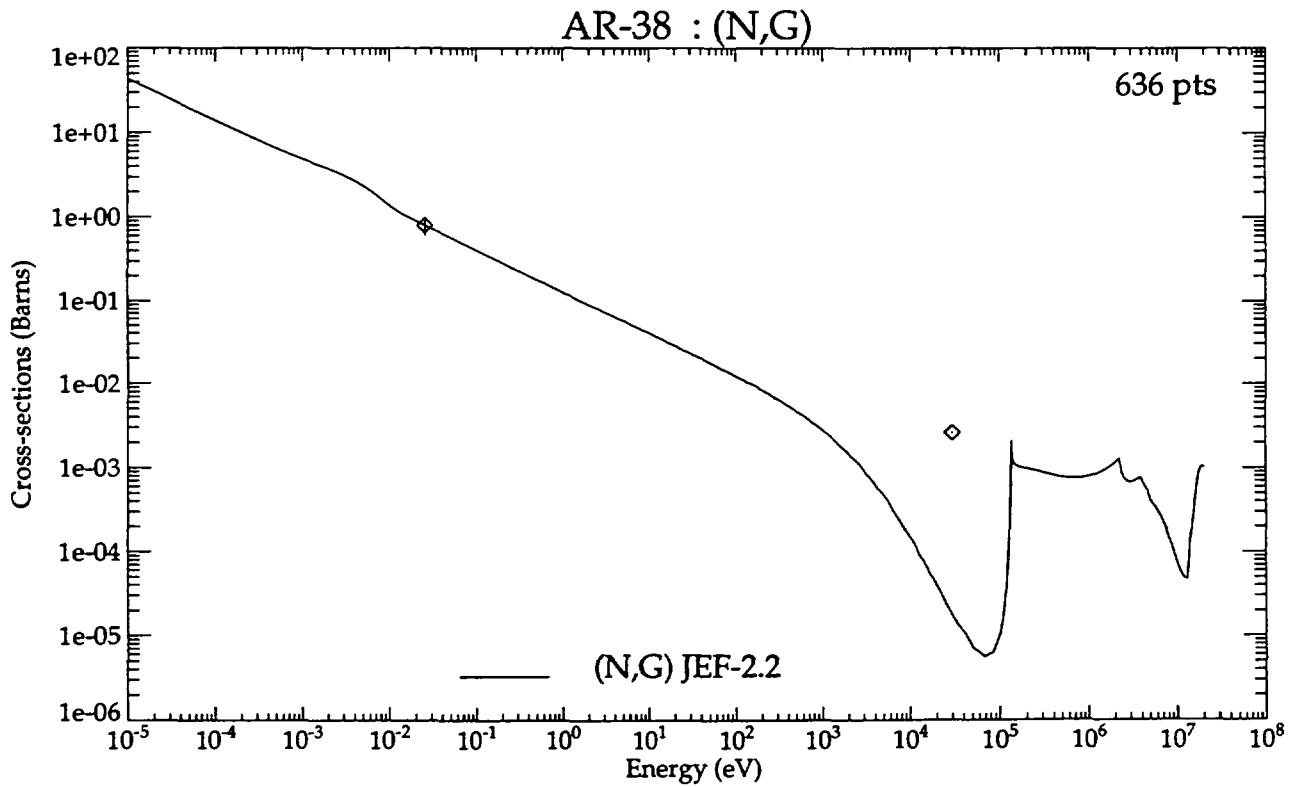
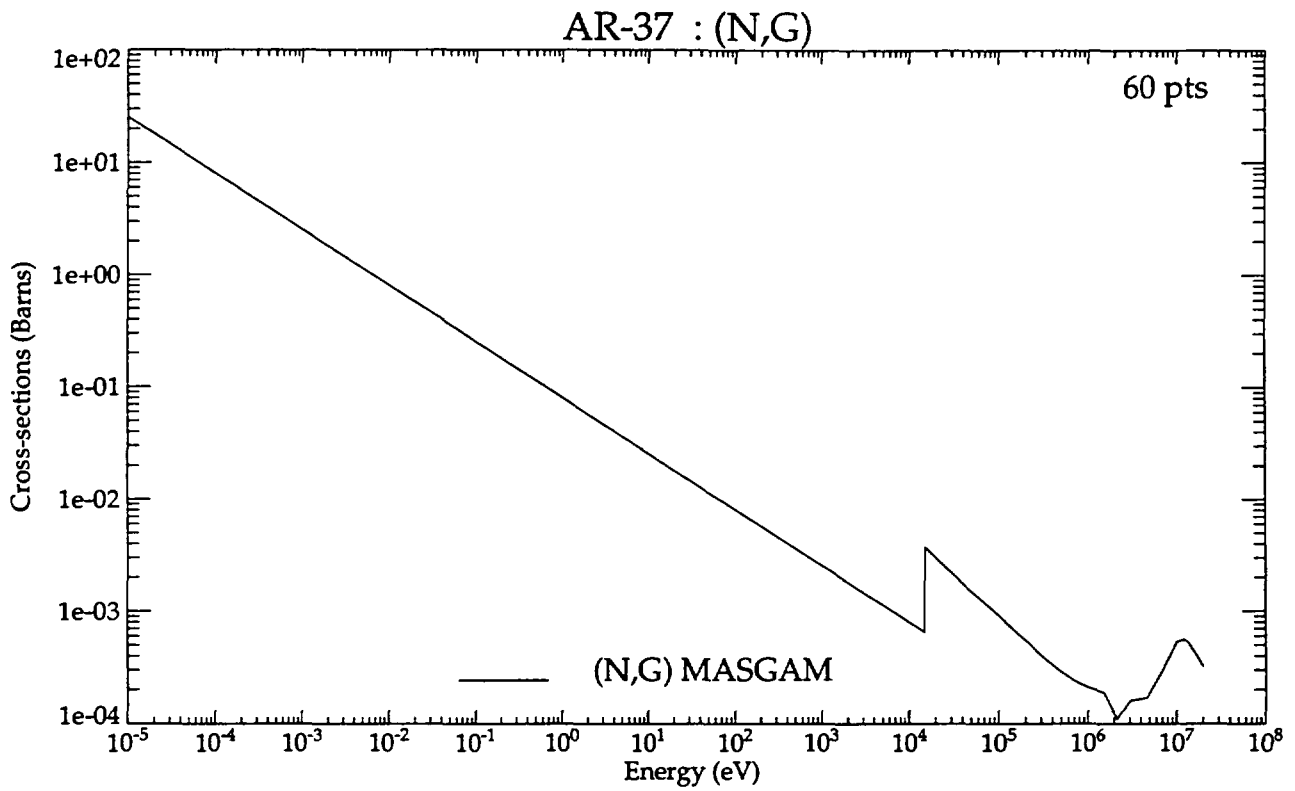


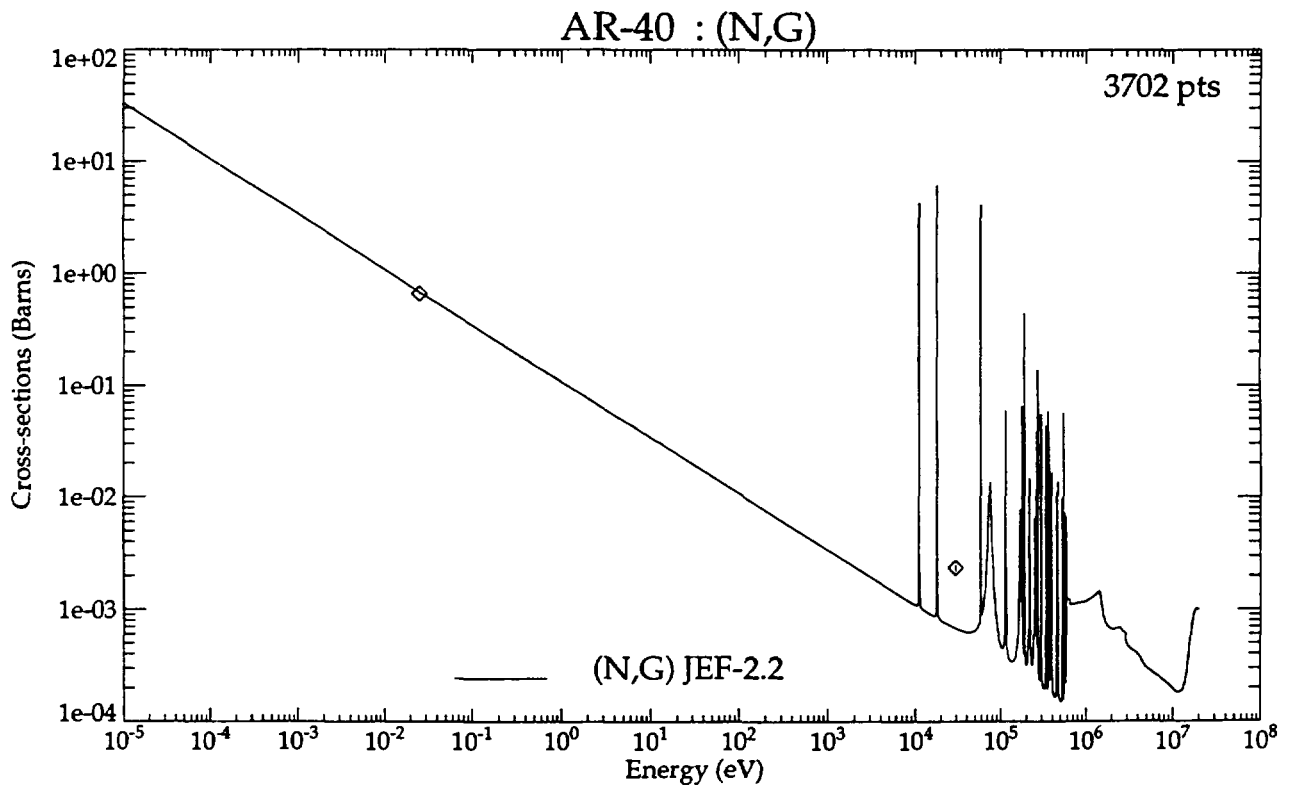
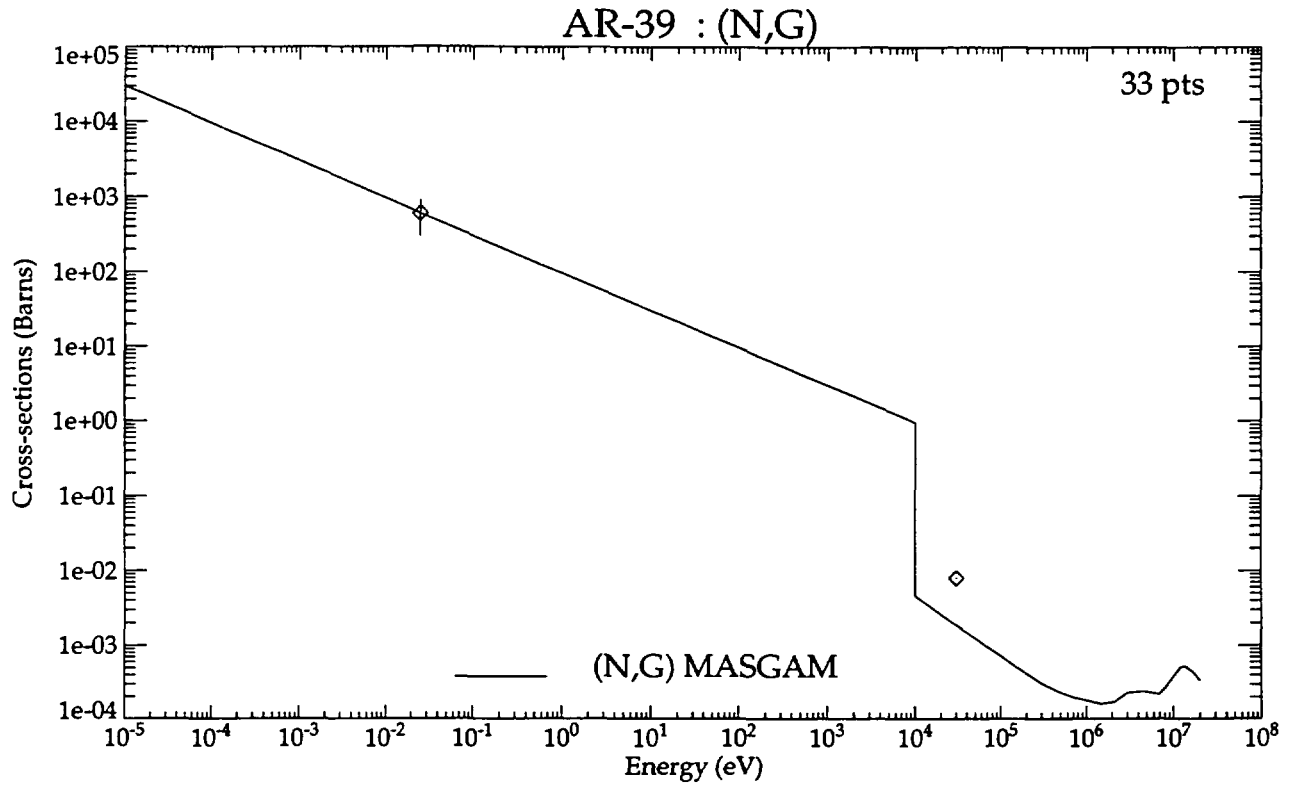




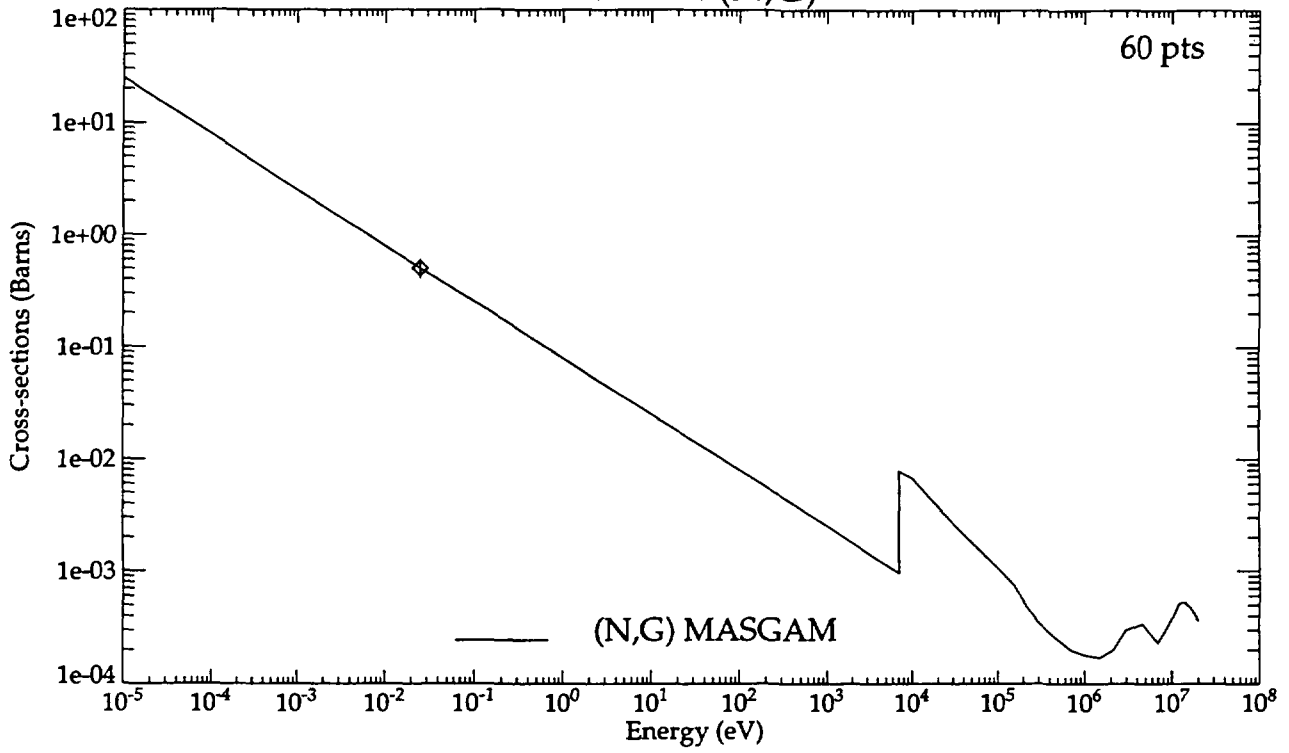




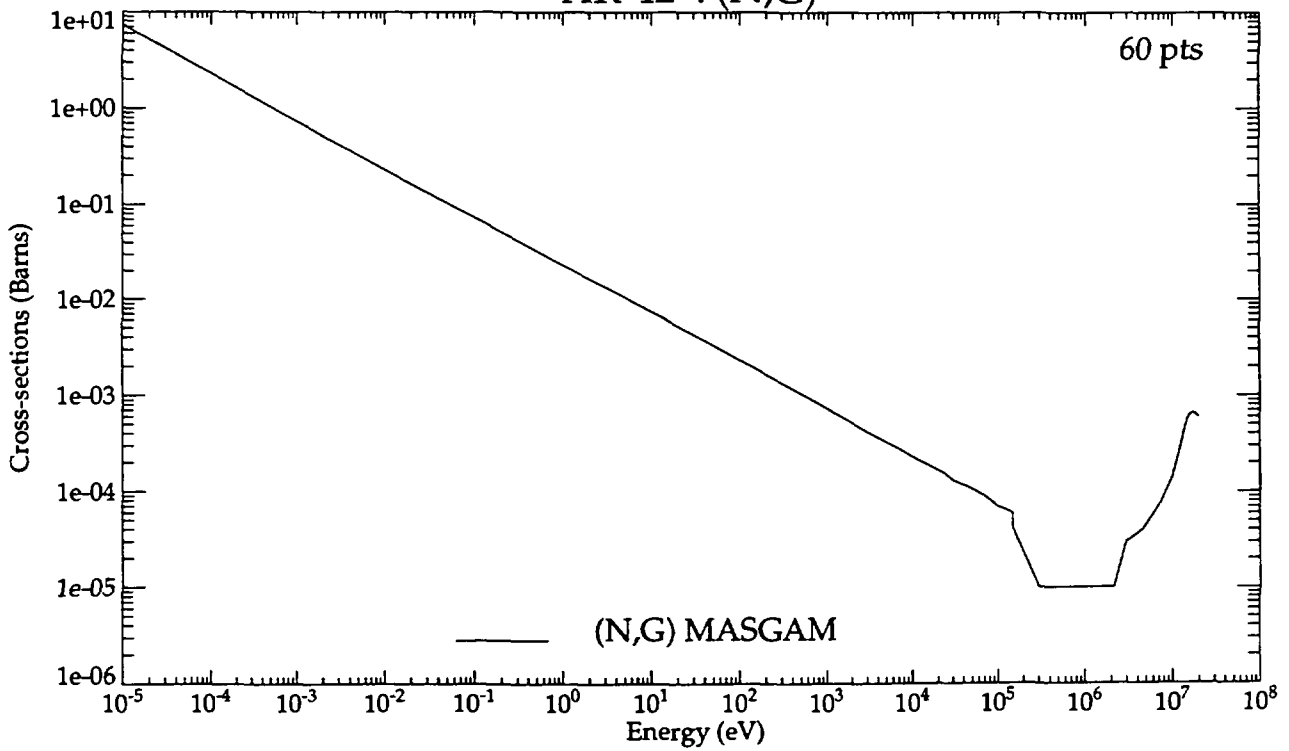


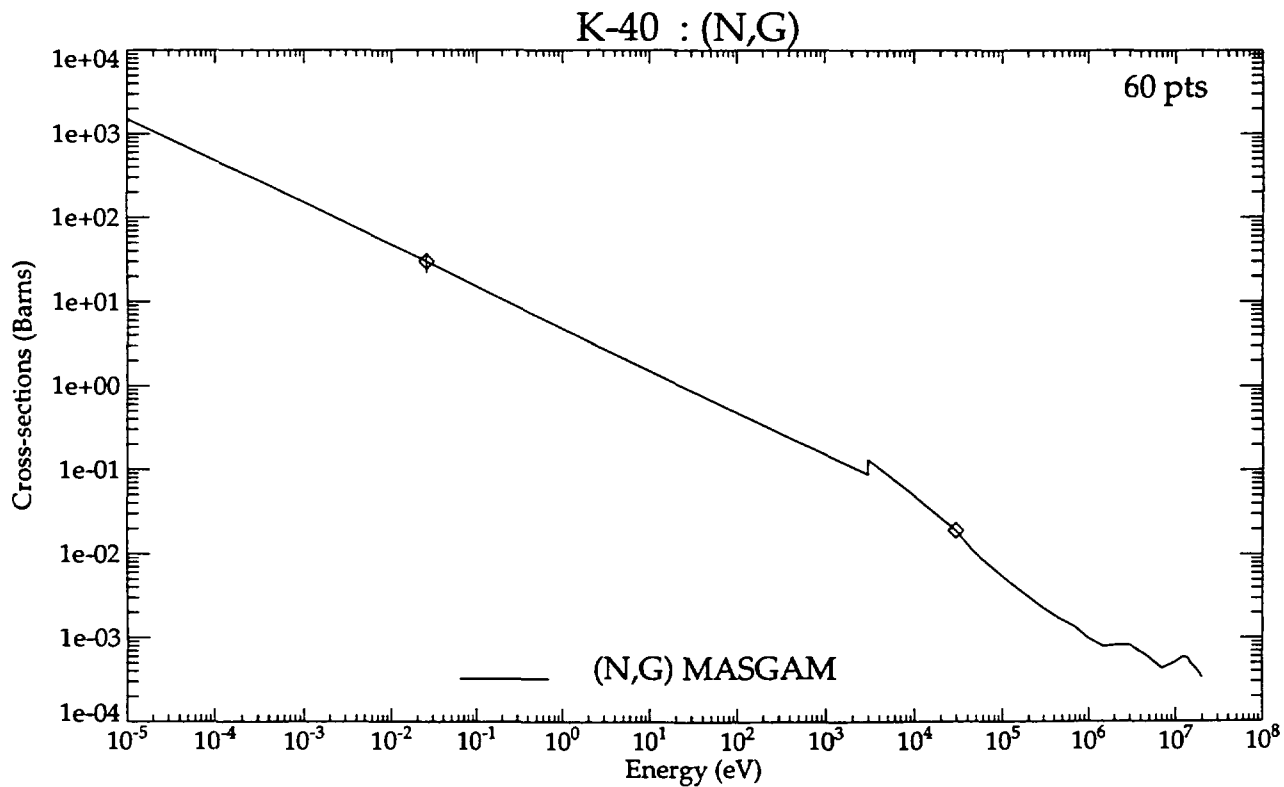
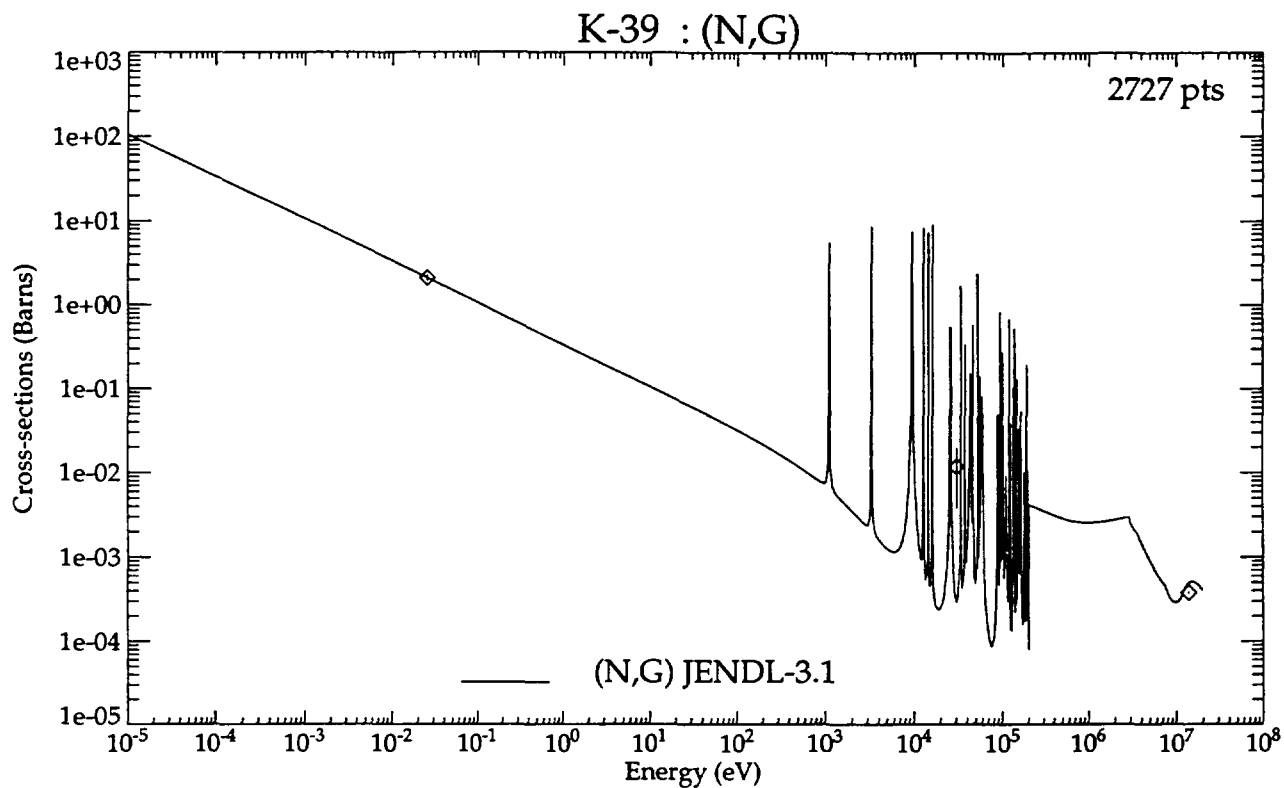


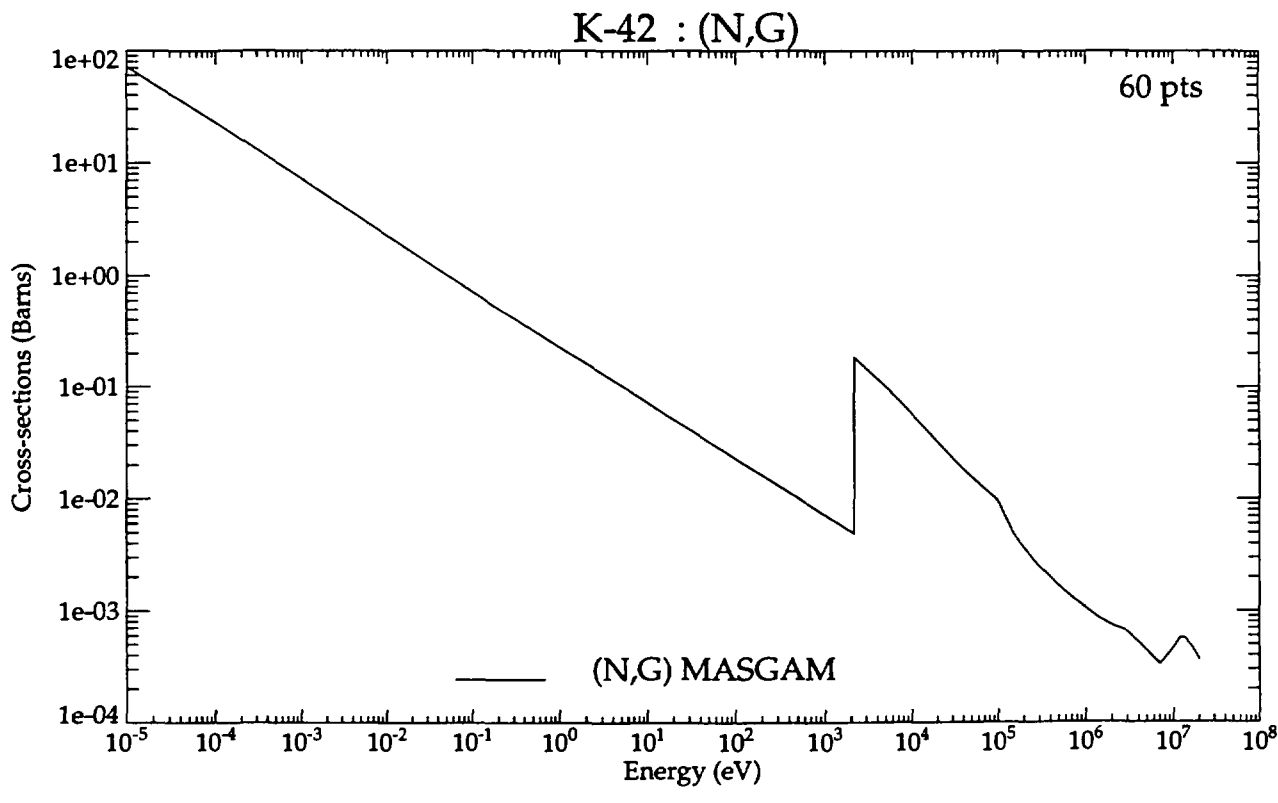
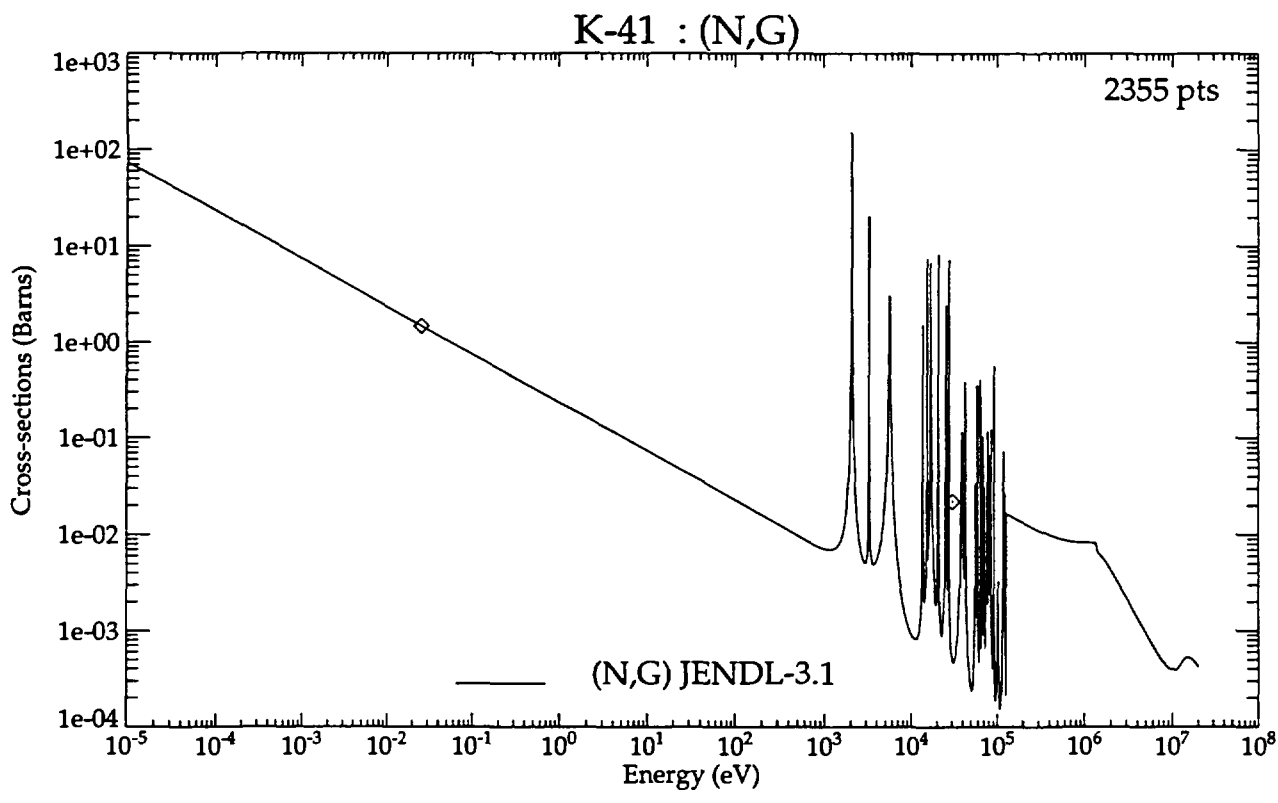
AR-41 : (N,G)

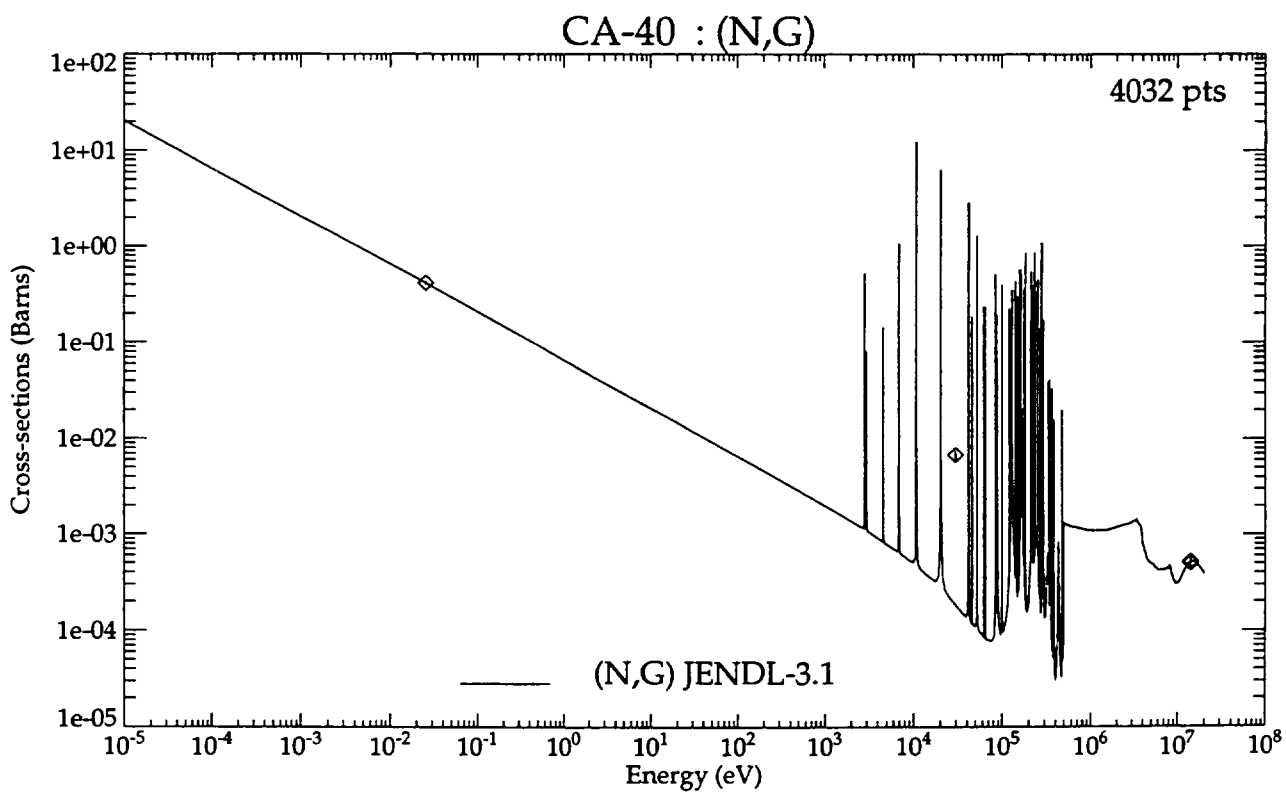
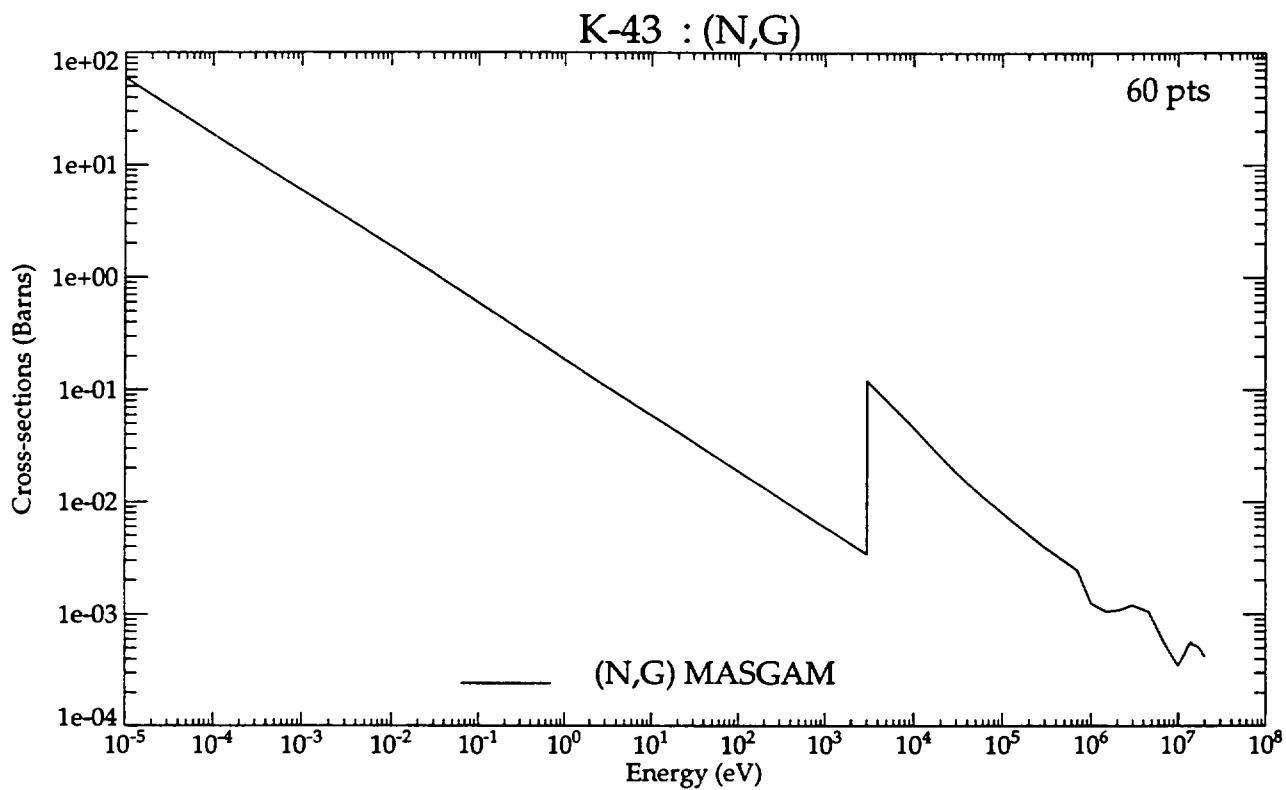


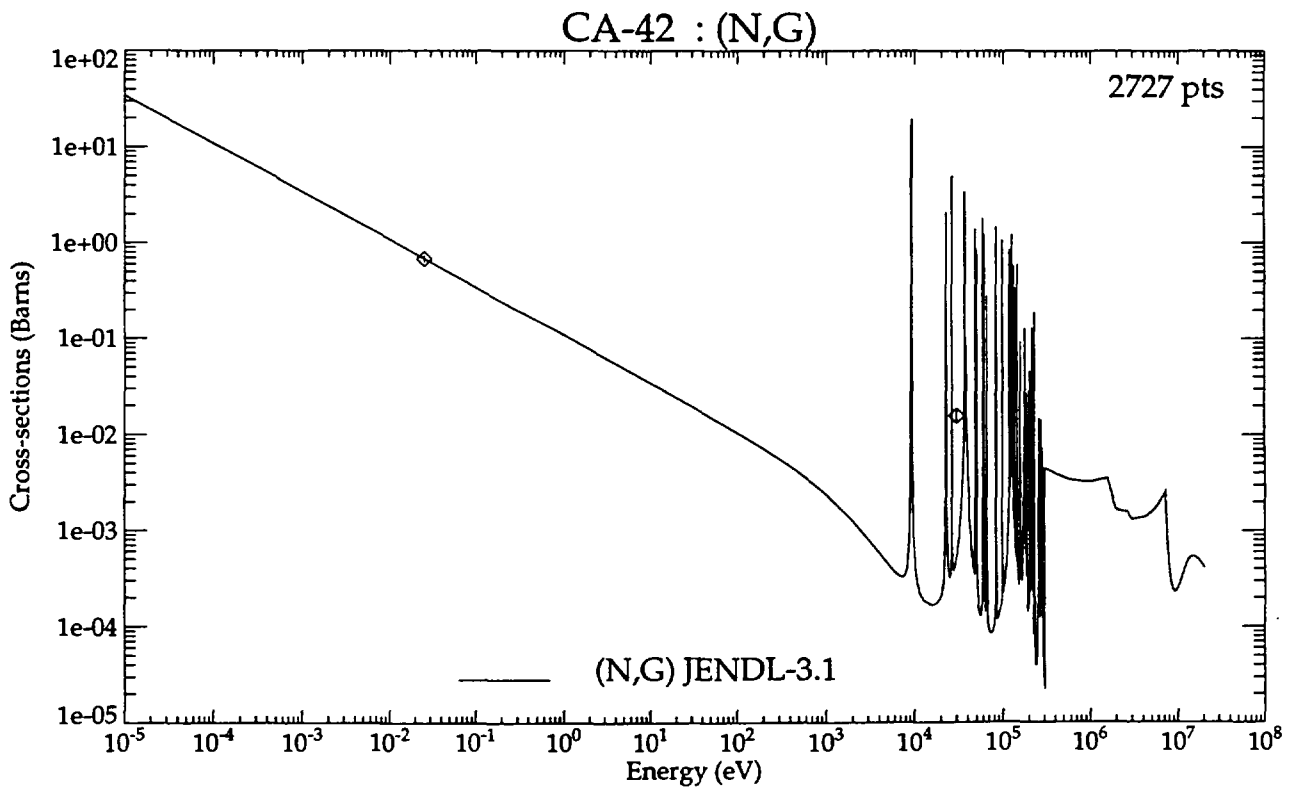
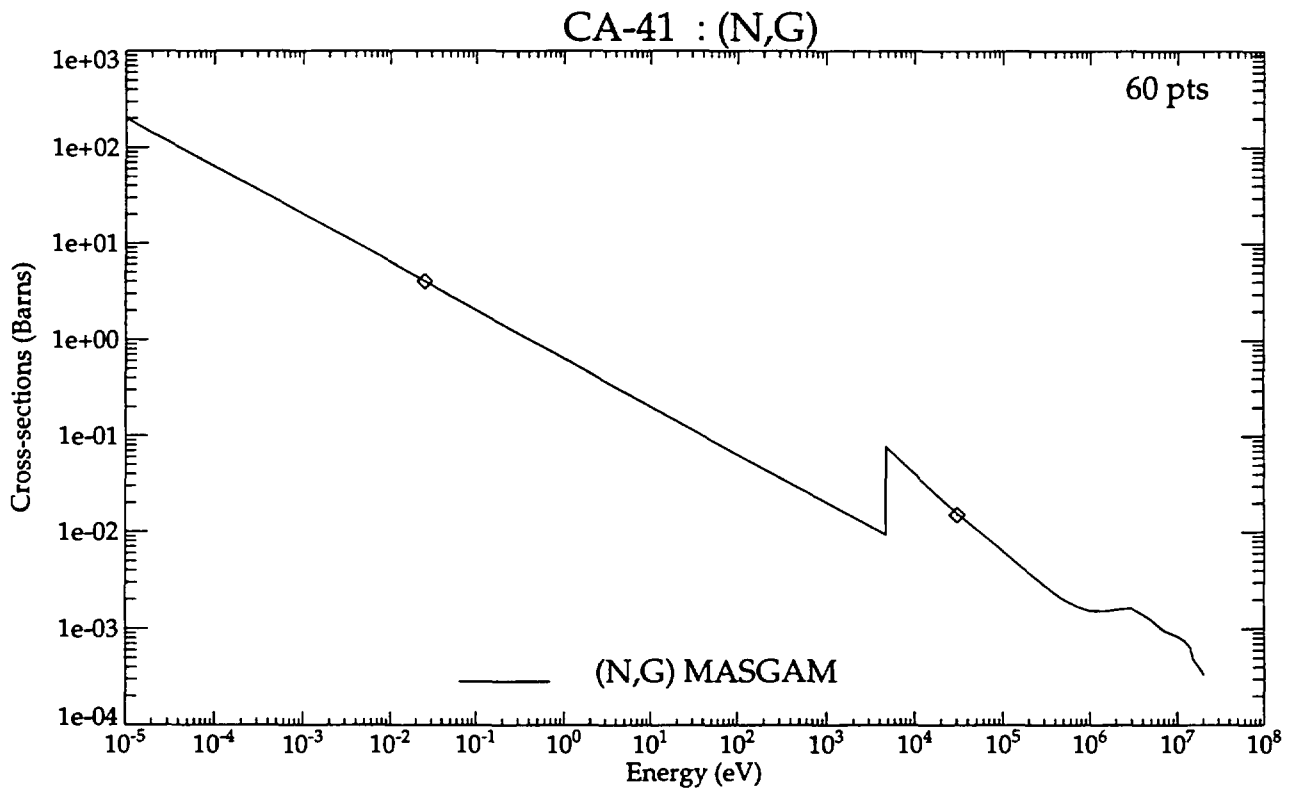
AR-42 : (N,G)

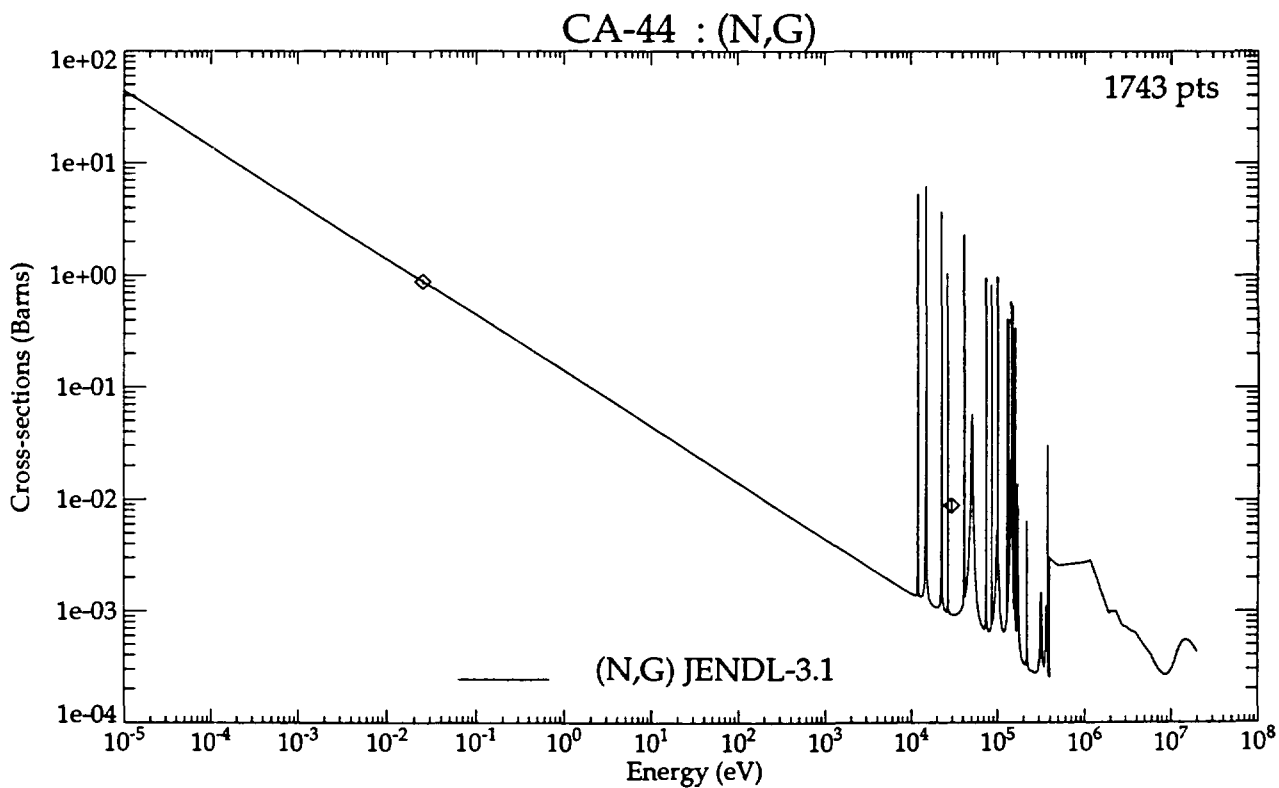
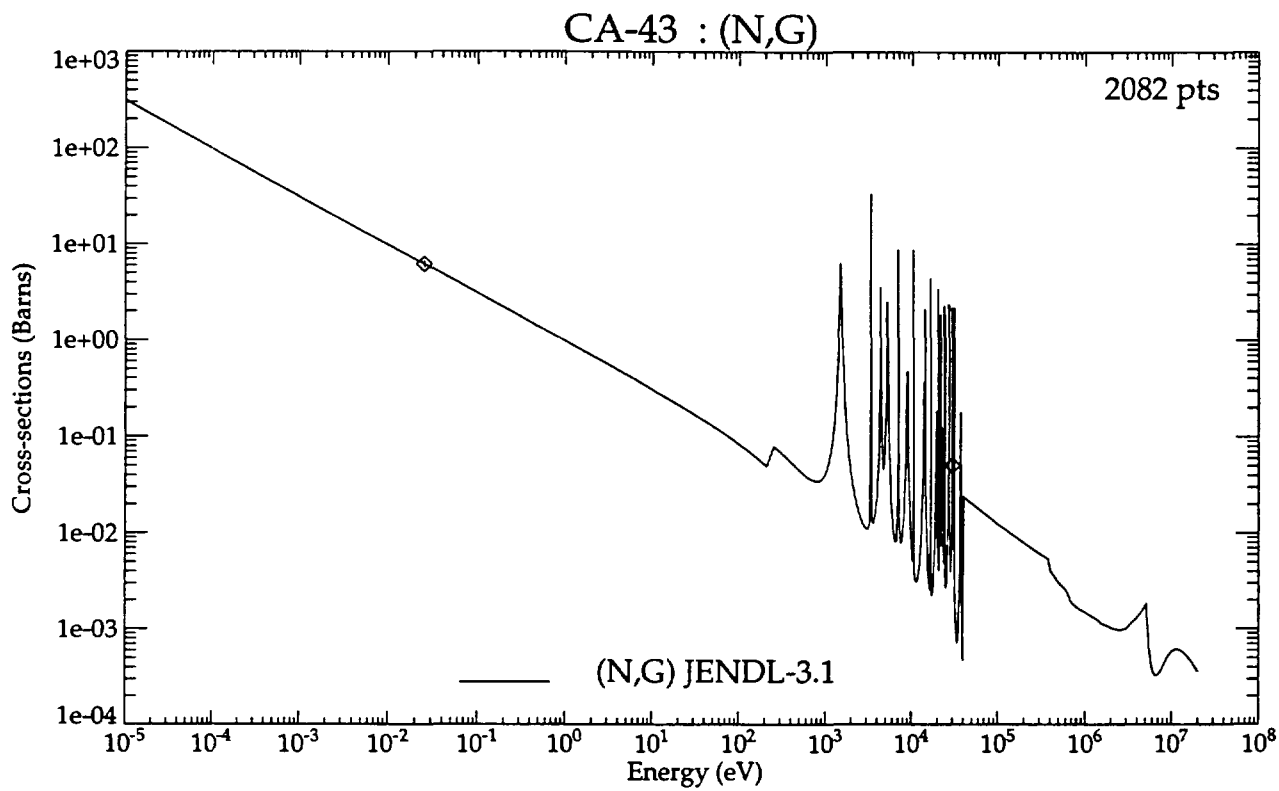


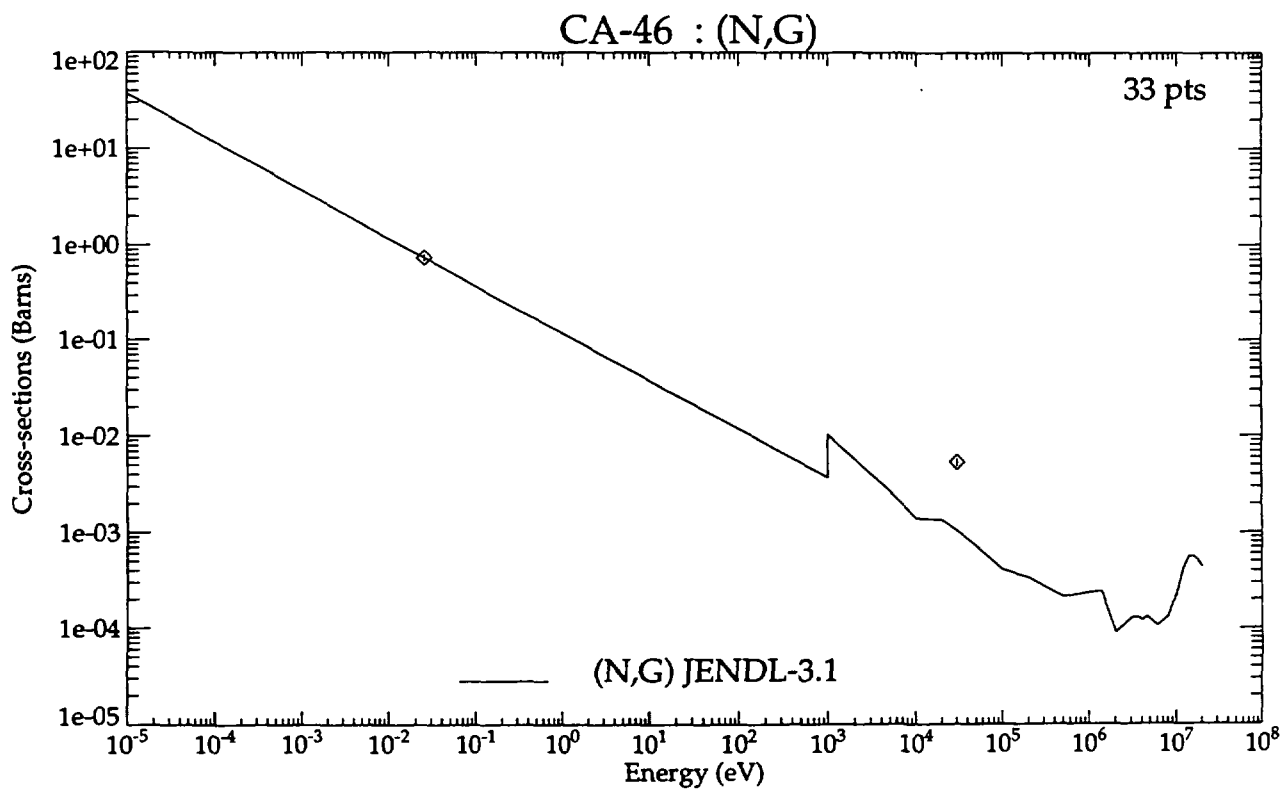
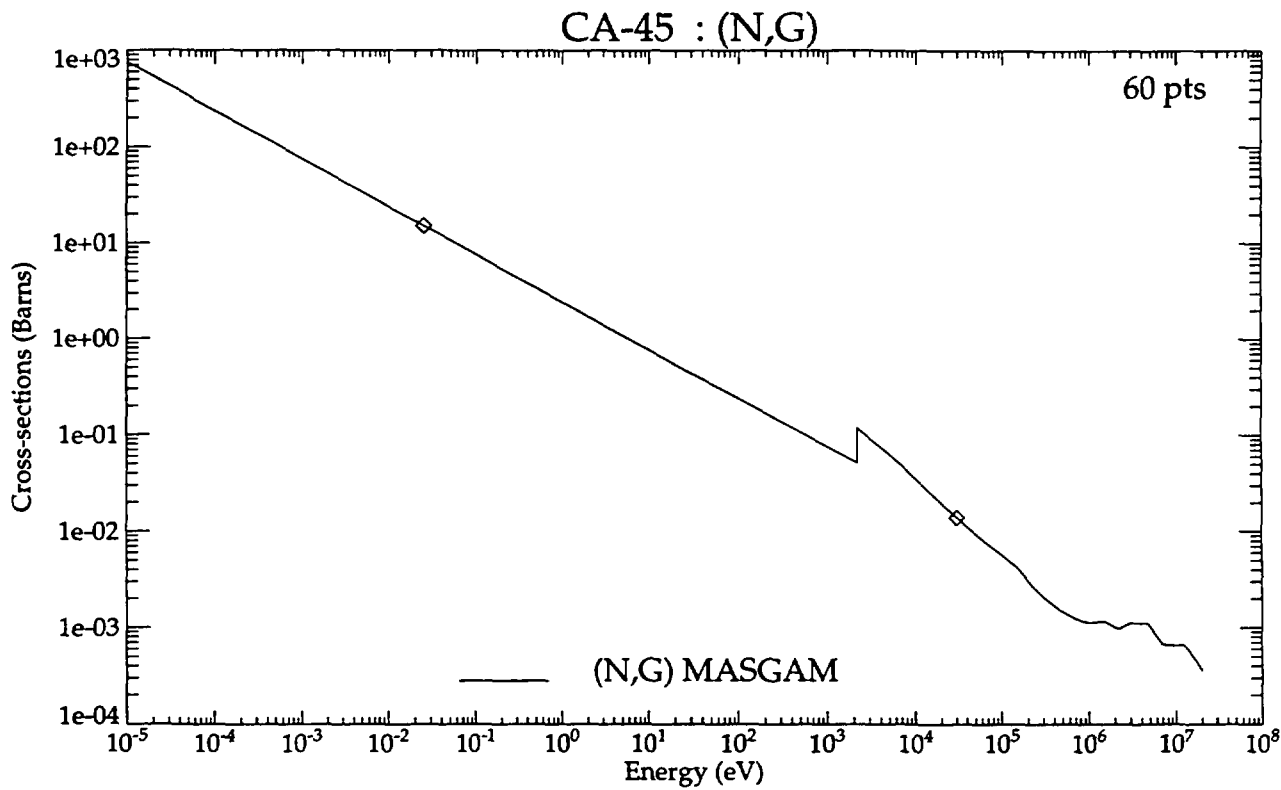


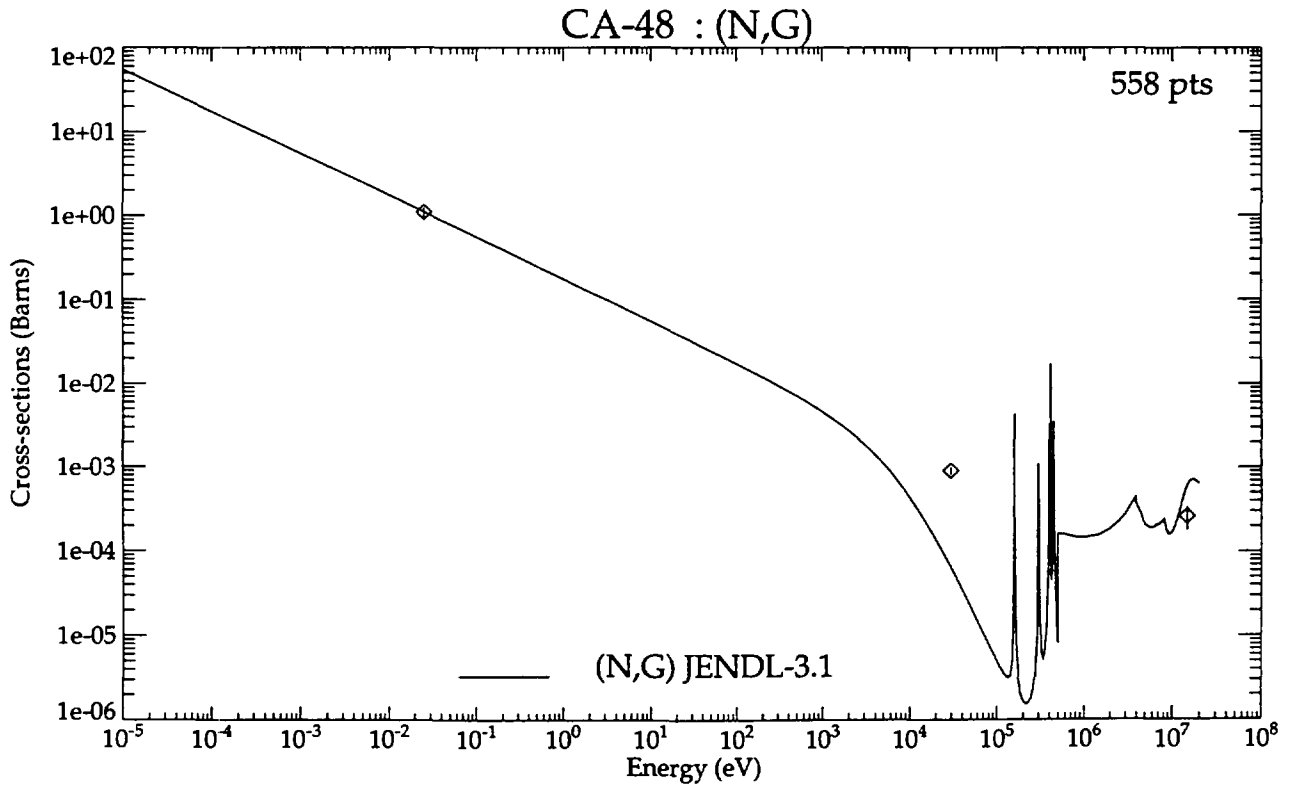
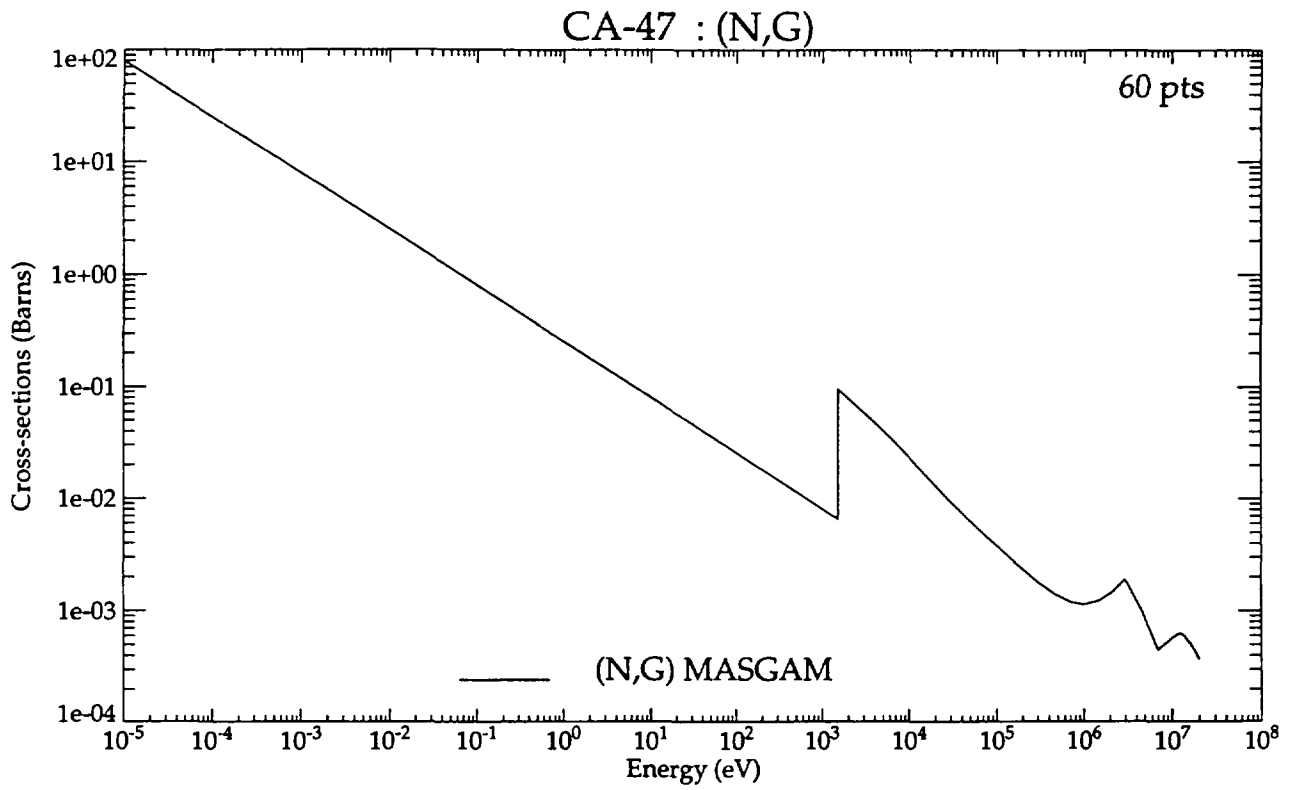


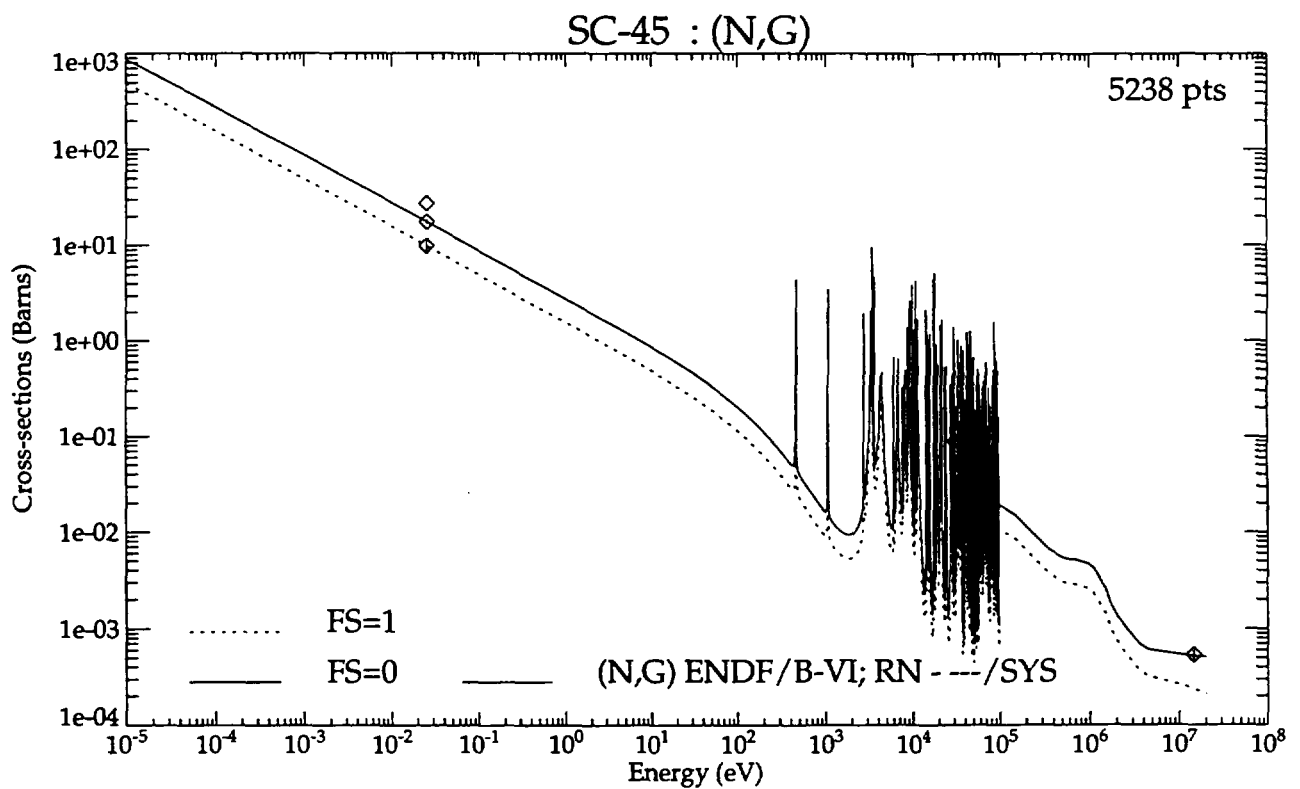
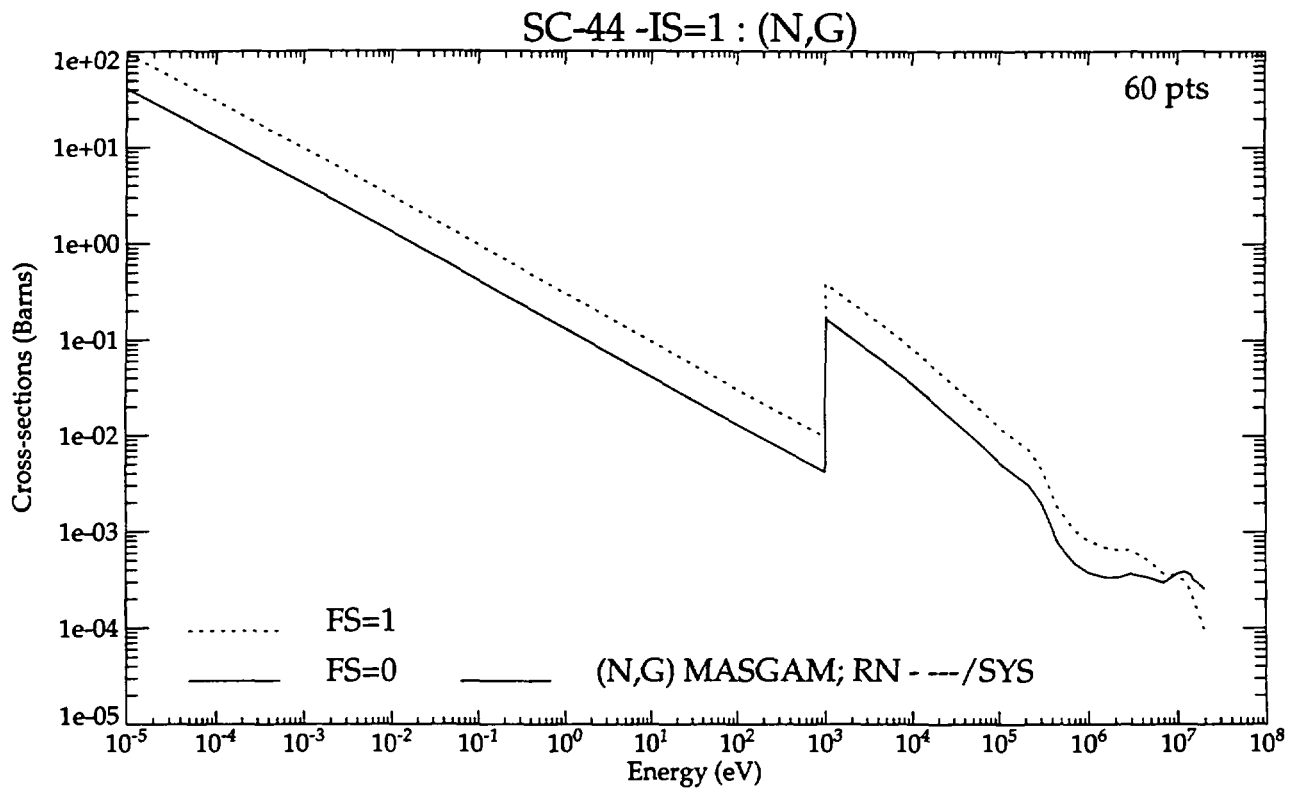


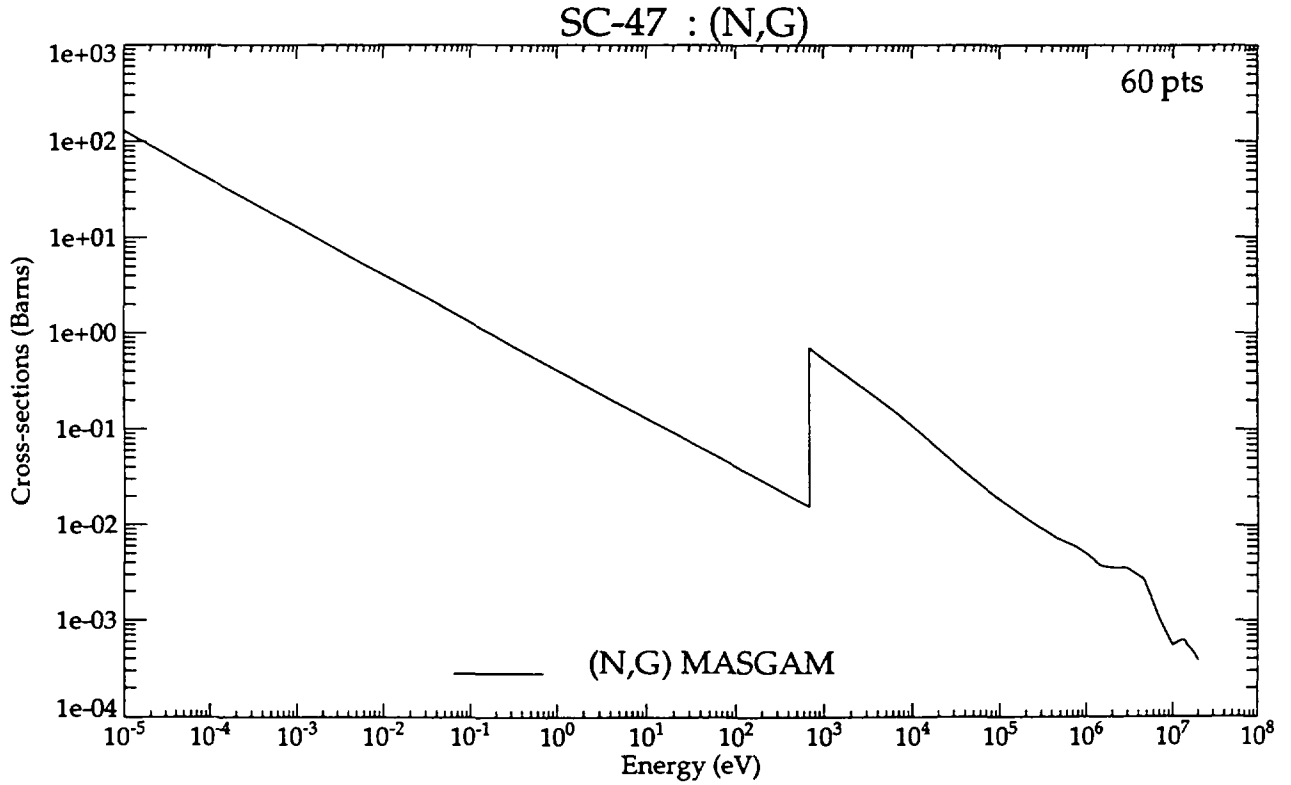
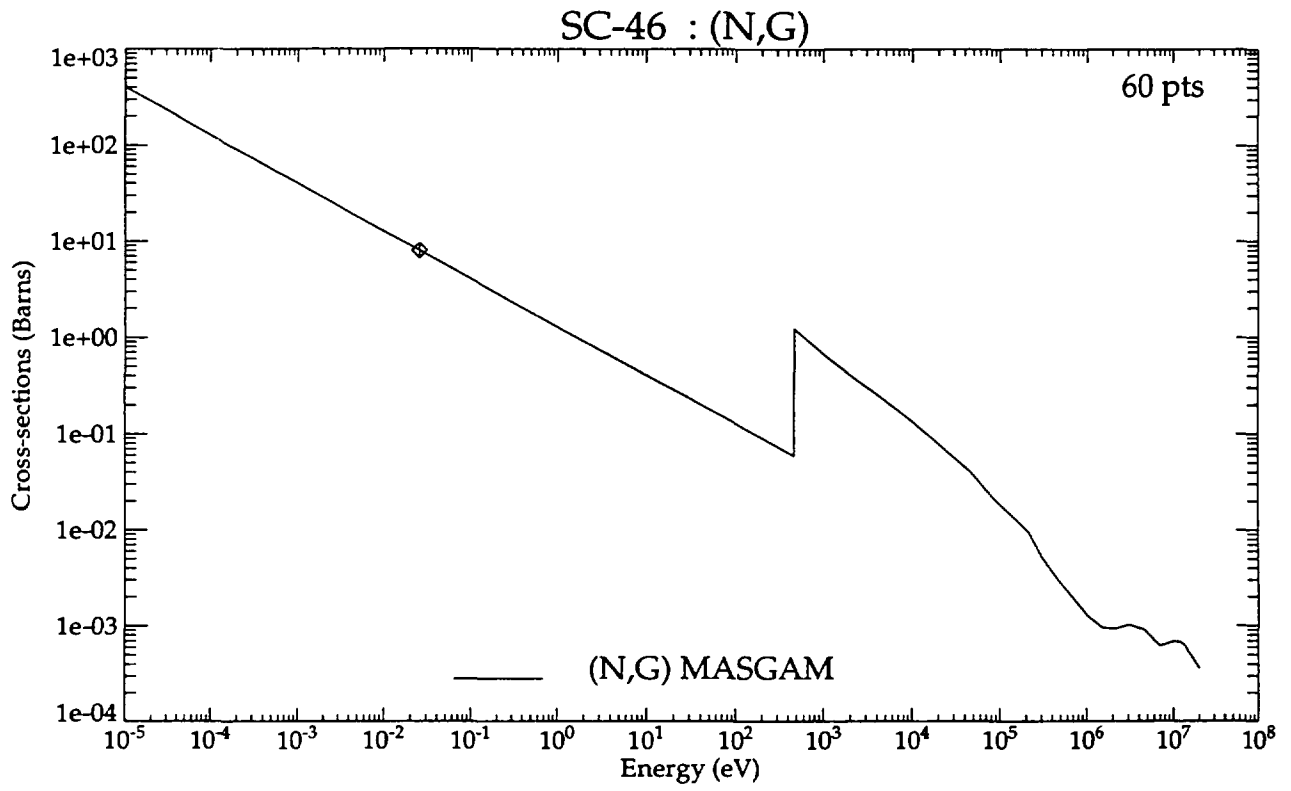


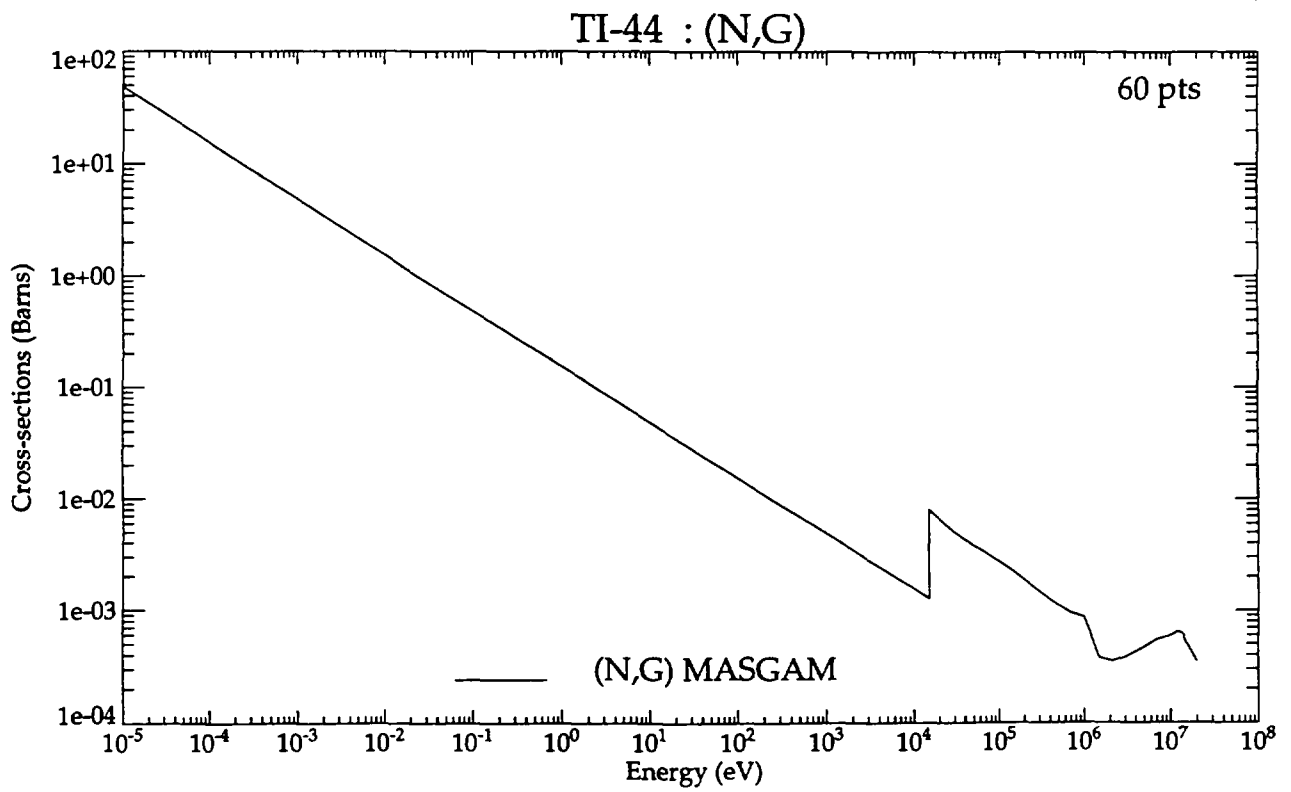
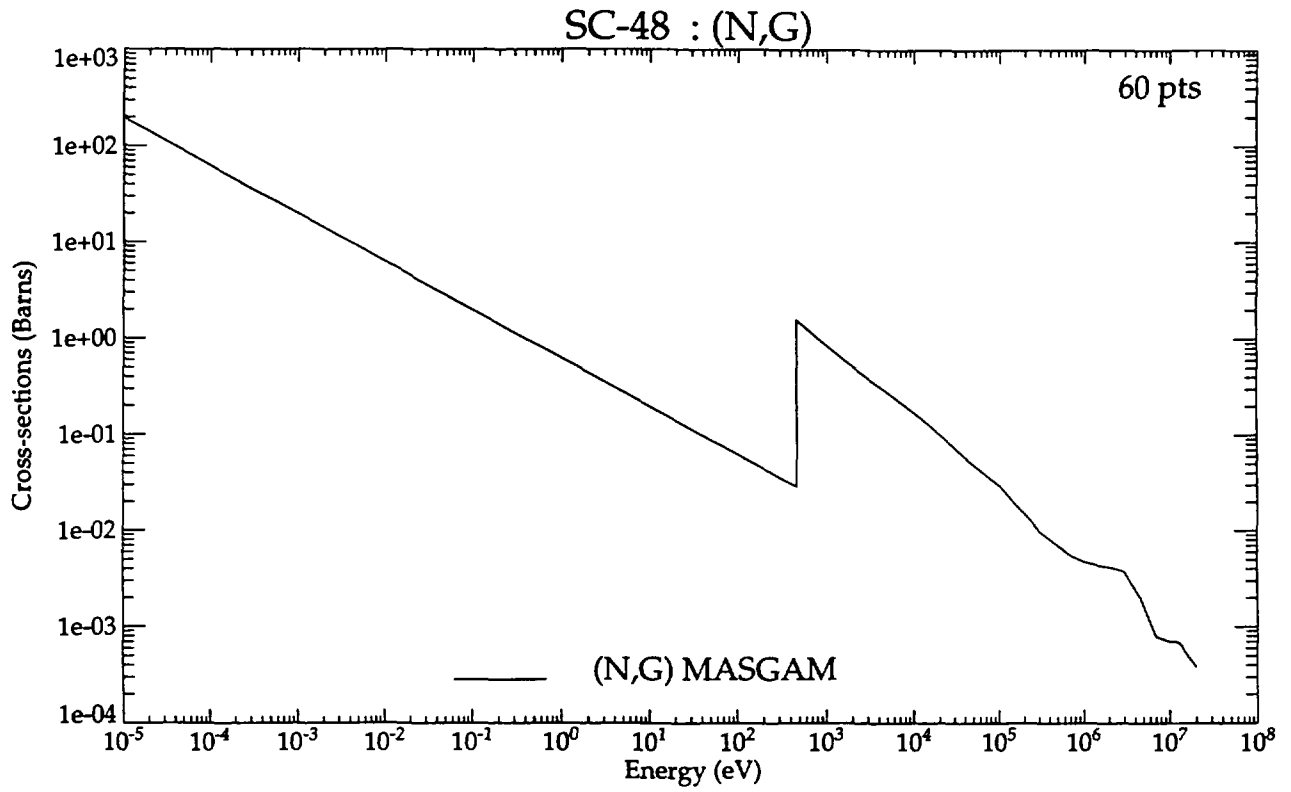


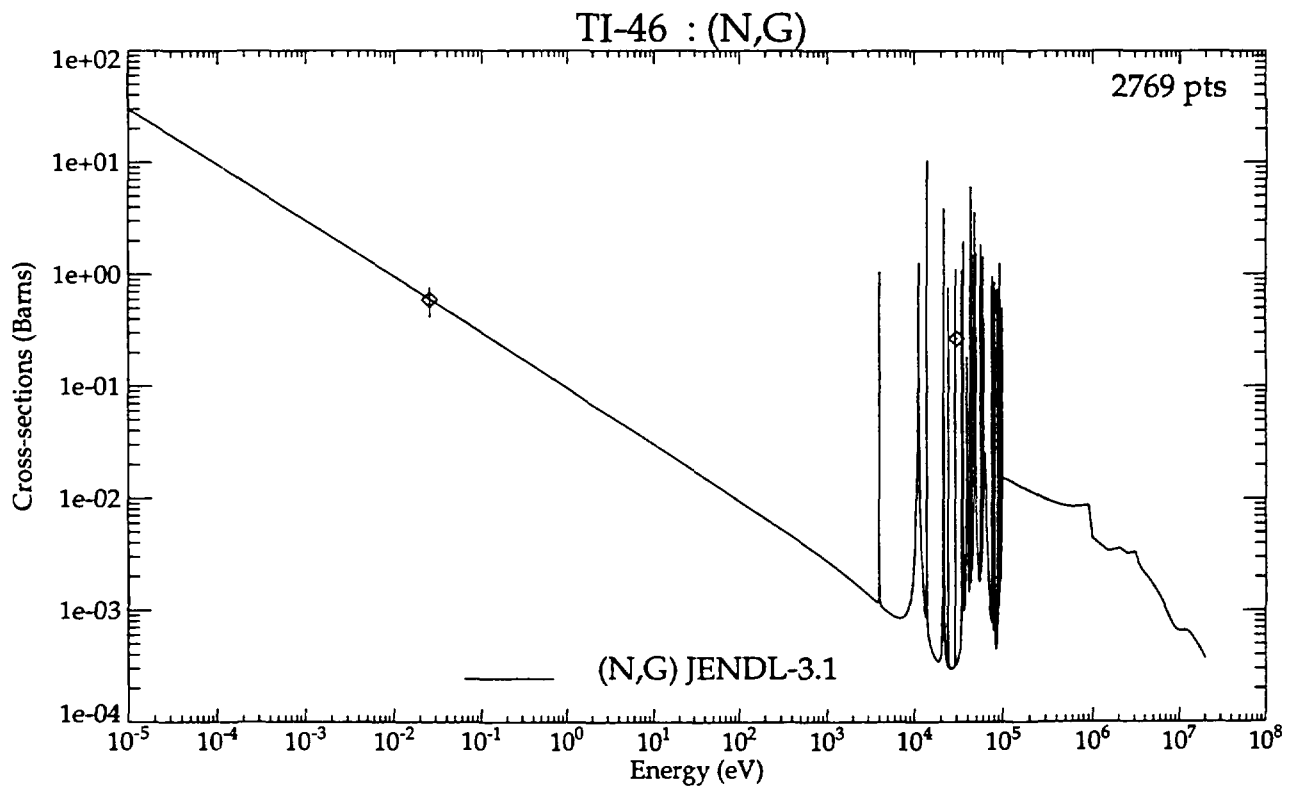
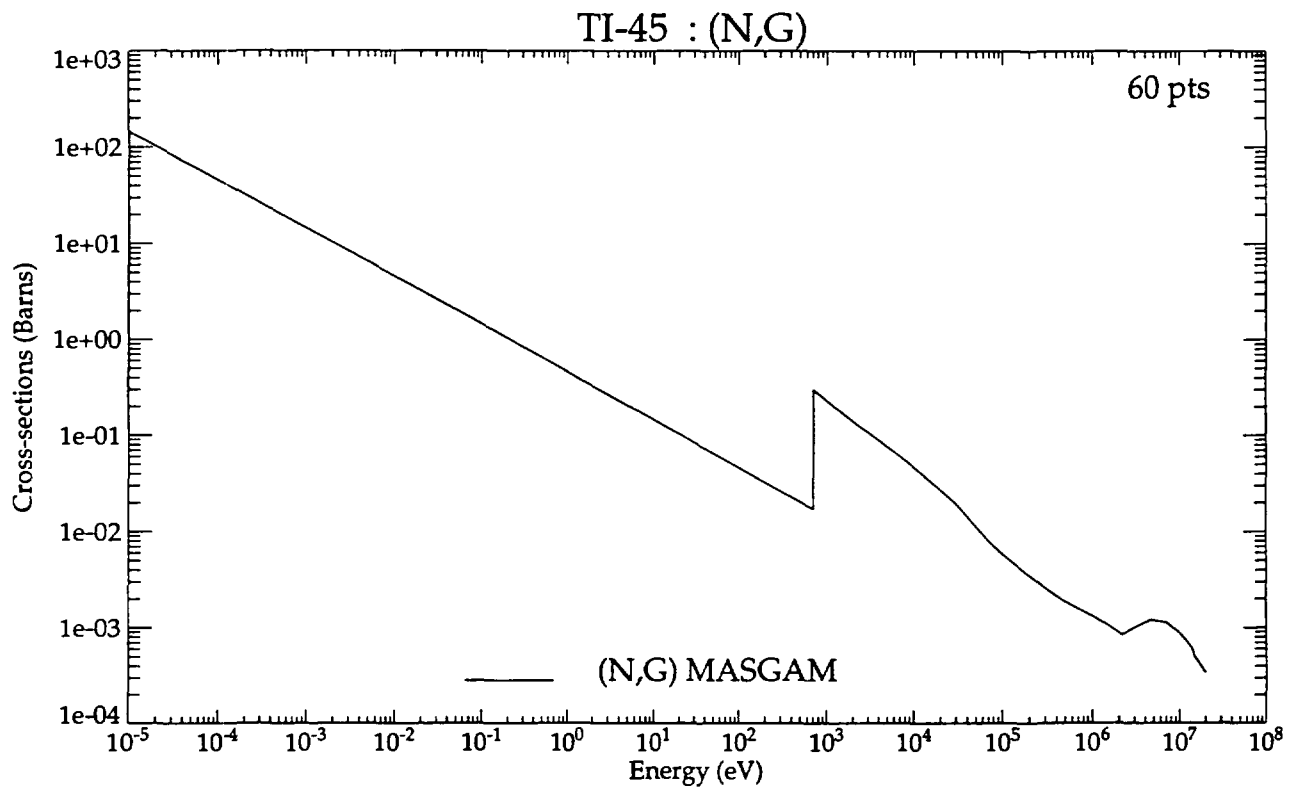


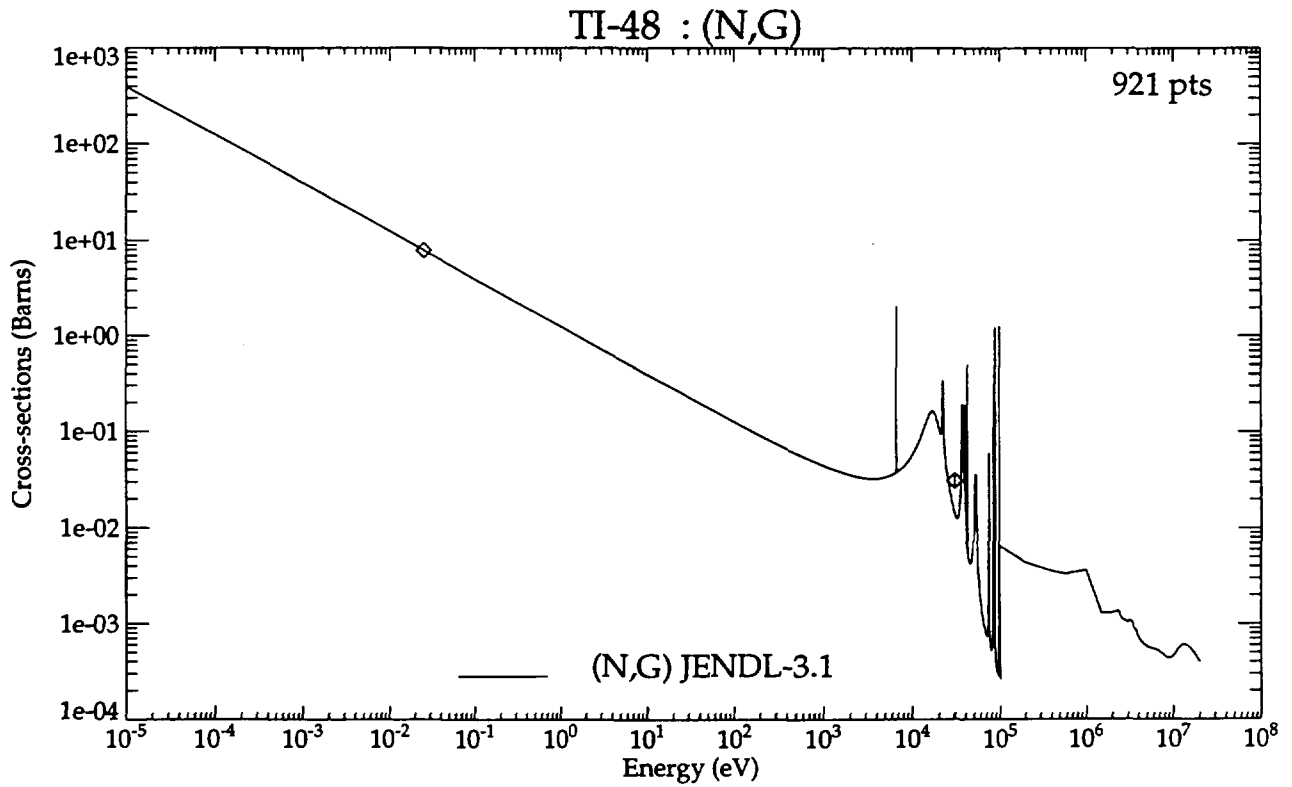
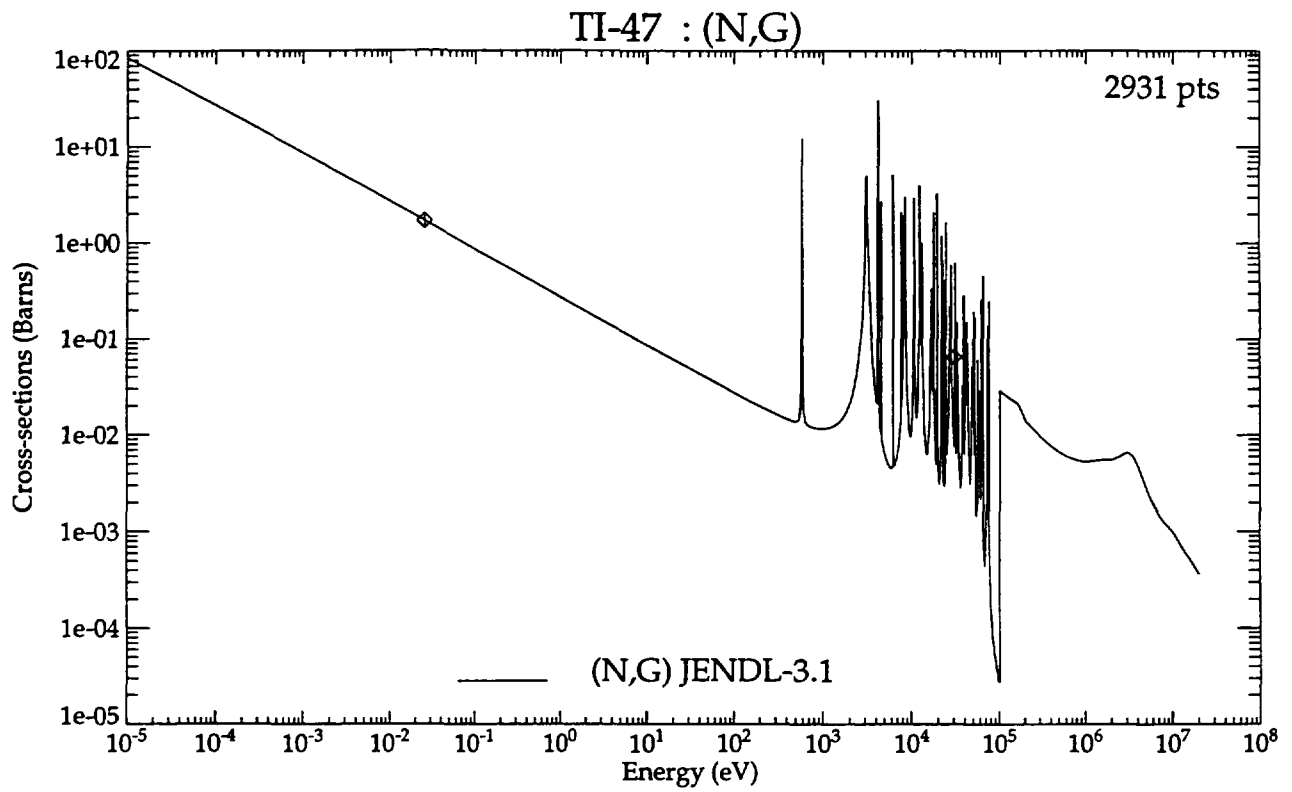


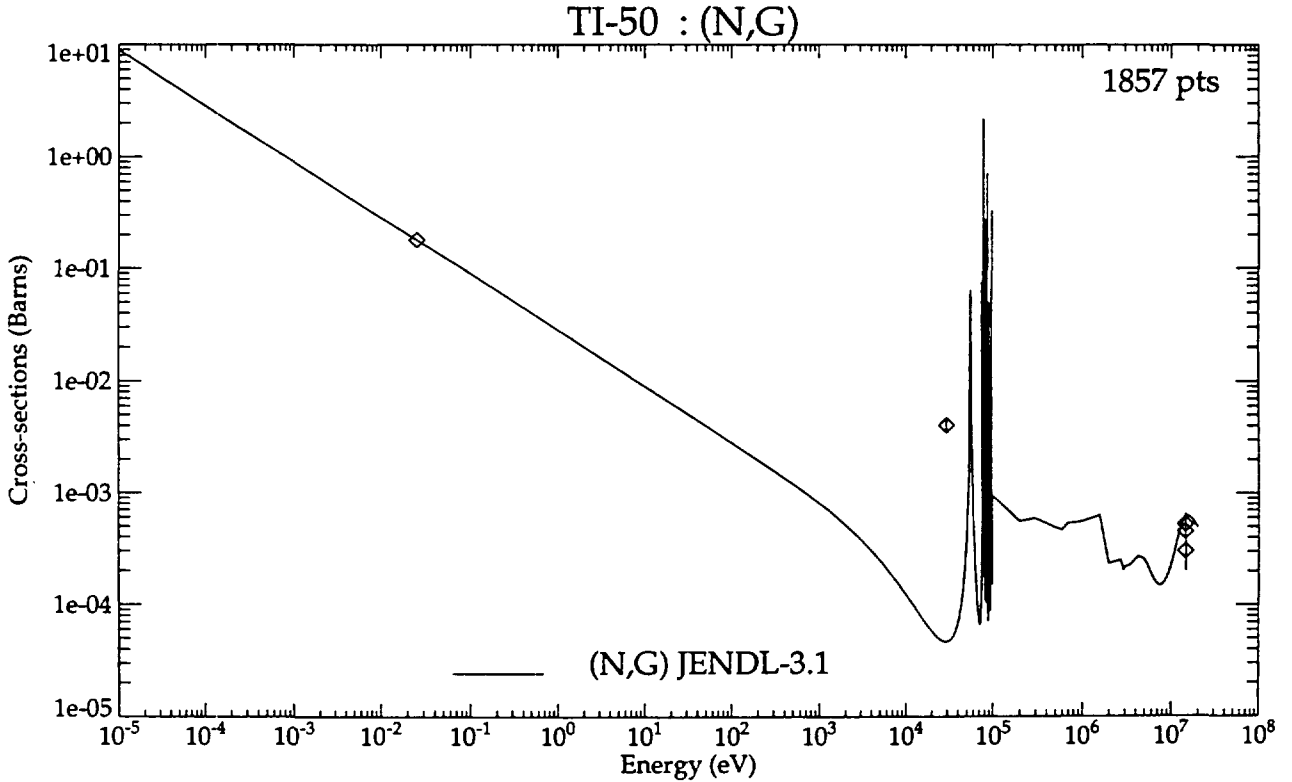
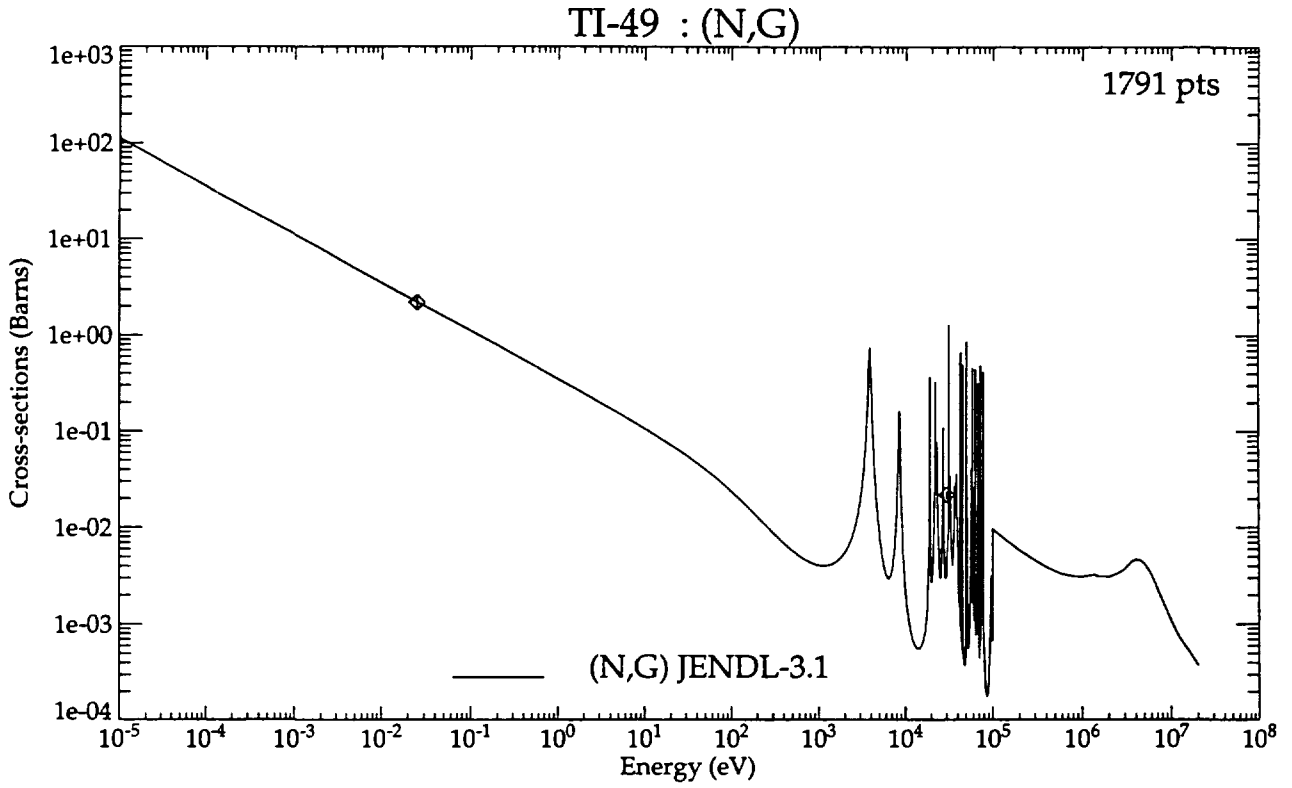


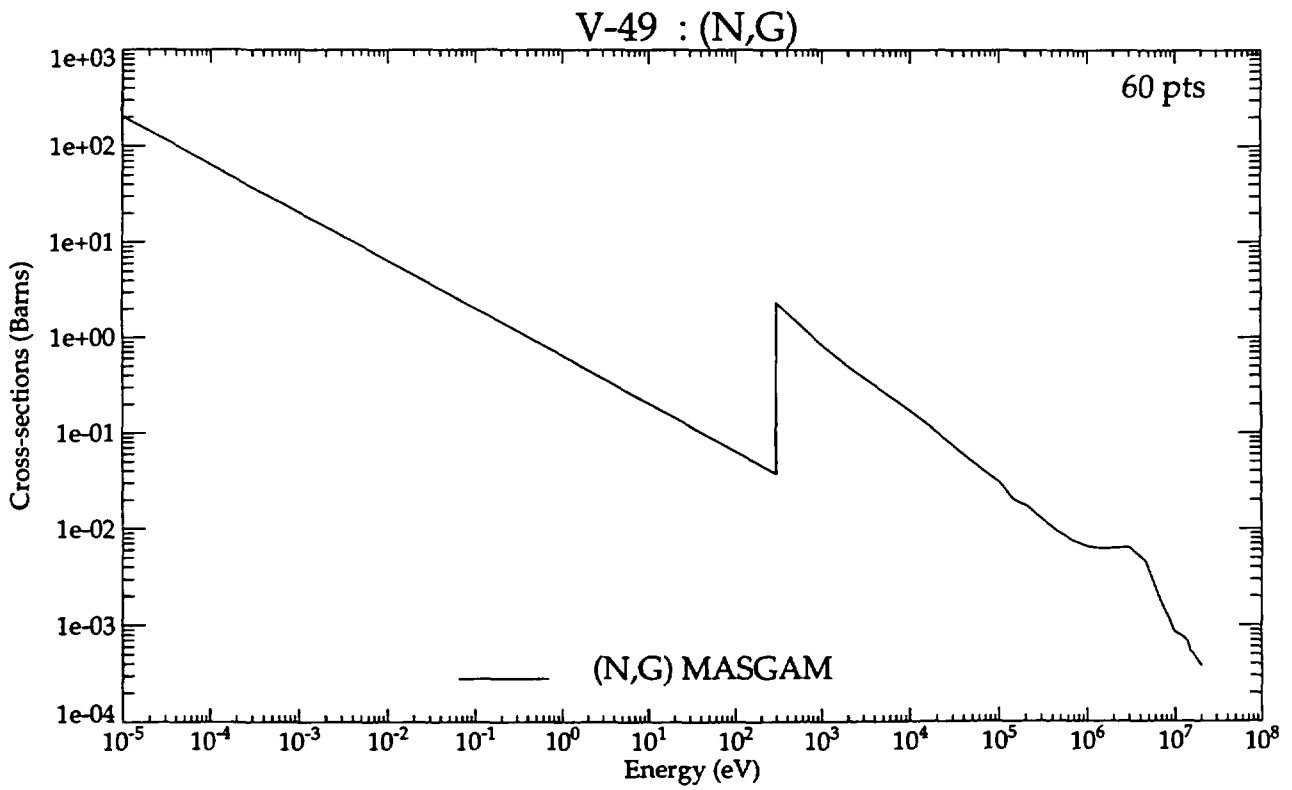
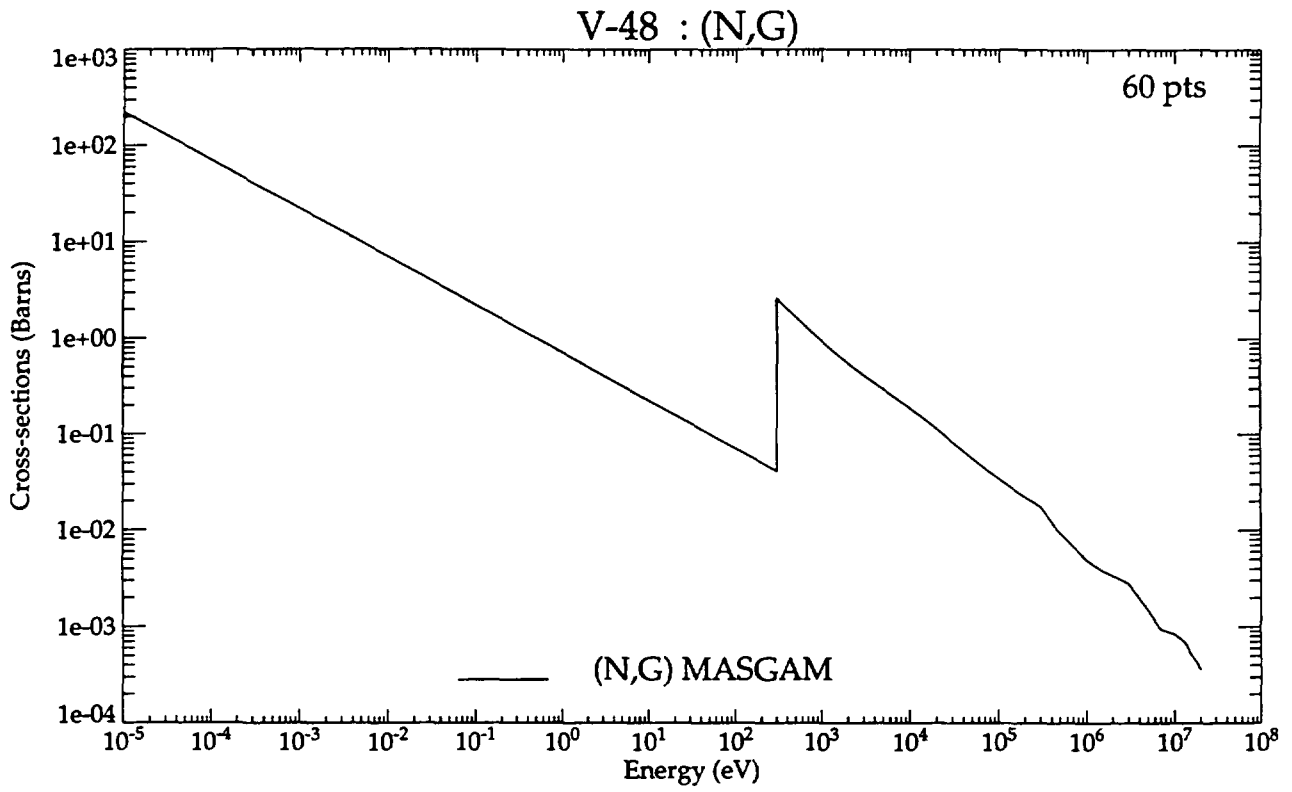


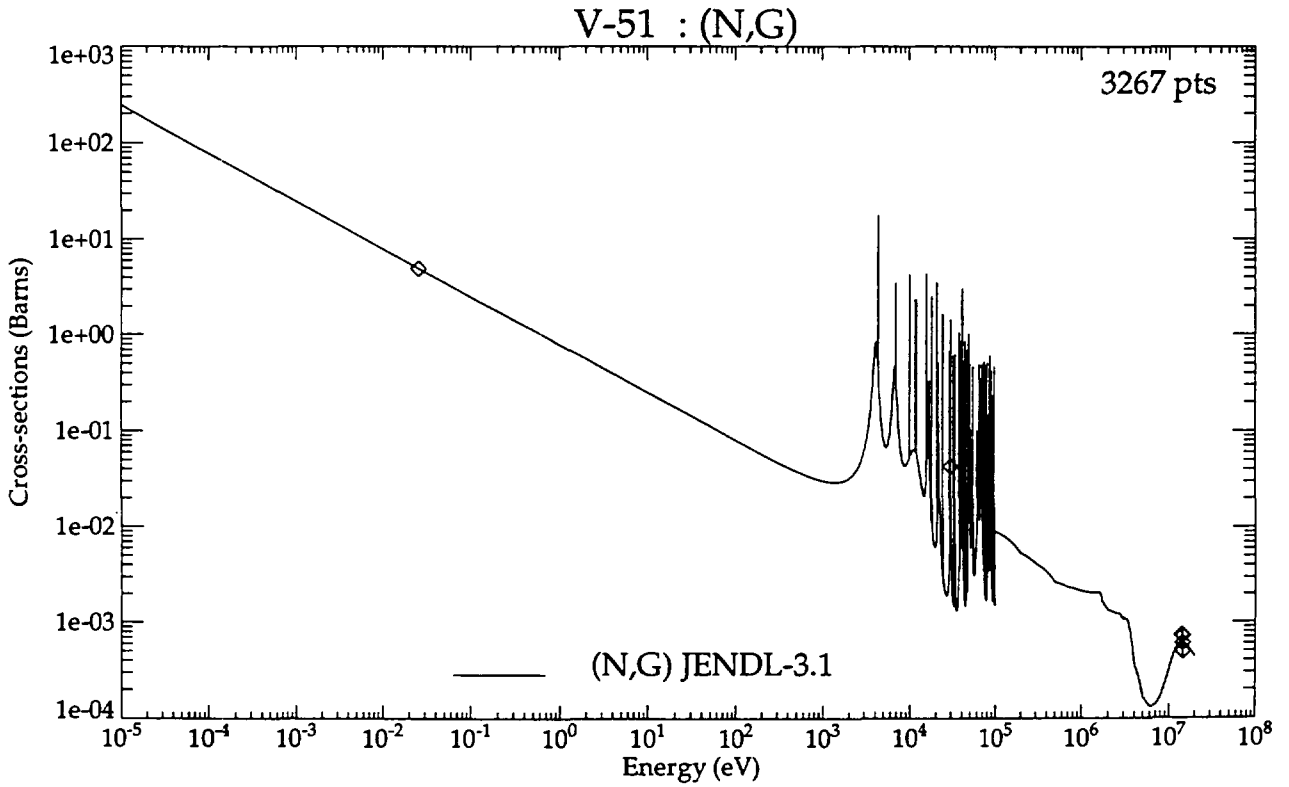
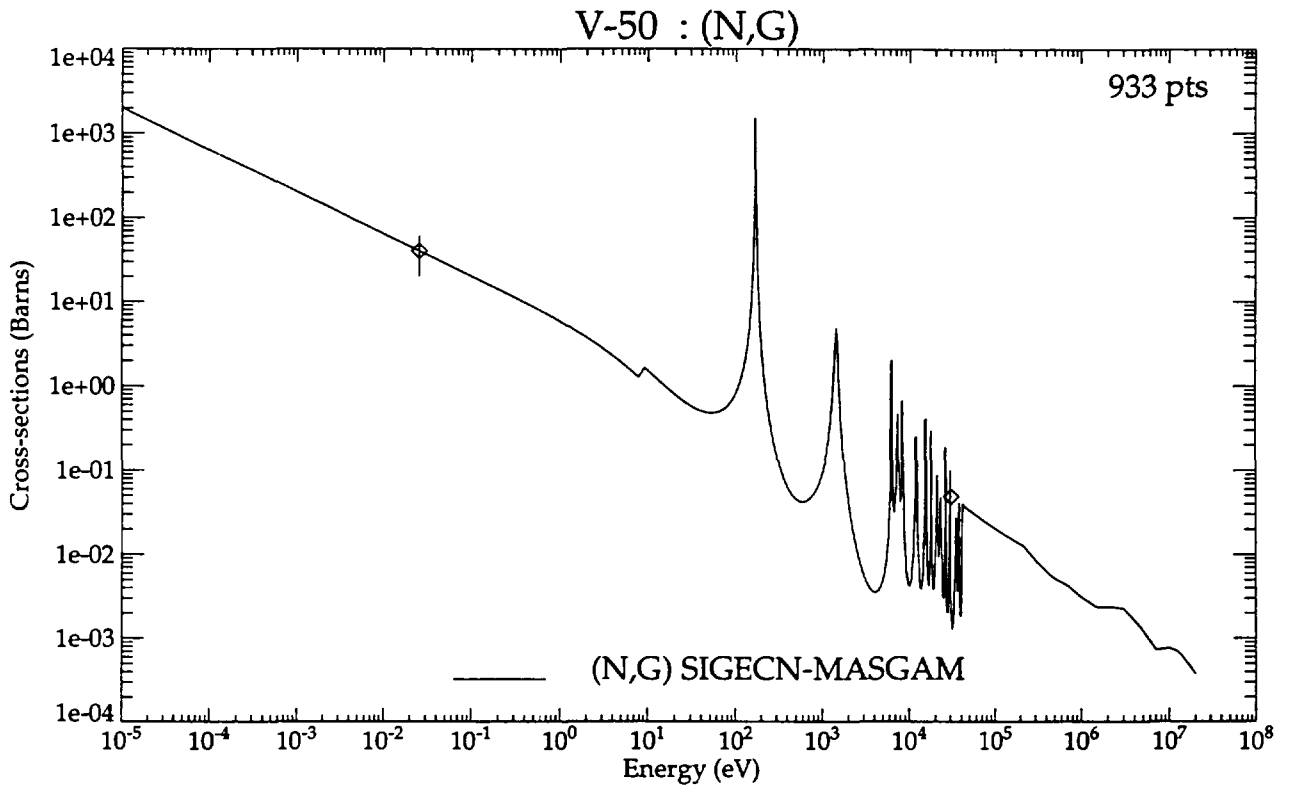


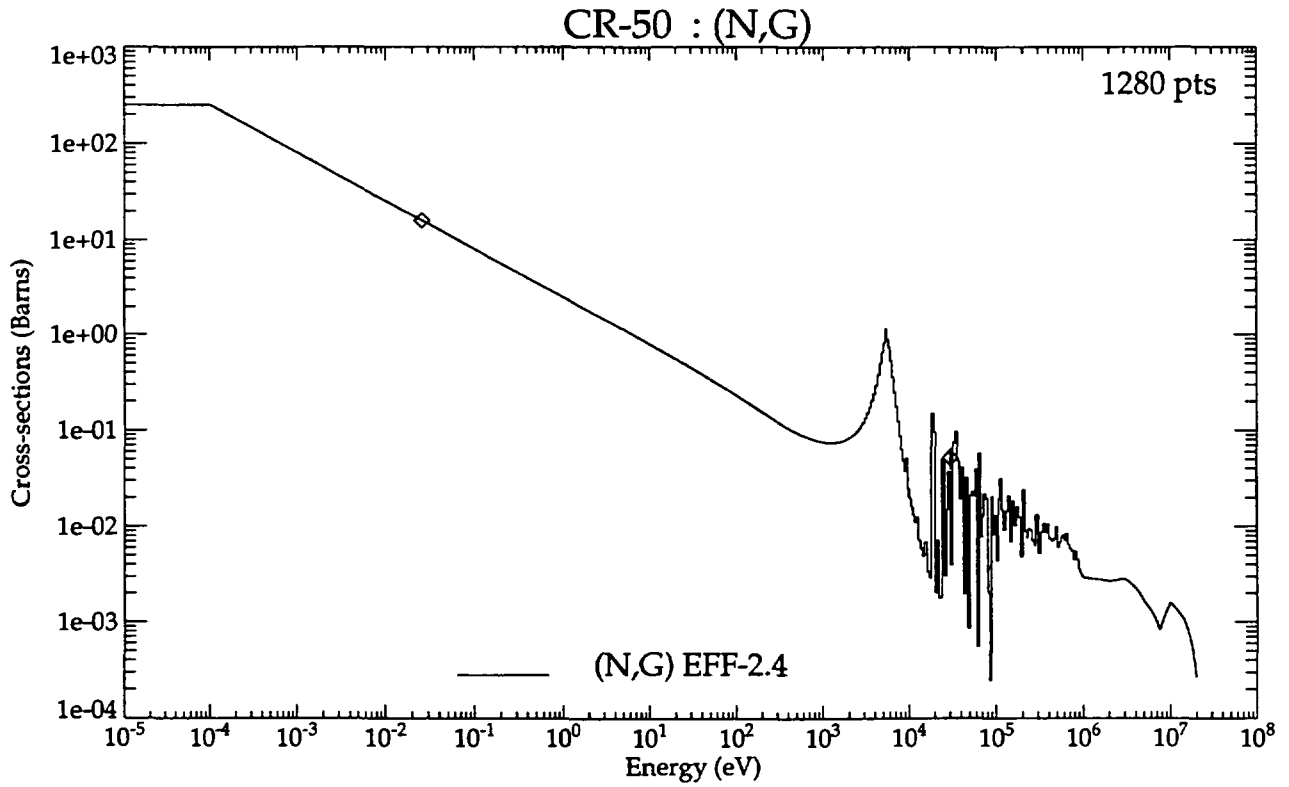
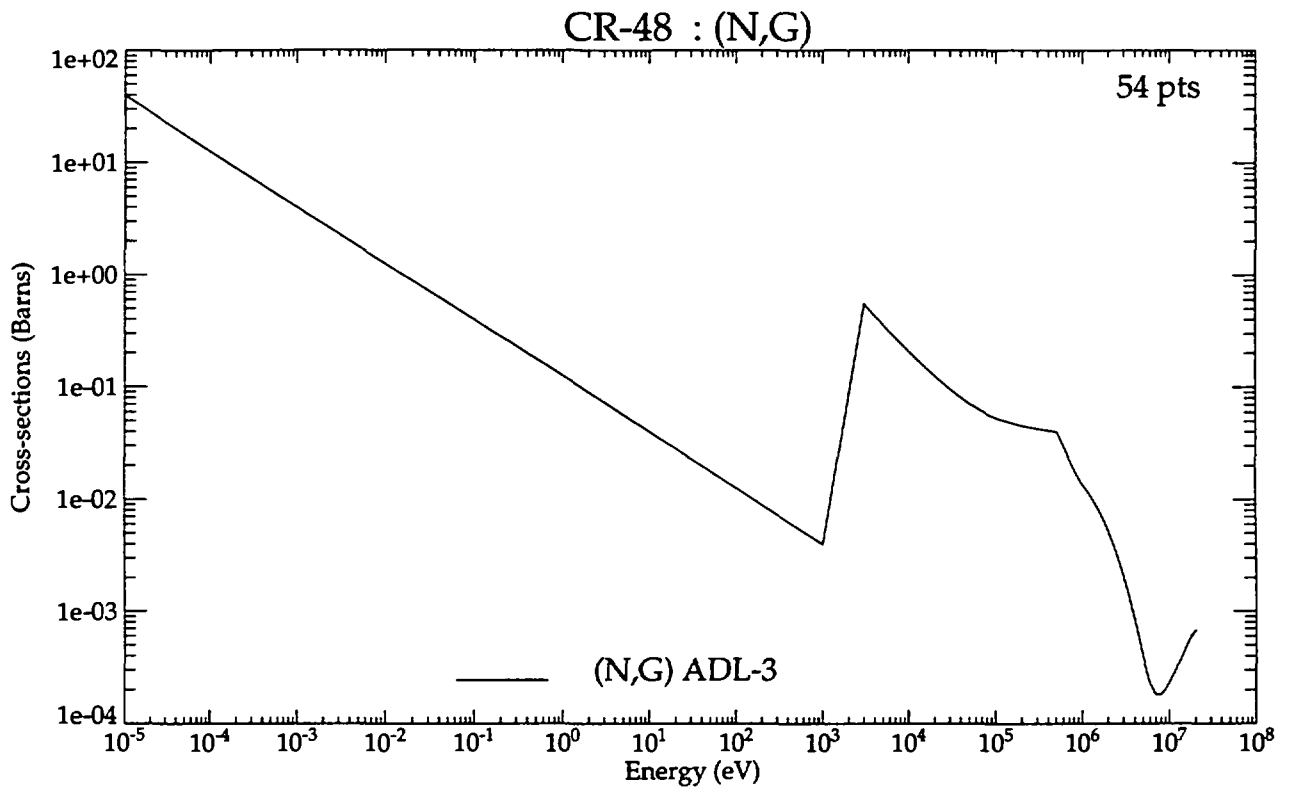


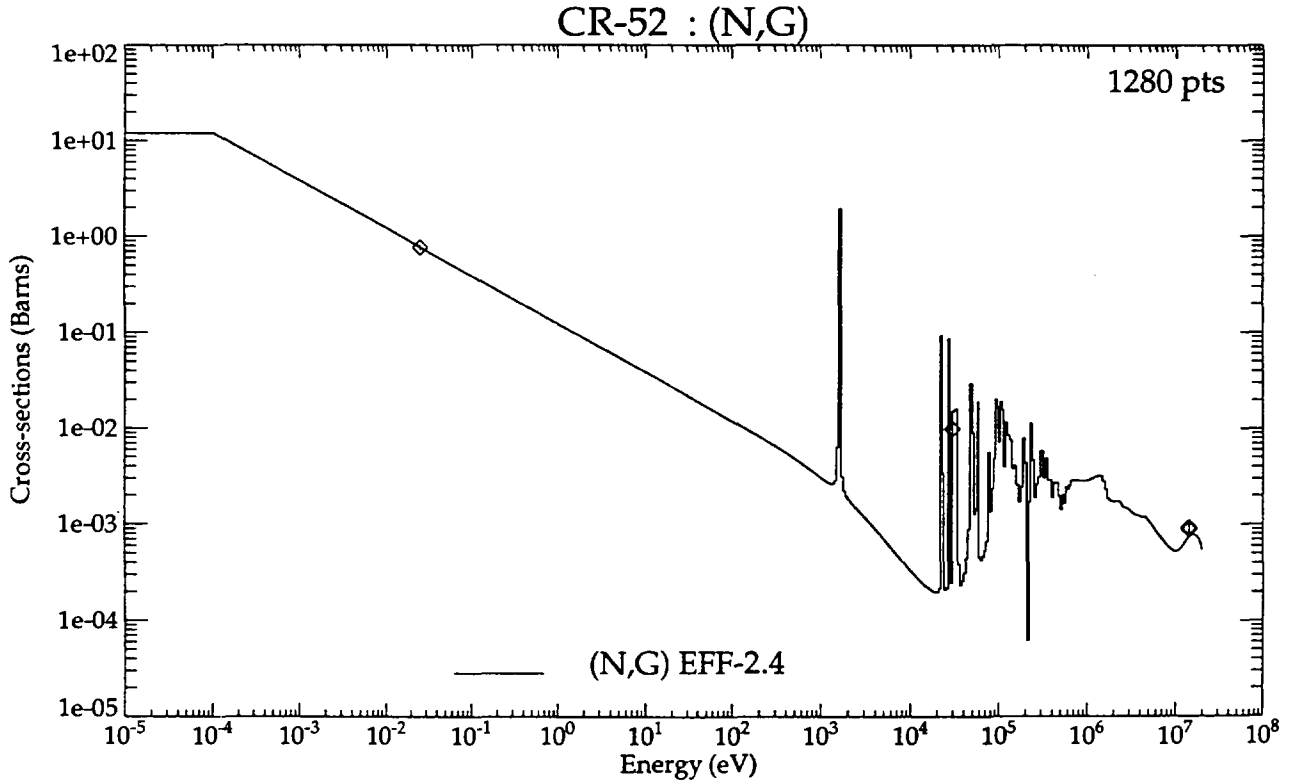
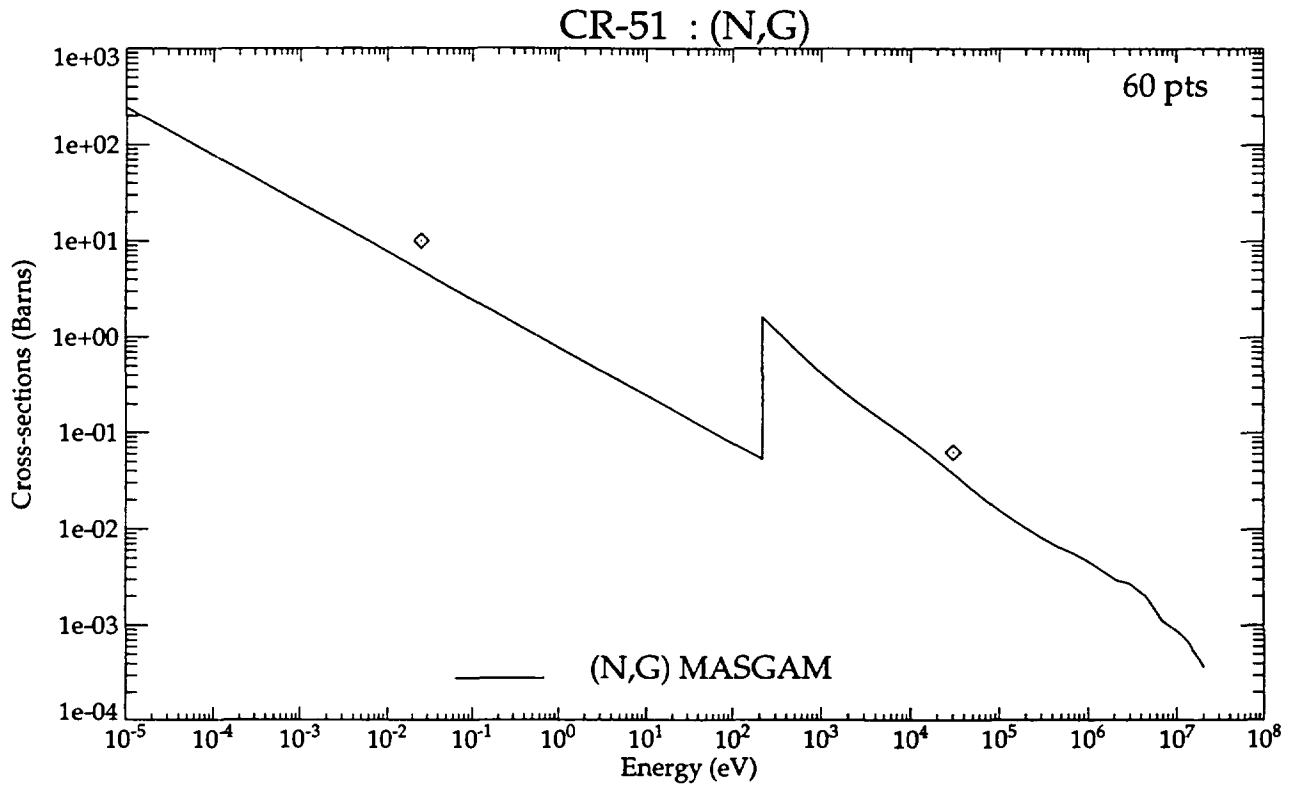


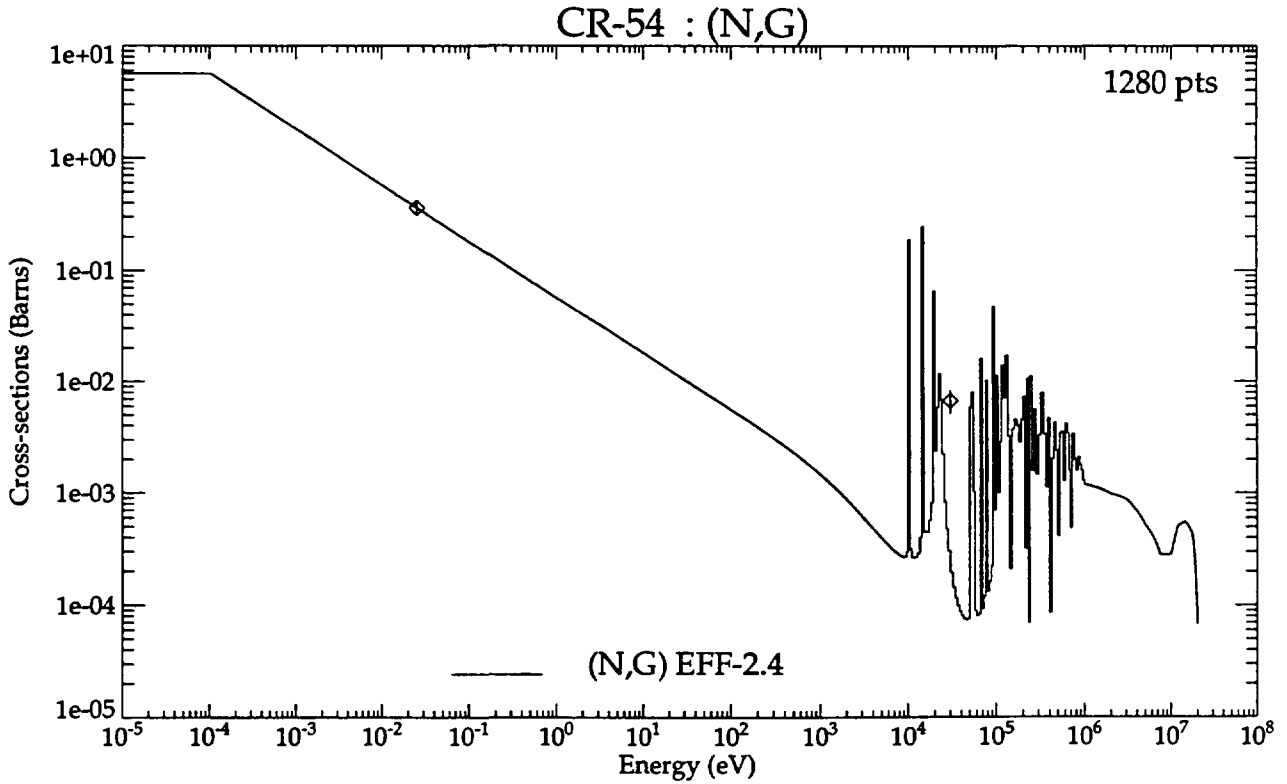
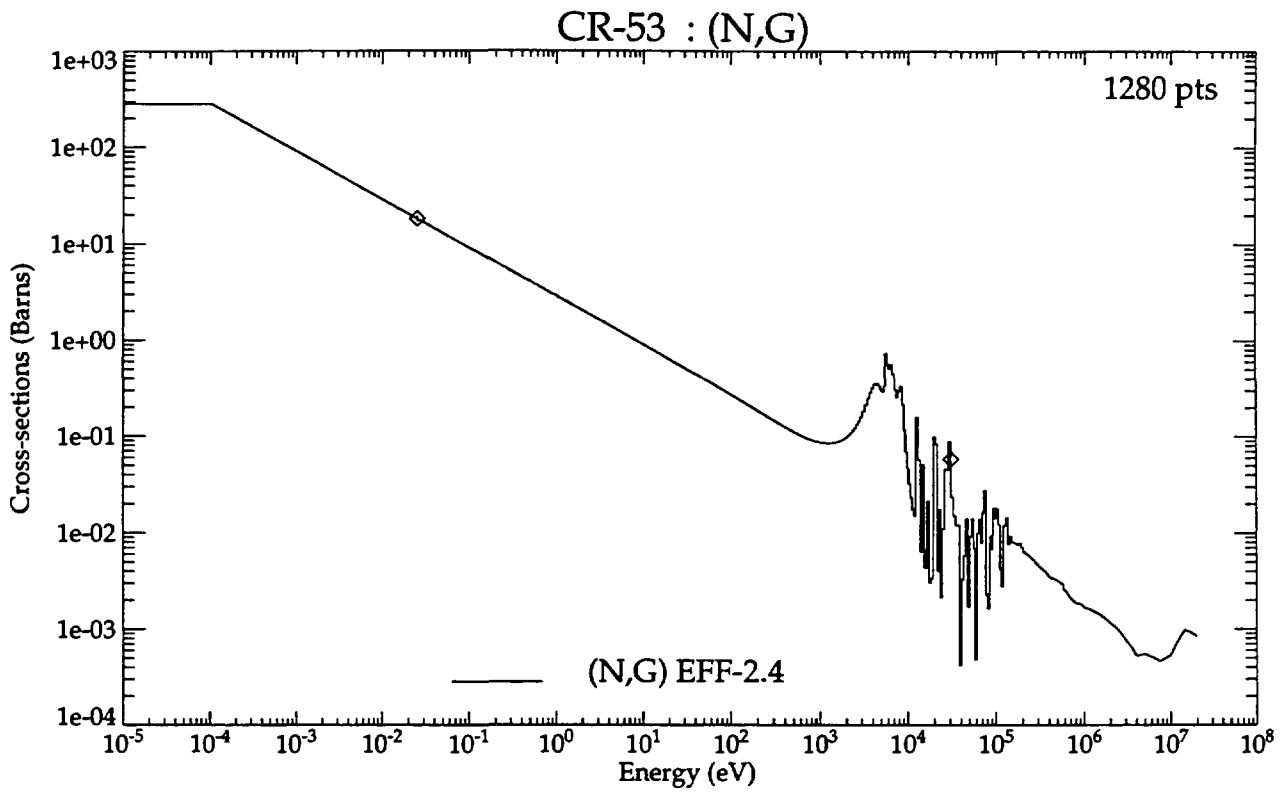


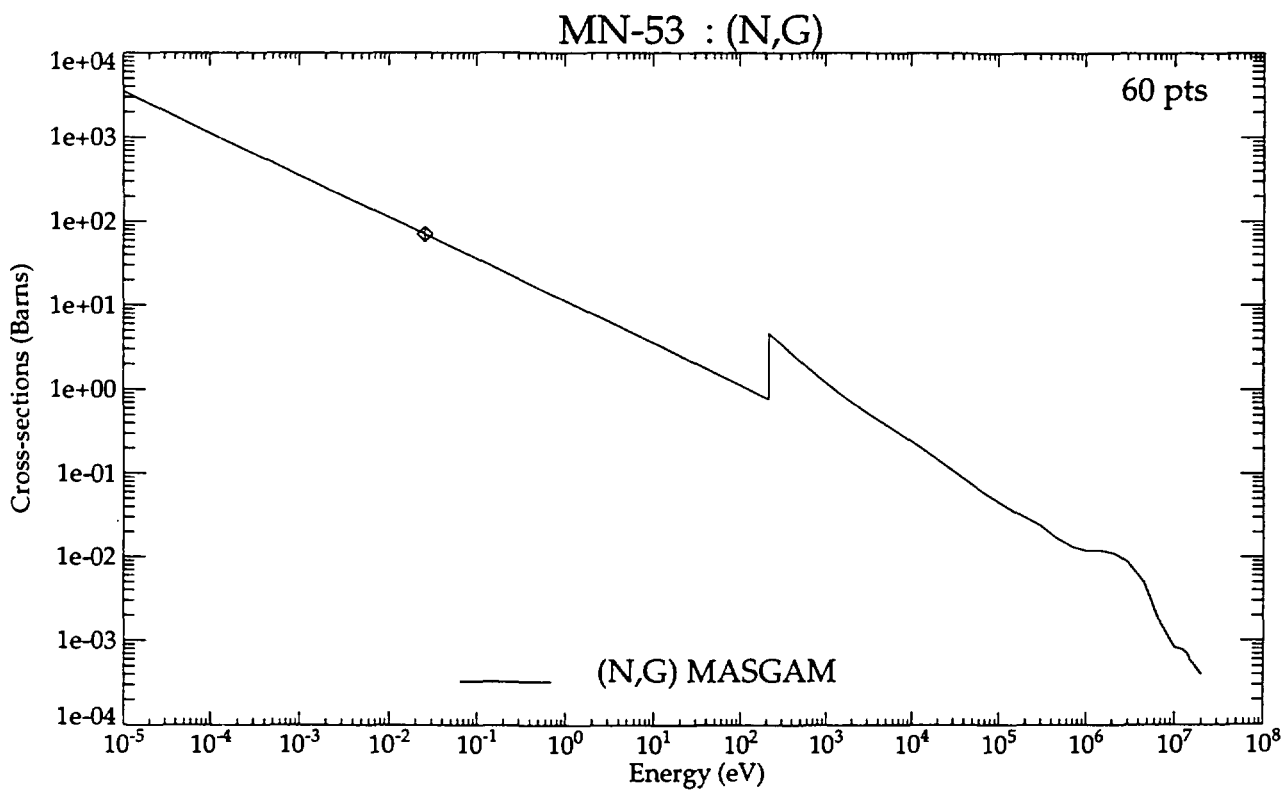
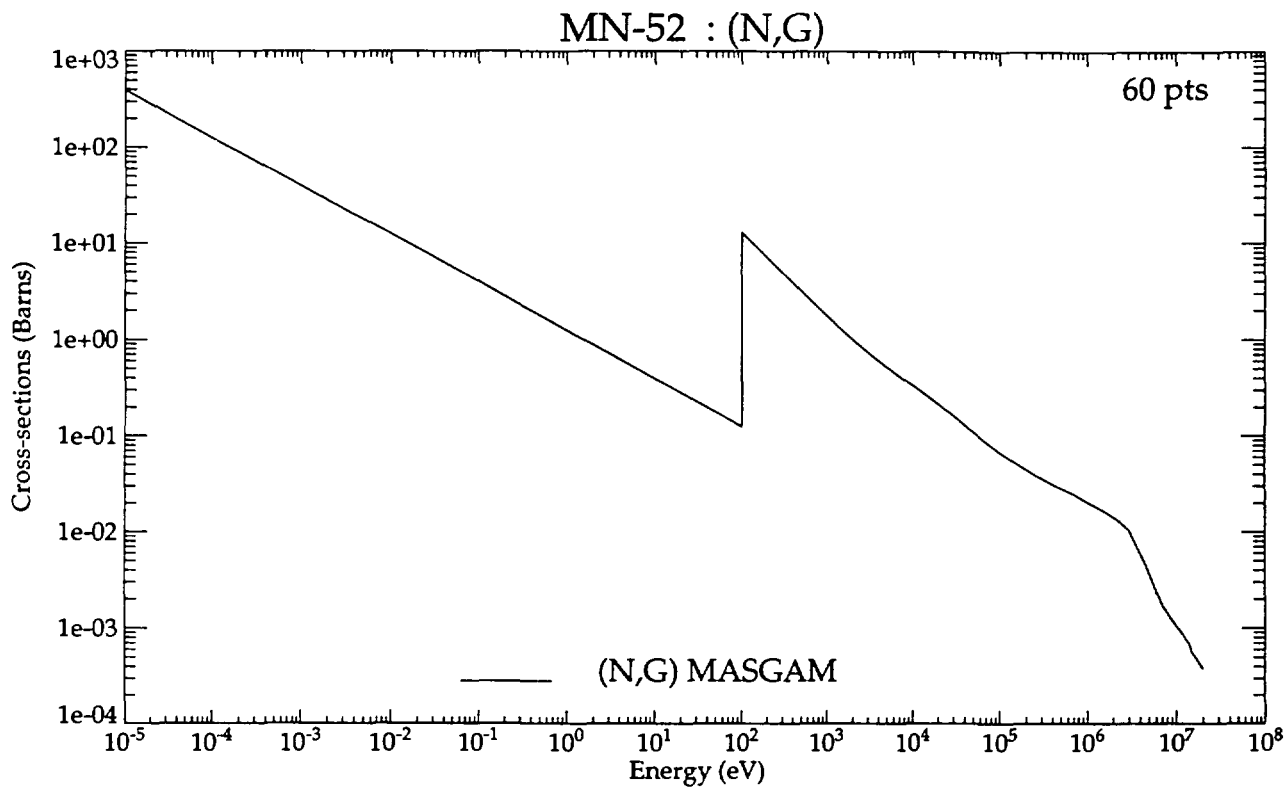




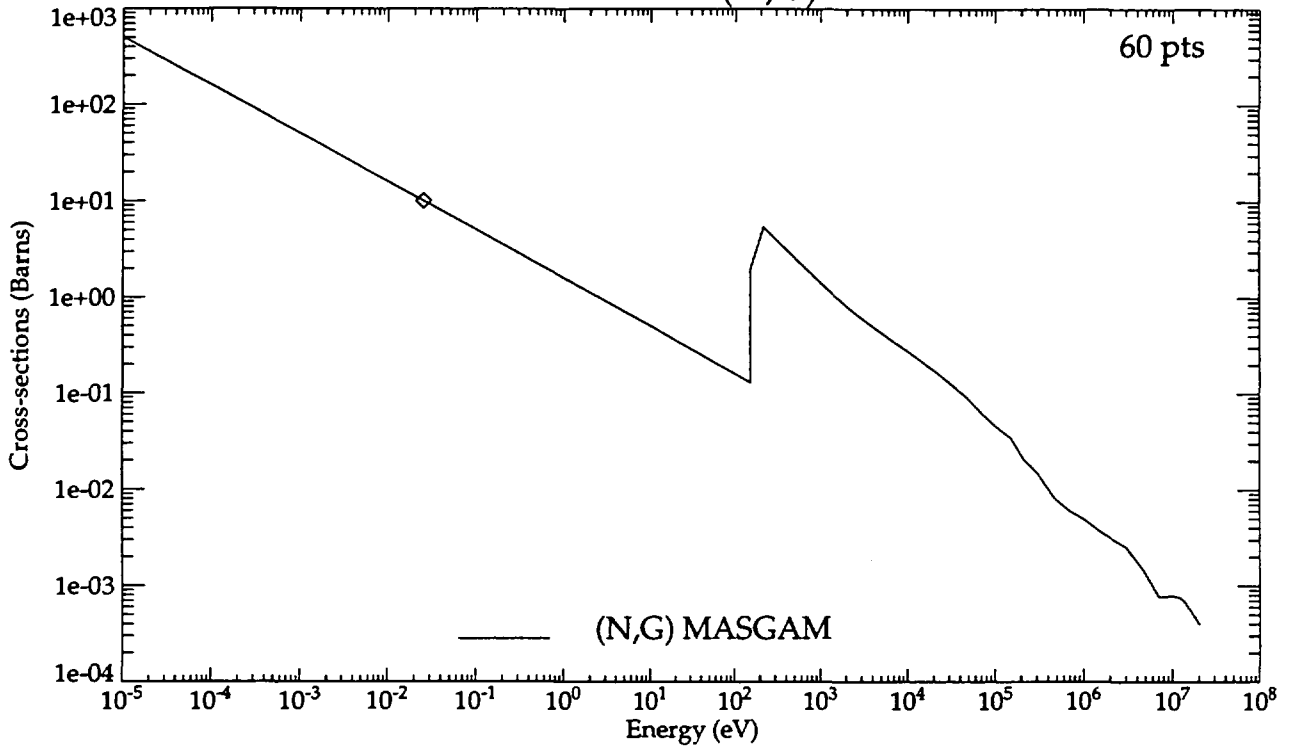




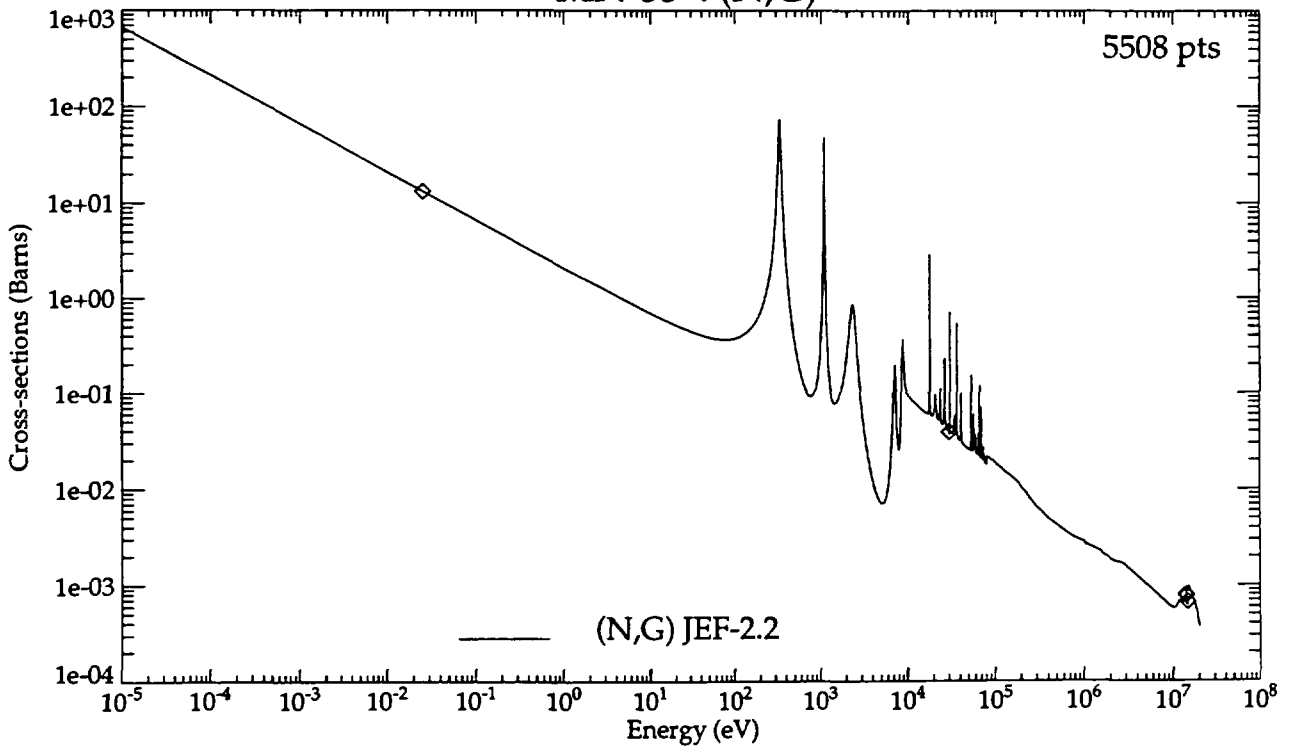


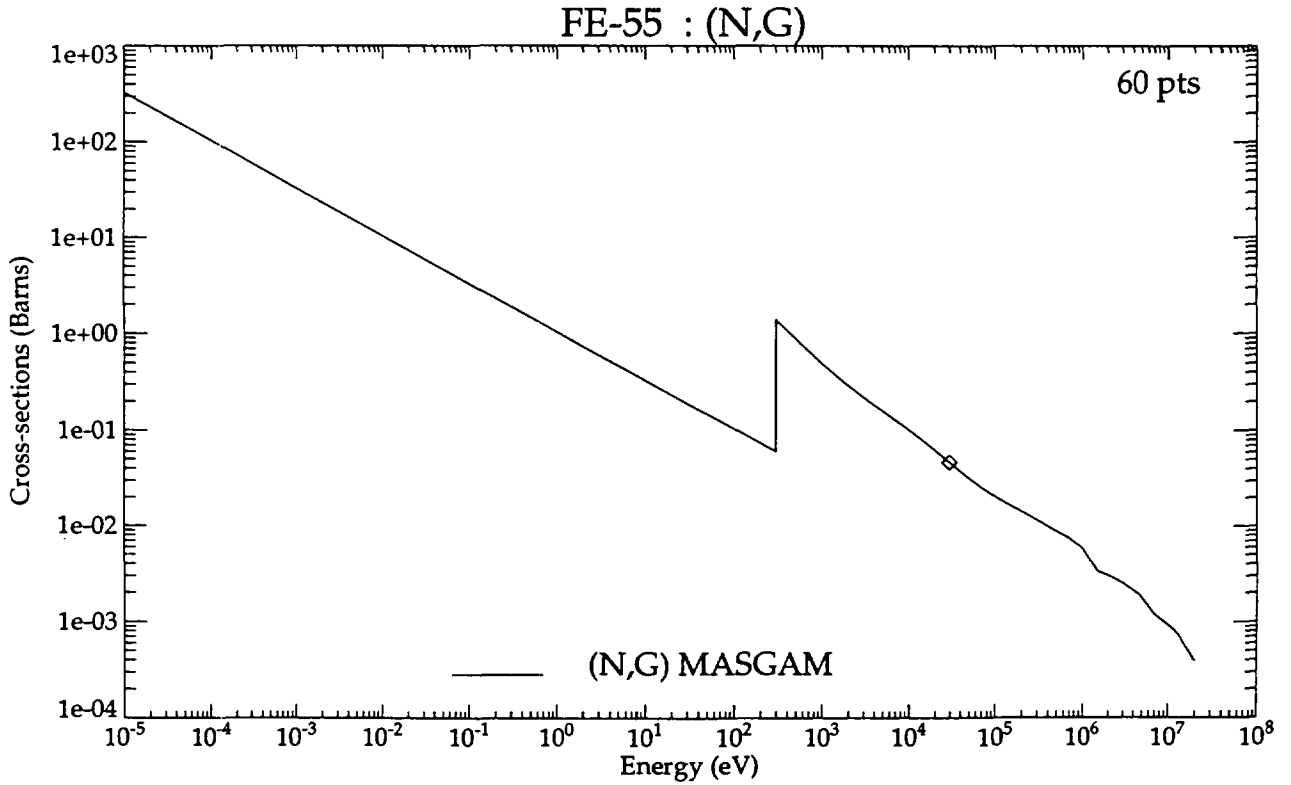
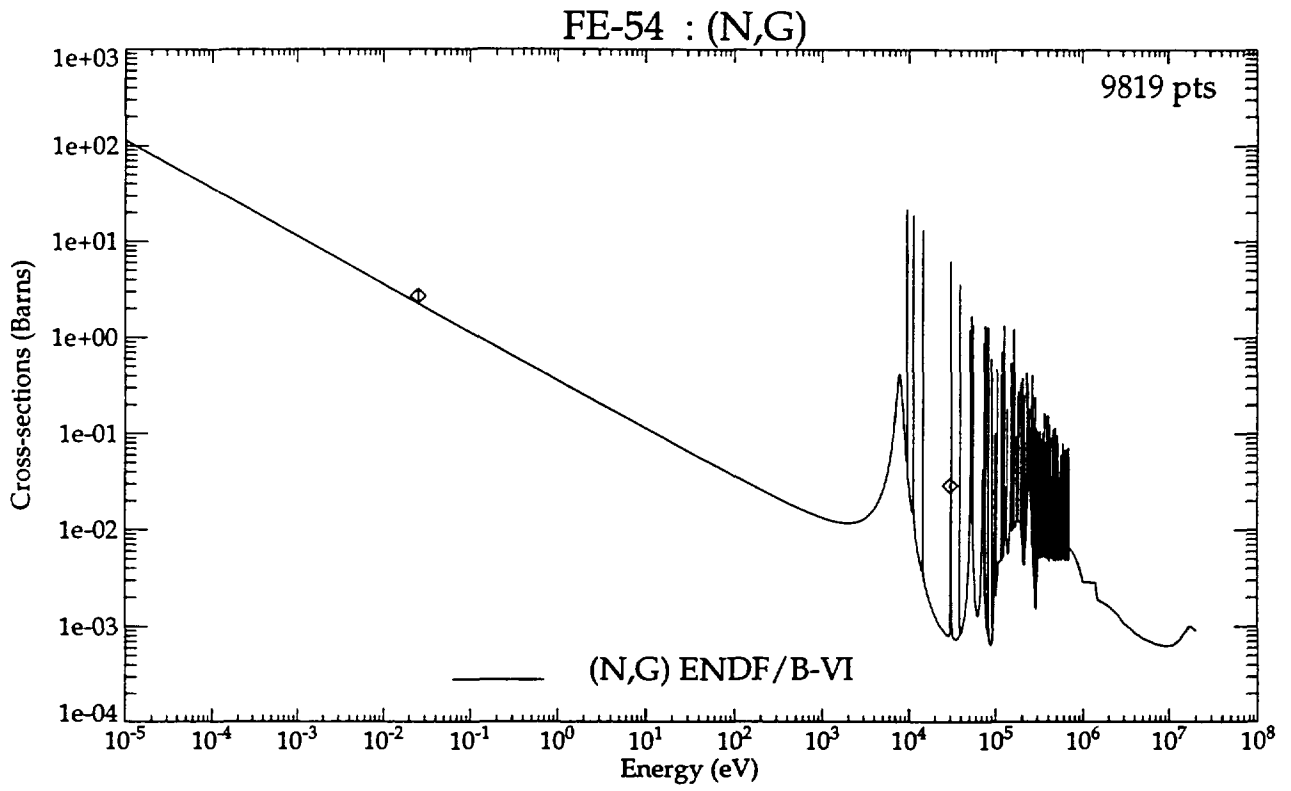


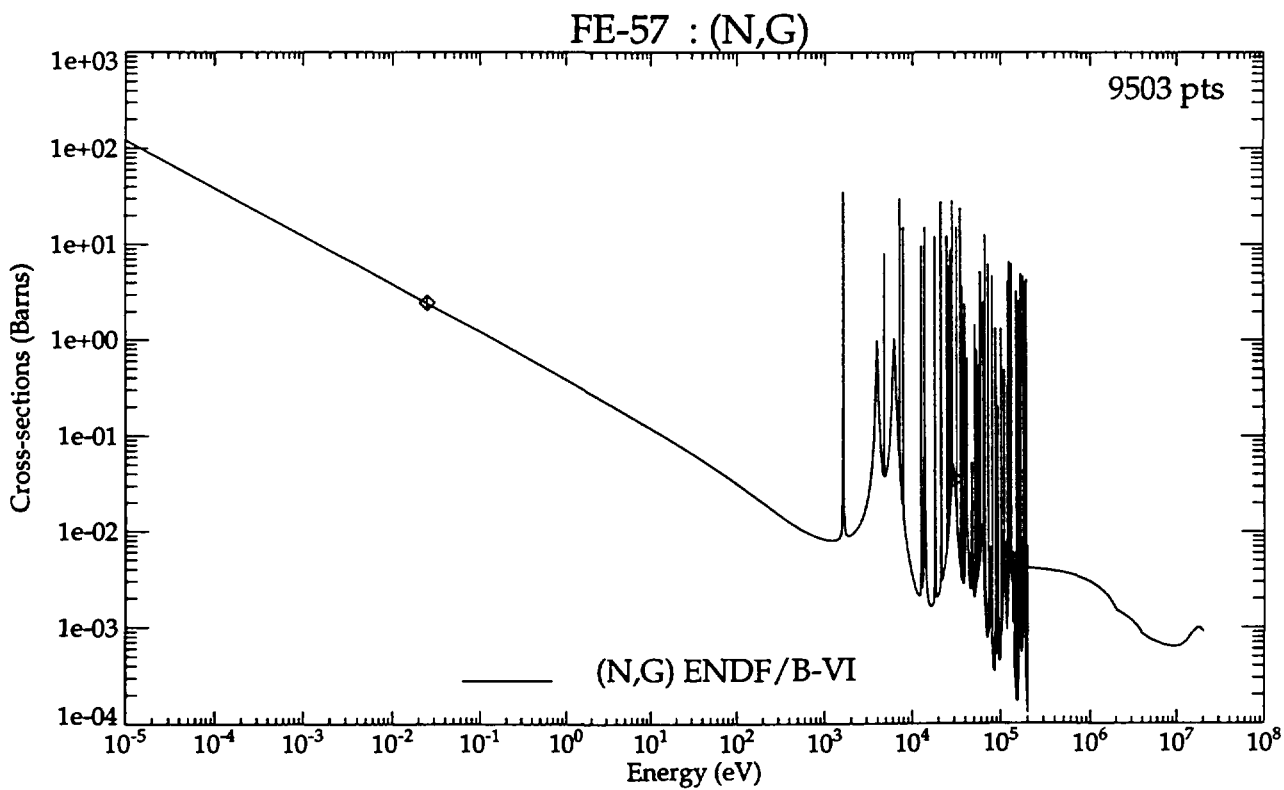
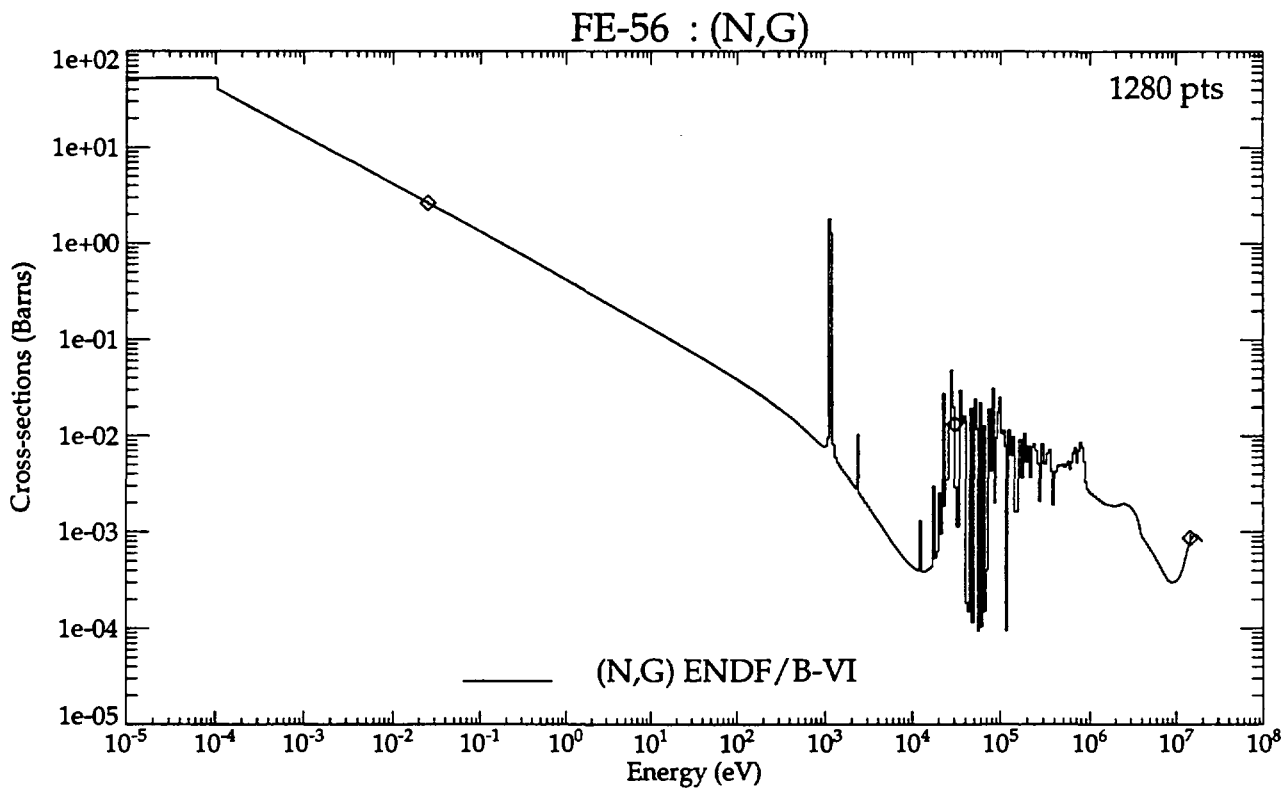
MN-54 : (N,G)

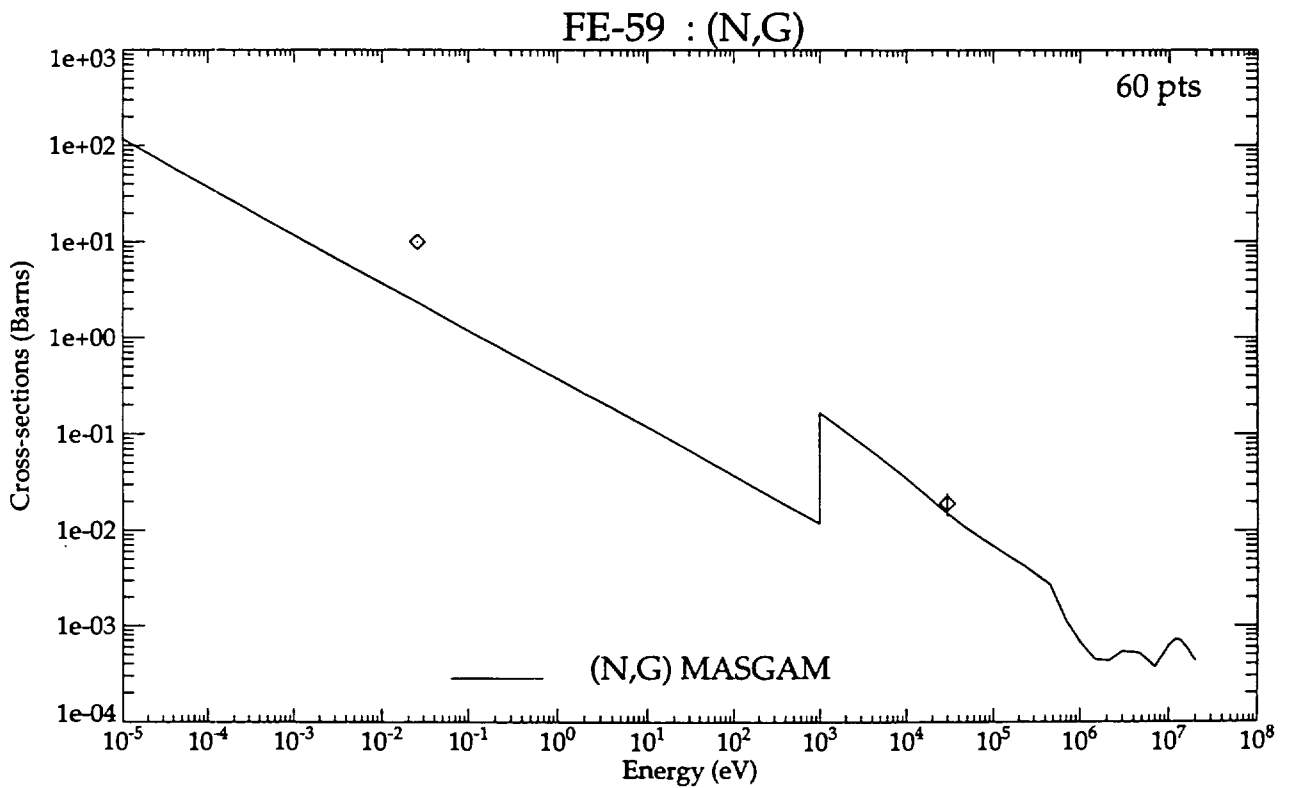
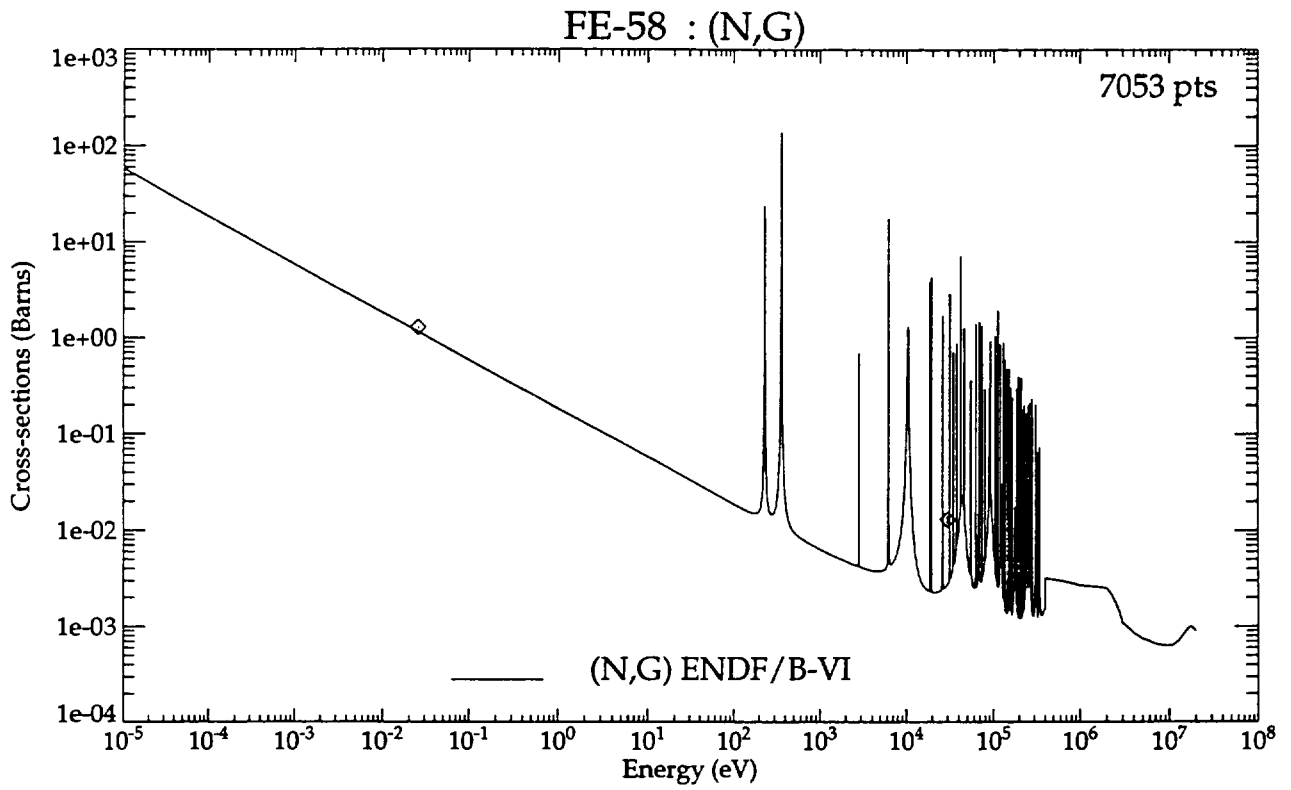


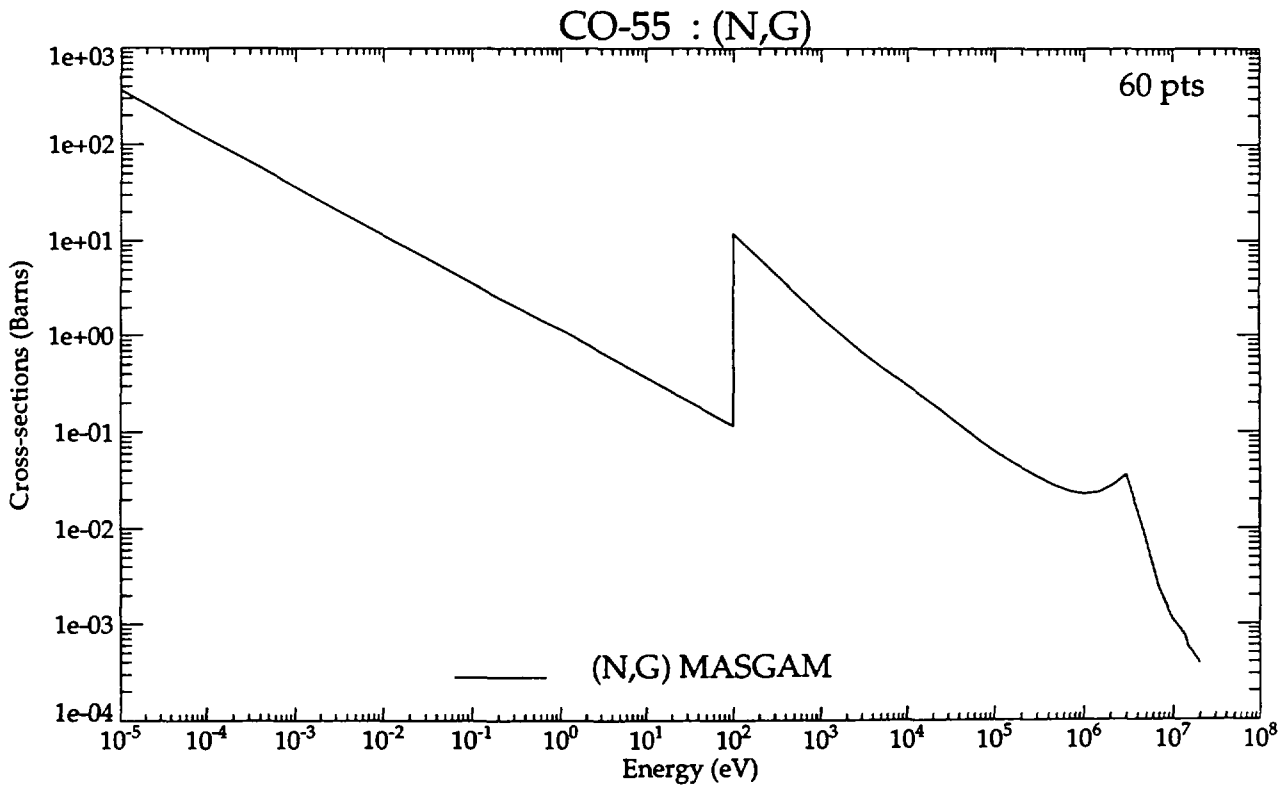
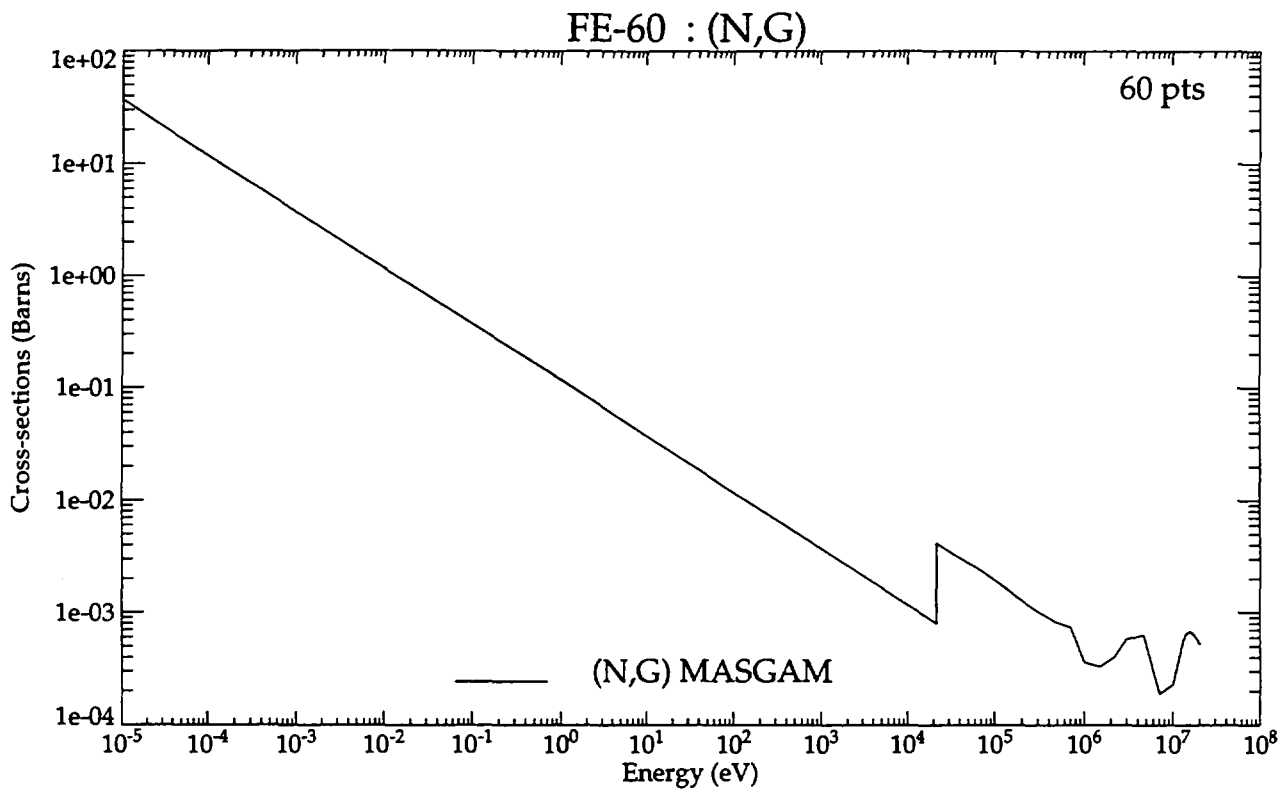
MN-55 : (N,G)

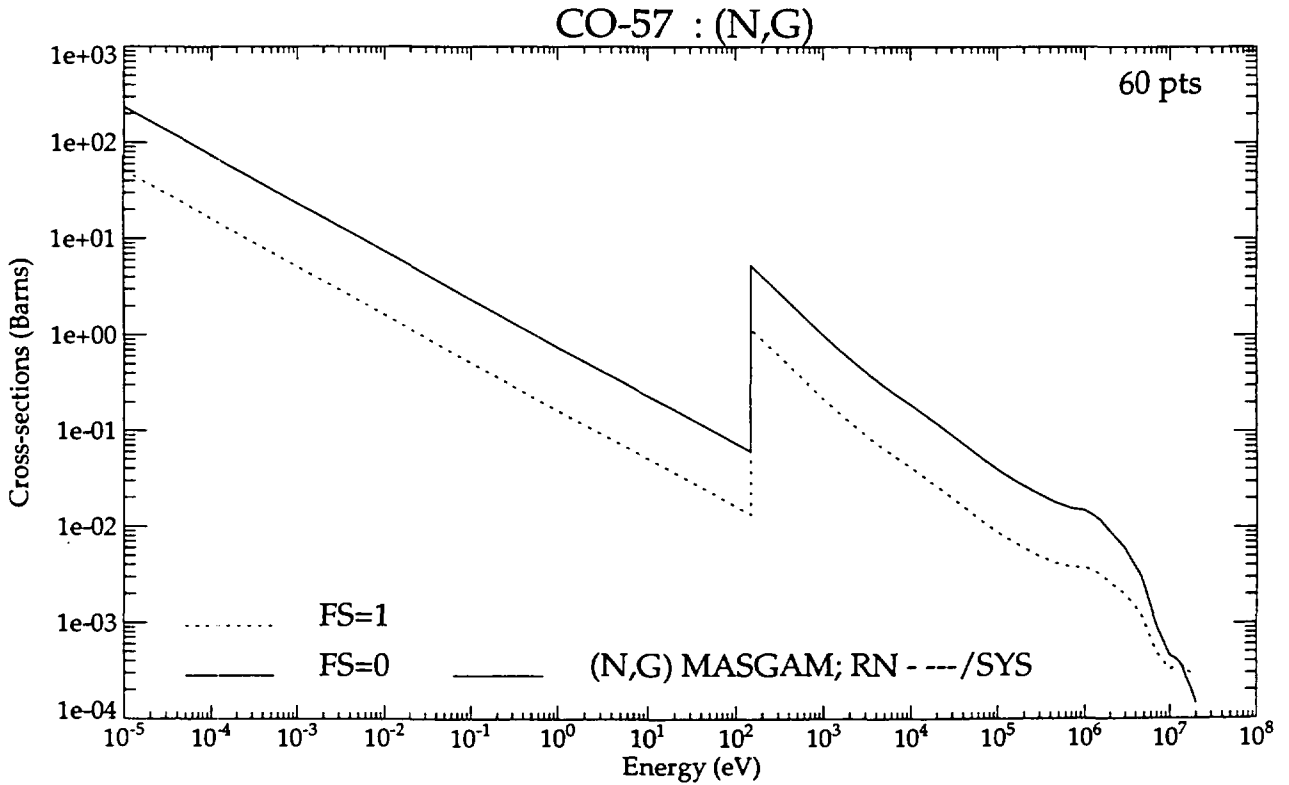
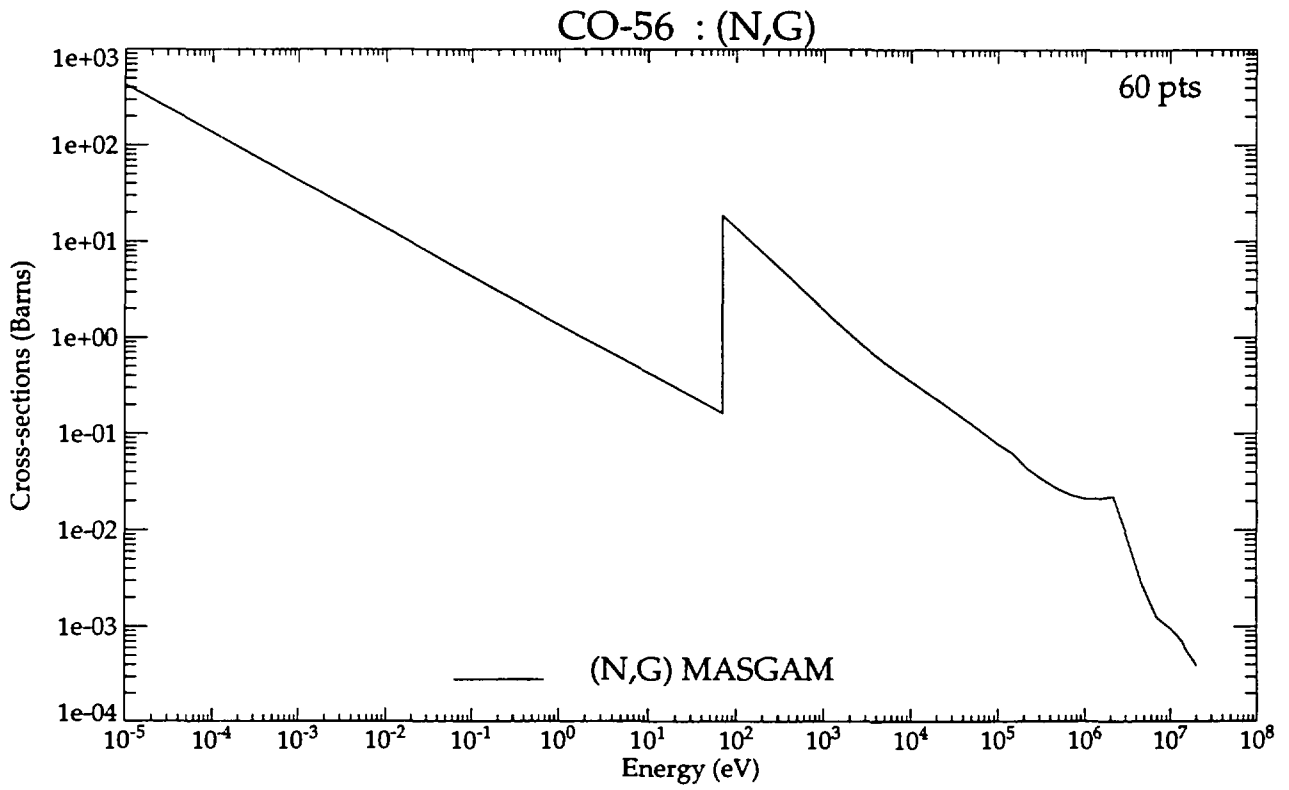


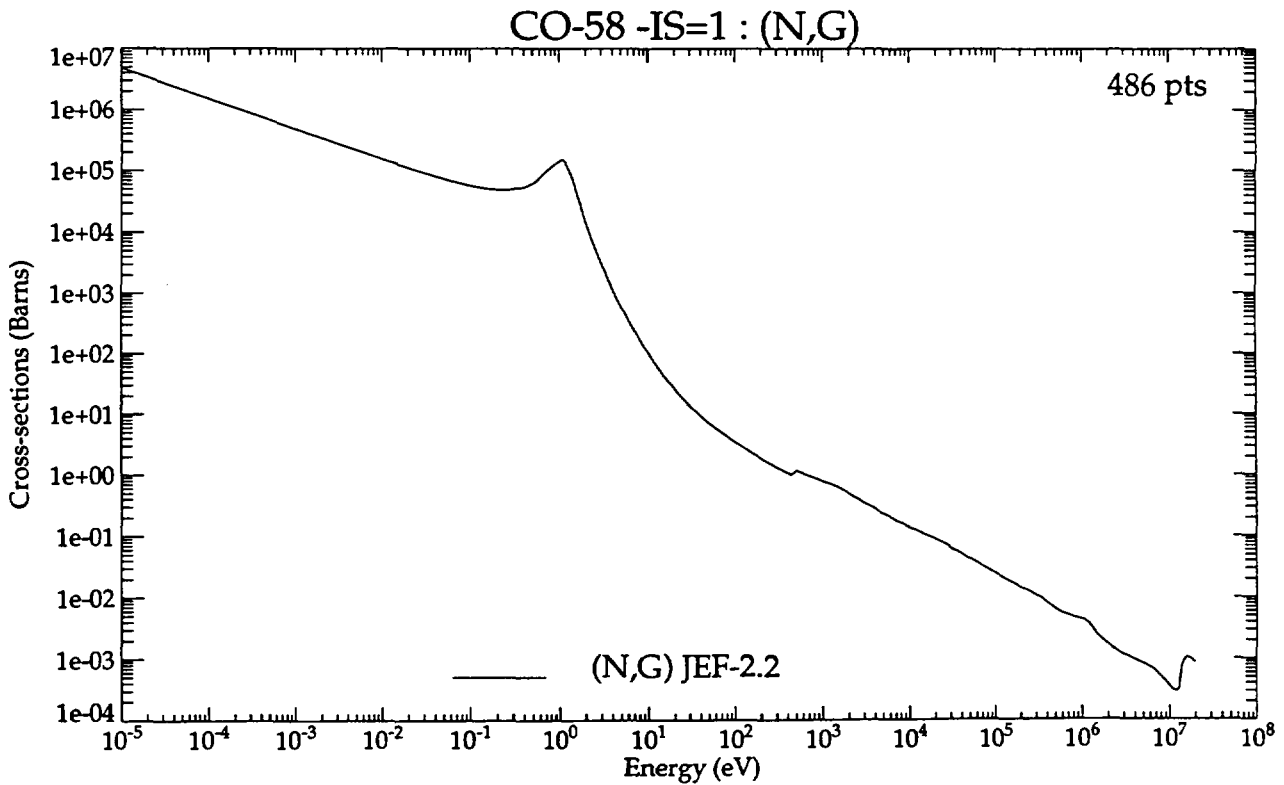
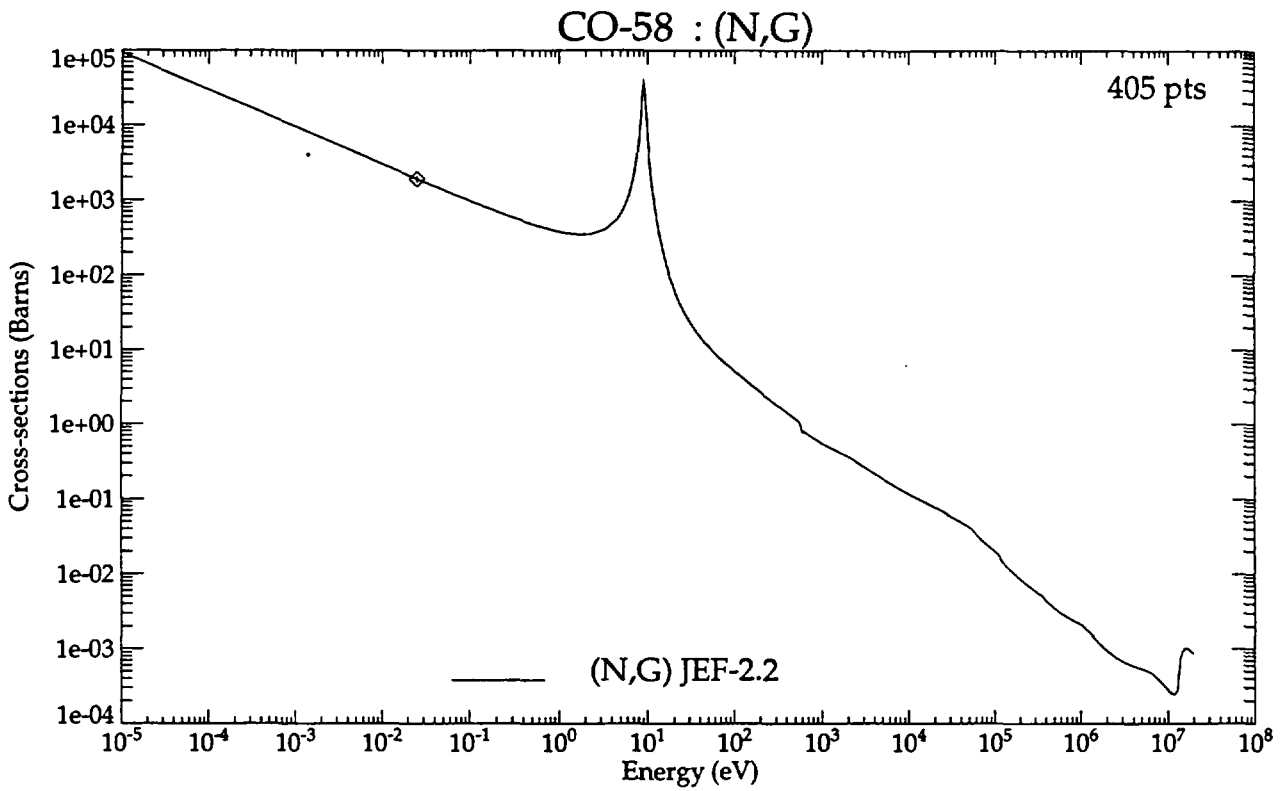


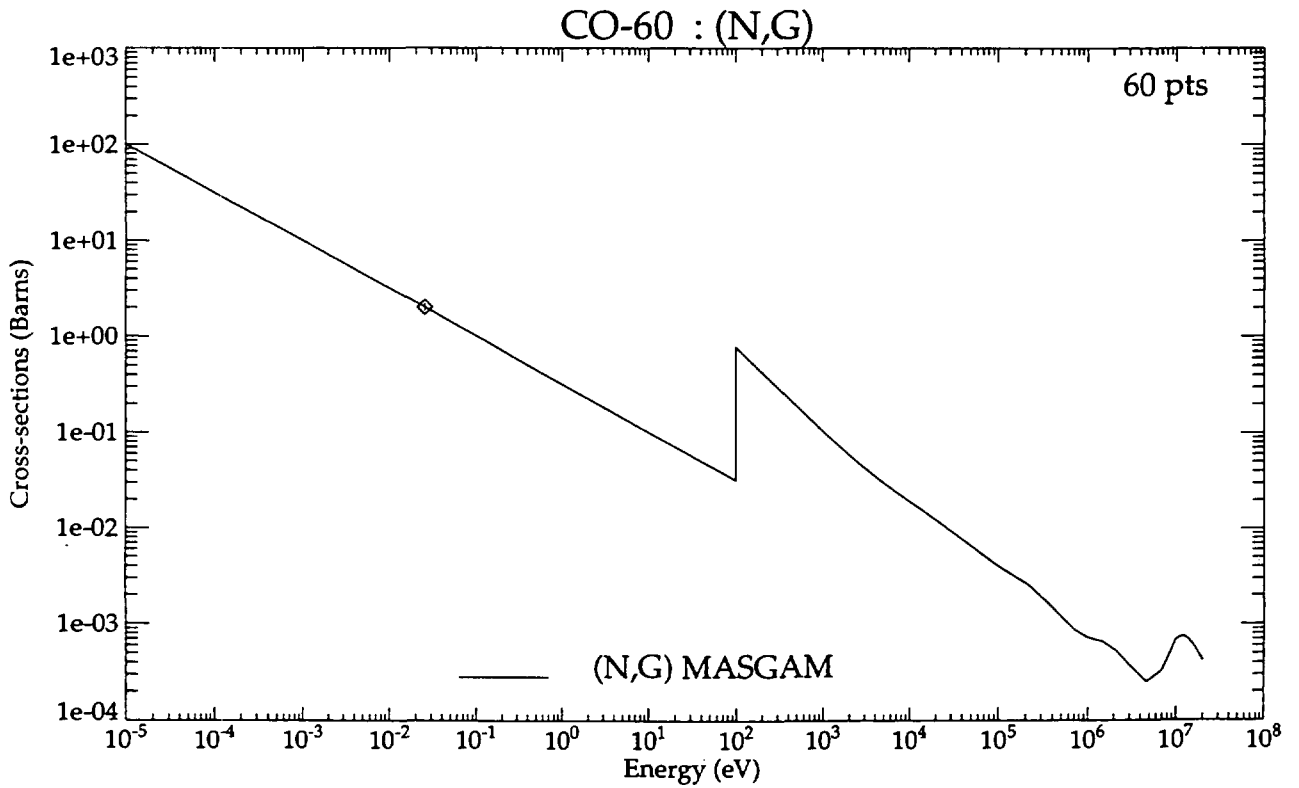
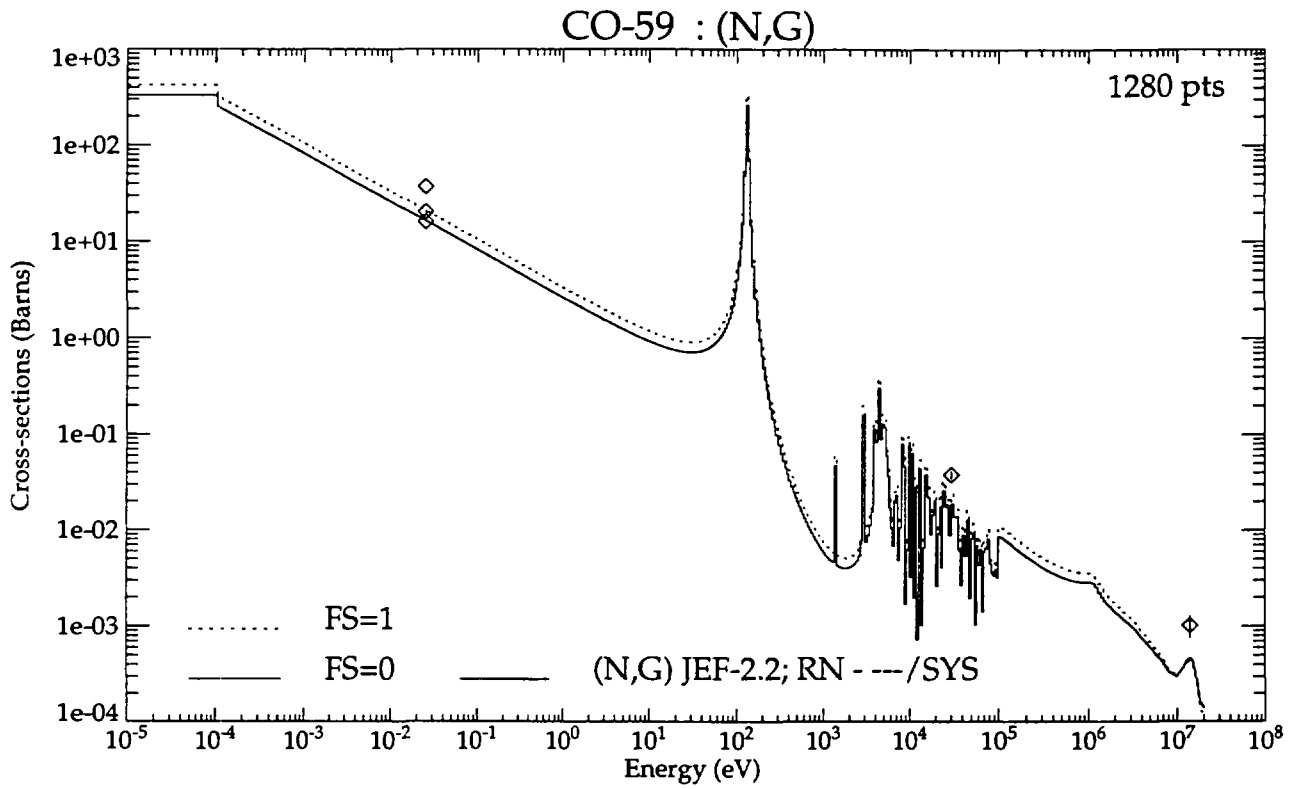


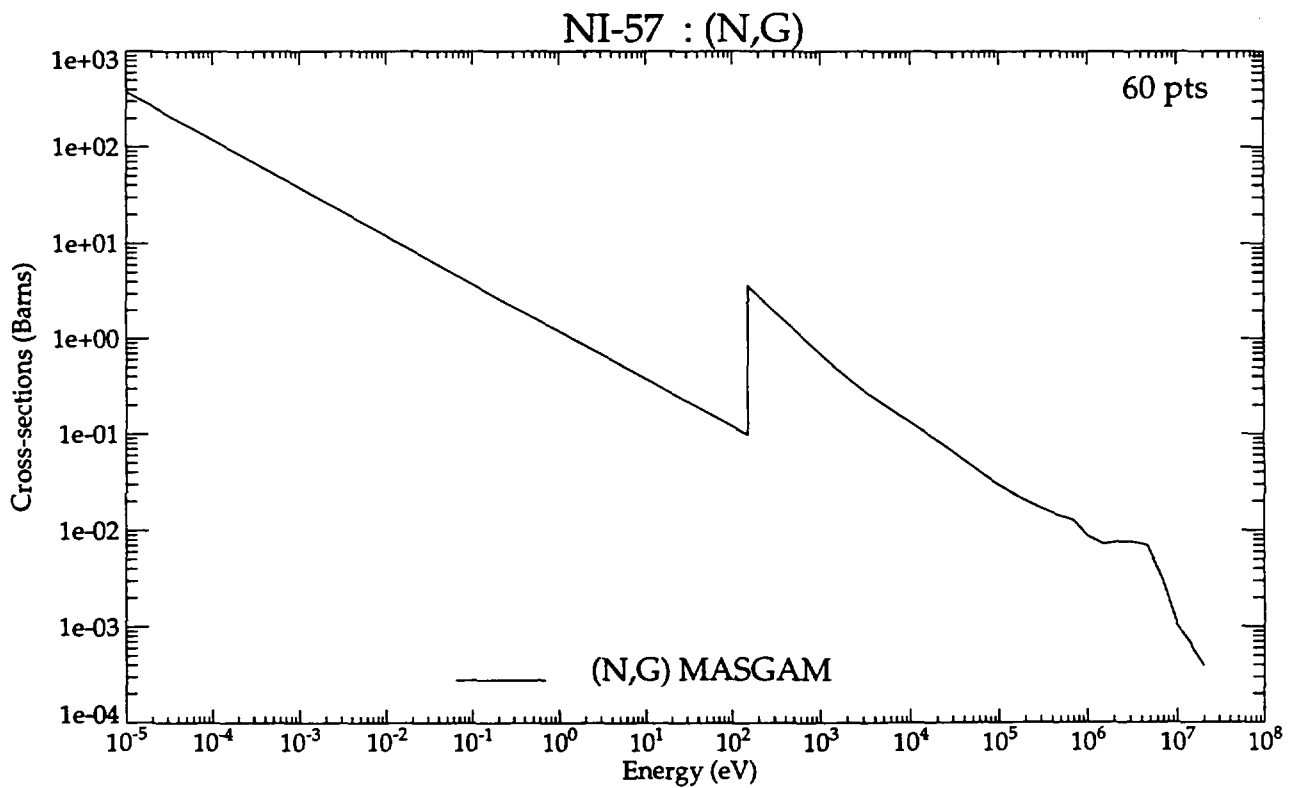
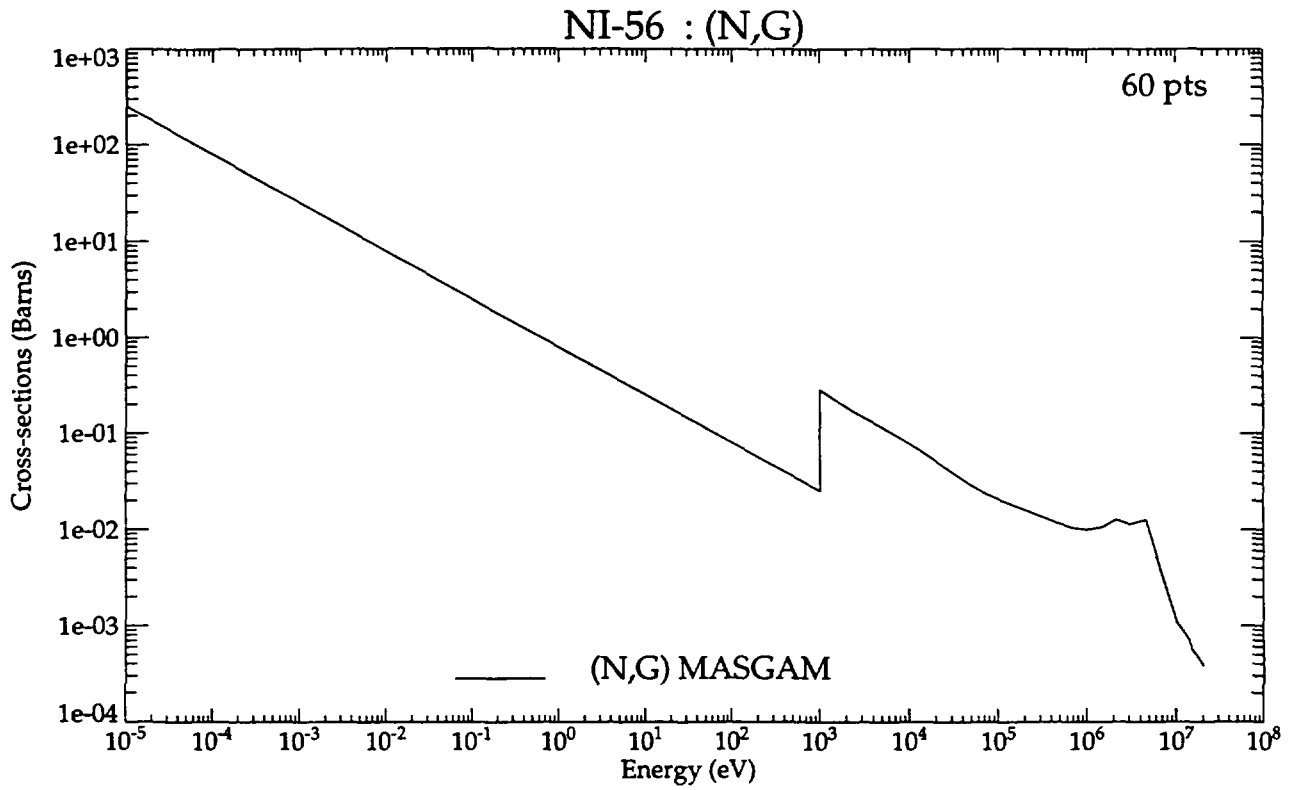


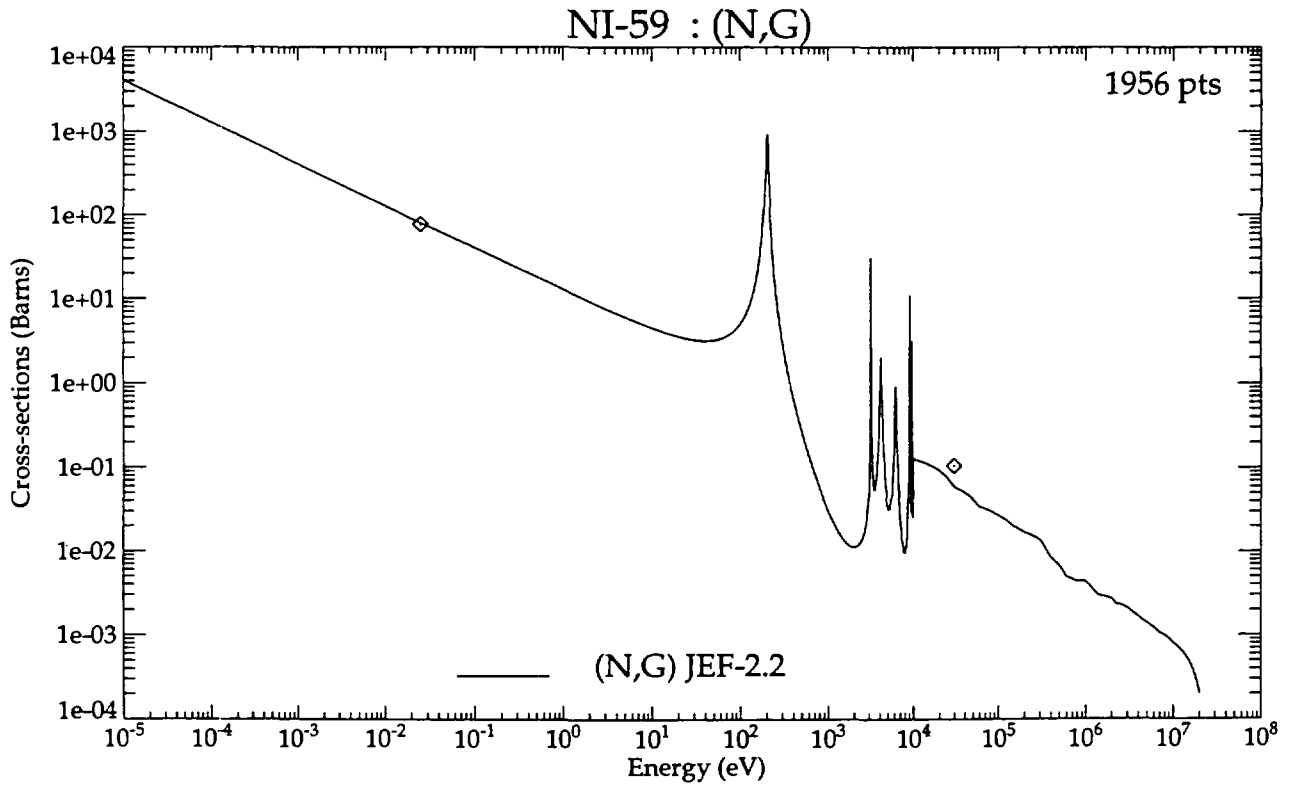
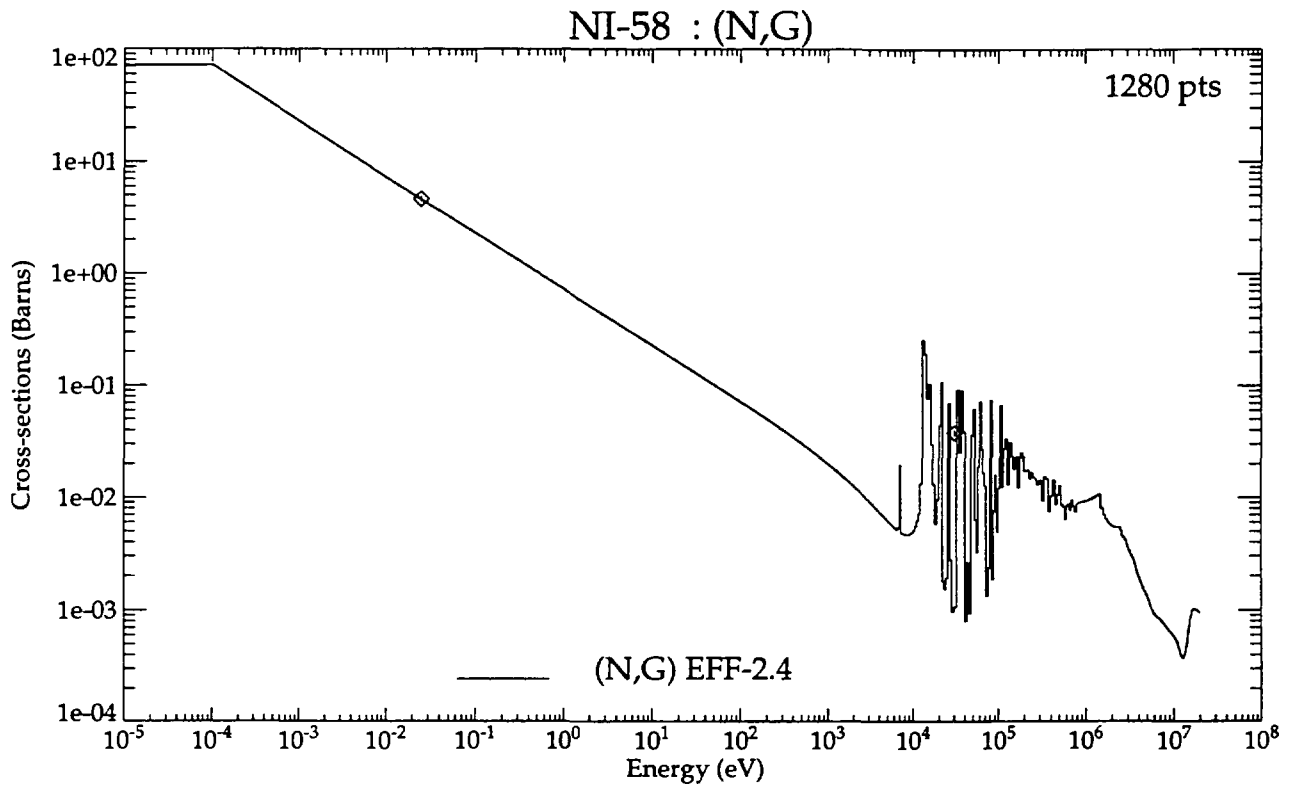


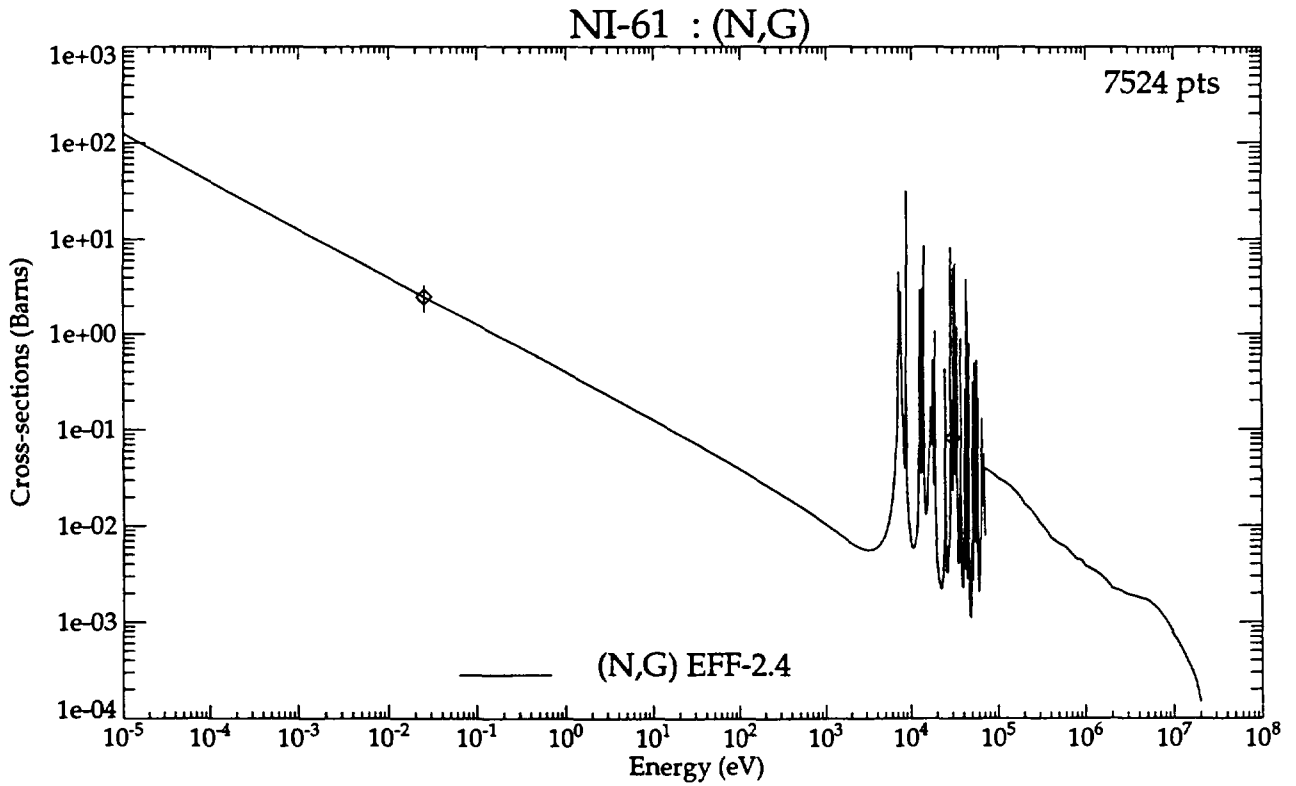
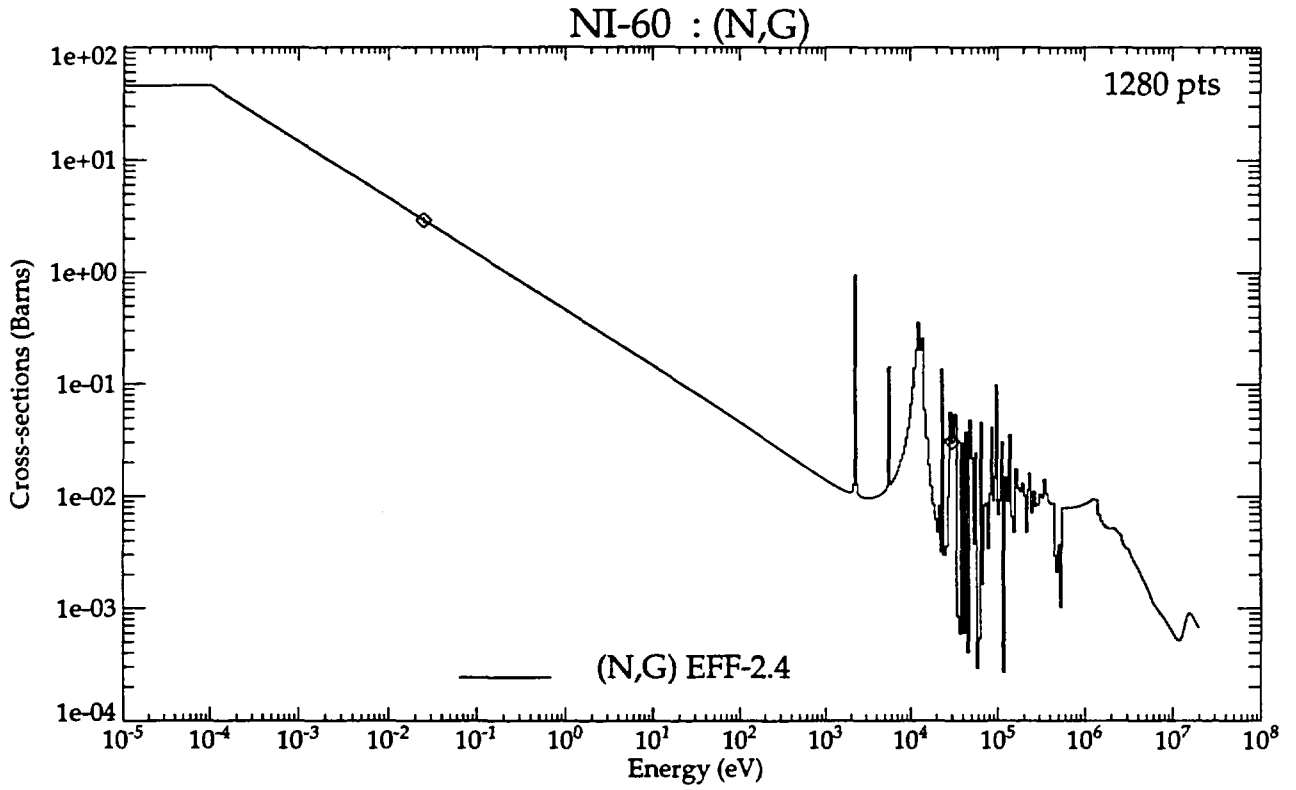


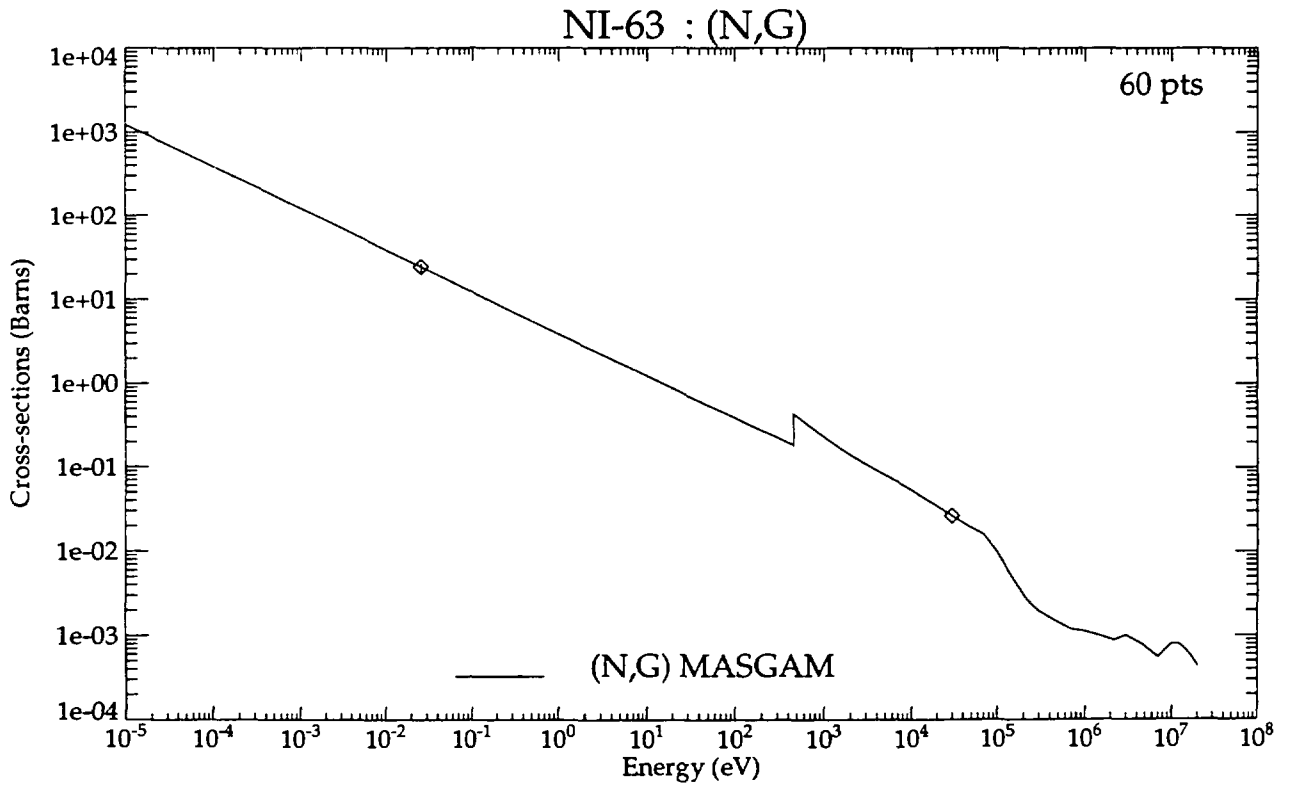
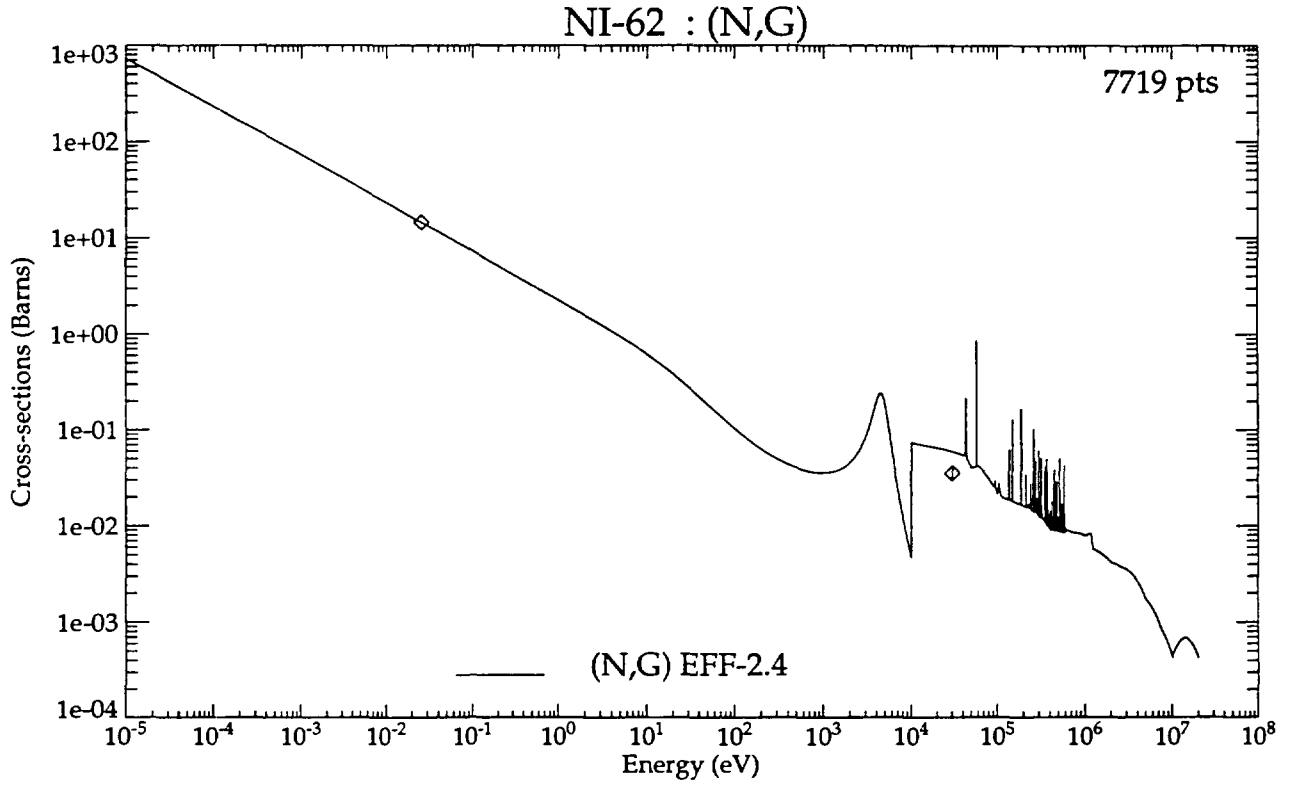


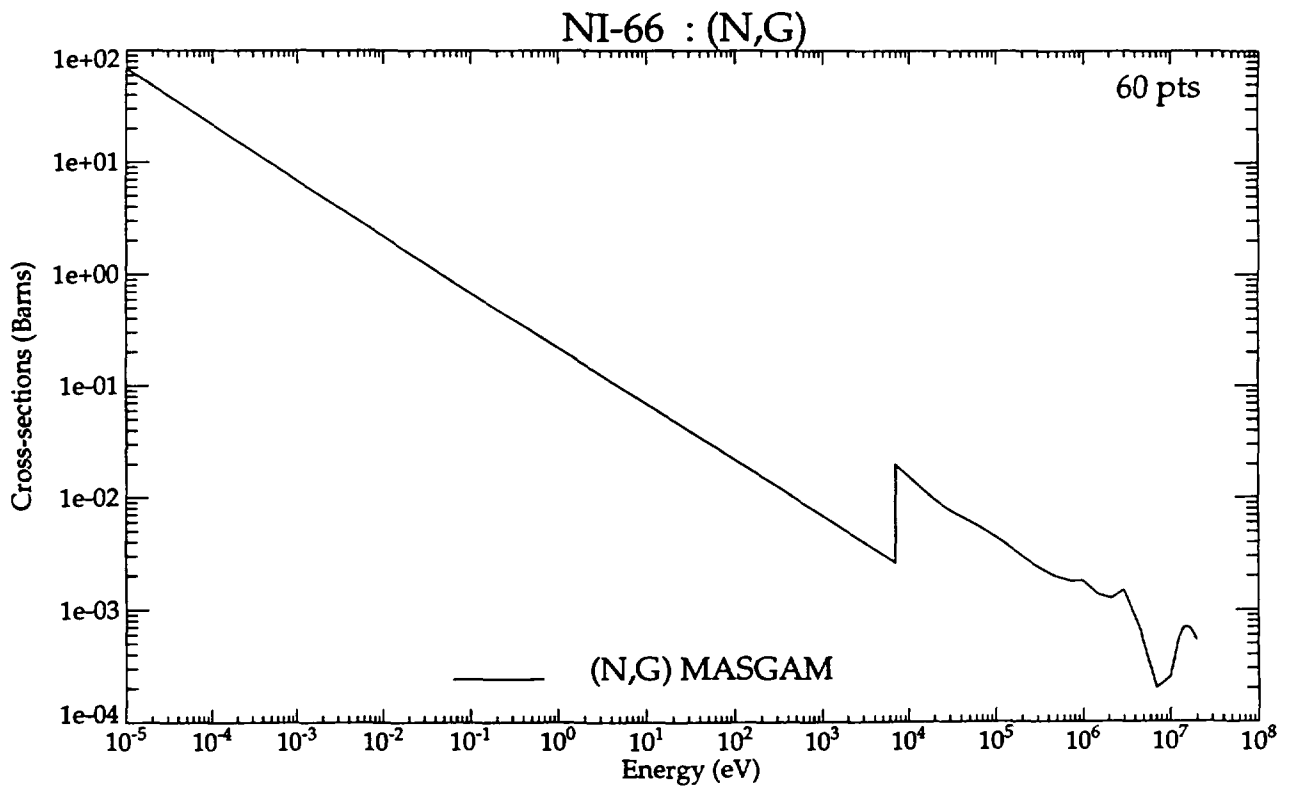
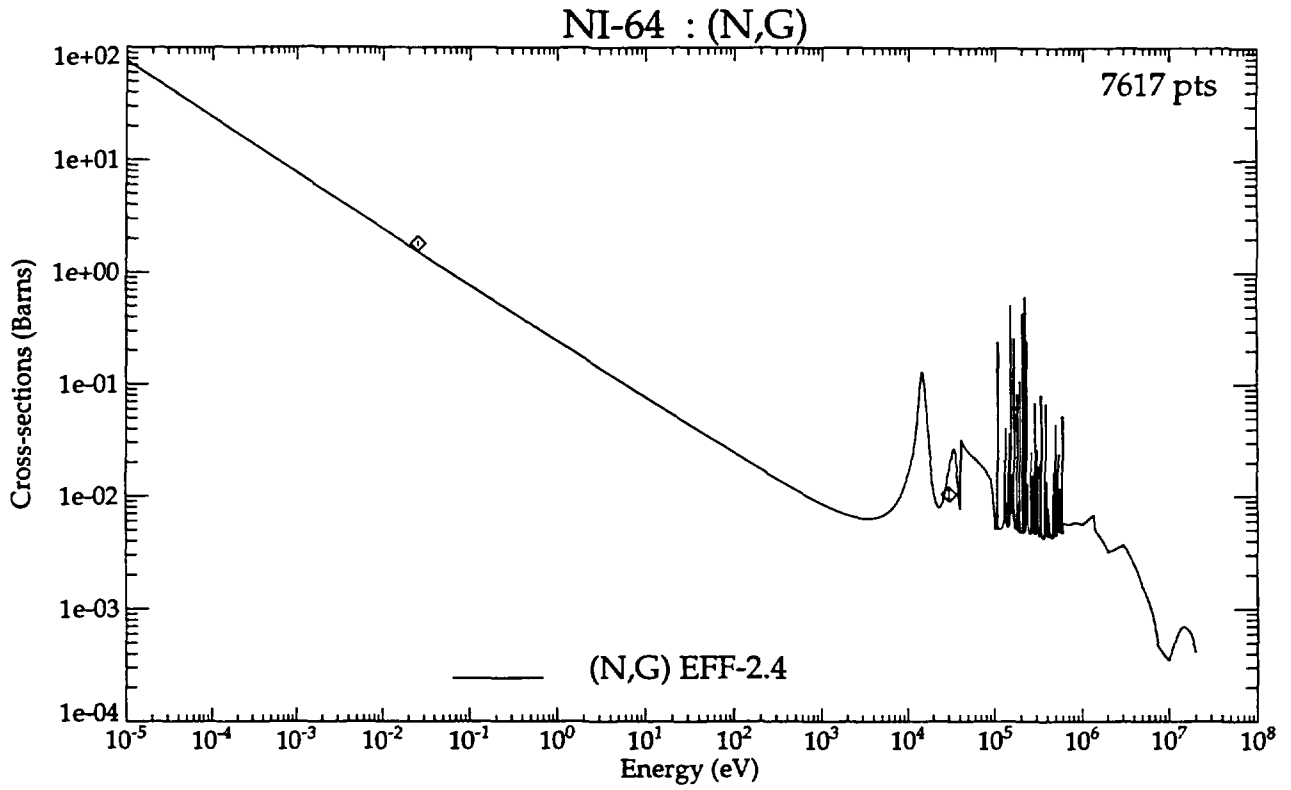


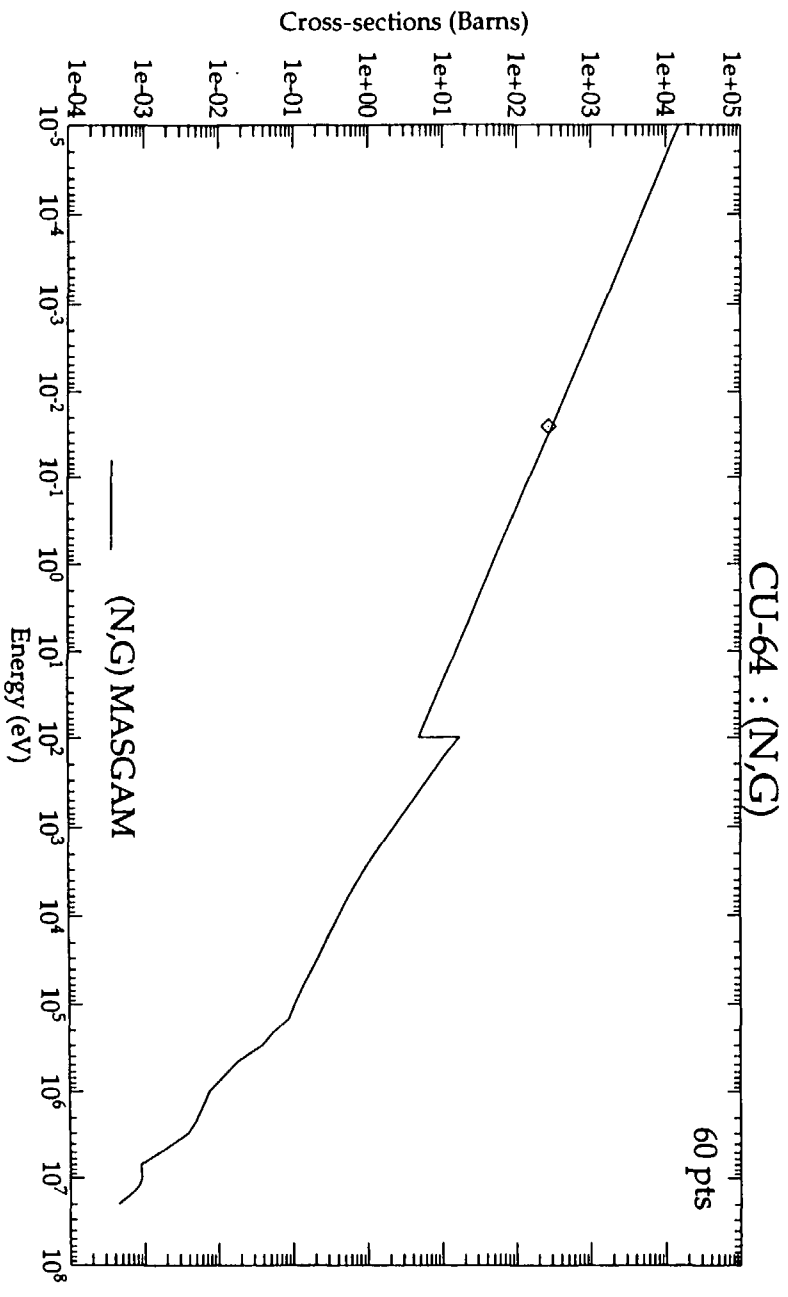
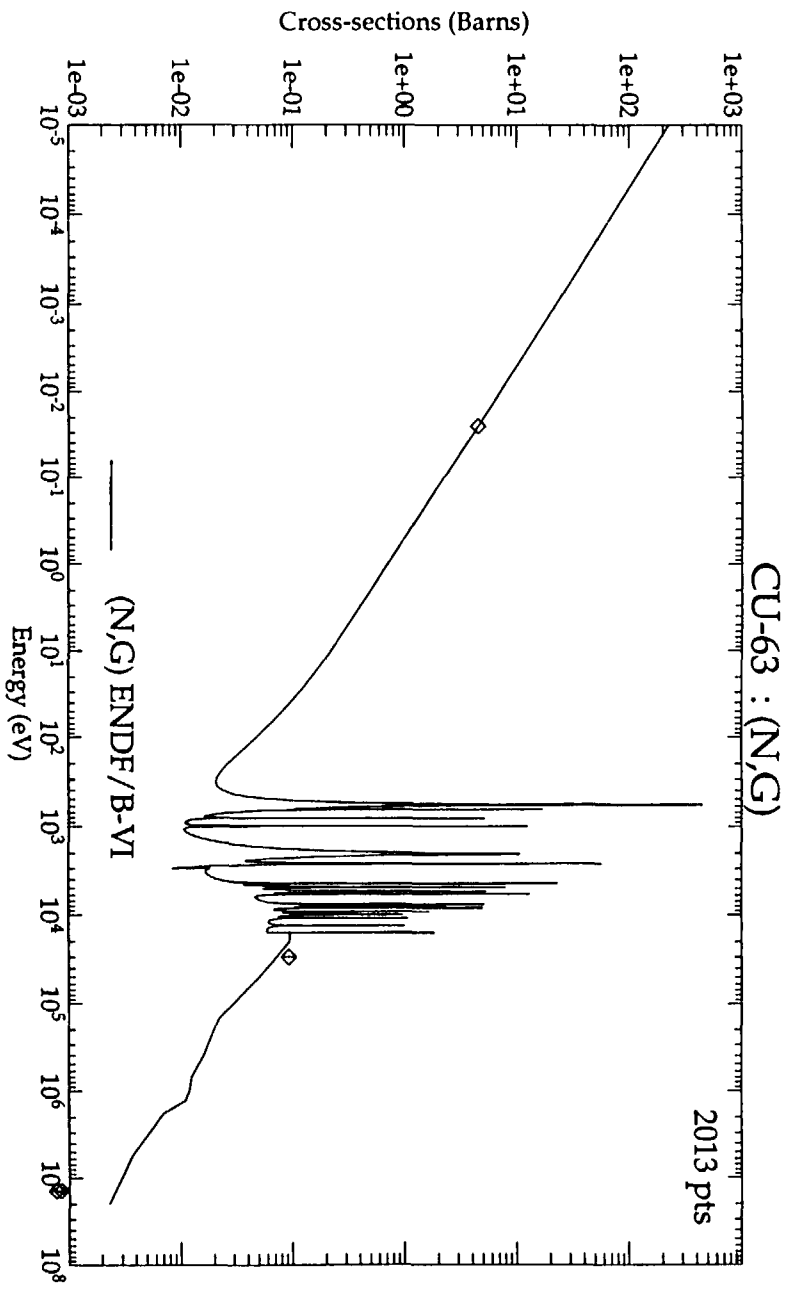


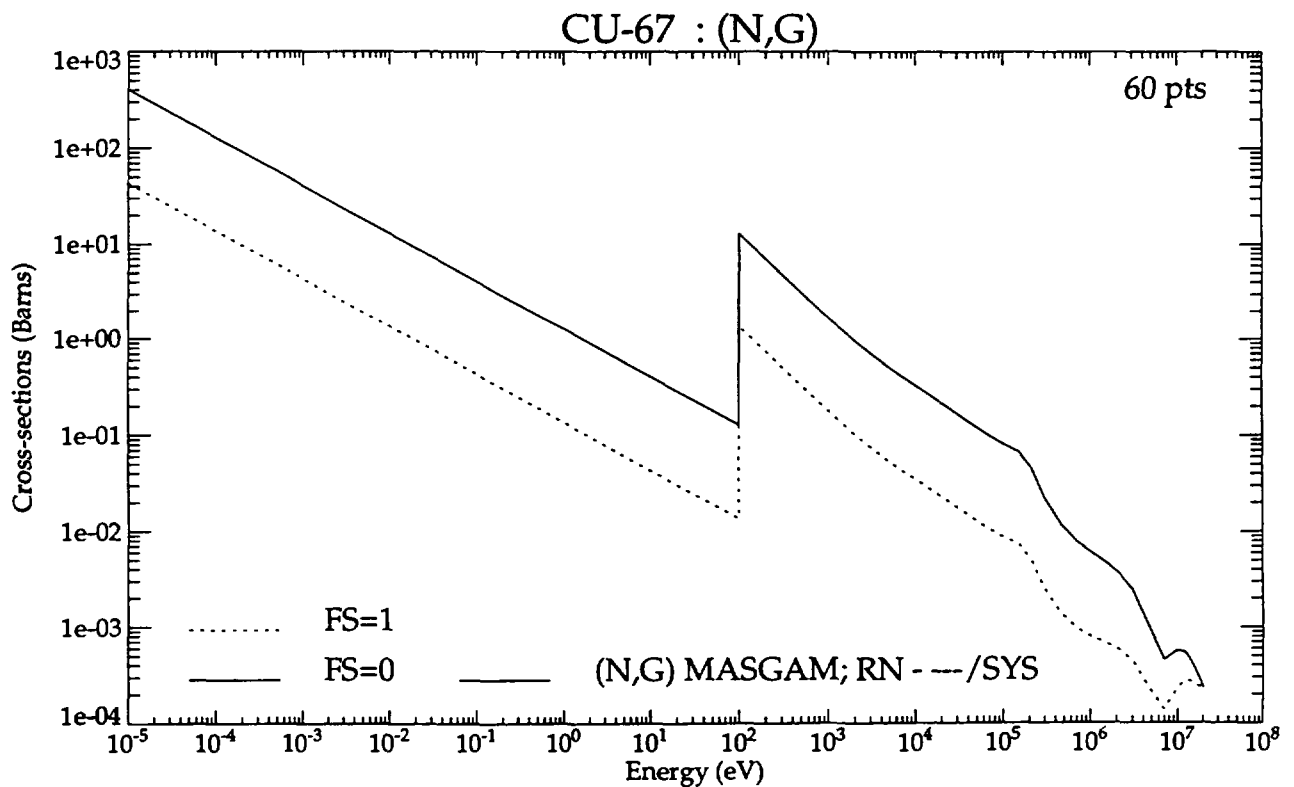
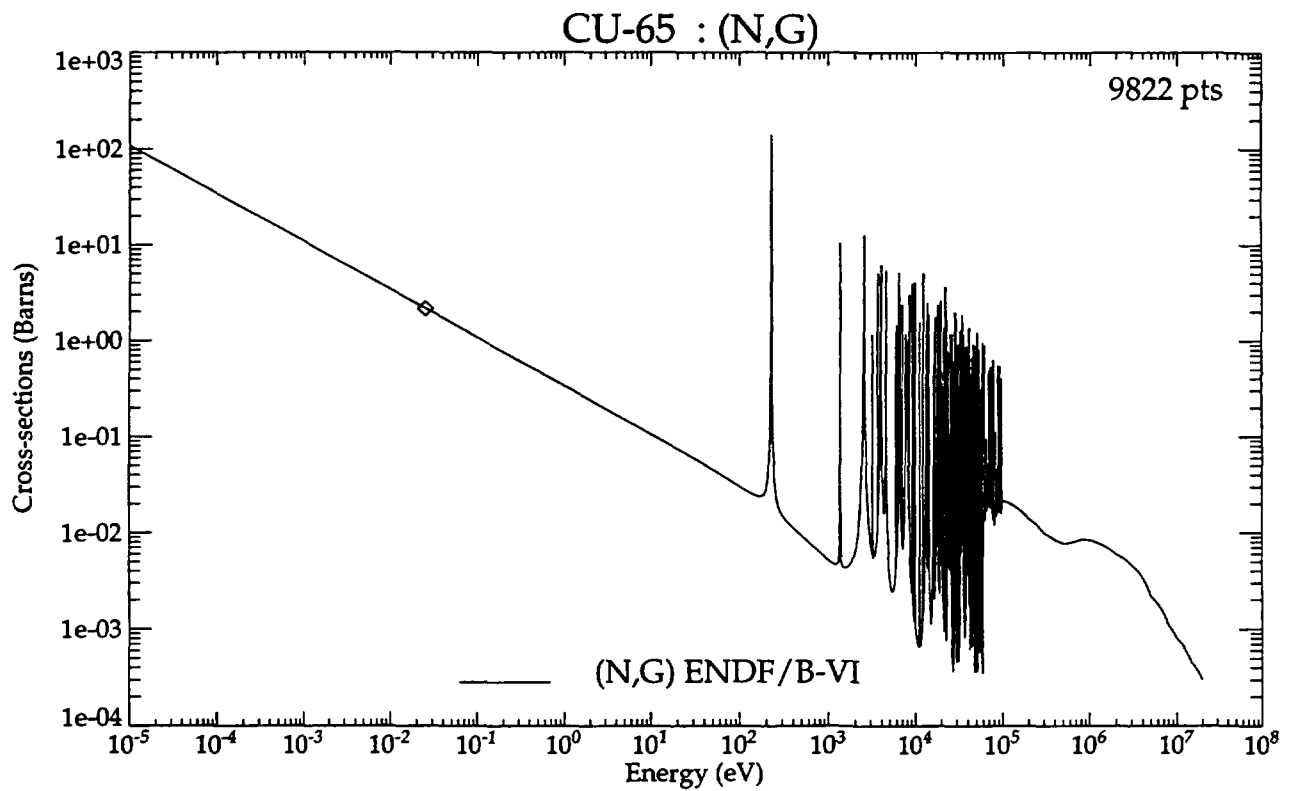


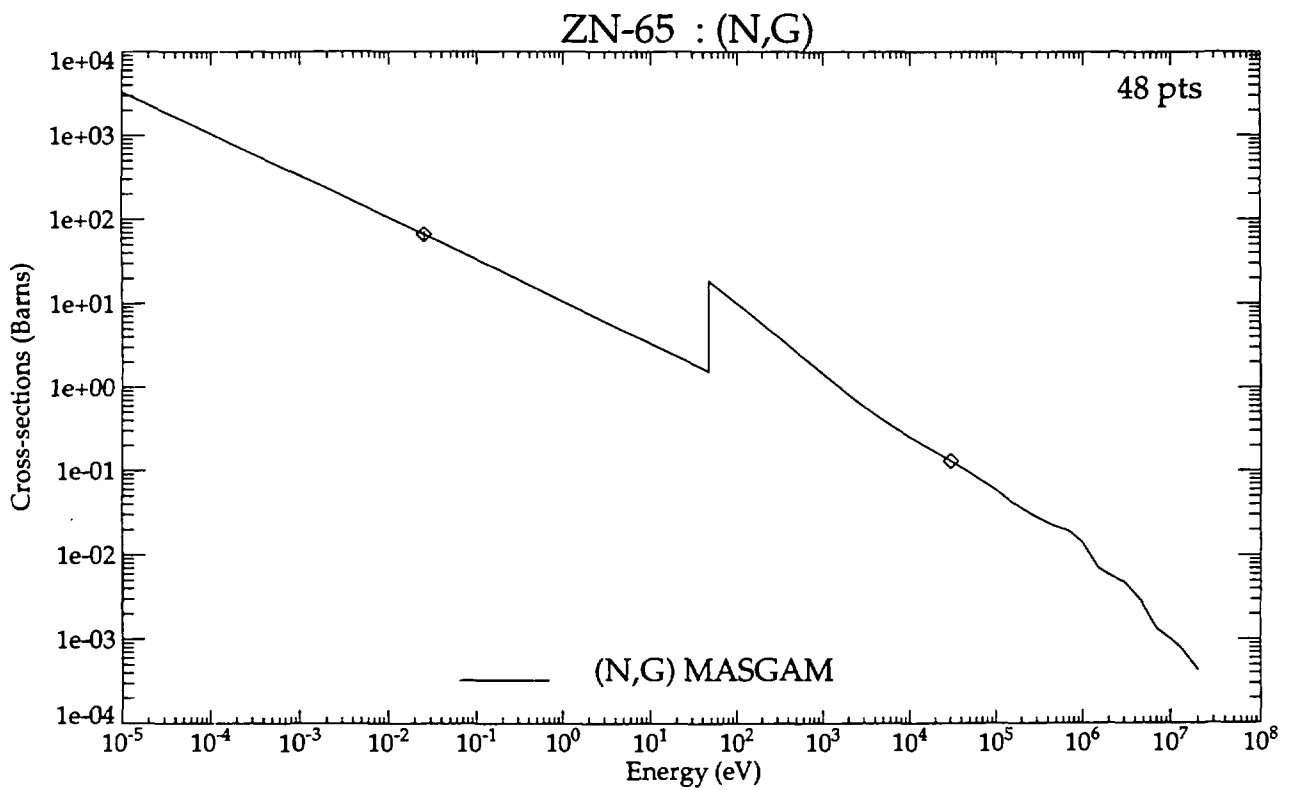
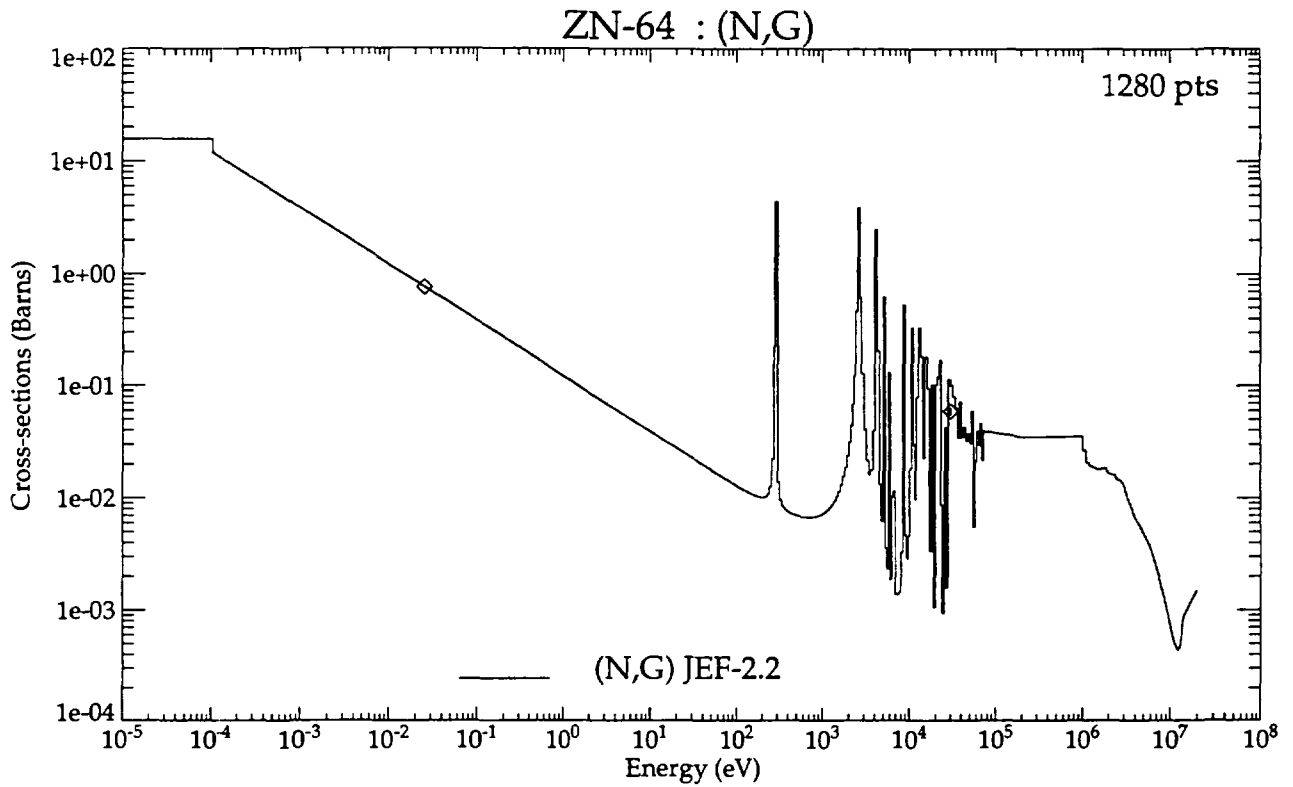


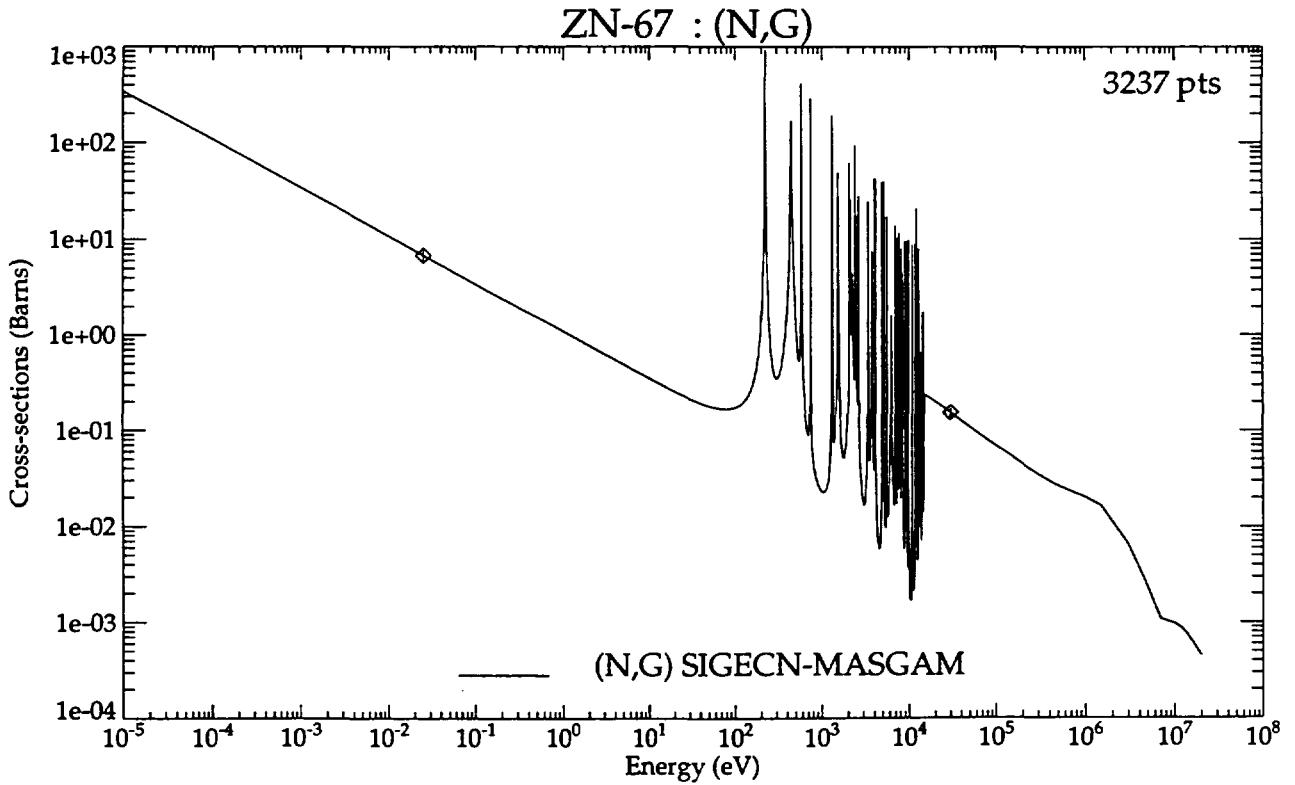
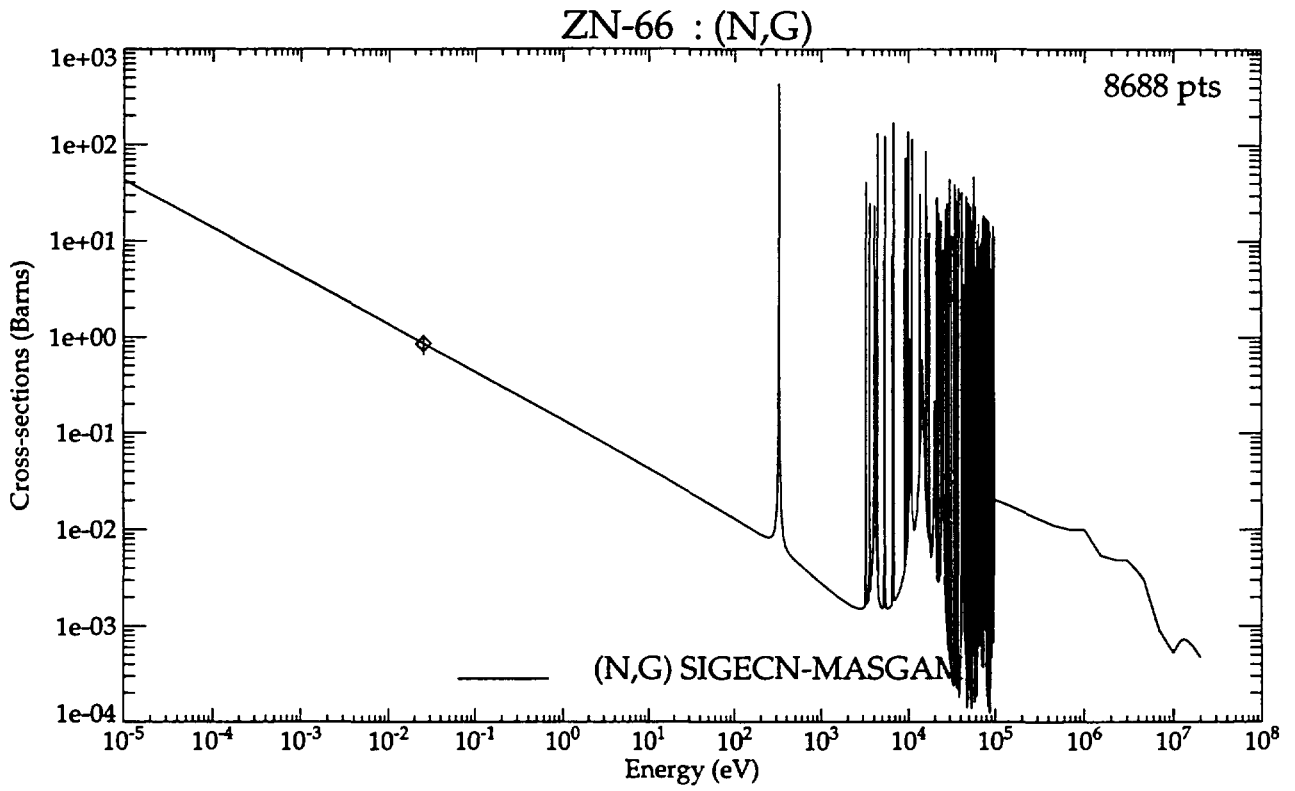


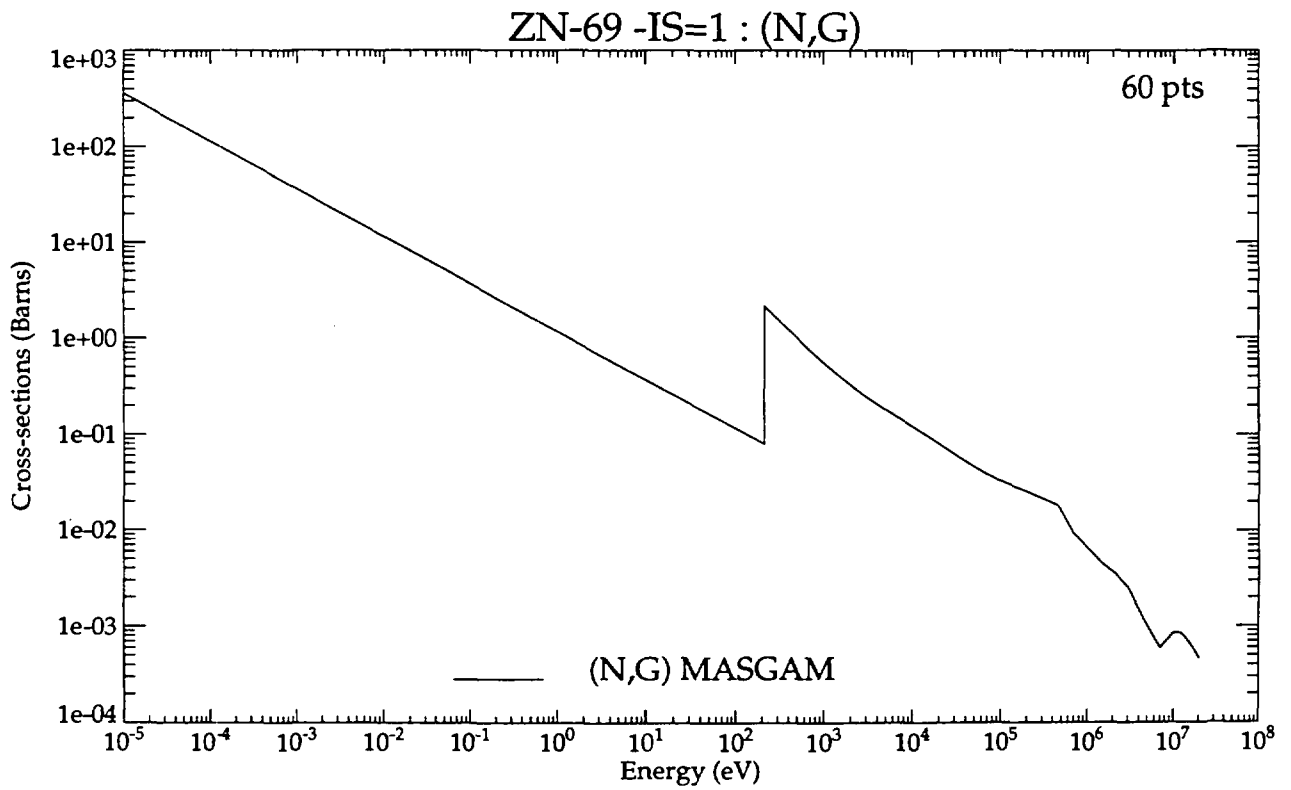
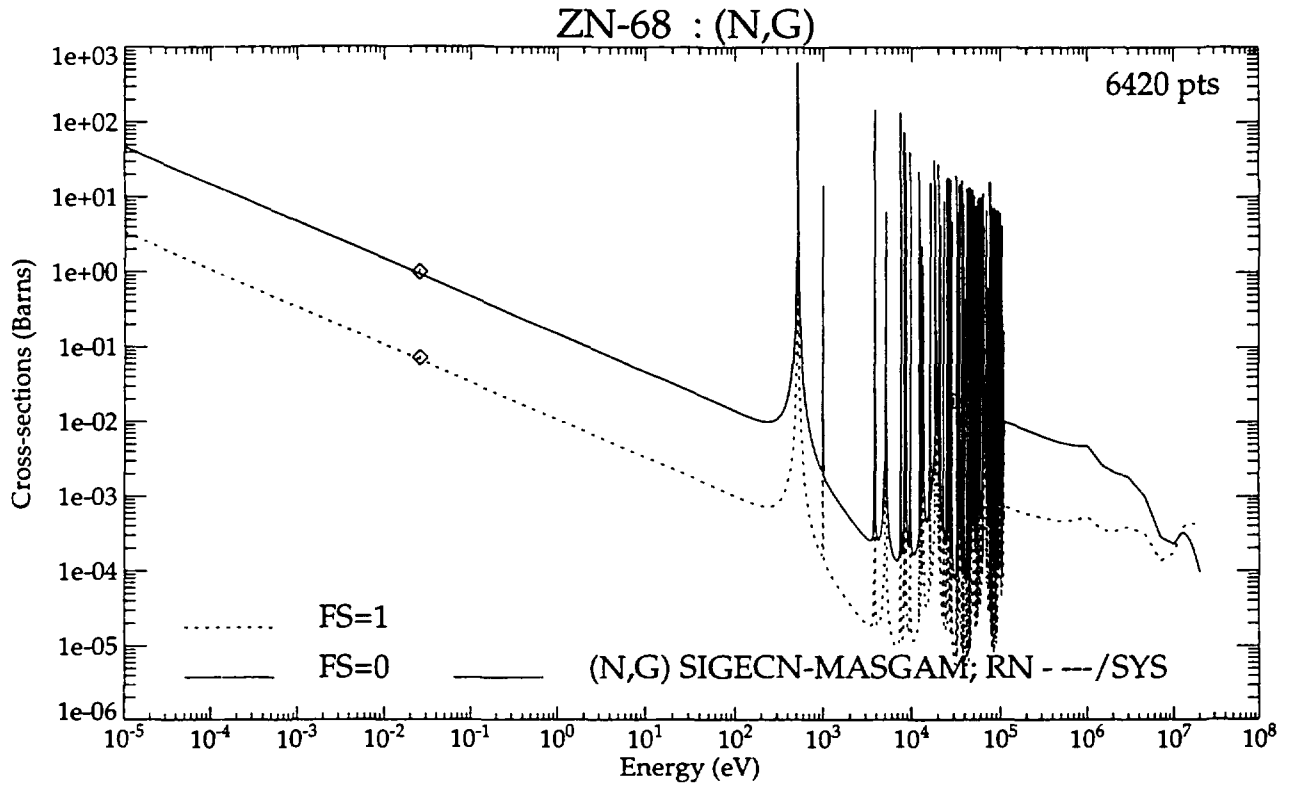


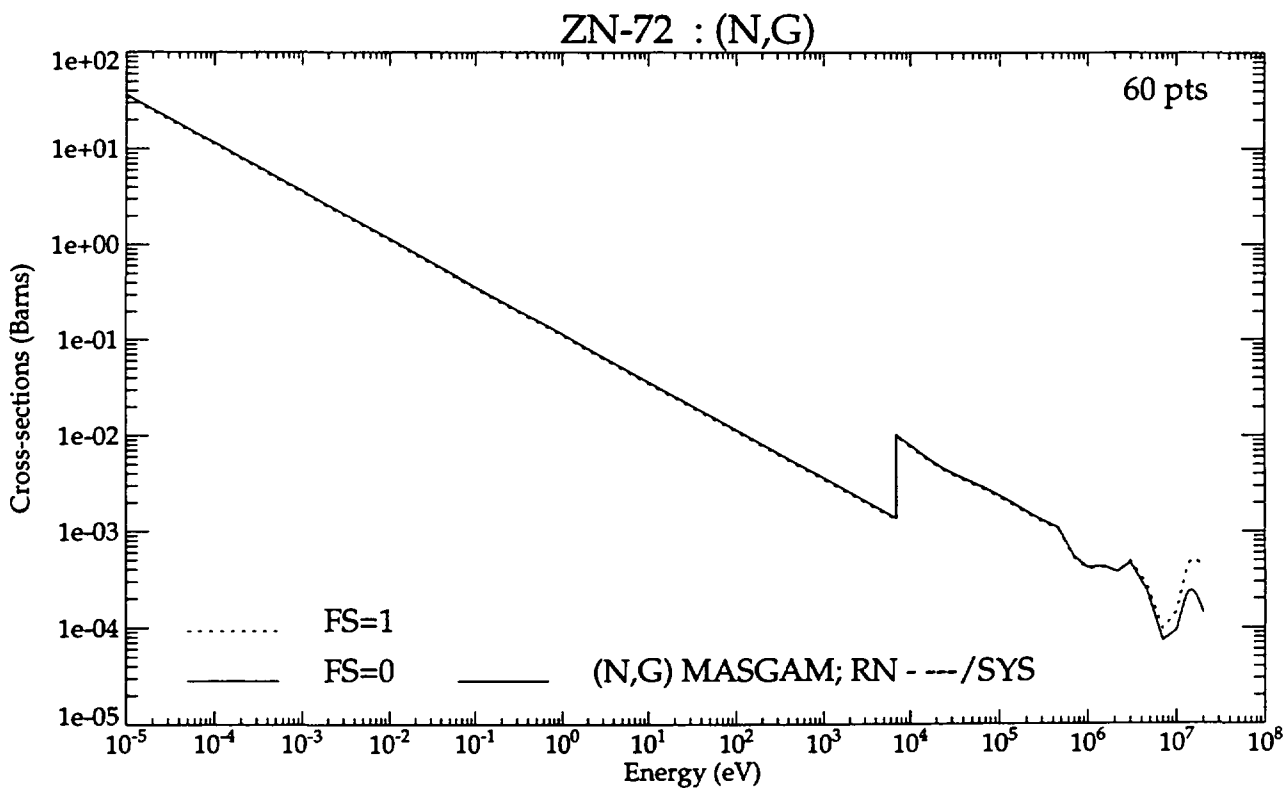
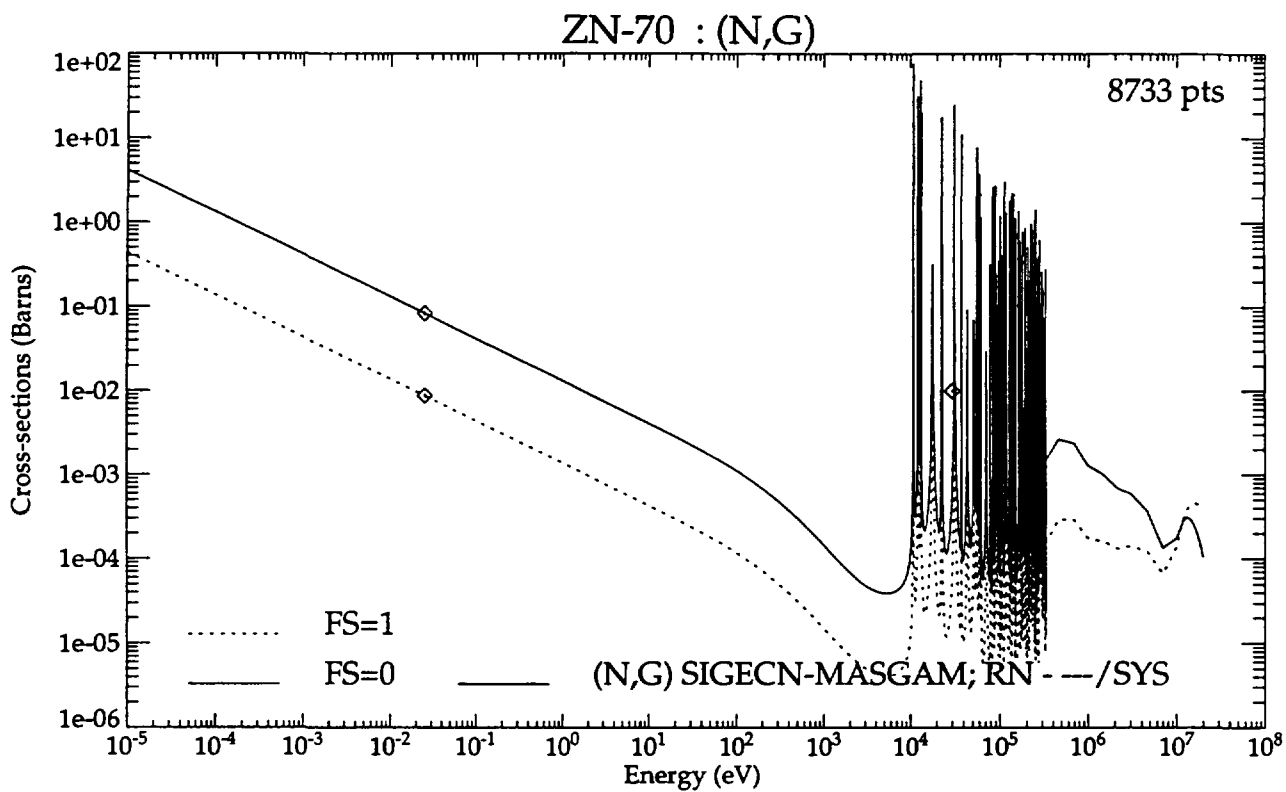


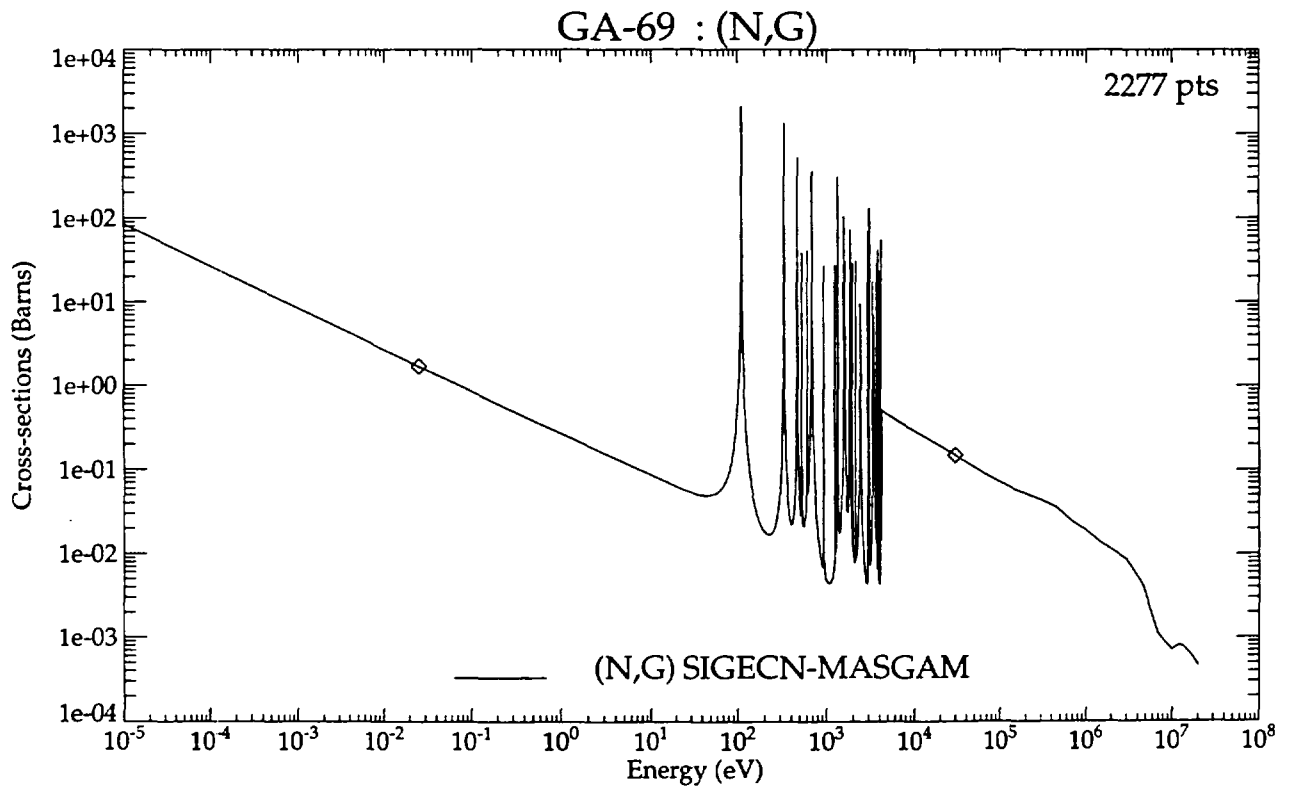
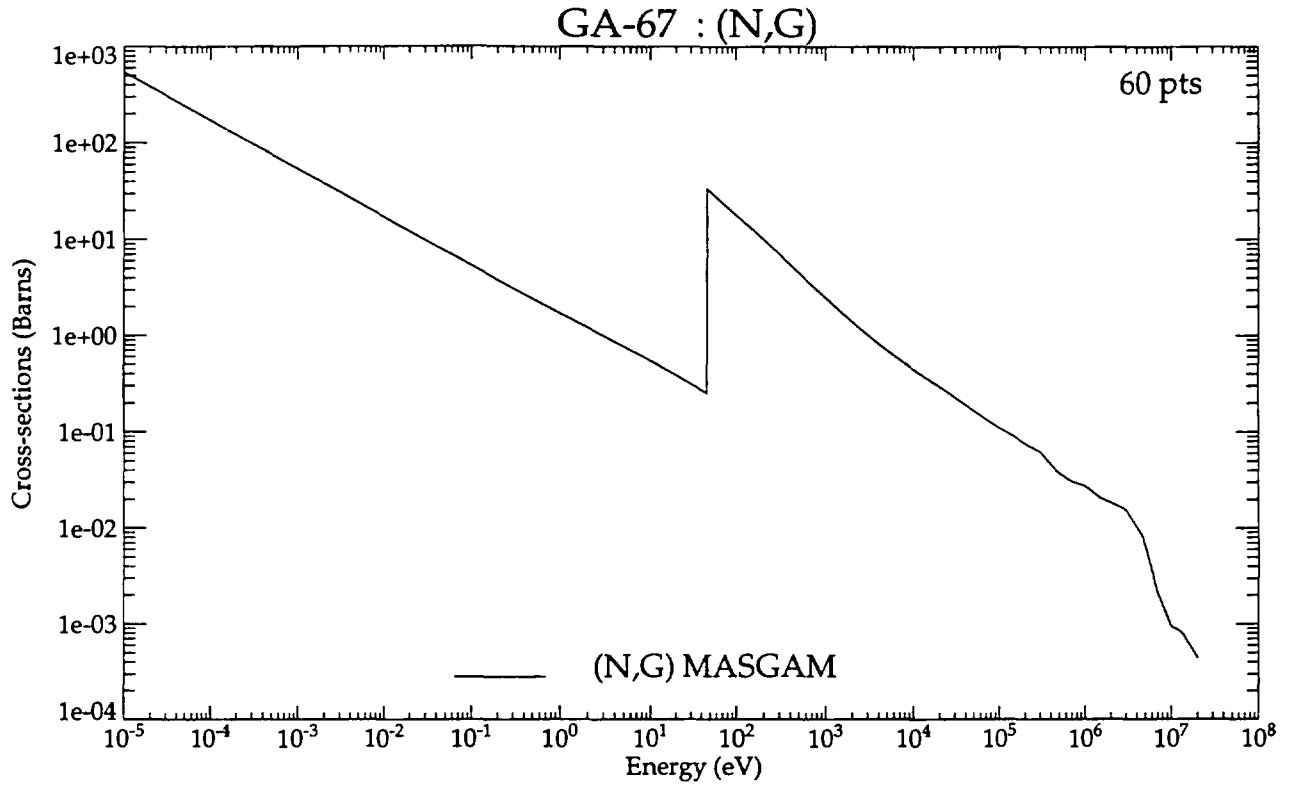


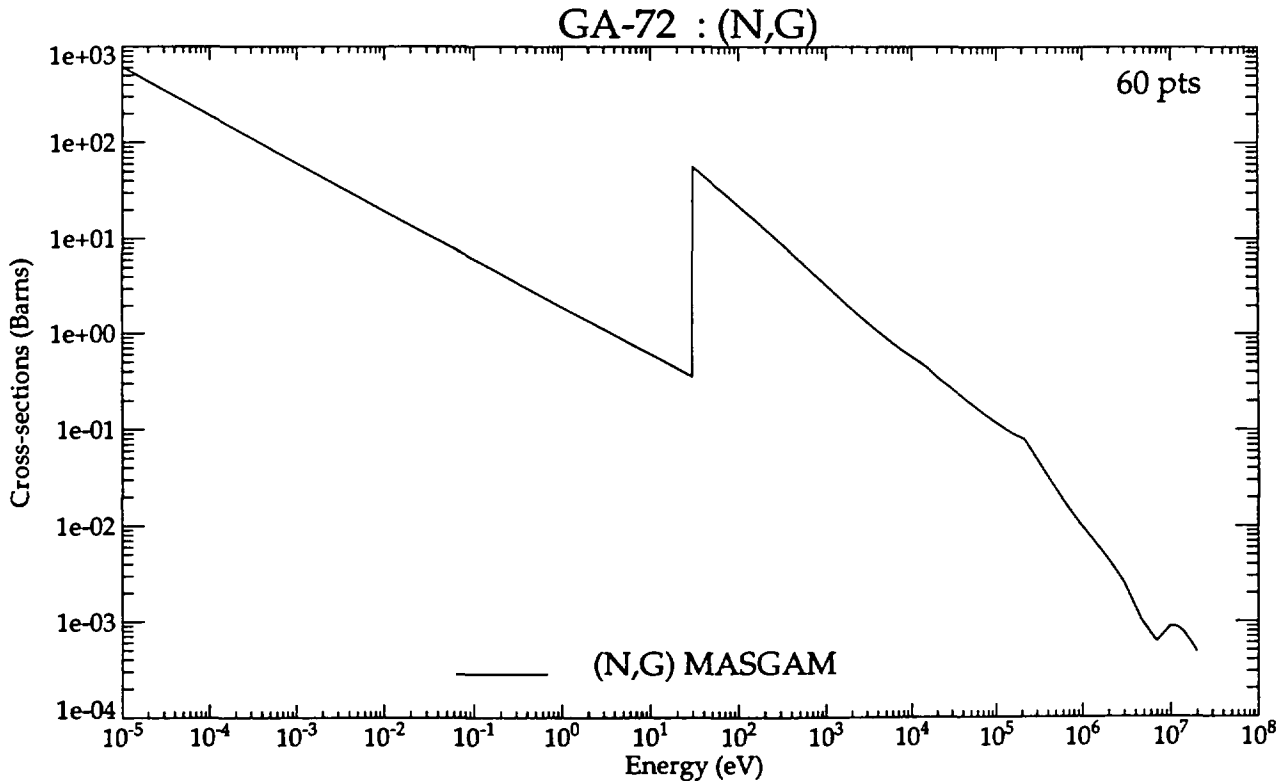
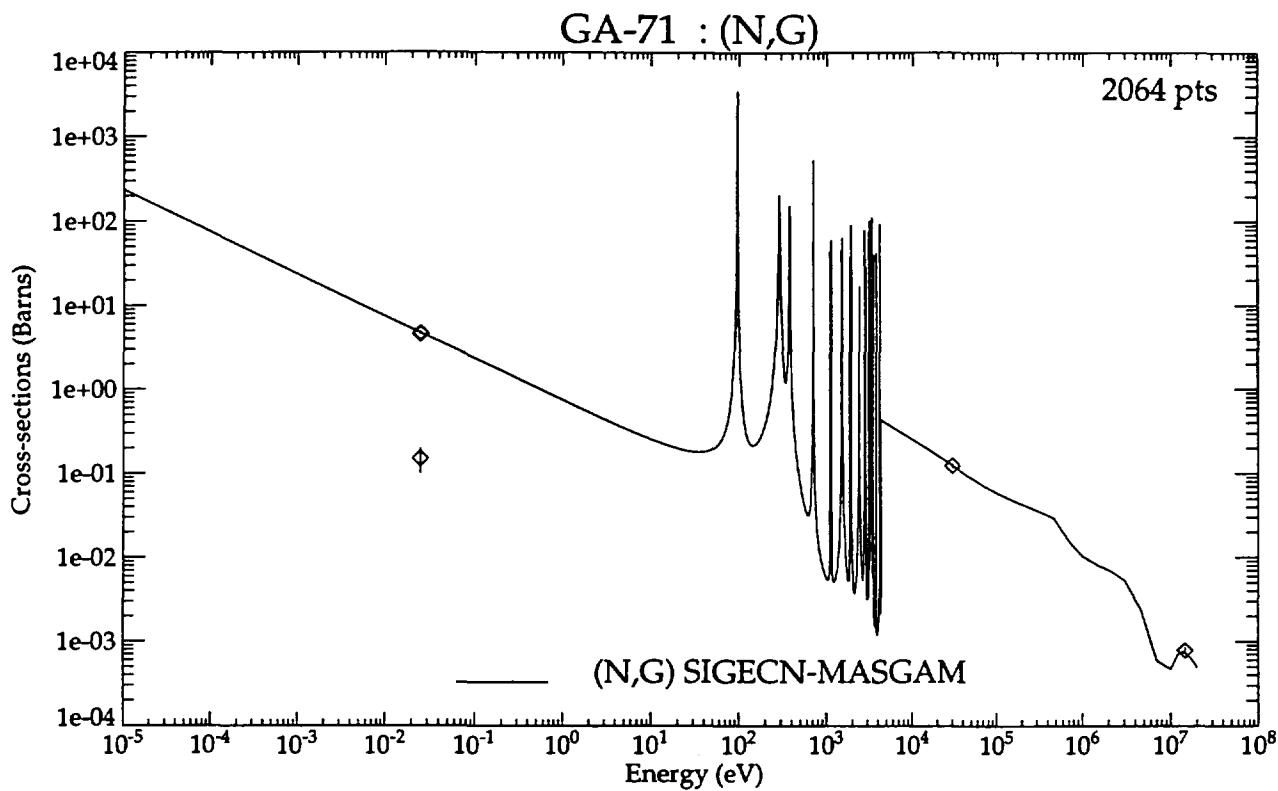


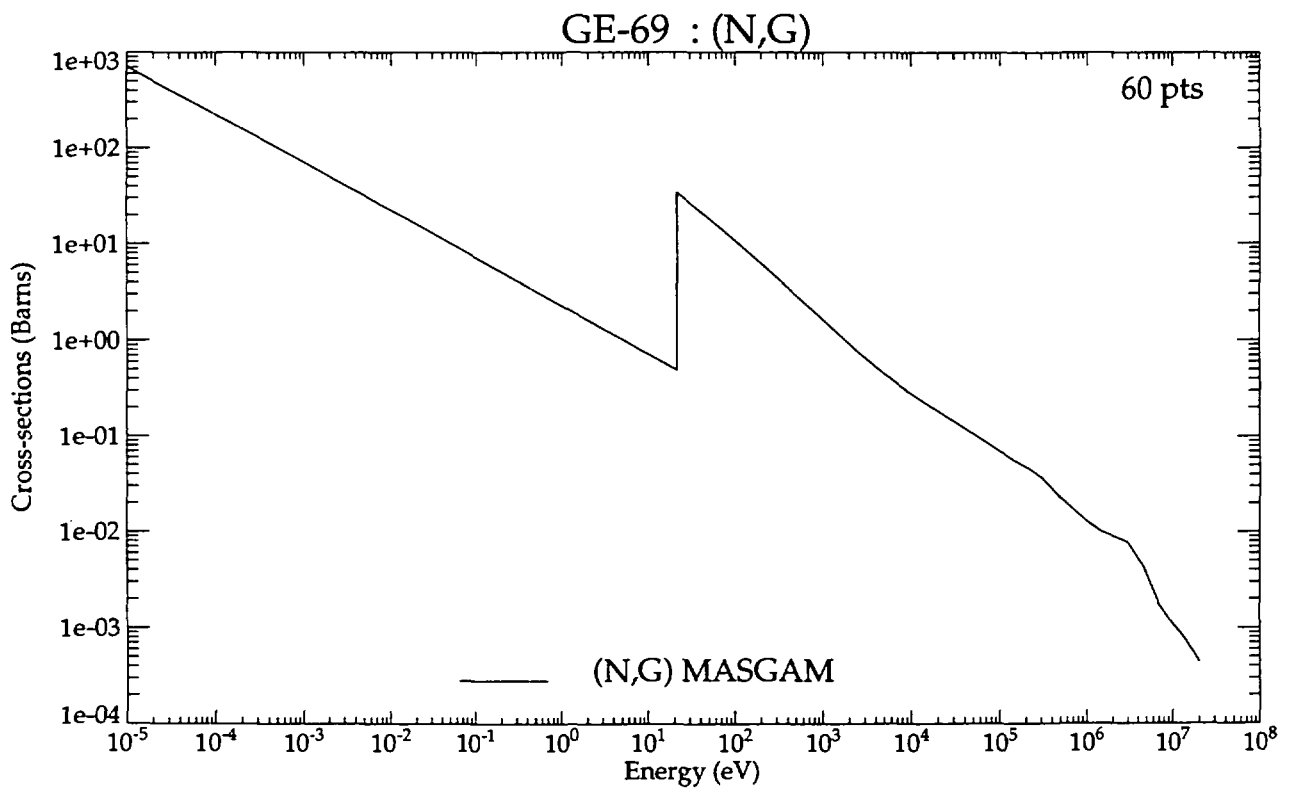
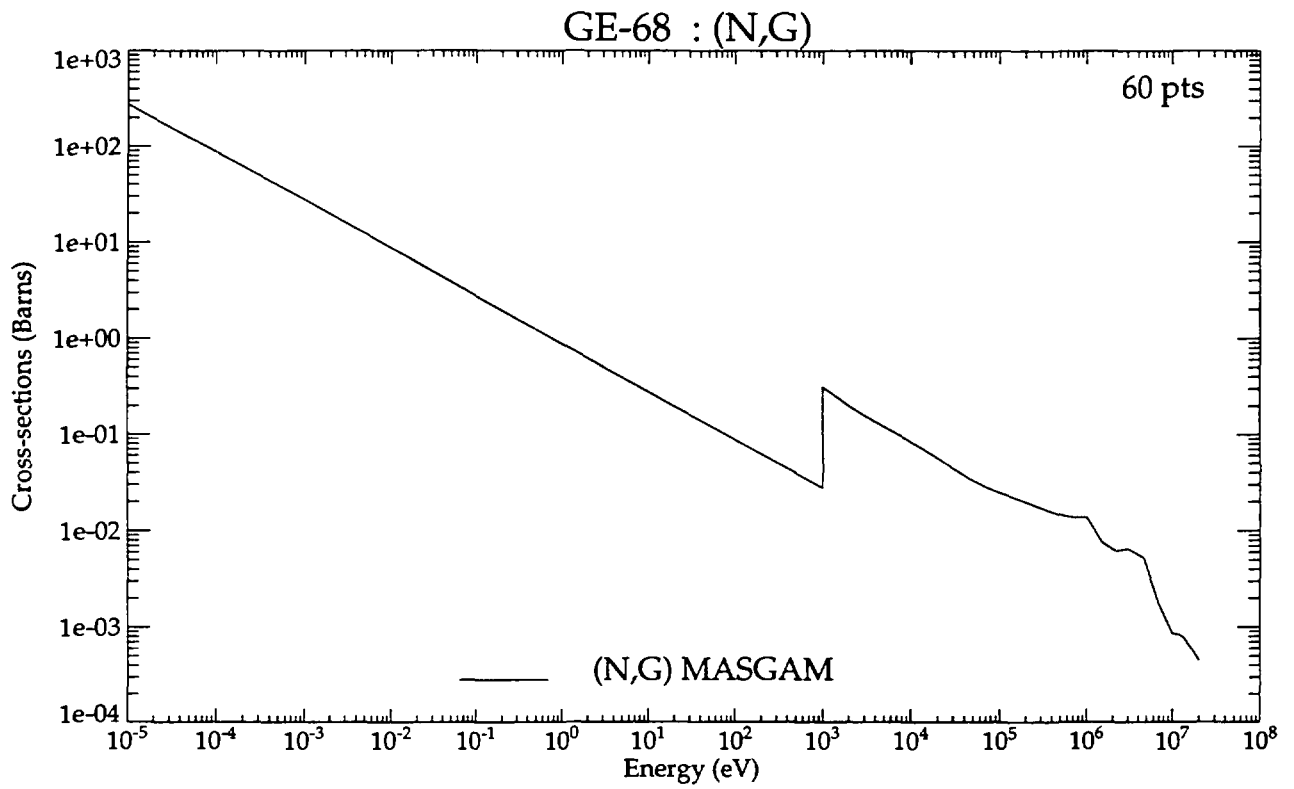


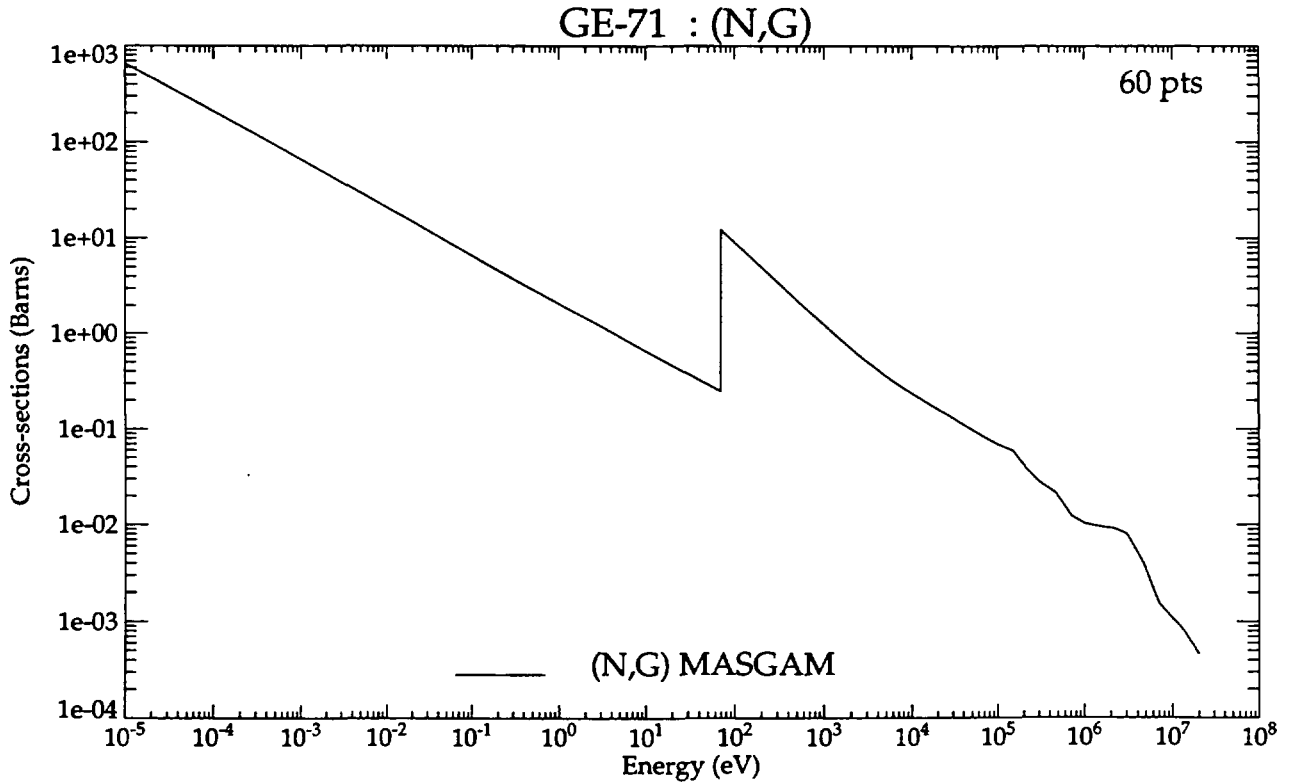
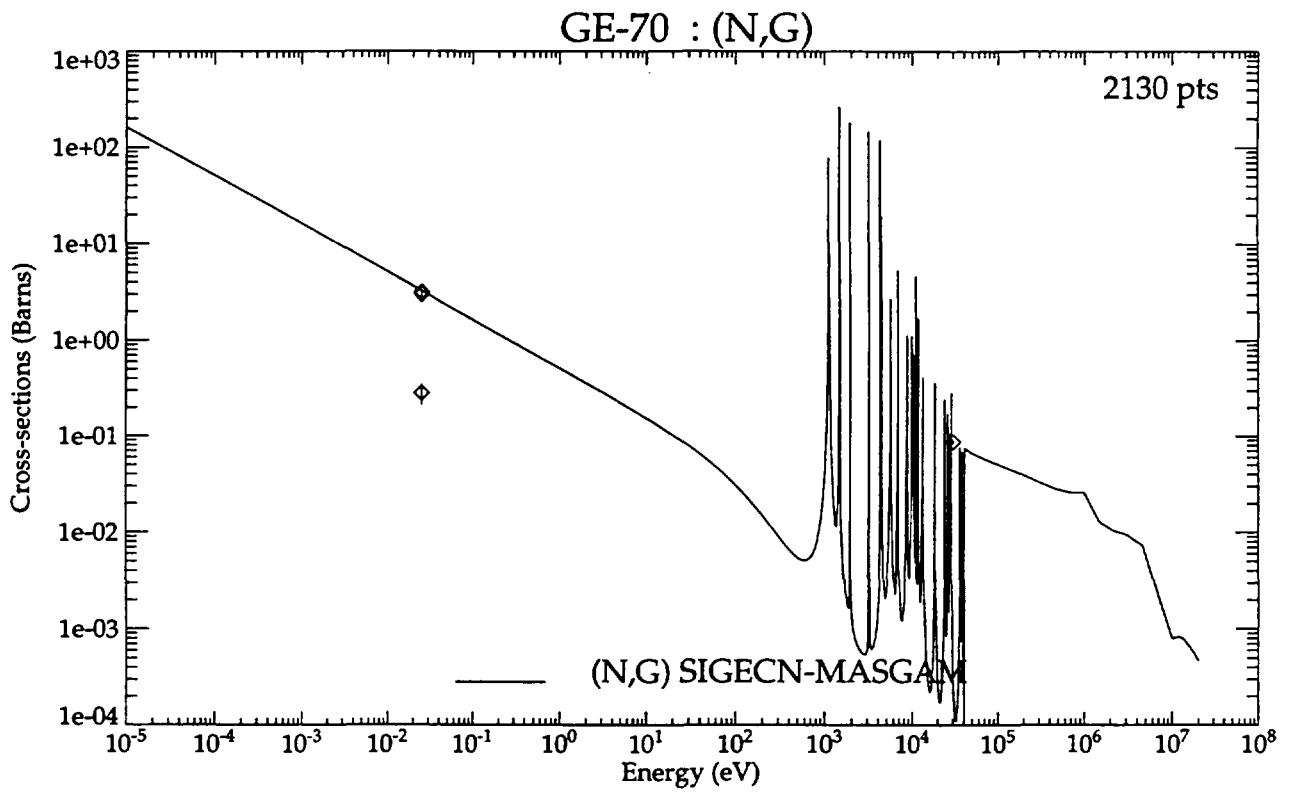


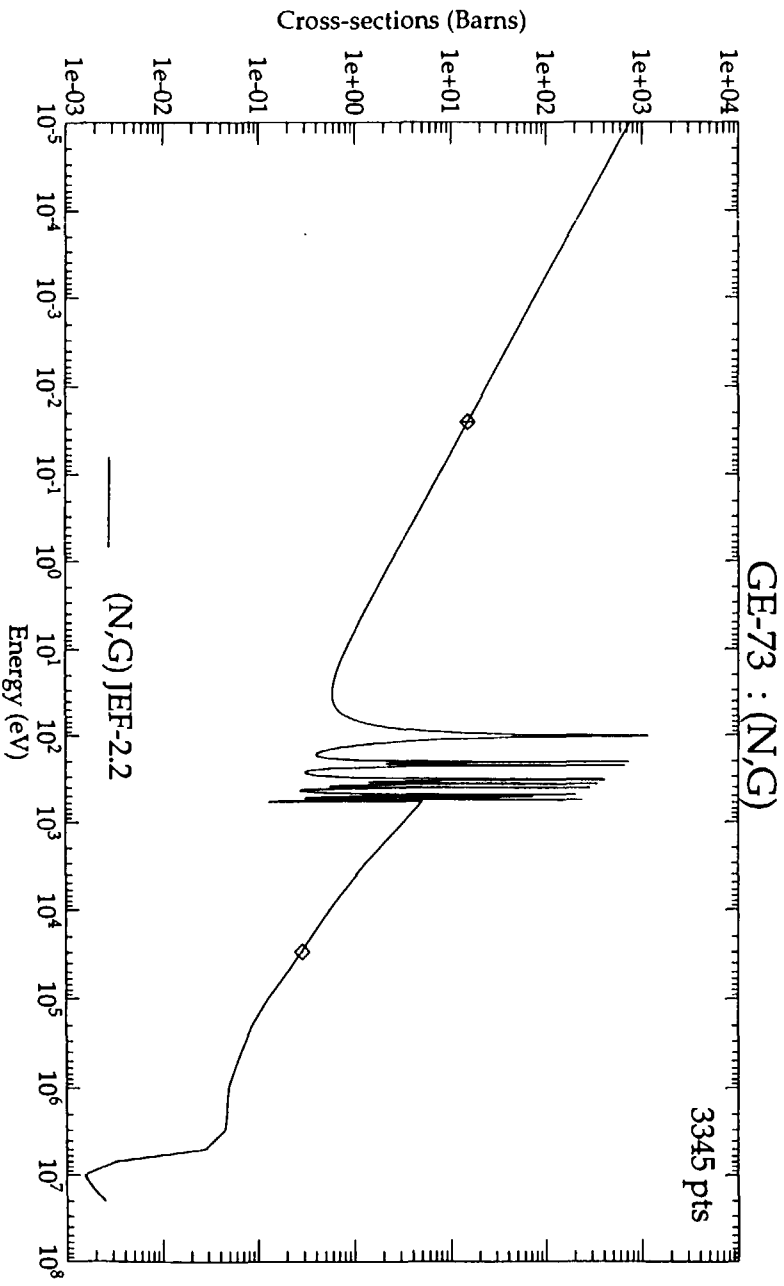
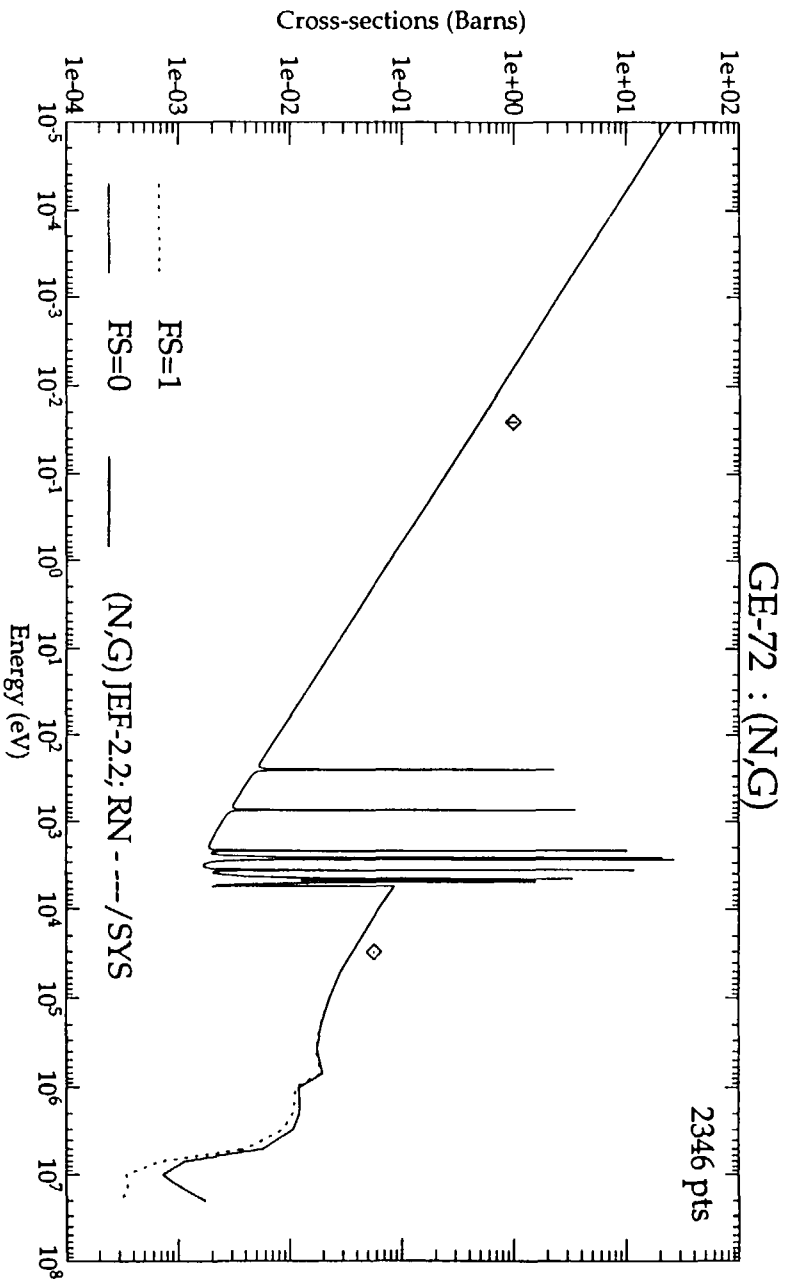


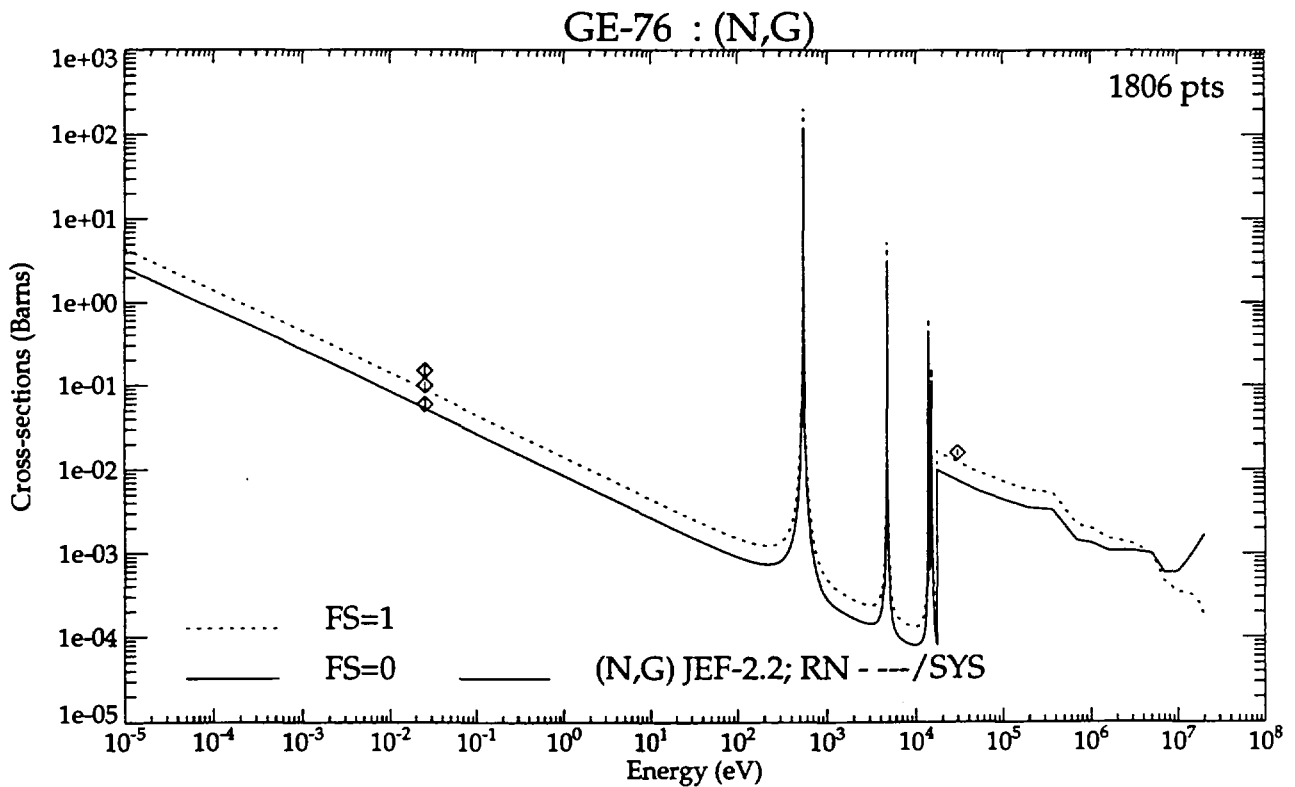
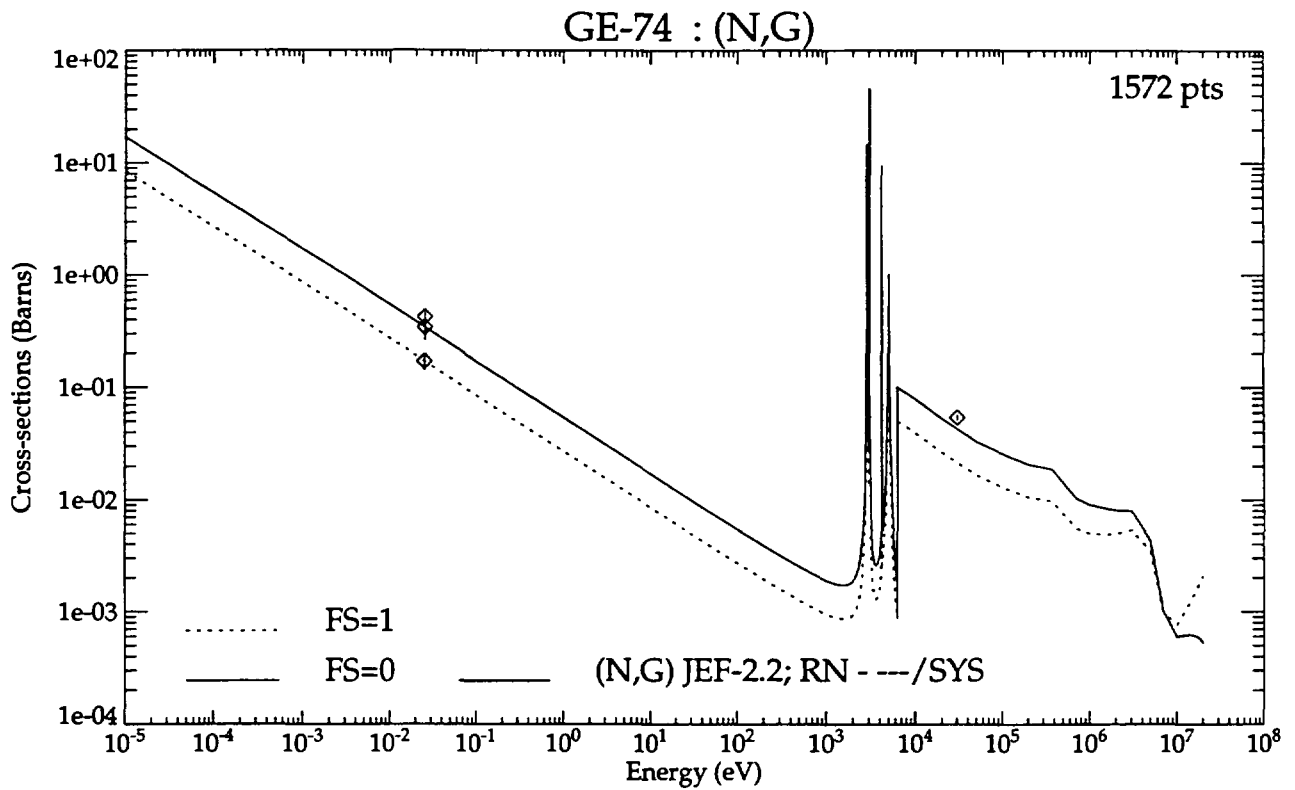


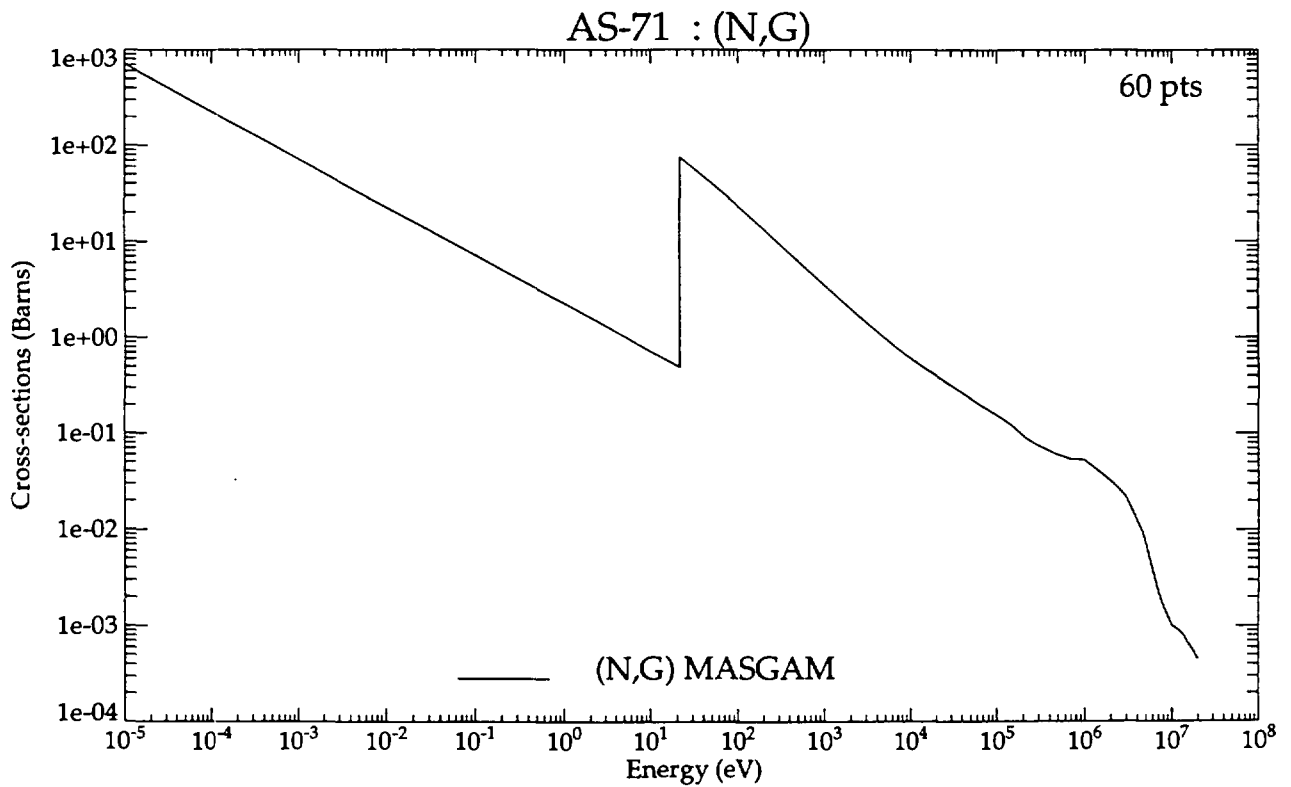
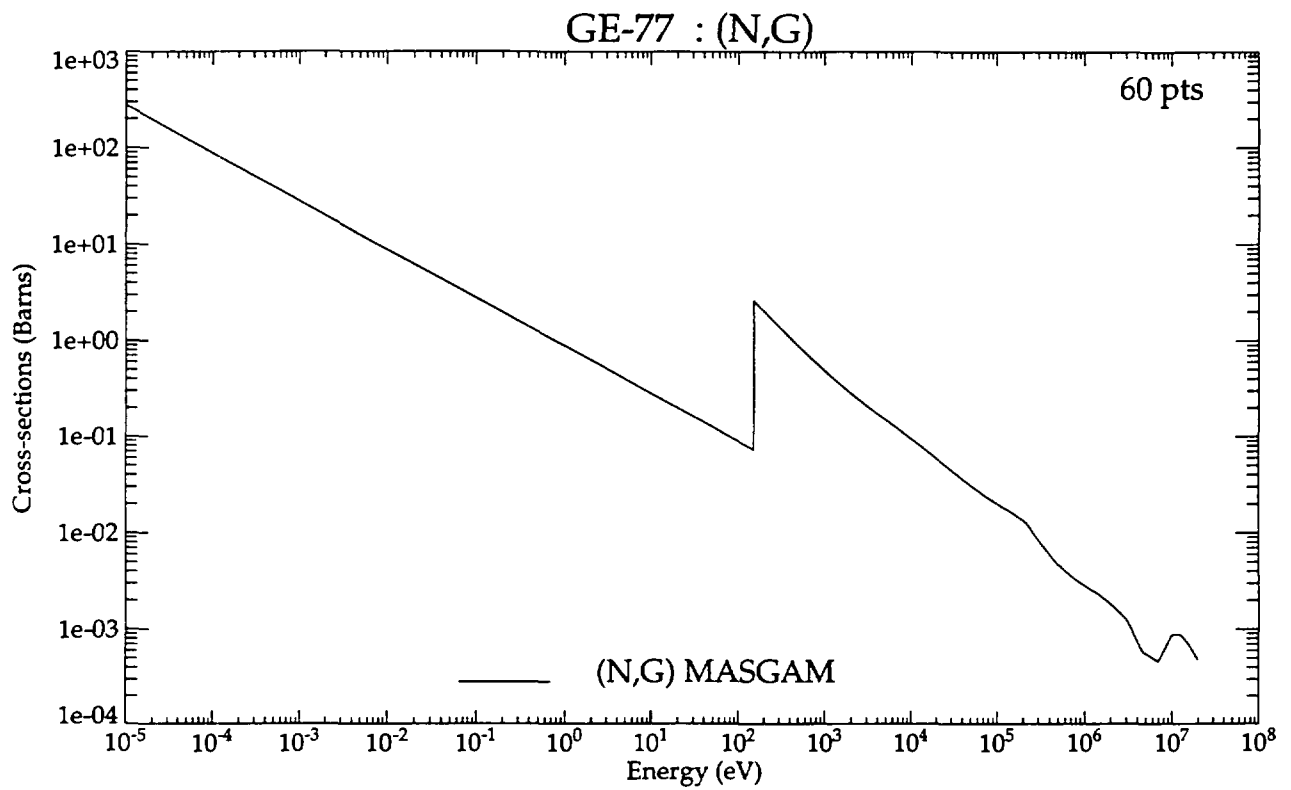


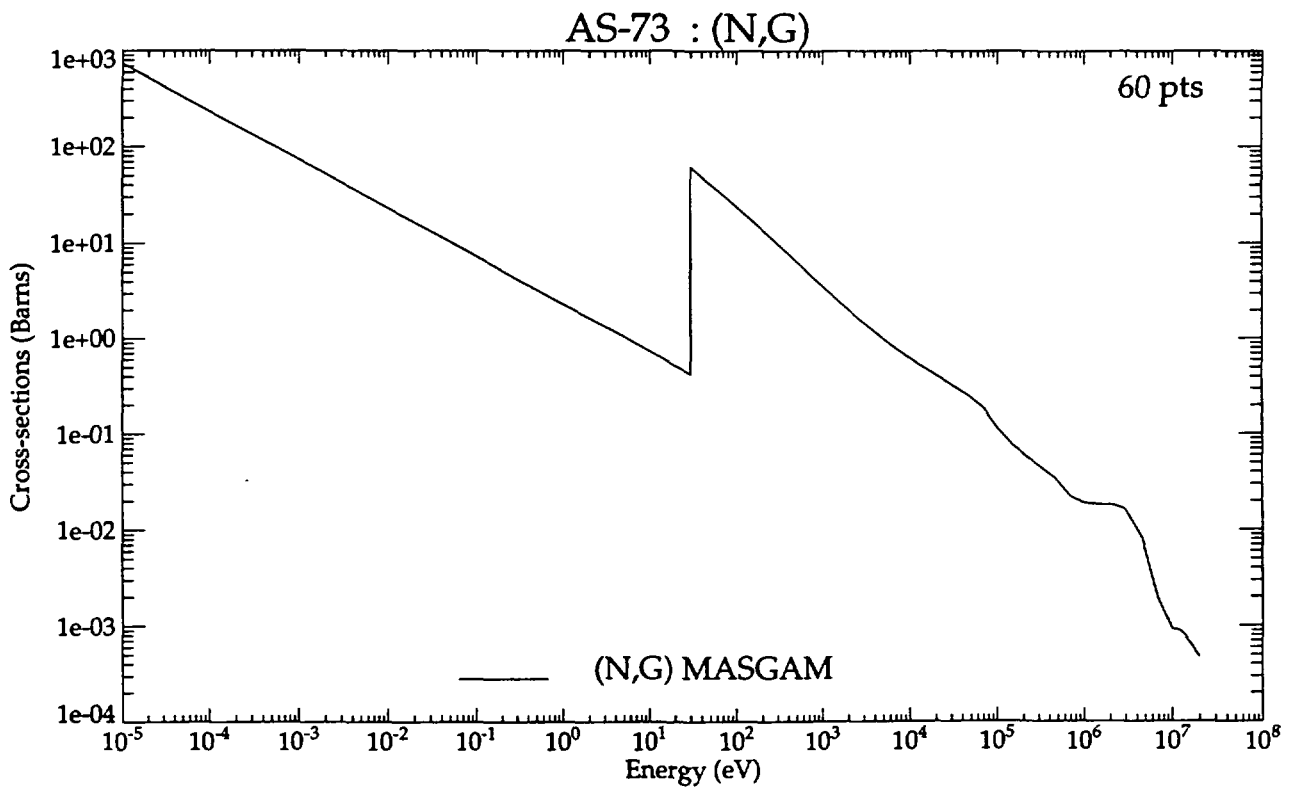
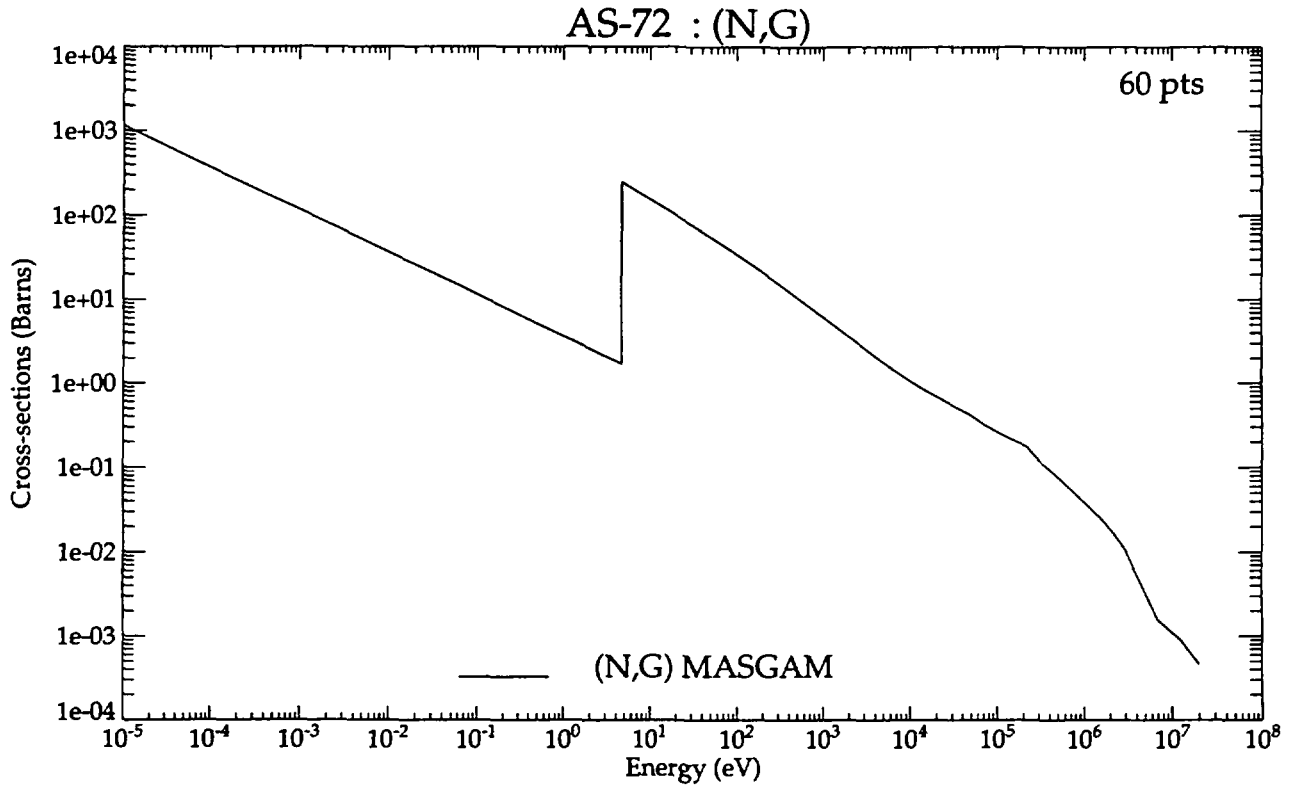


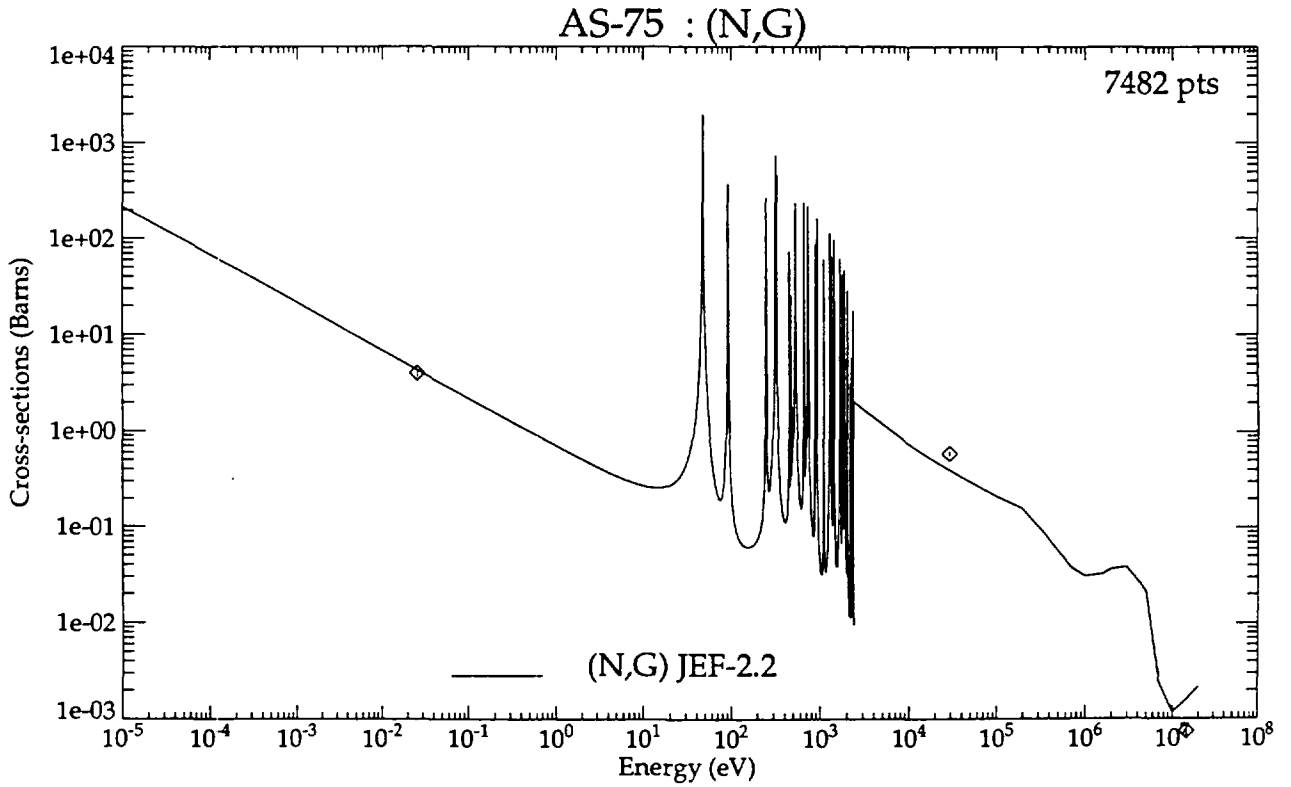
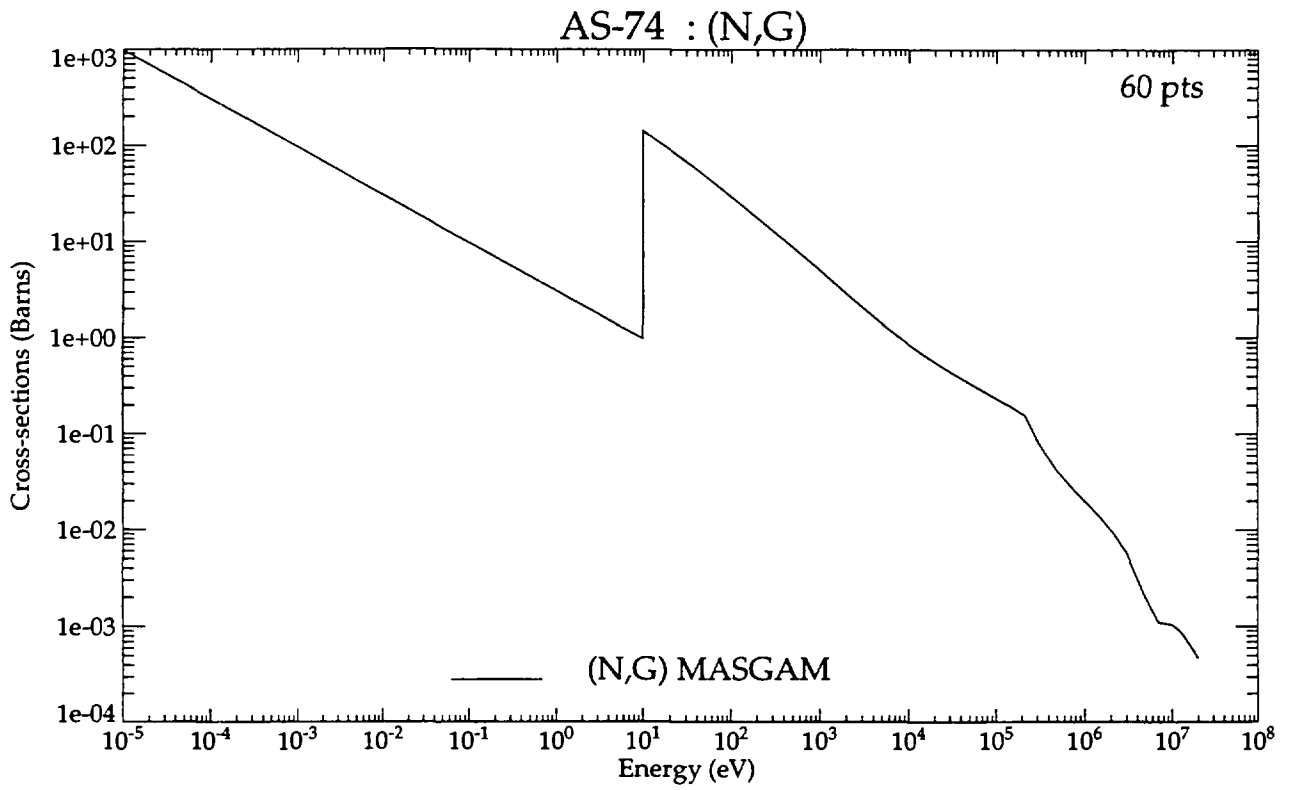


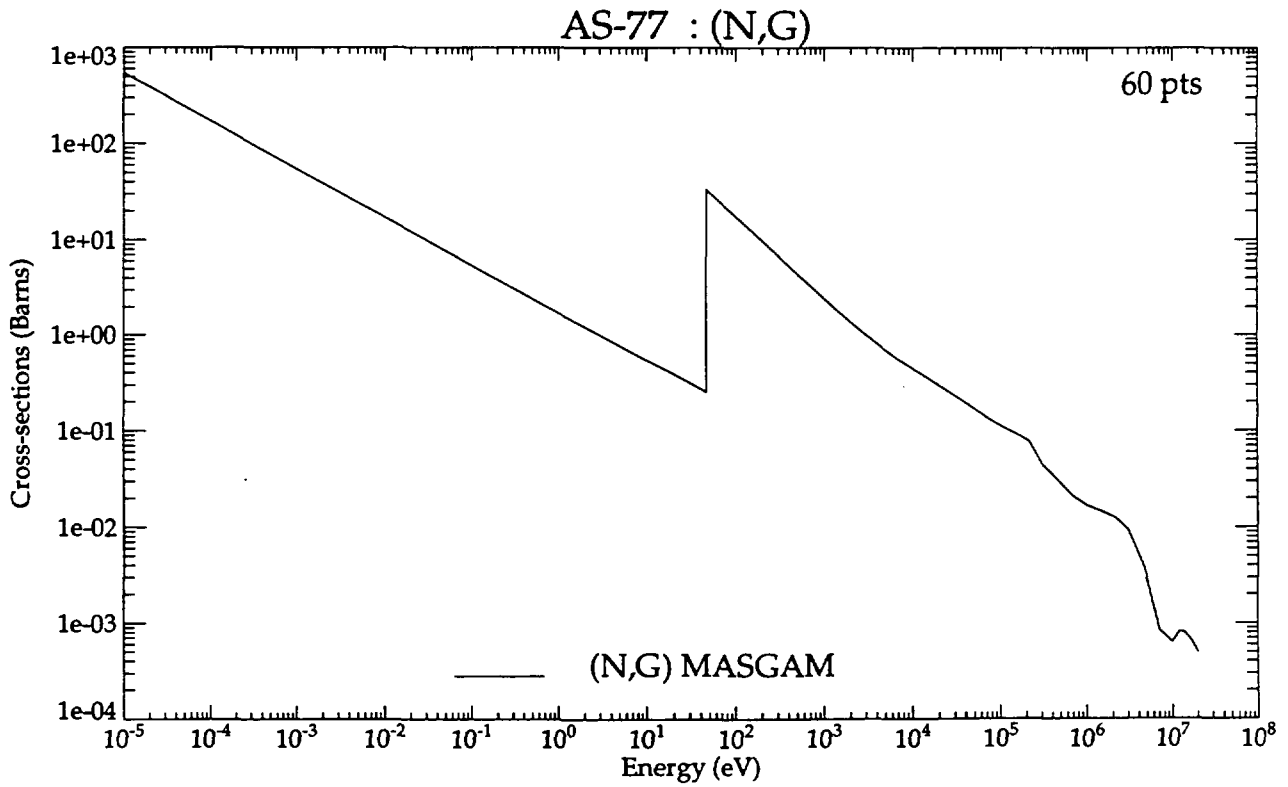
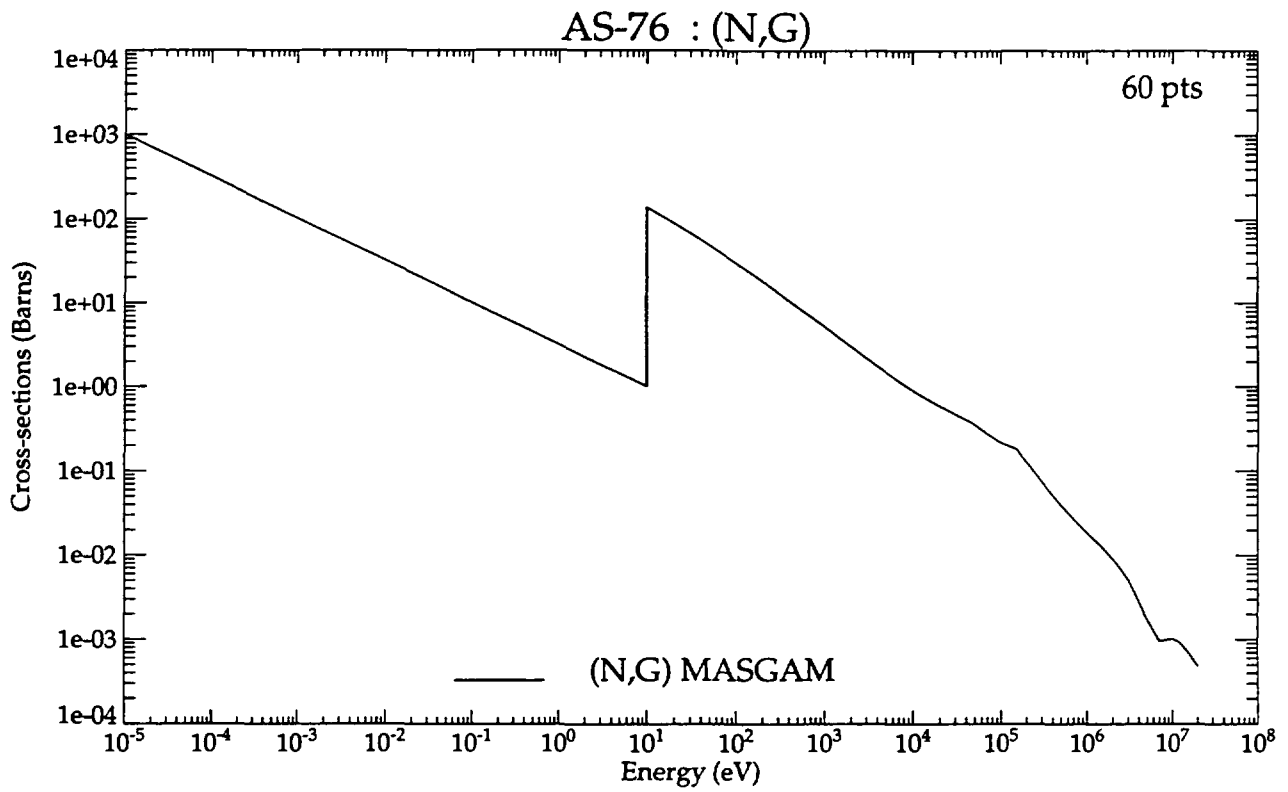




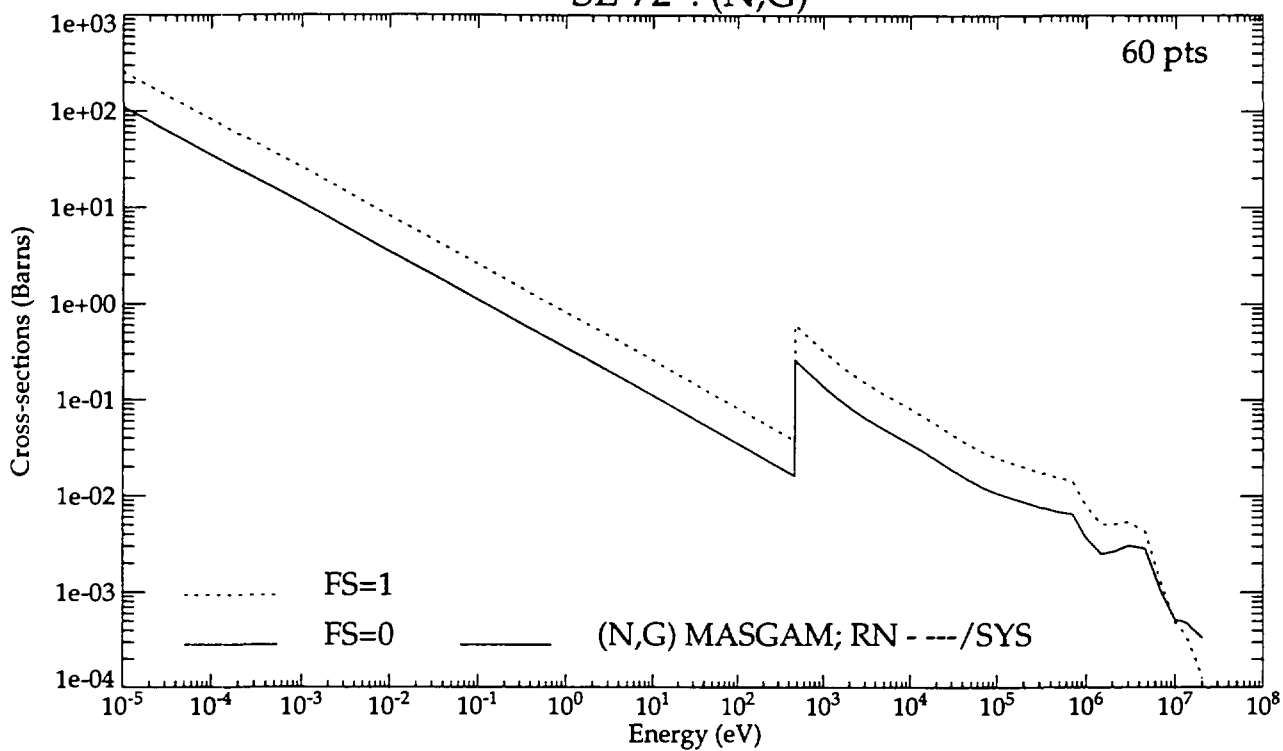




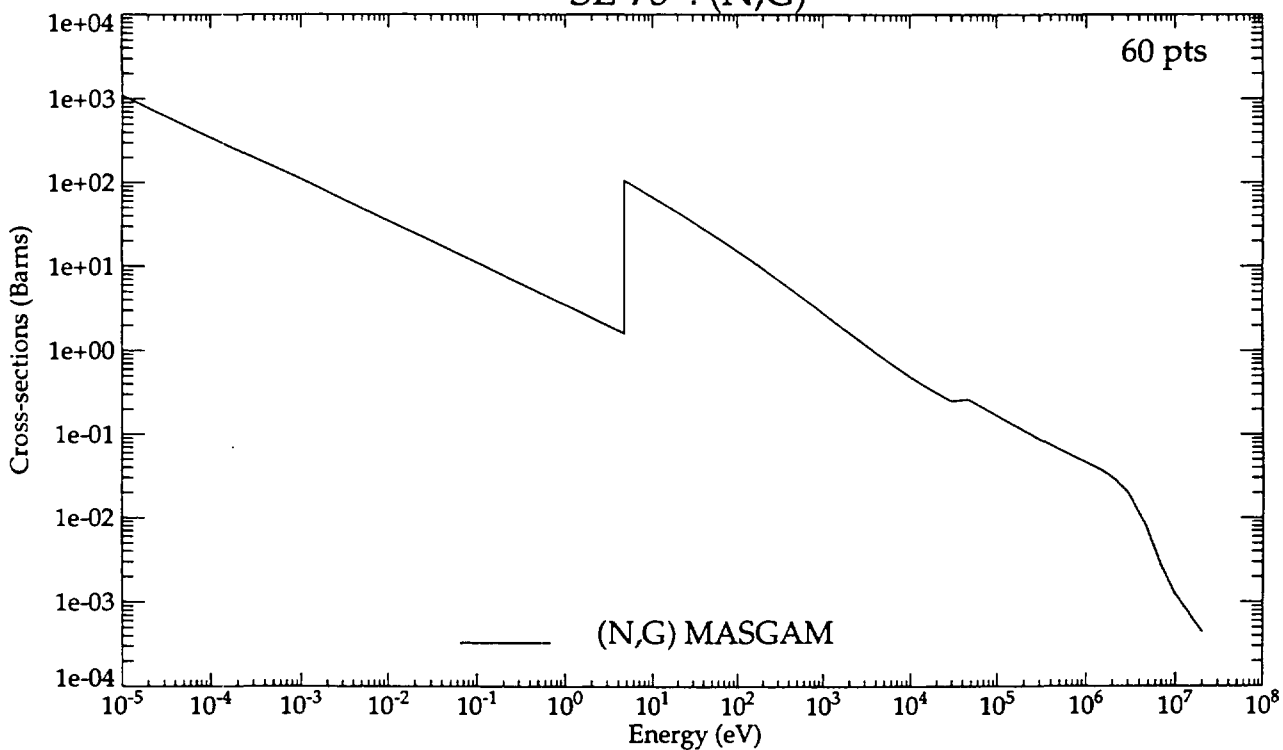


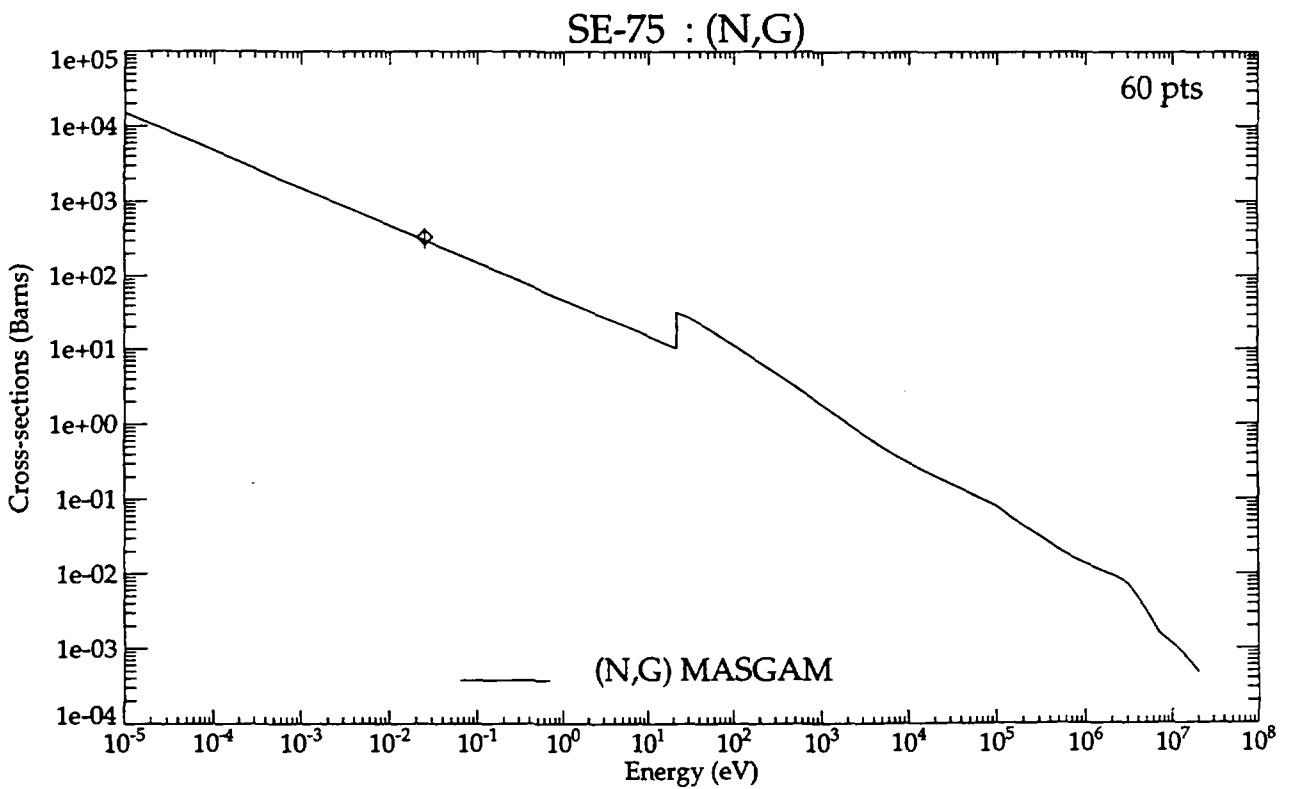
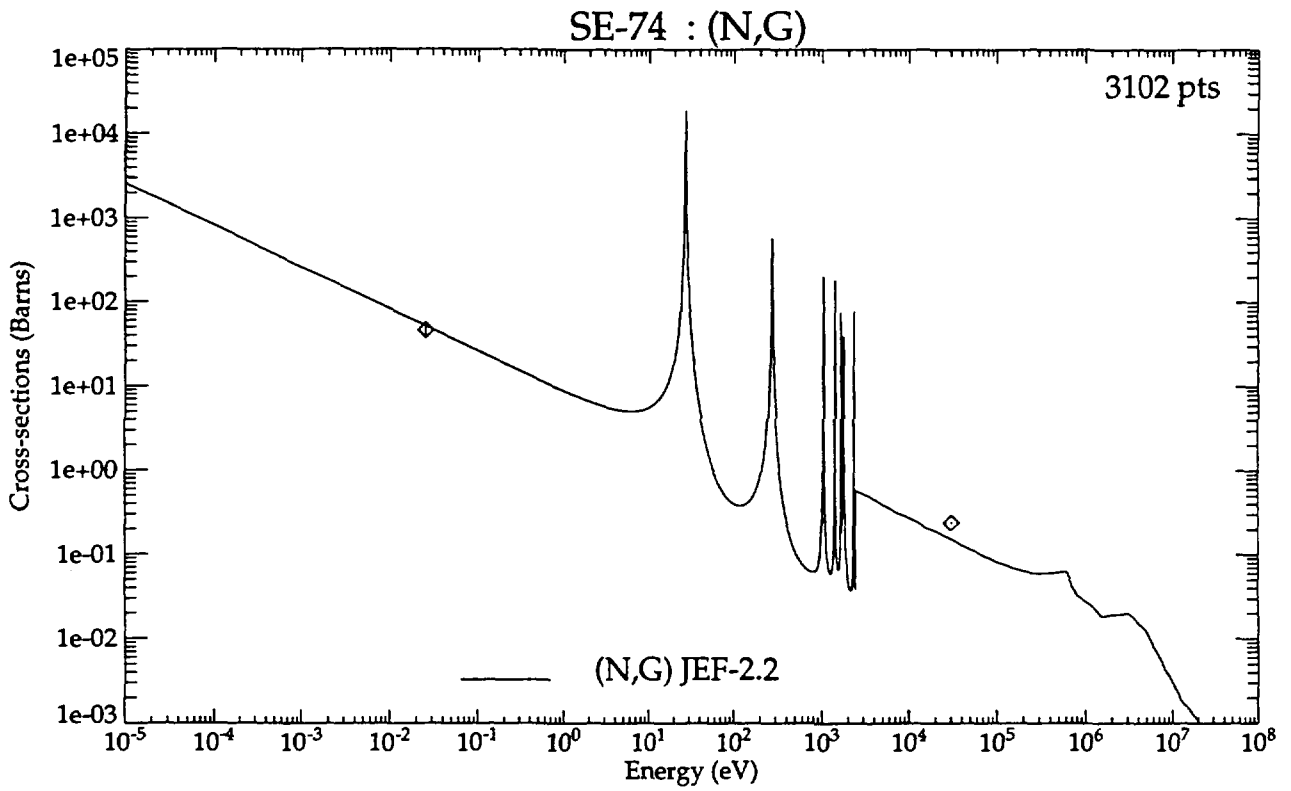


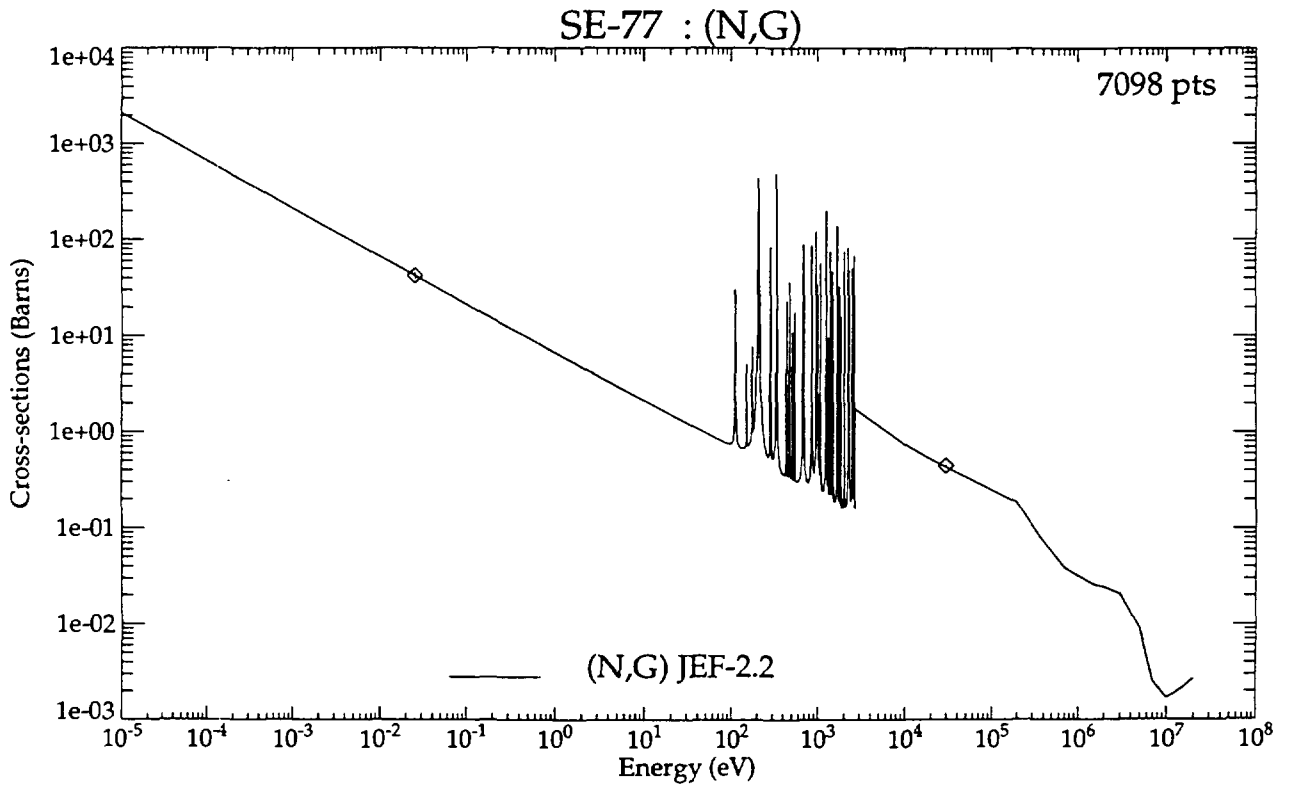
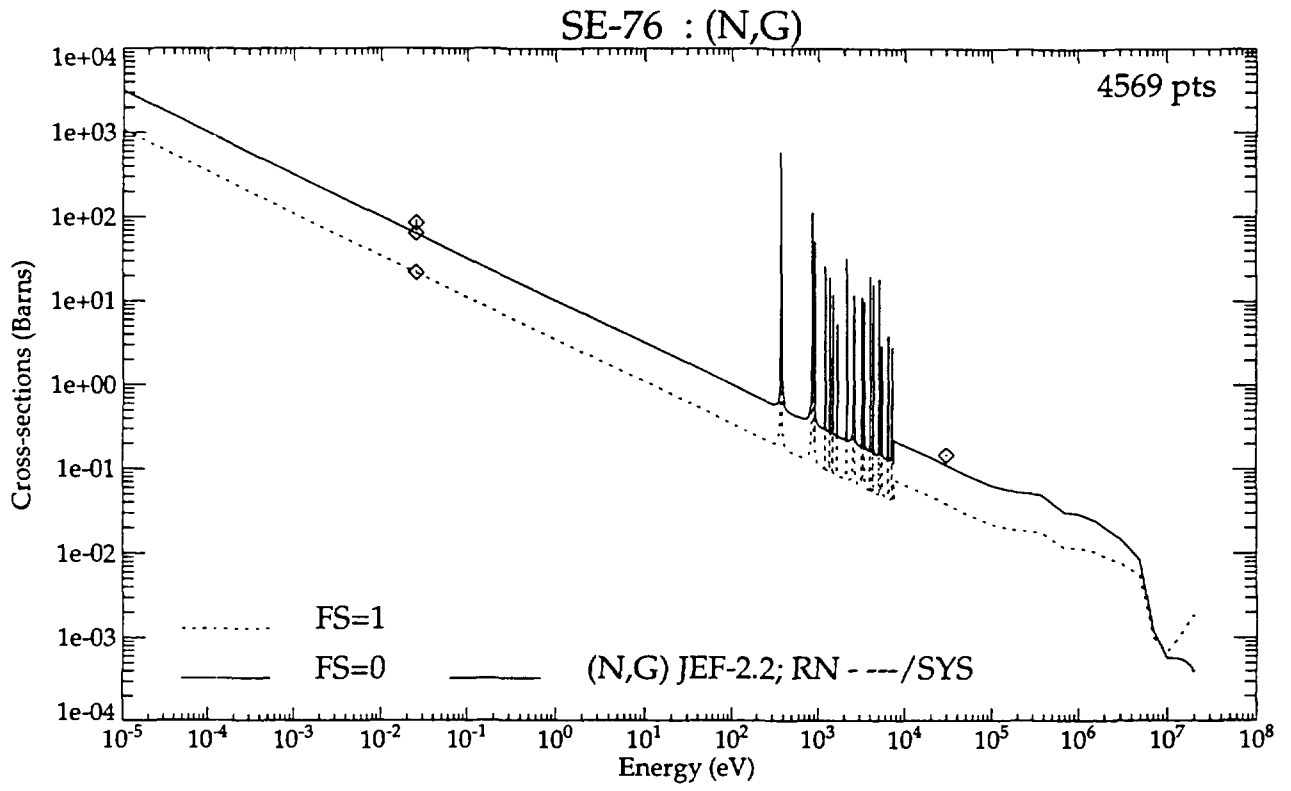
SE-72 : (N,G)

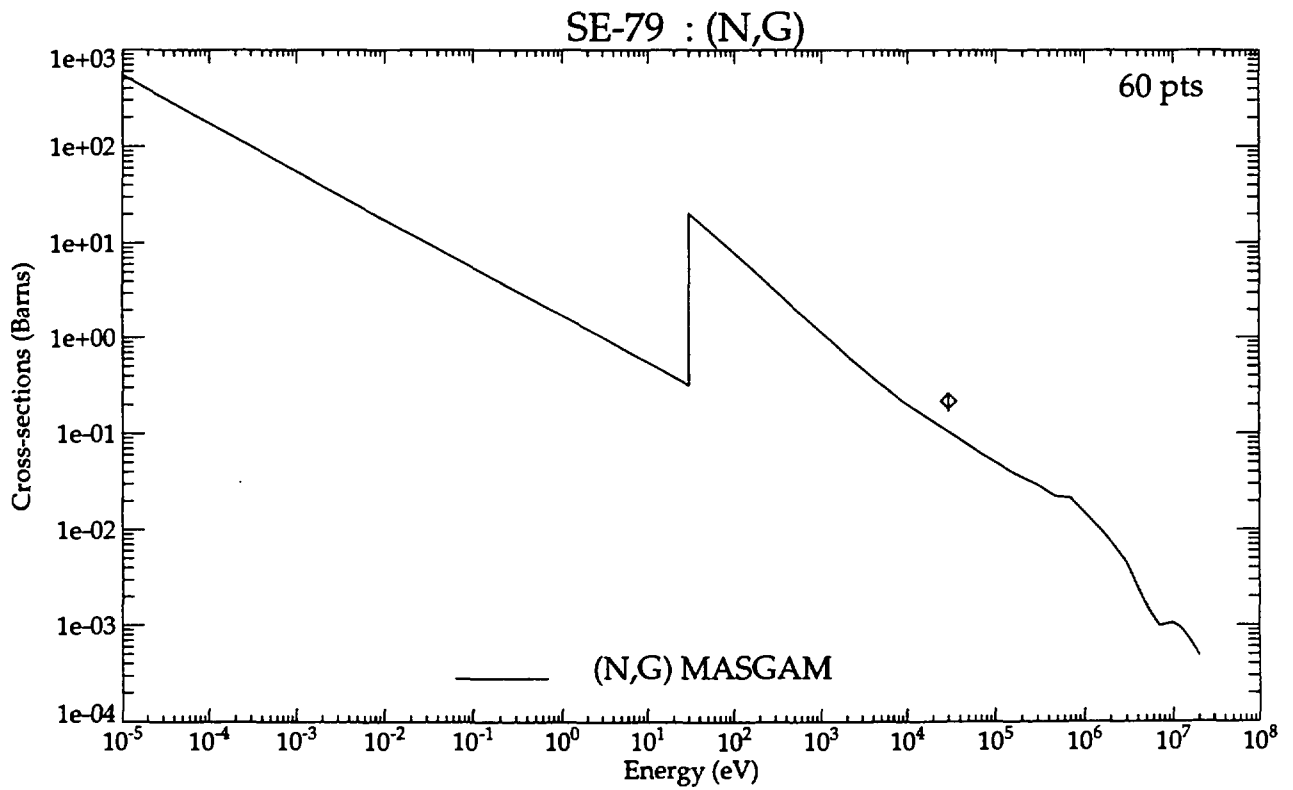
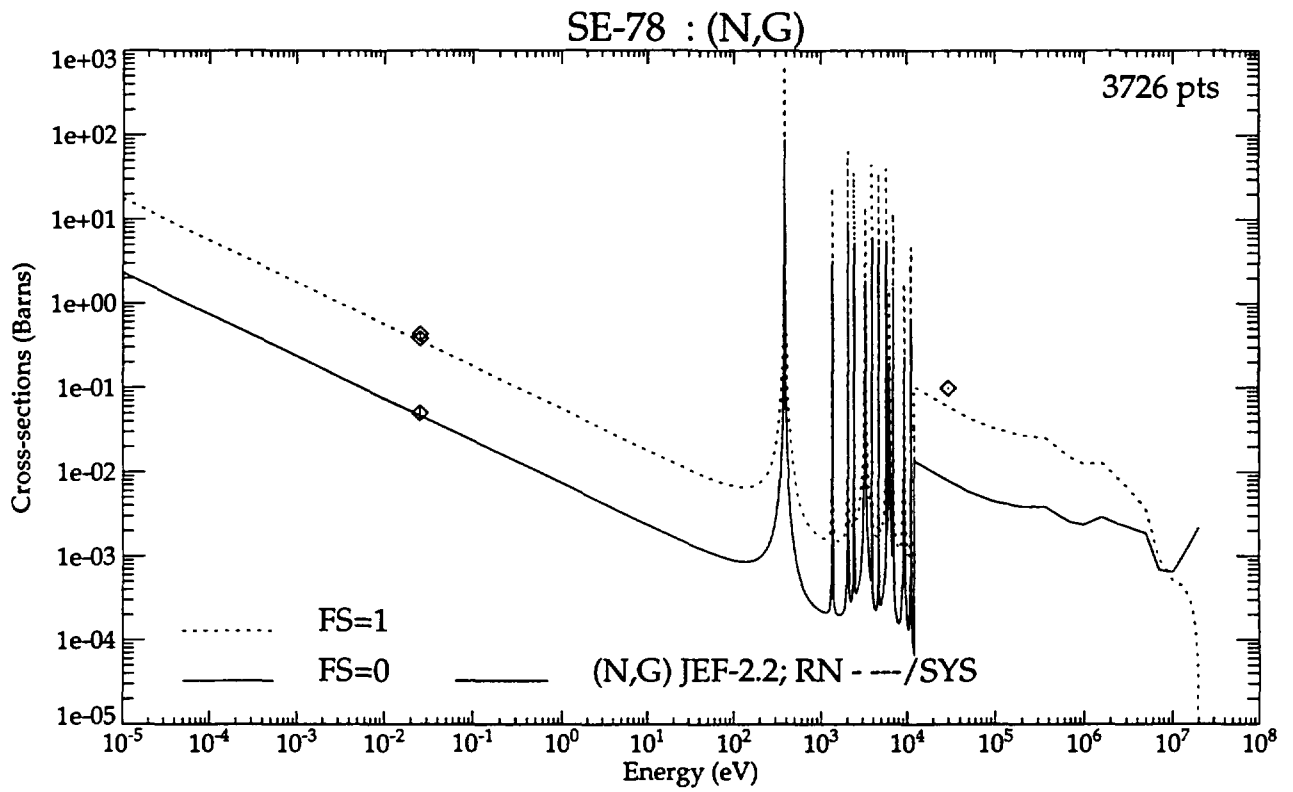


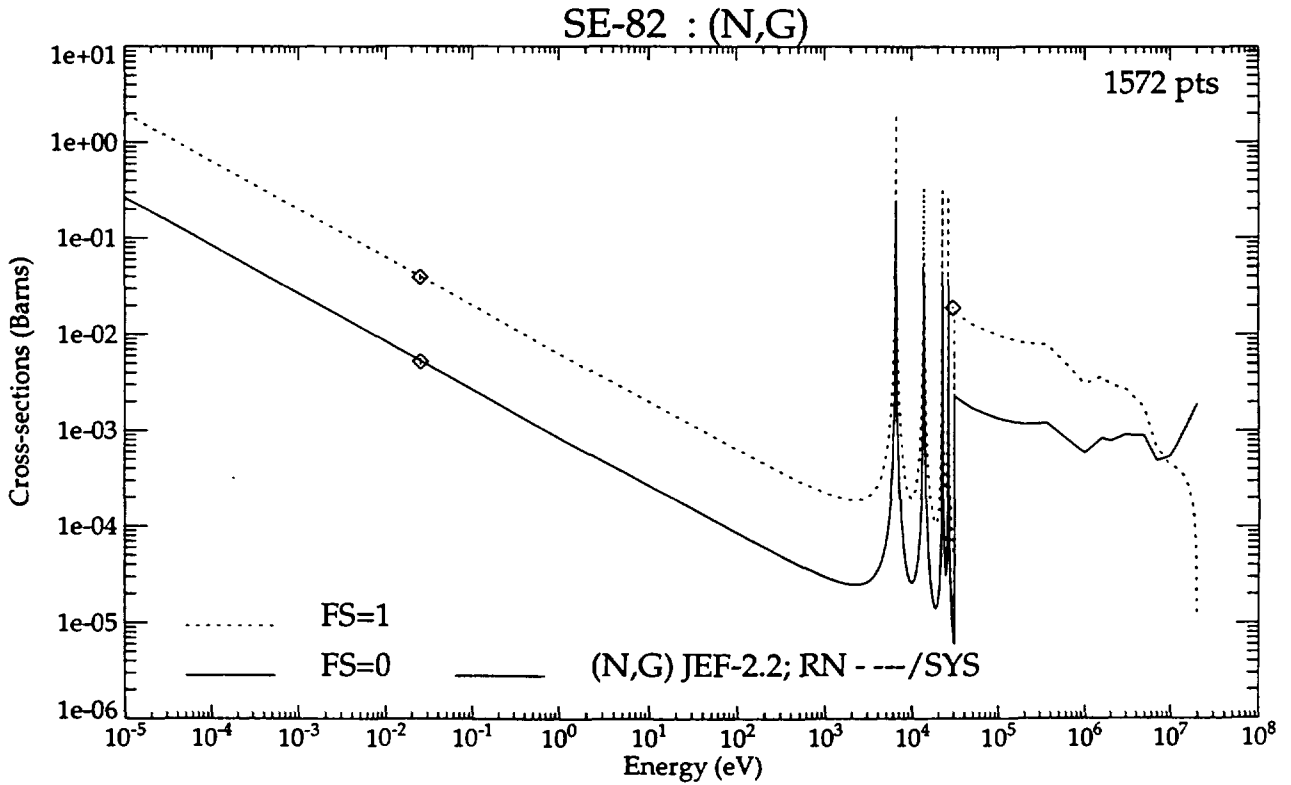
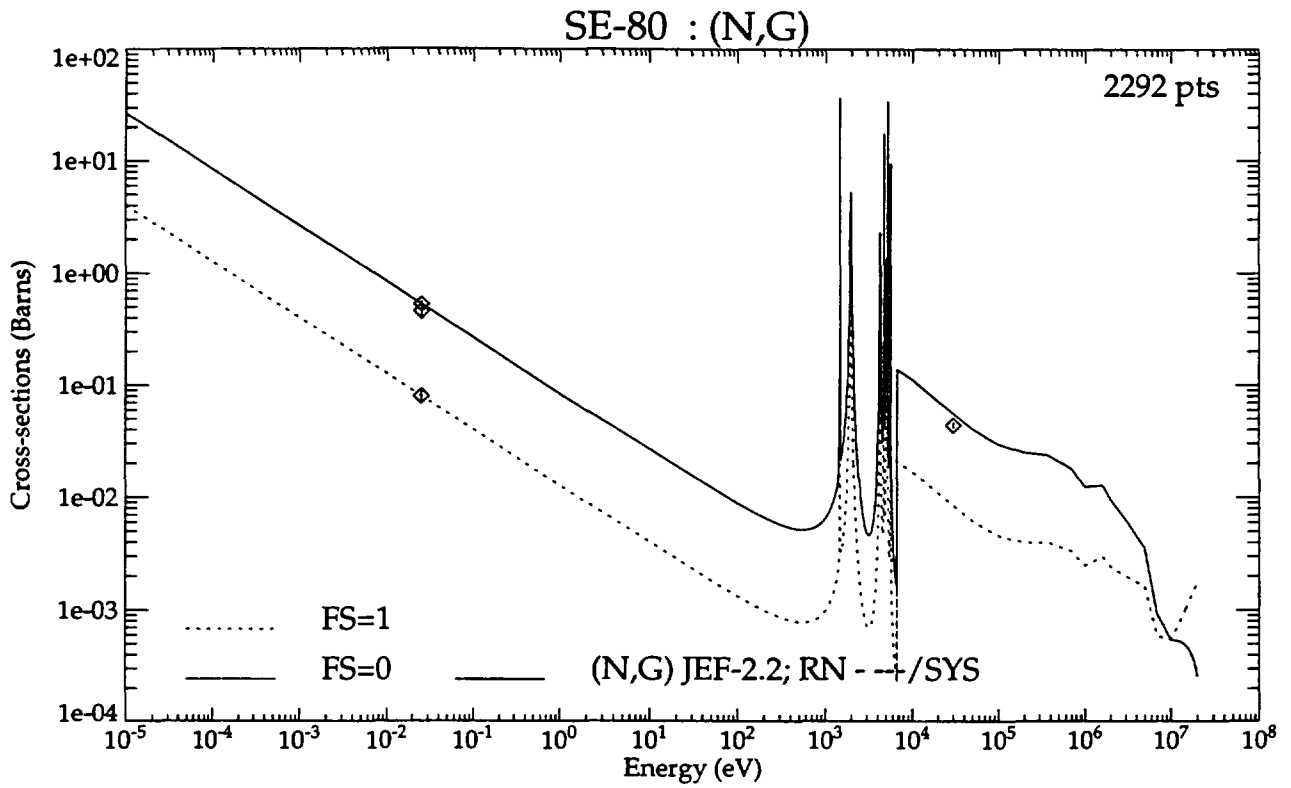
SE-73 : (N,G)

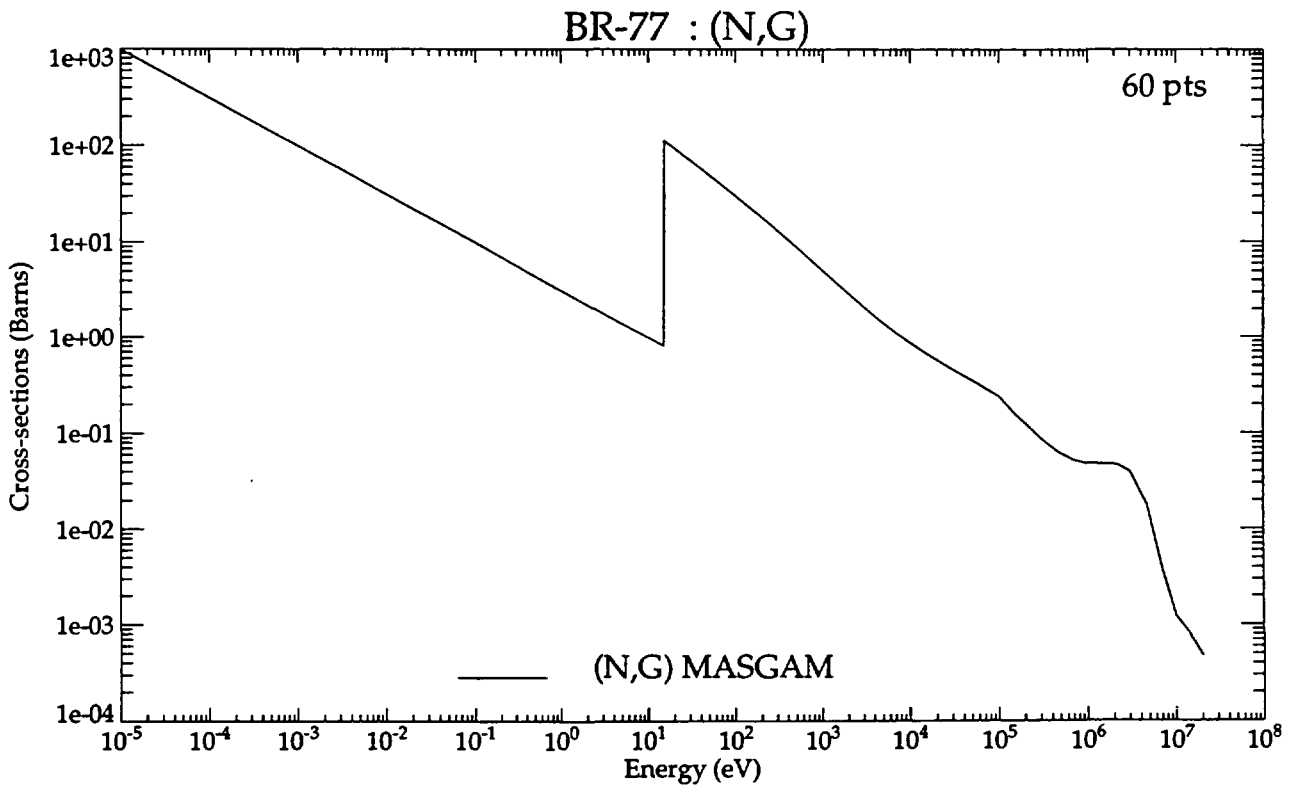
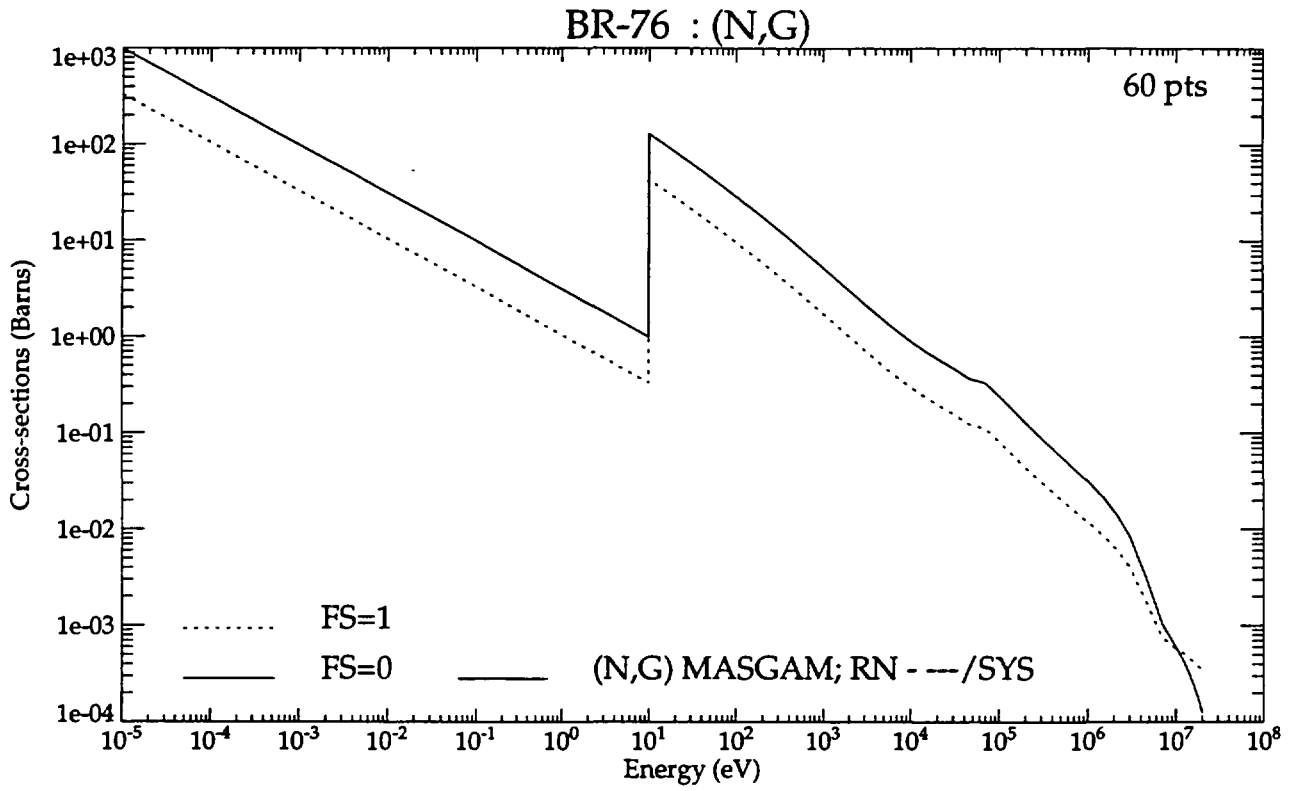


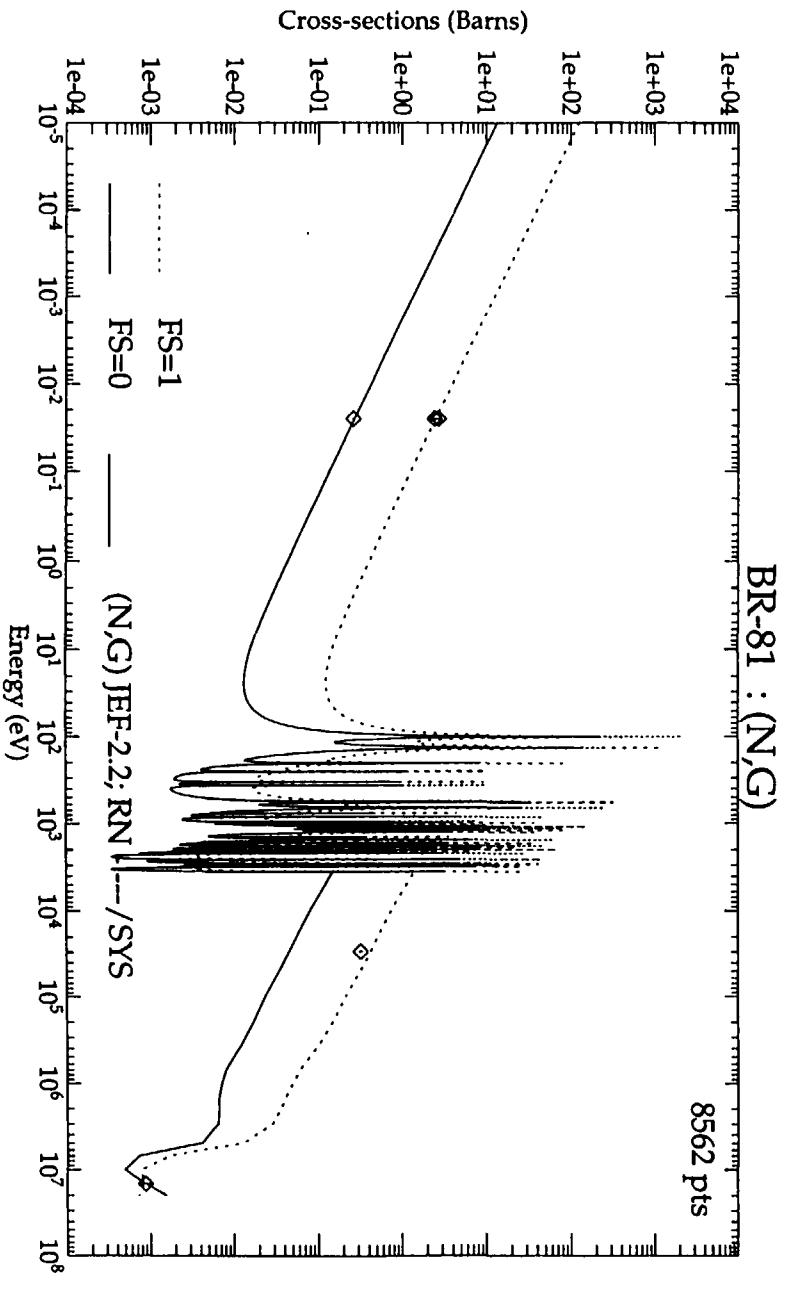
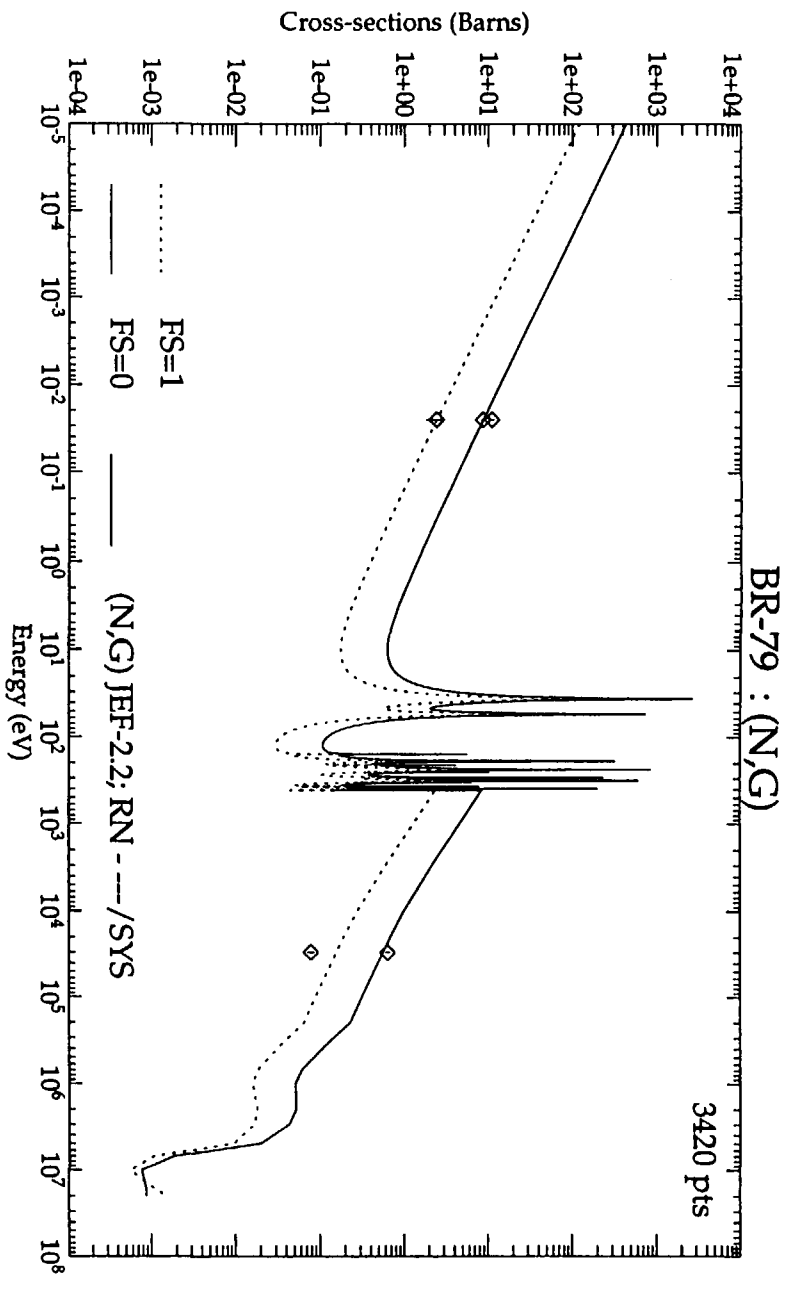


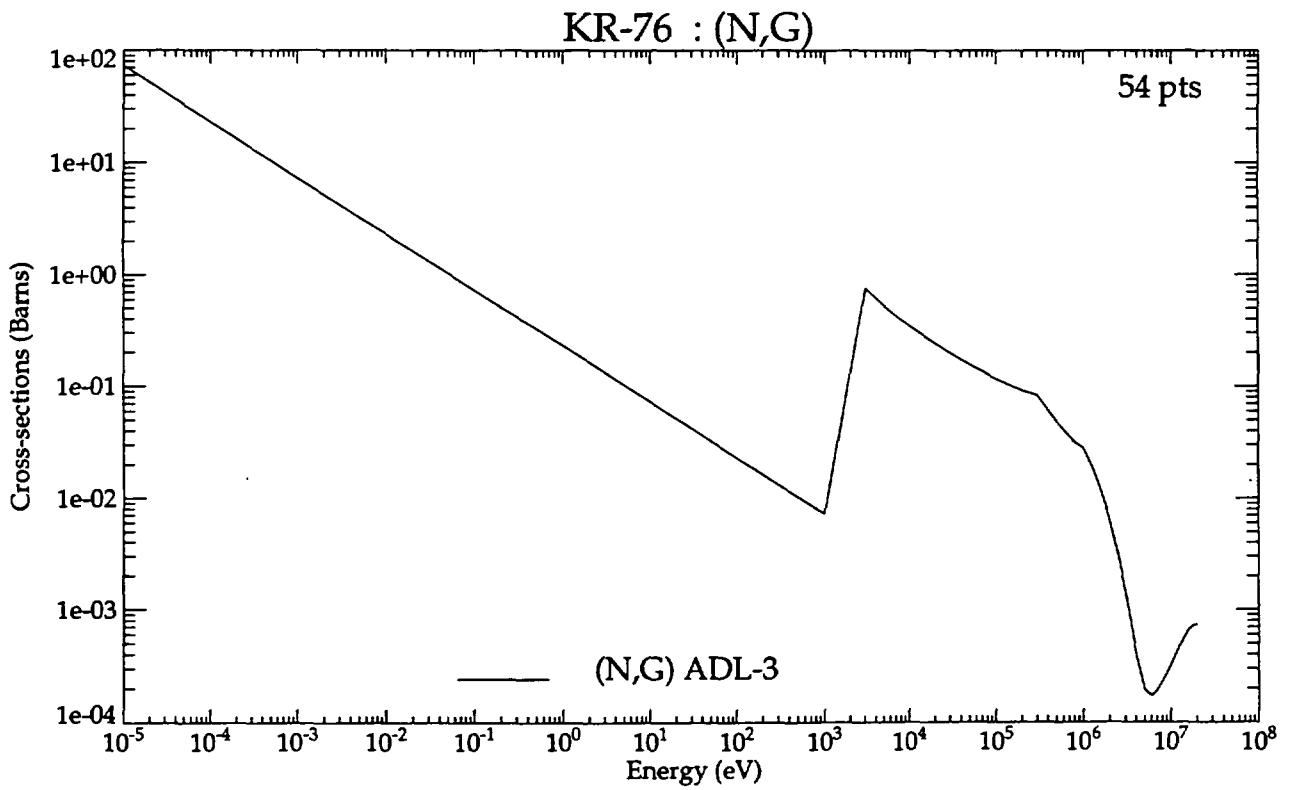
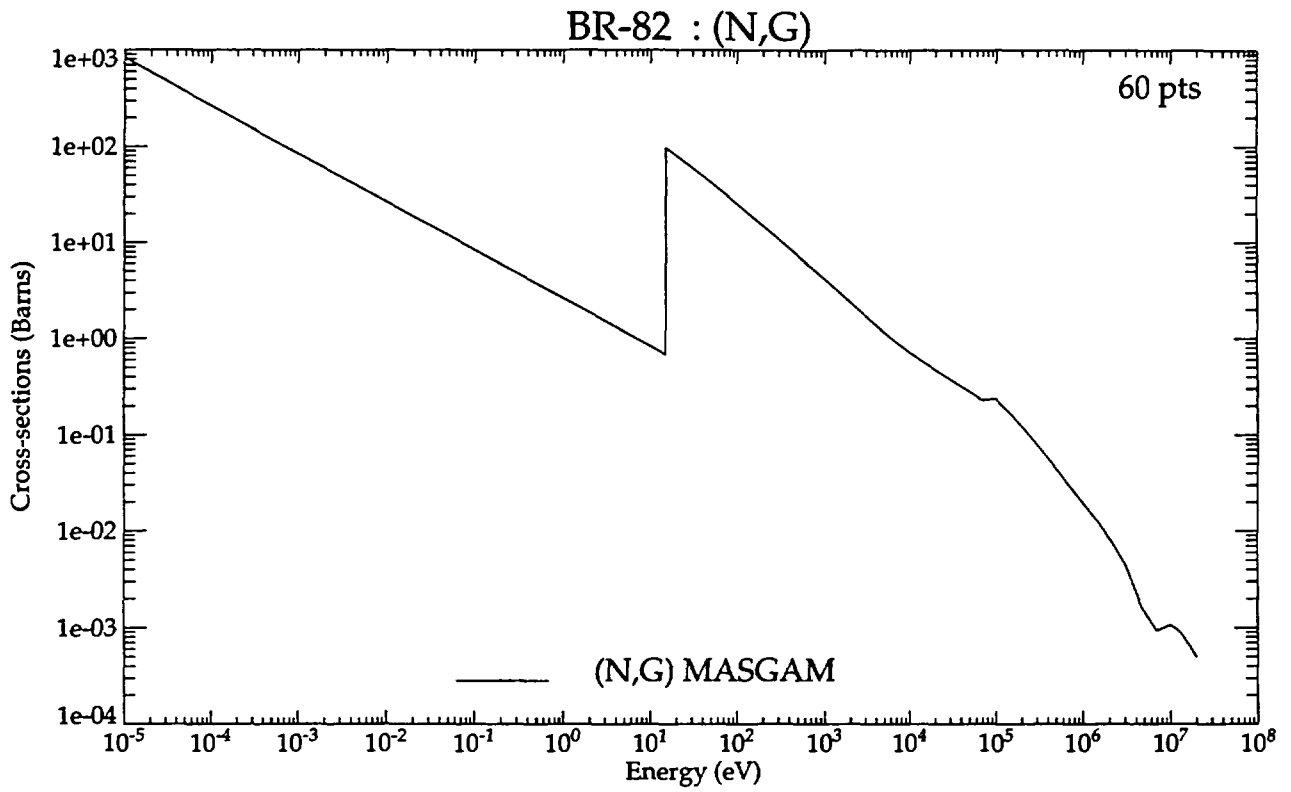


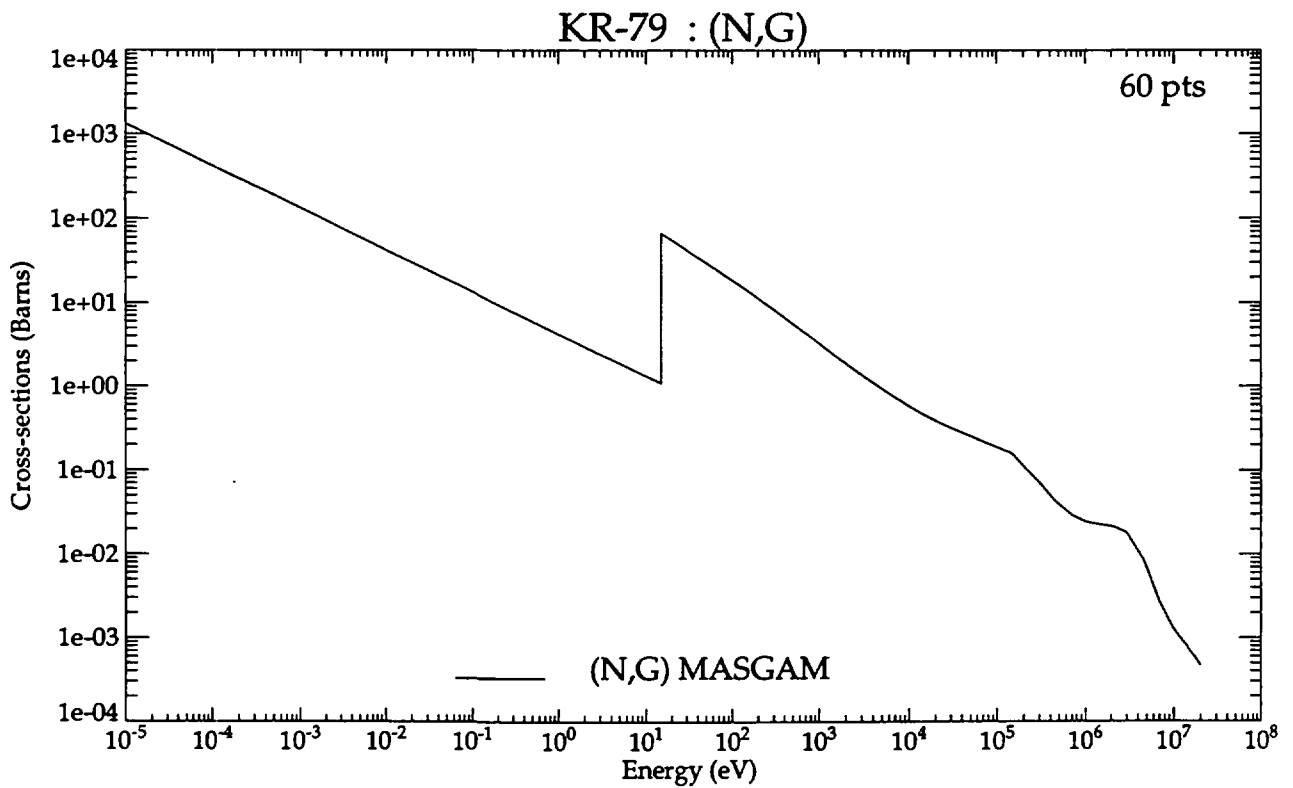
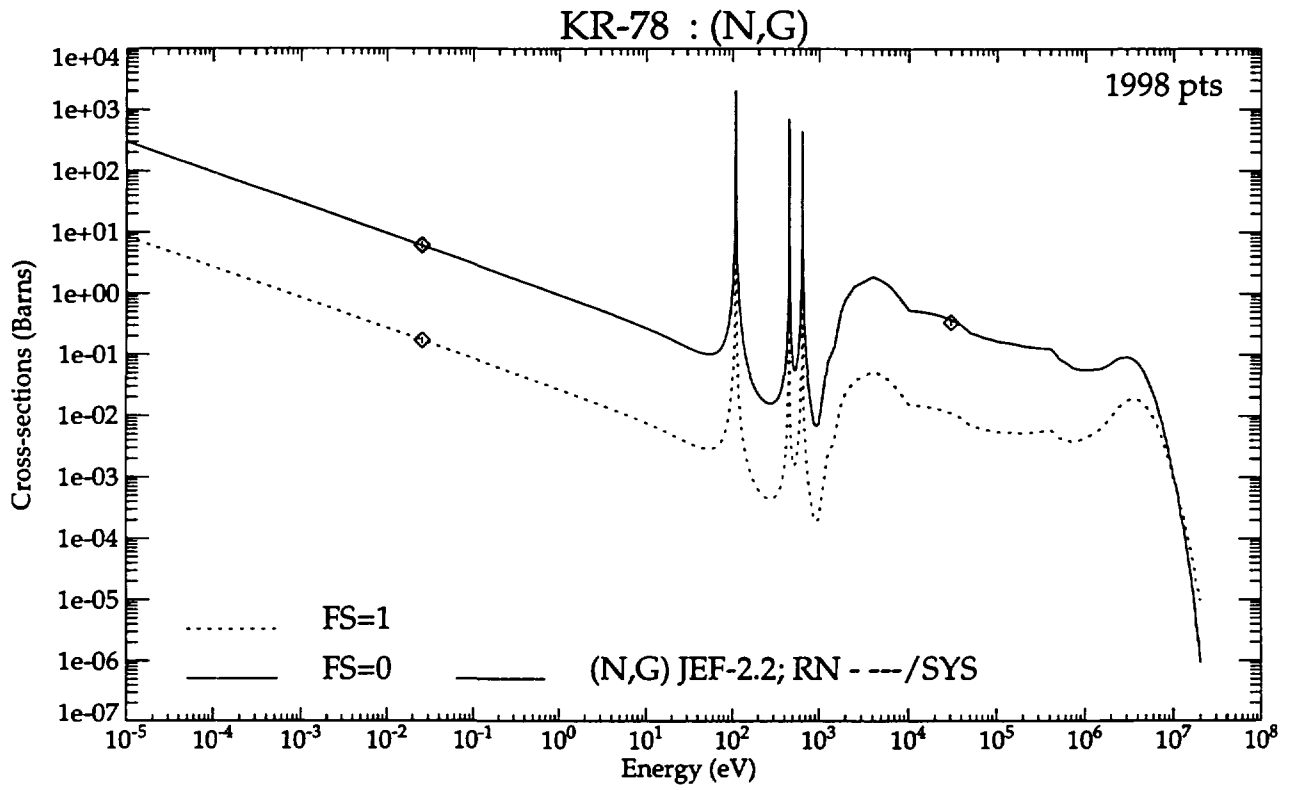


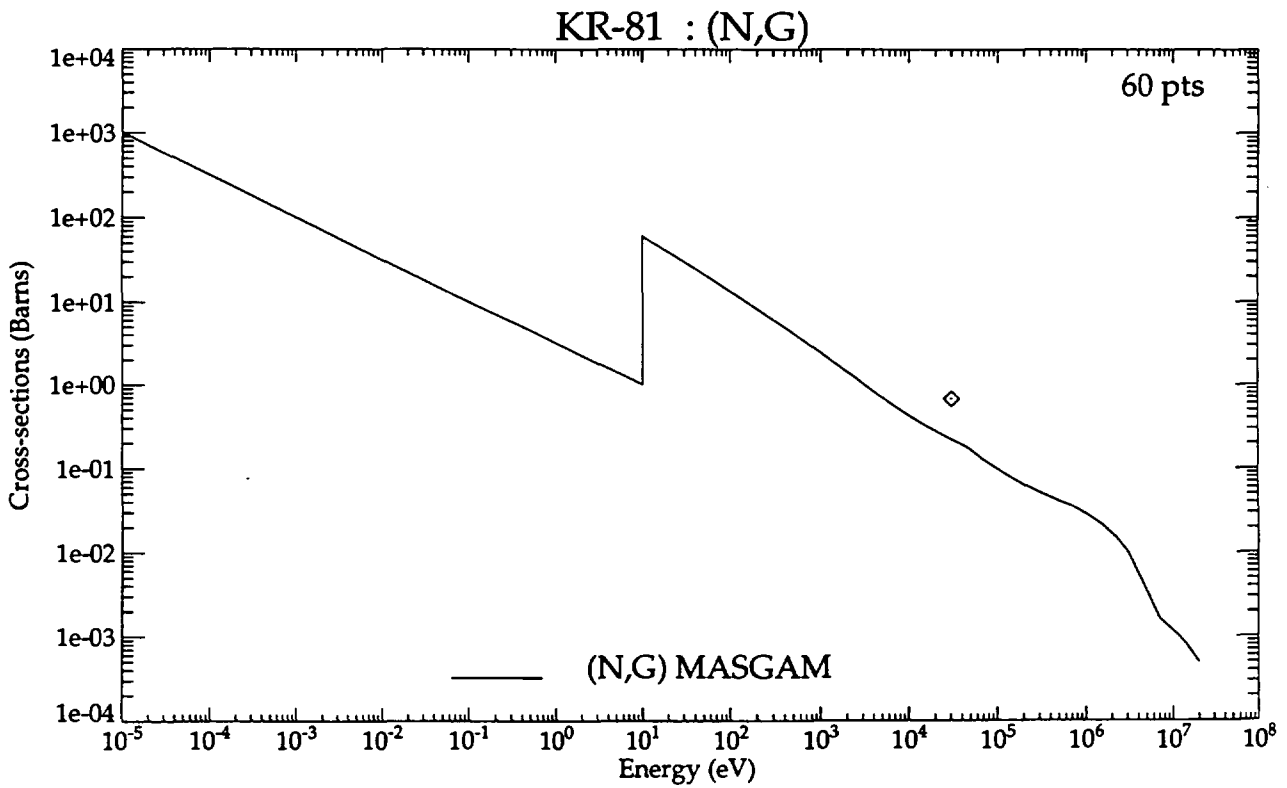
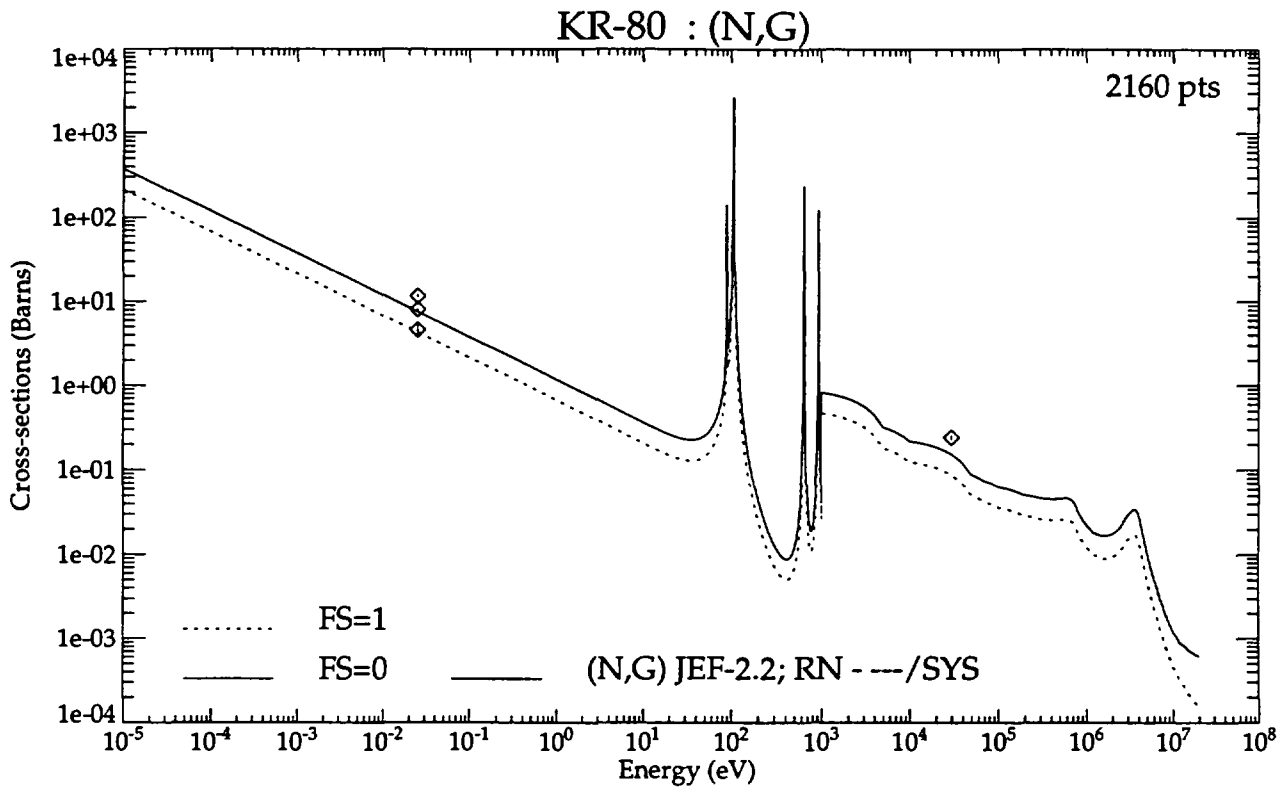


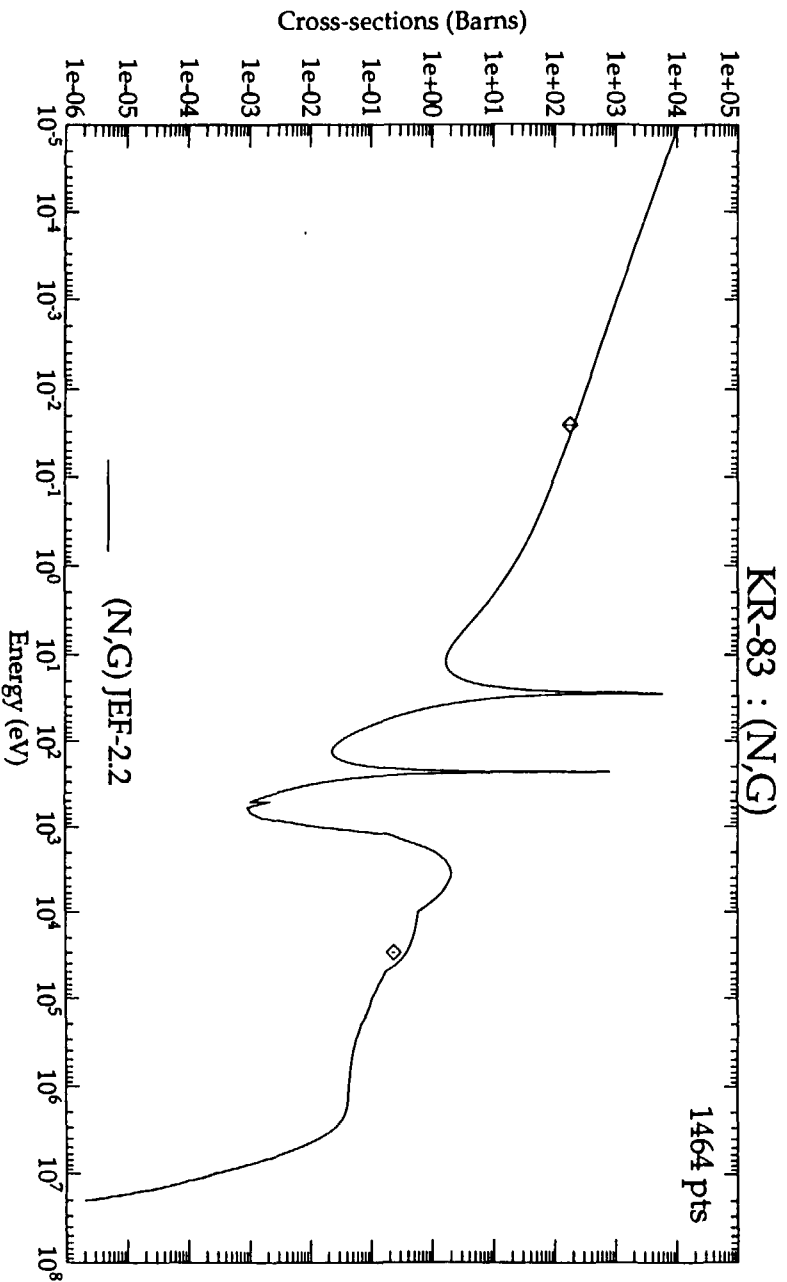
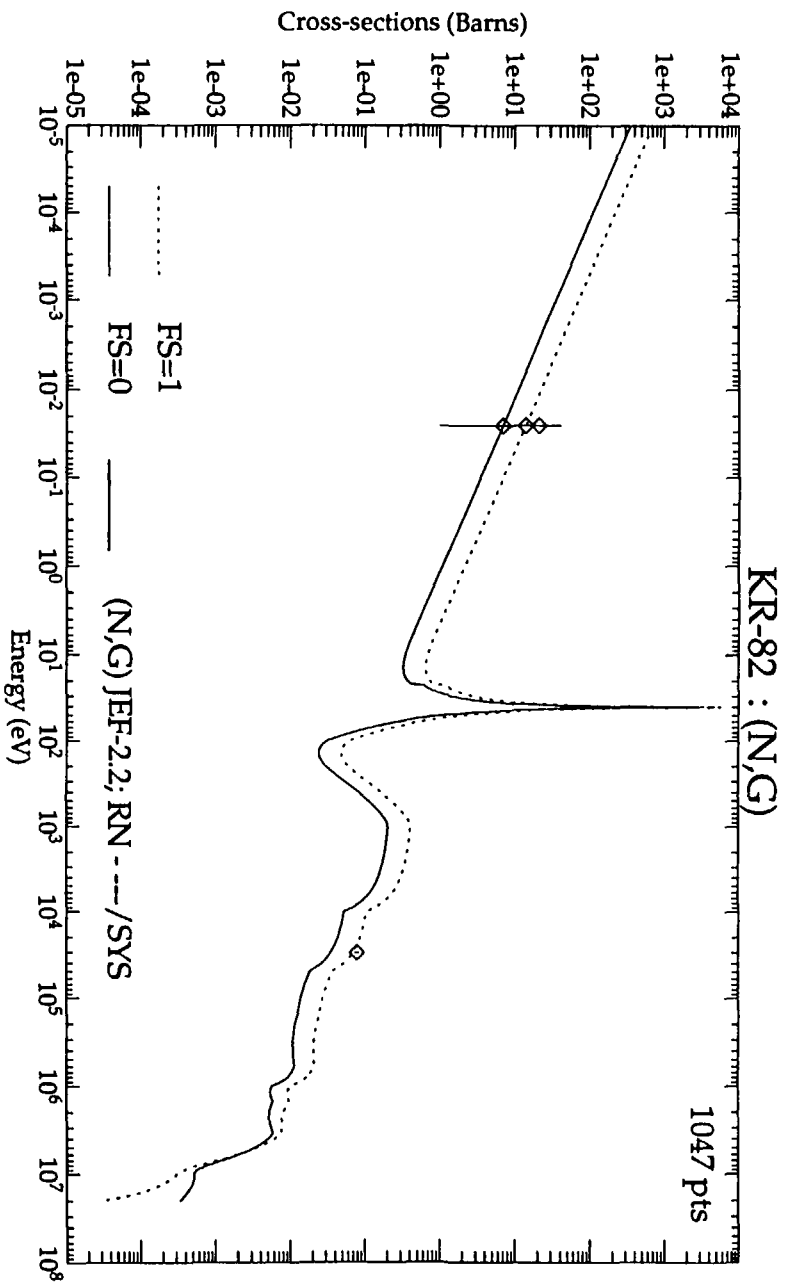




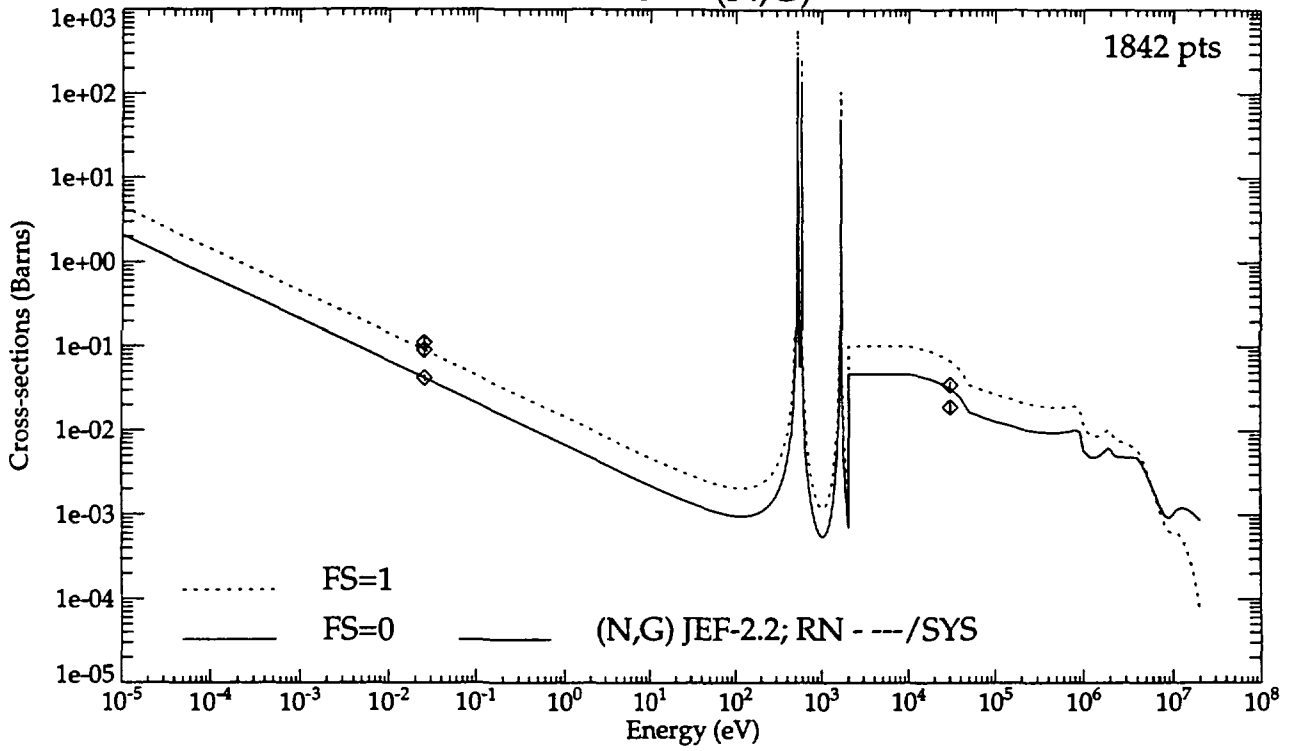




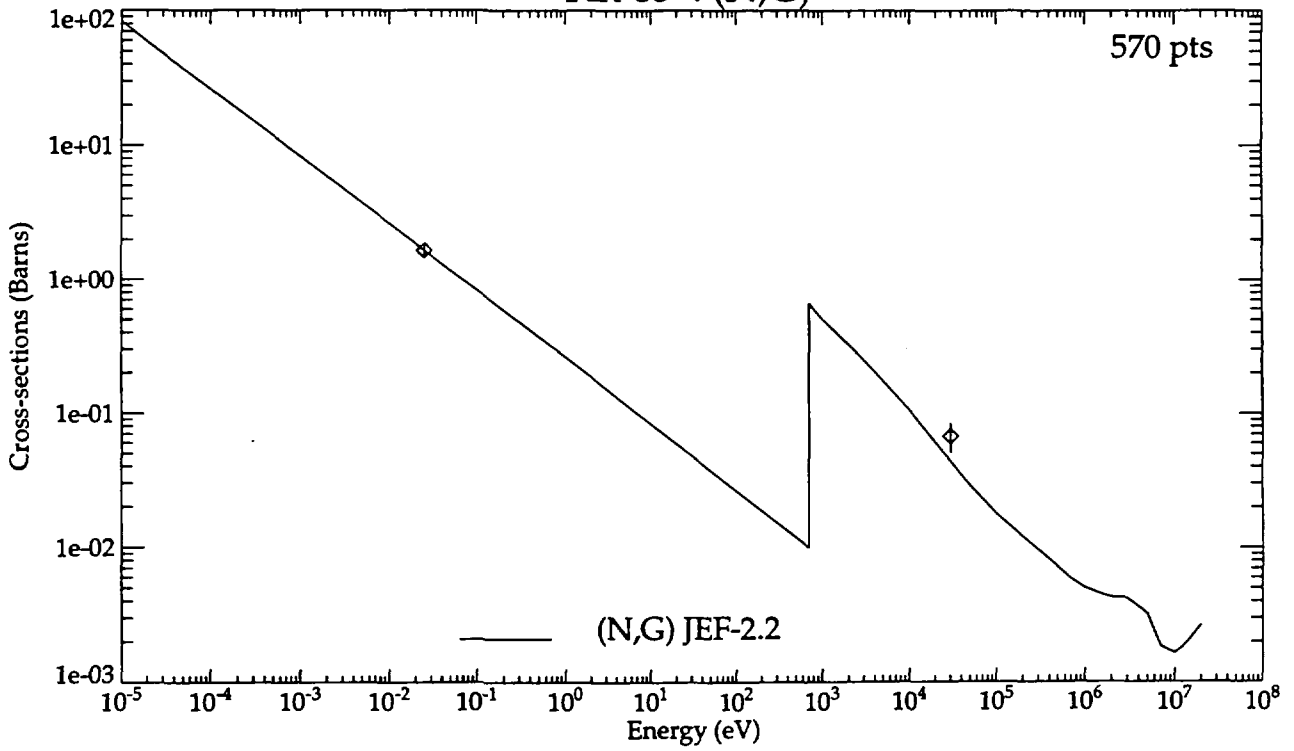


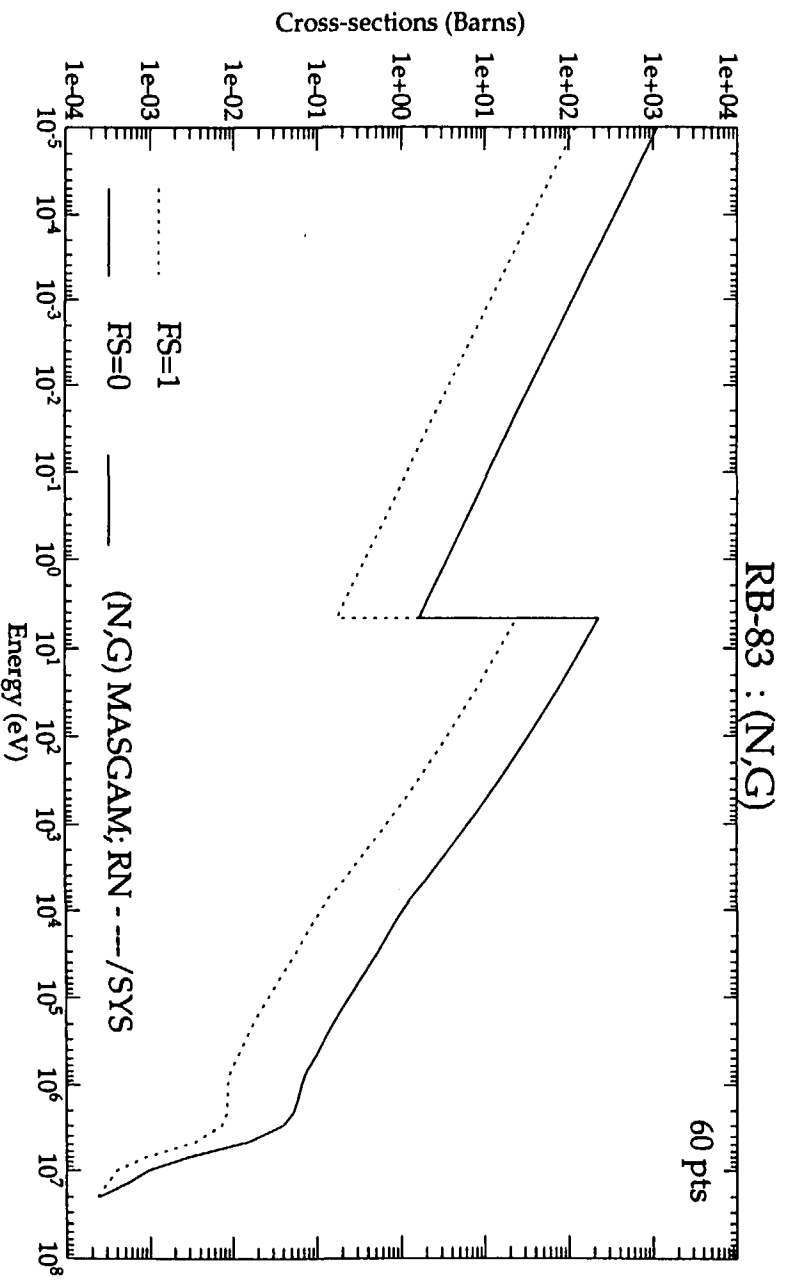
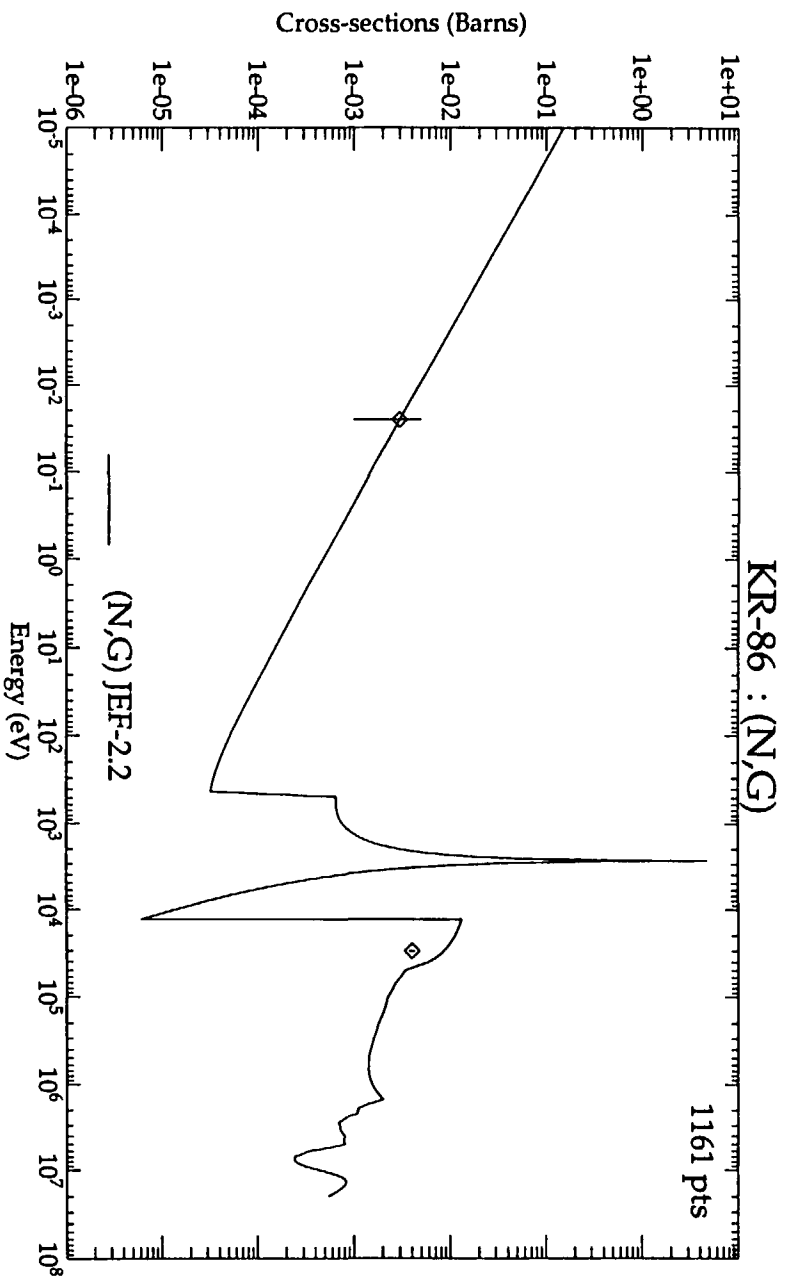


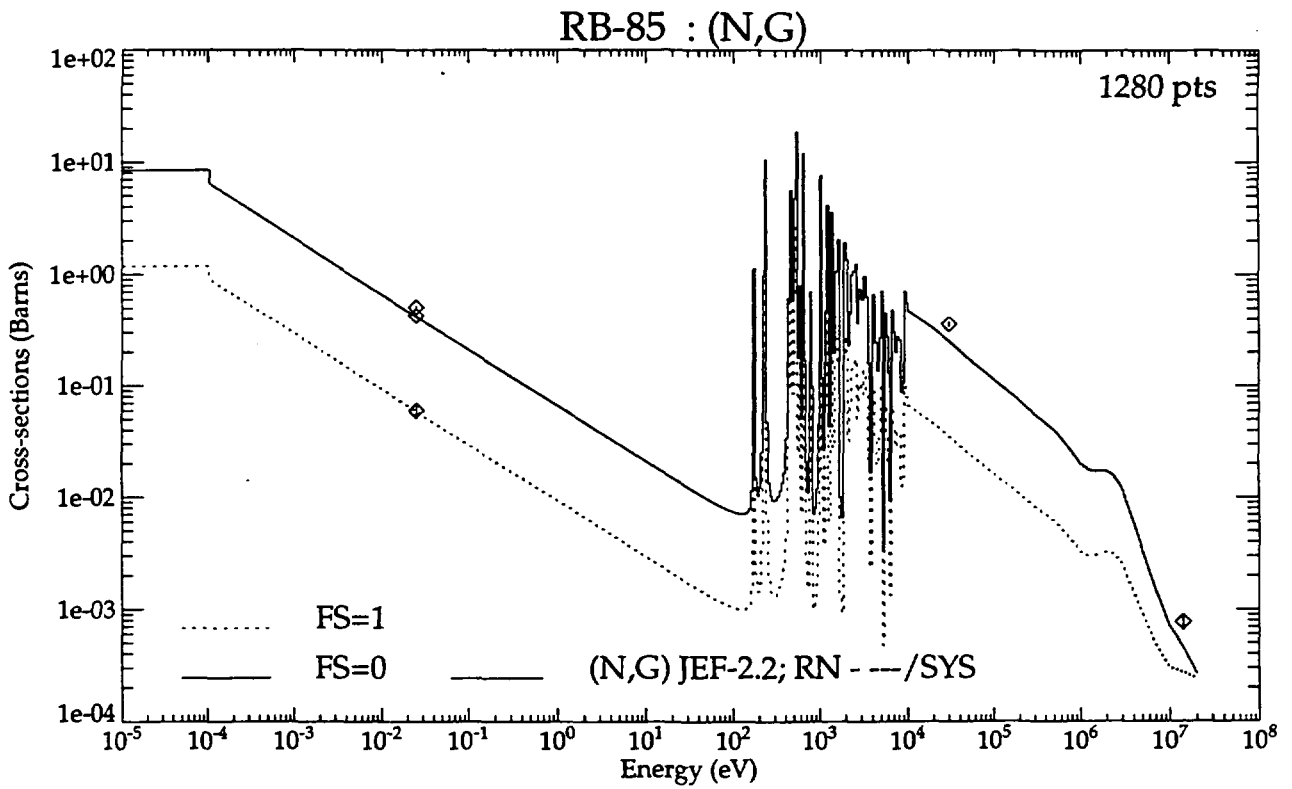
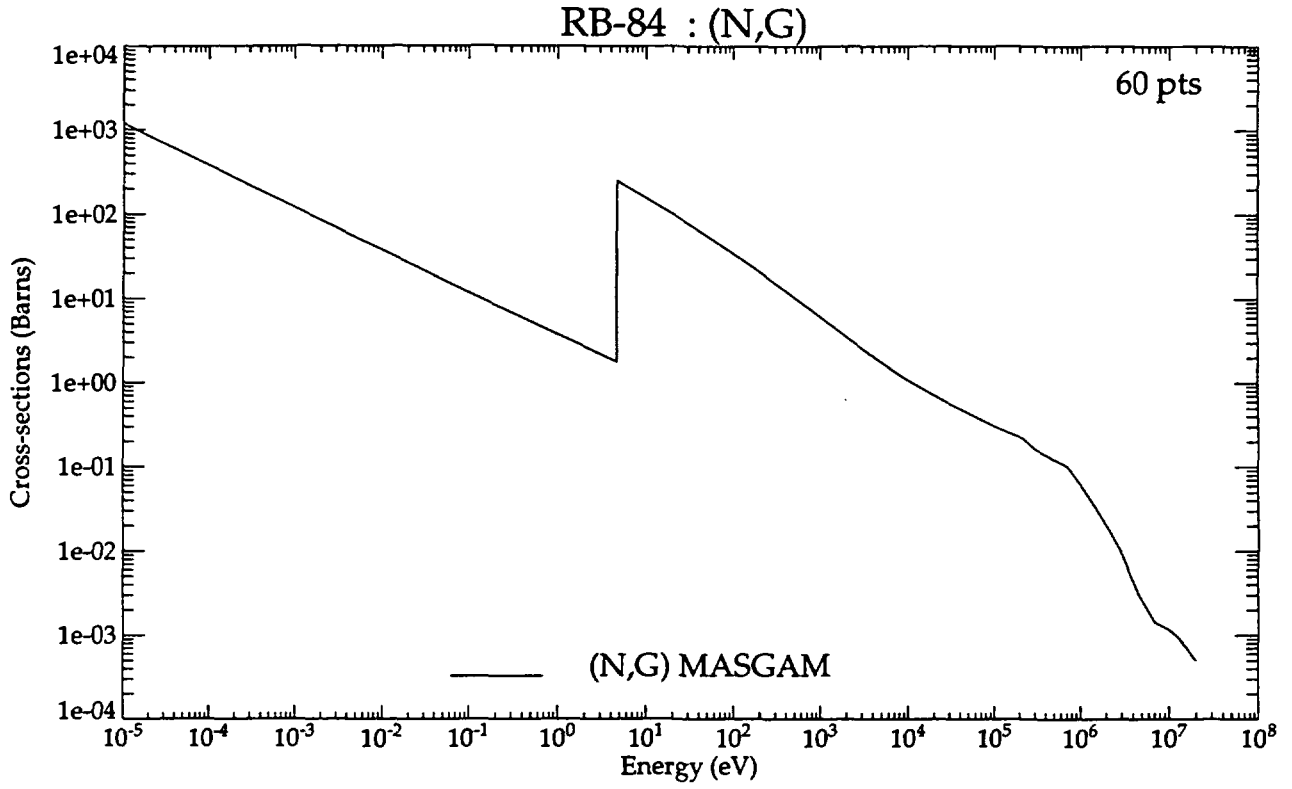
KR-84 : (N,G)

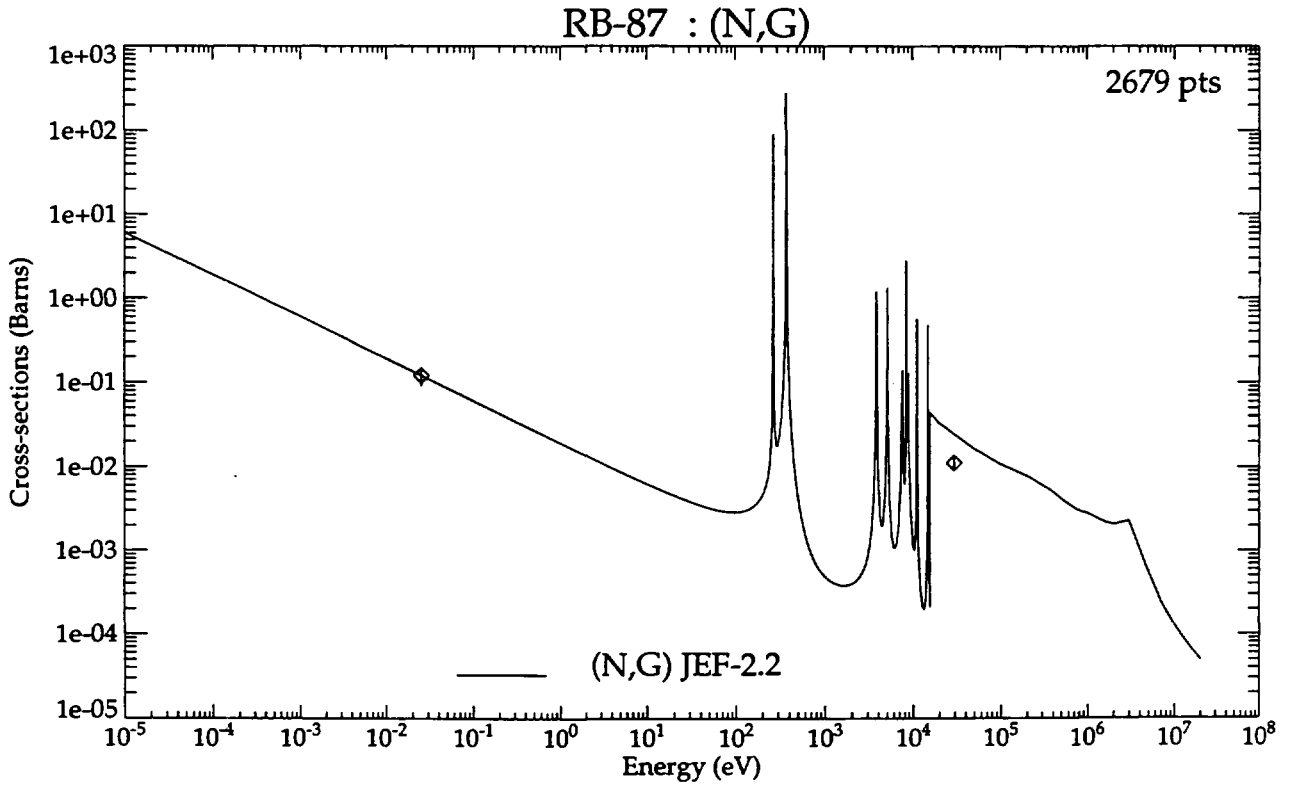
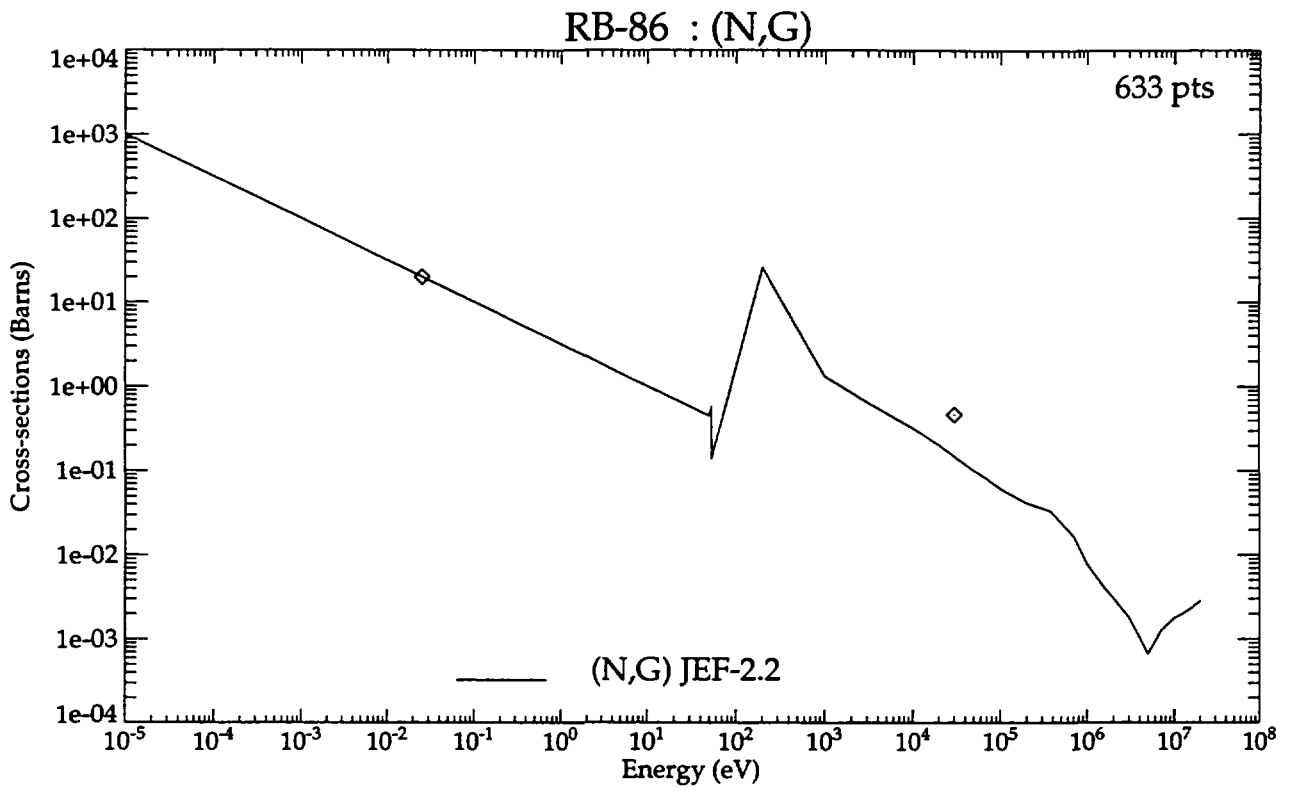


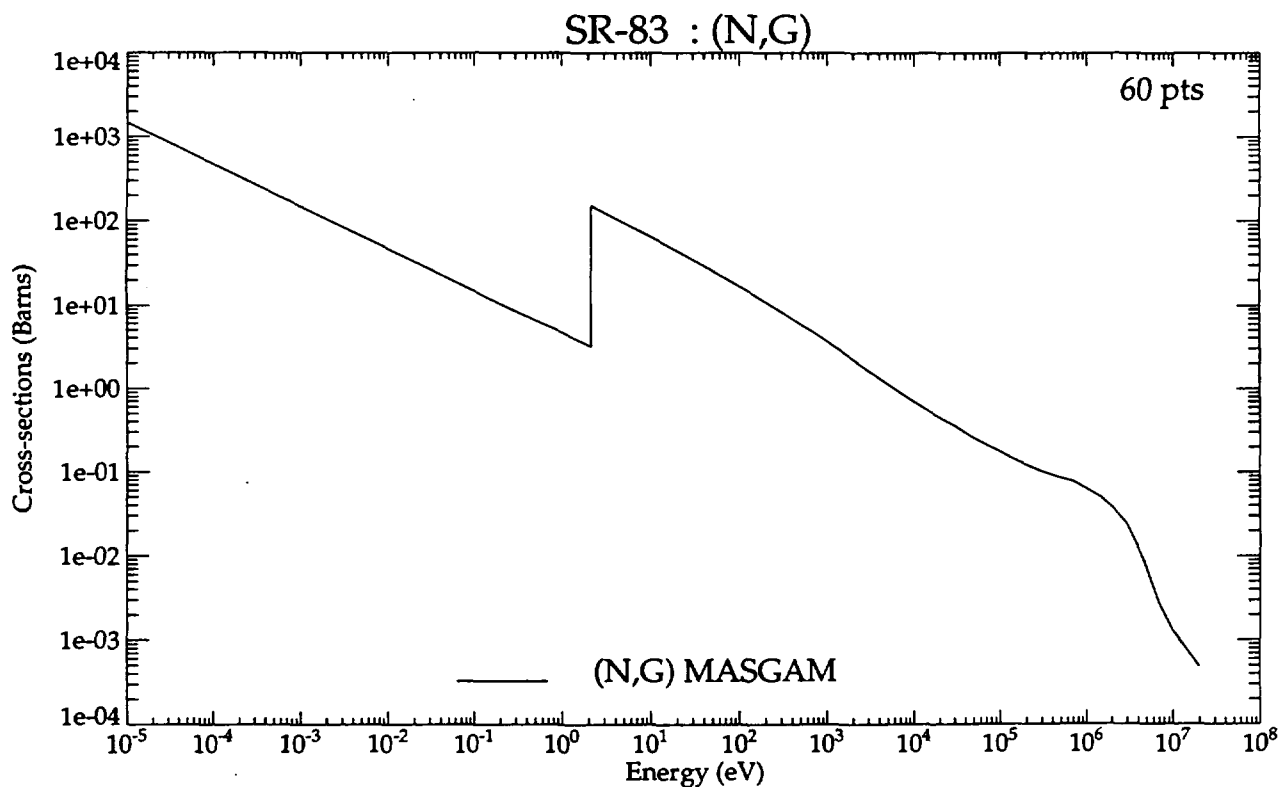
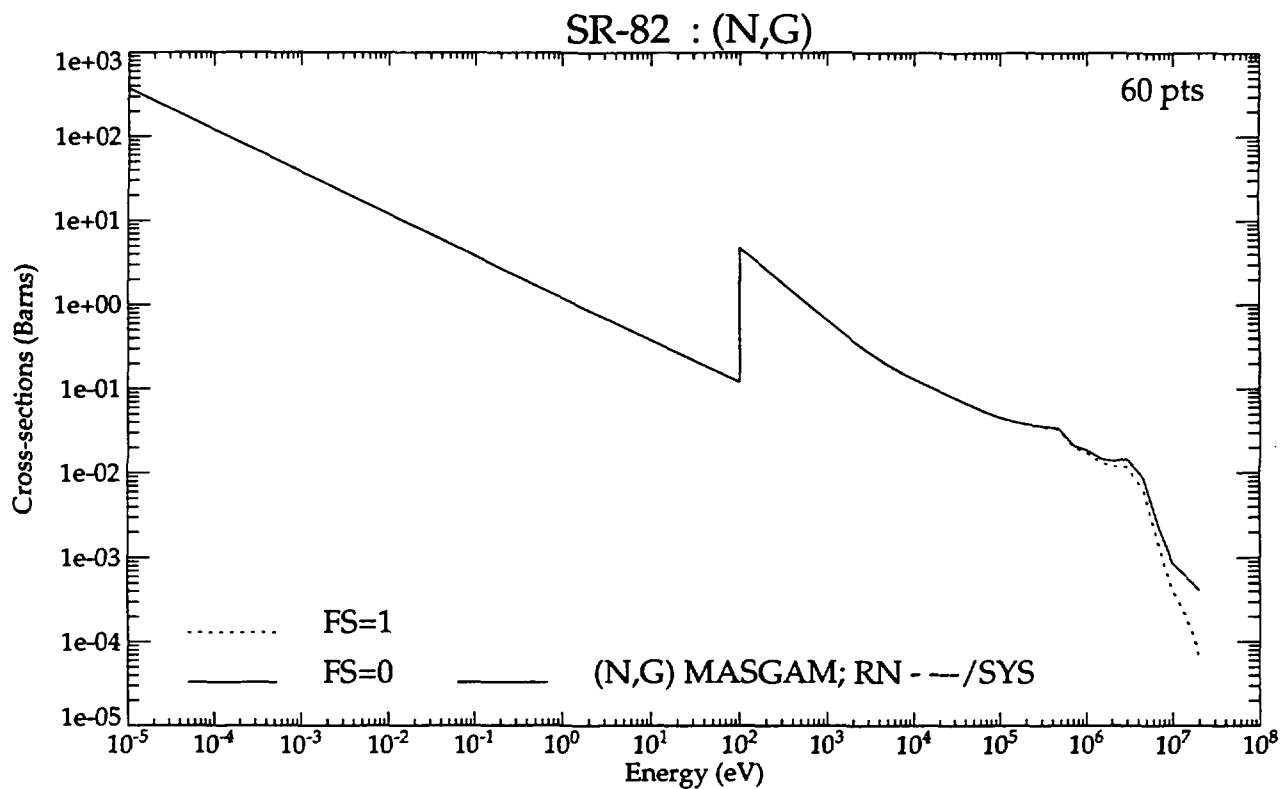
KR-85 : (N,G)

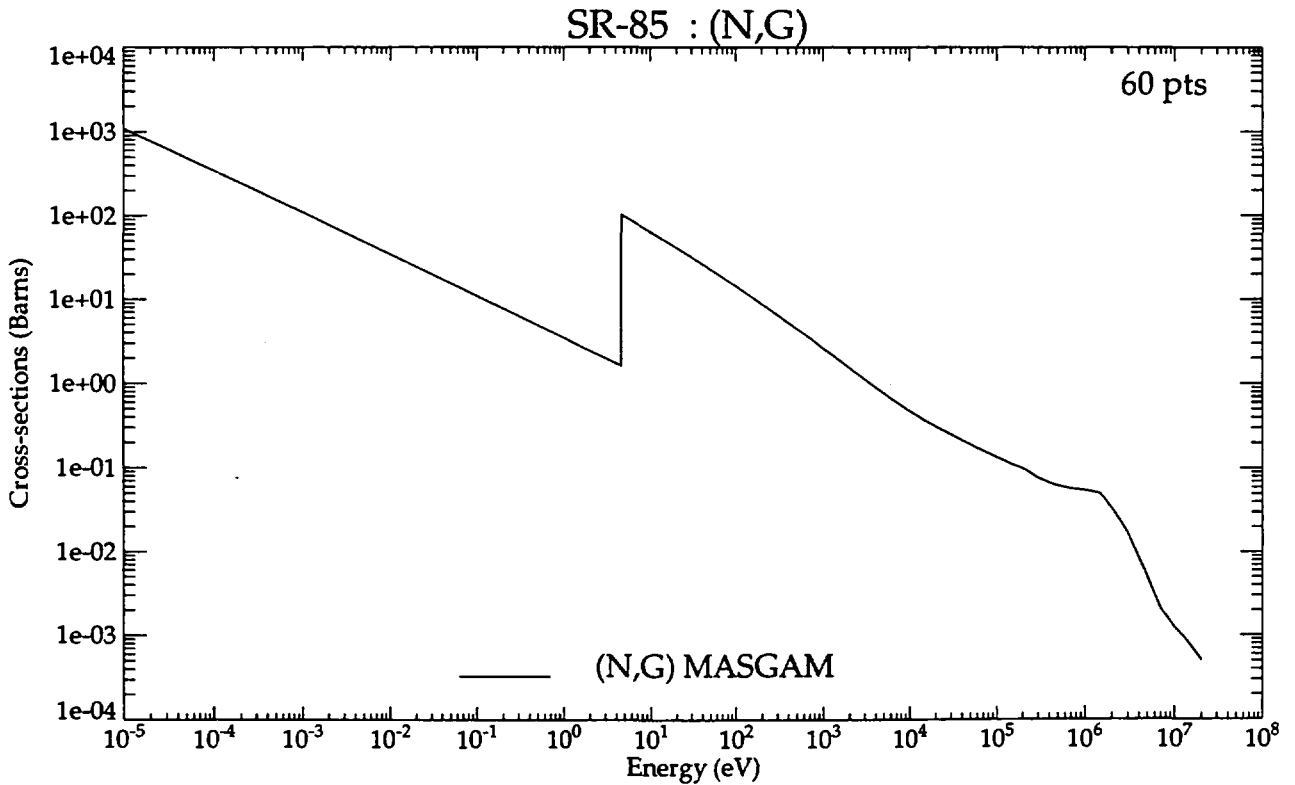
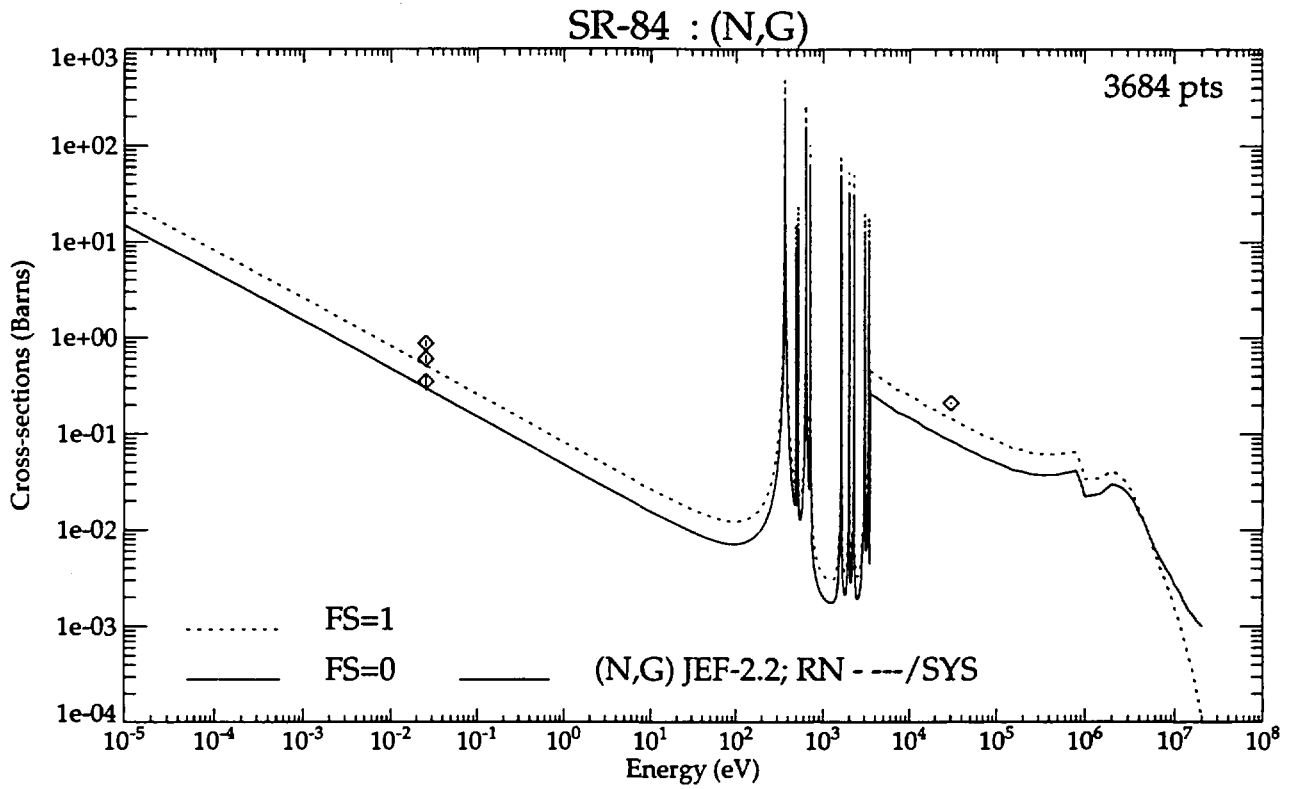


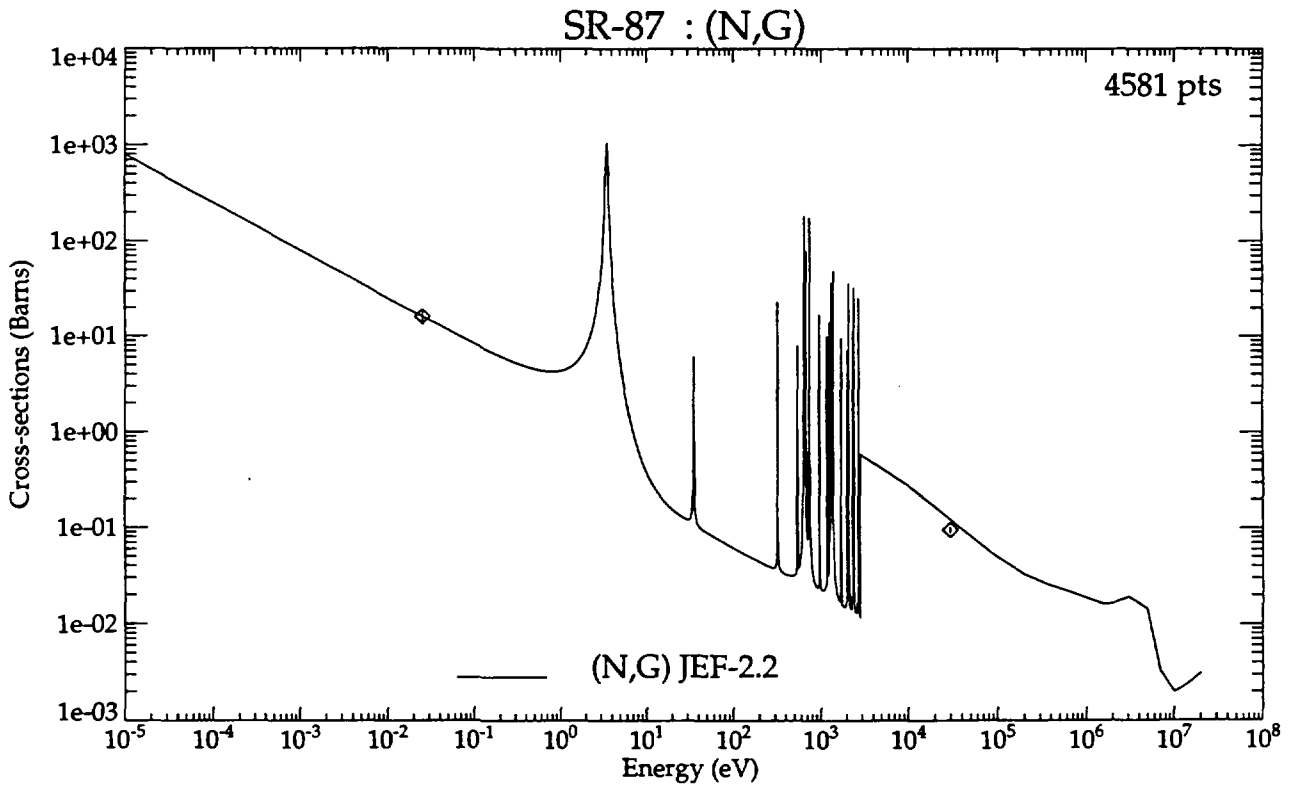
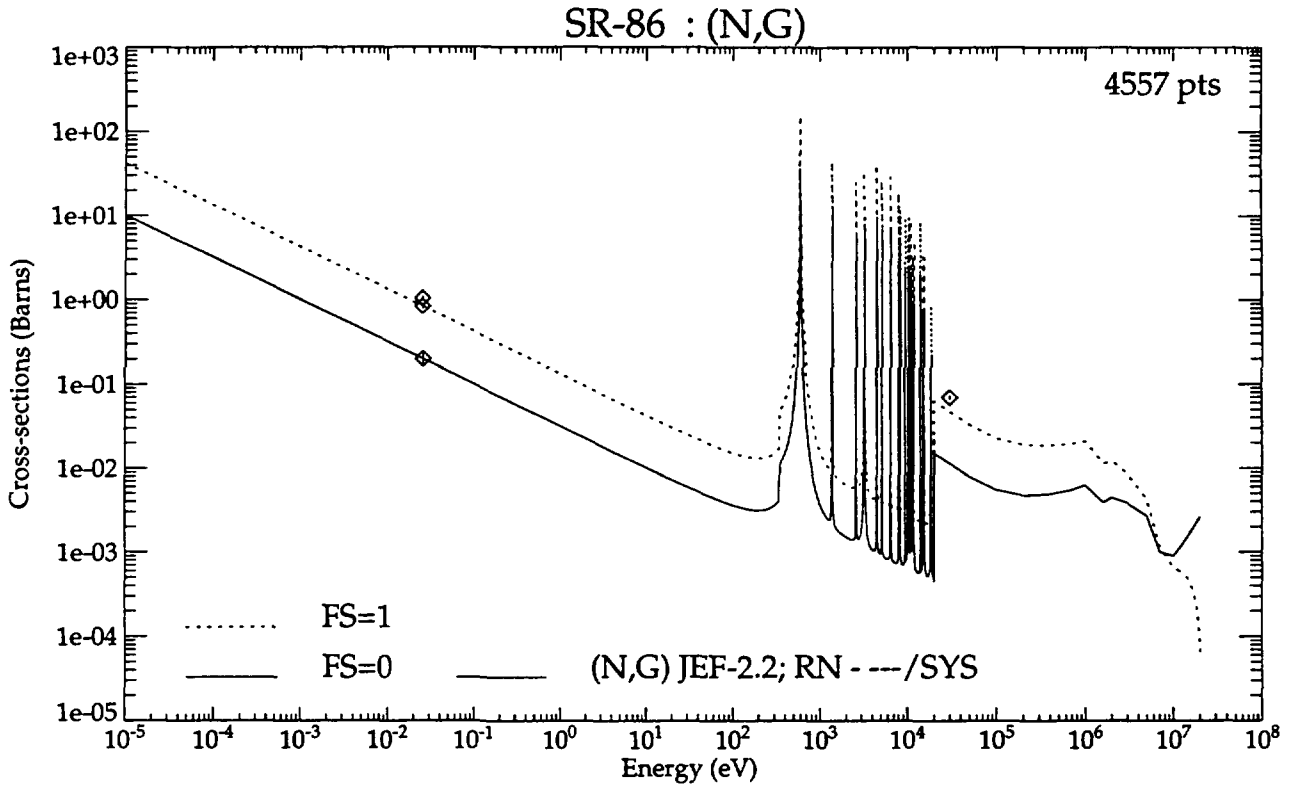


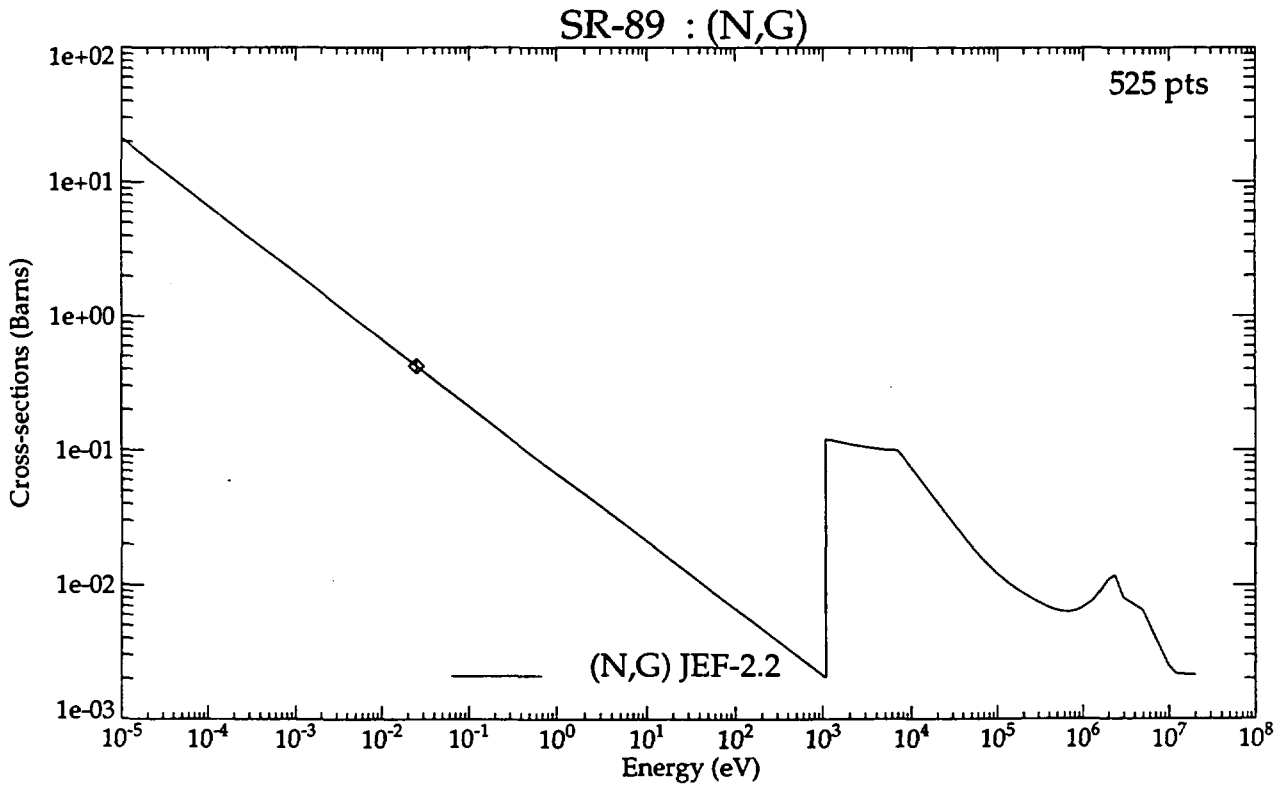
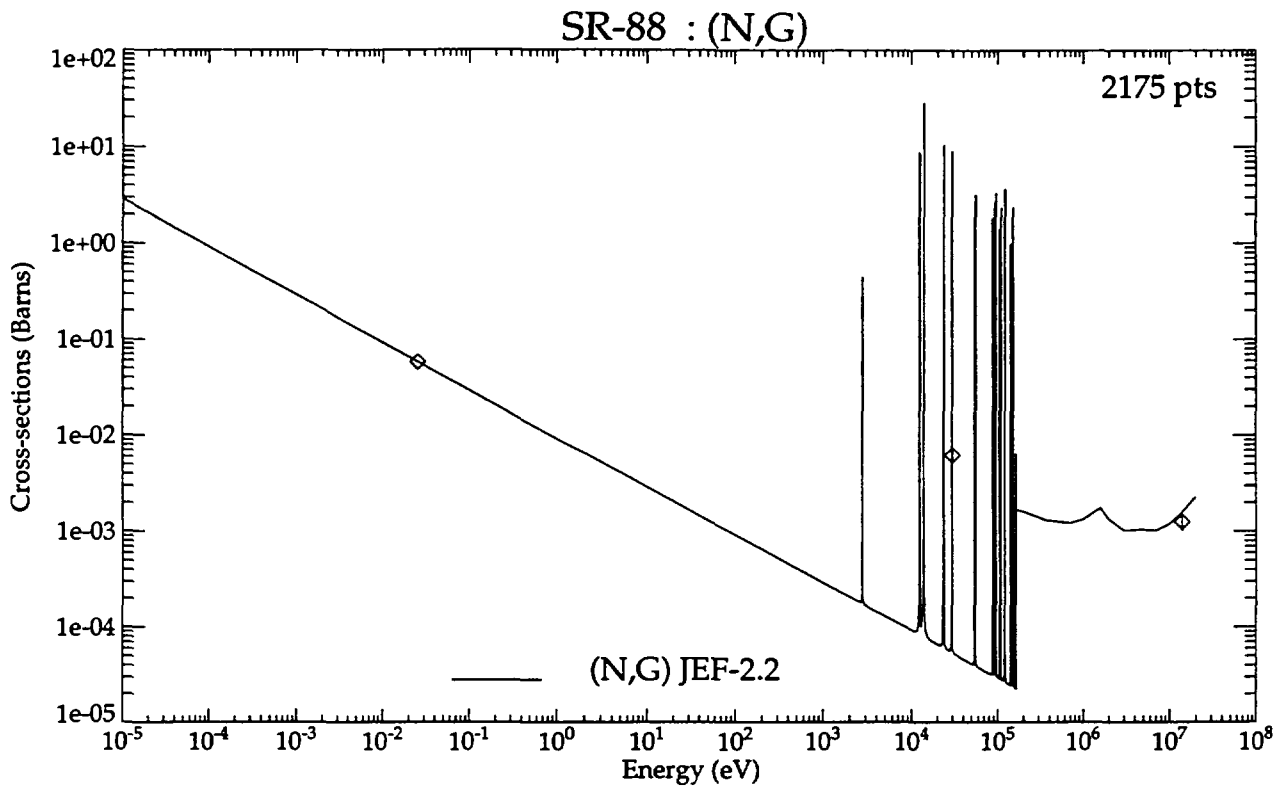


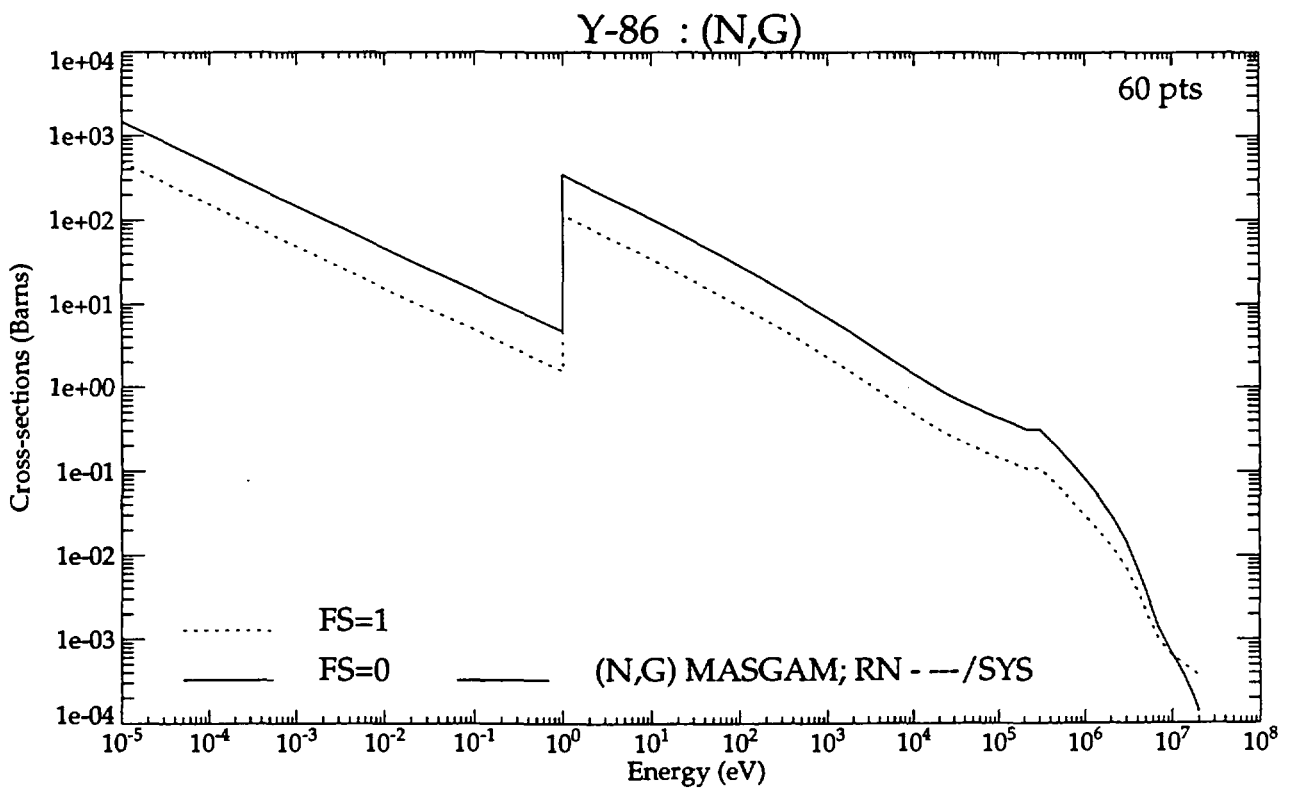
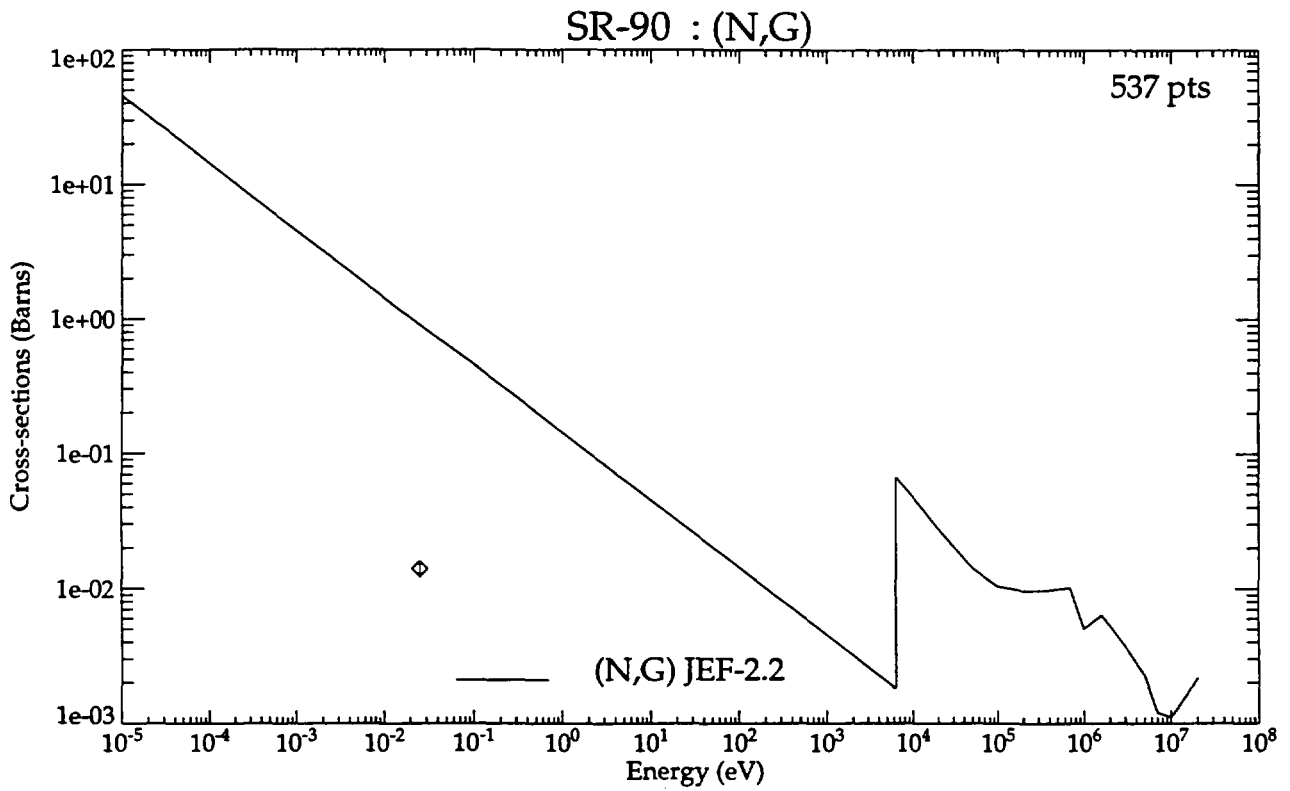


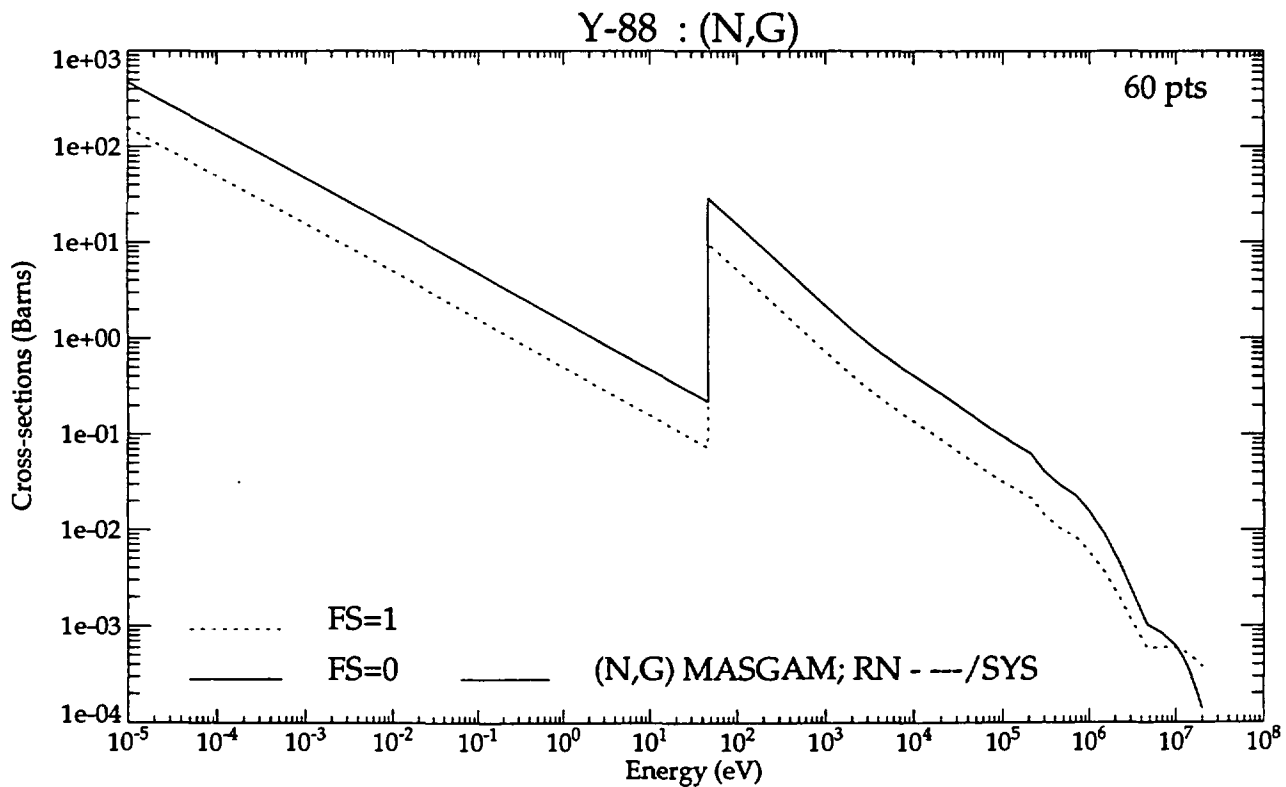
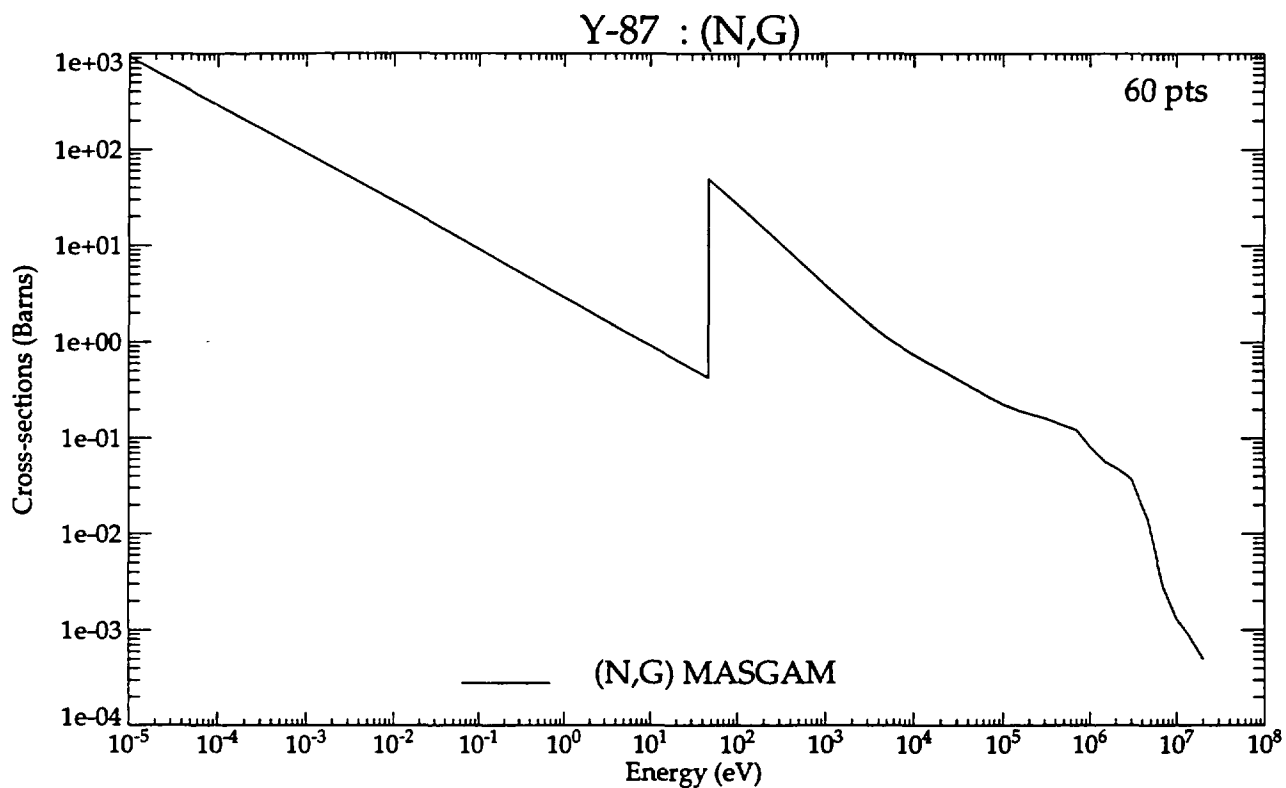


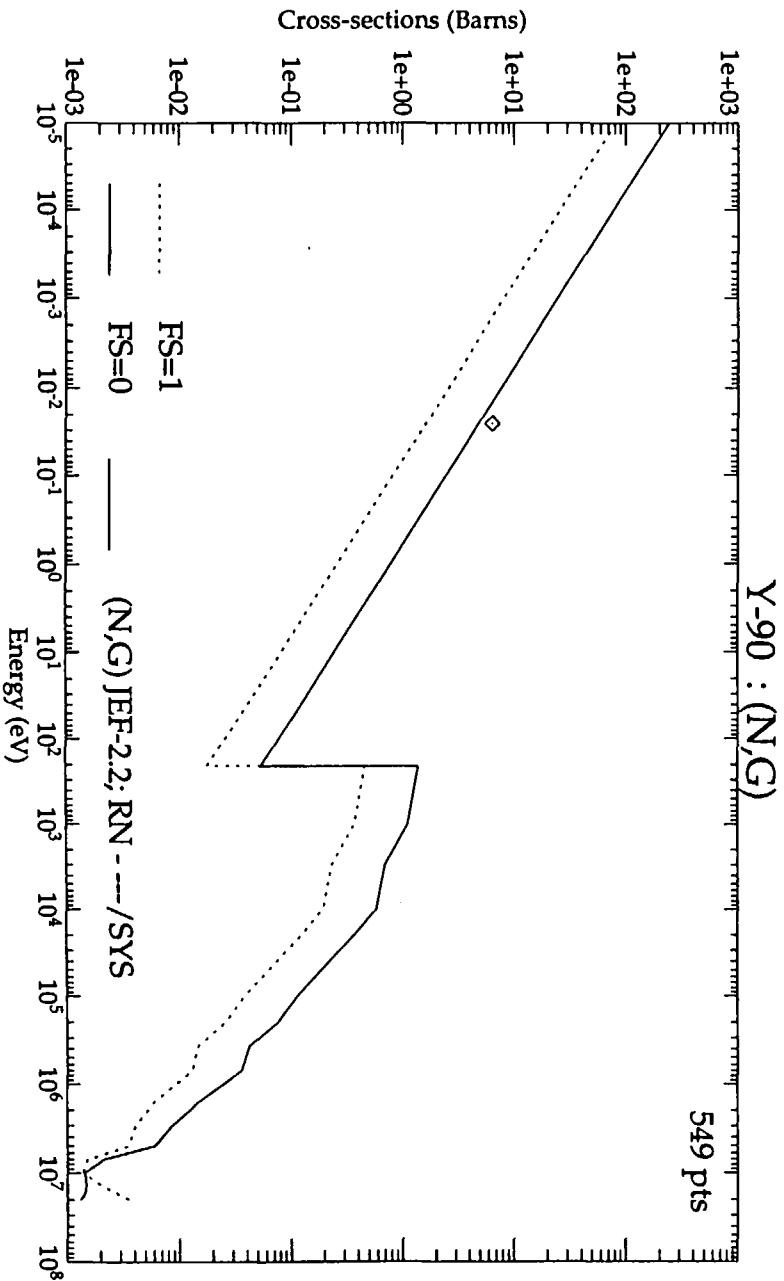
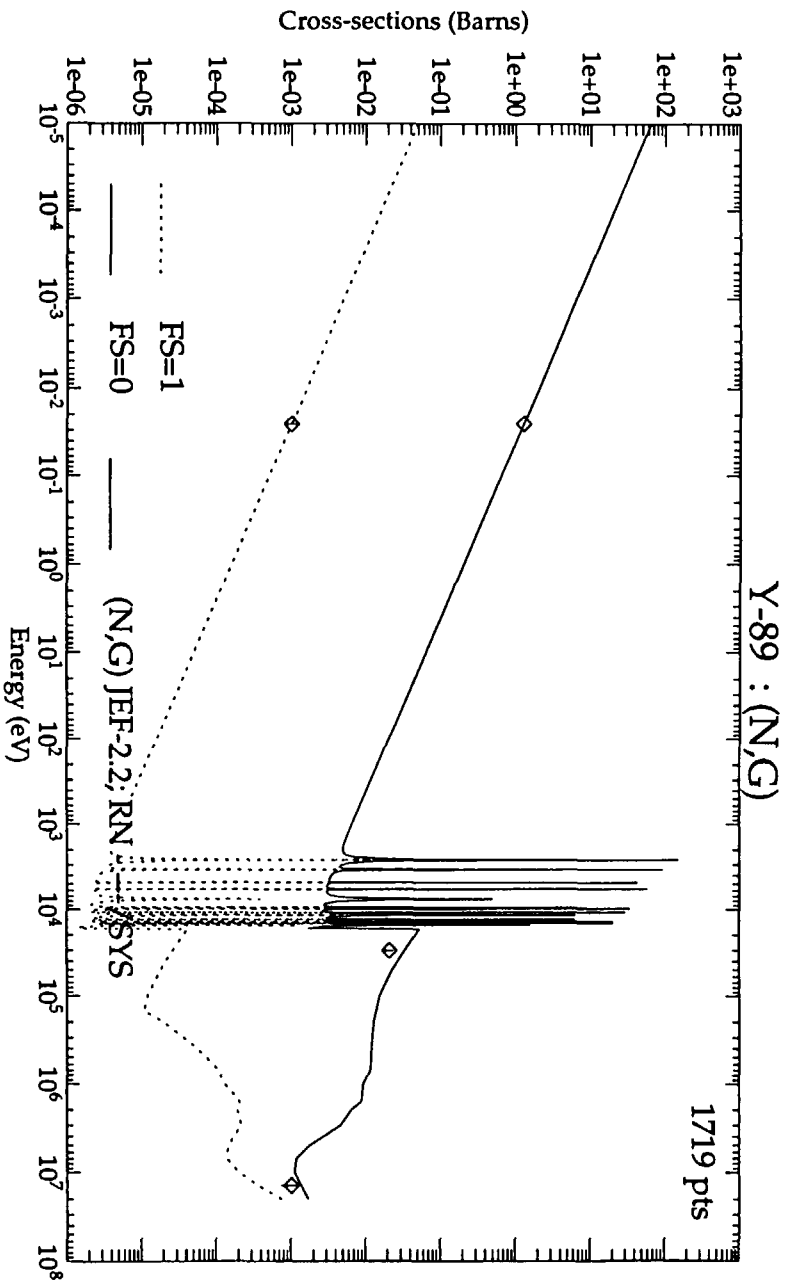


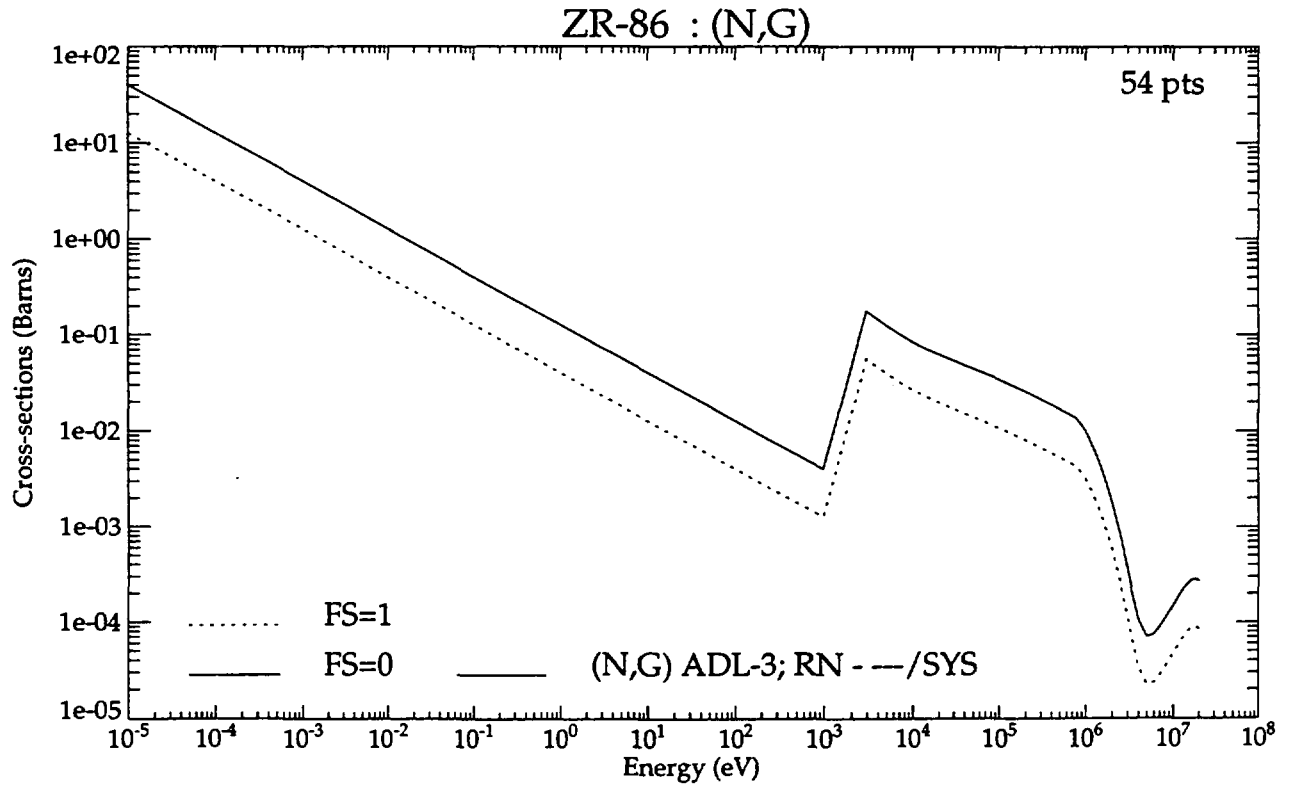
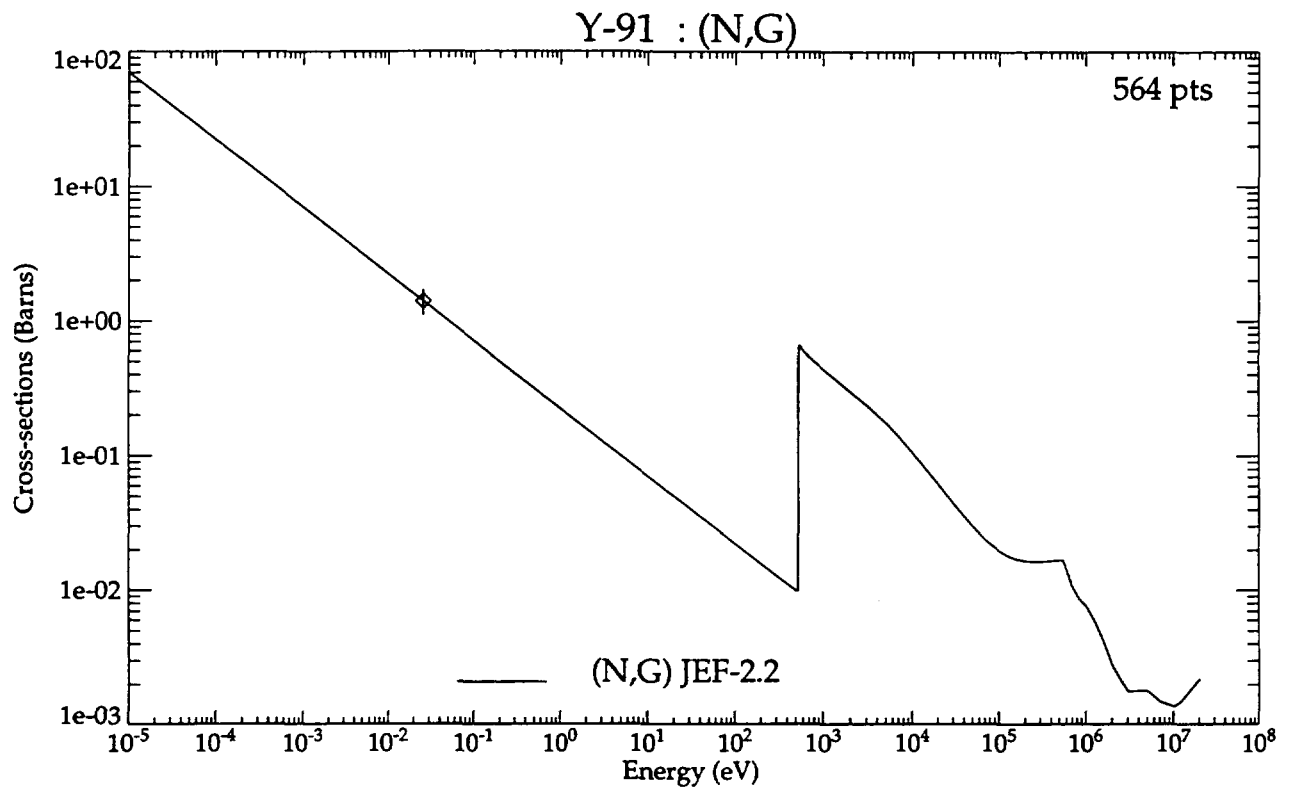




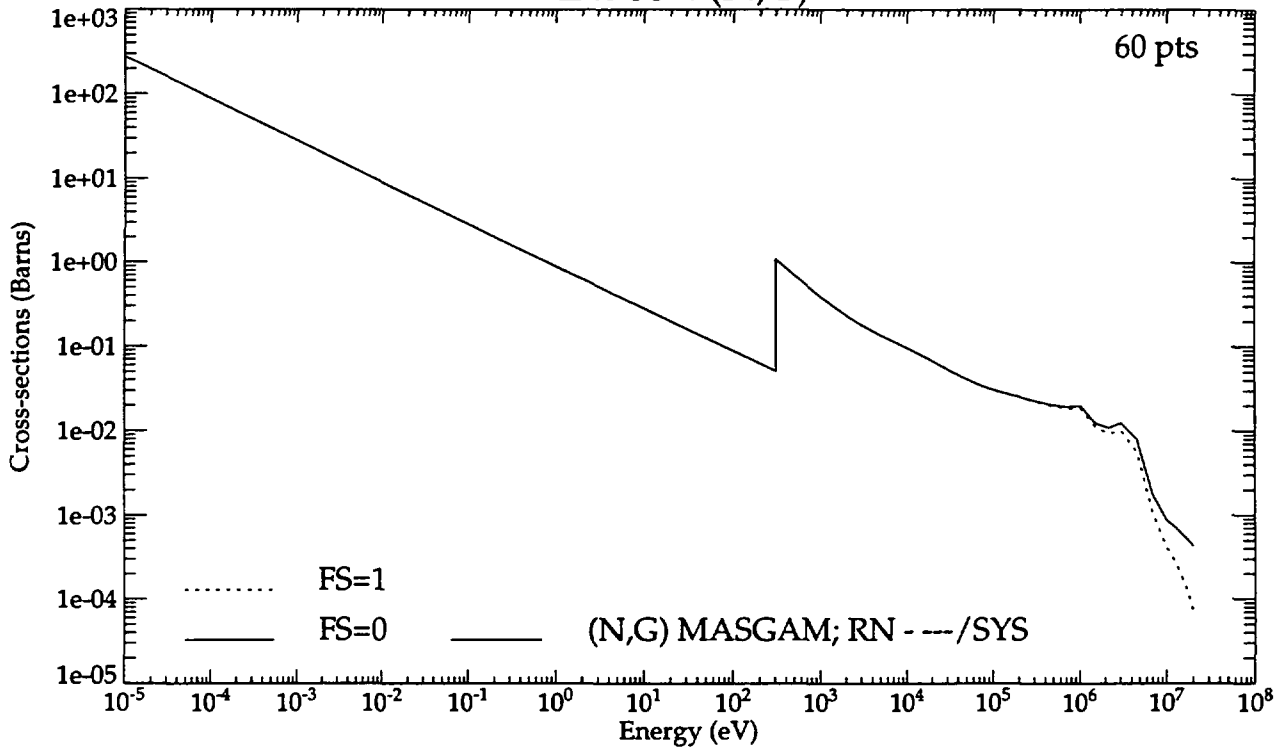




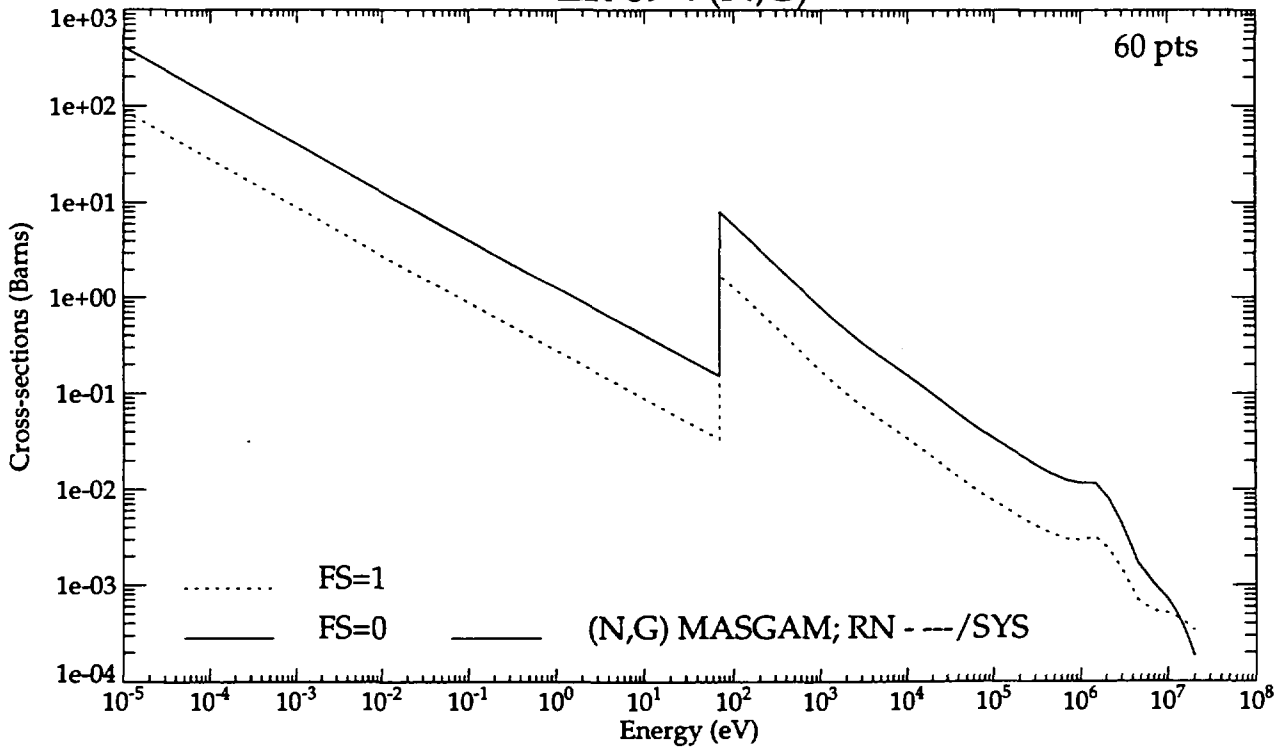


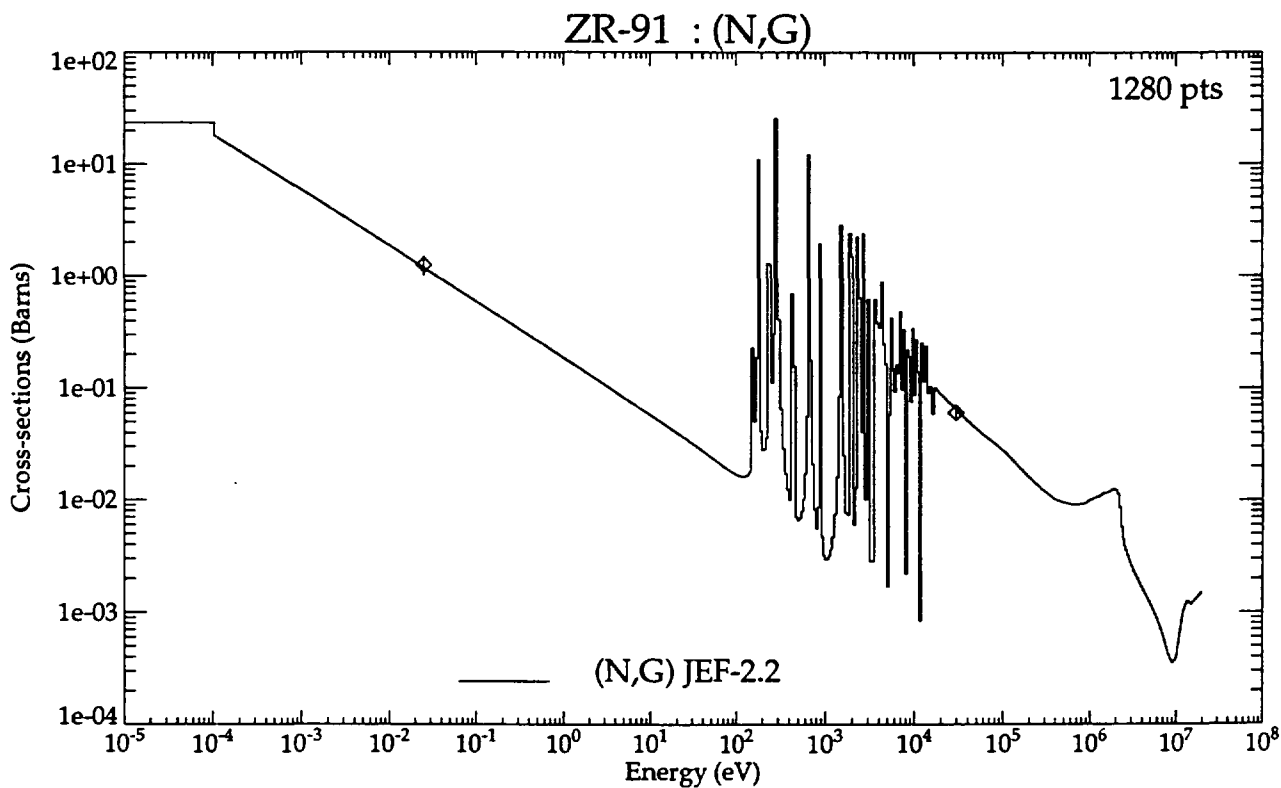
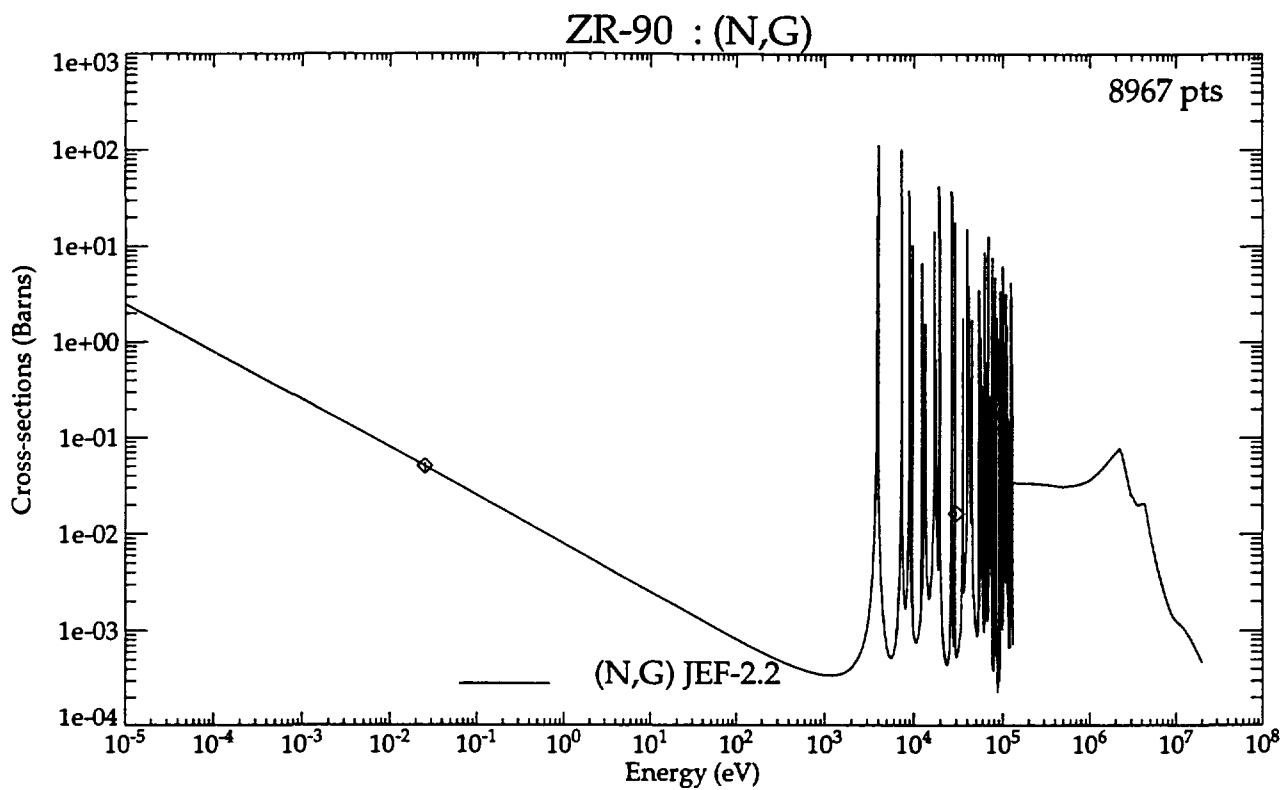


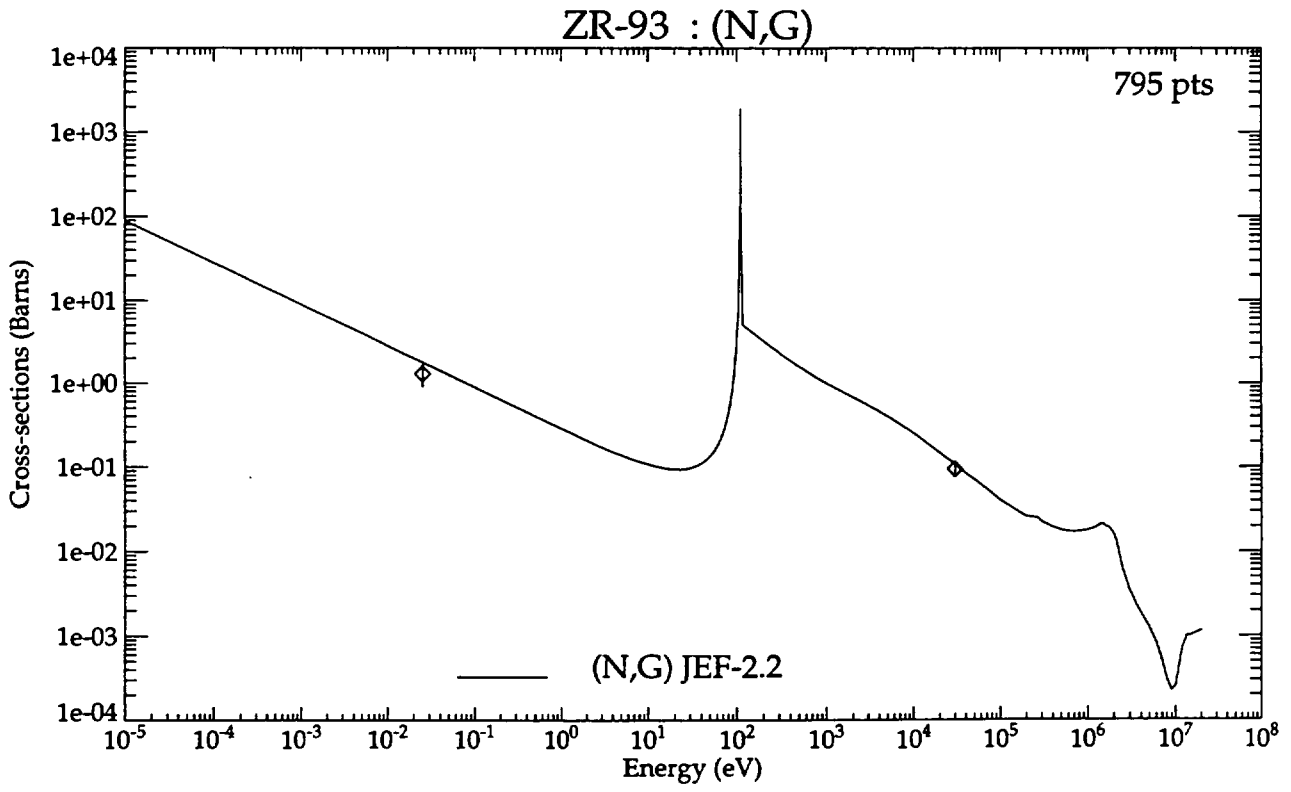
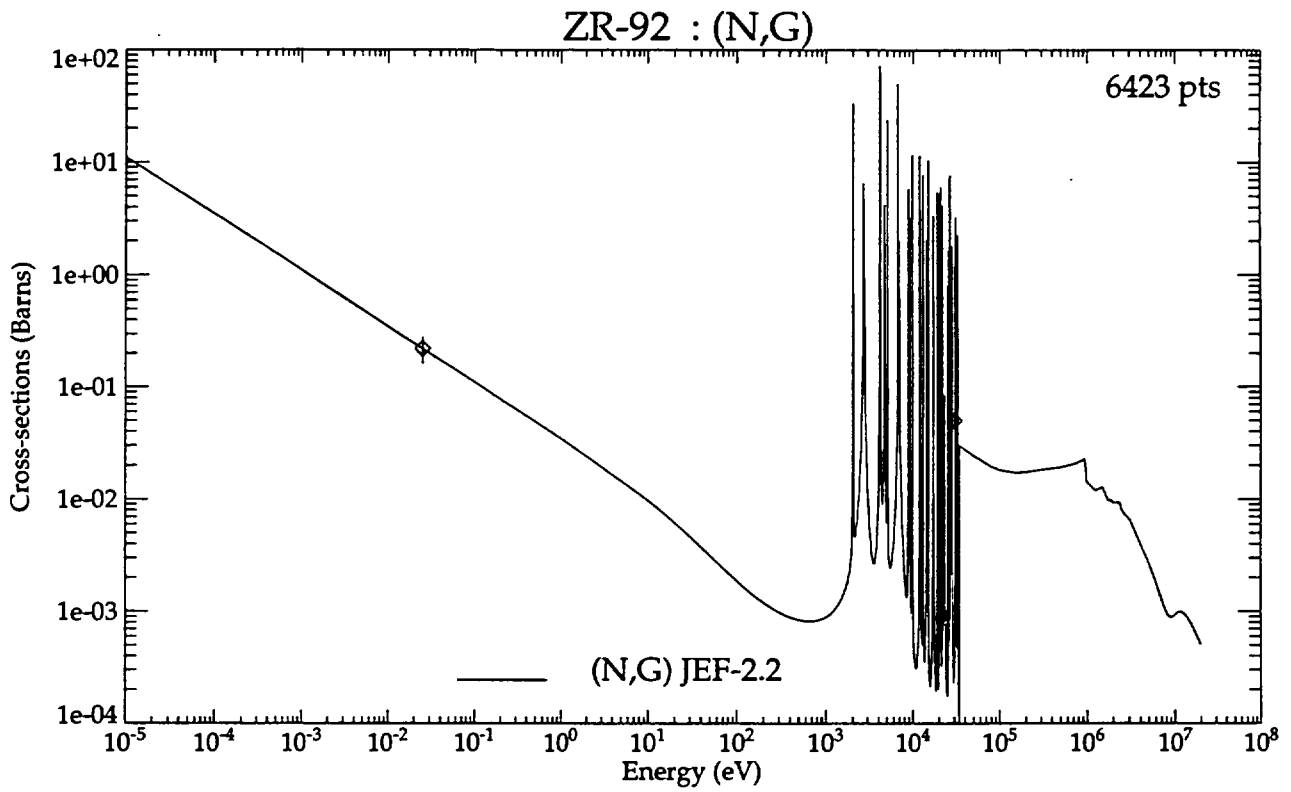
ZR-88 : (N,G)

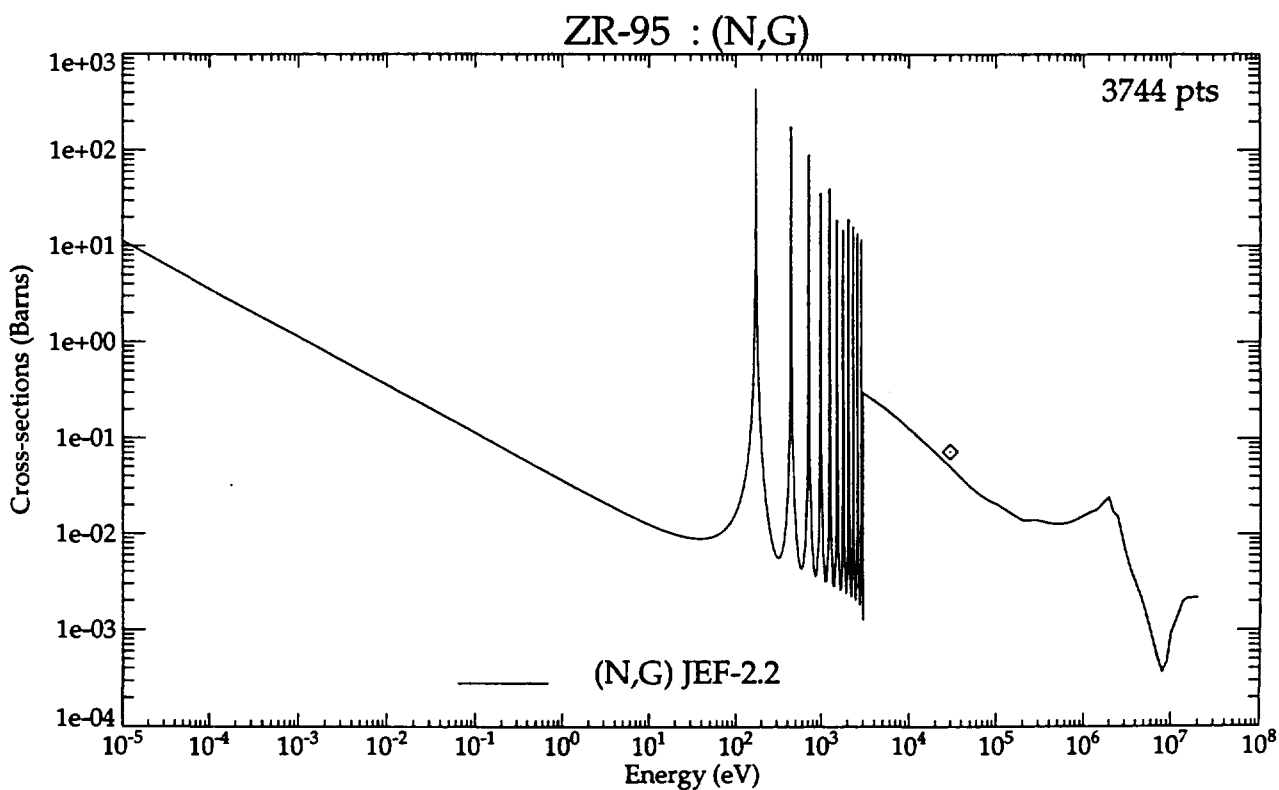
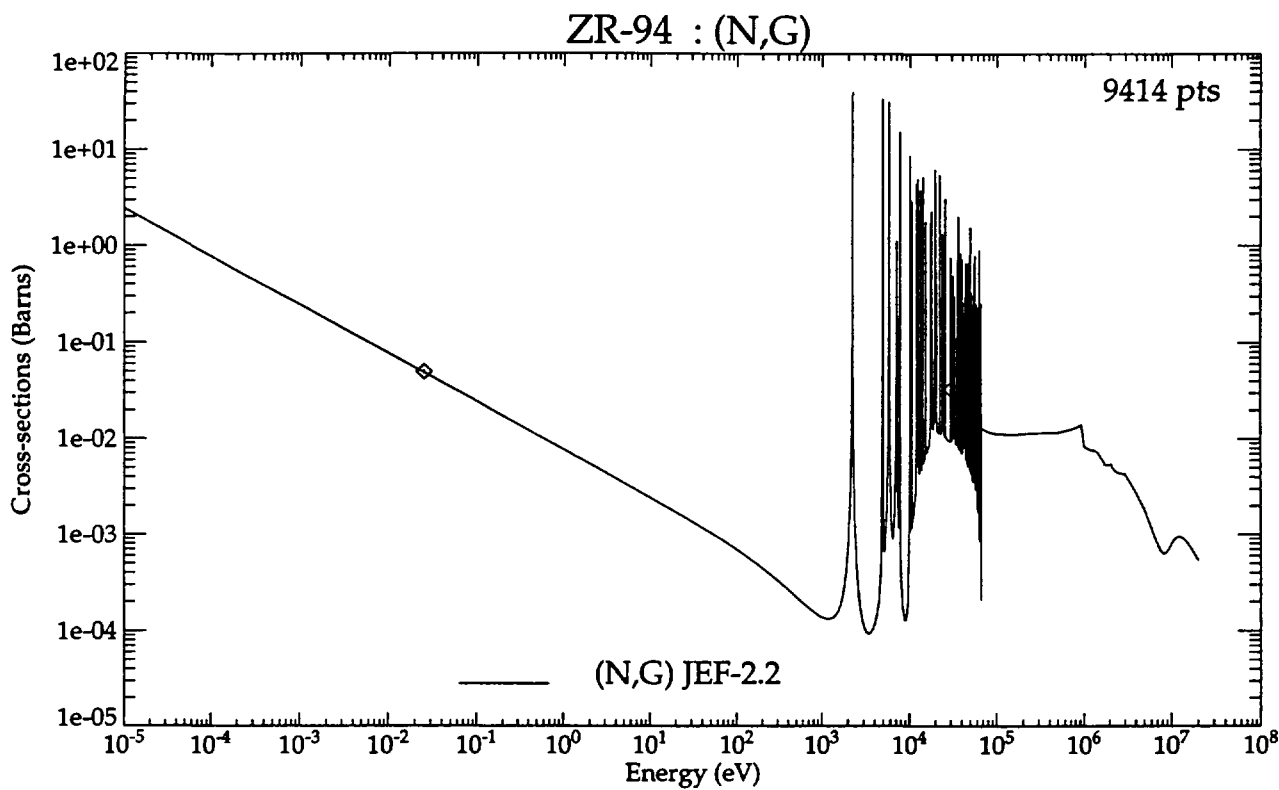


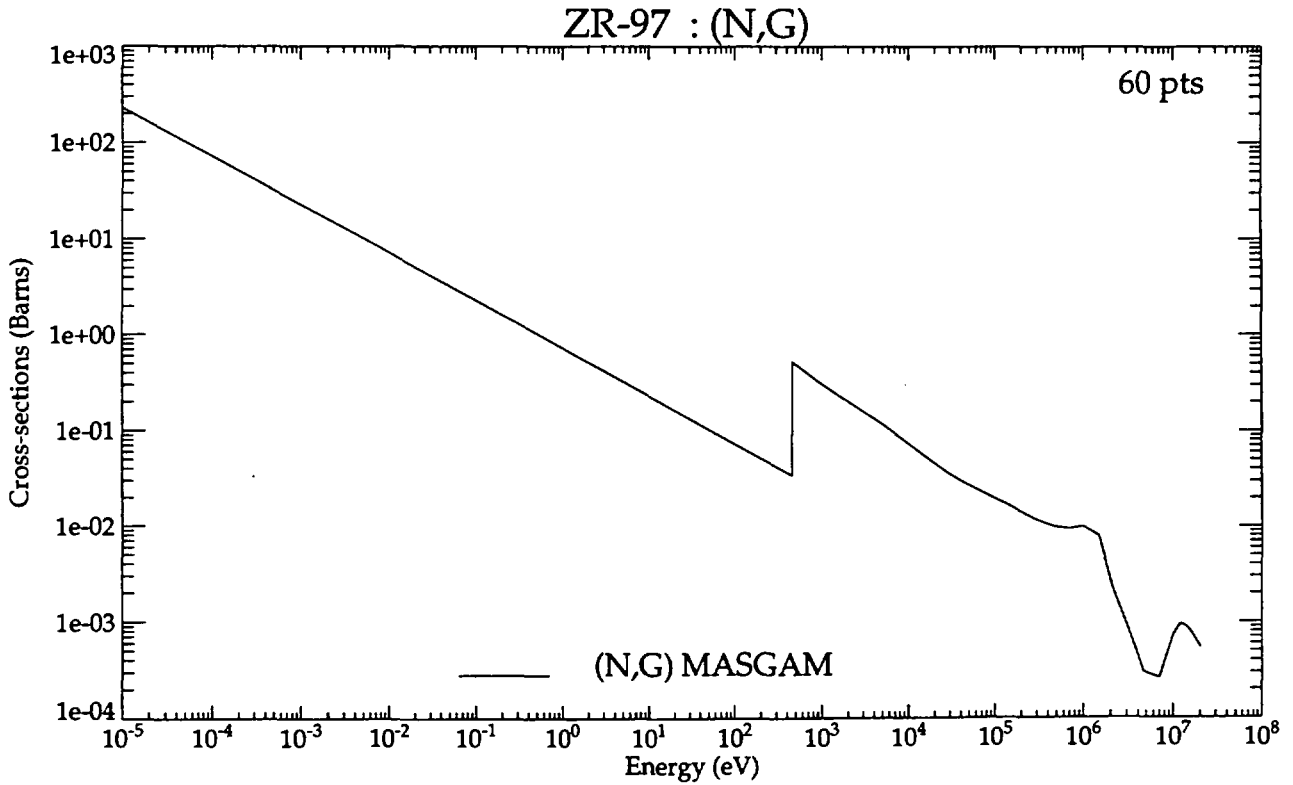
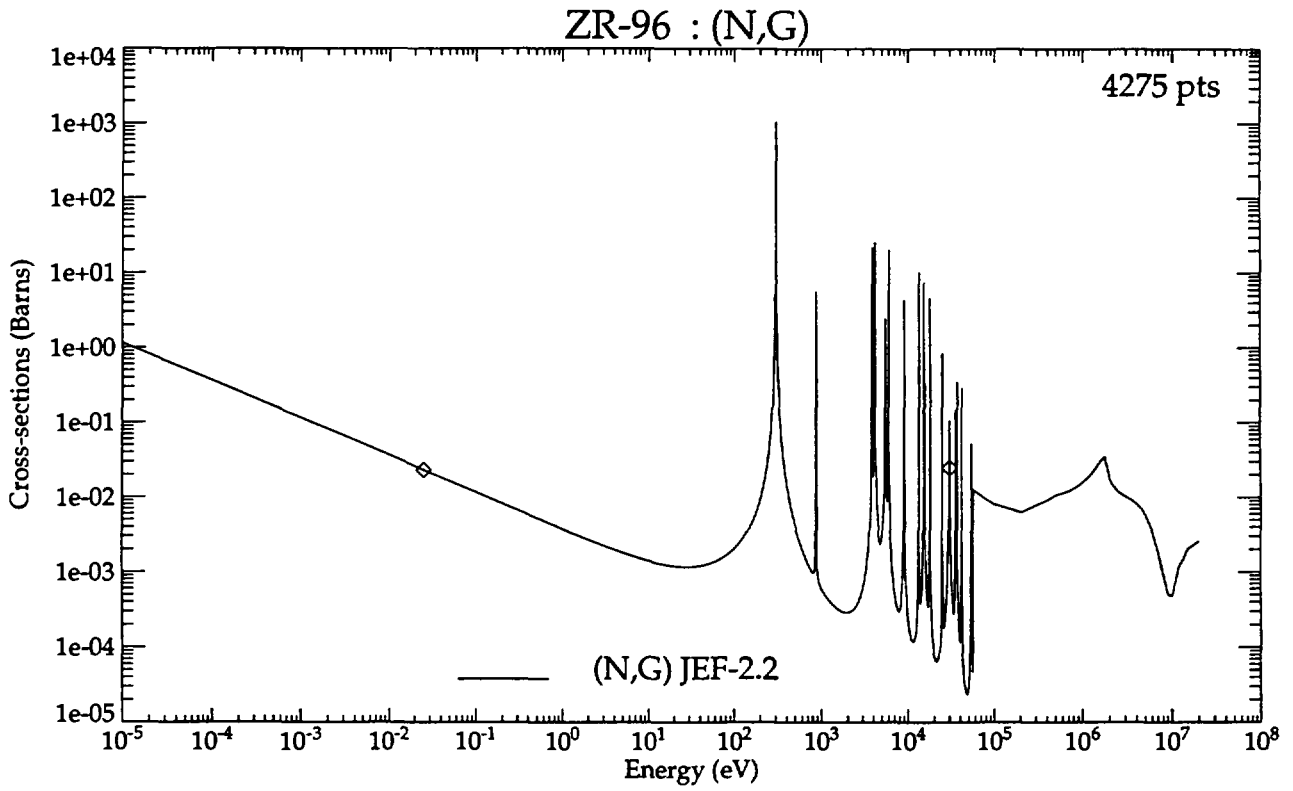
ZR-89 : (N,G)

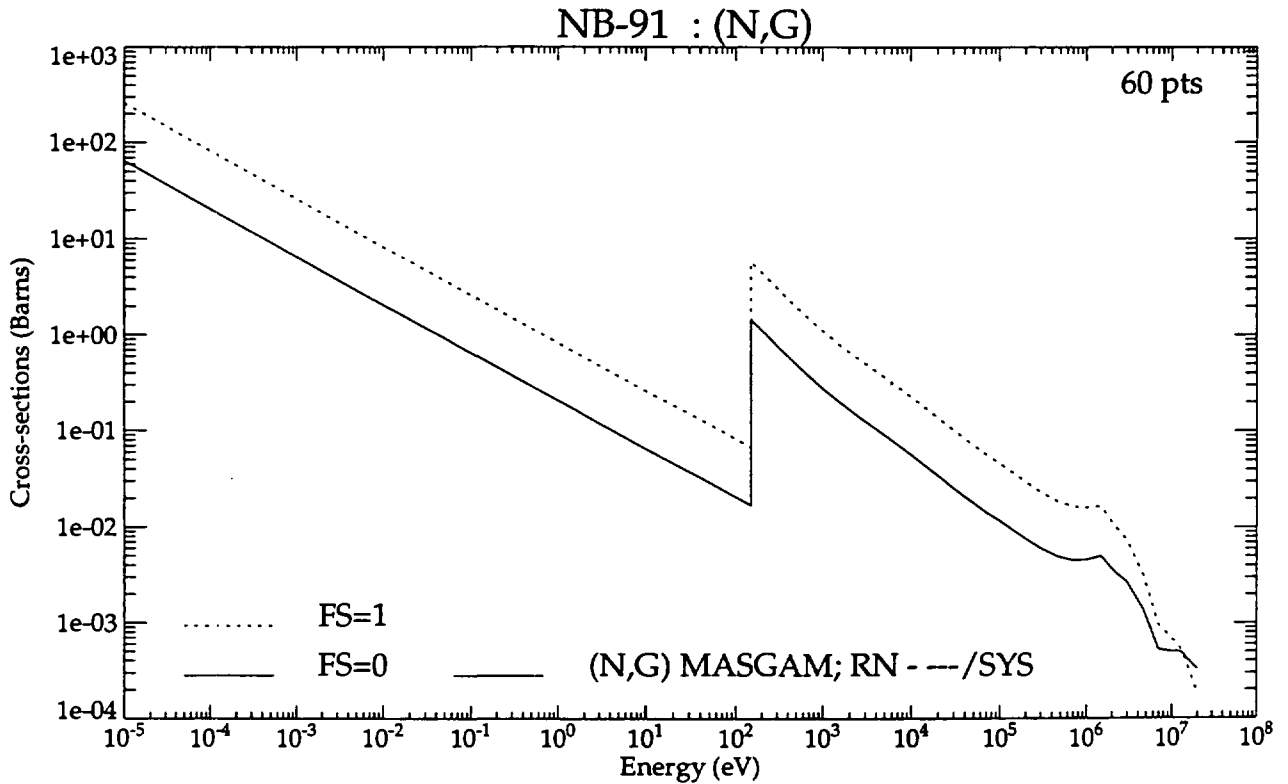
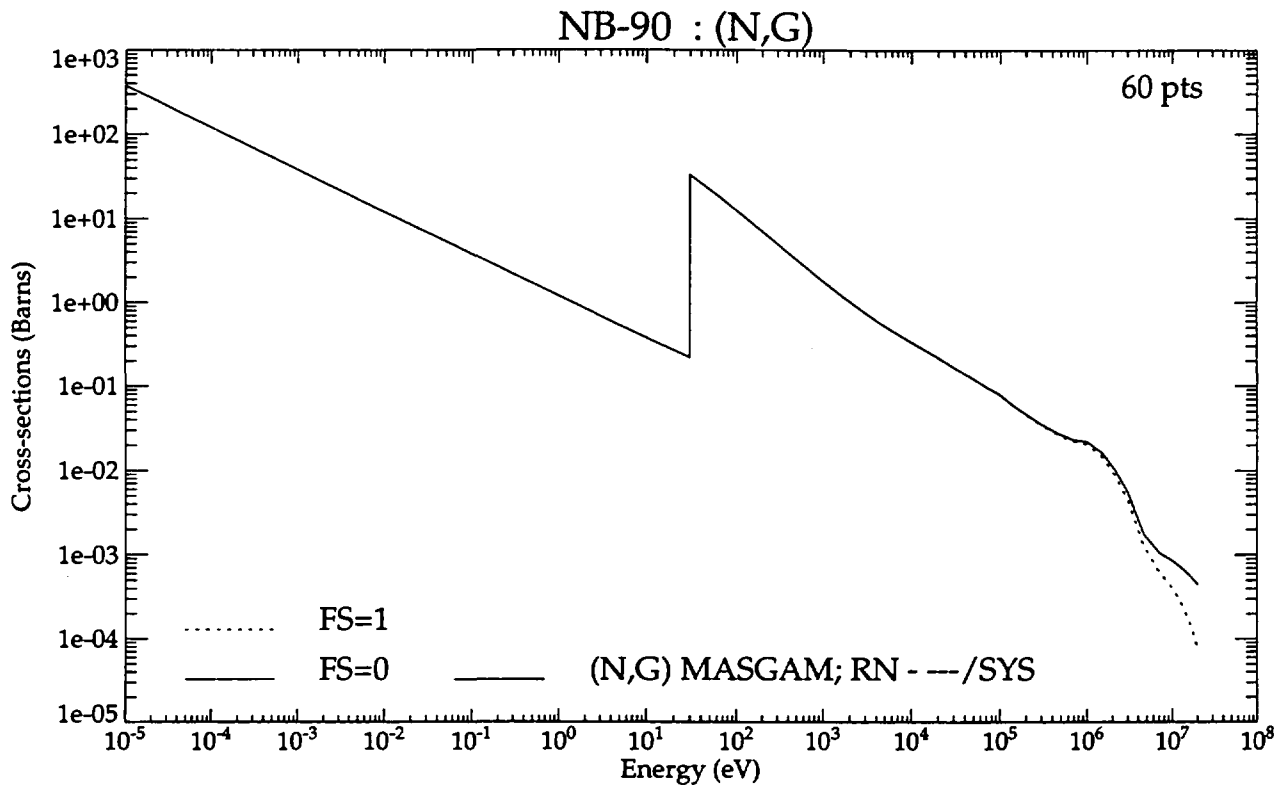




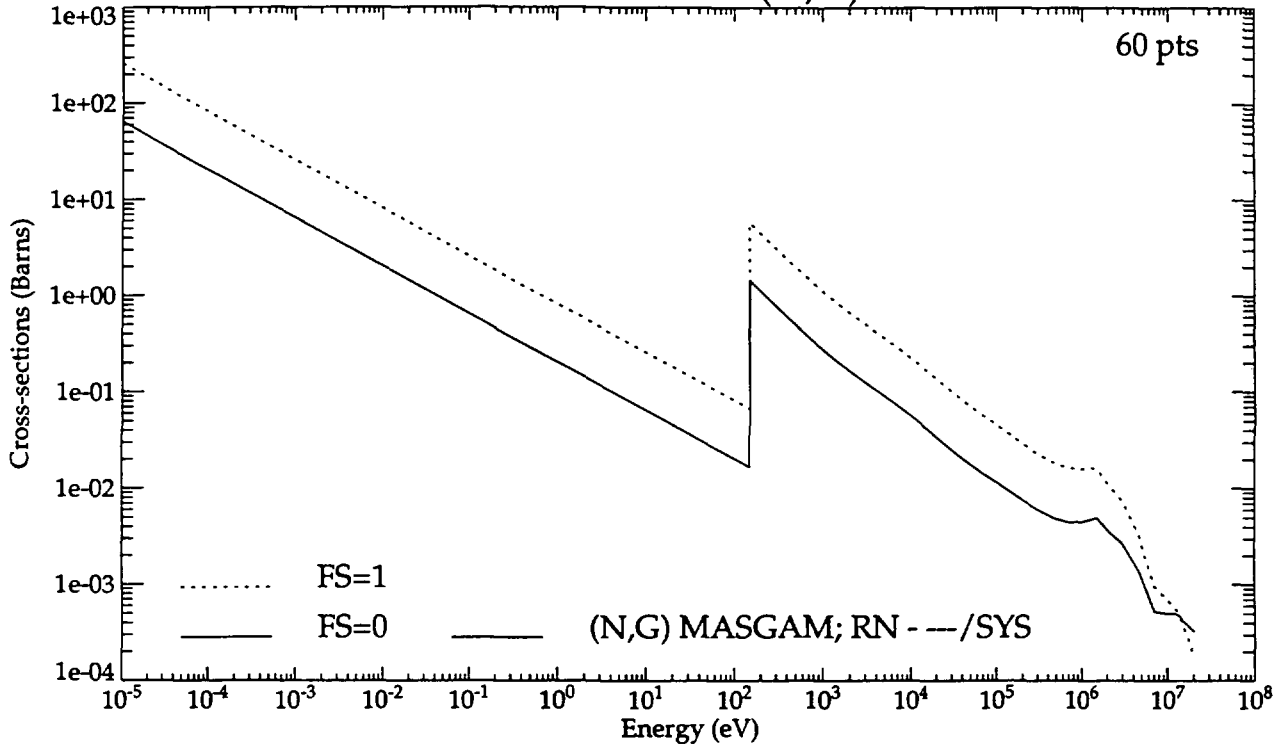




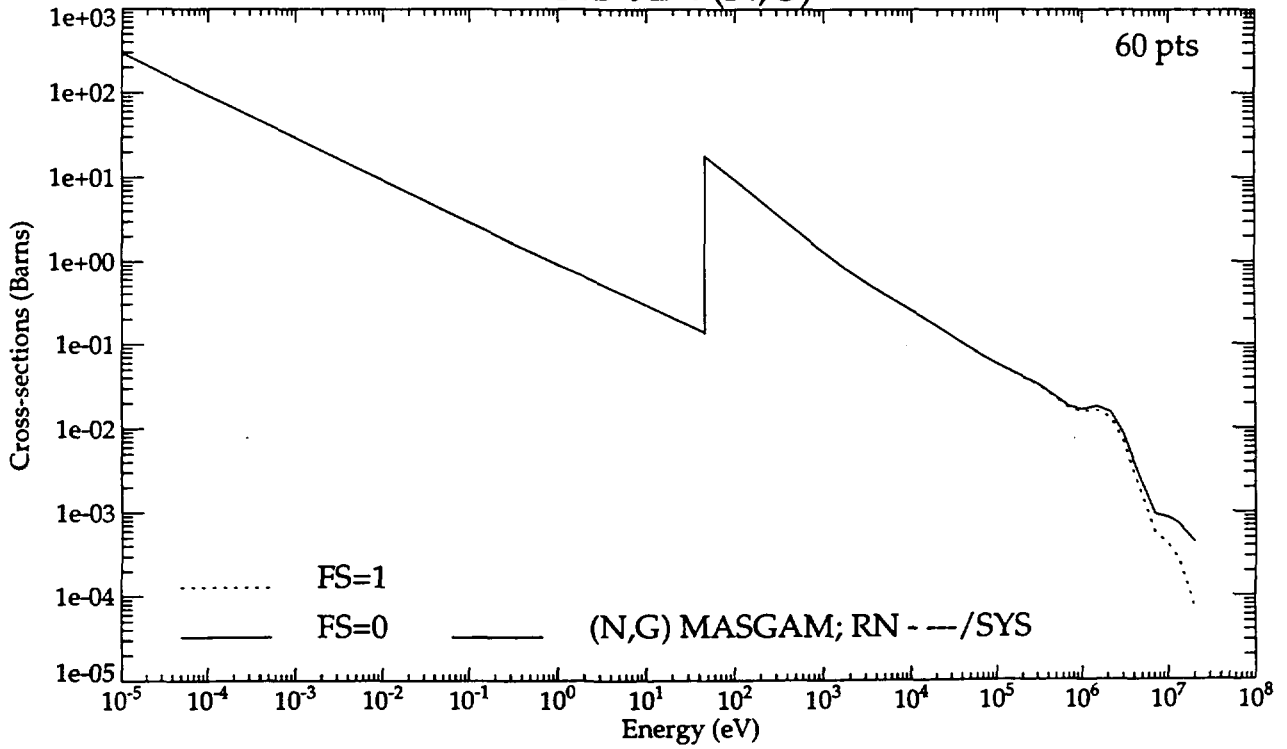


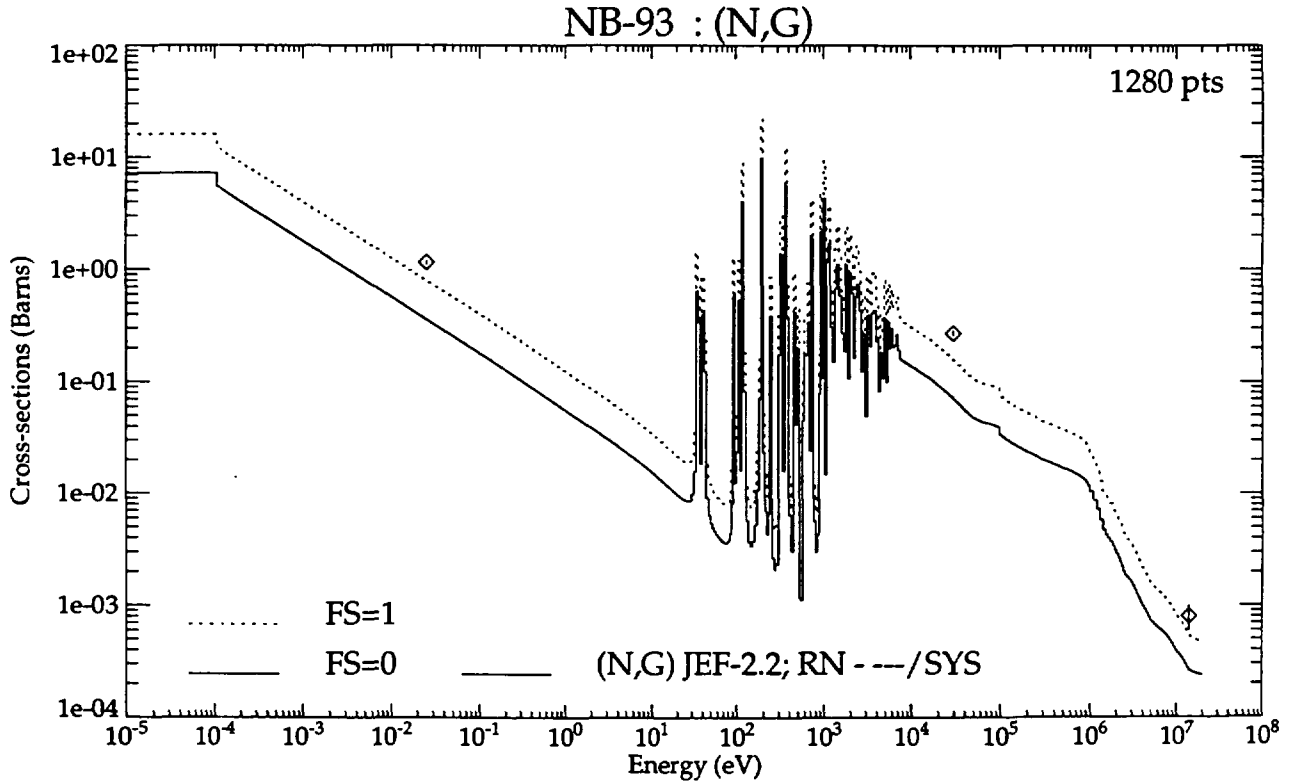
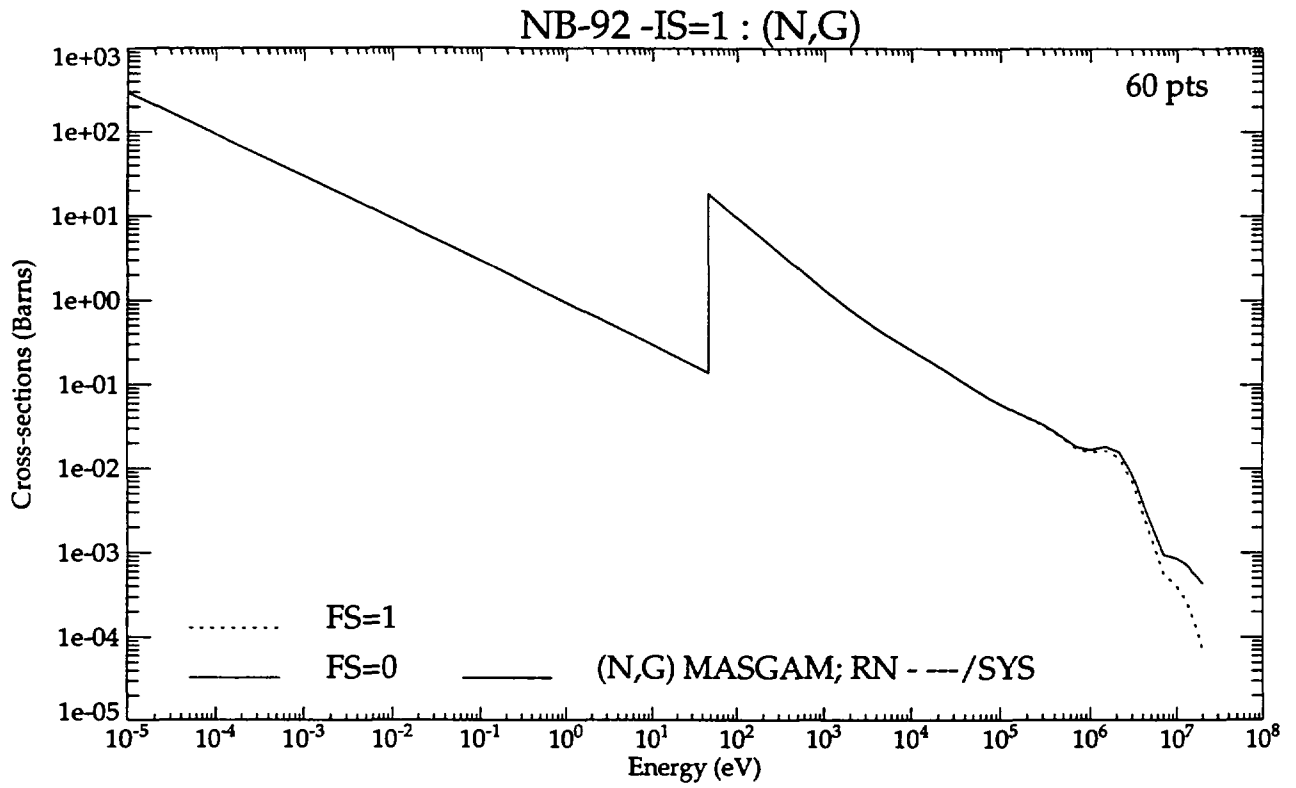


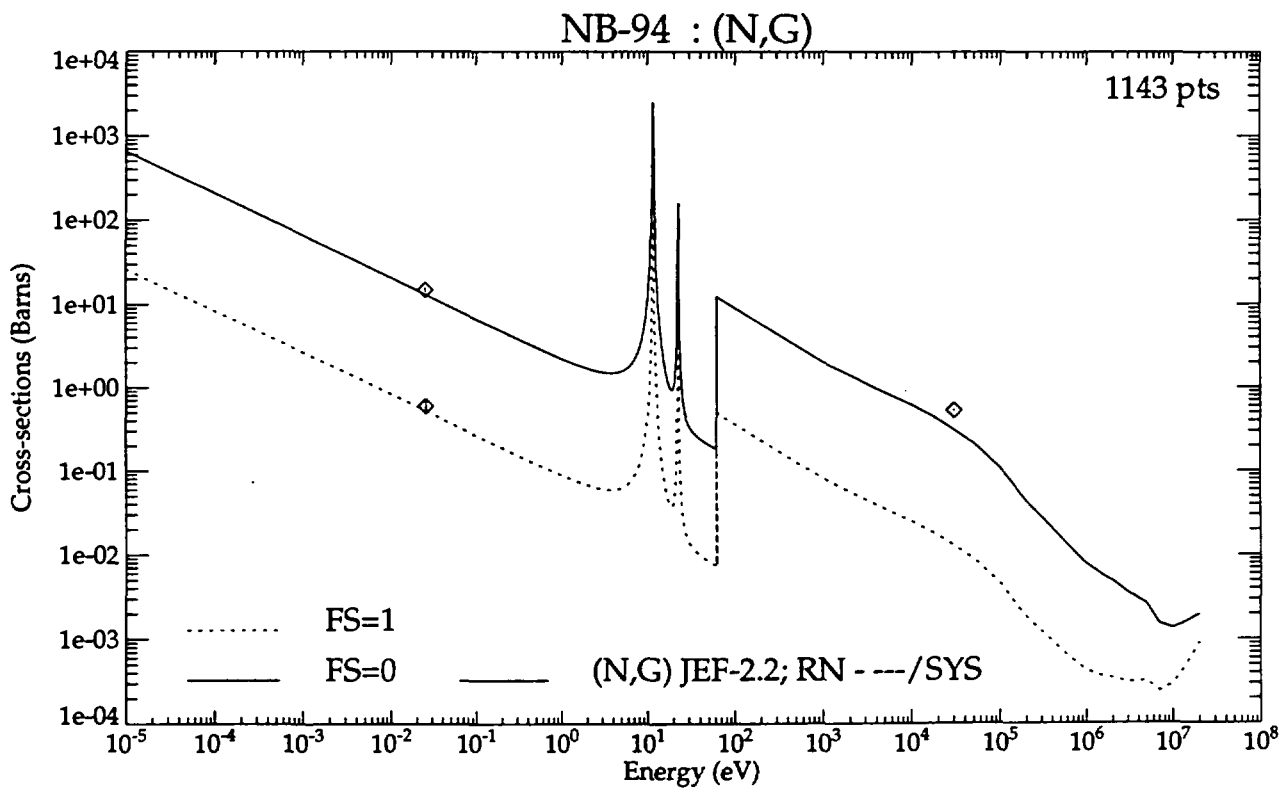
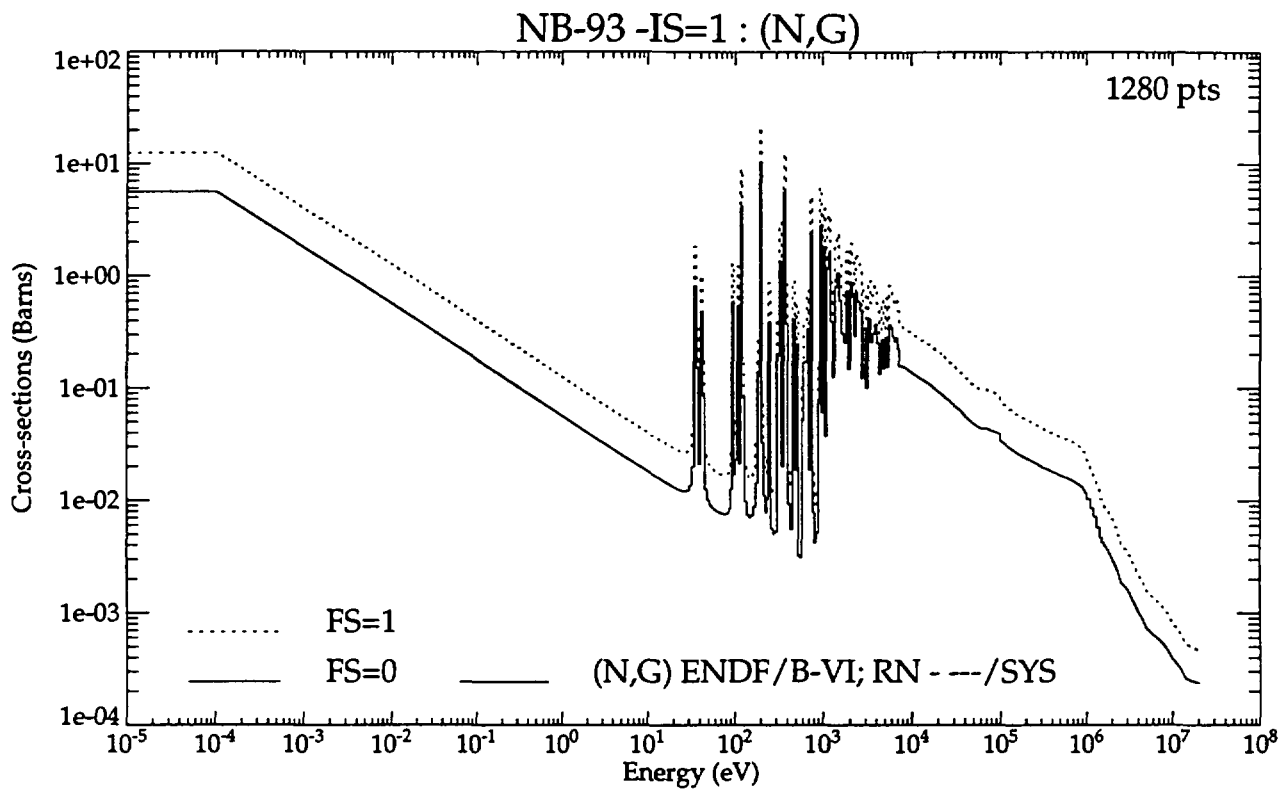
NB-91 -IS=1 : (N,G)

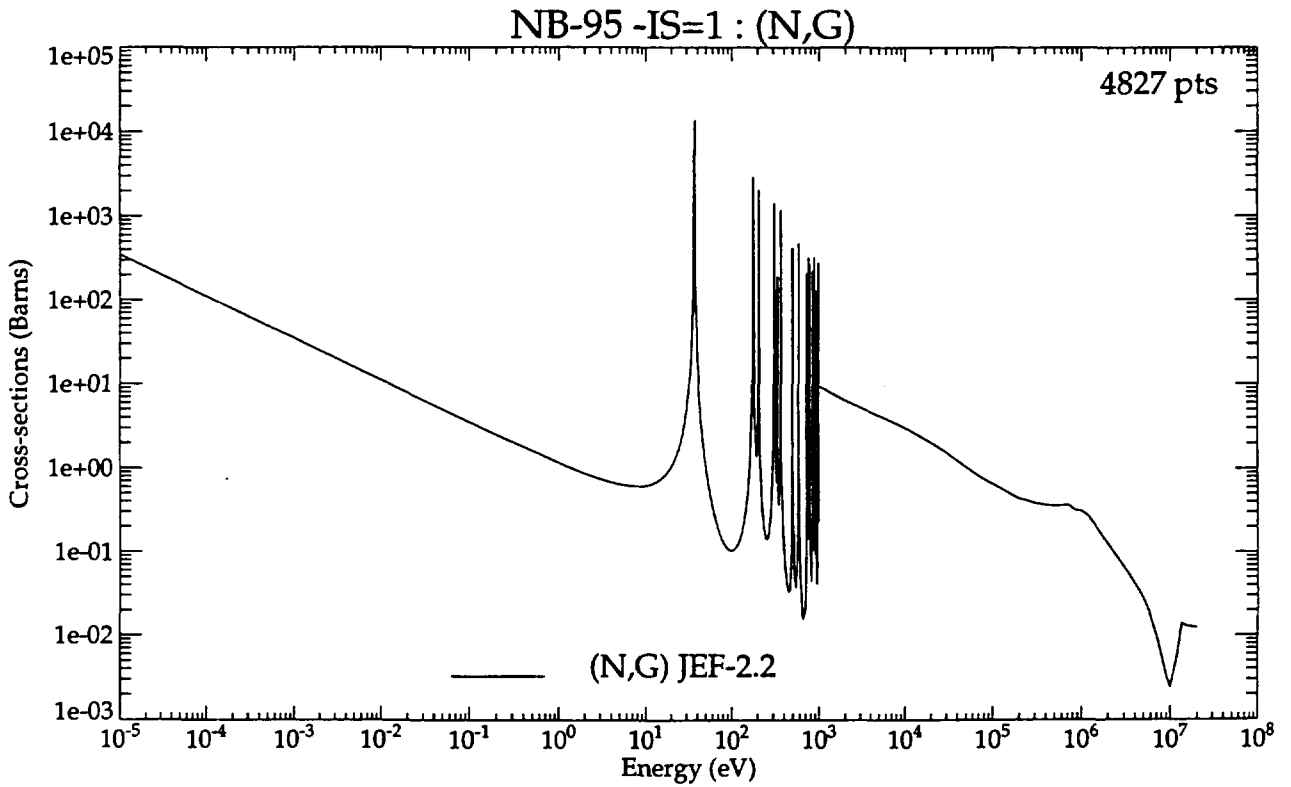
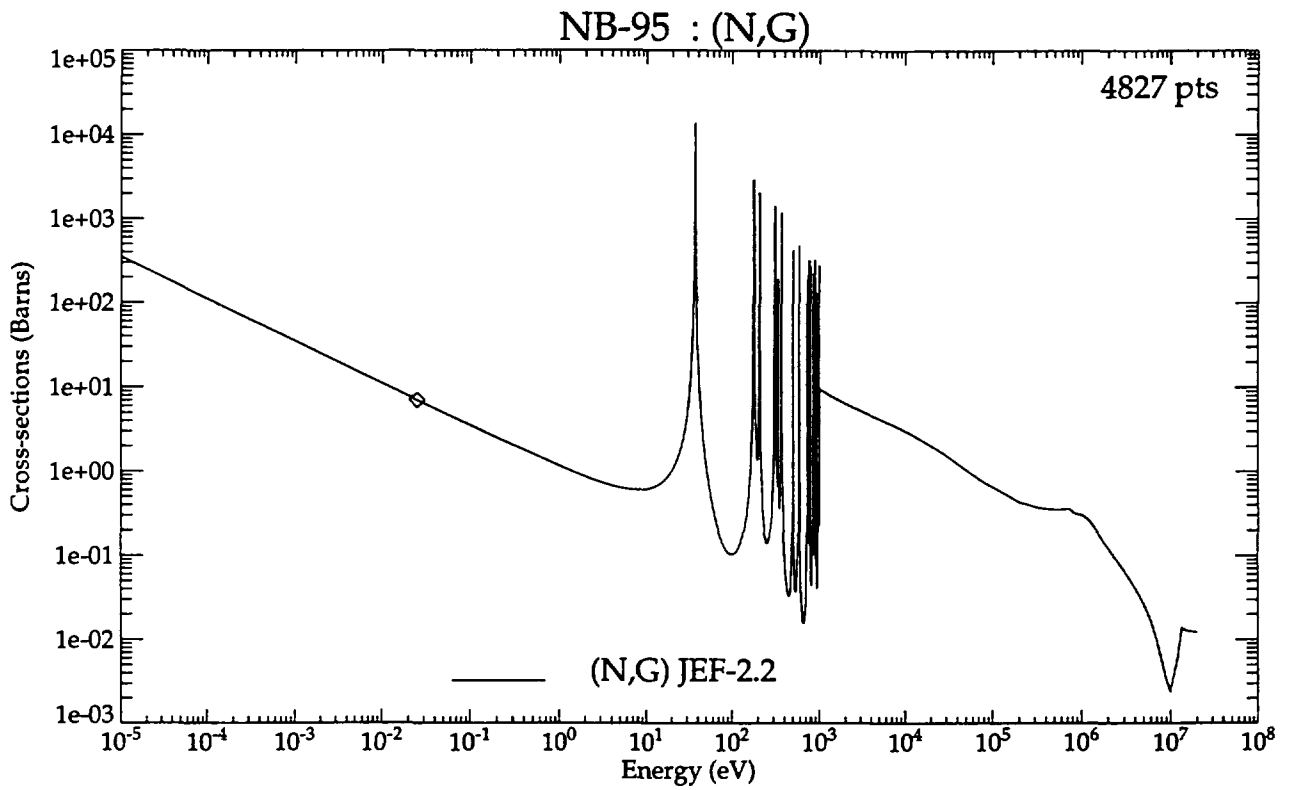


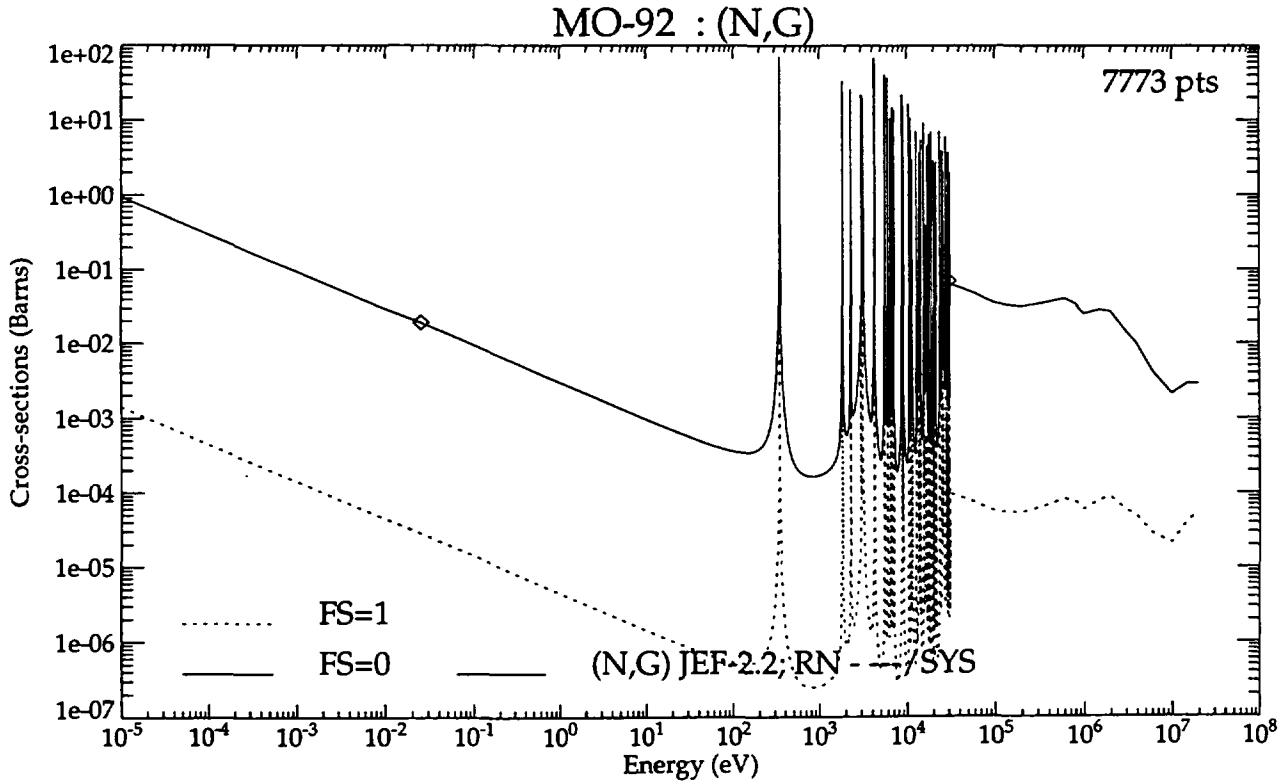
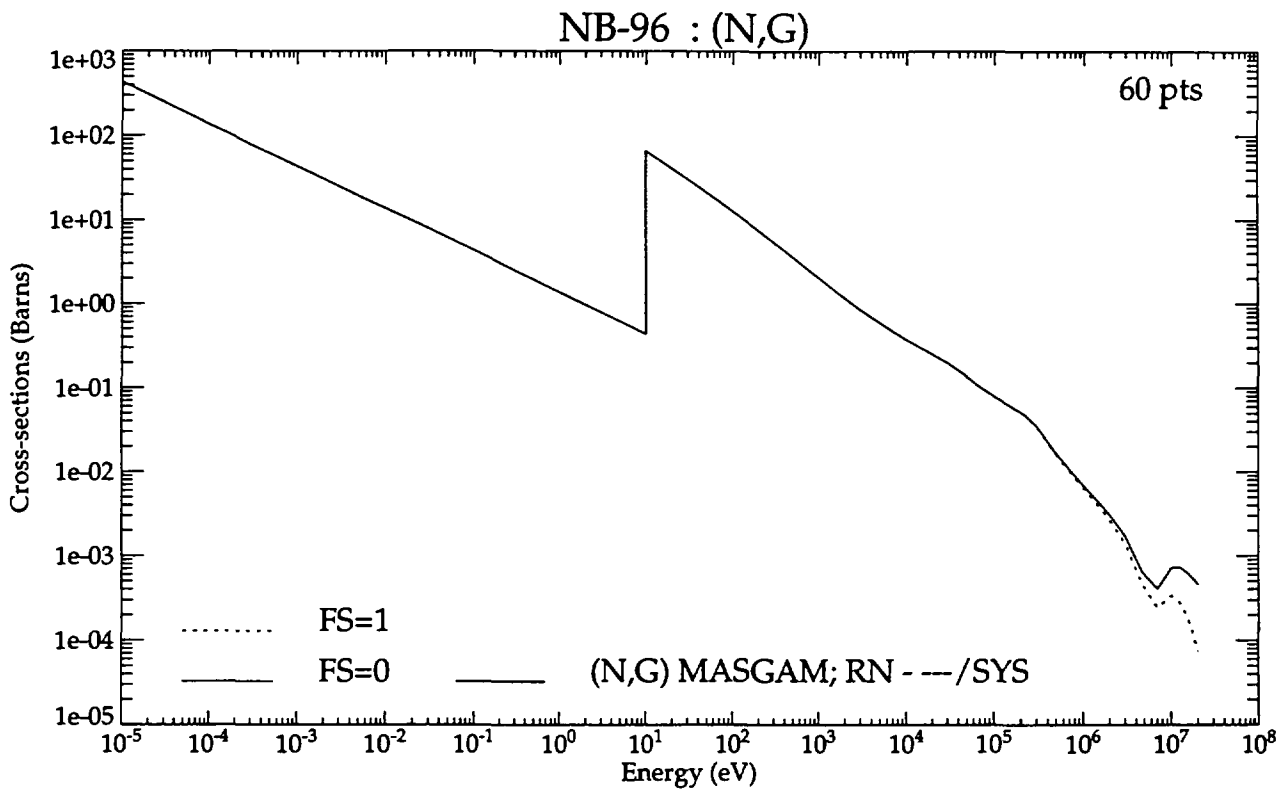
NB-92 : (N,G)

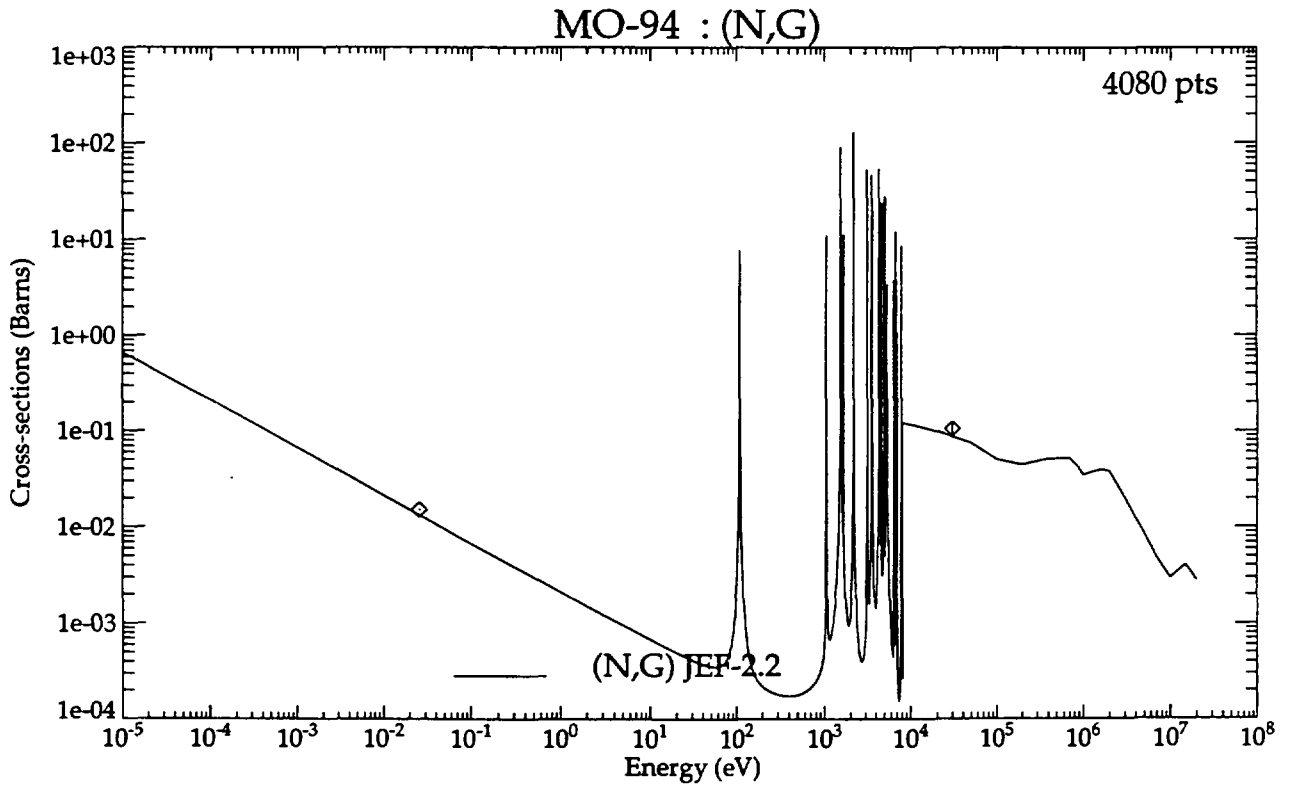
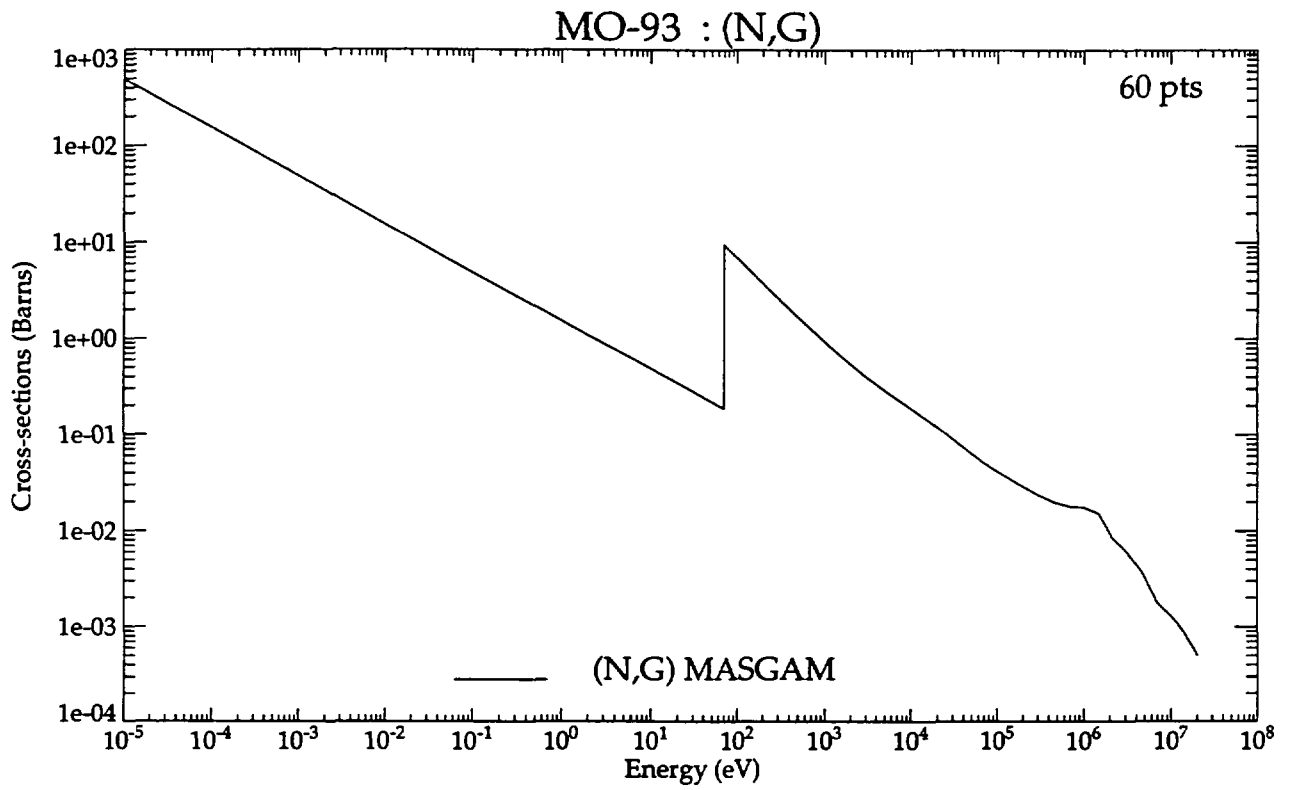


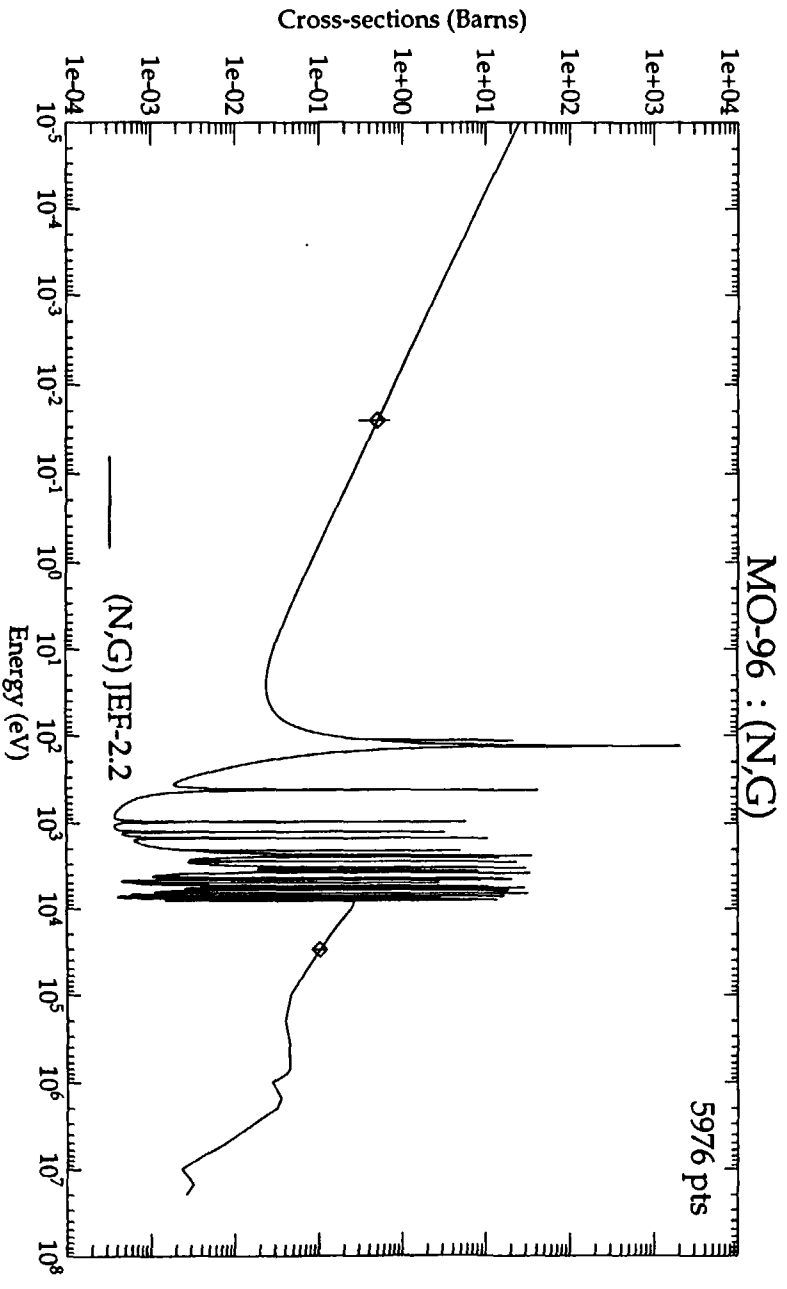
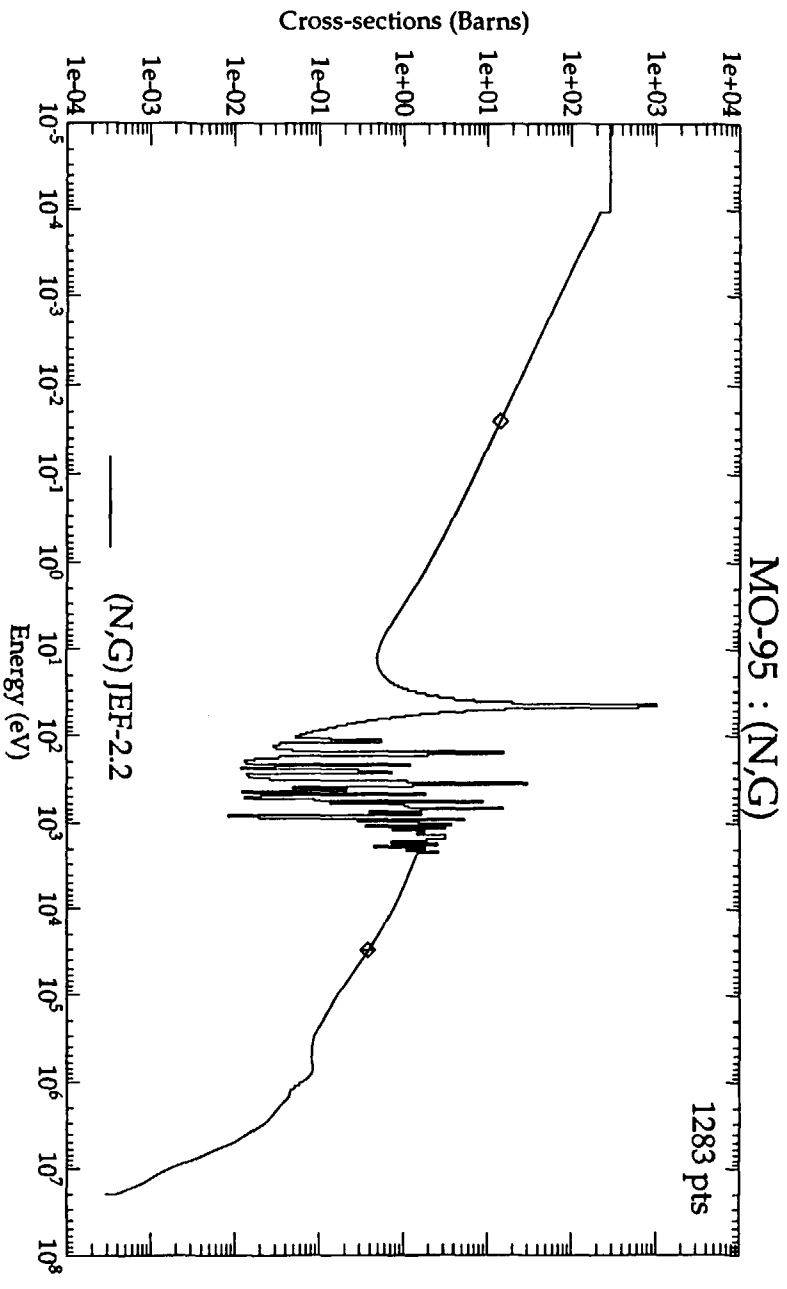


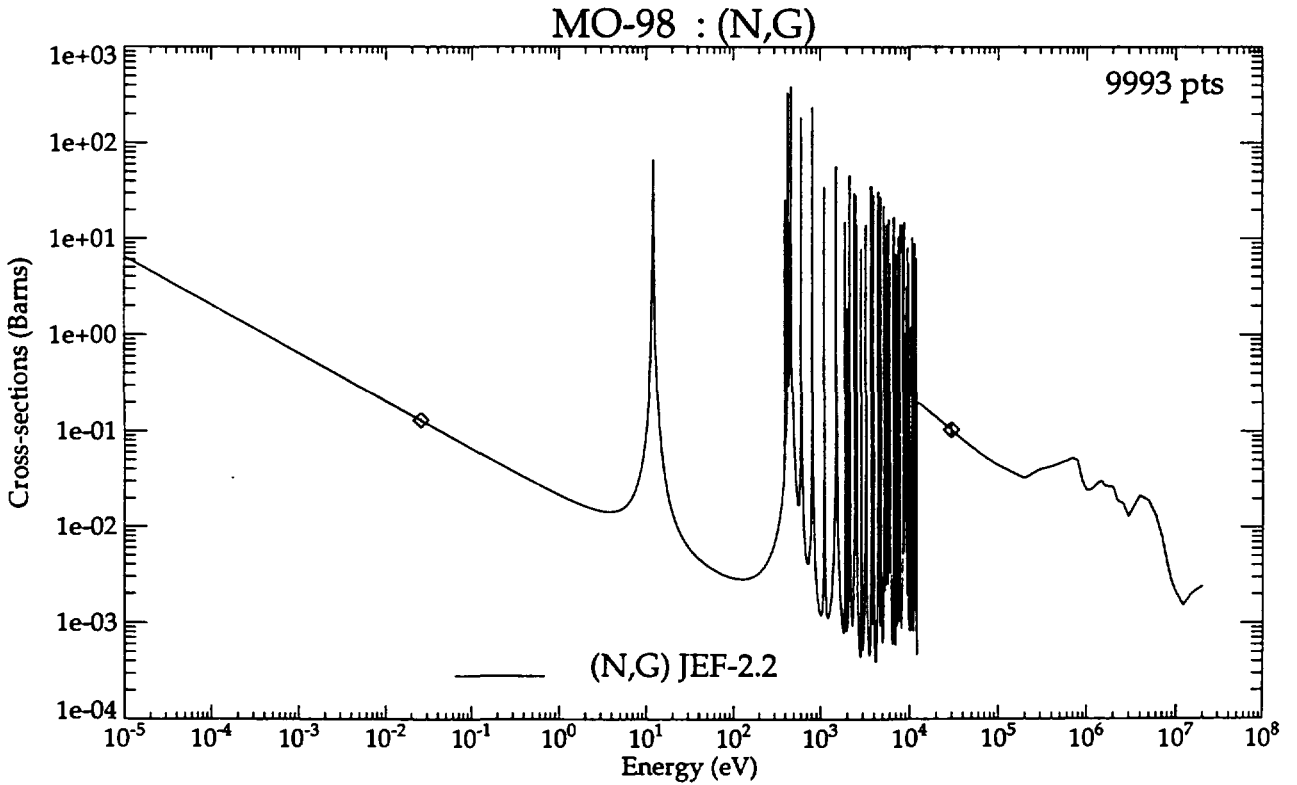
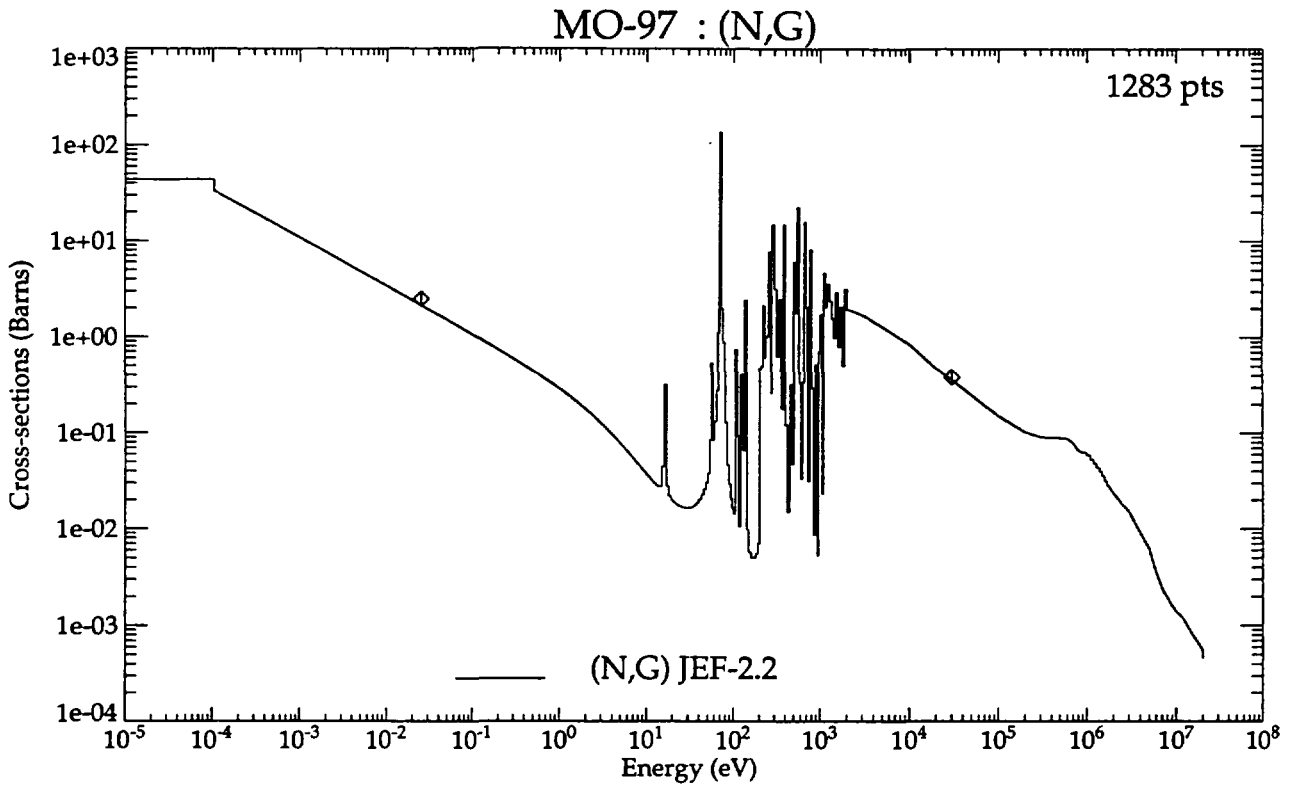


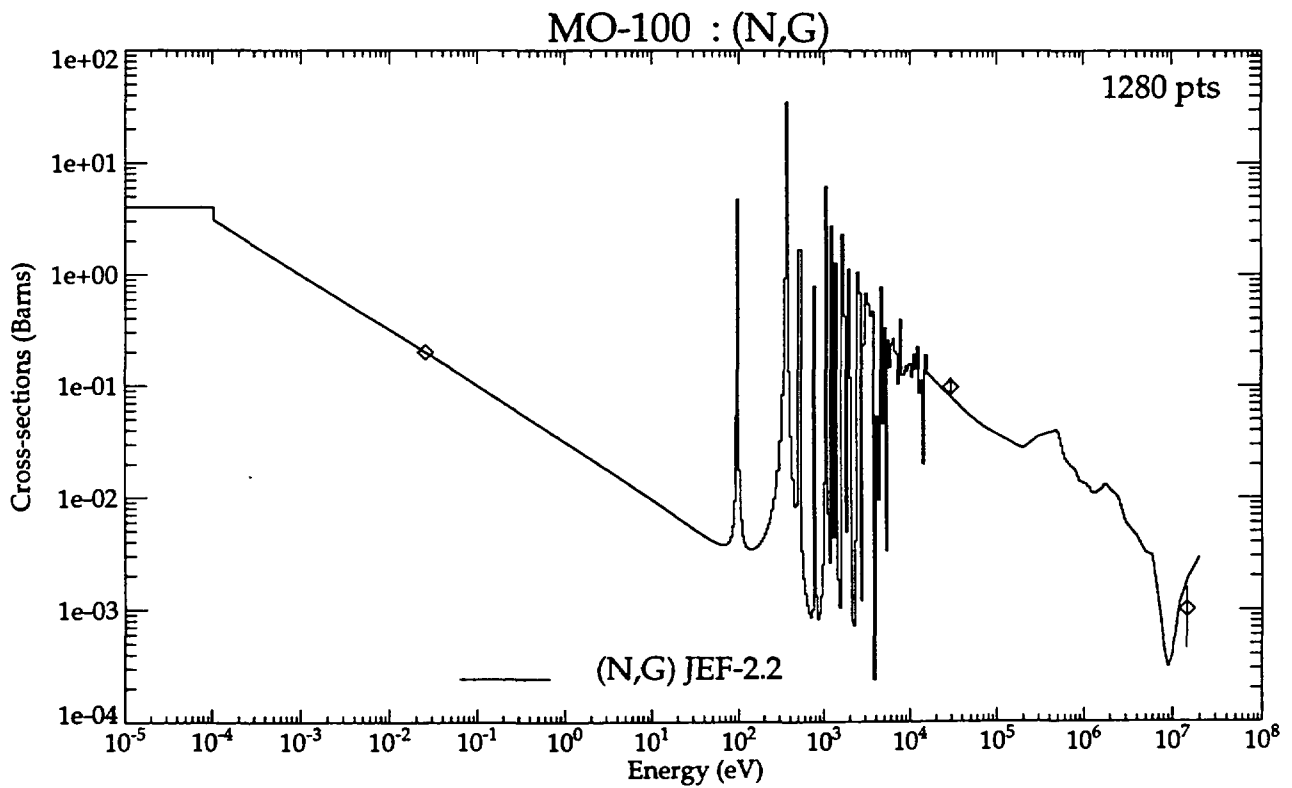
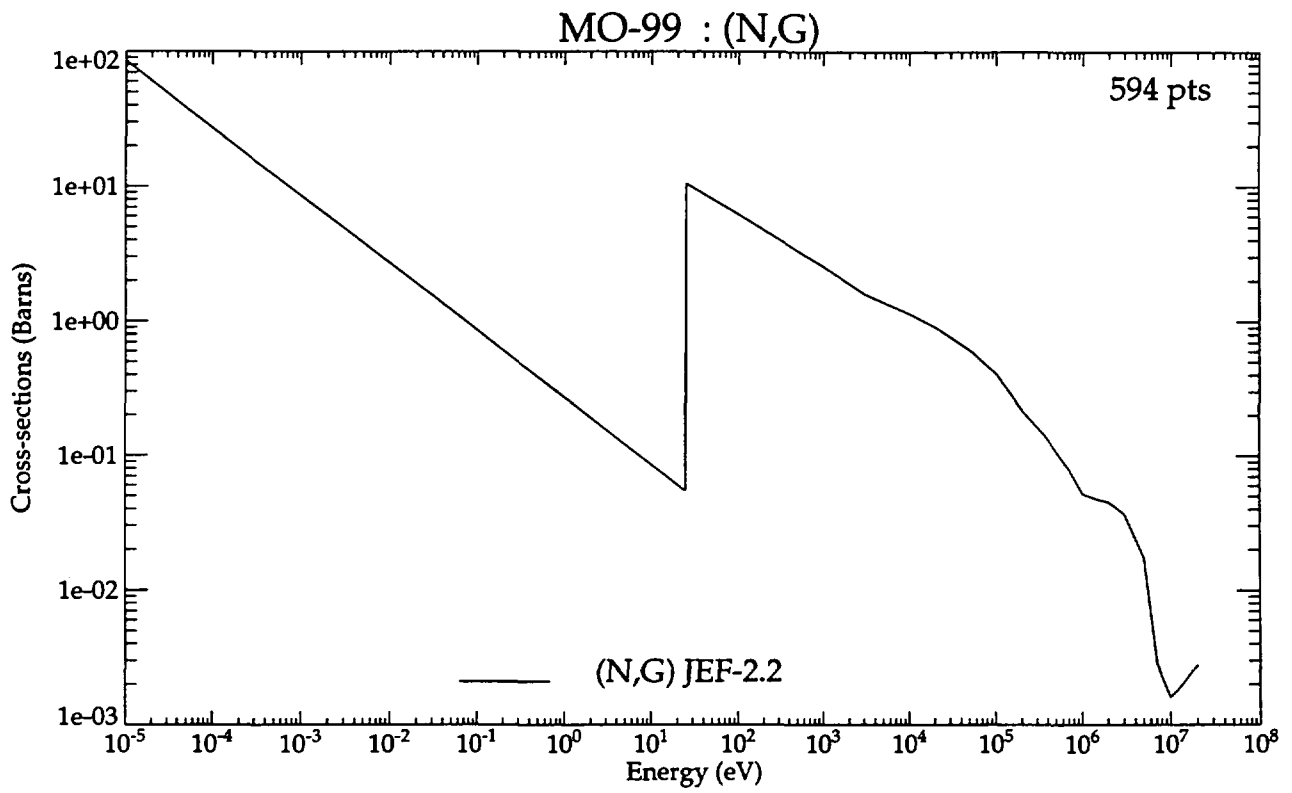


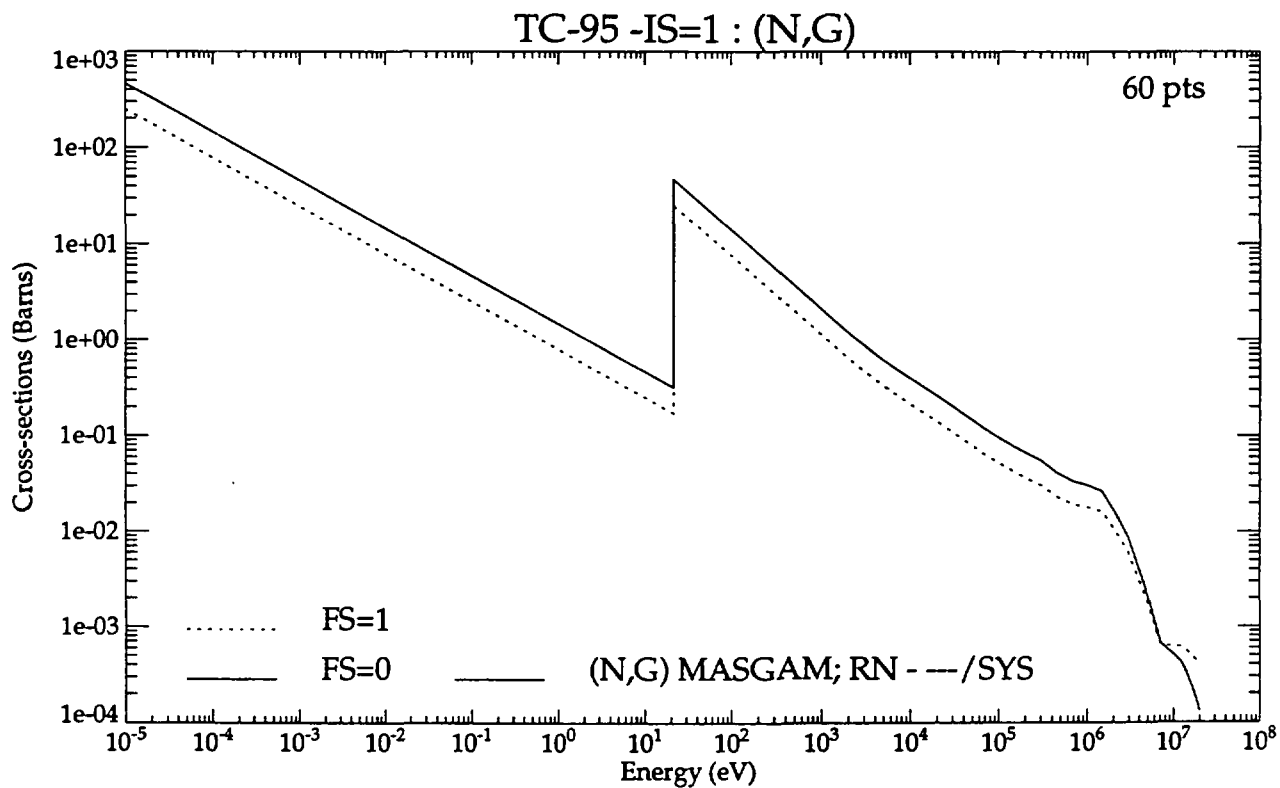
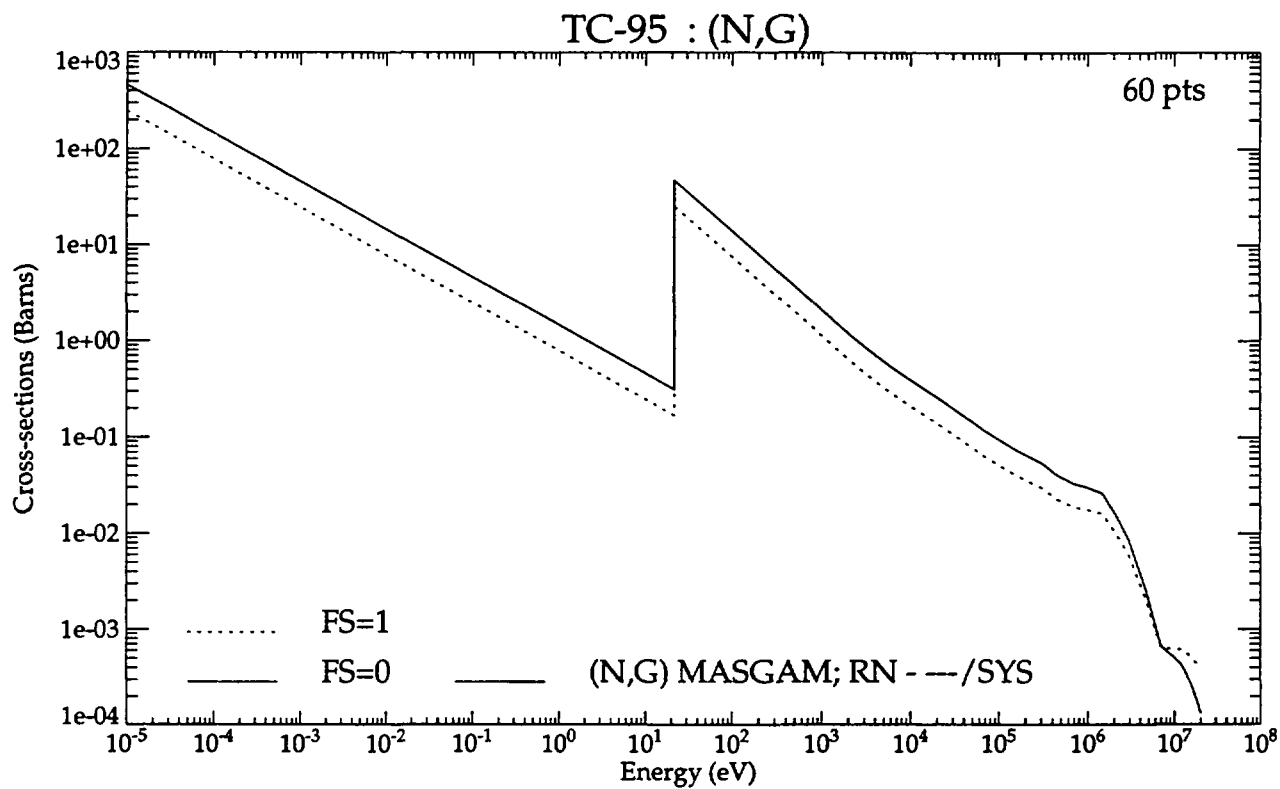


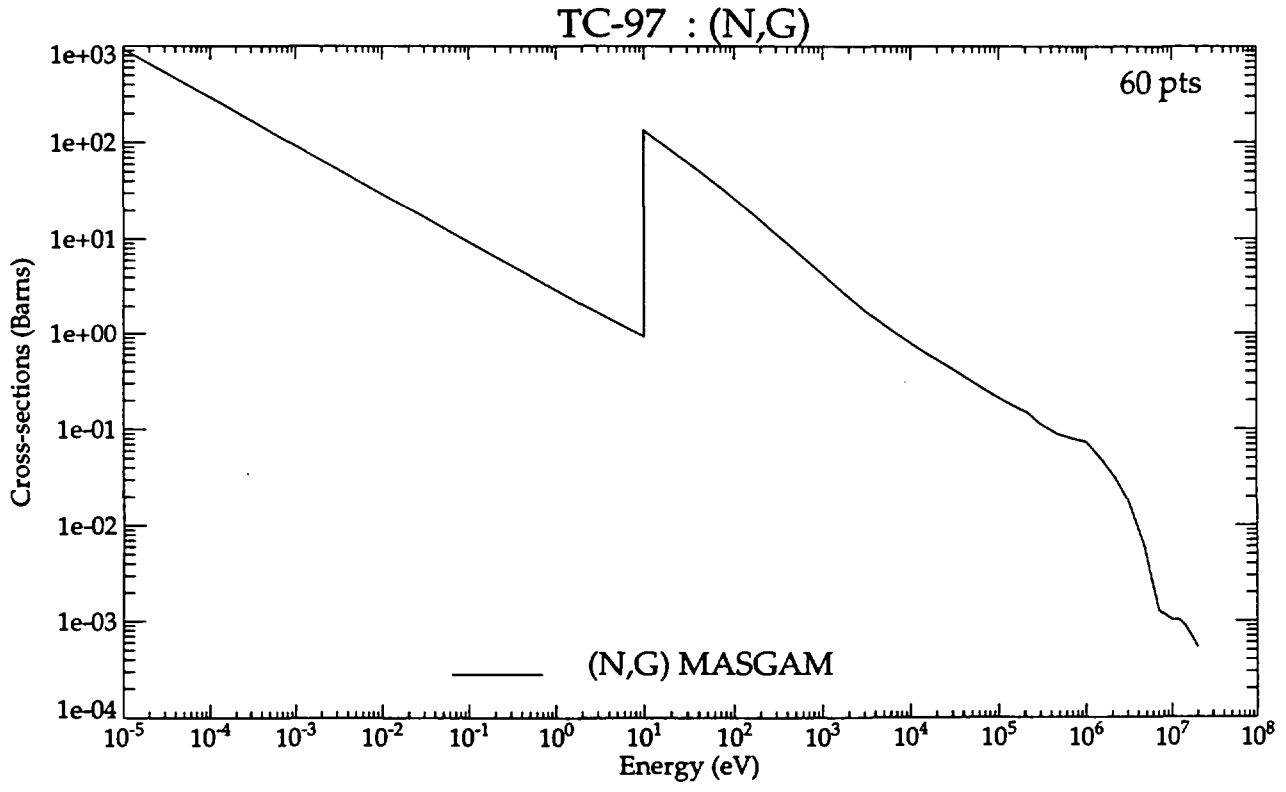
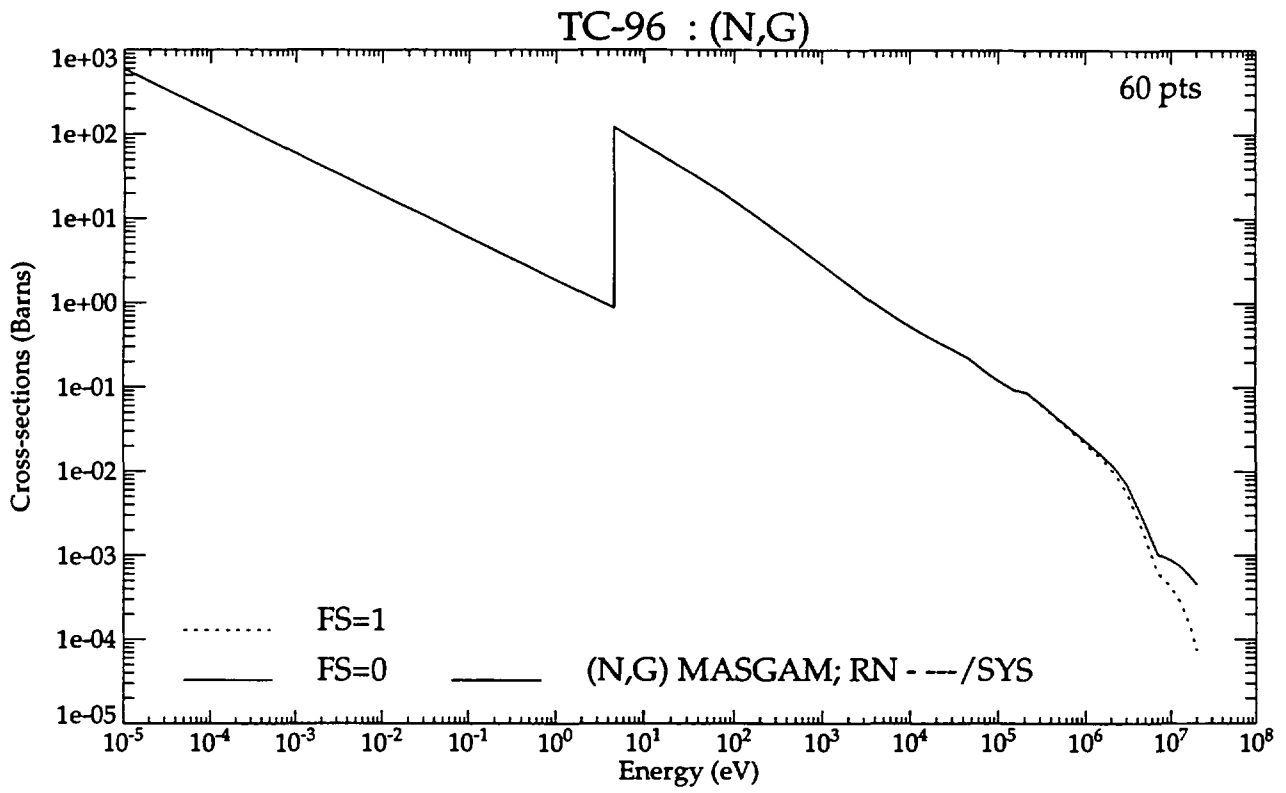


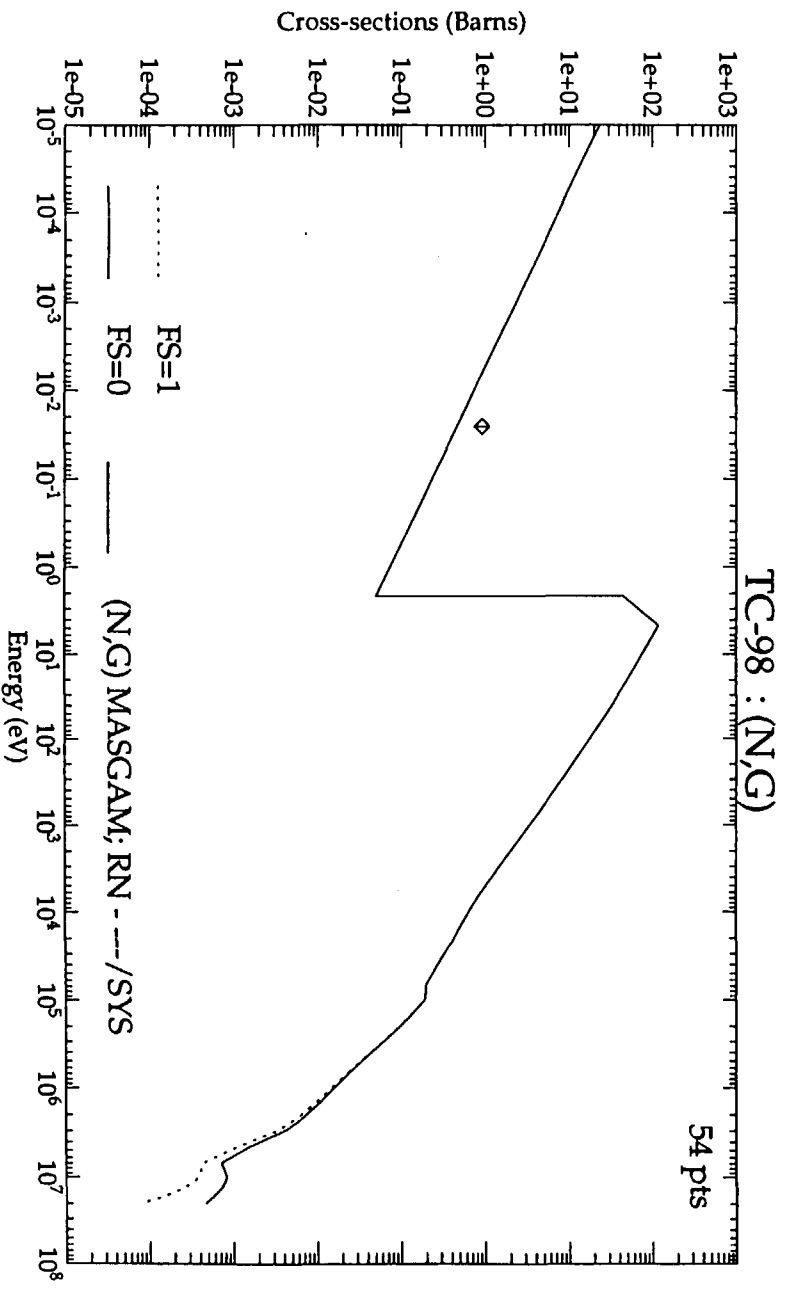
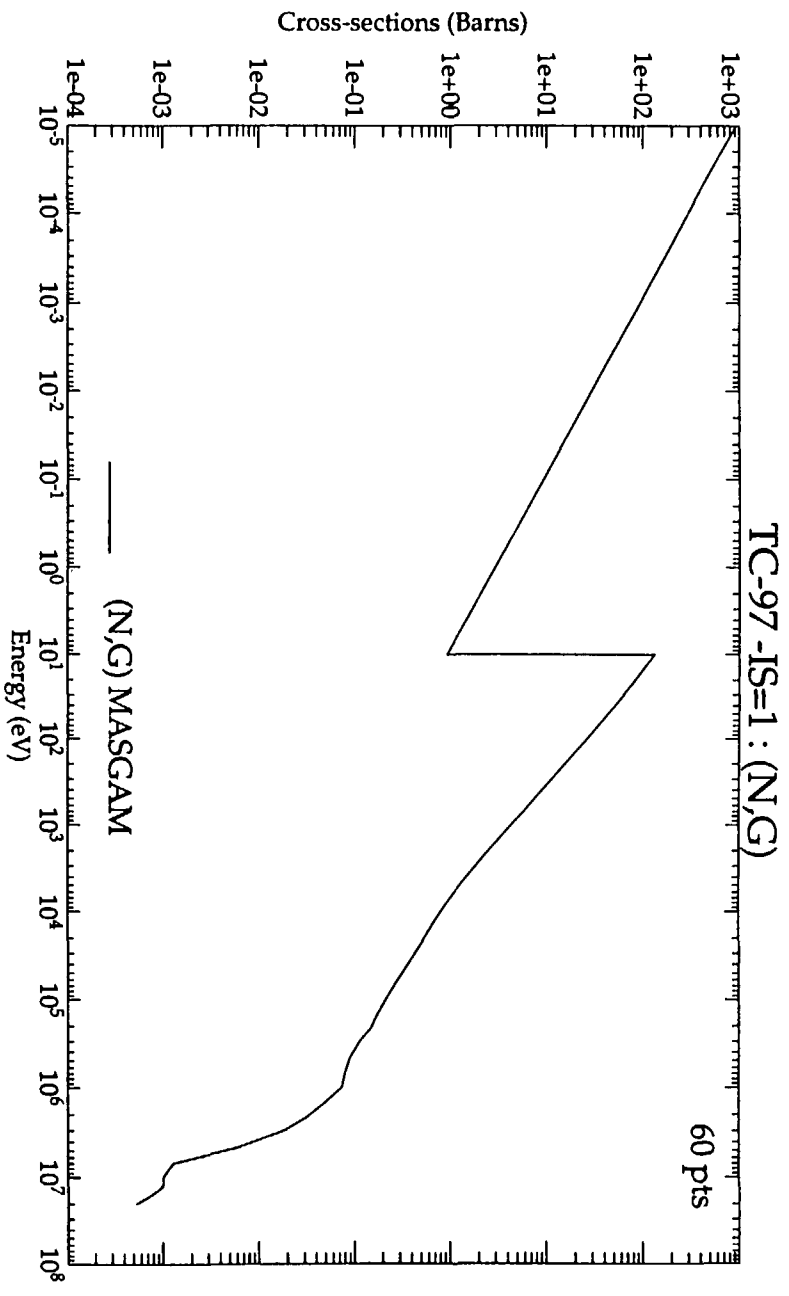


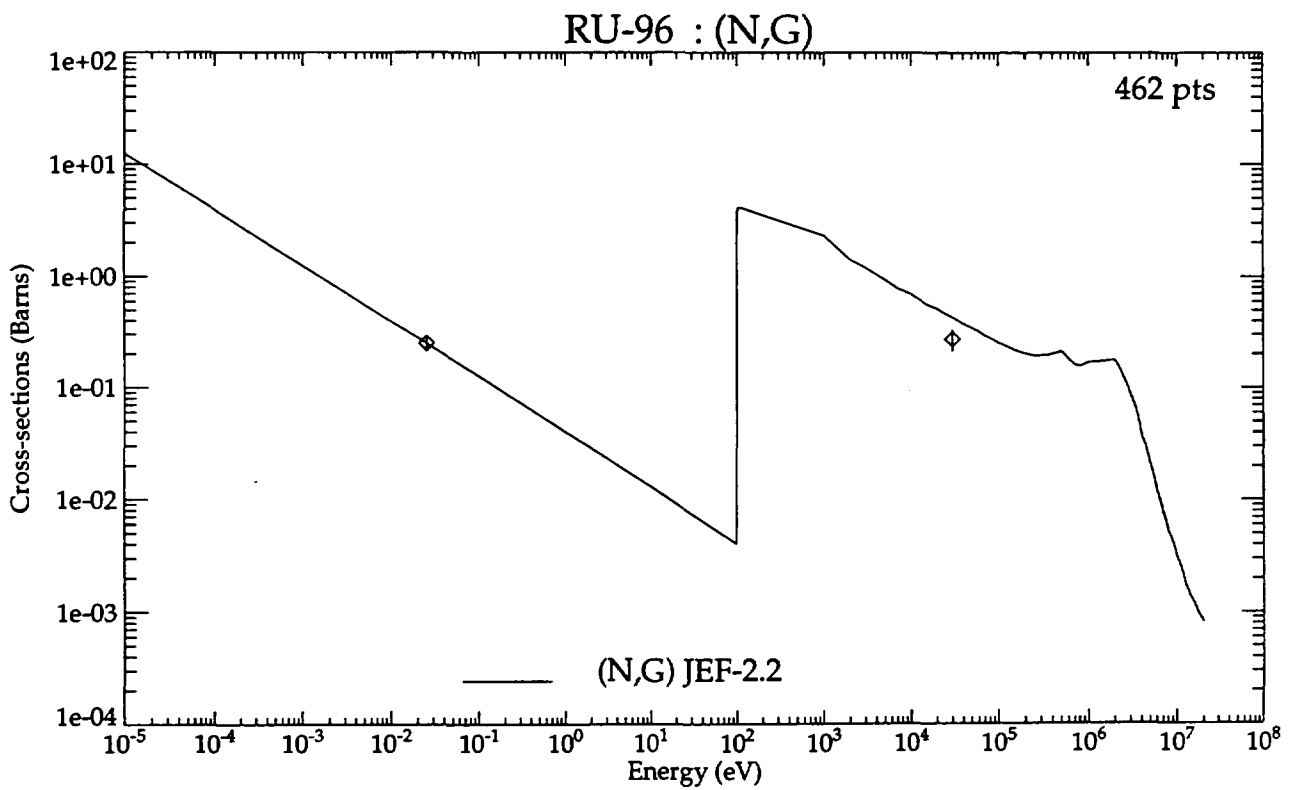
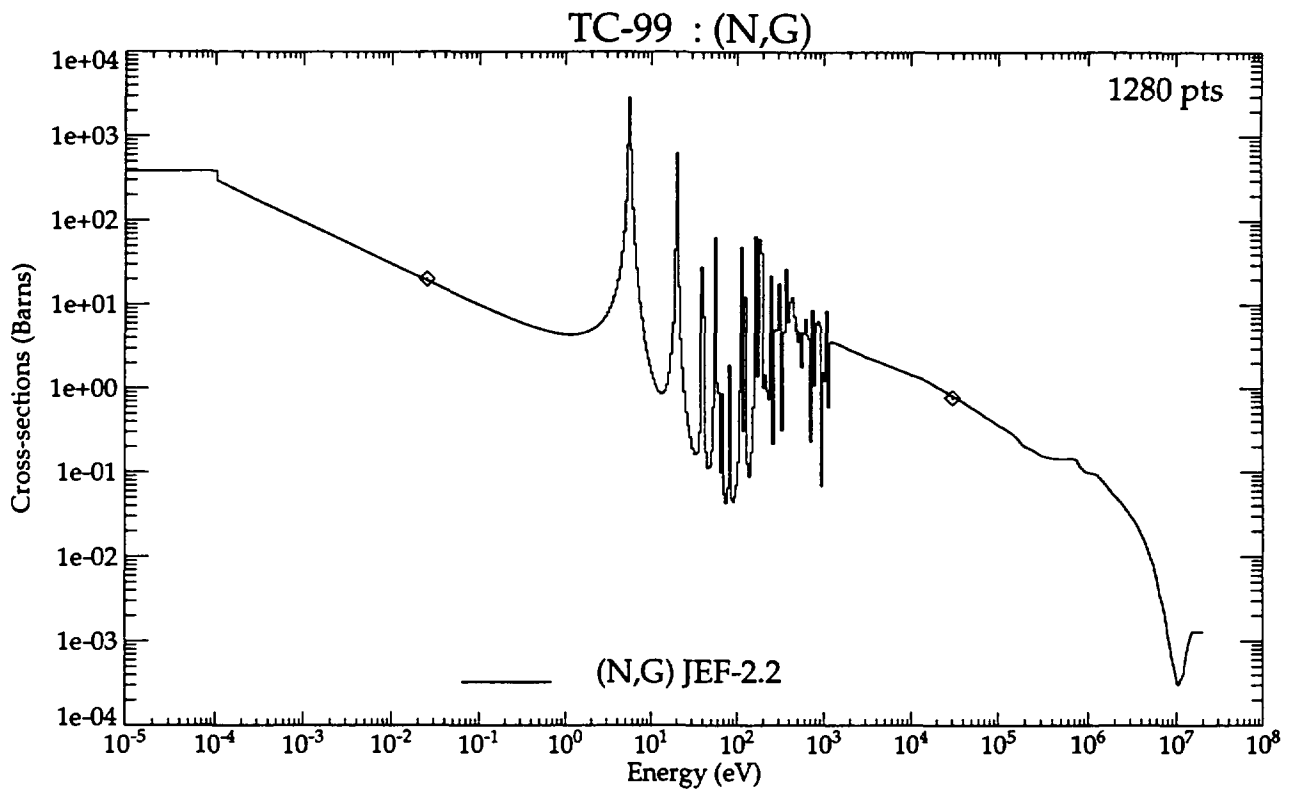


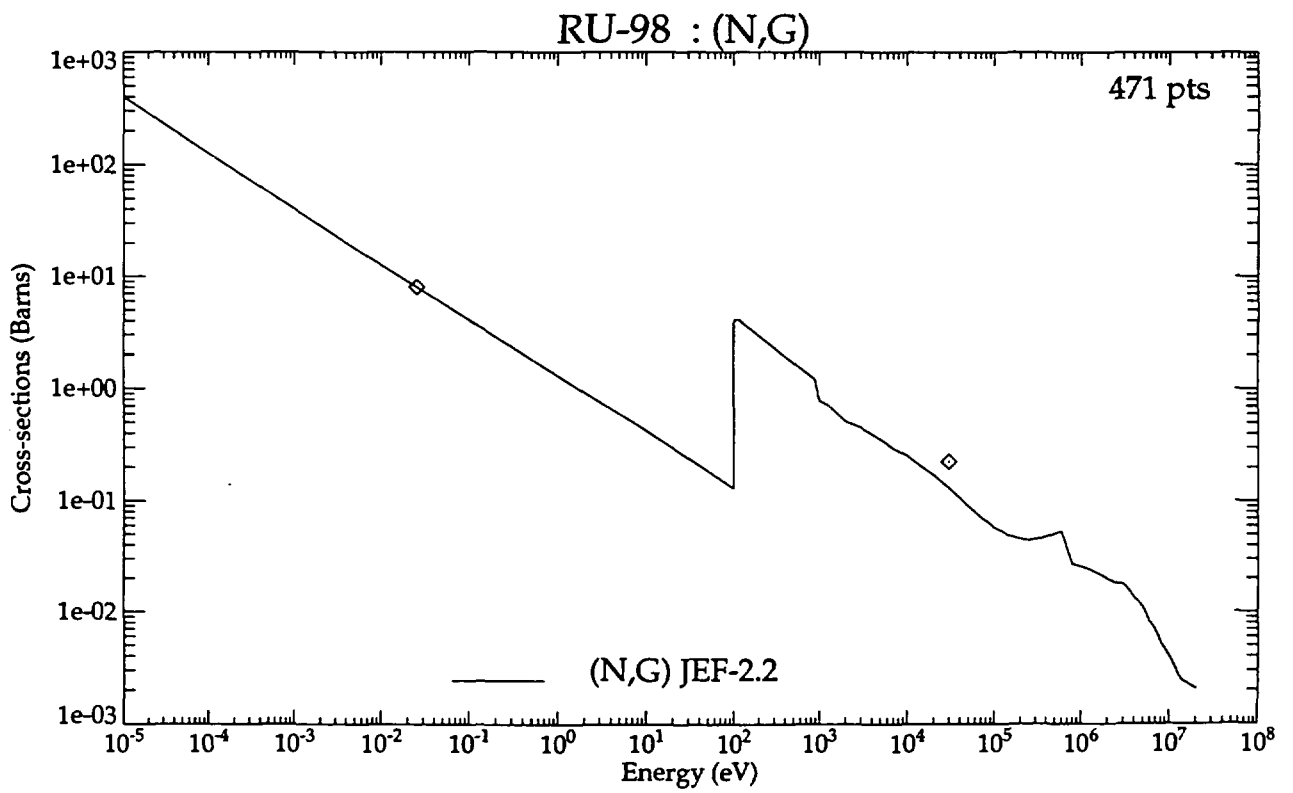
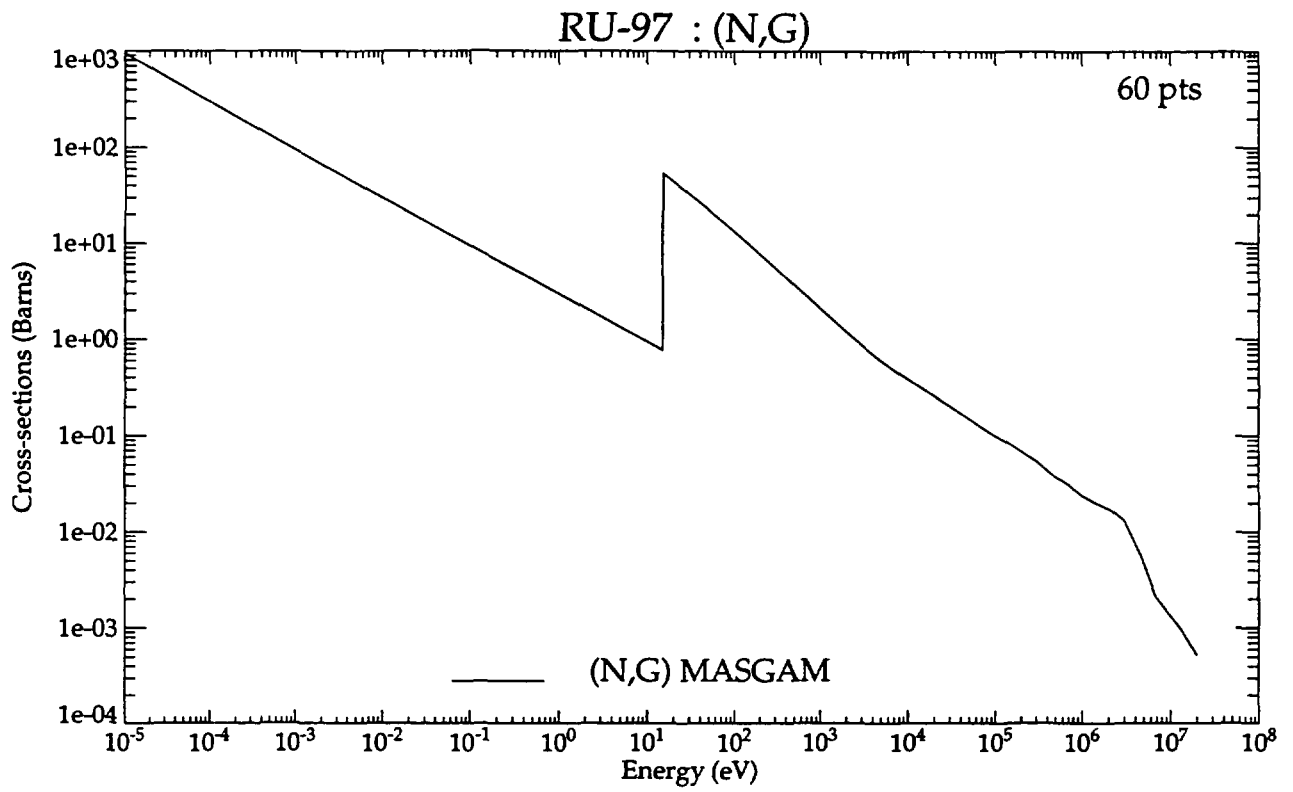


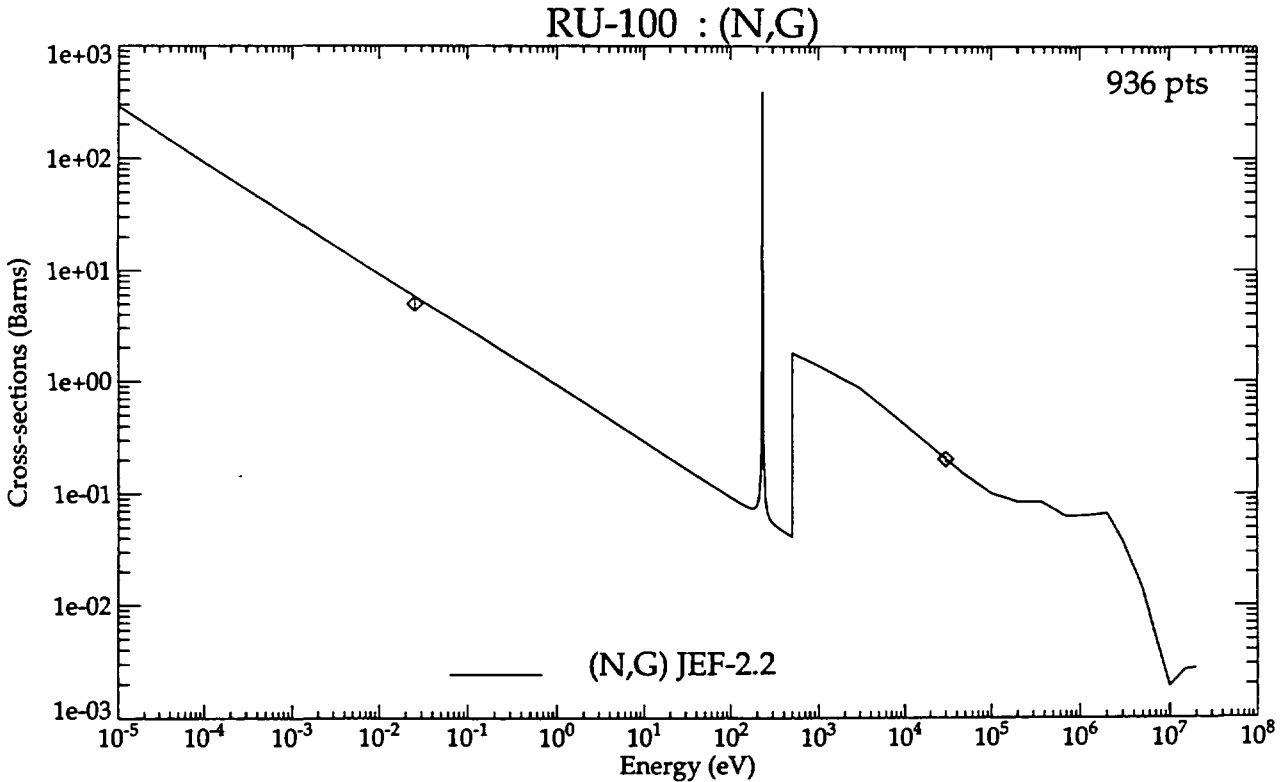
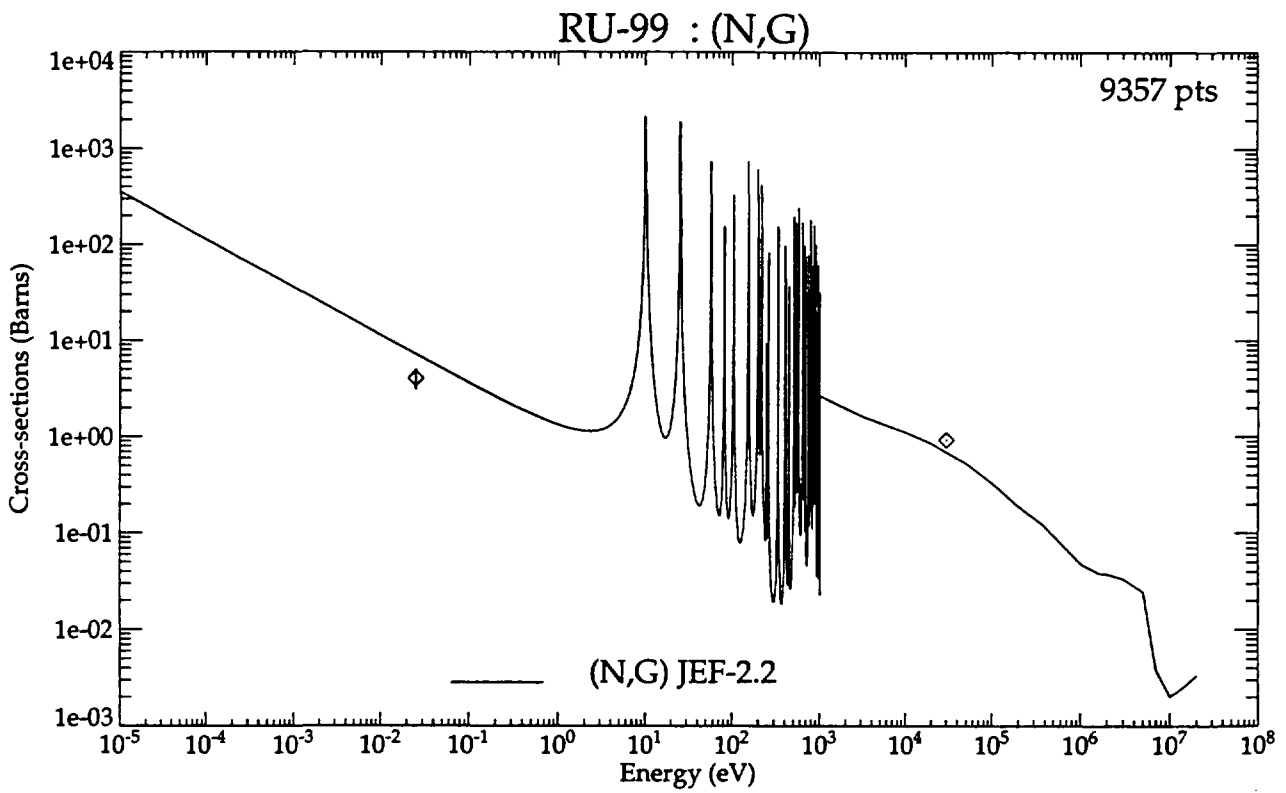


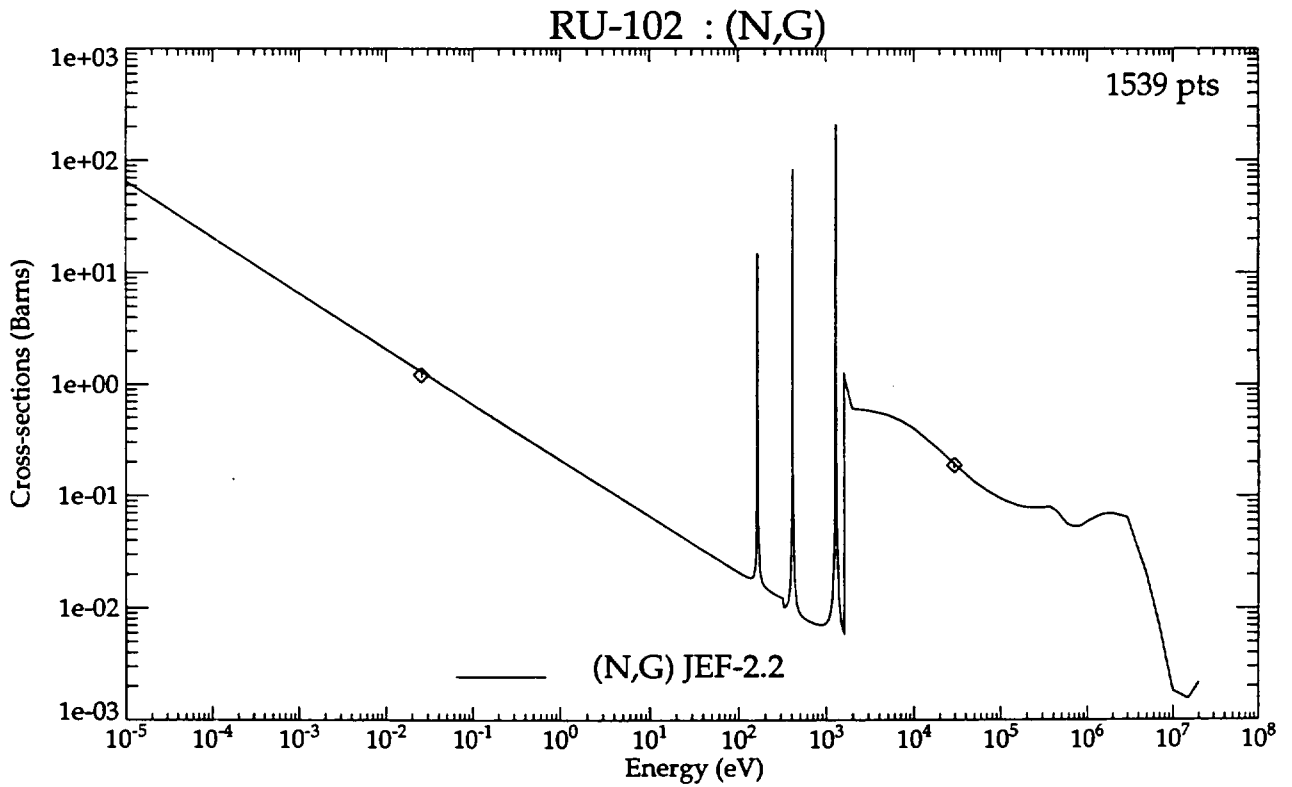
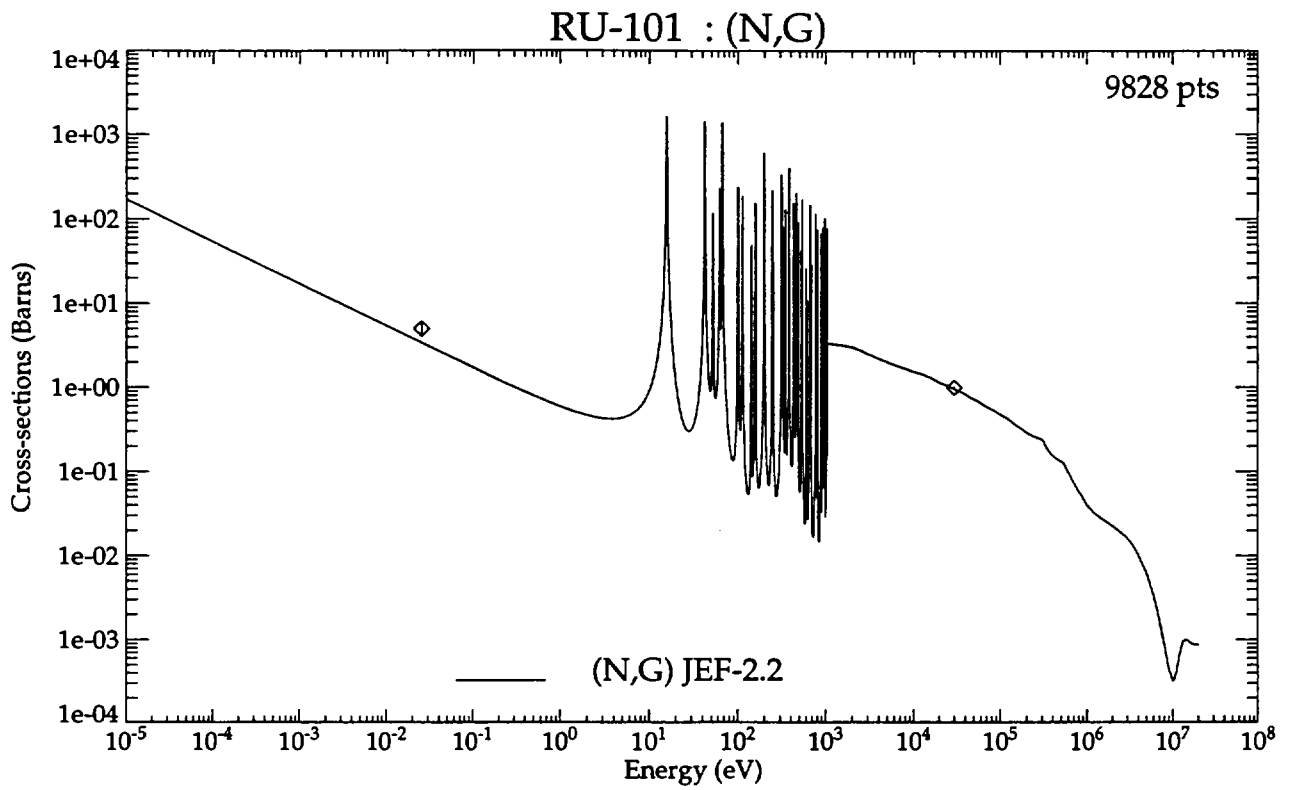


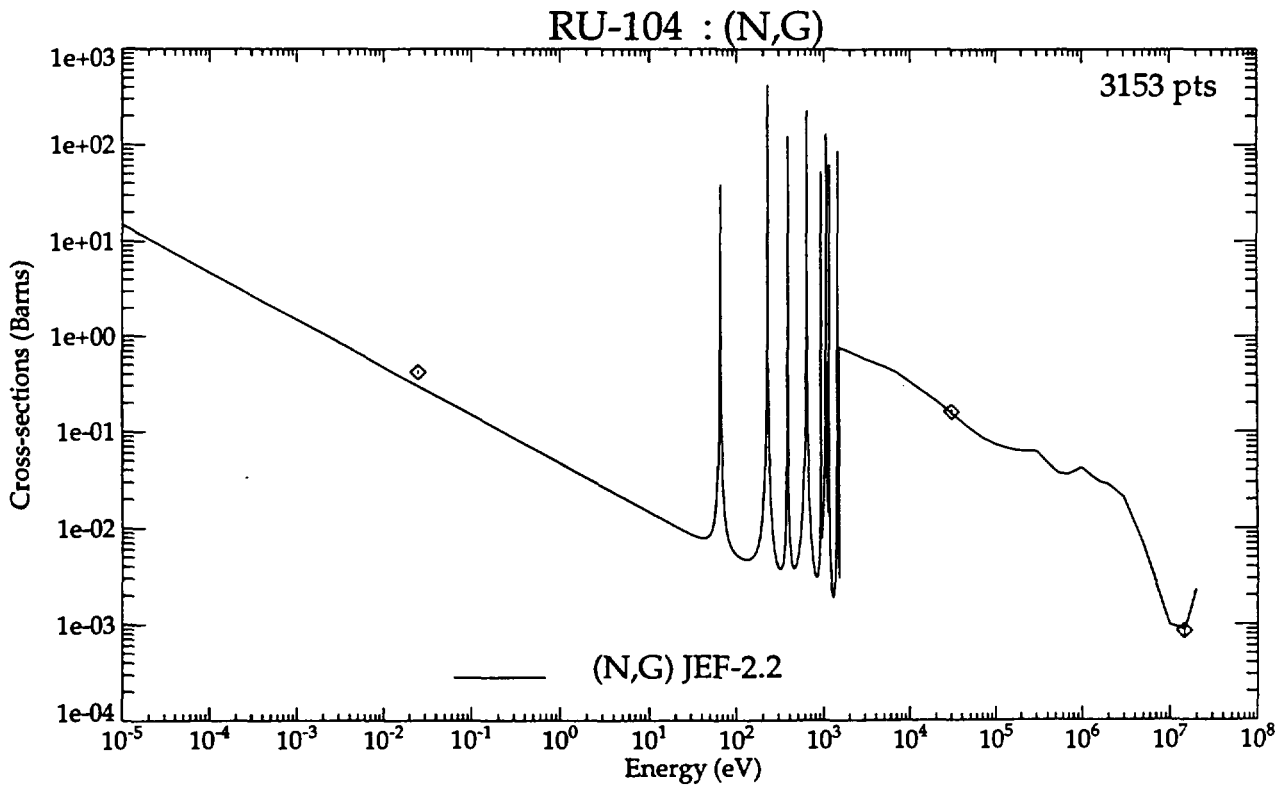
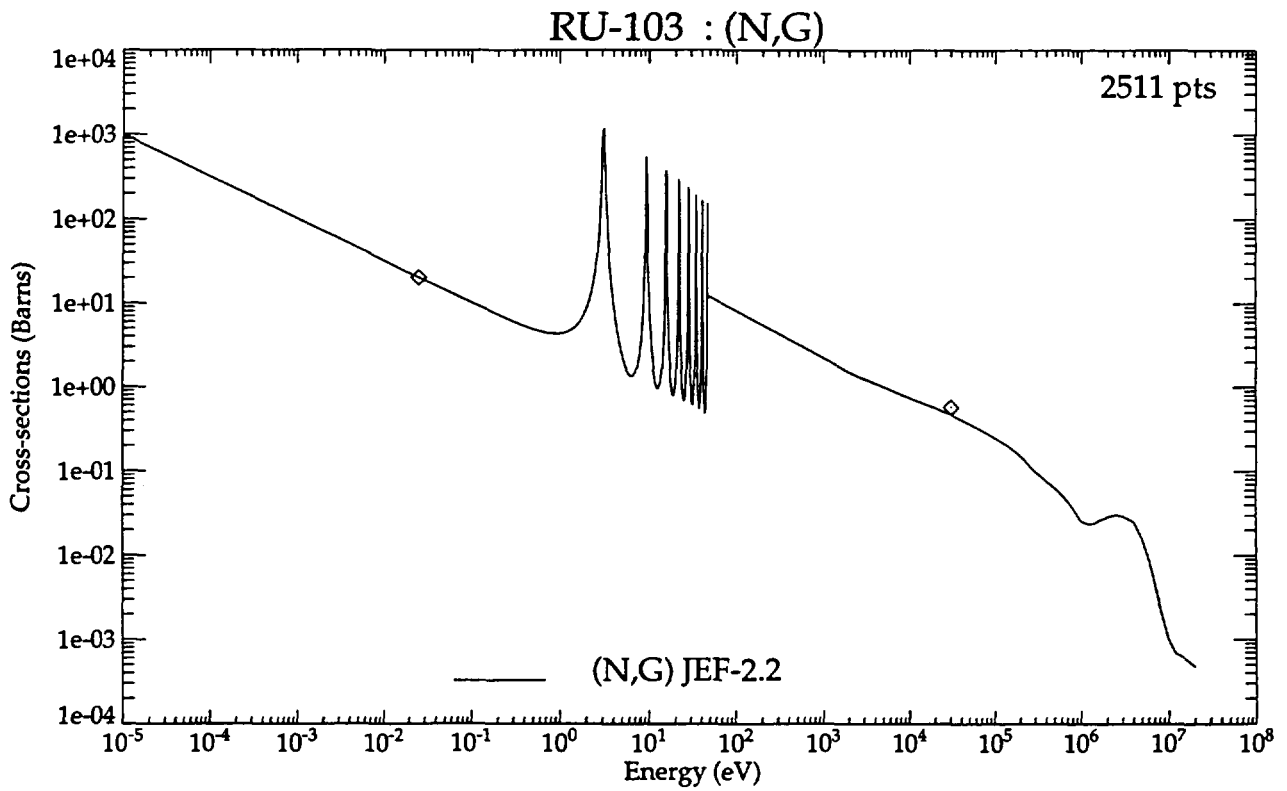


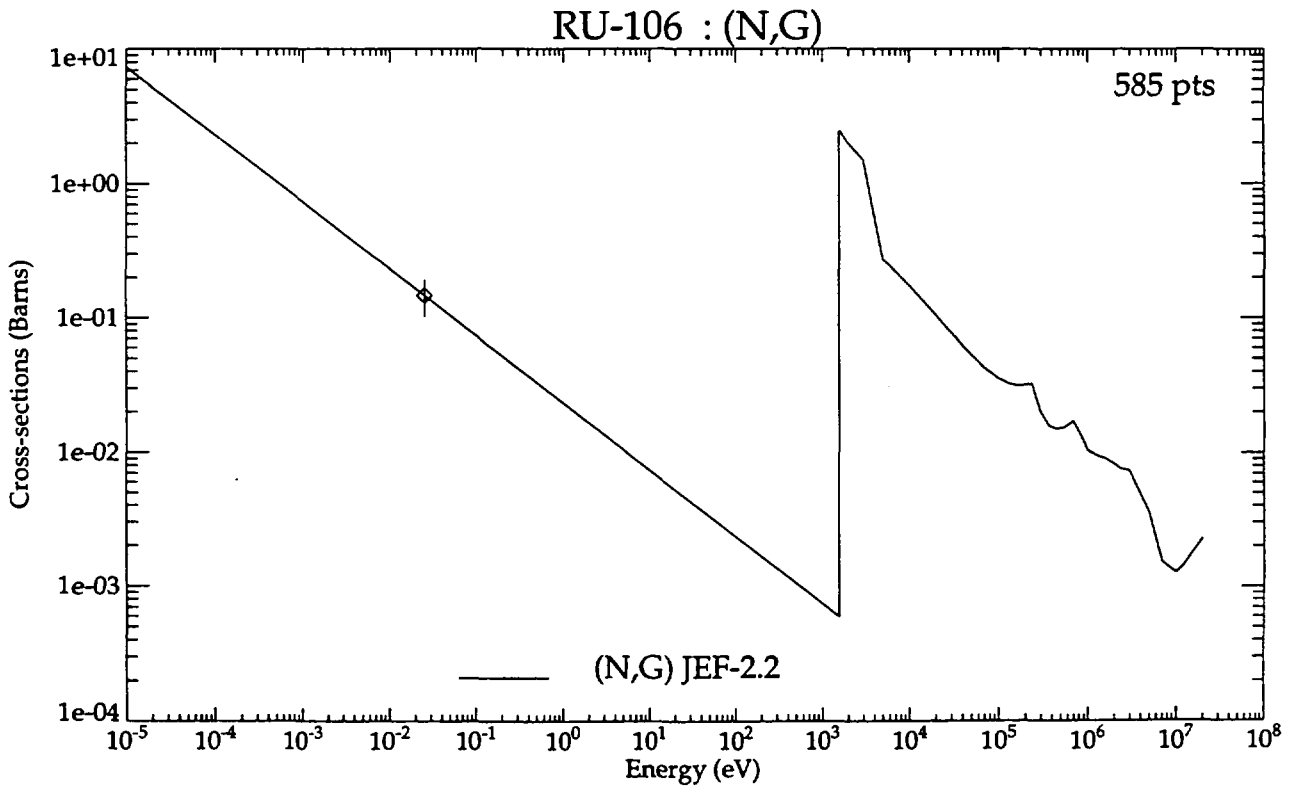
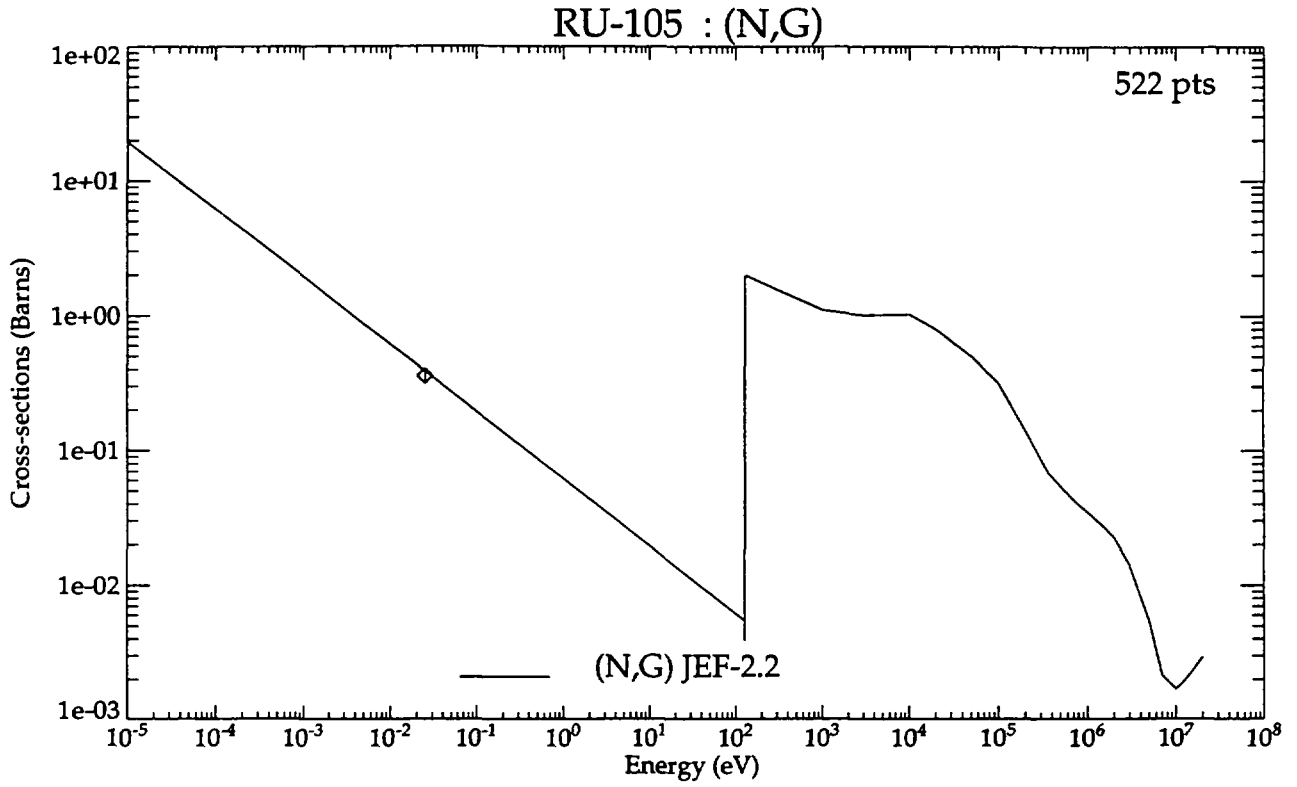




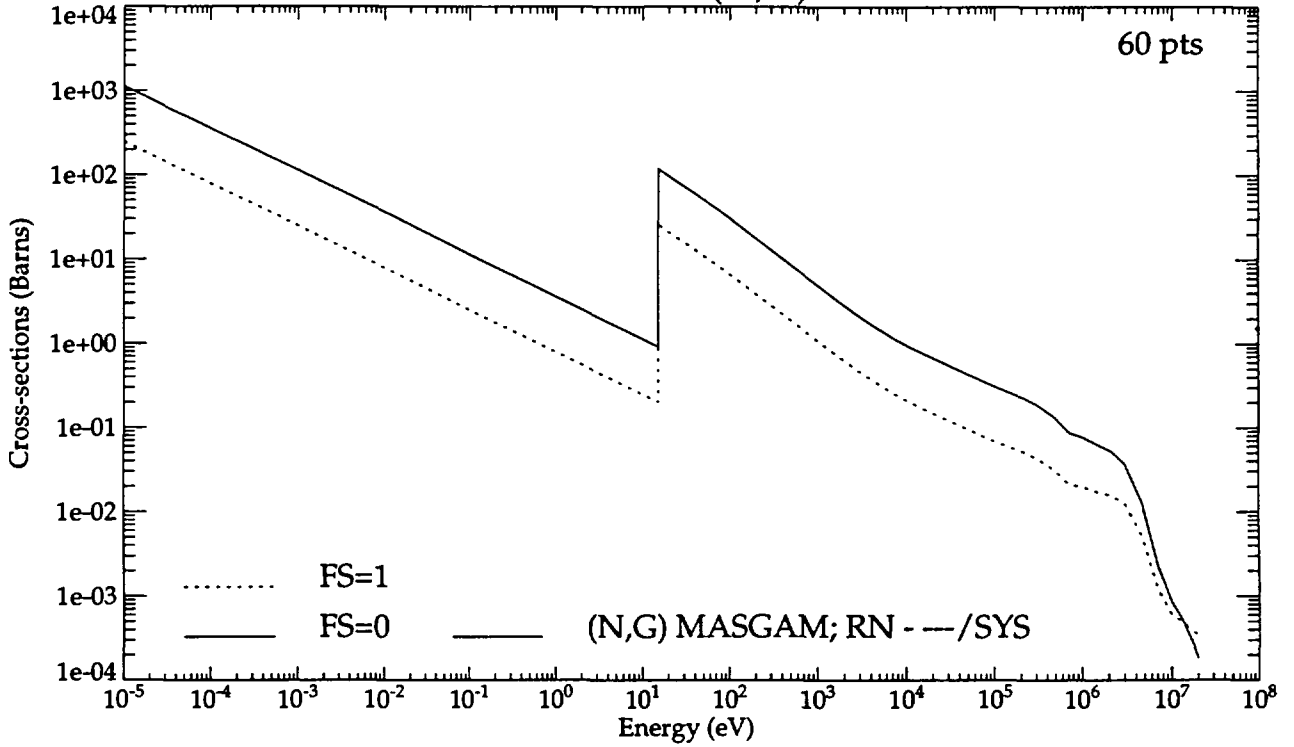




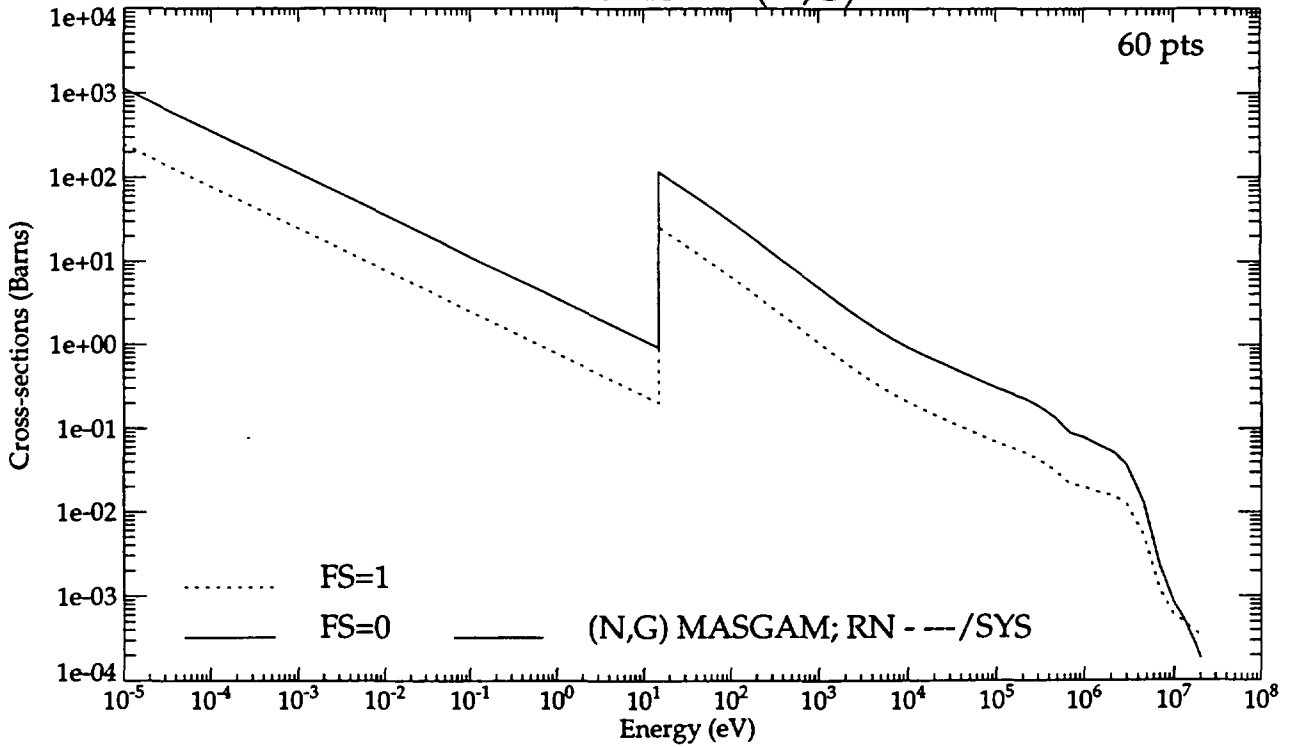


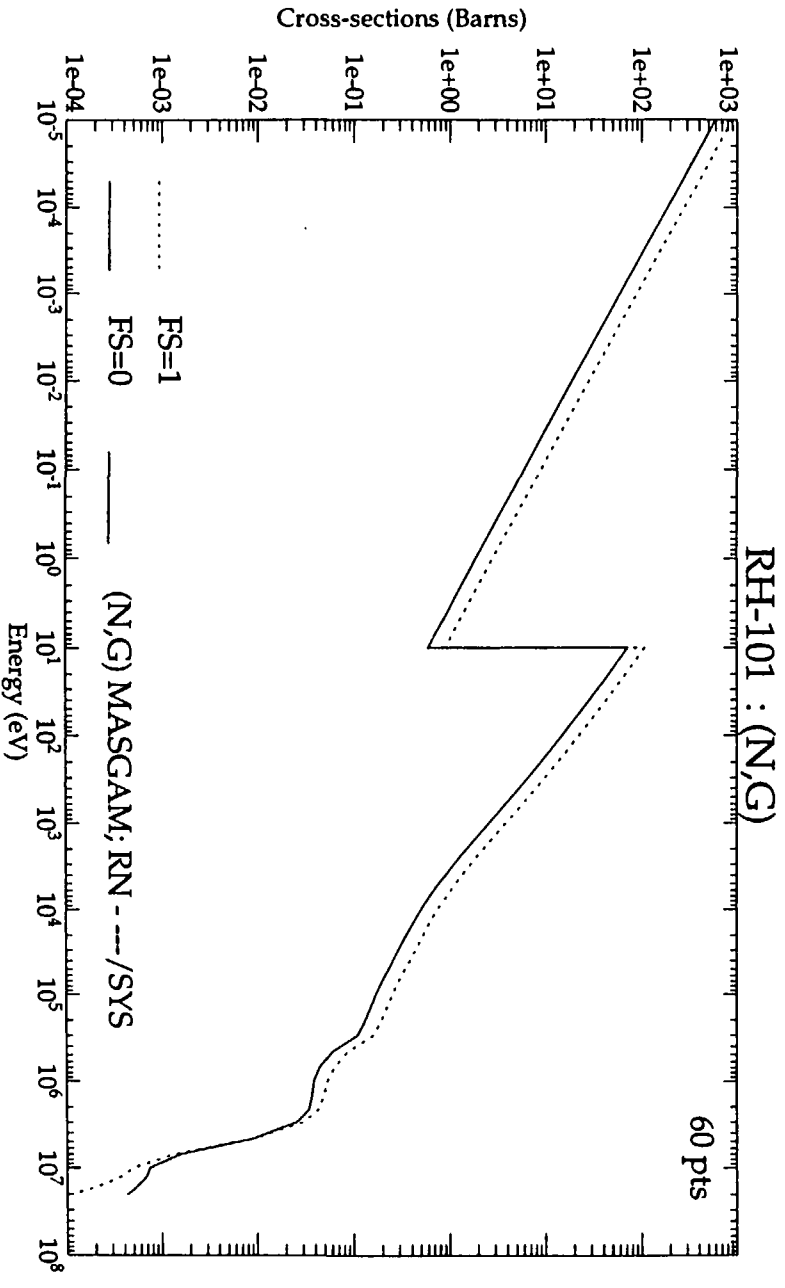
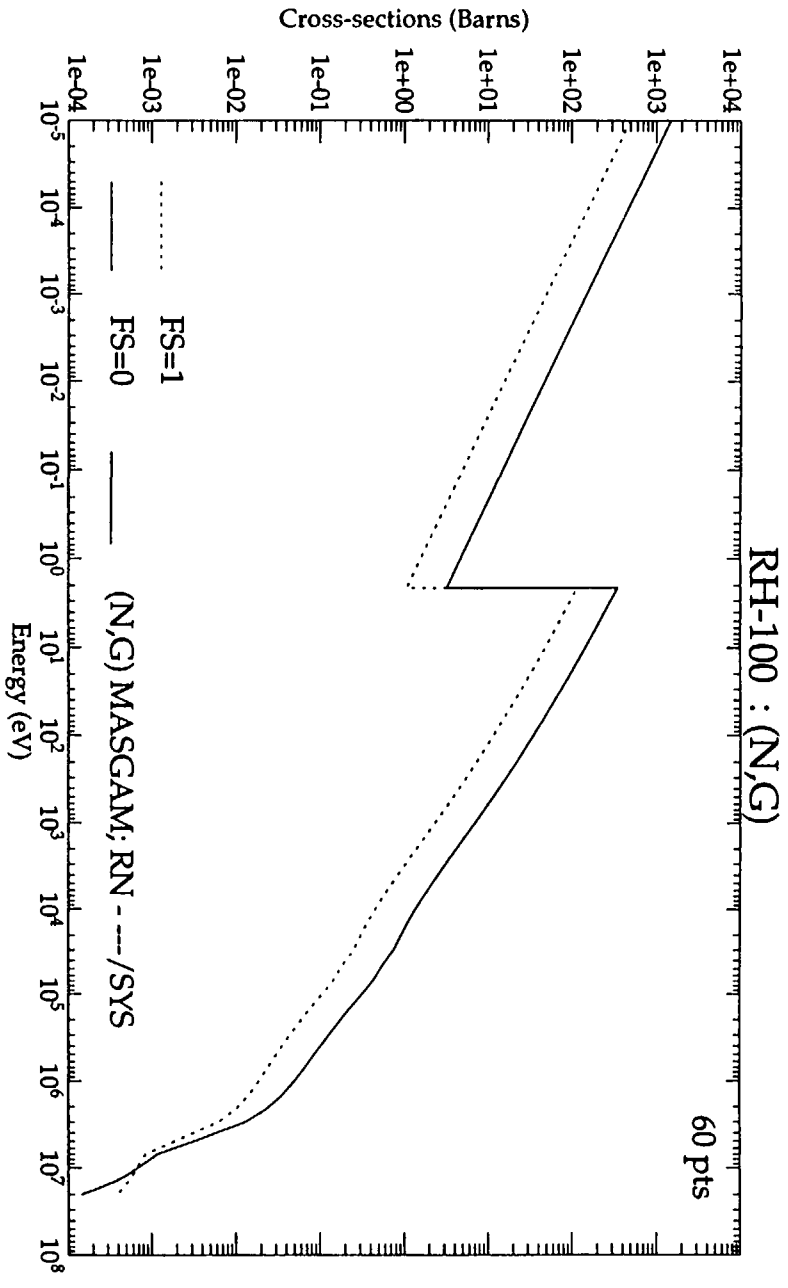


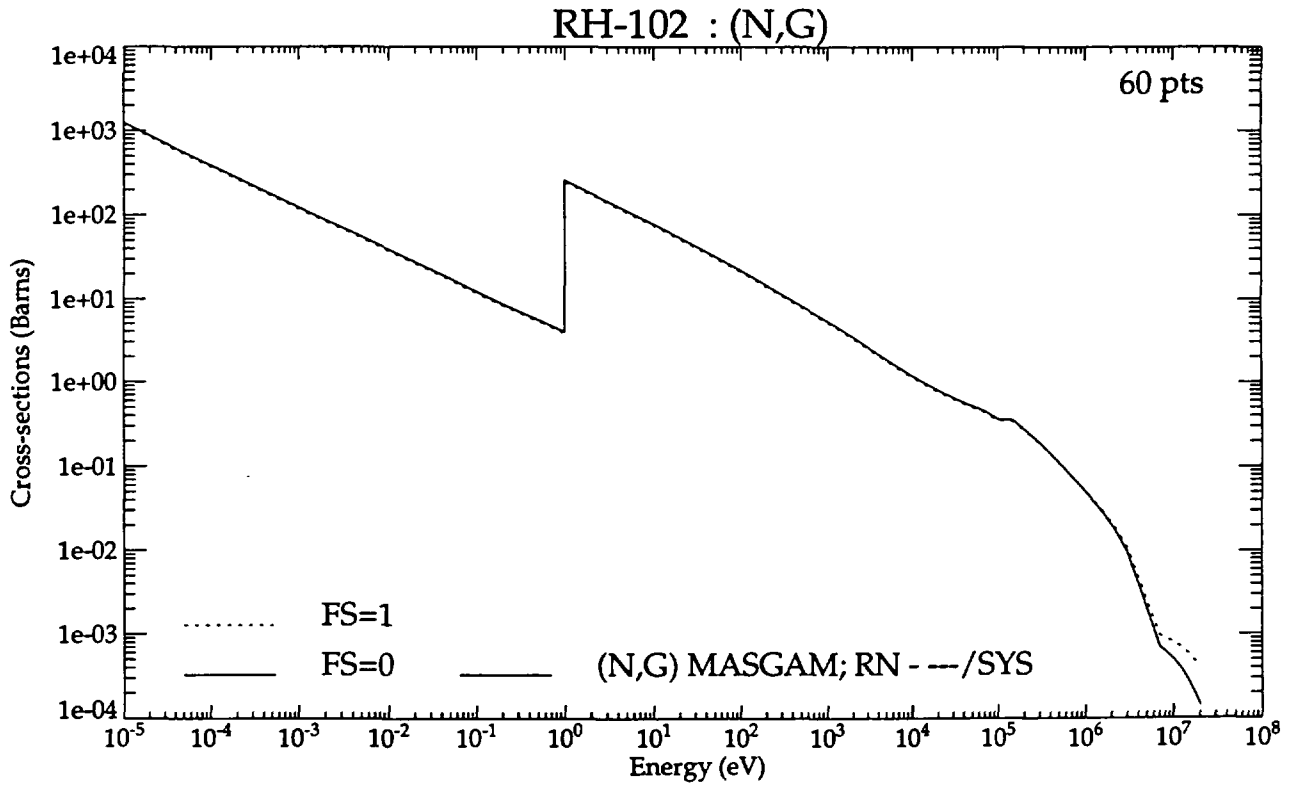
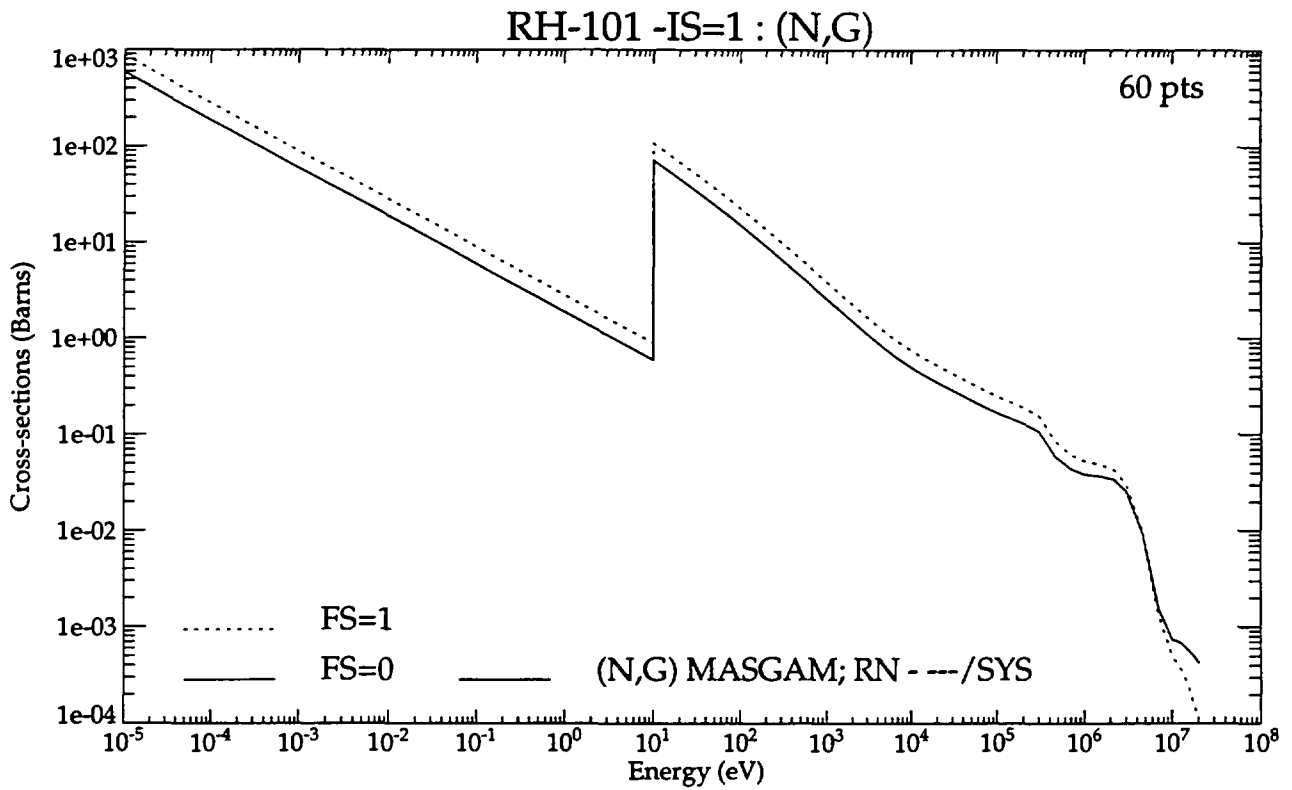
RH-99 : (N,G)

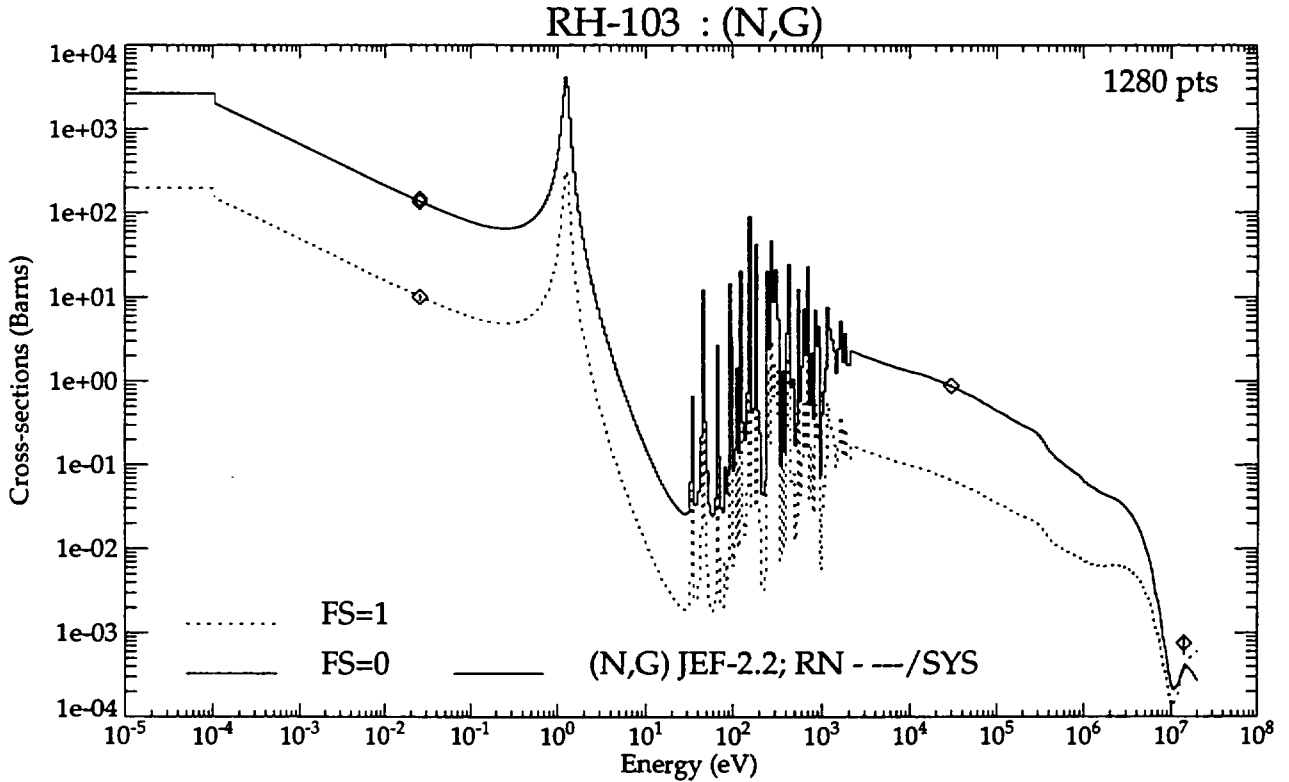
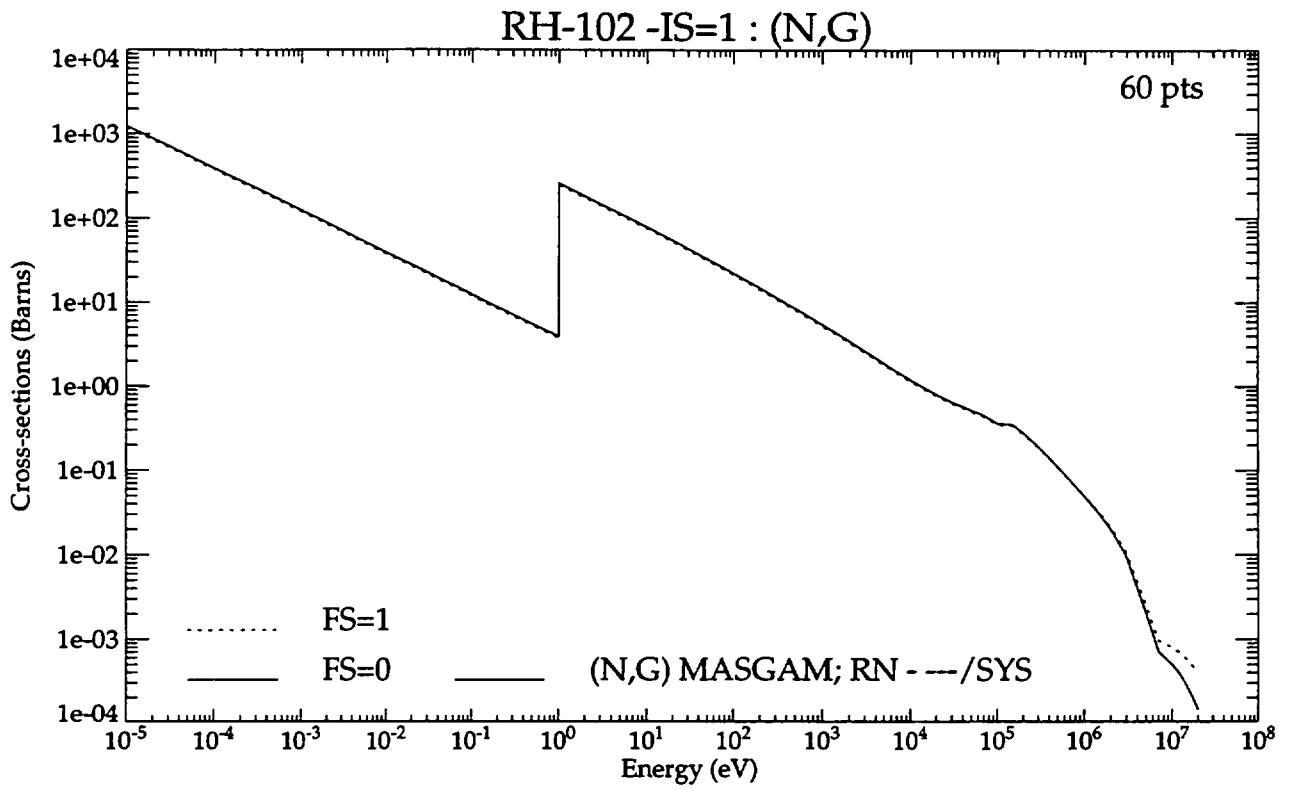


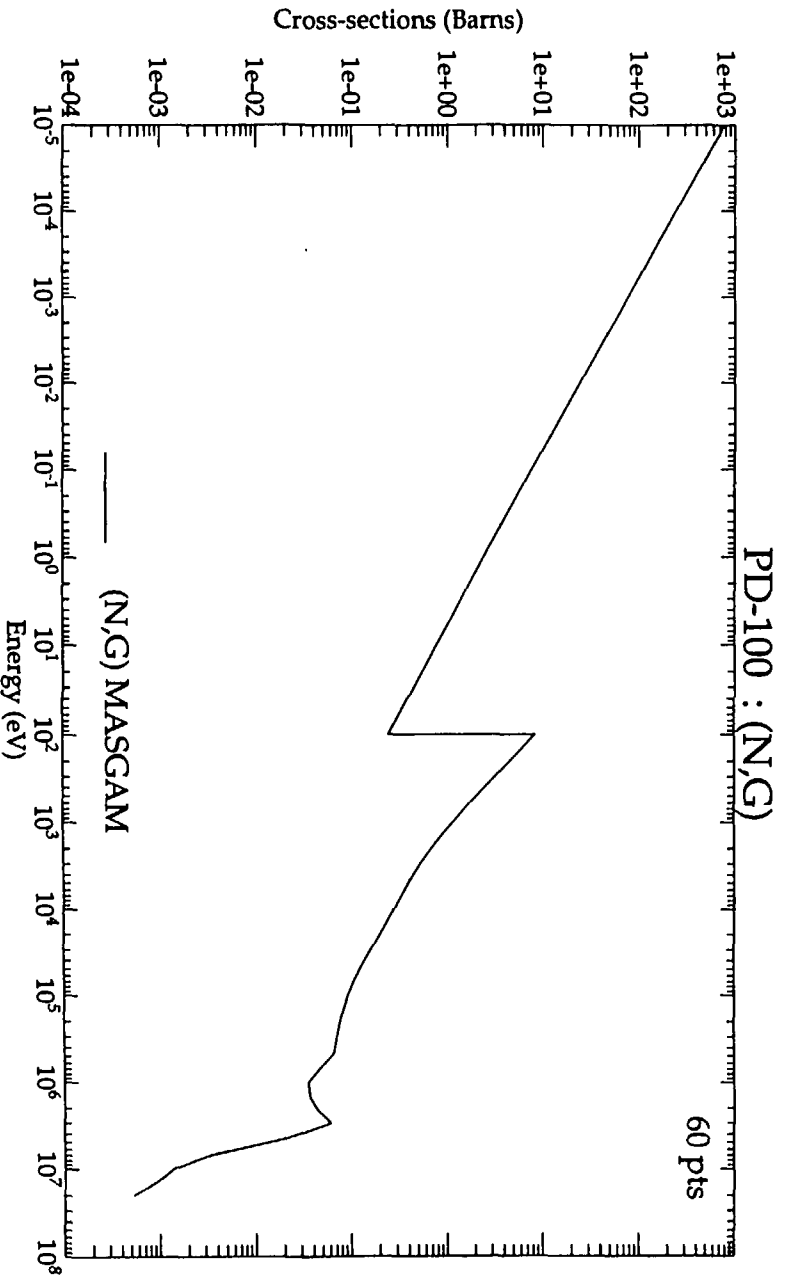
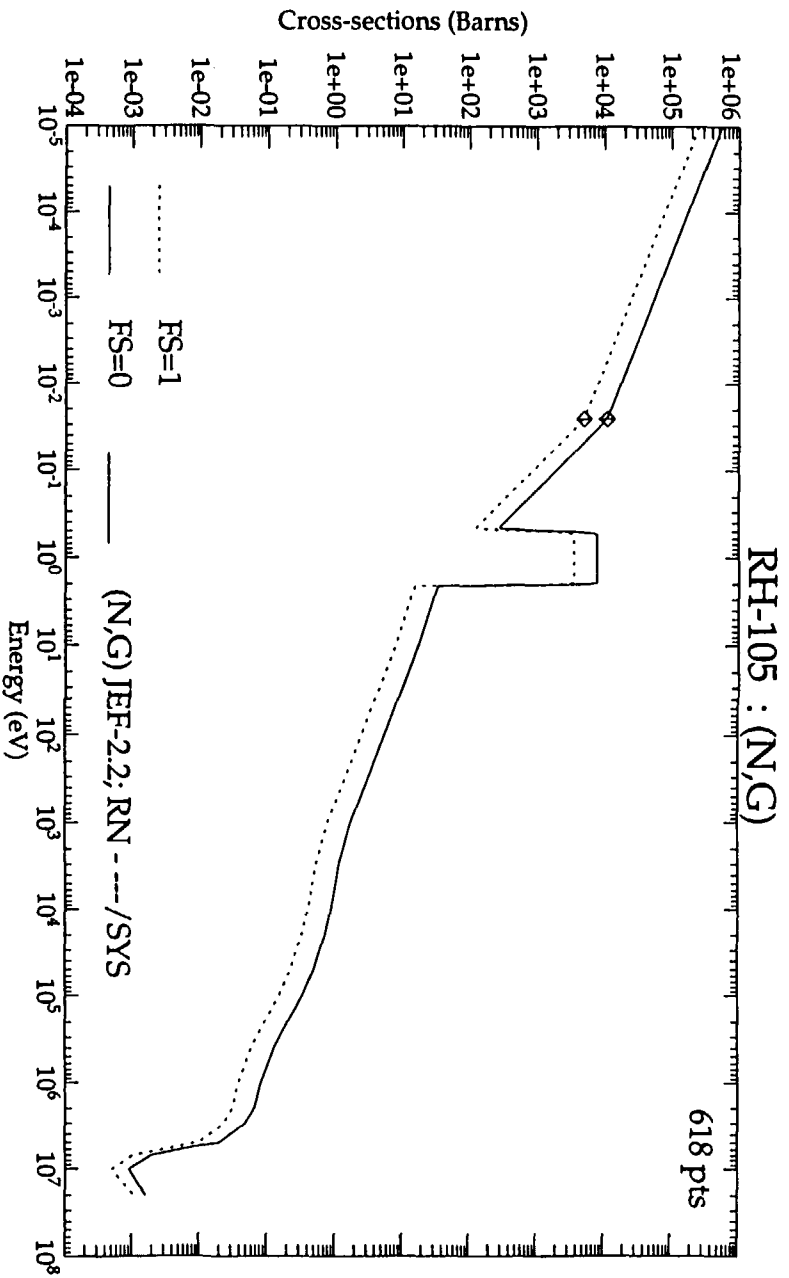
RH-99 -IS=1 : (N,G)

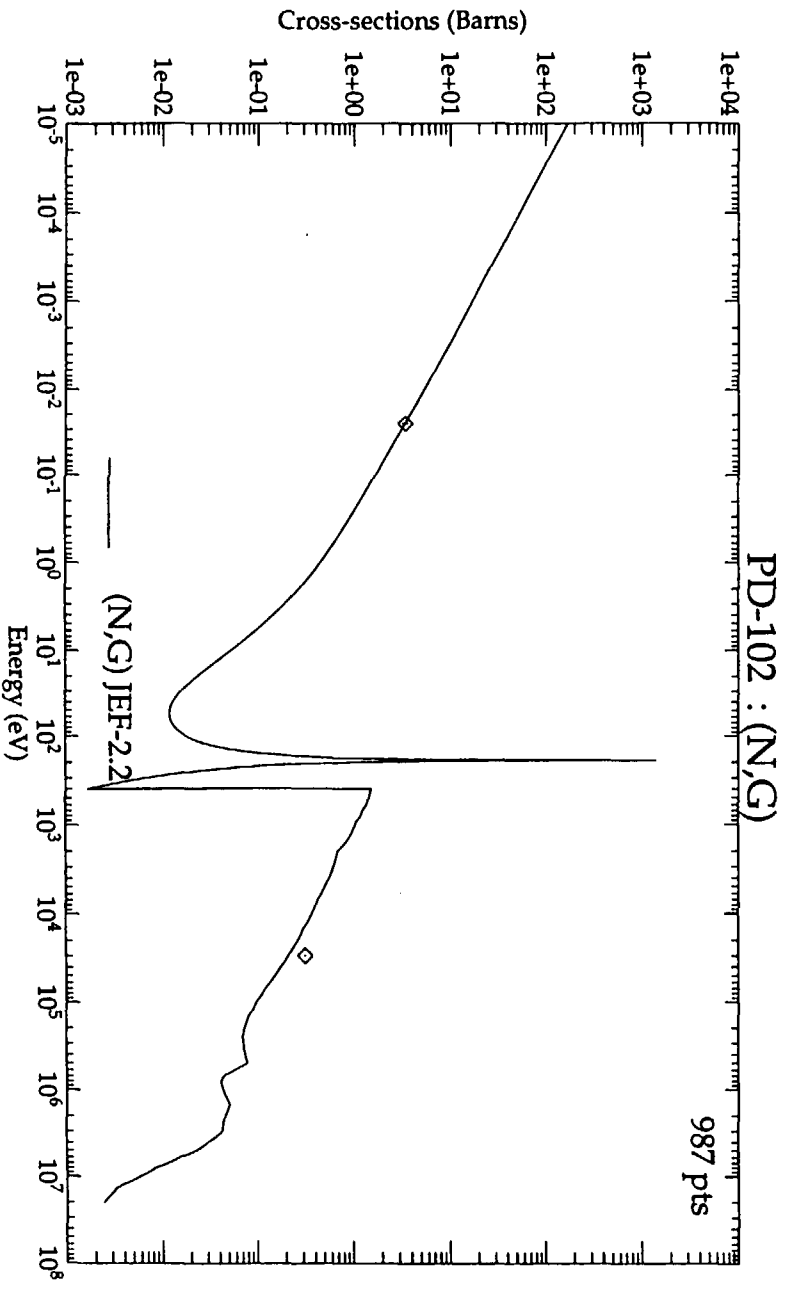
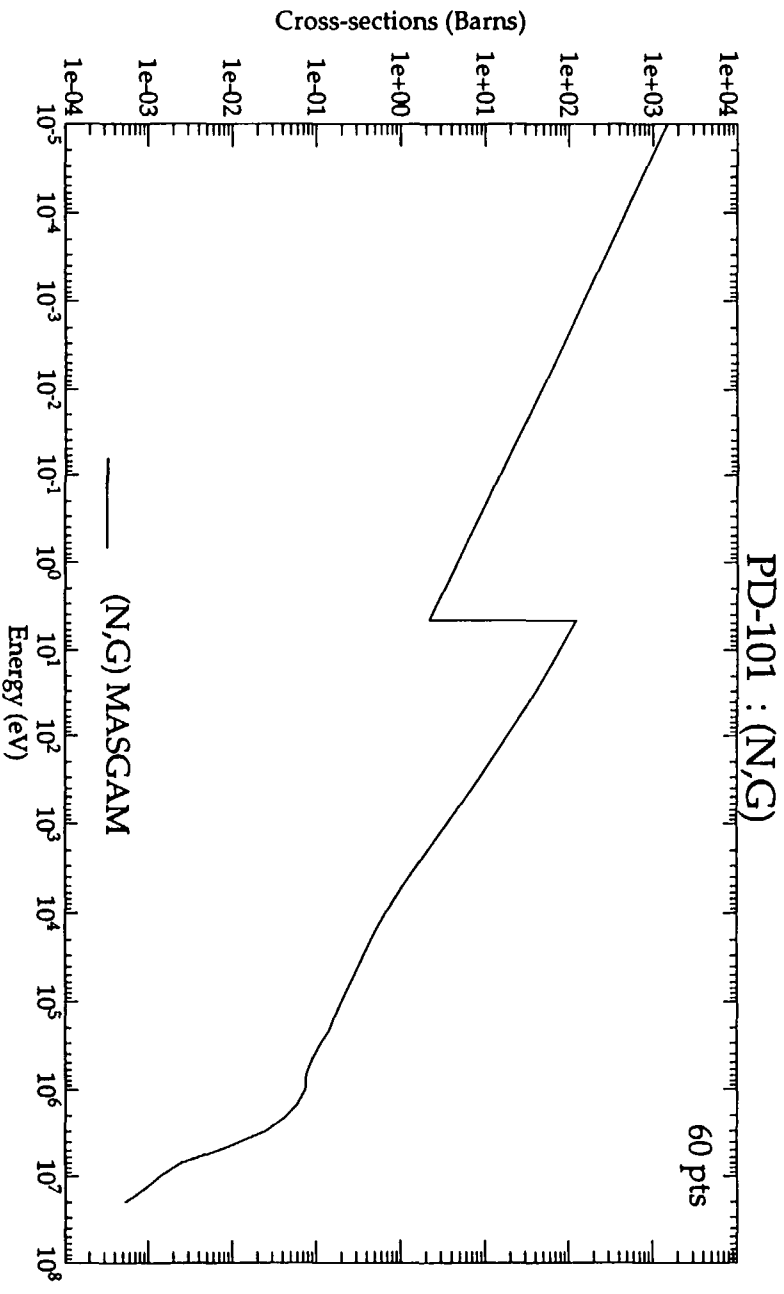


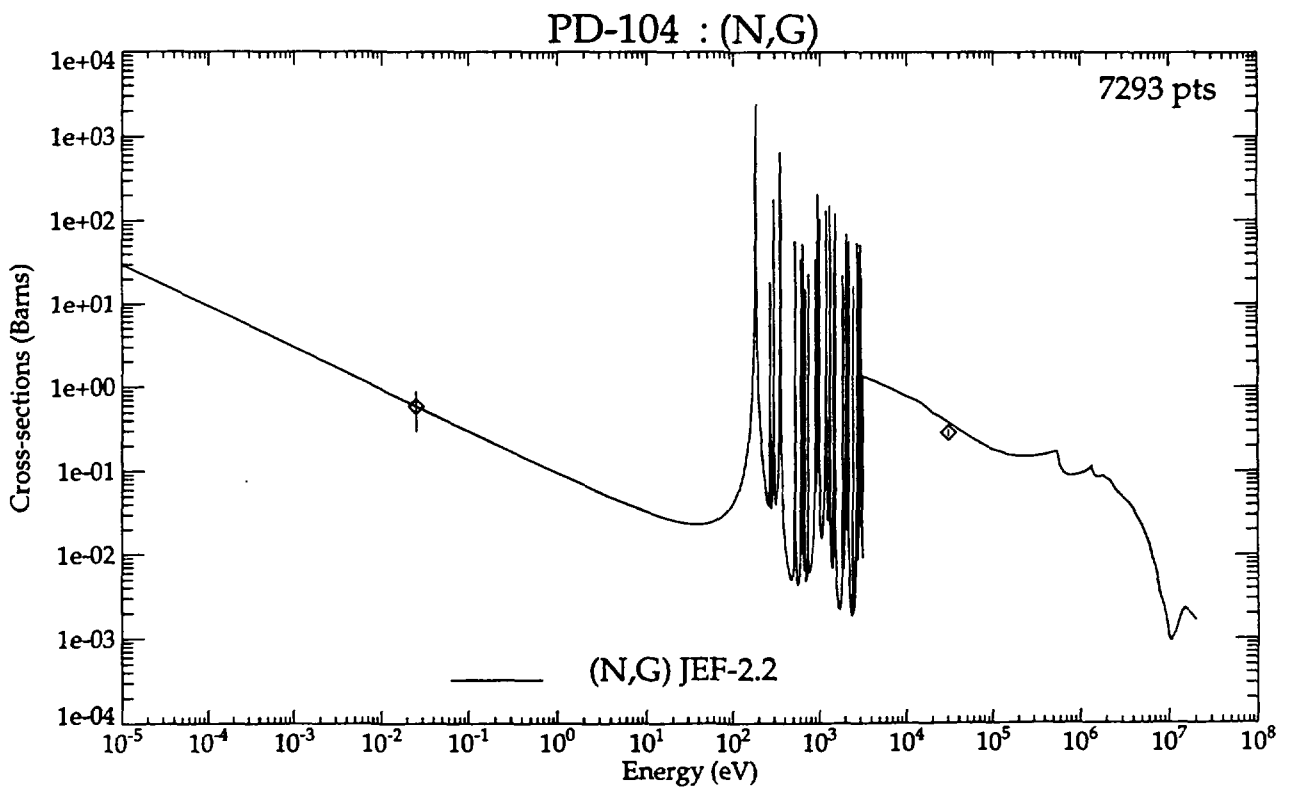
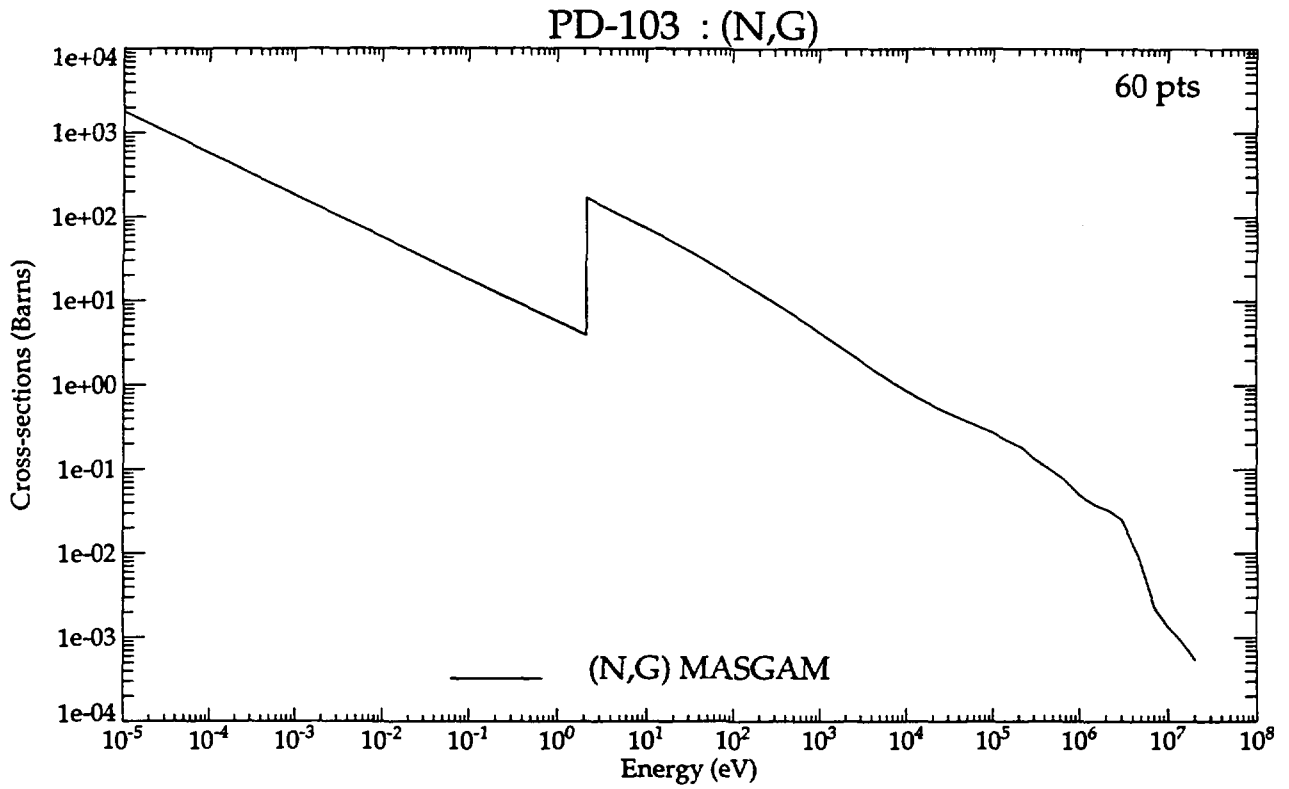


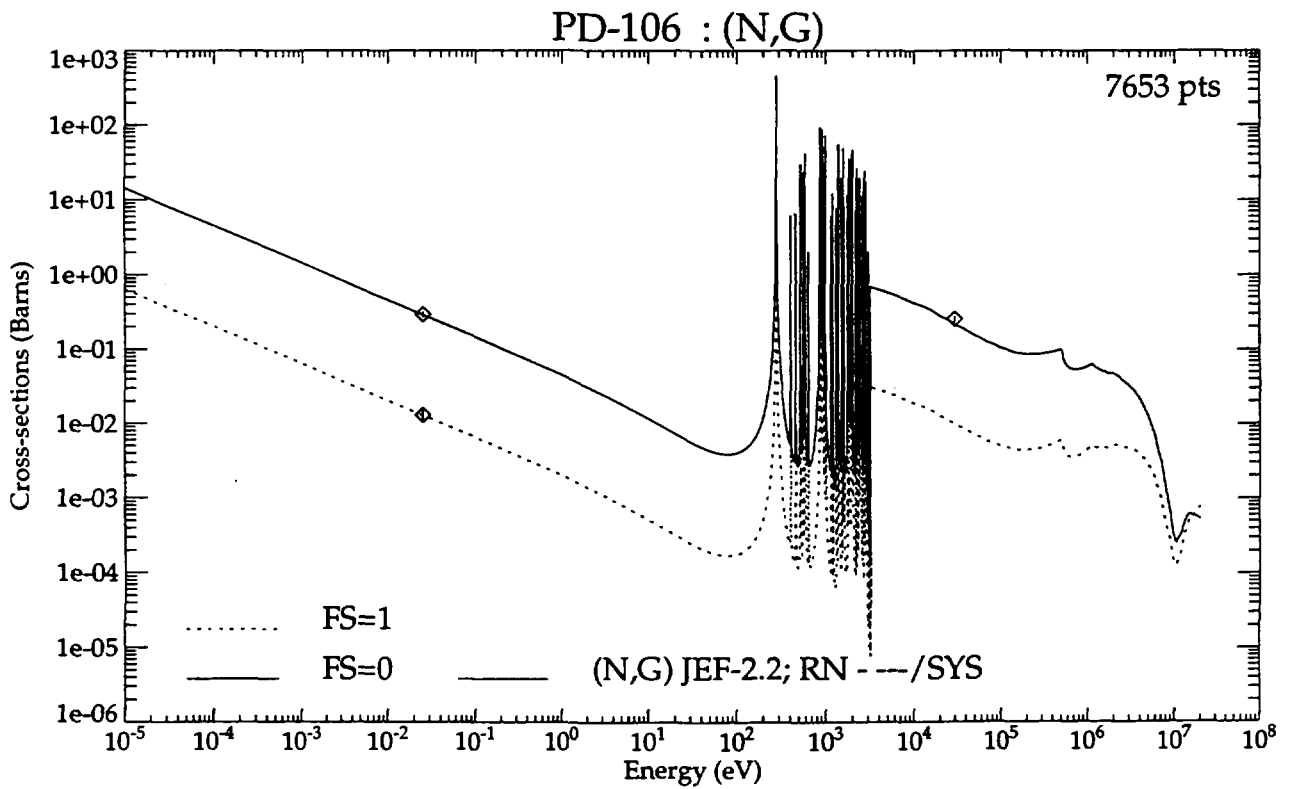
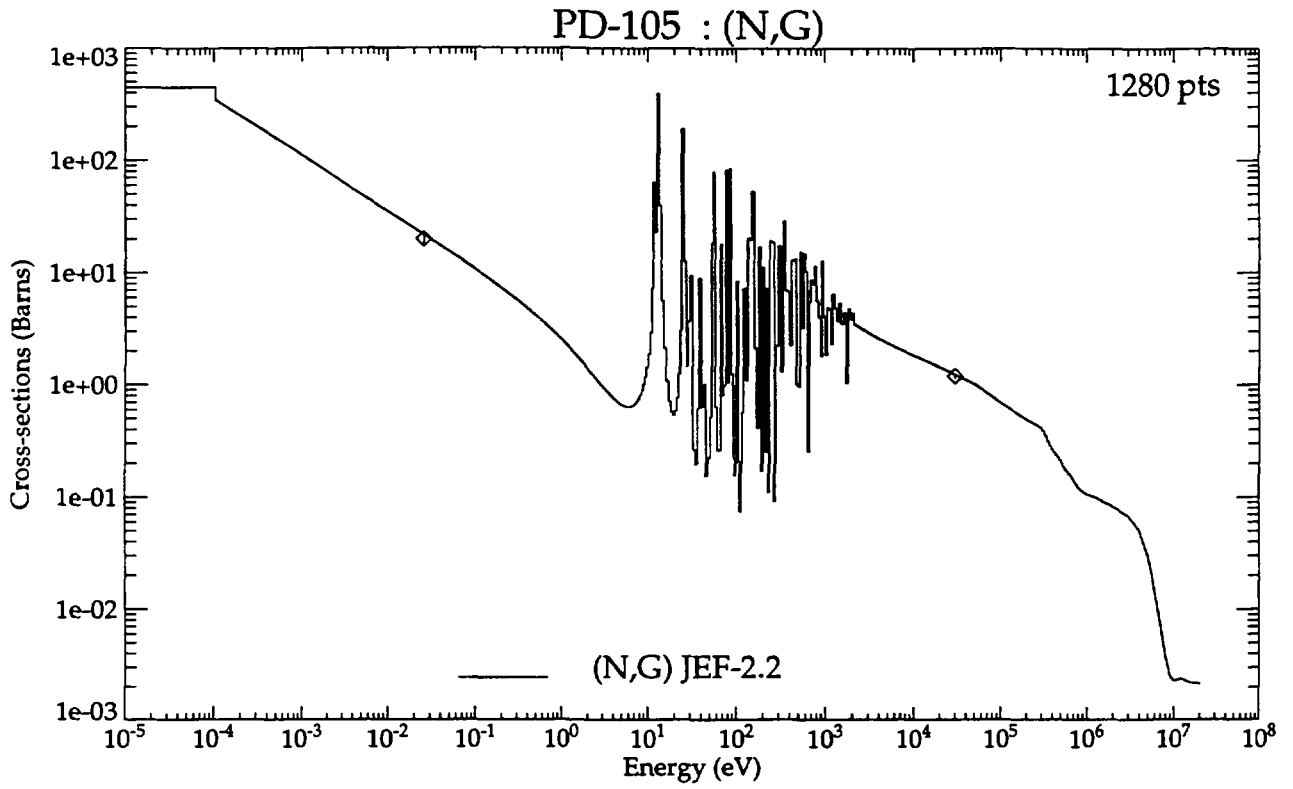


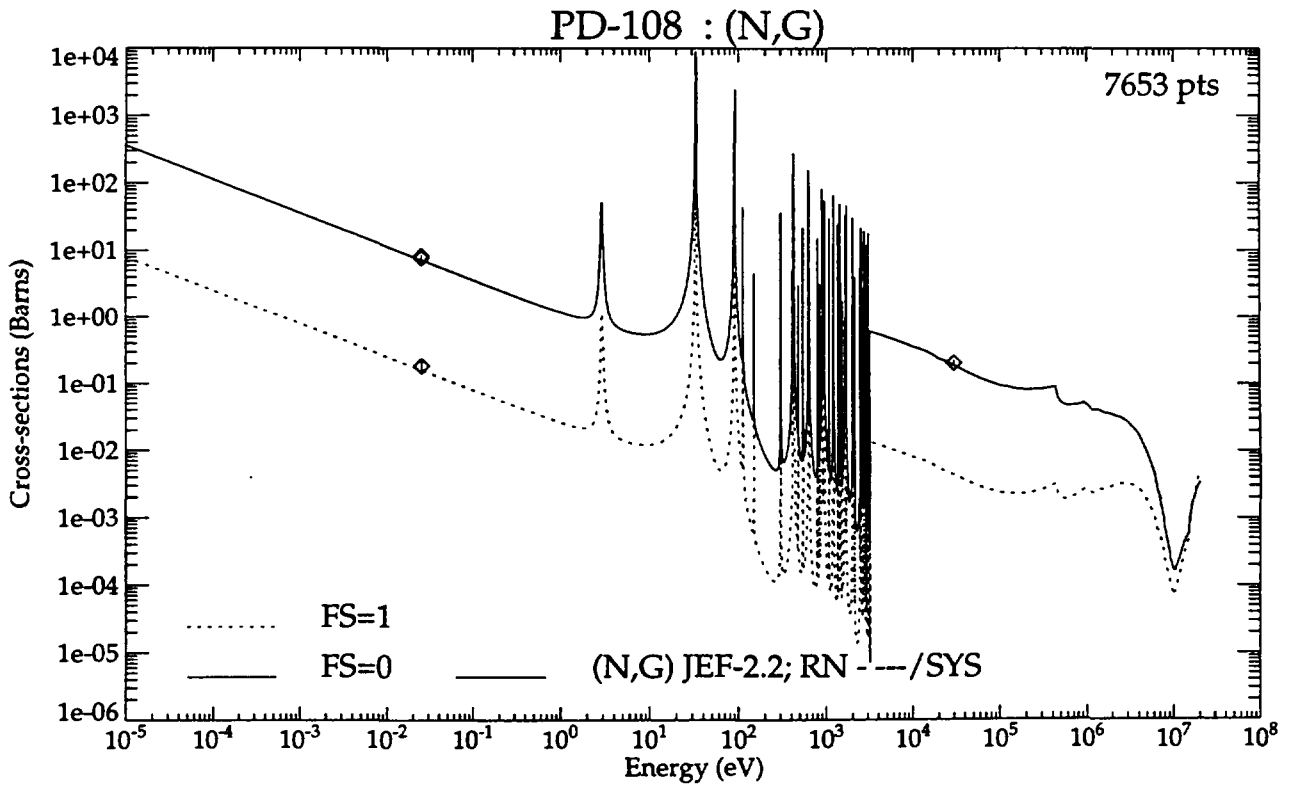
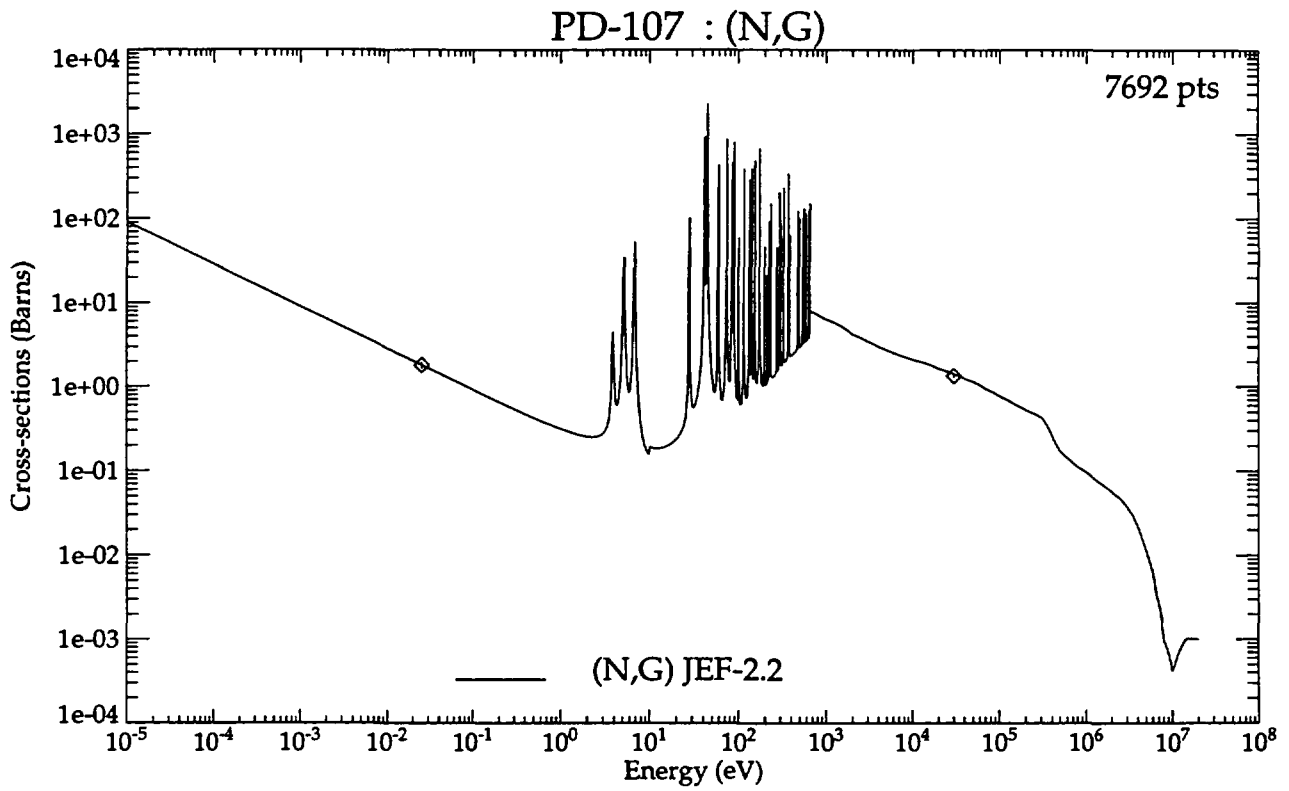


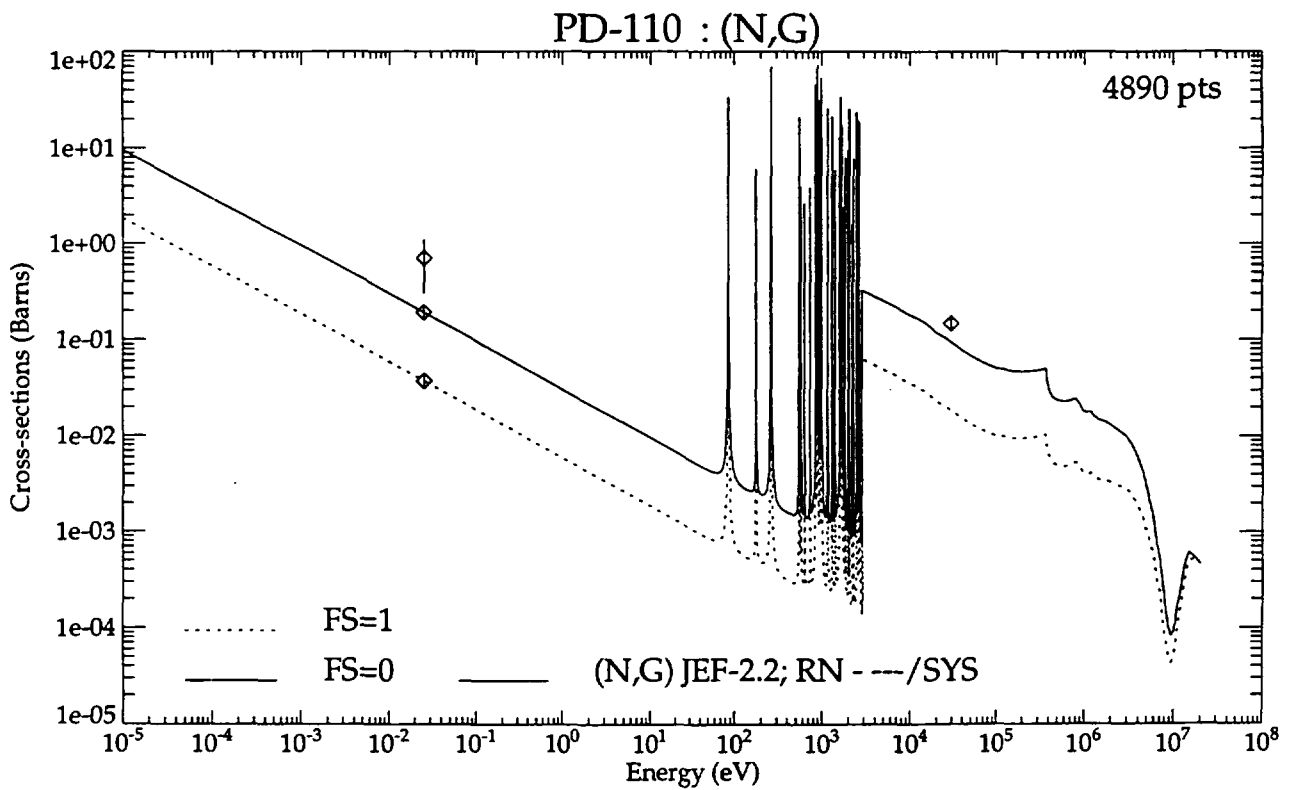
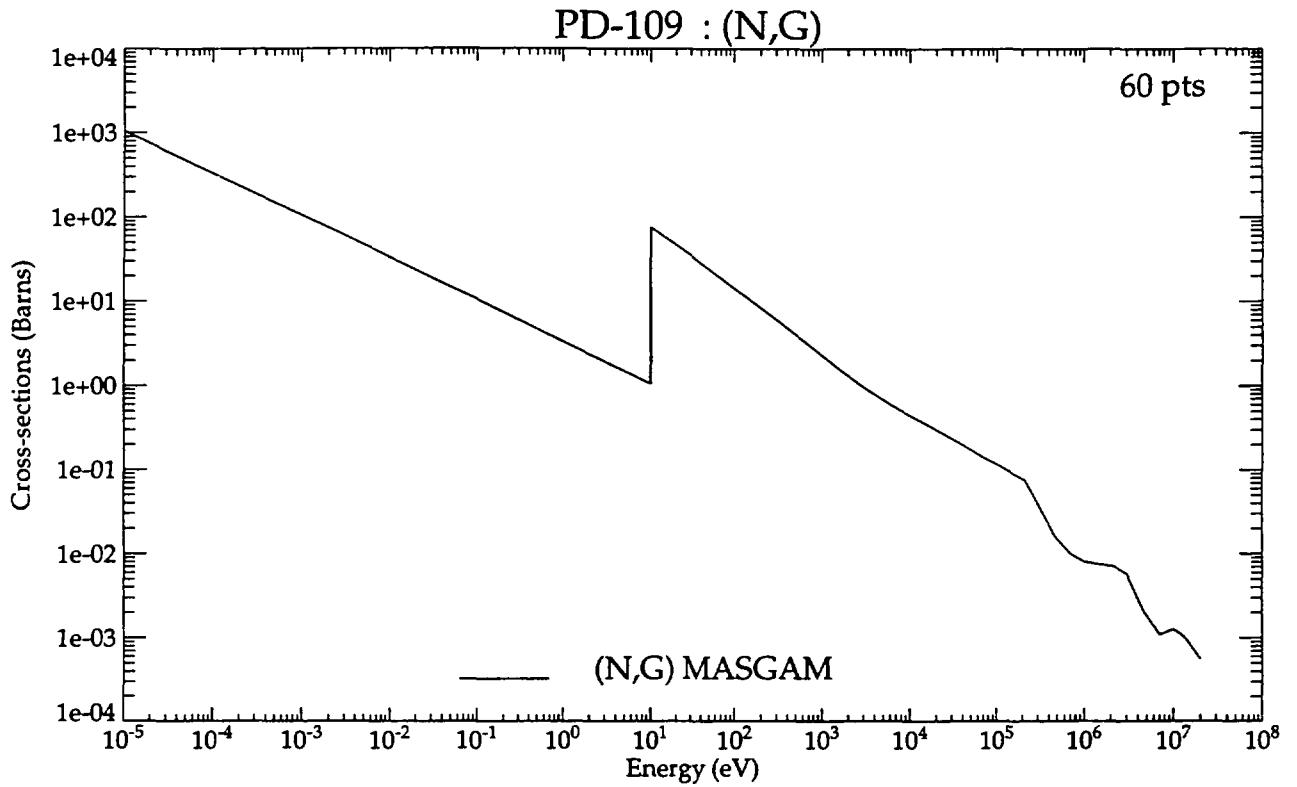




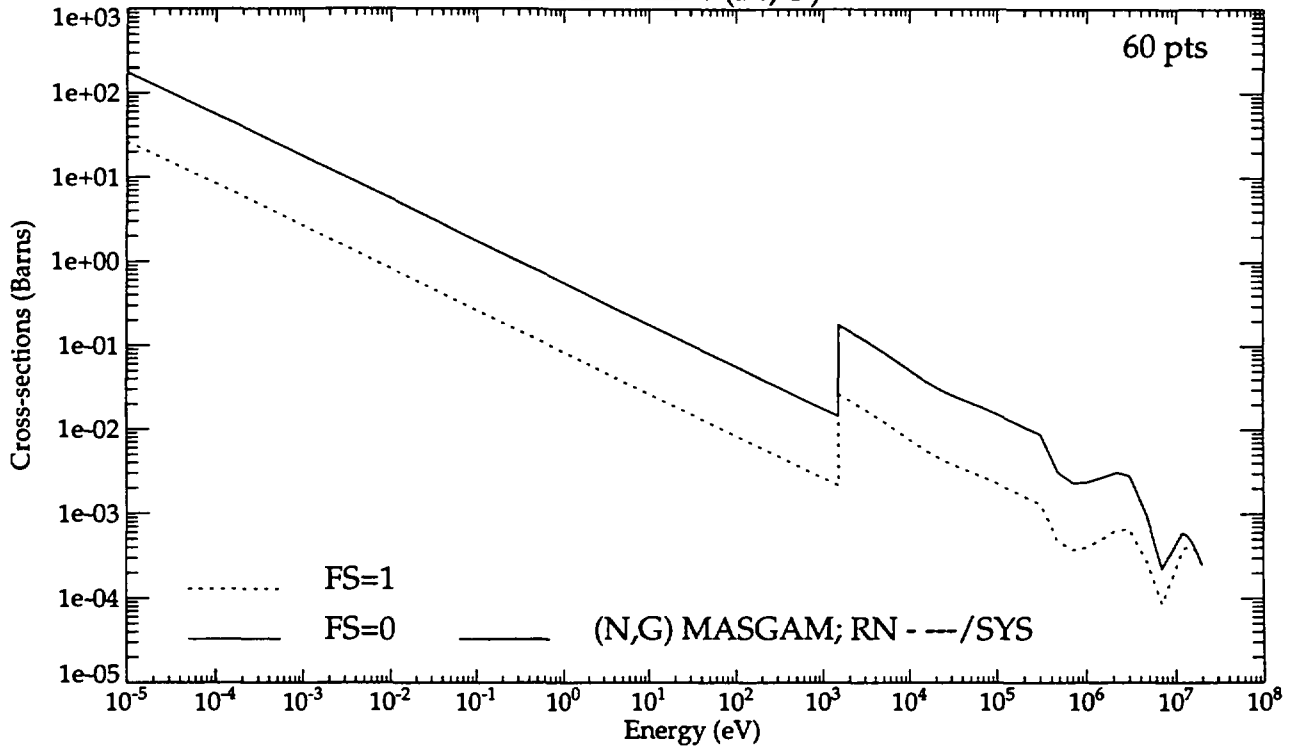




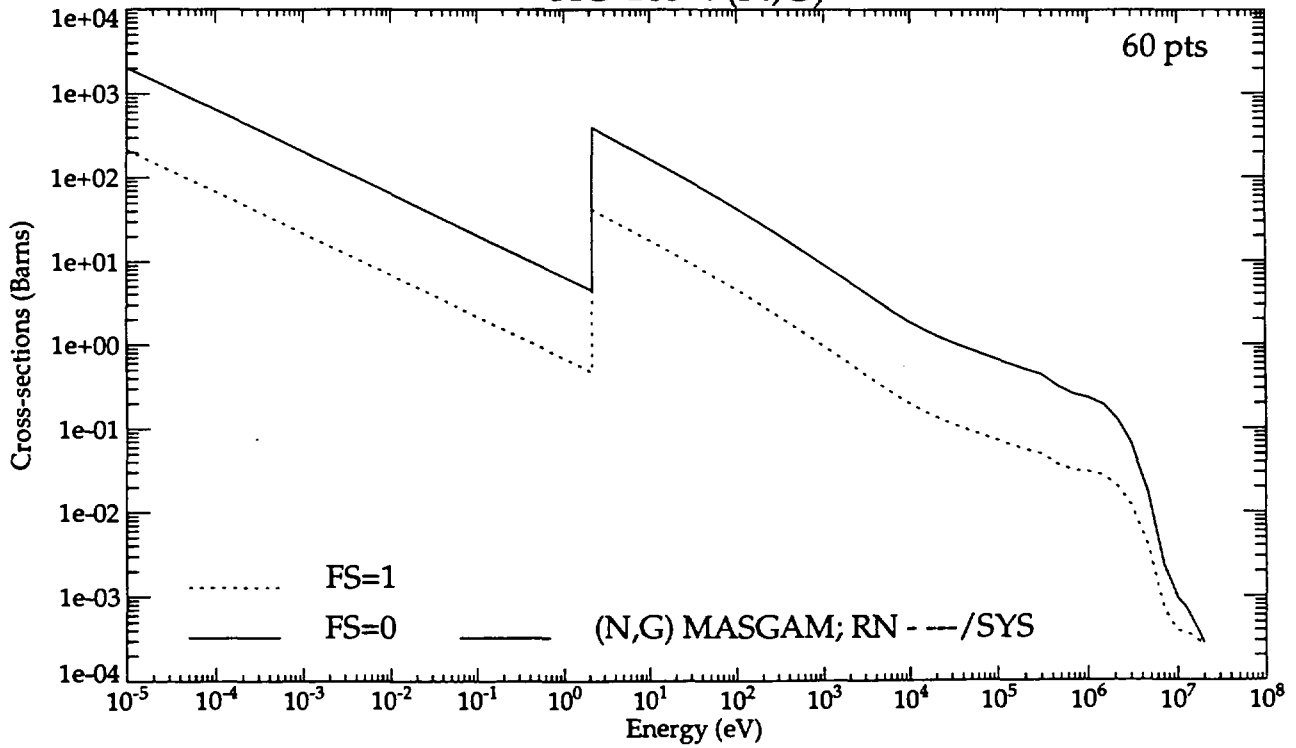




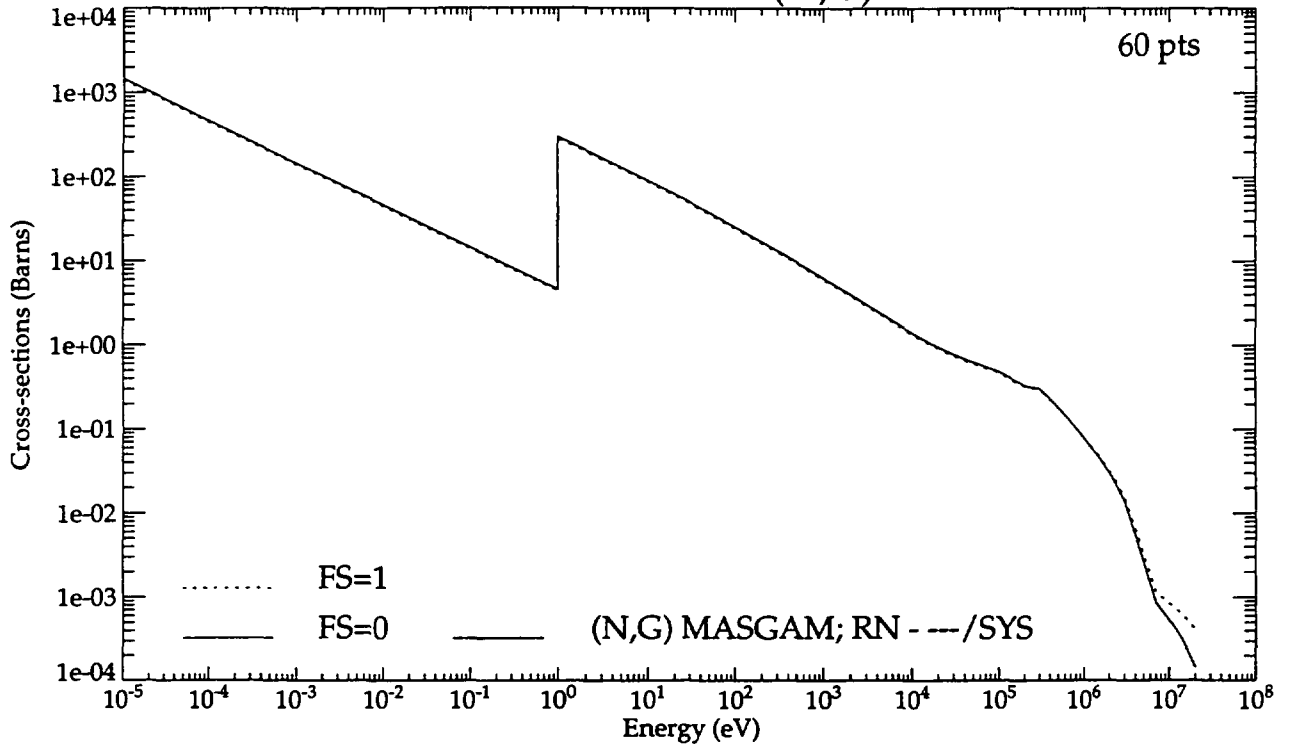
PD-112 : (N,G)



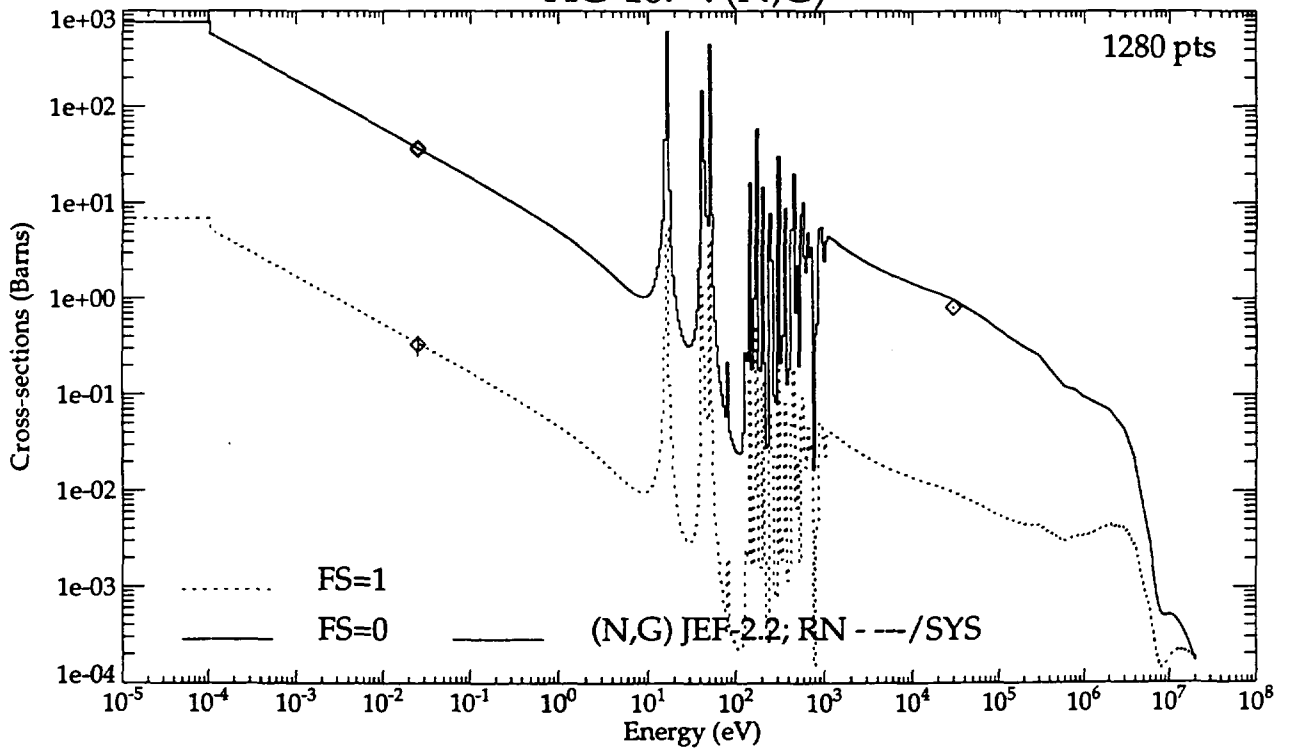
AG-105 : (N,G)



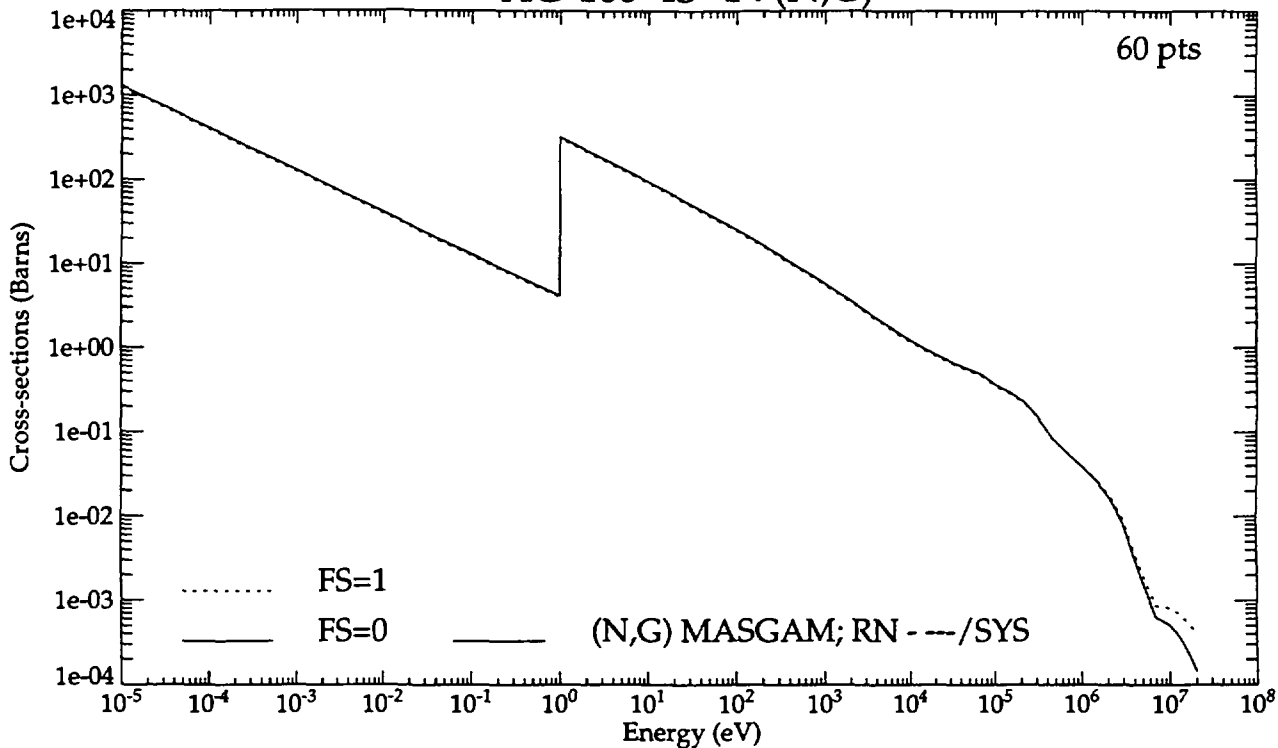
AG-106 -IS=1 : (N,G)



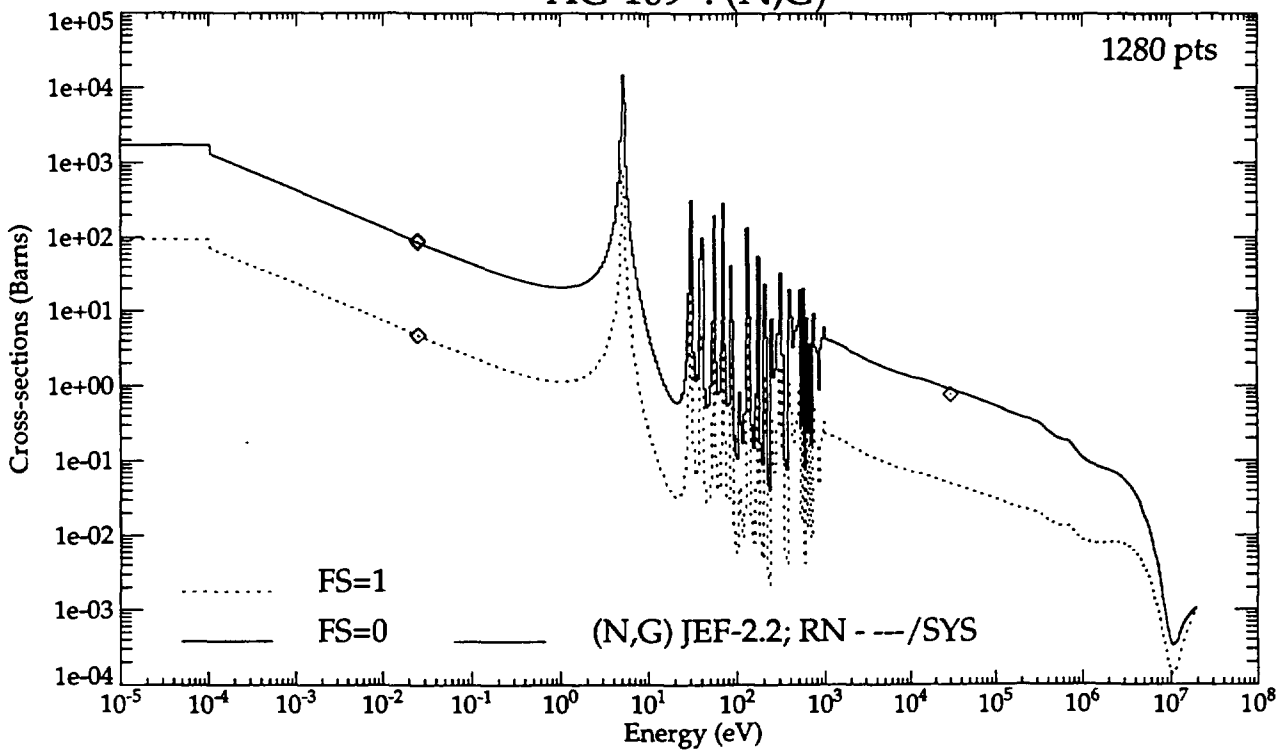
AG-107 : (N,G)

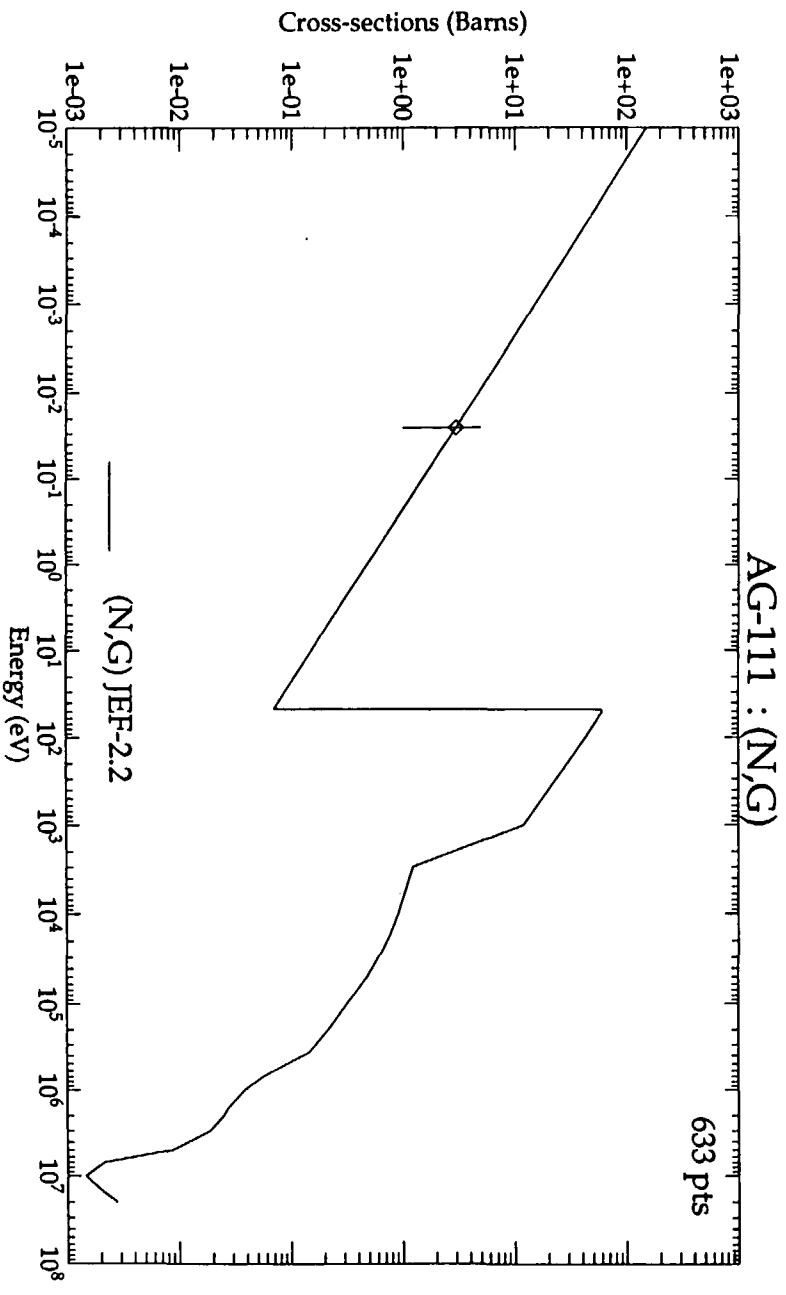
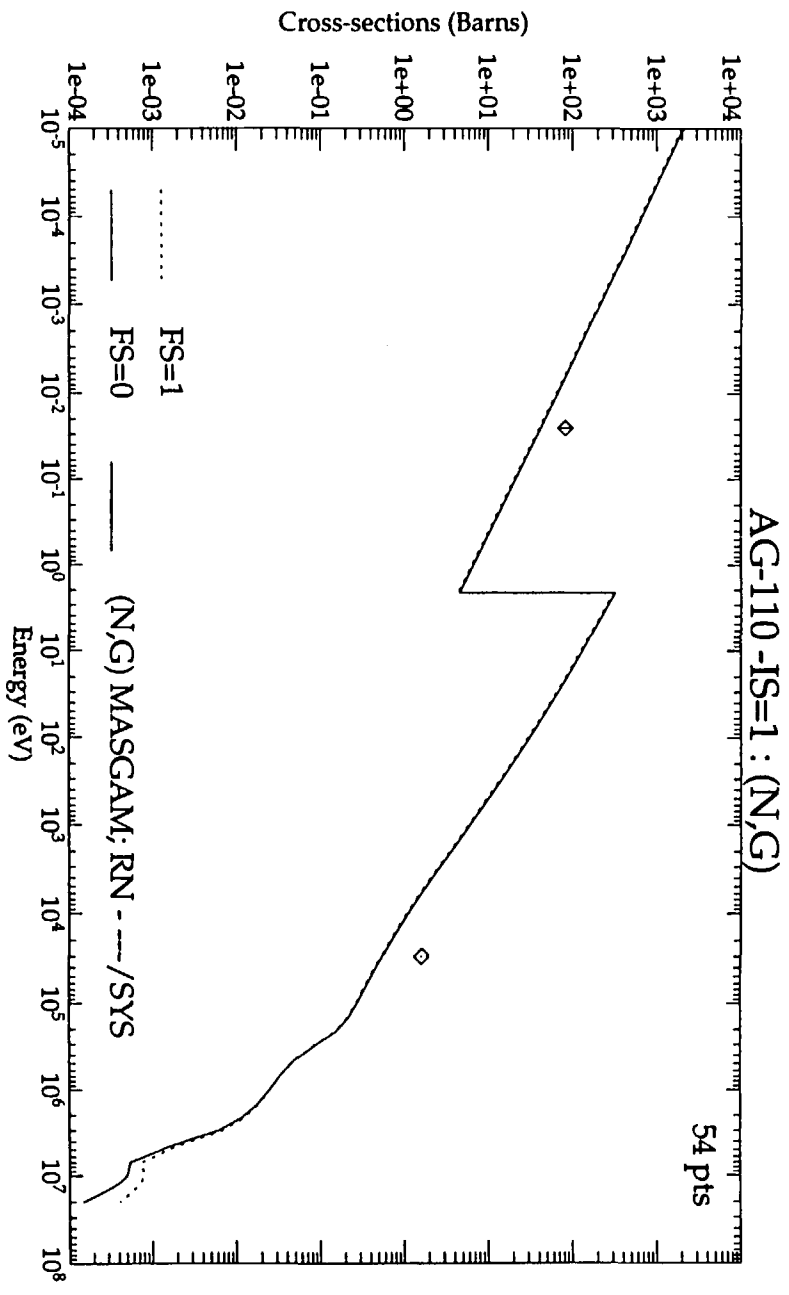


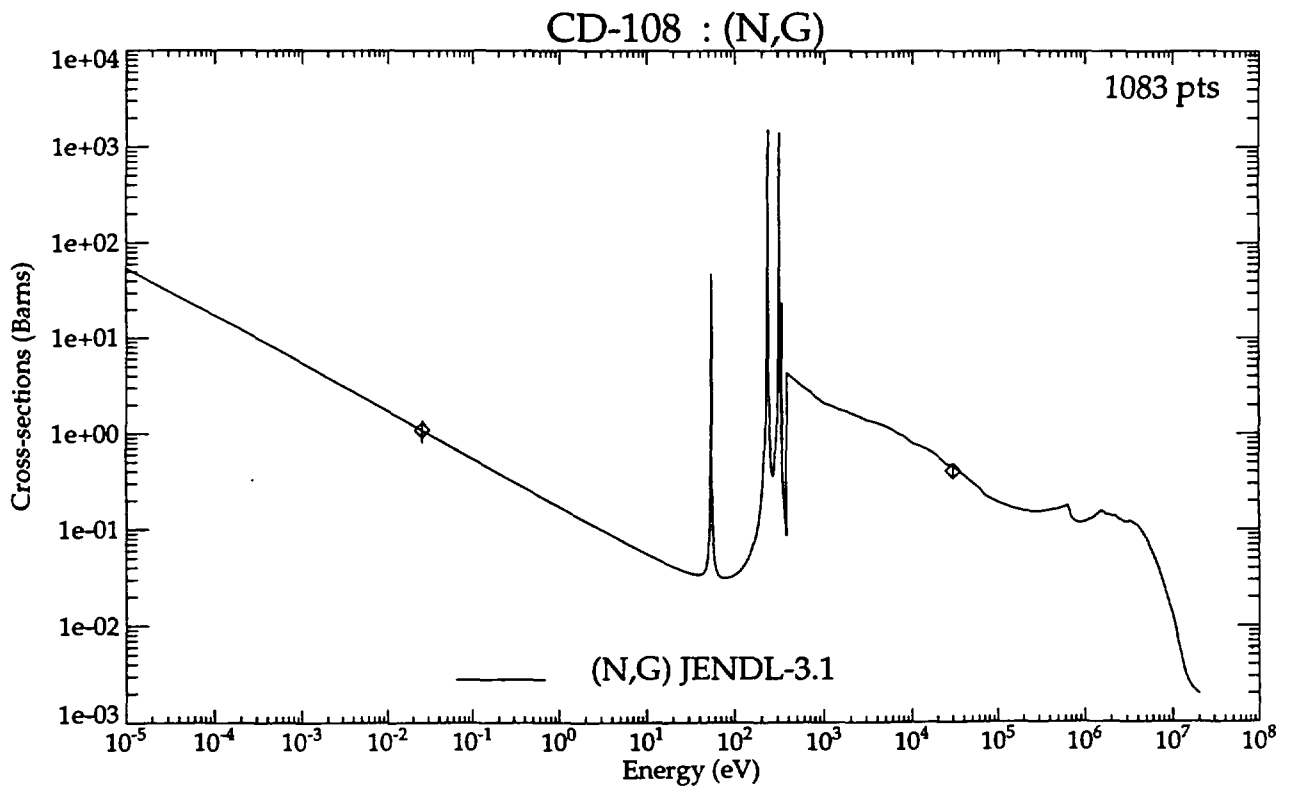
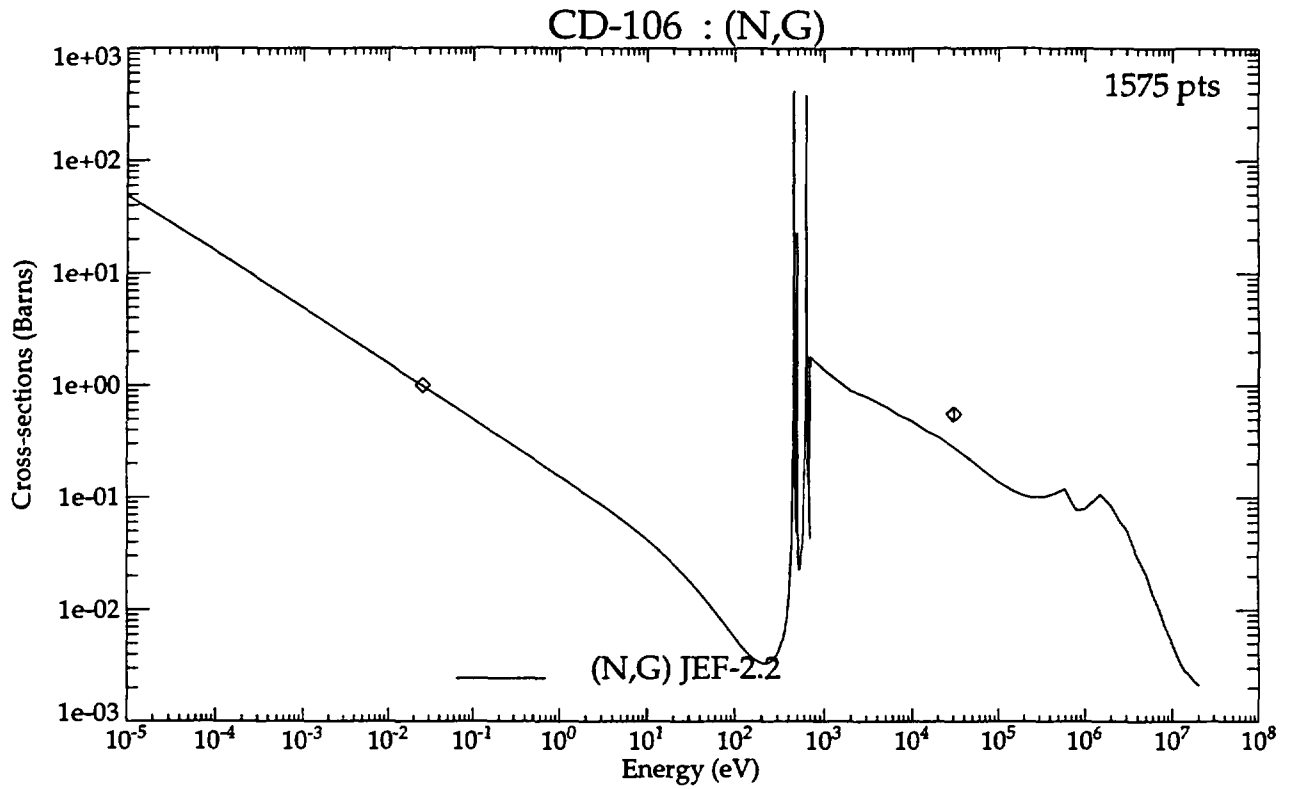
AG-108 -IS=1 : (N,G)

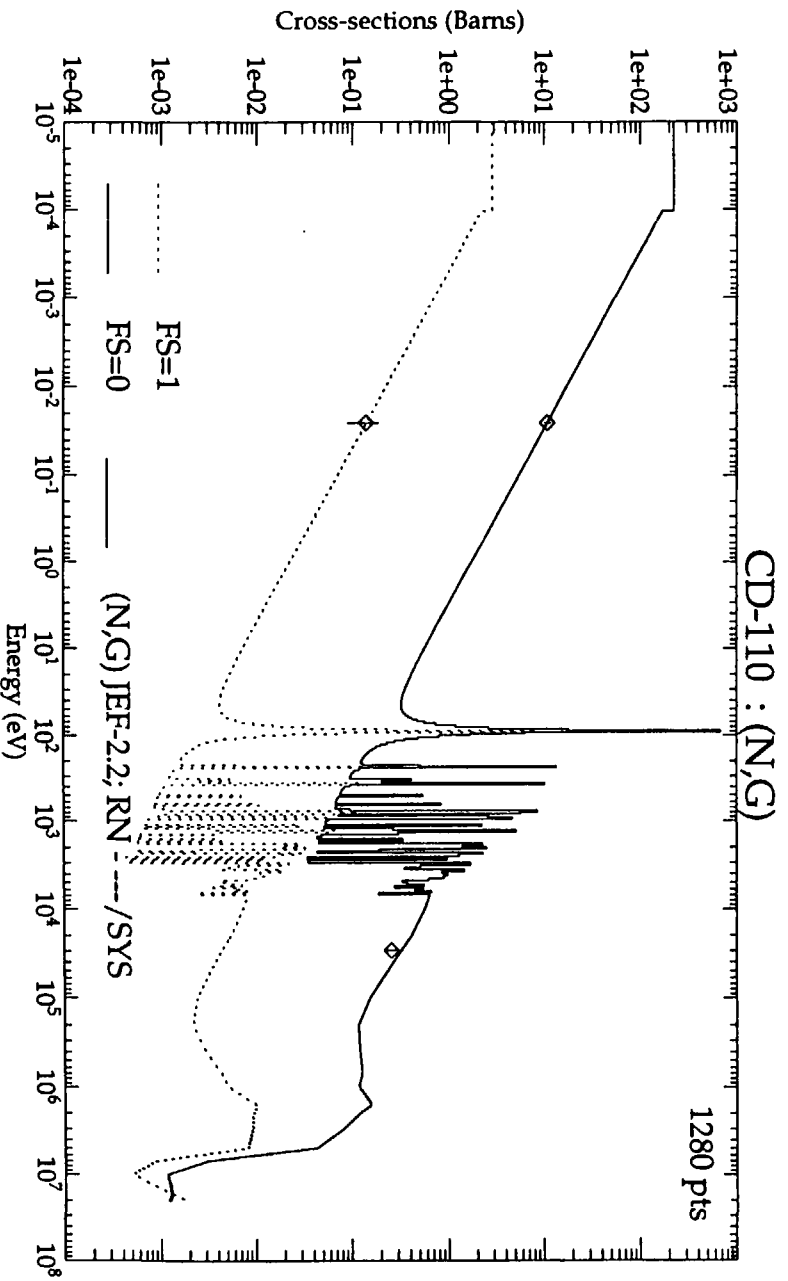
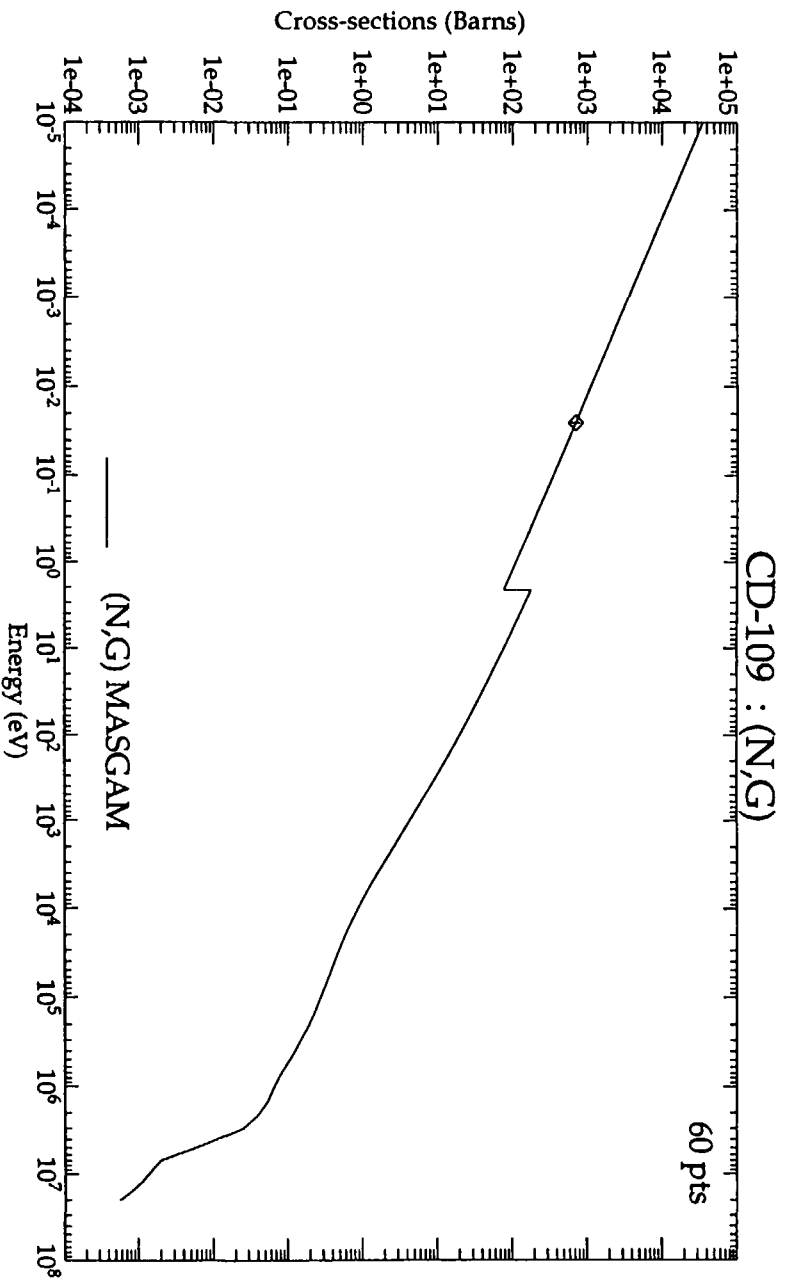


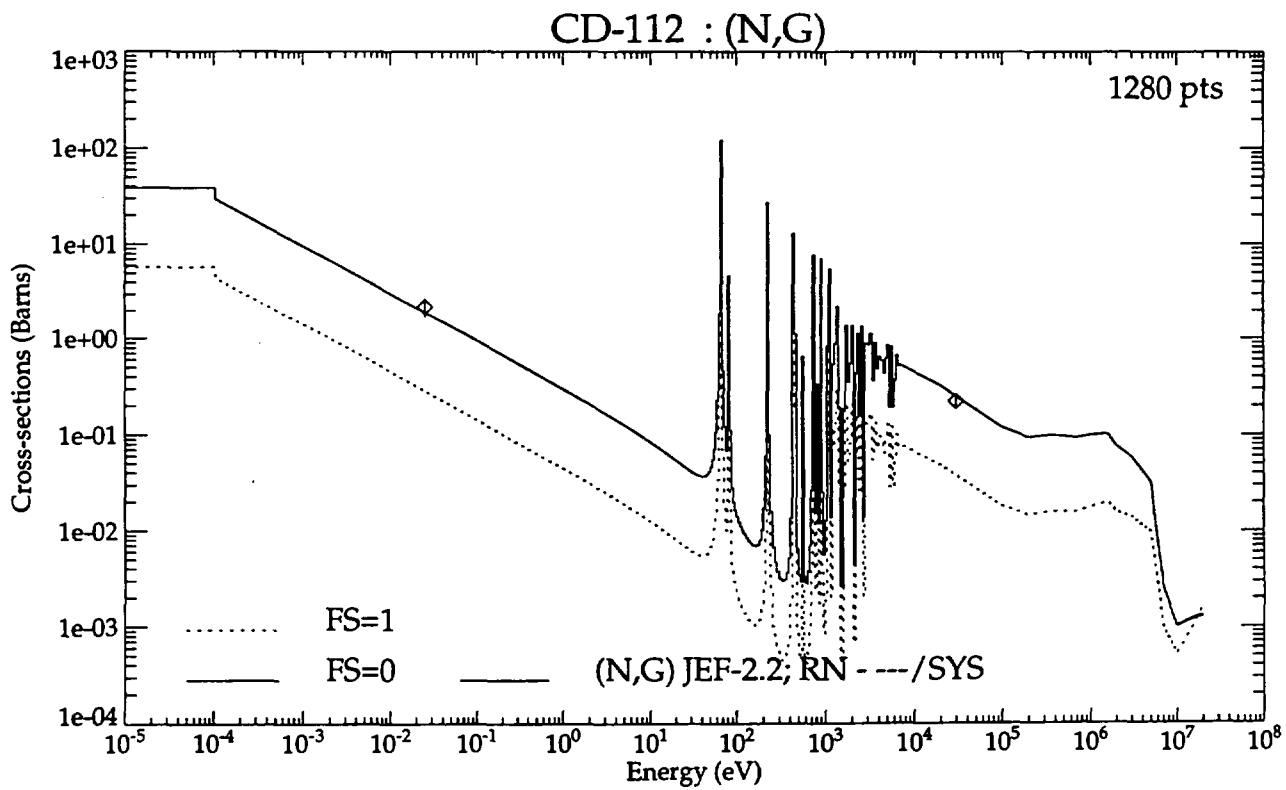
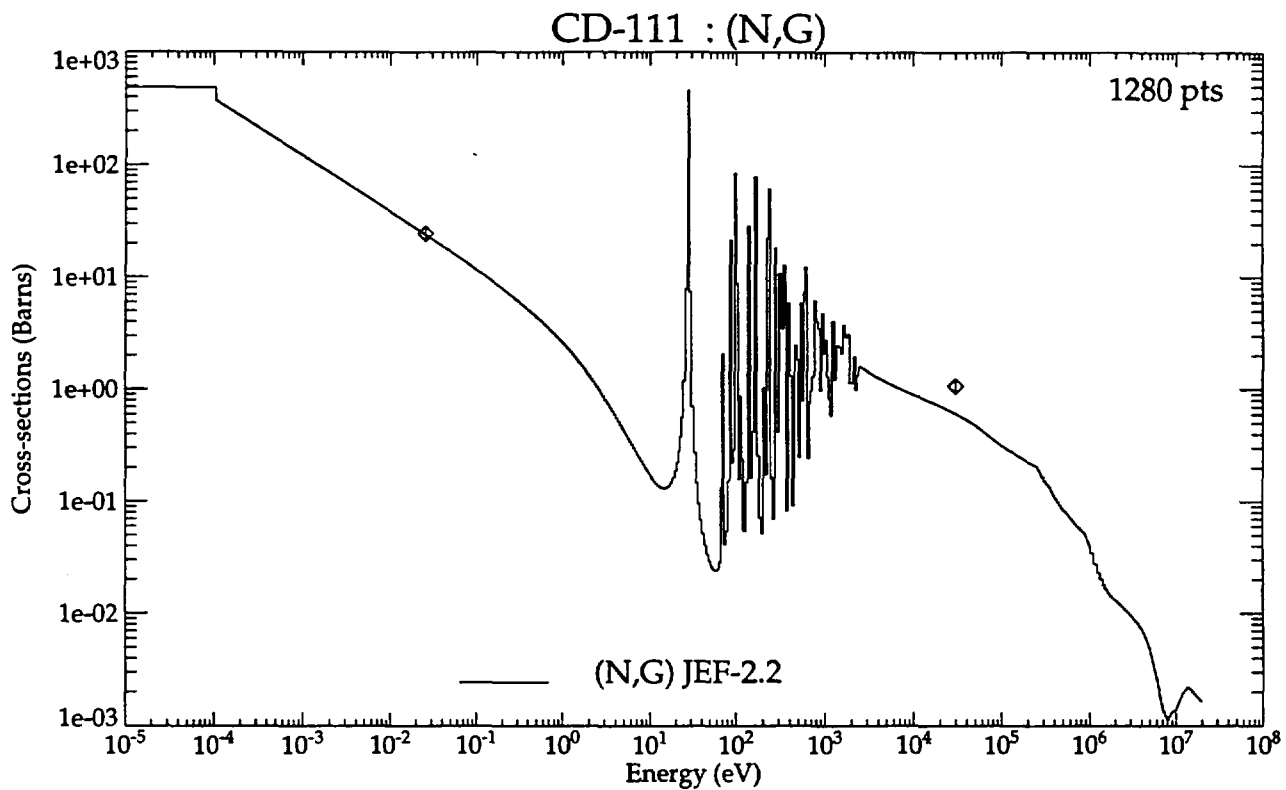
AG-109 : (N,G)

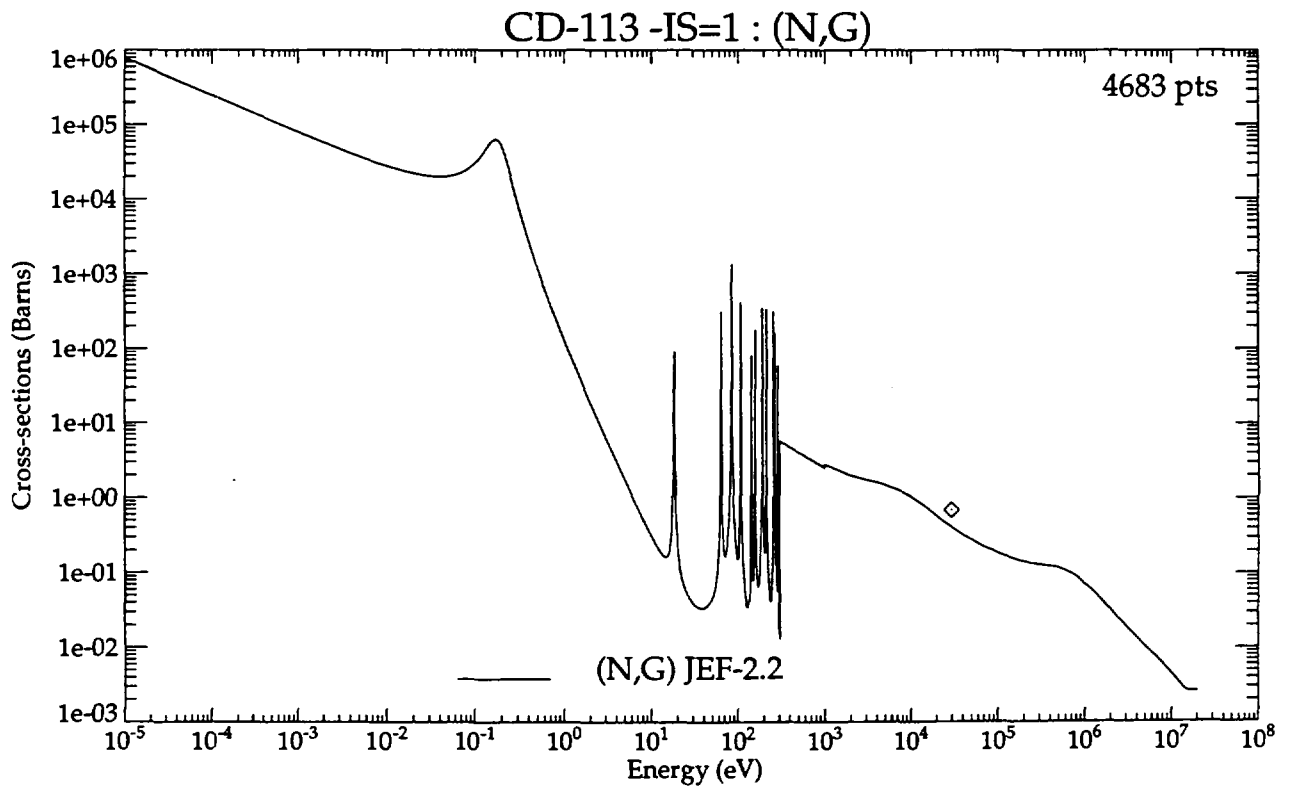
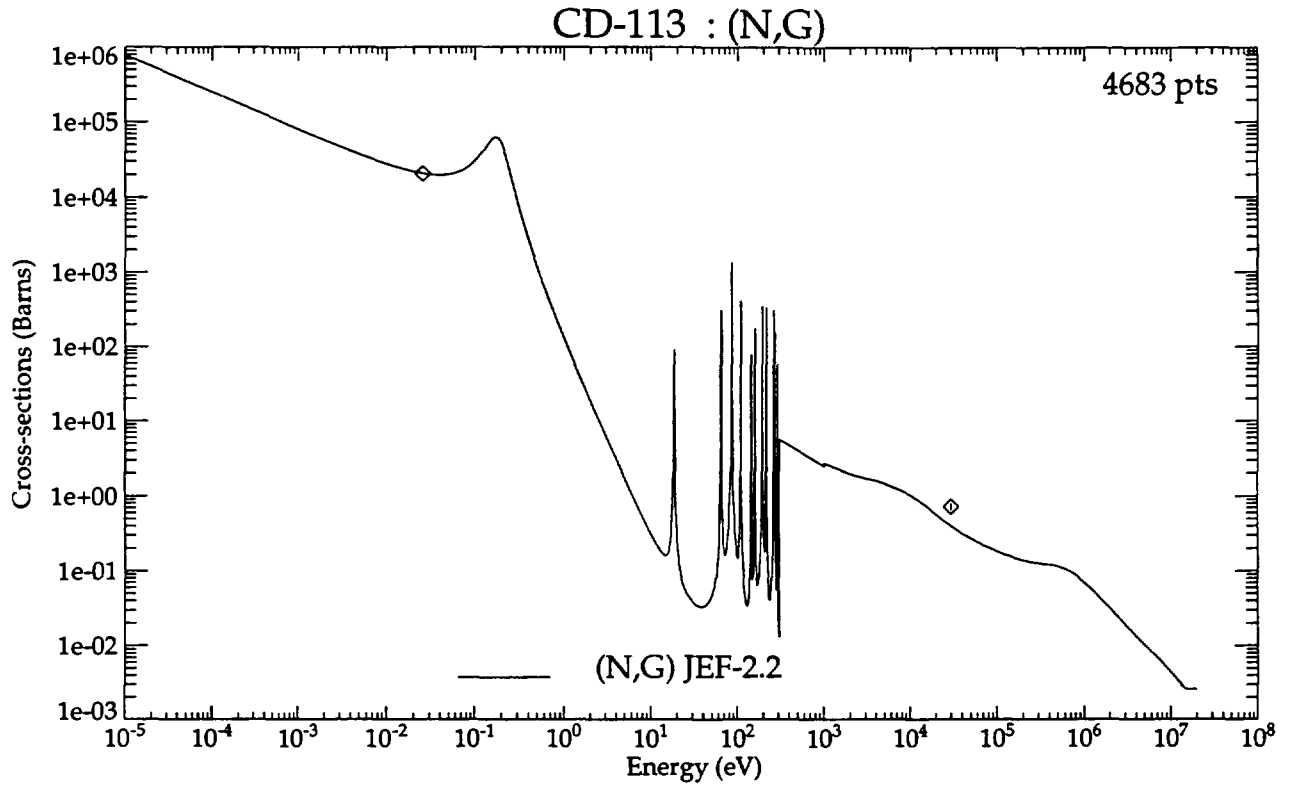


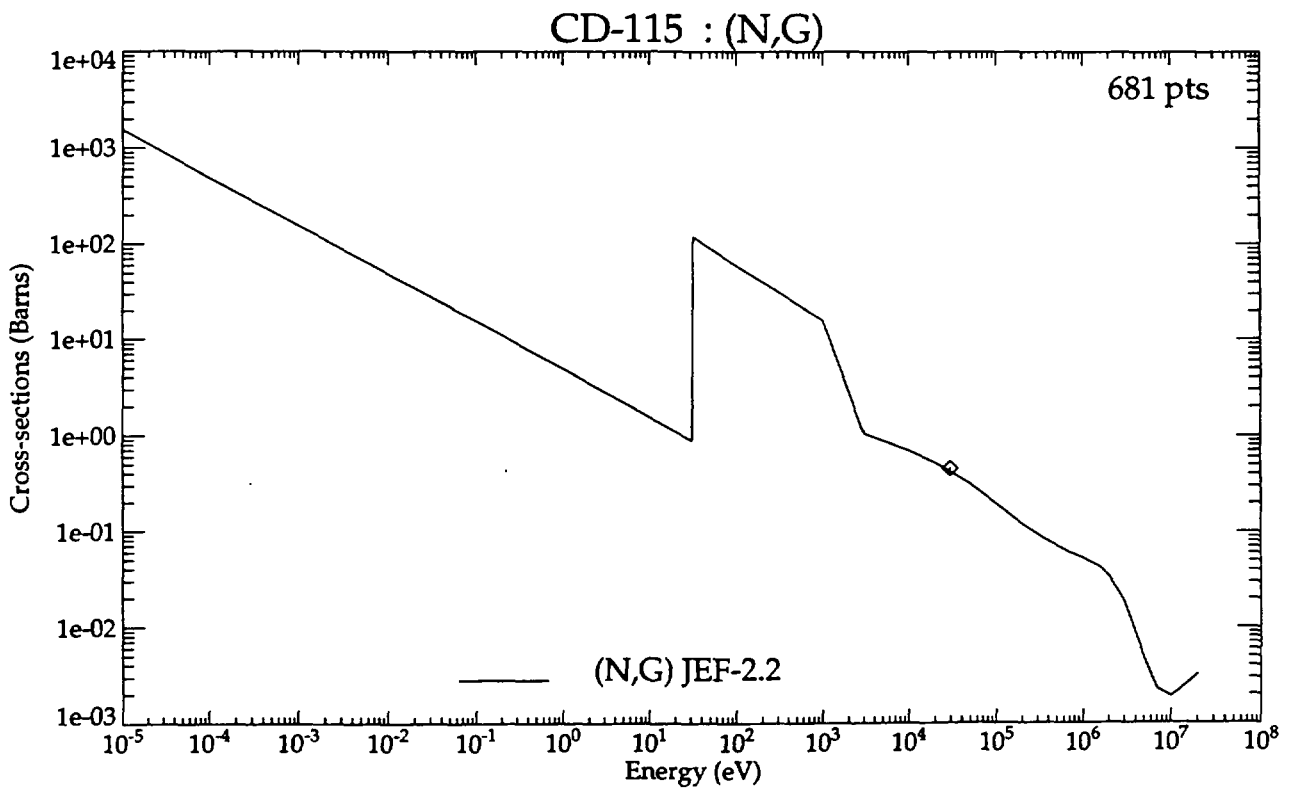
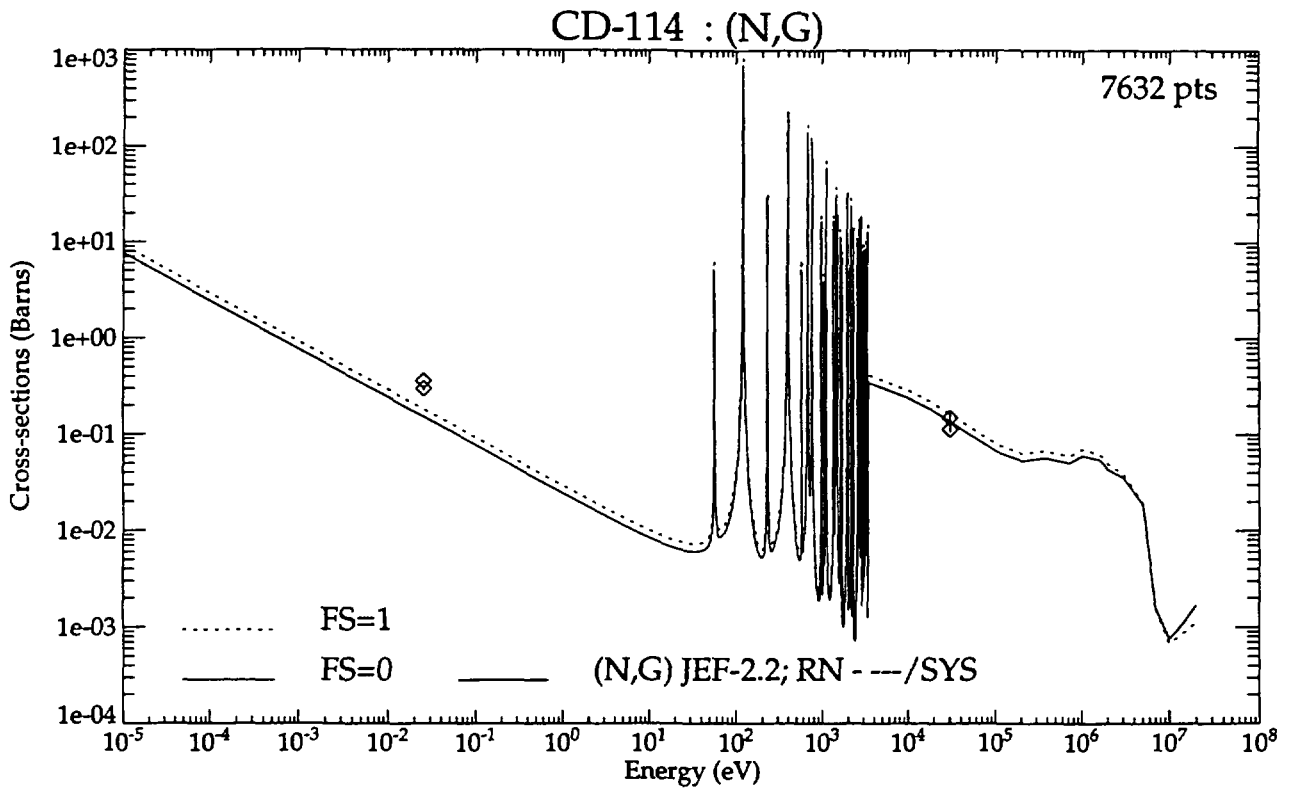


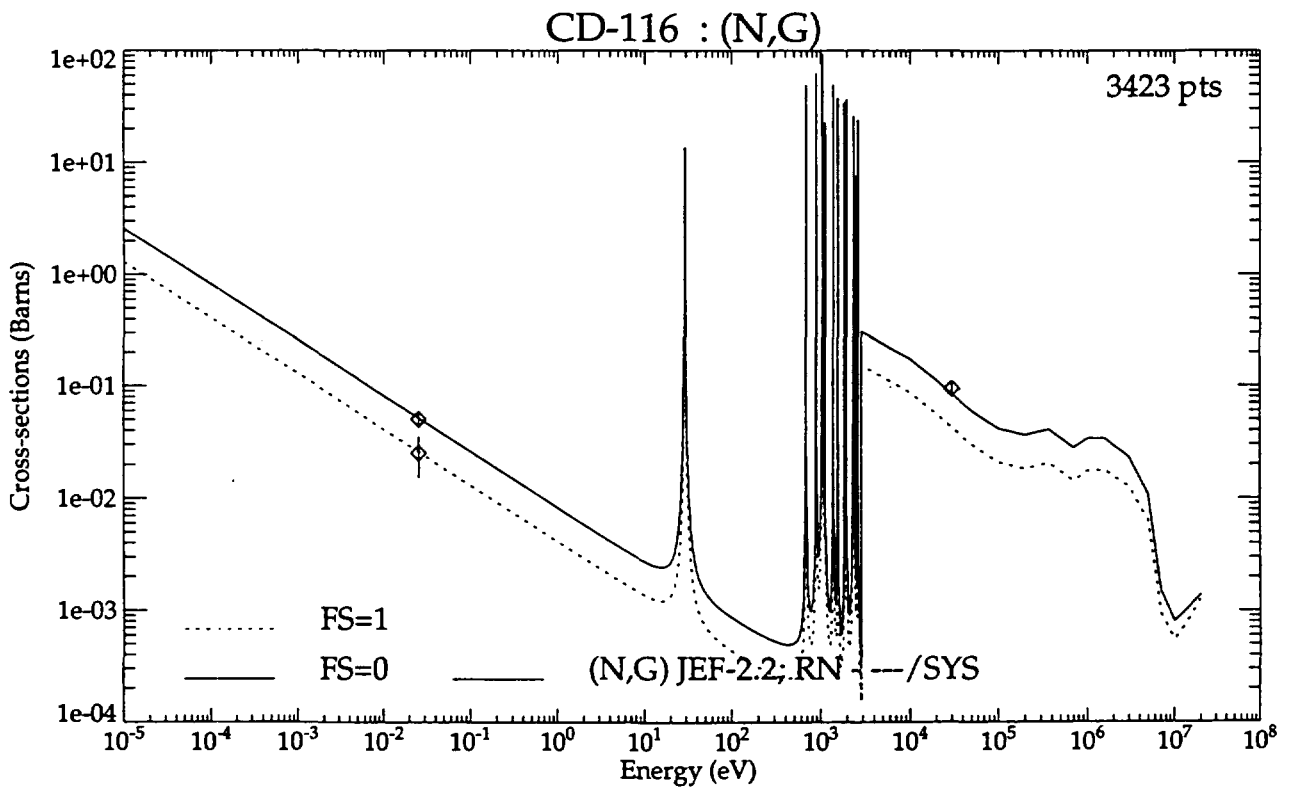
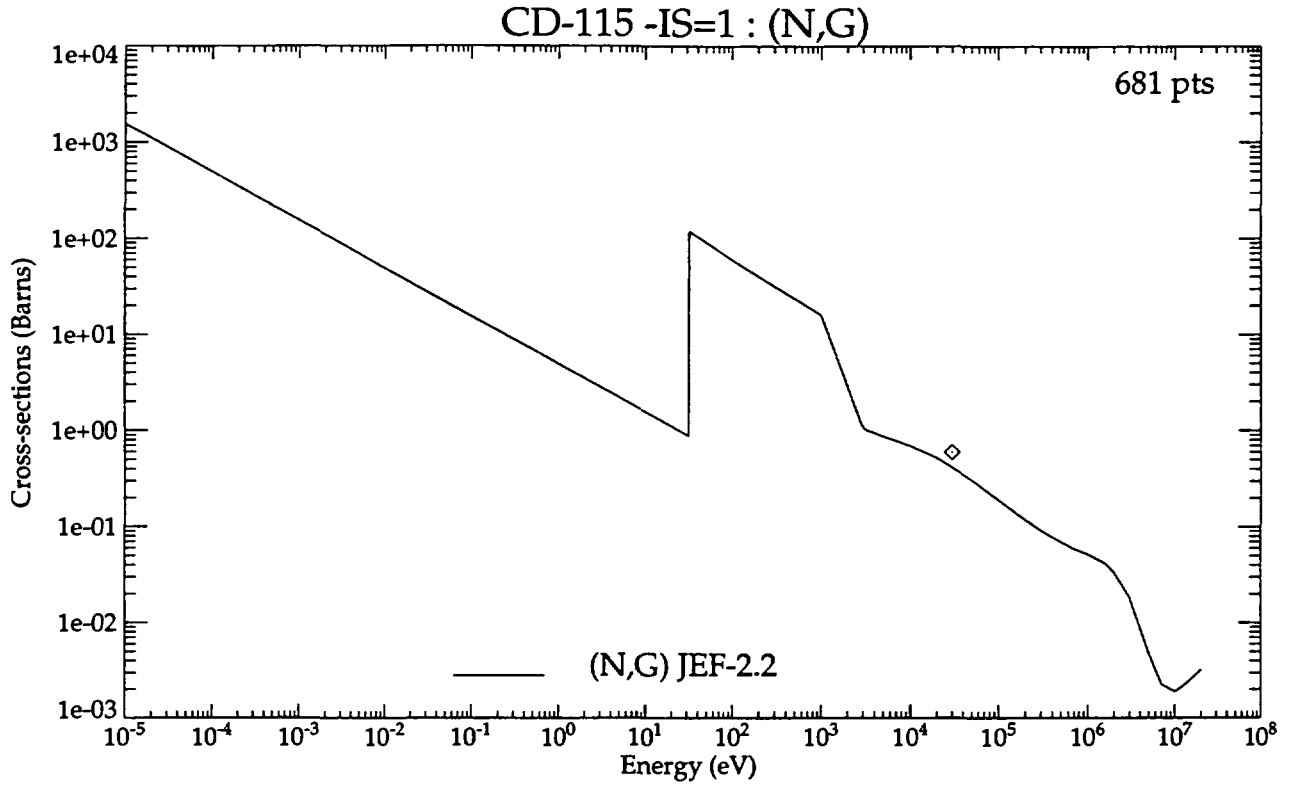


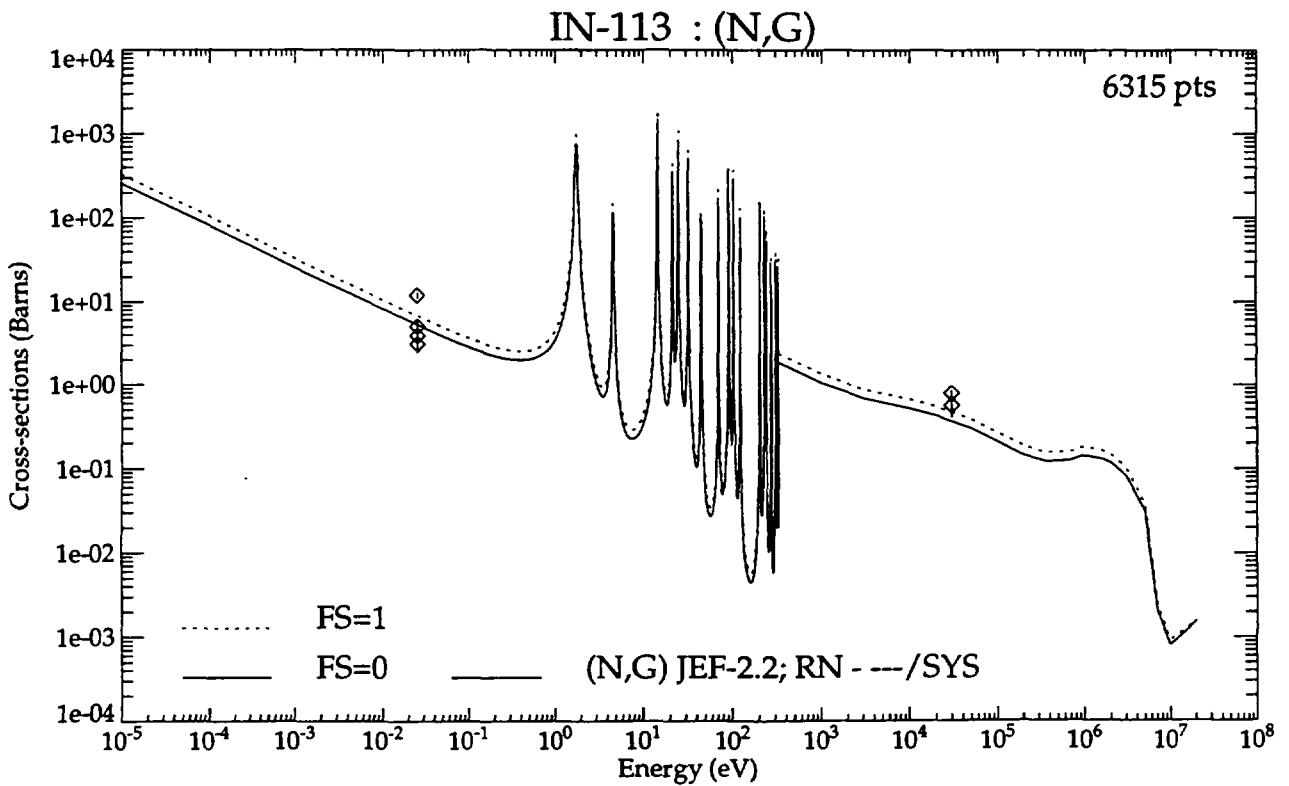
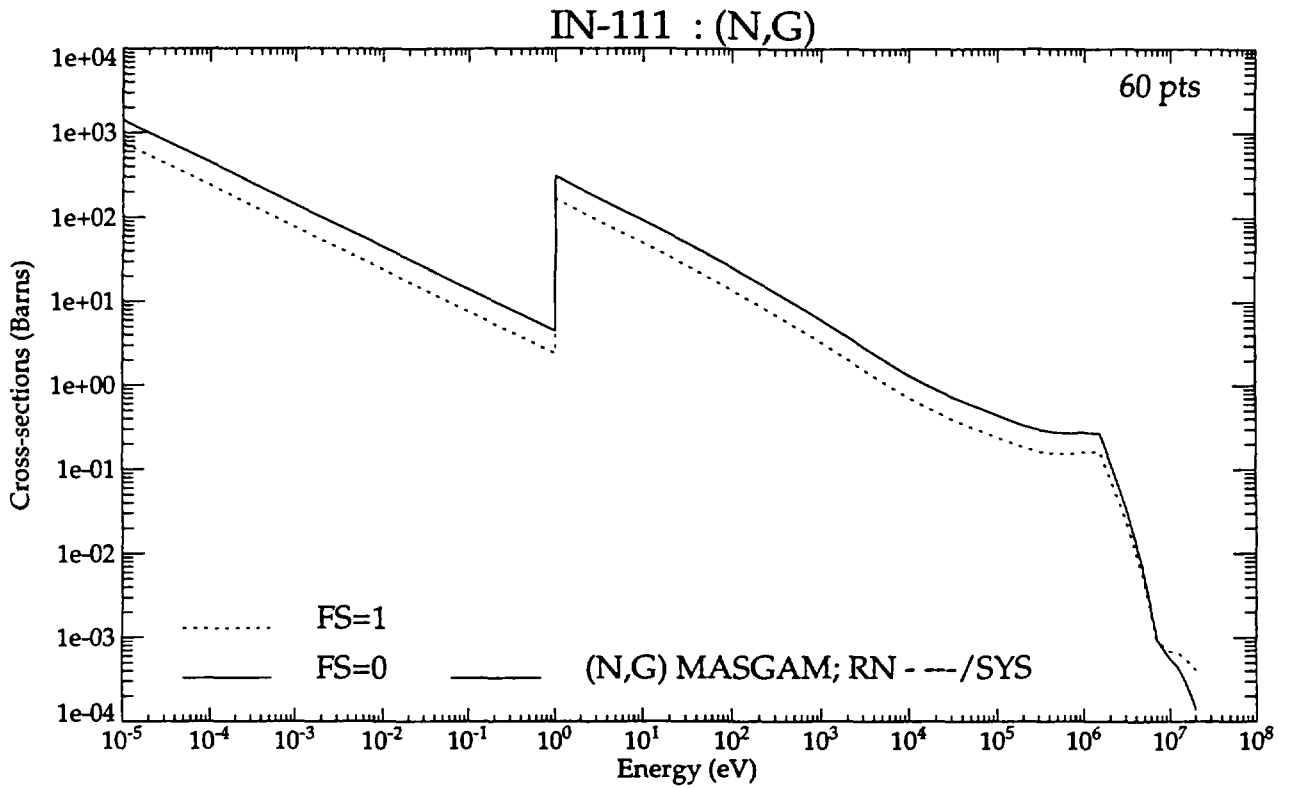


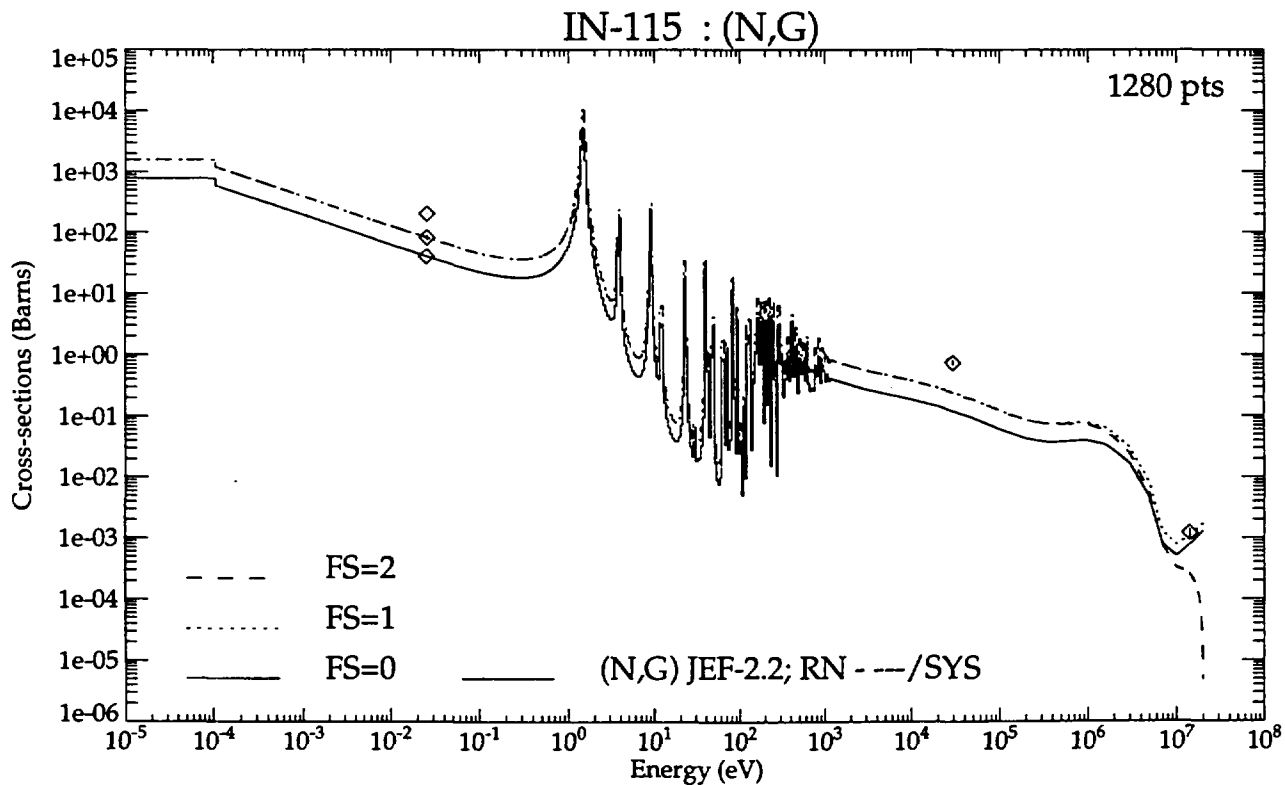
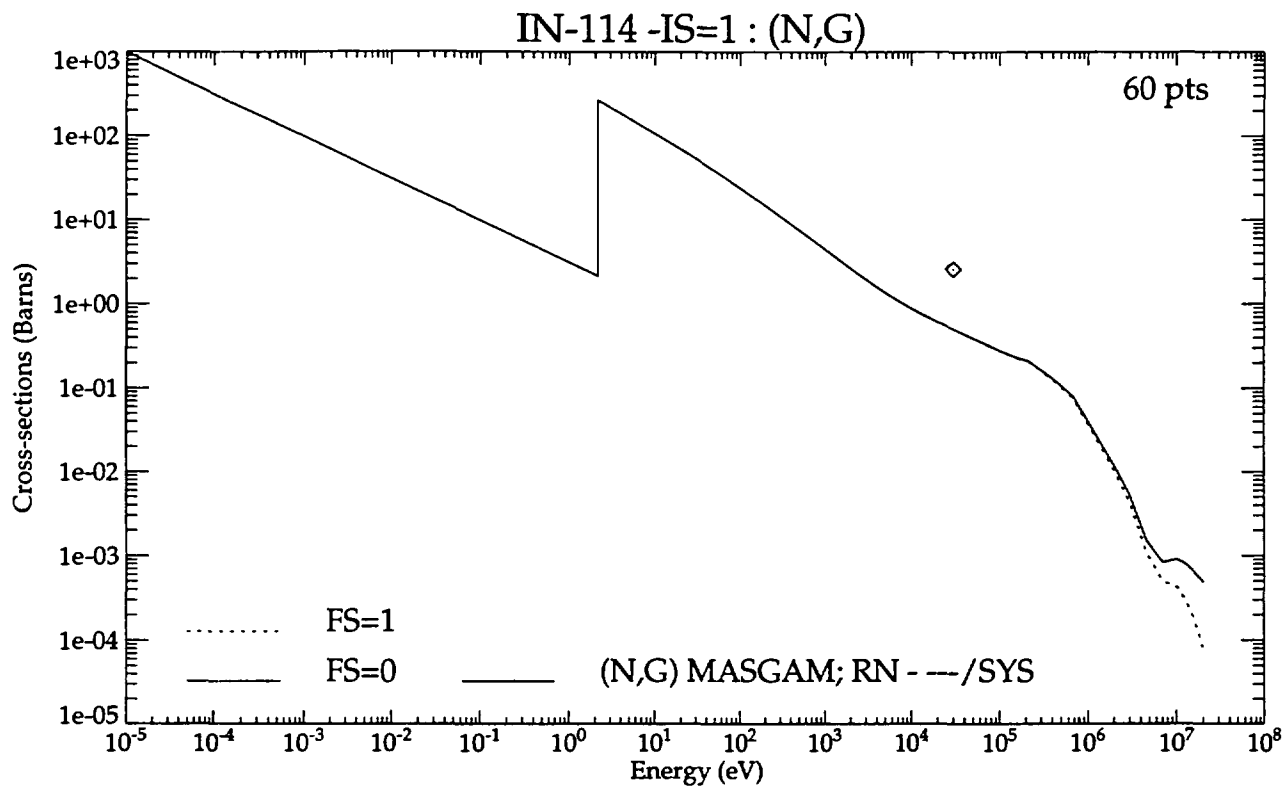


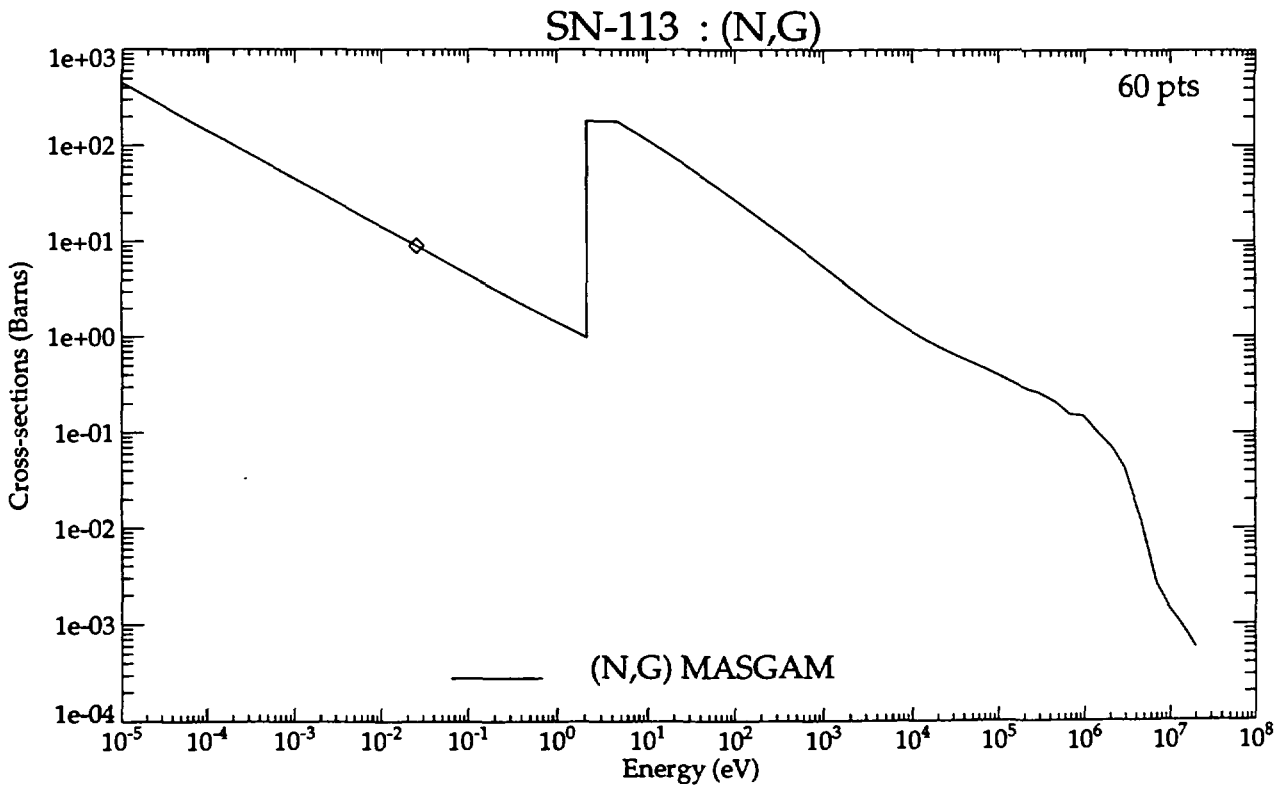
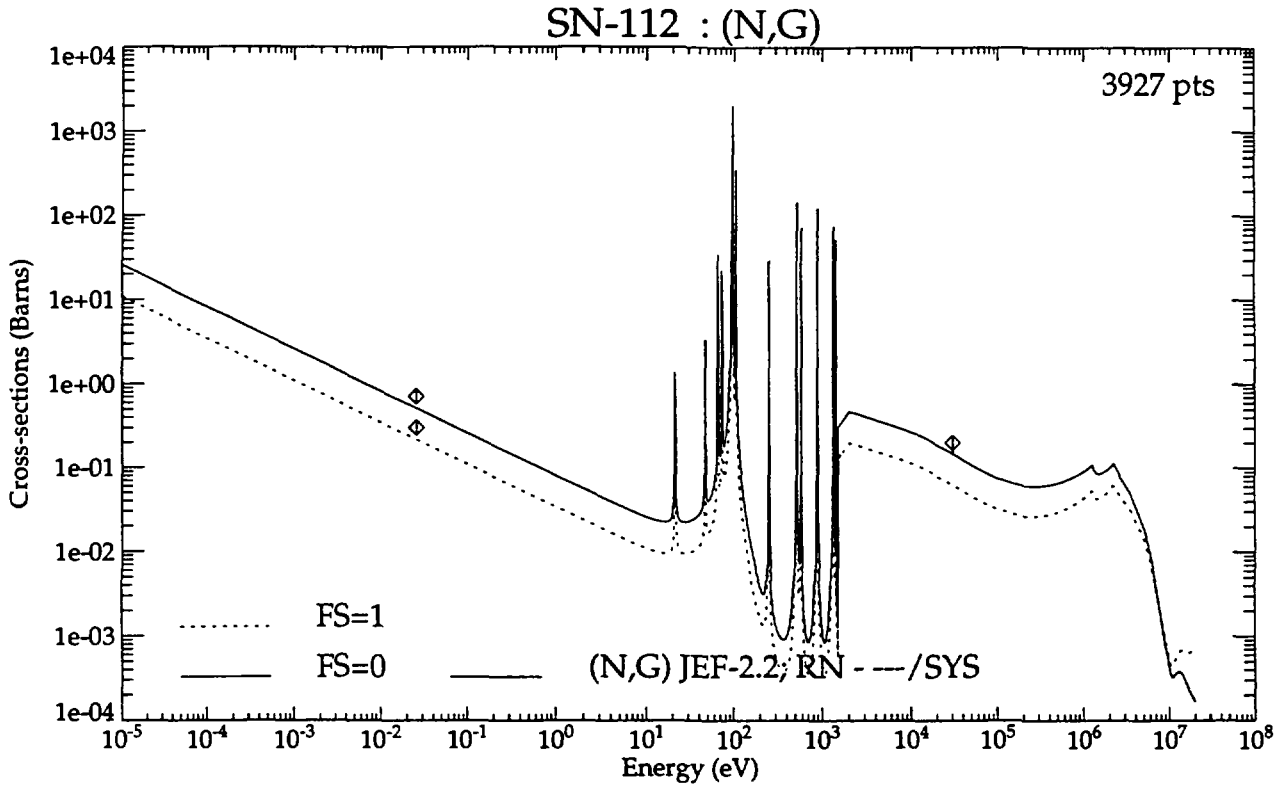


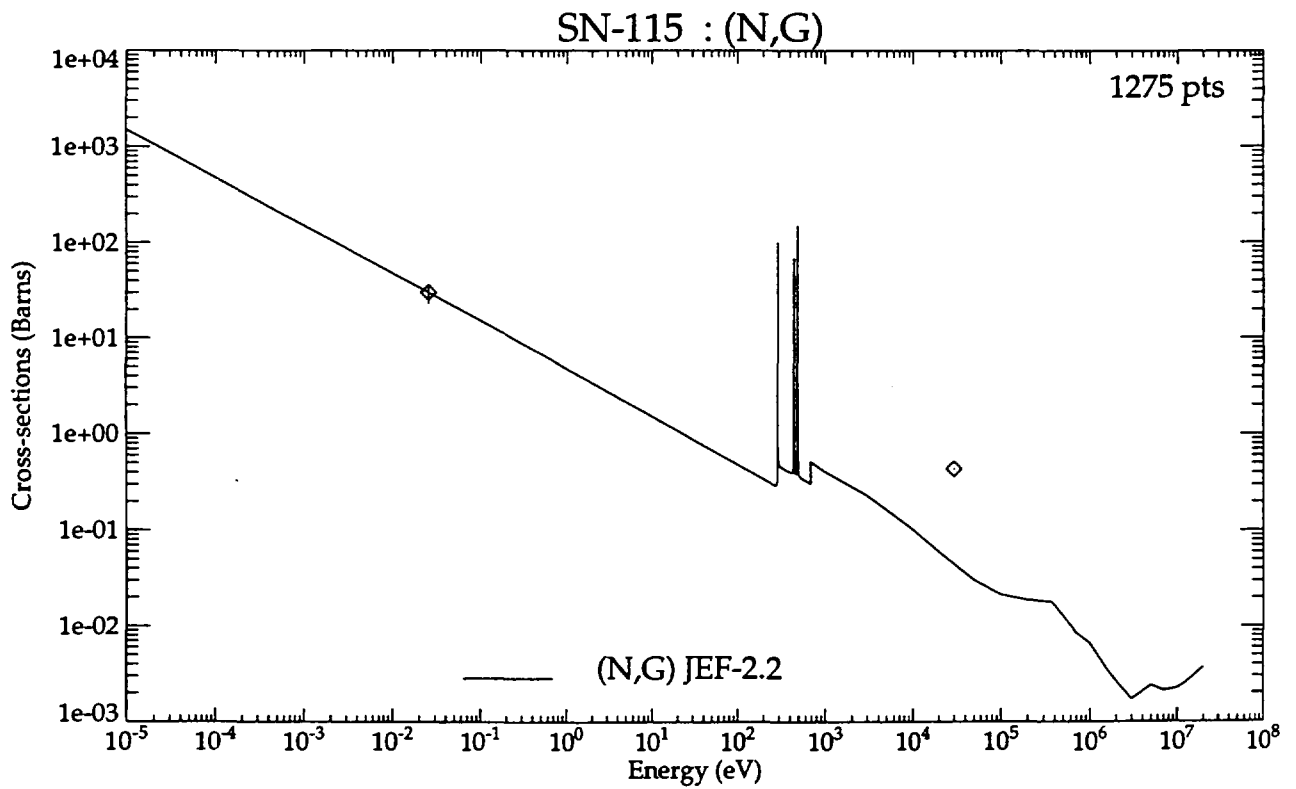
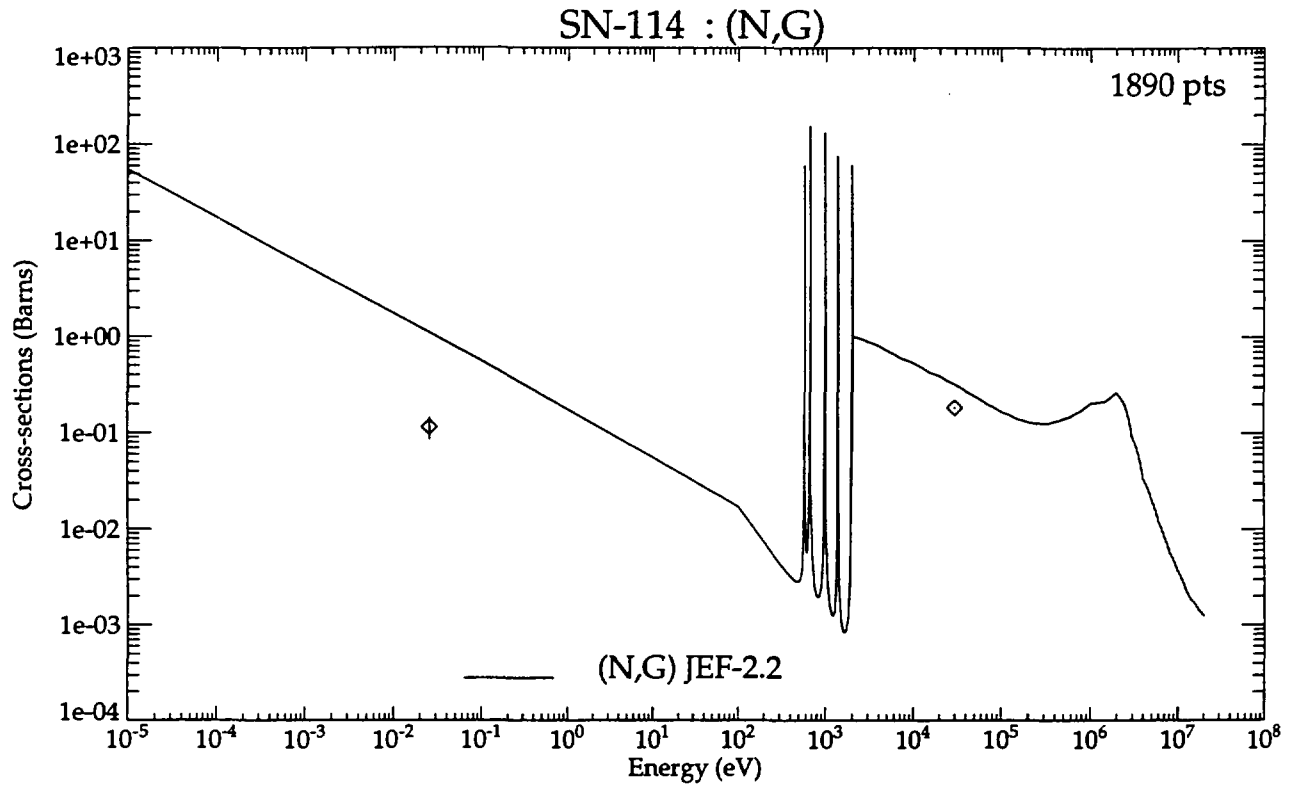




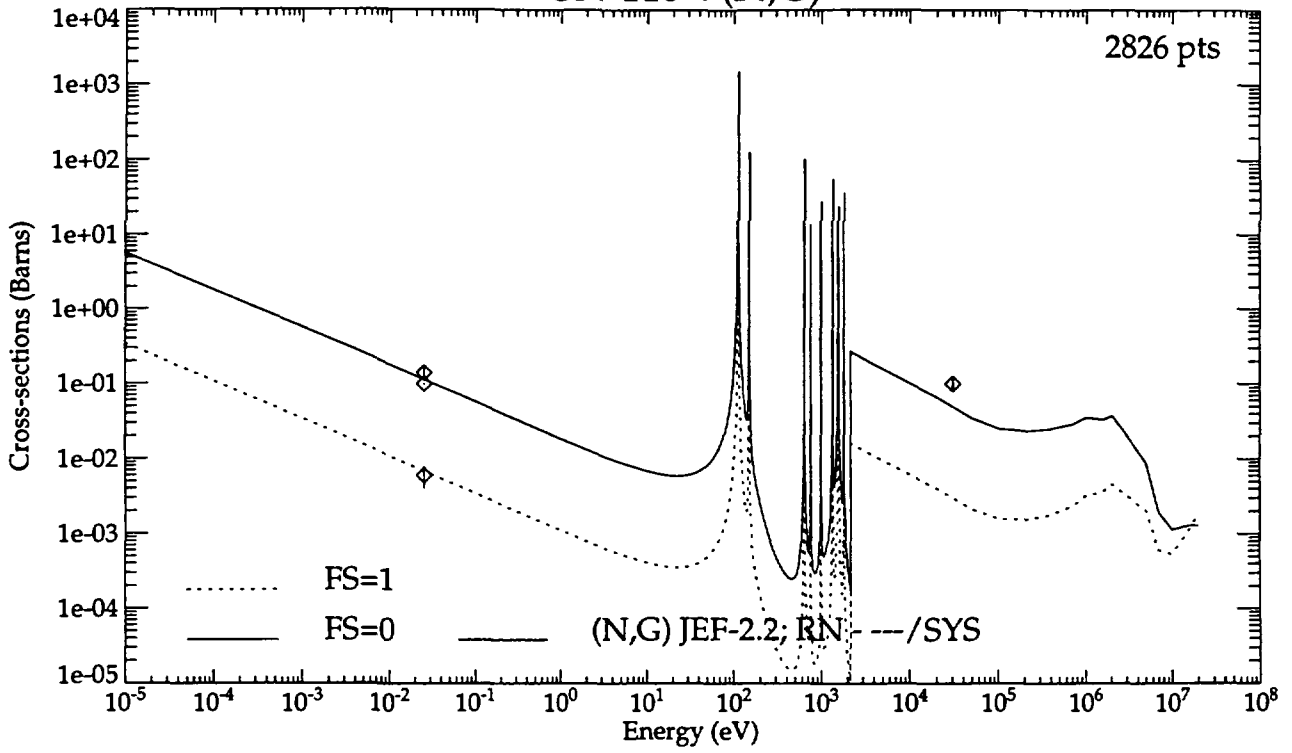




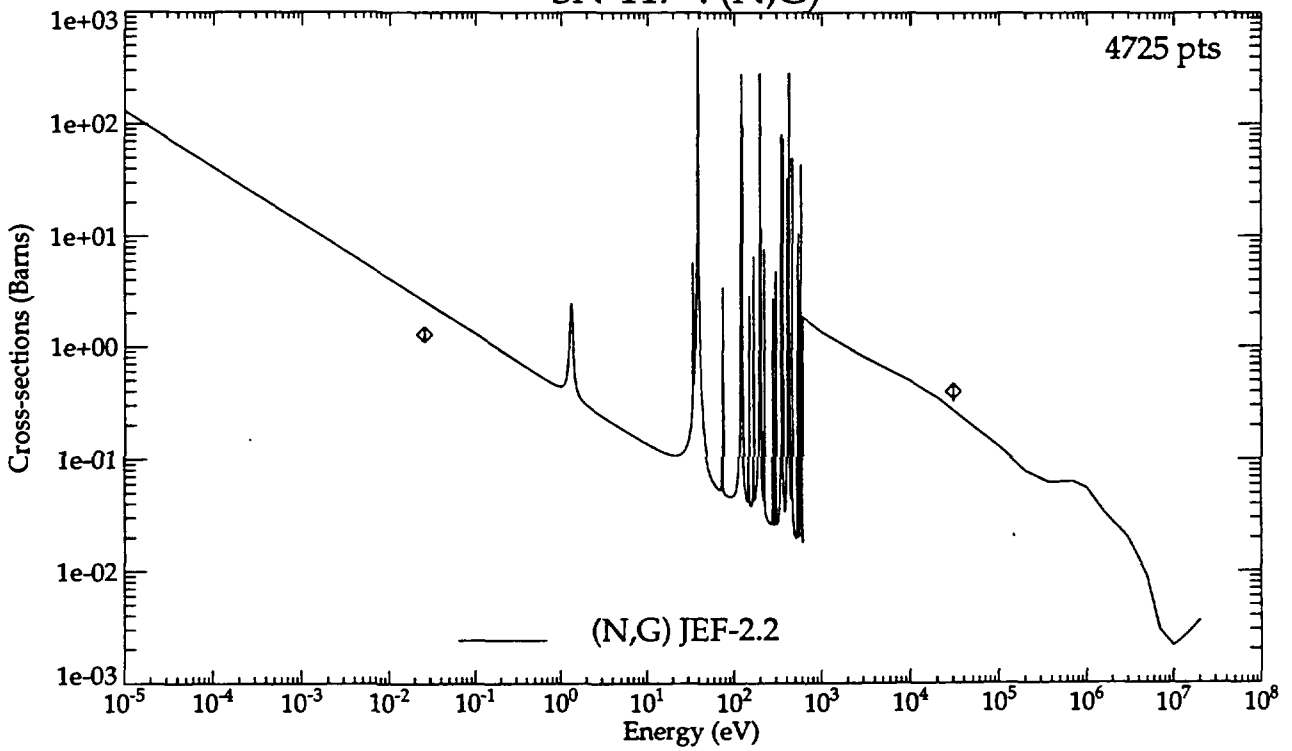


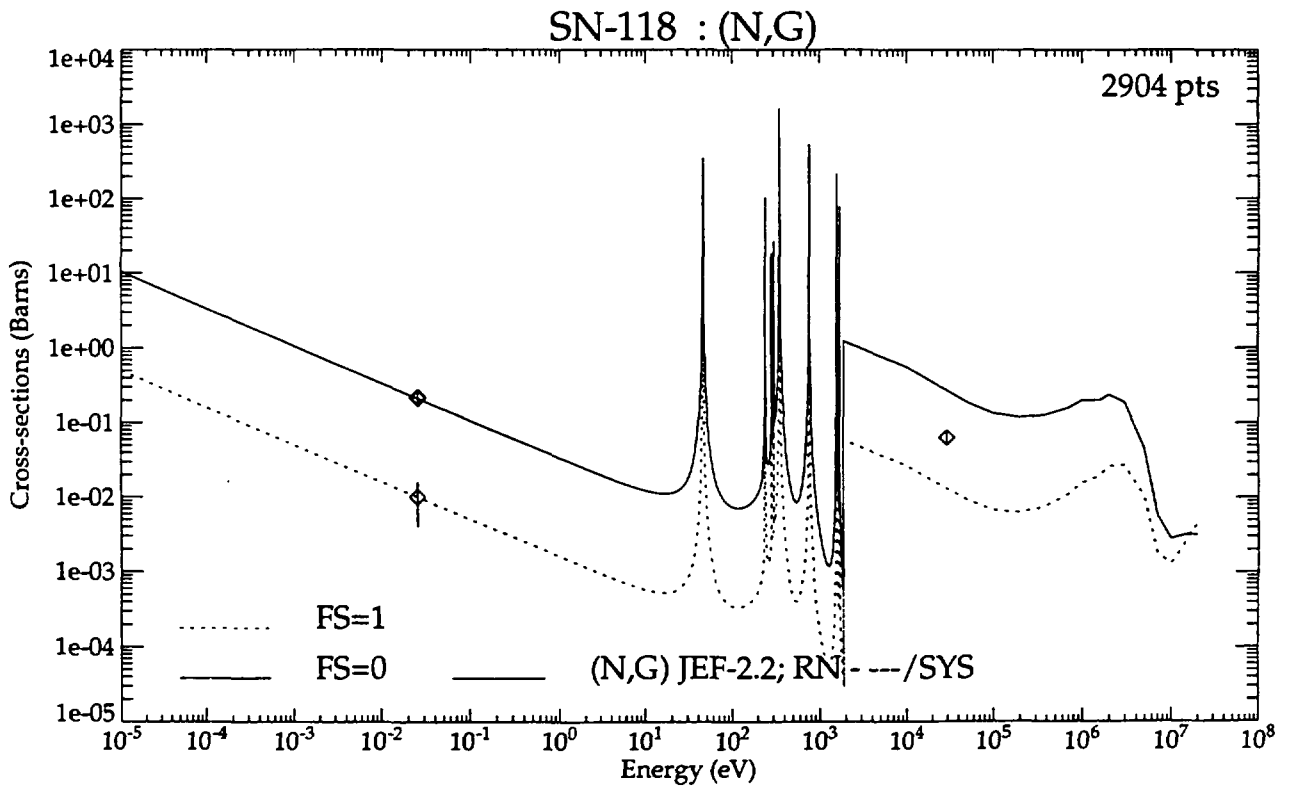
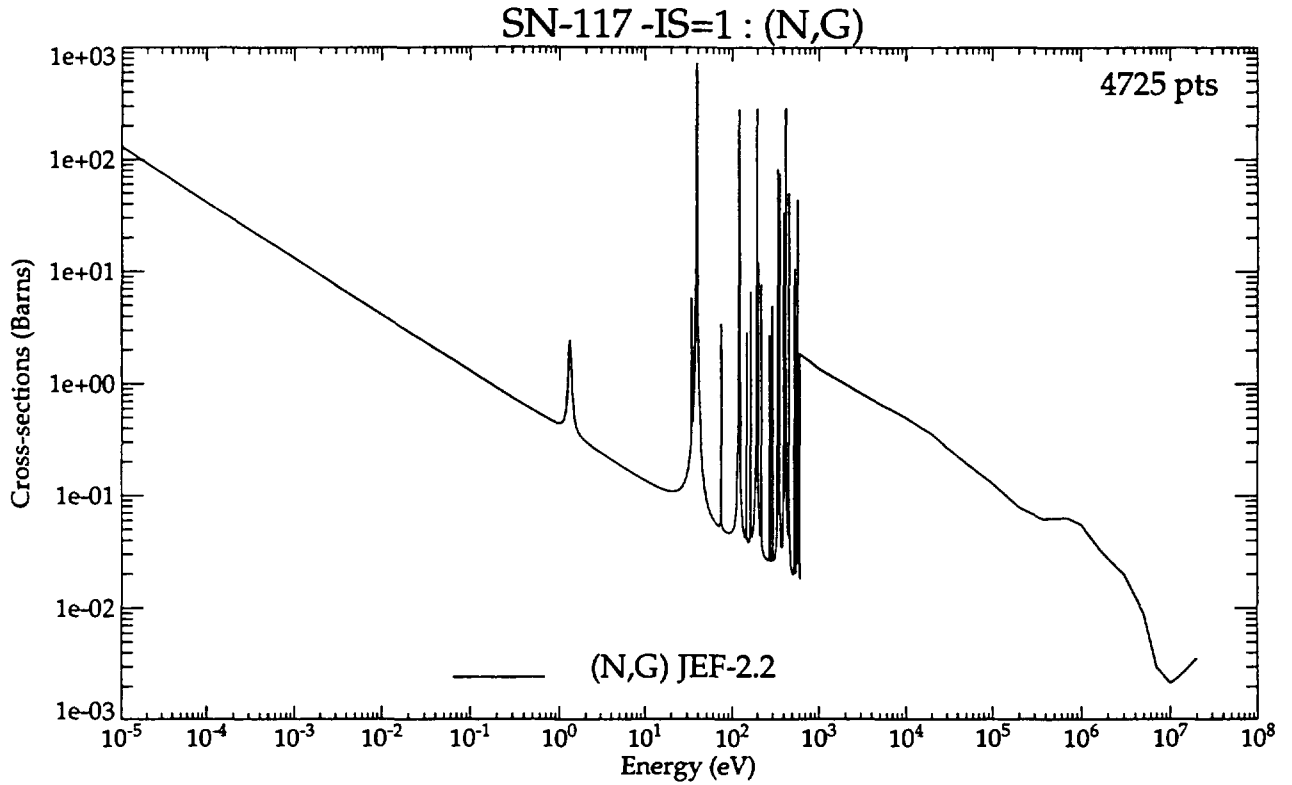


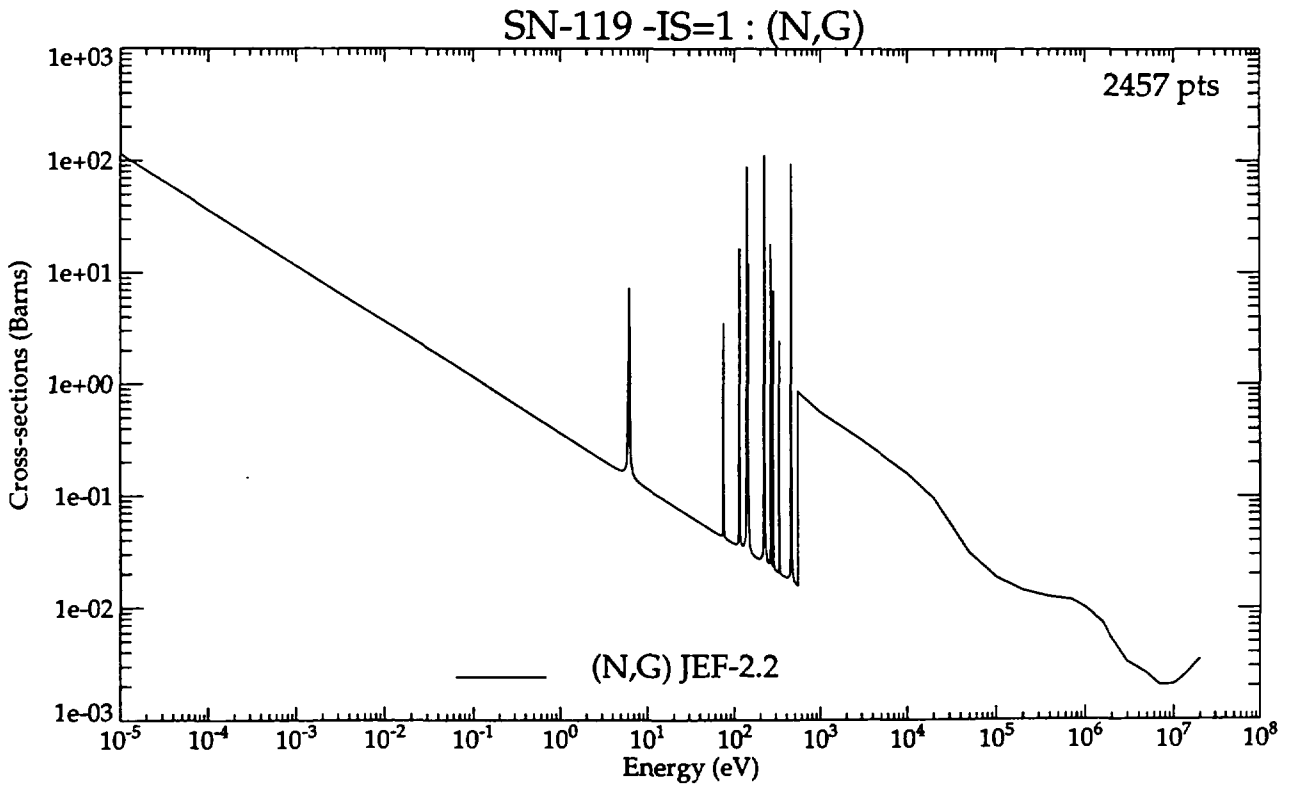
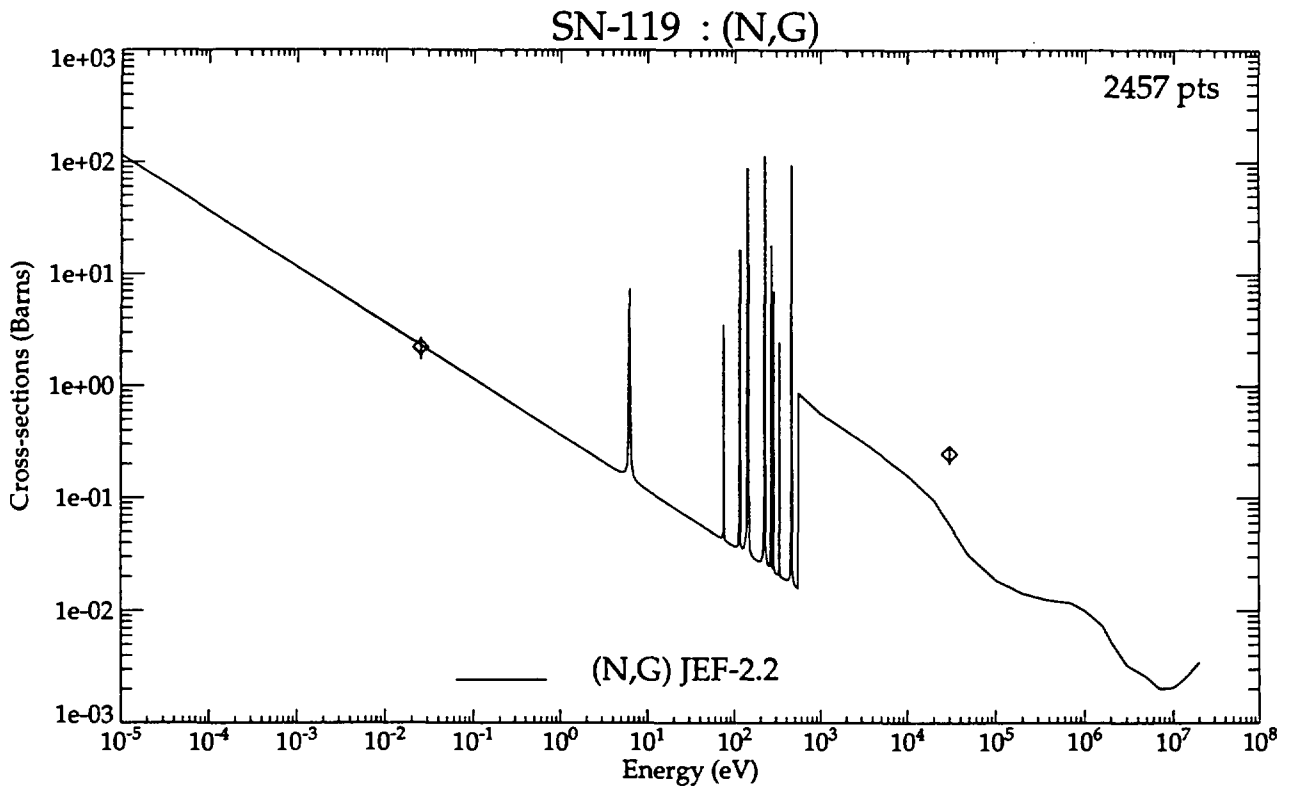
SN-116 : (N,G)

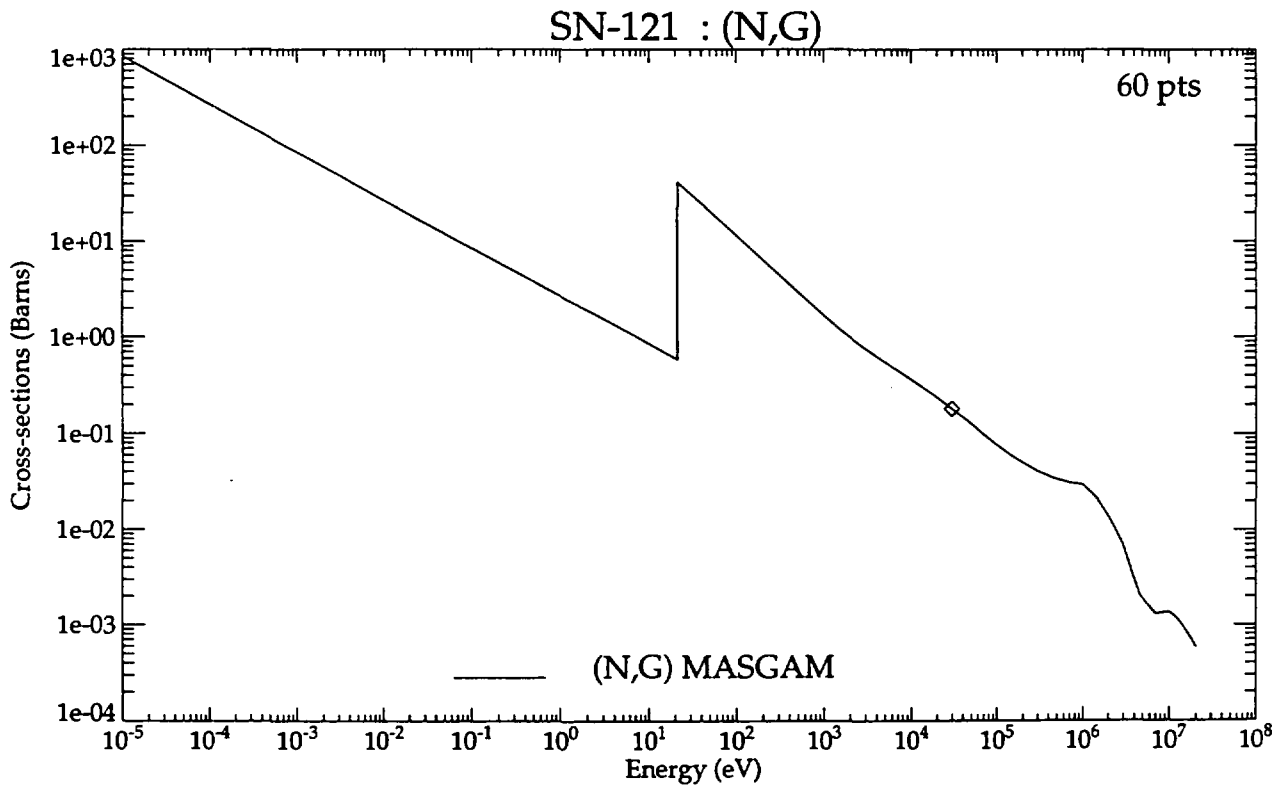
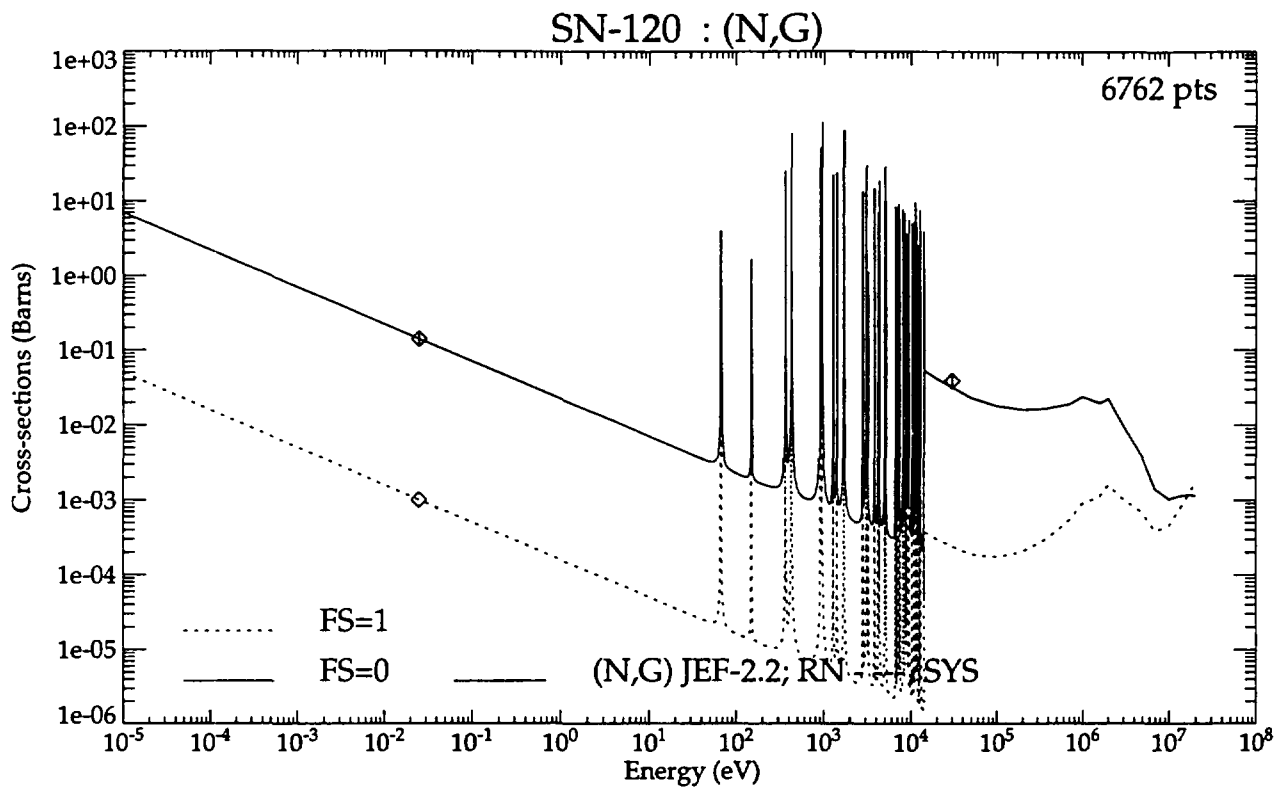


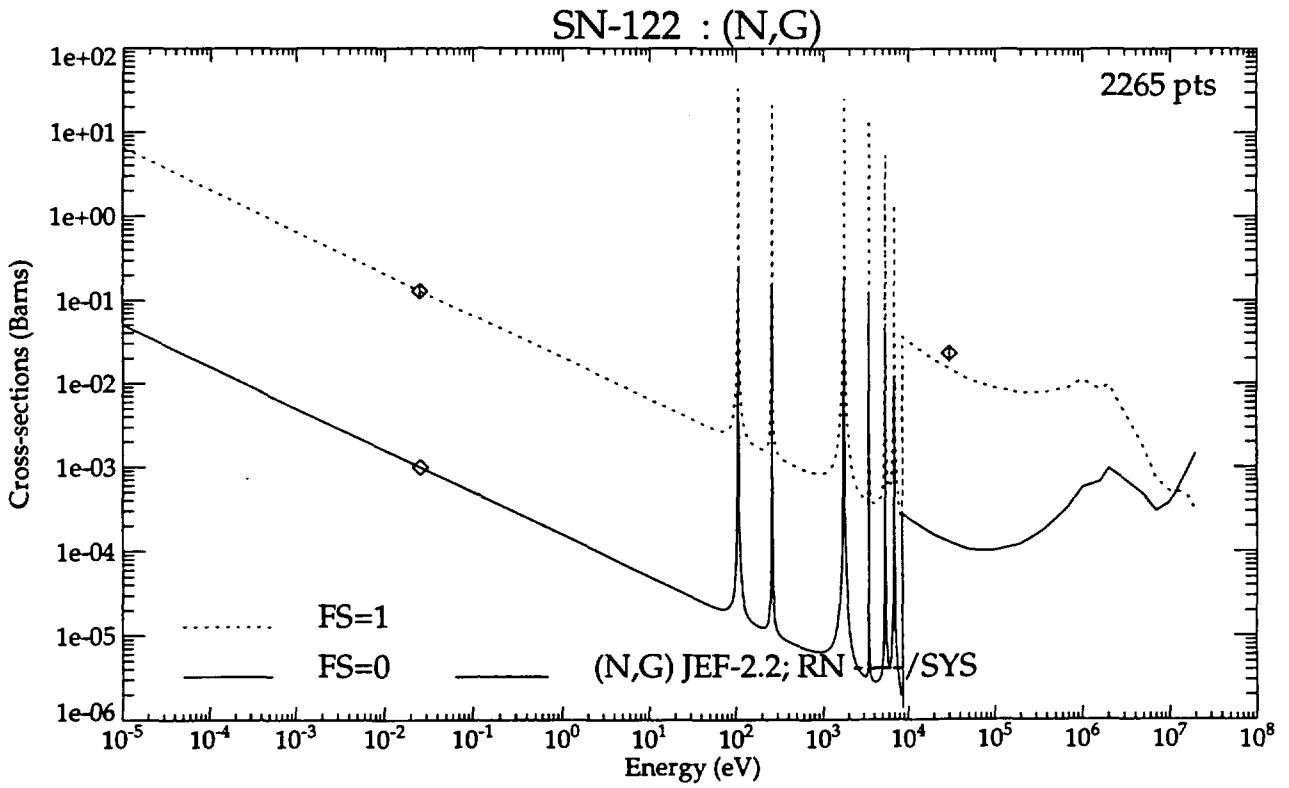
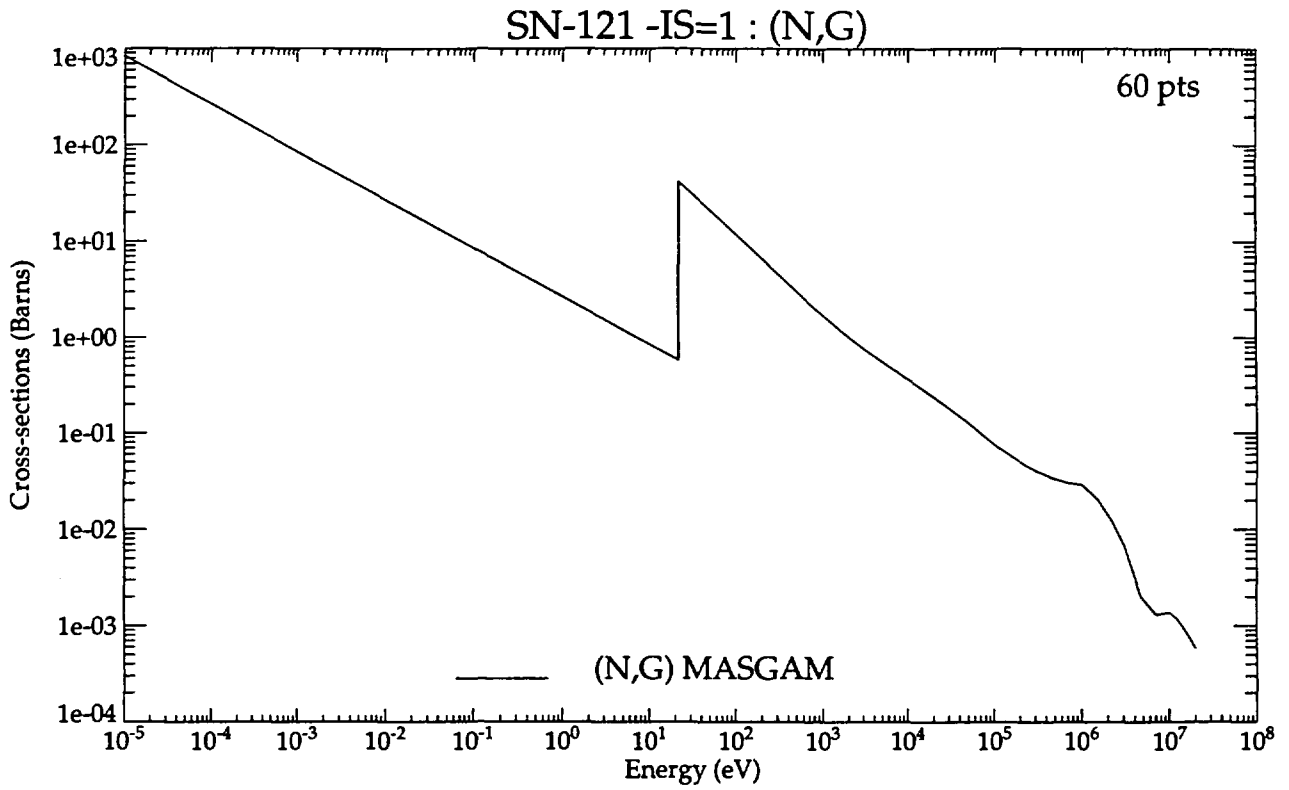
SN-117 : (N,G)

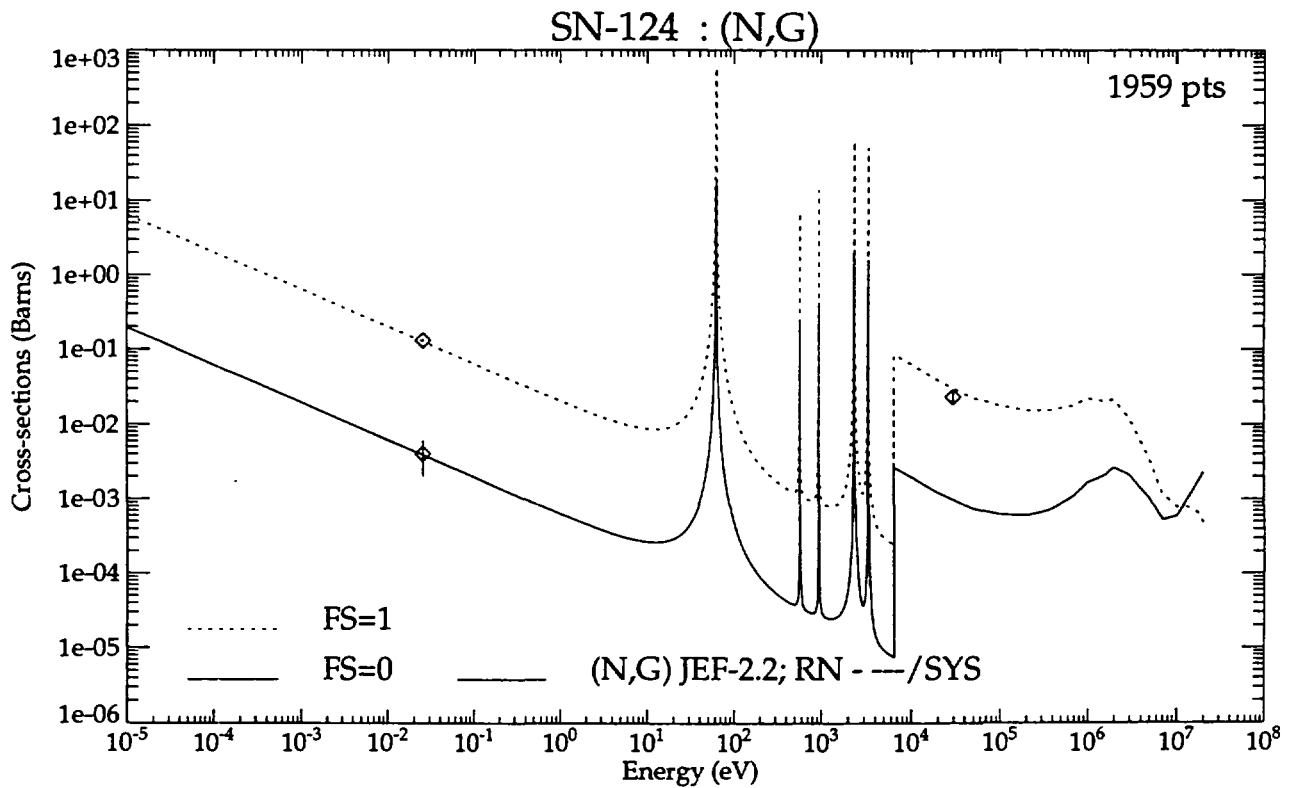
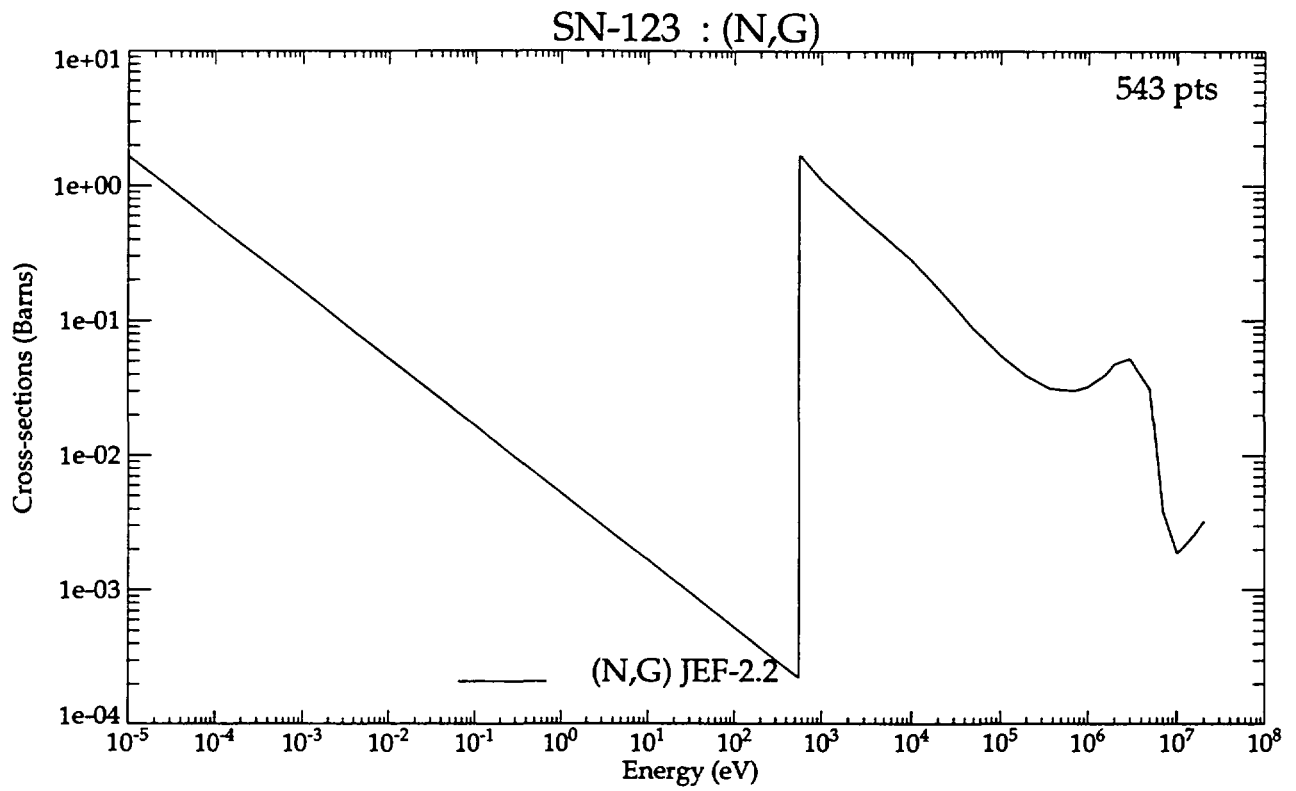


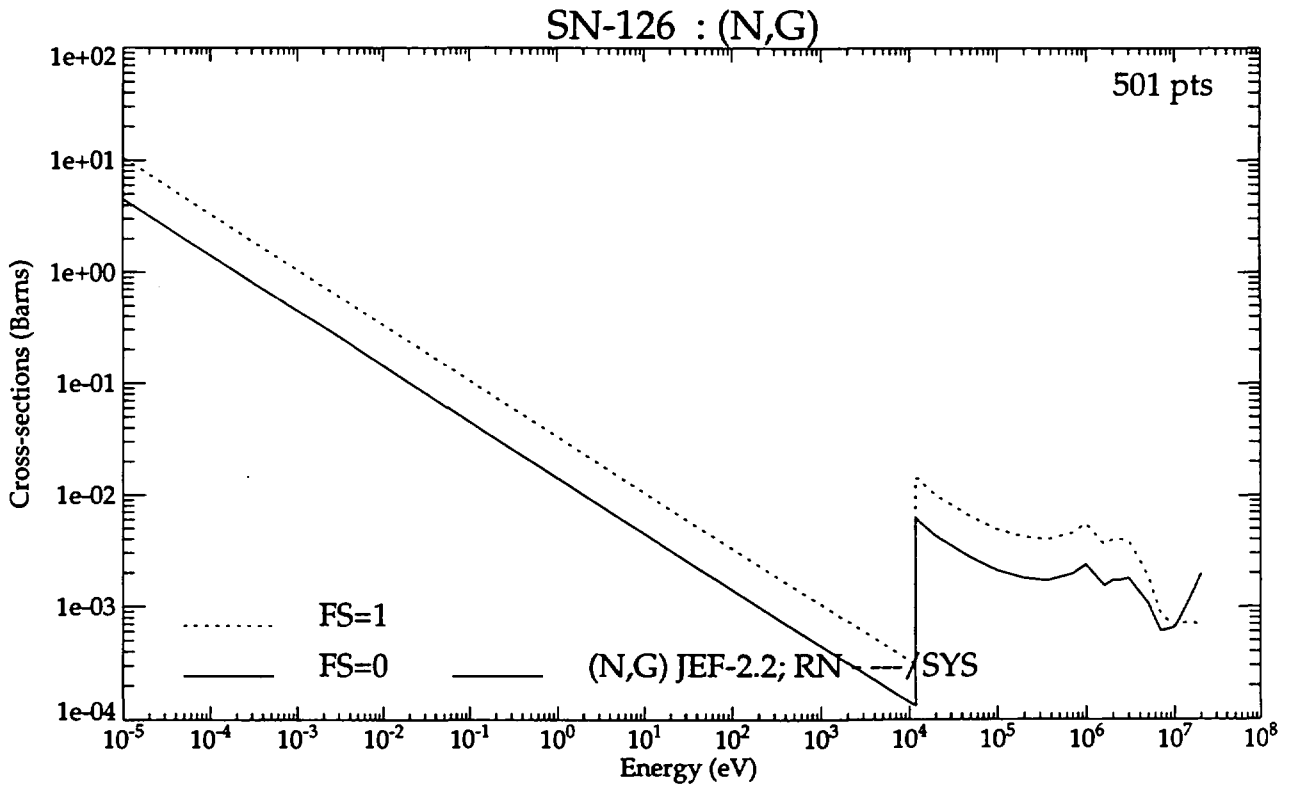
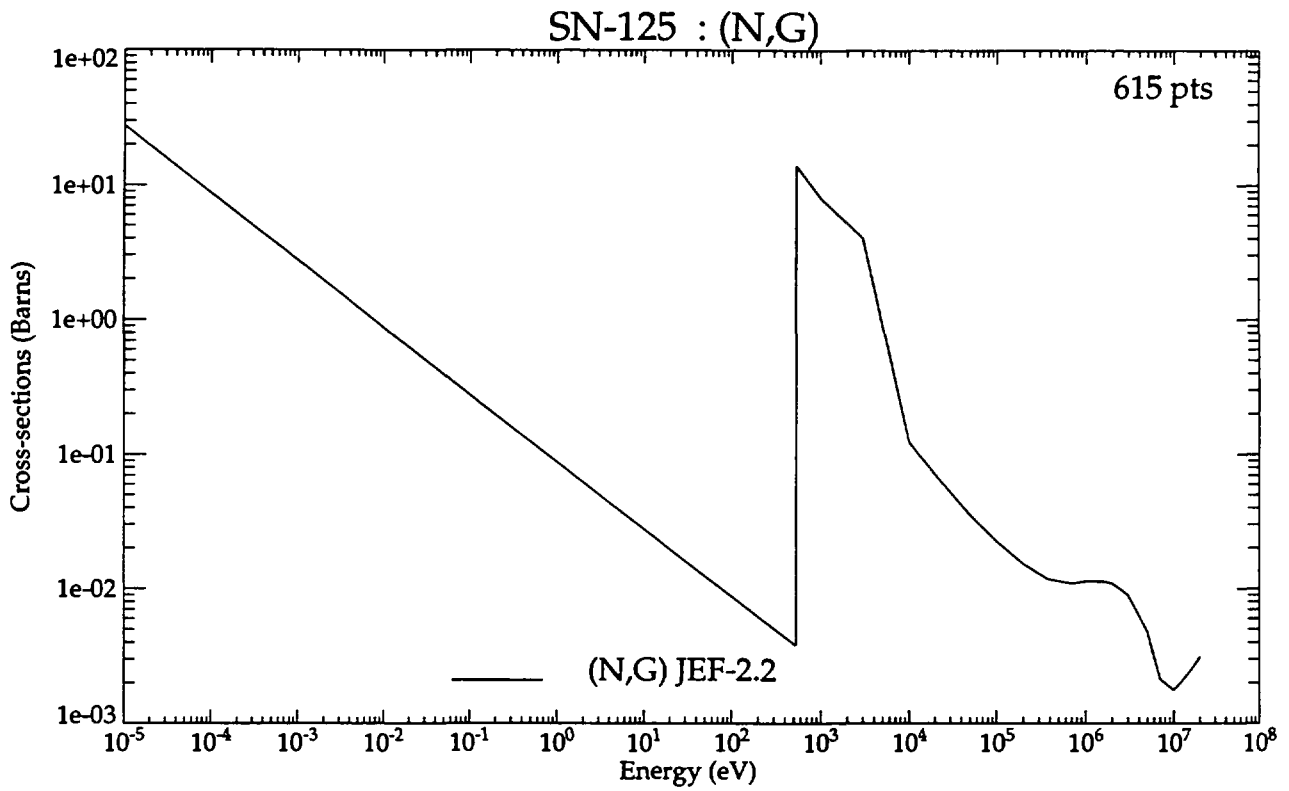


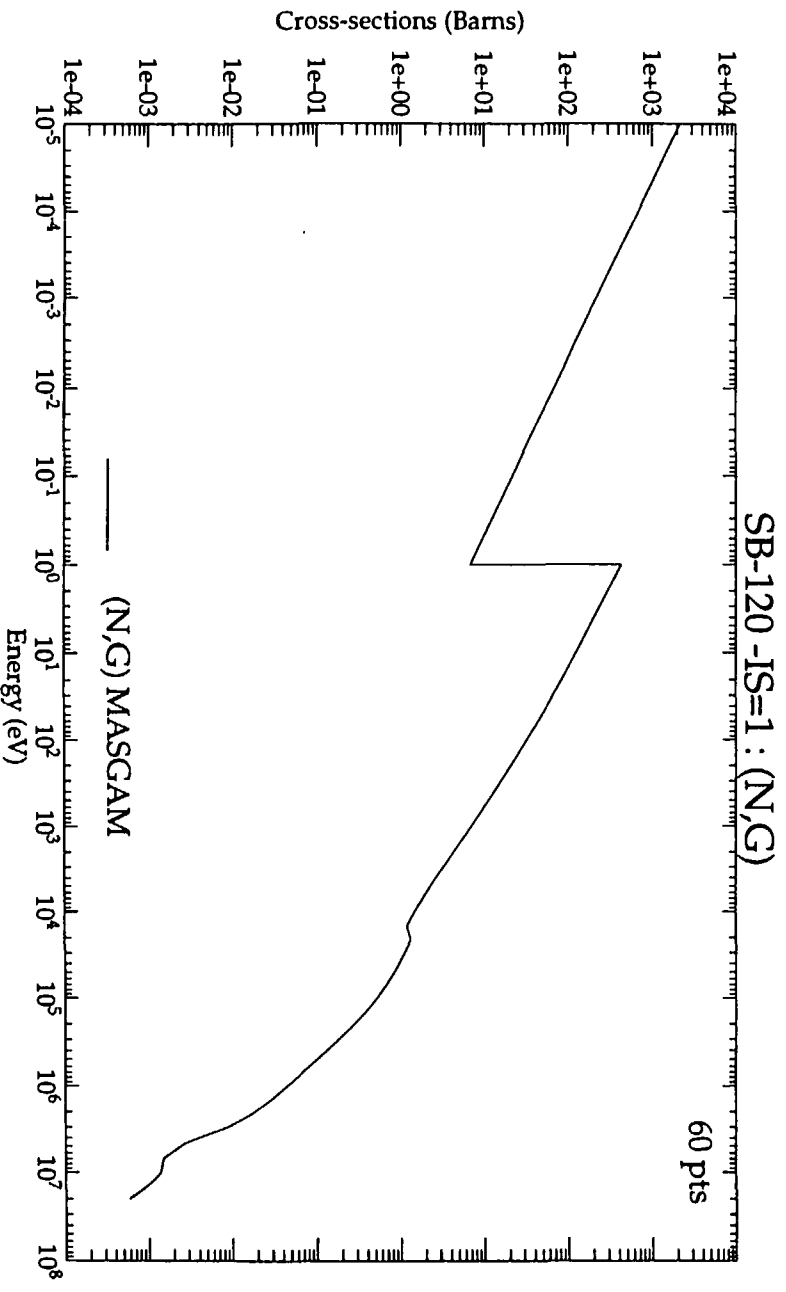
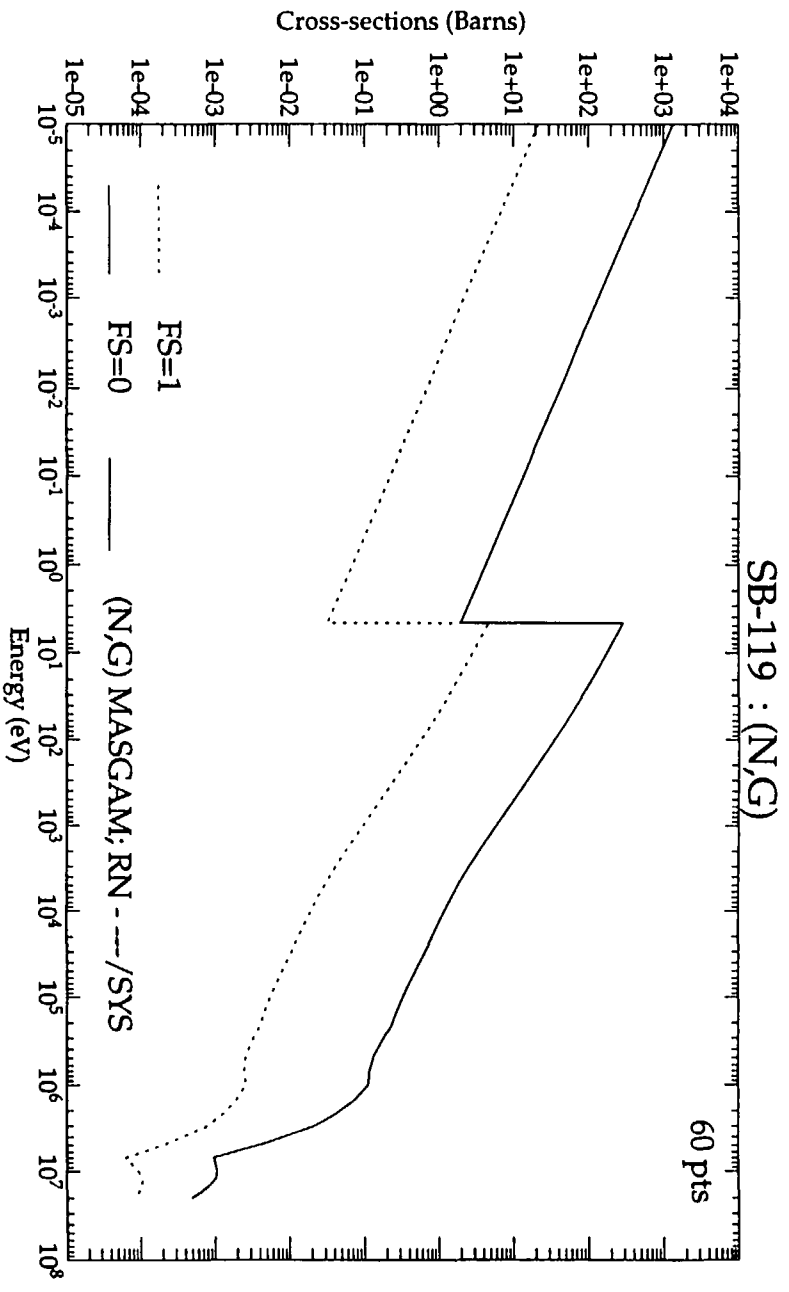


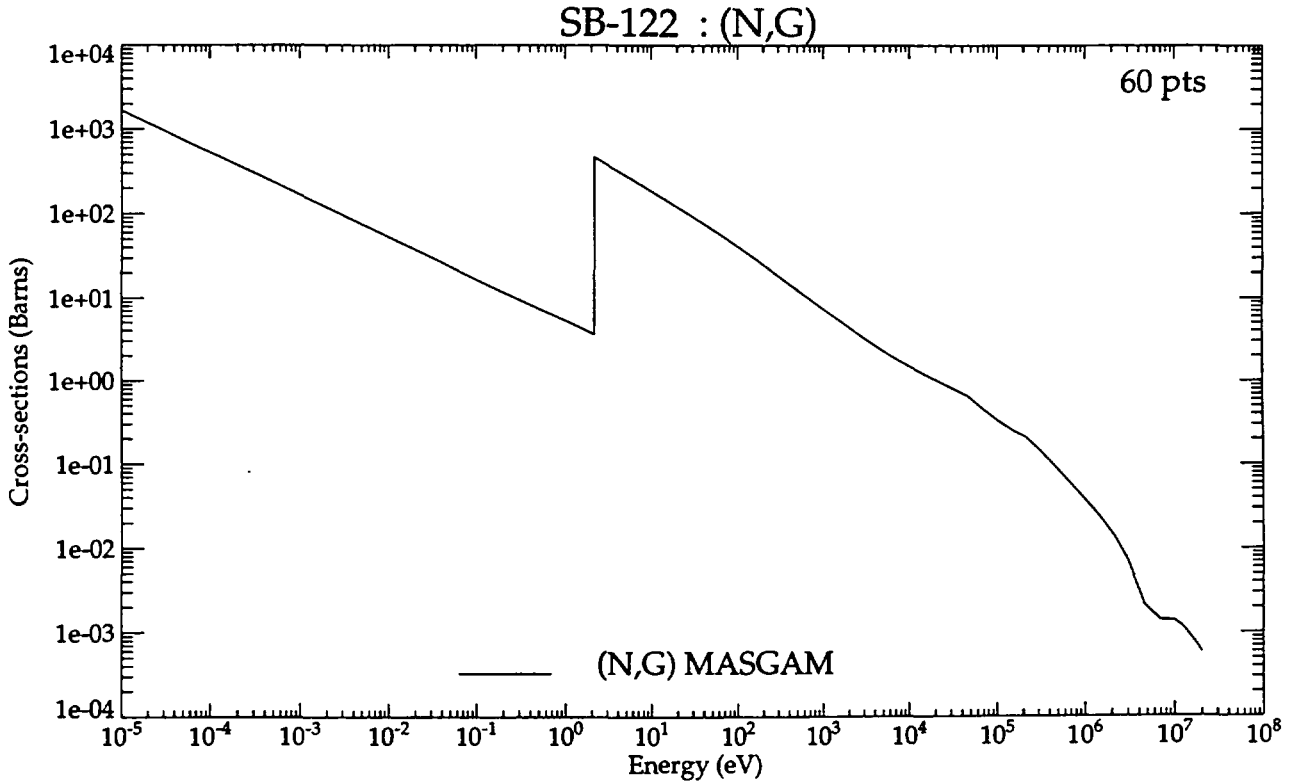
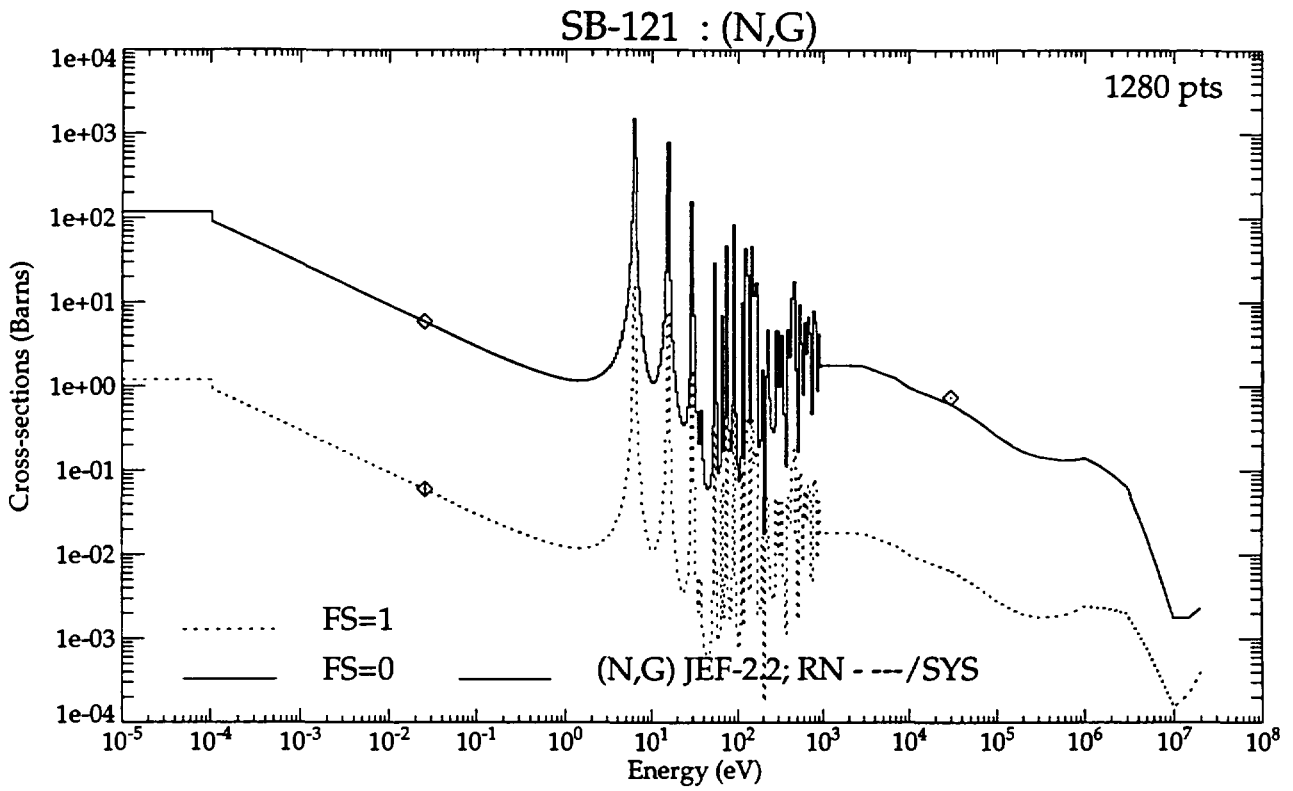


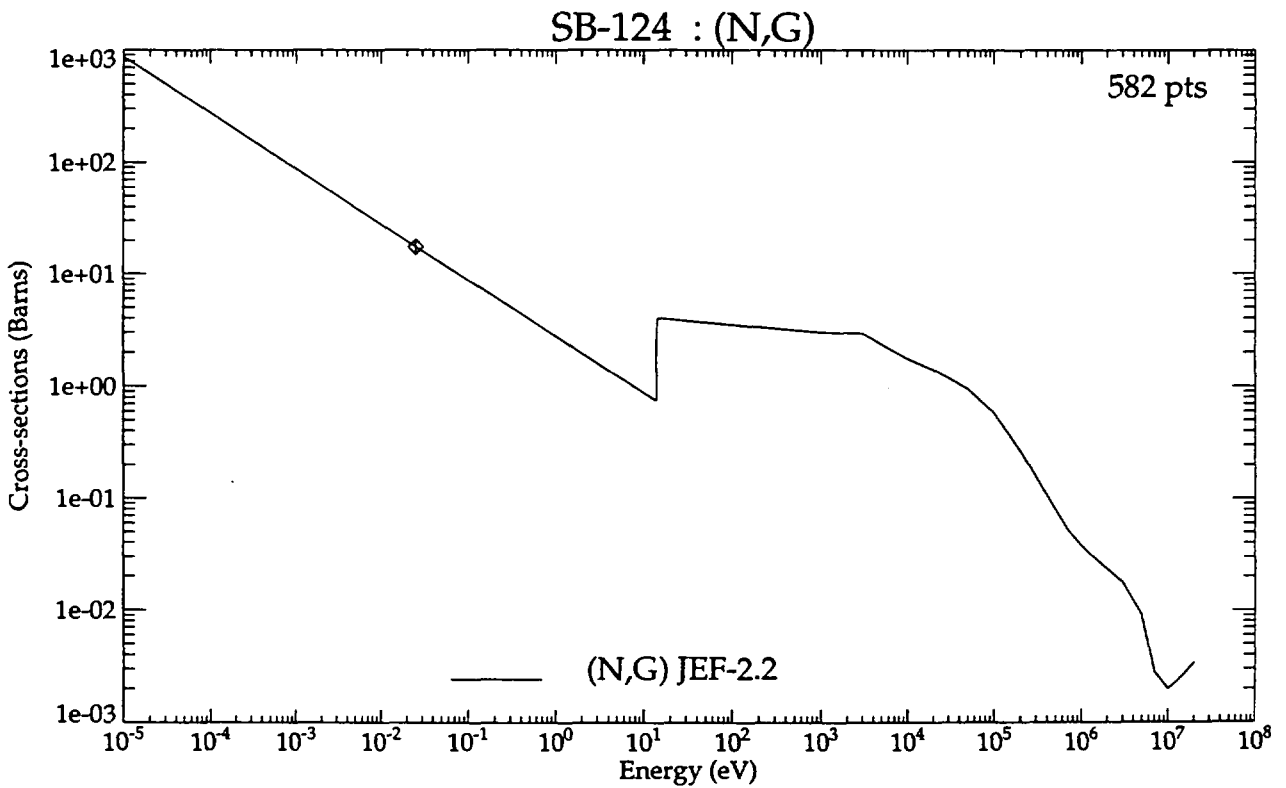
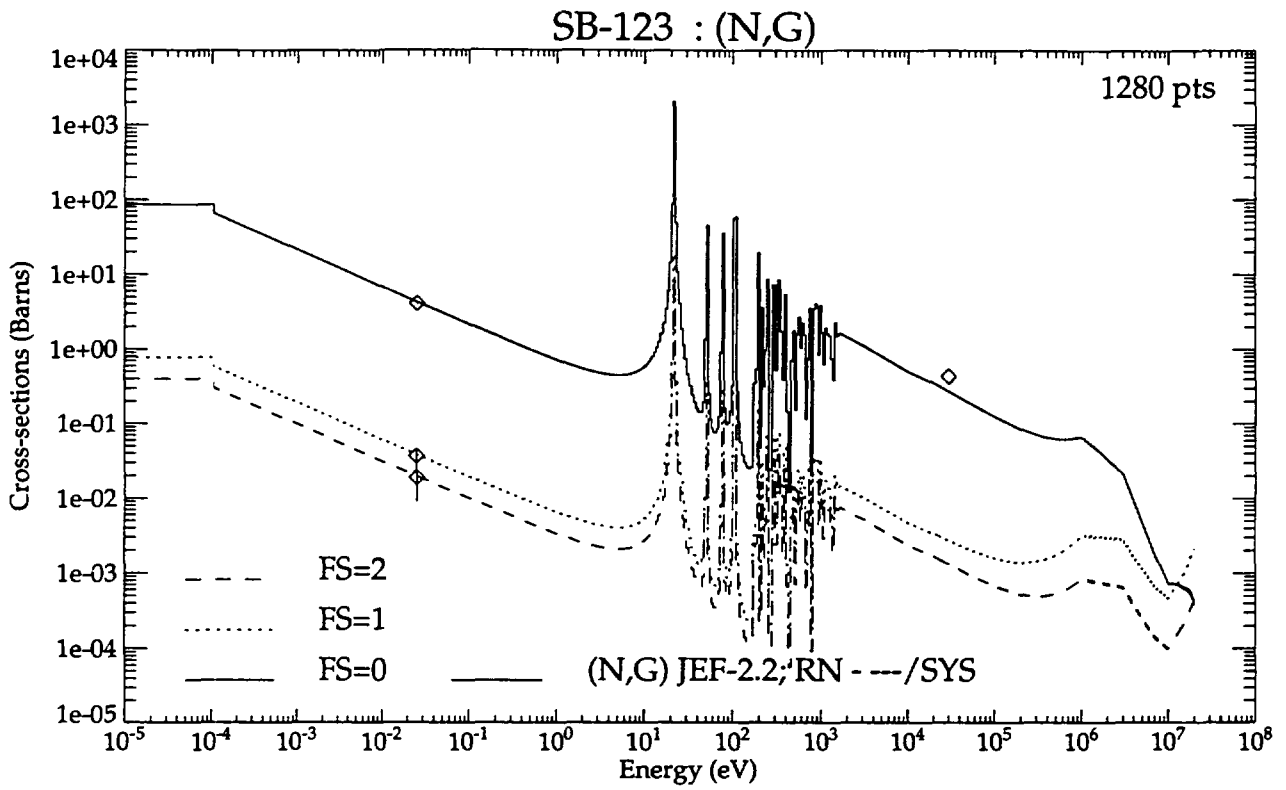


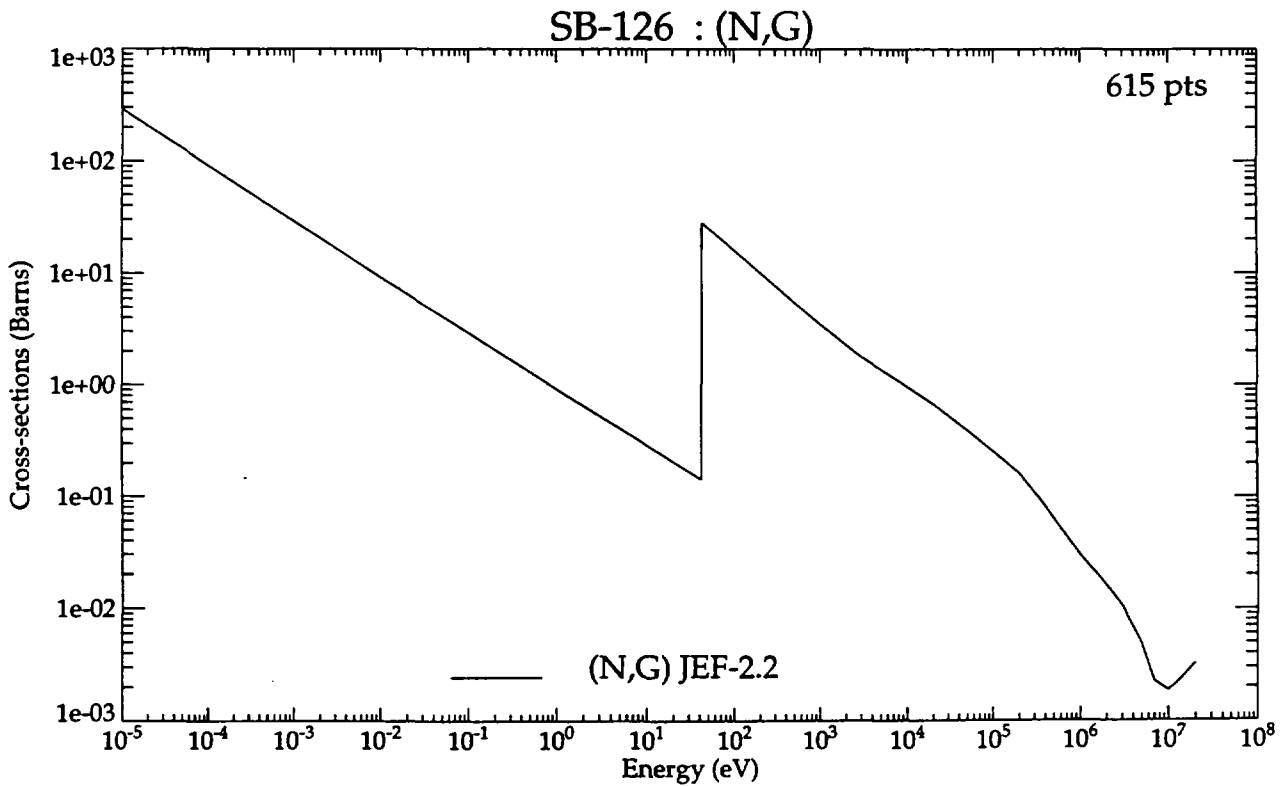
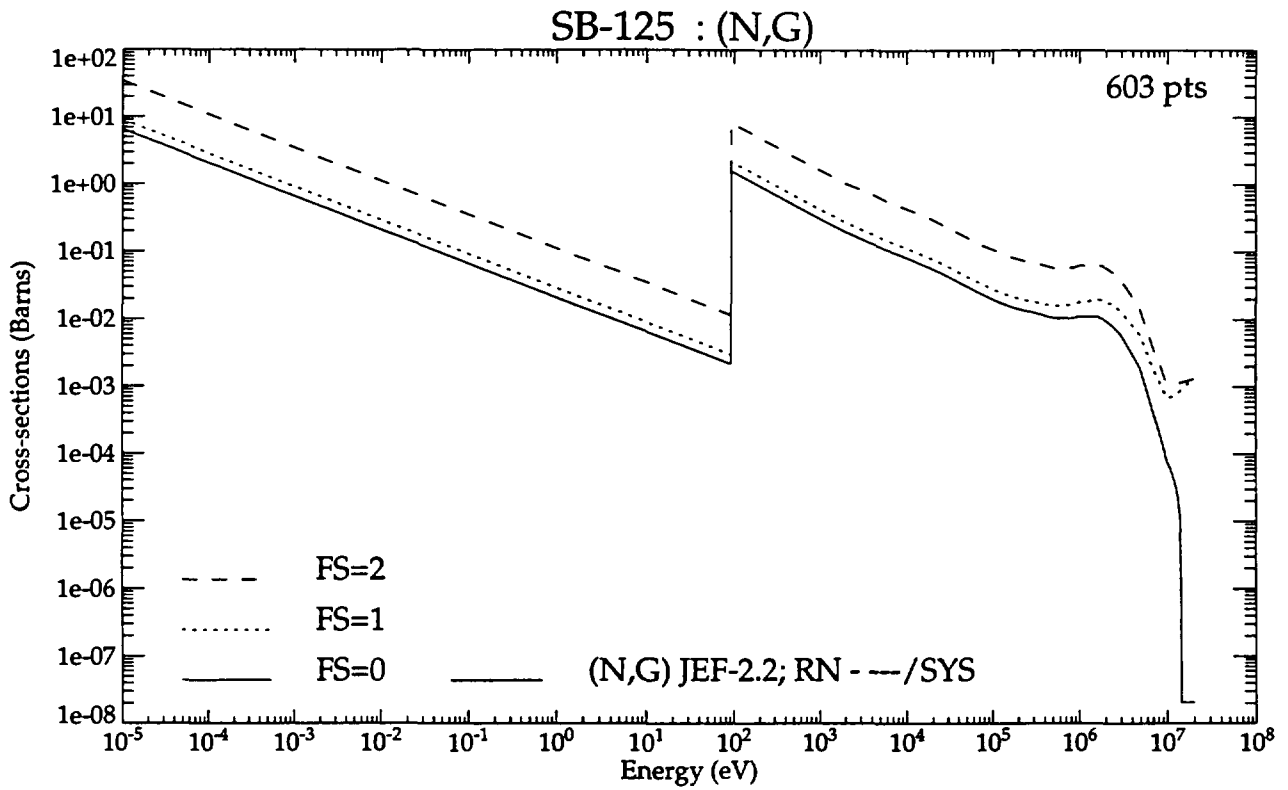




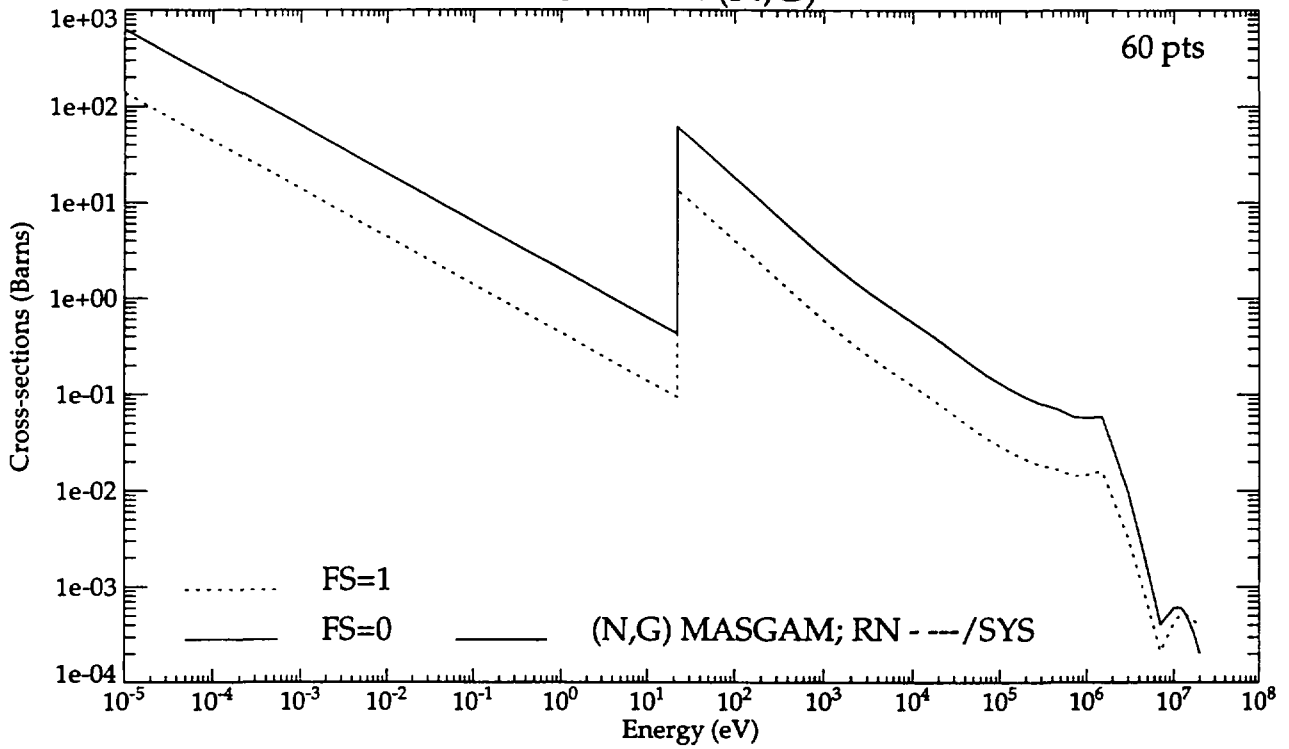




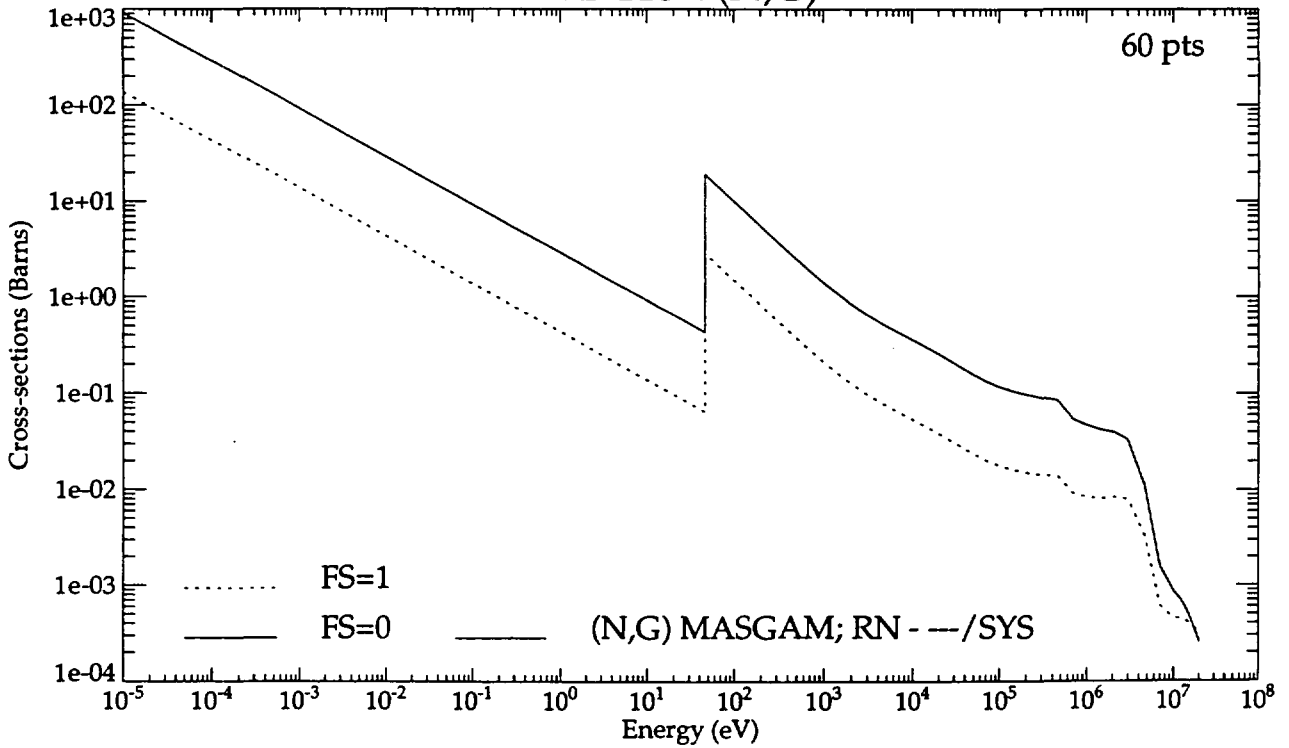


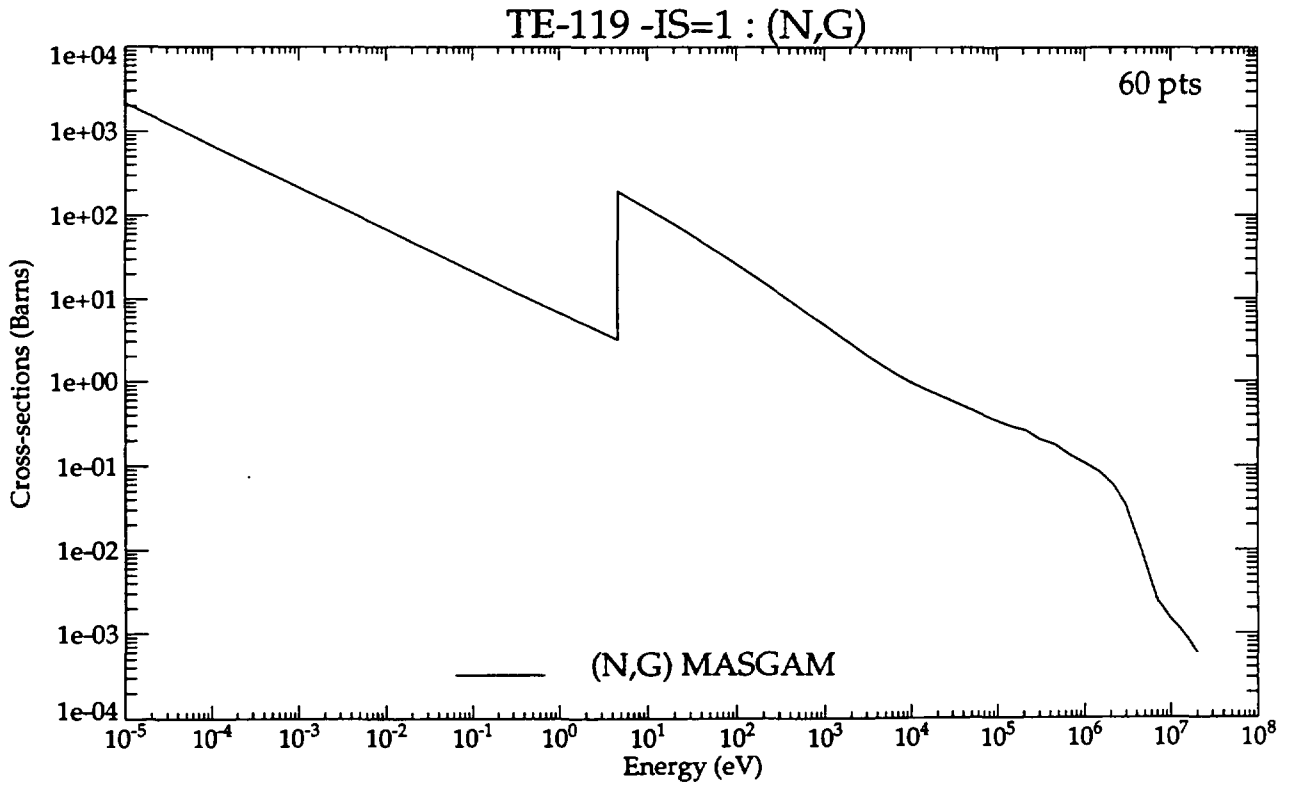
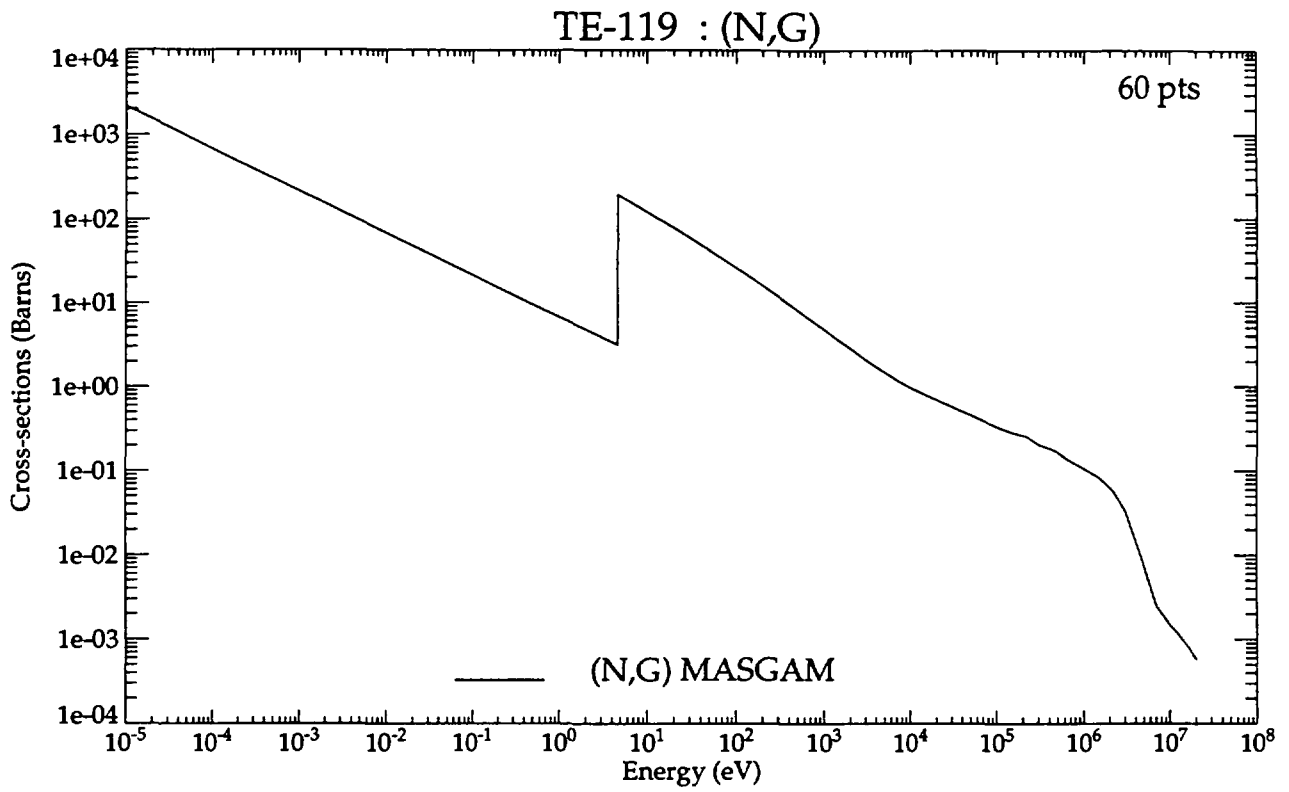


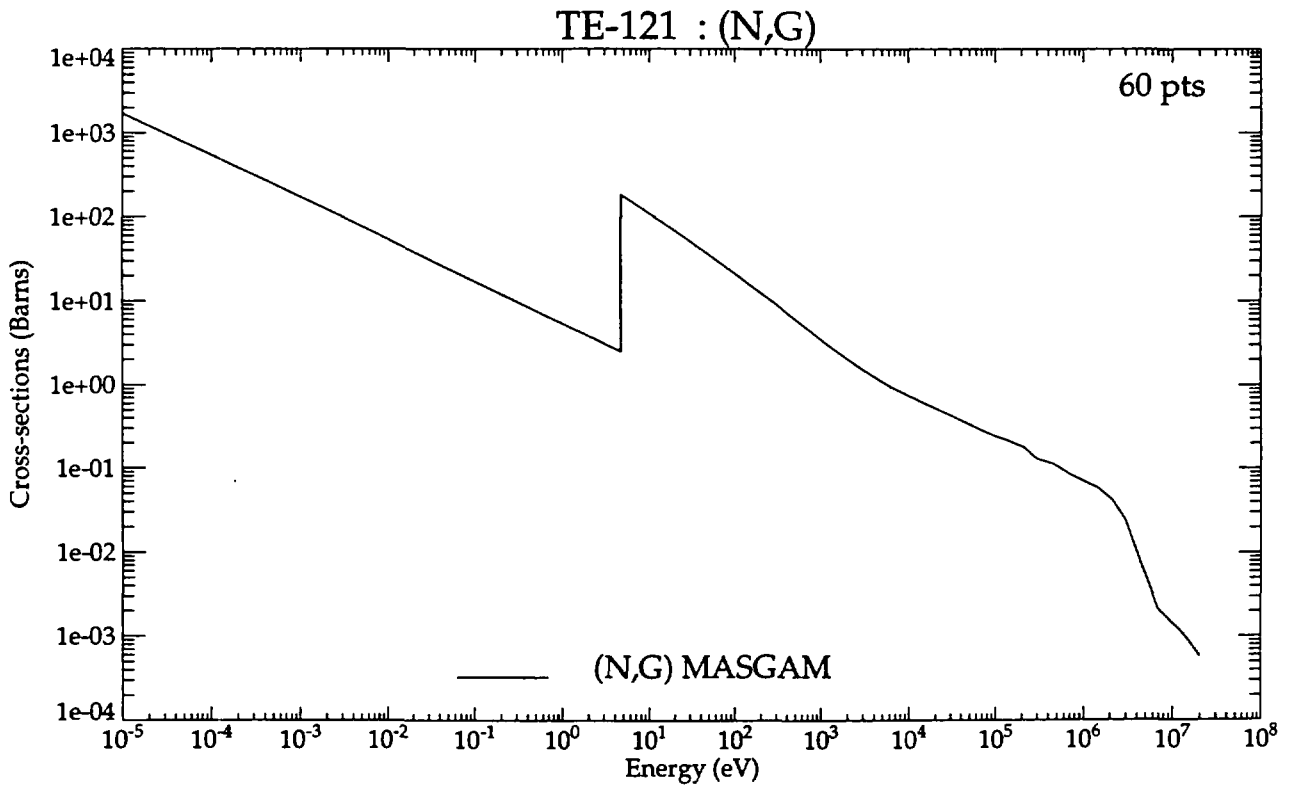
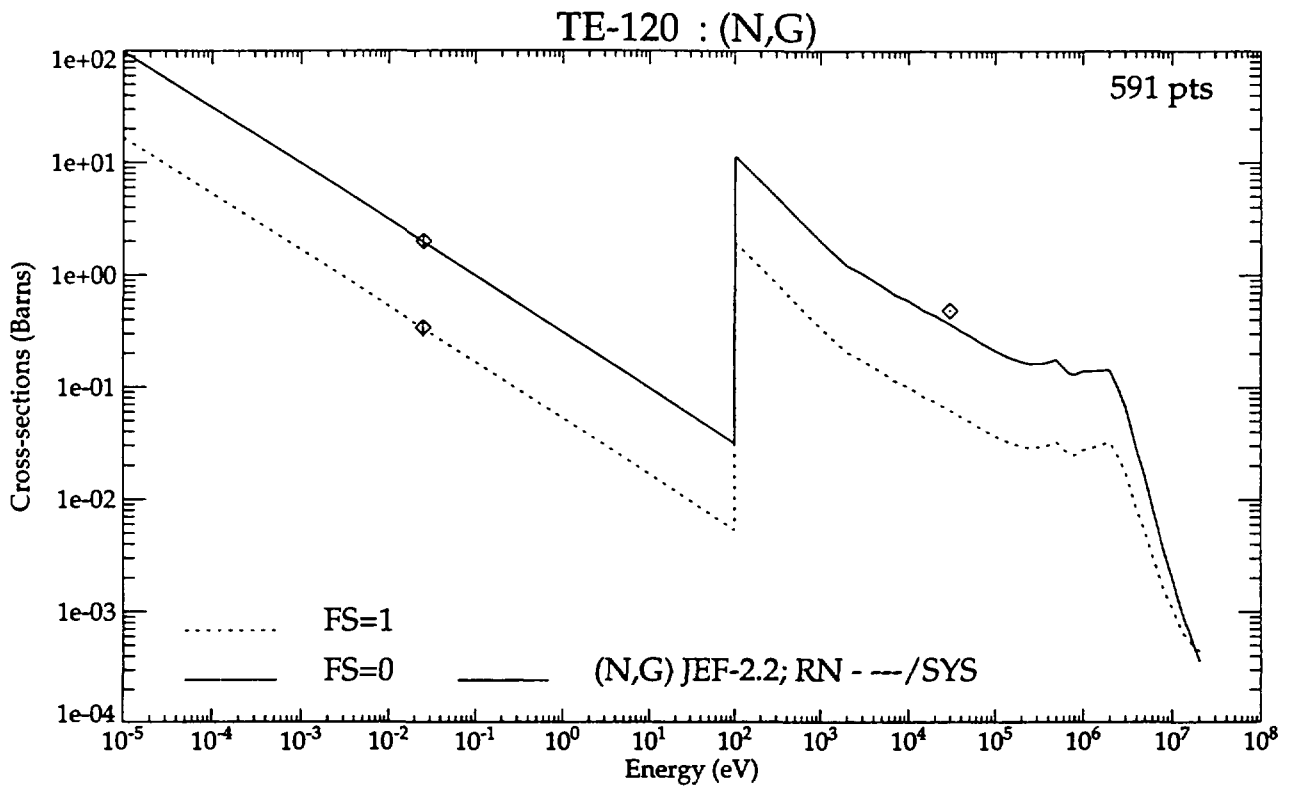
SB-127 : (N,G)

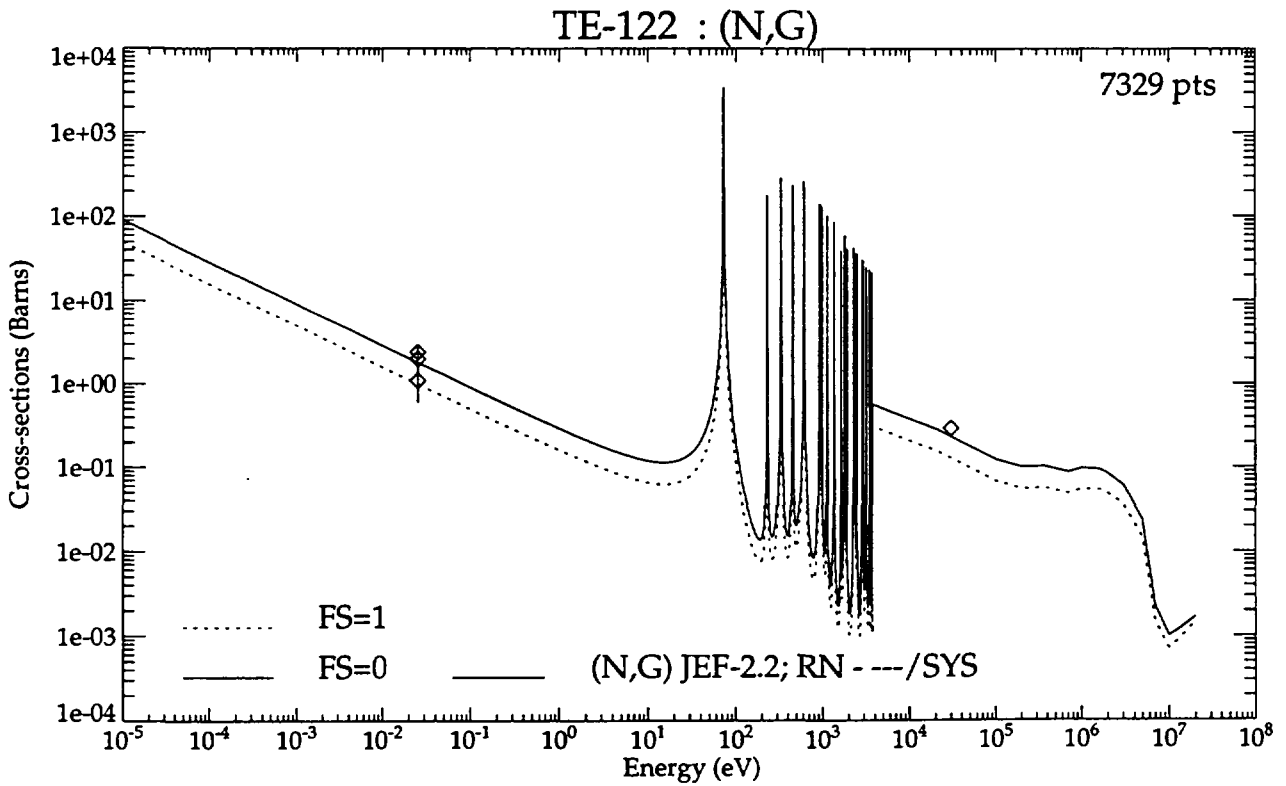
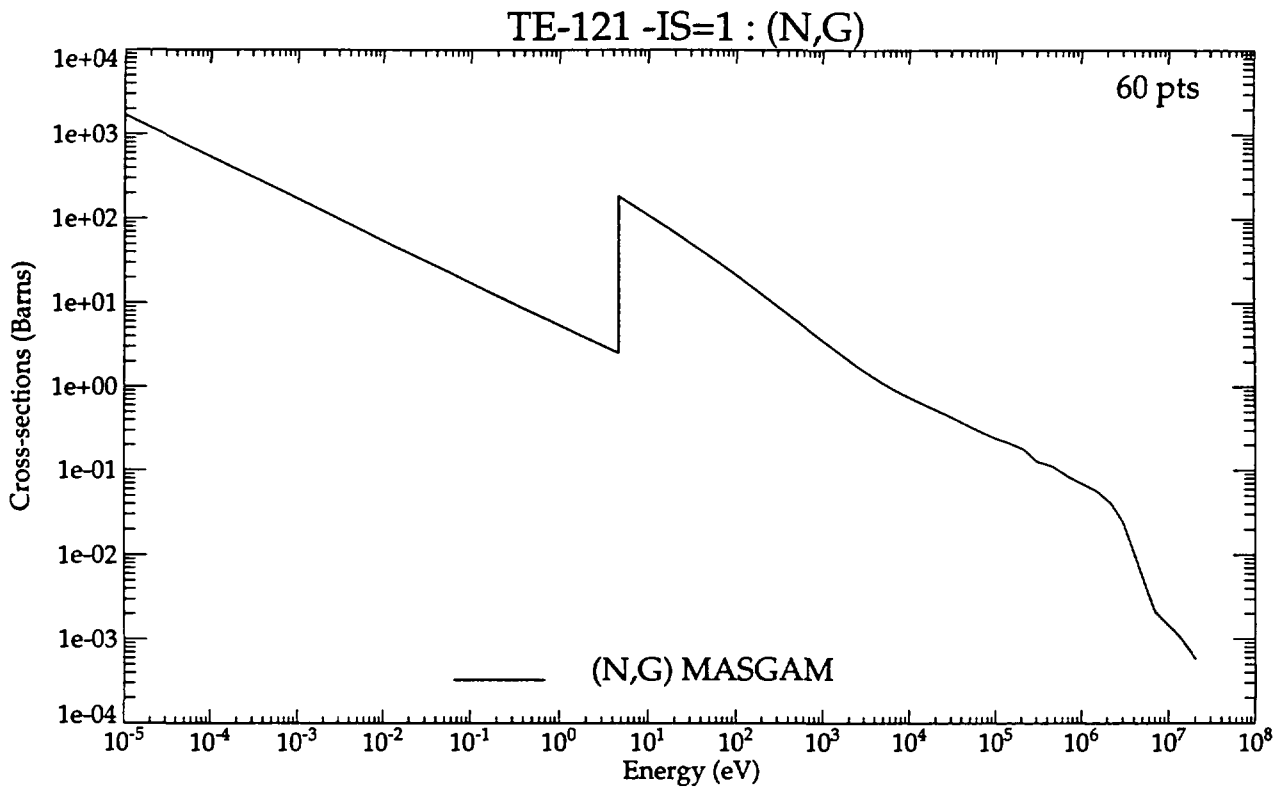


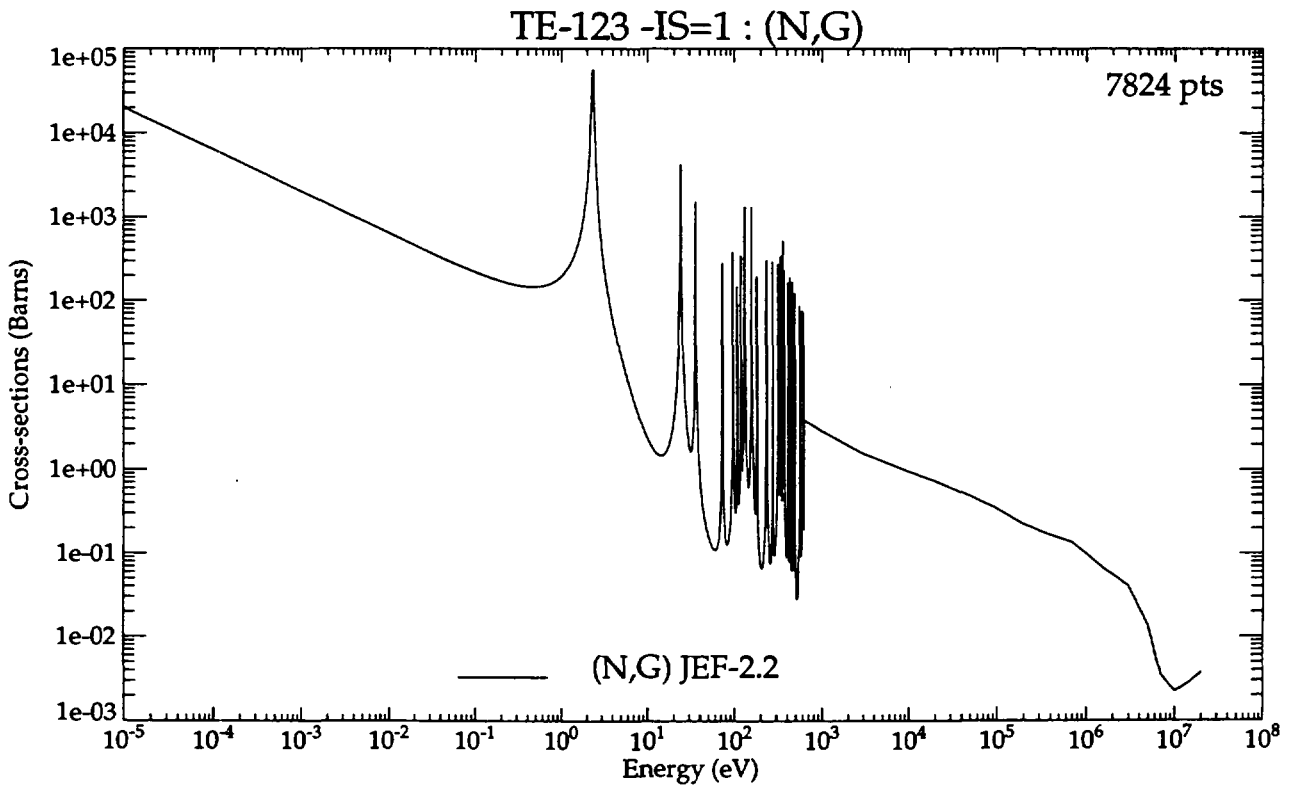
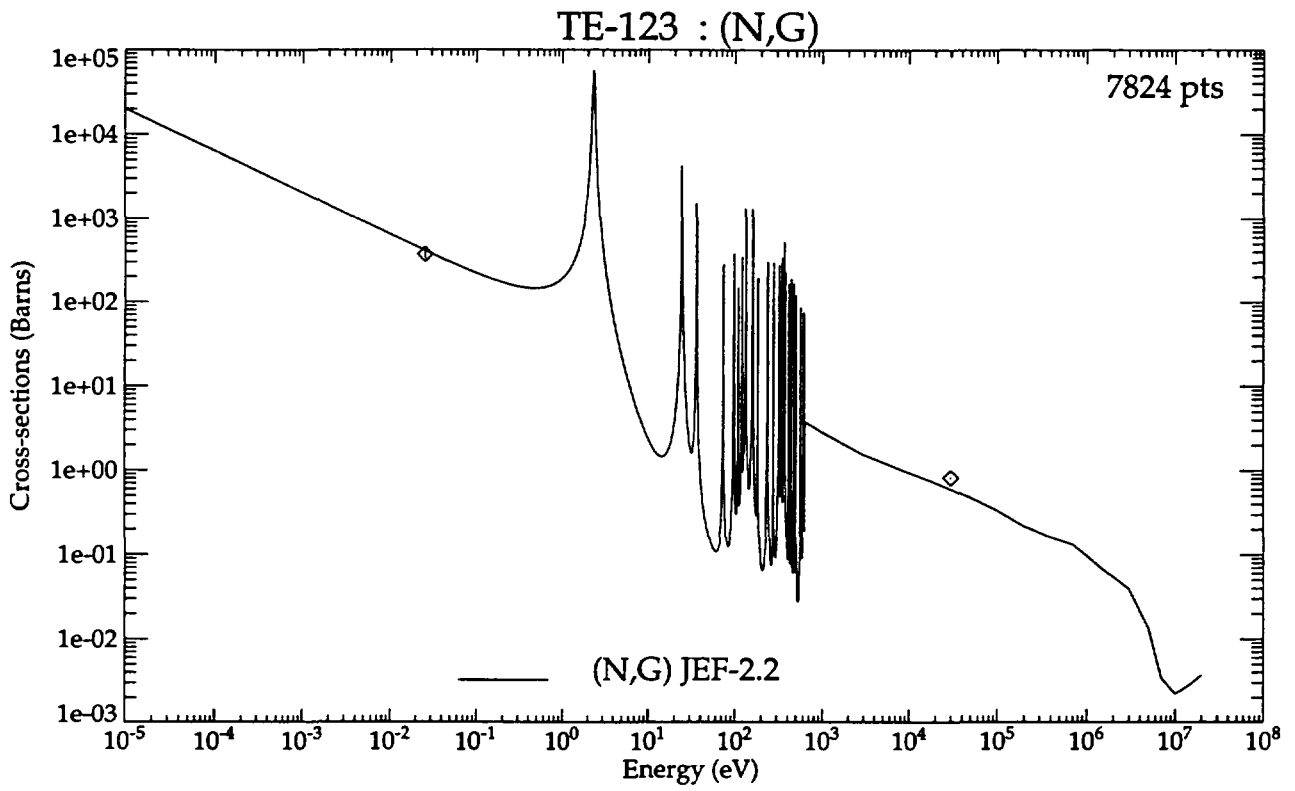
TE-118 : (N,G)

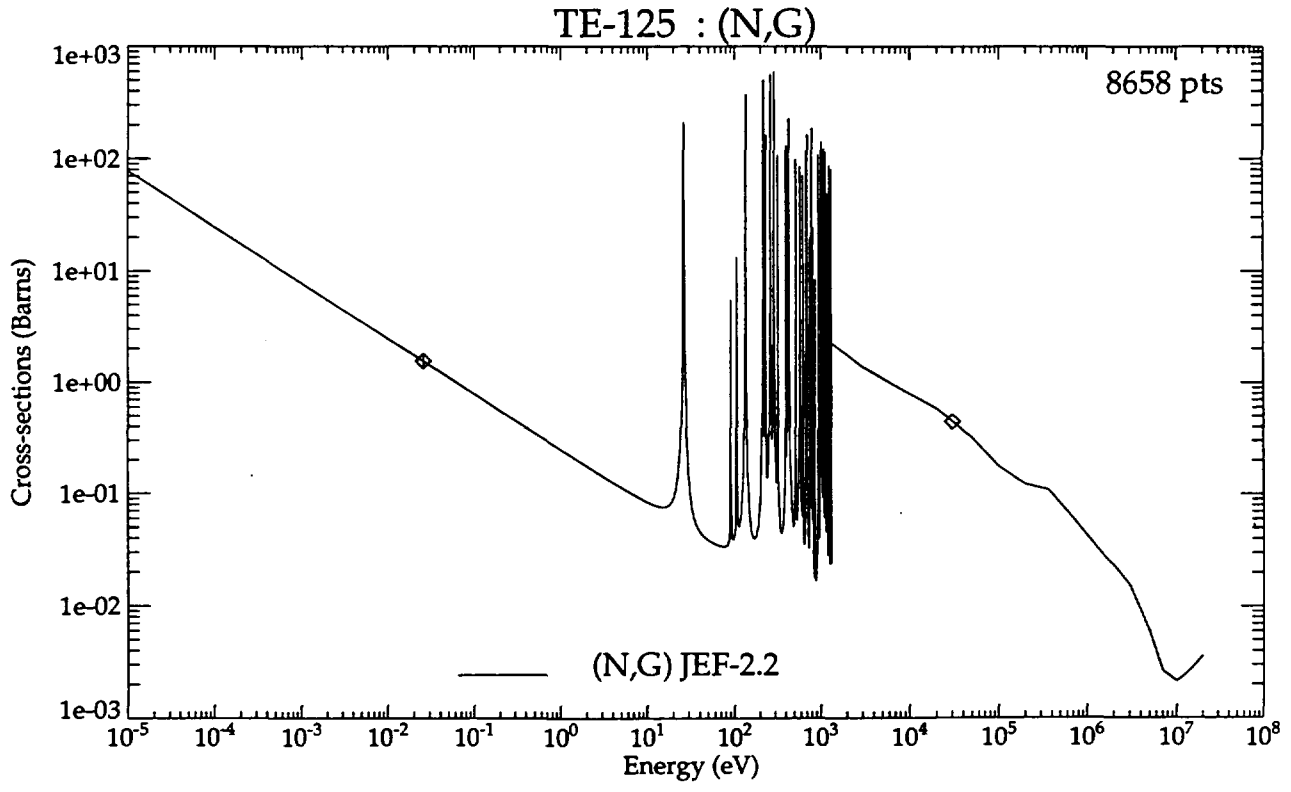
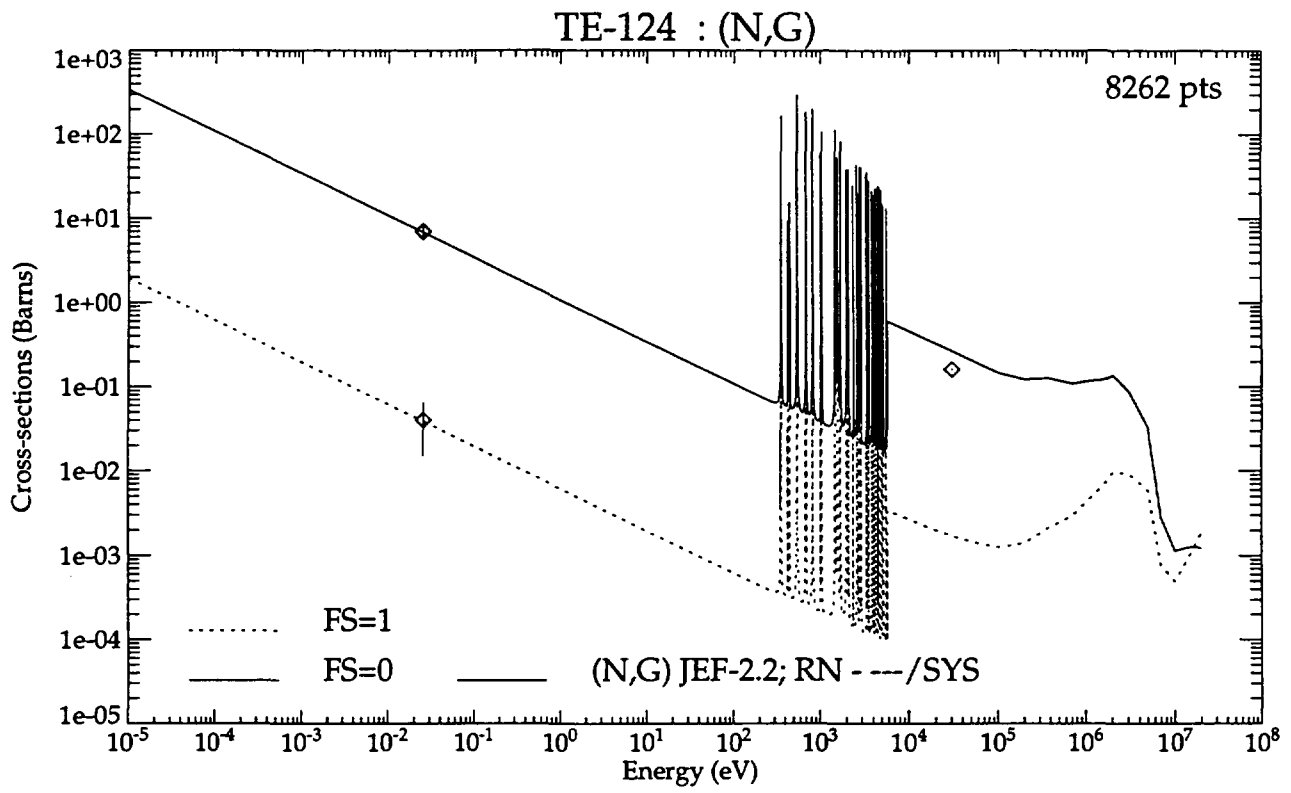


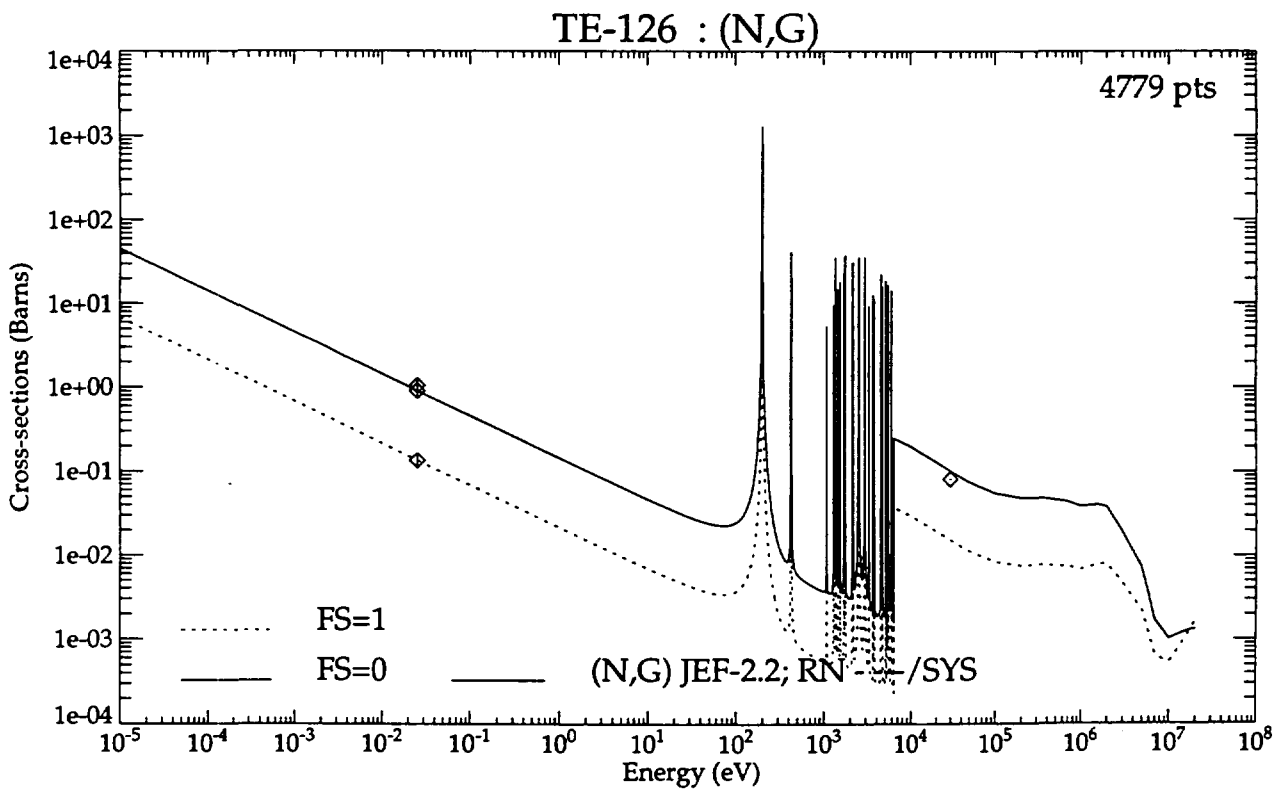
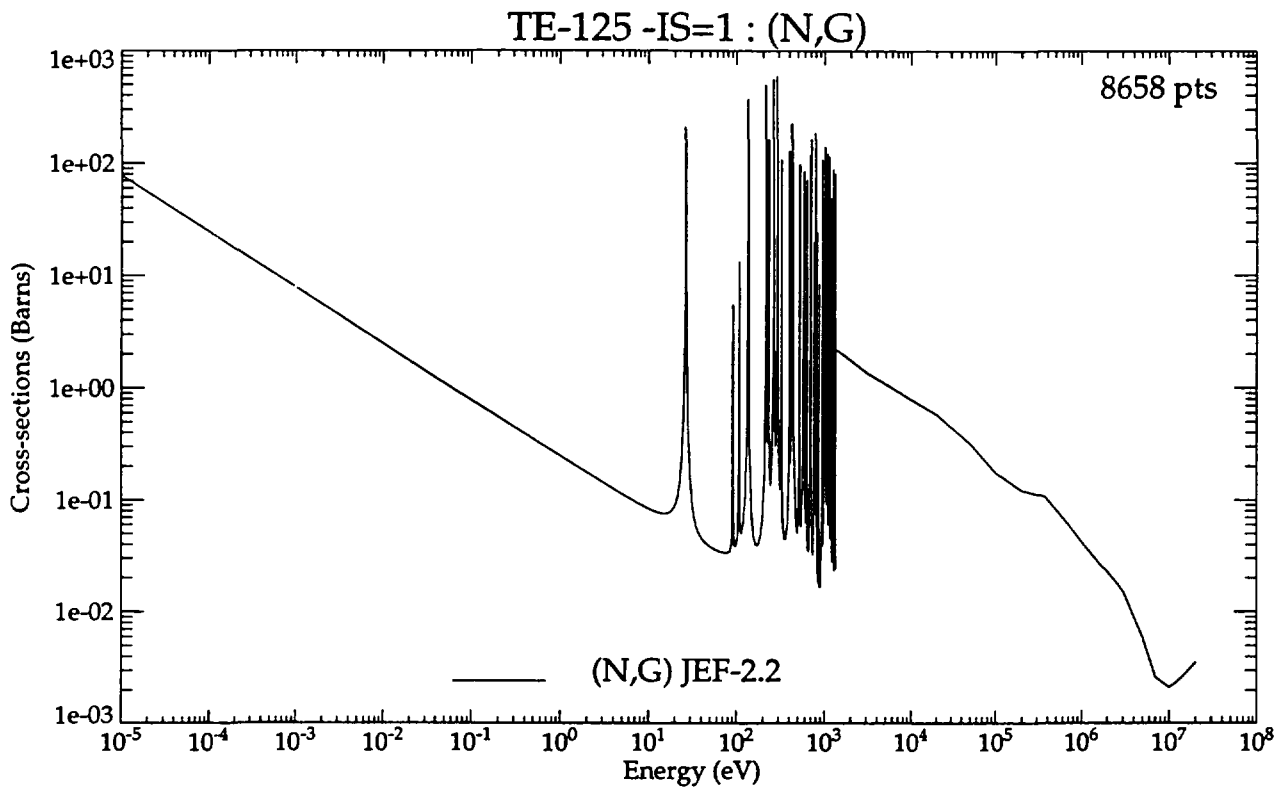


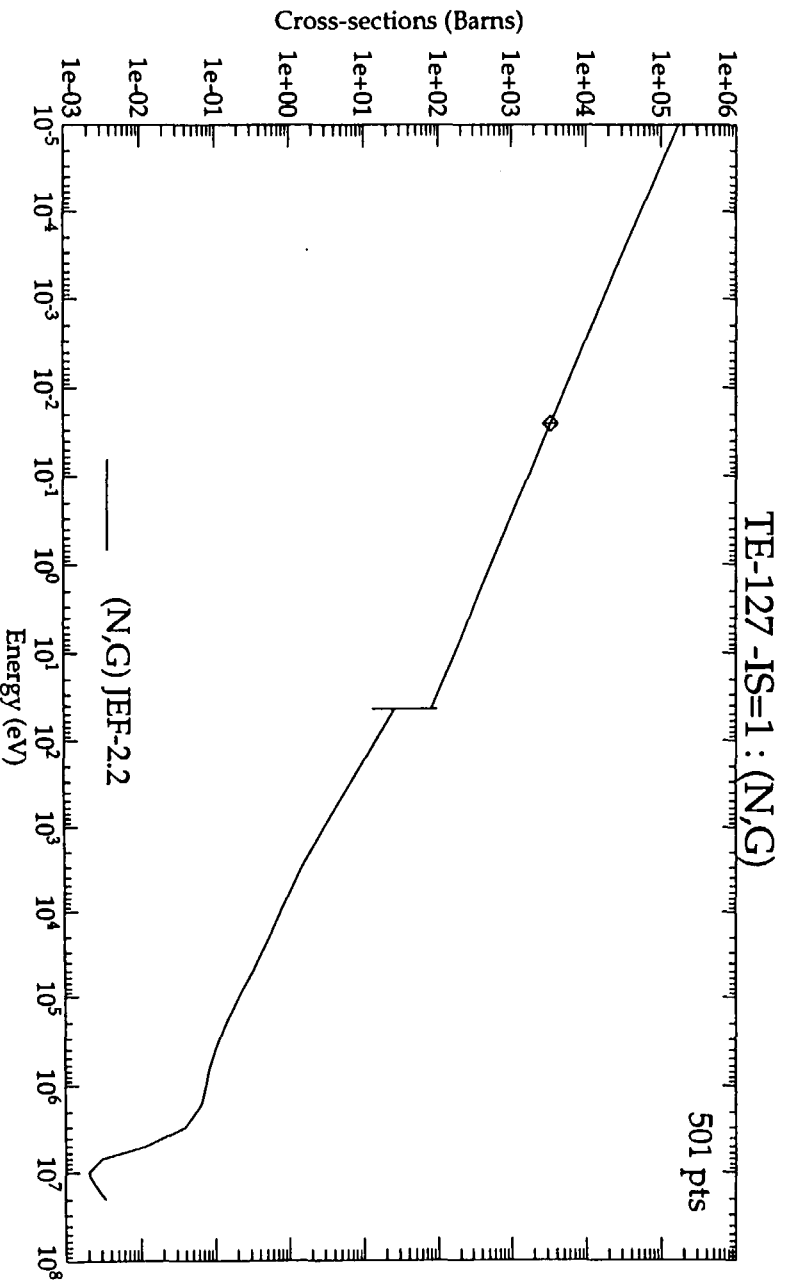
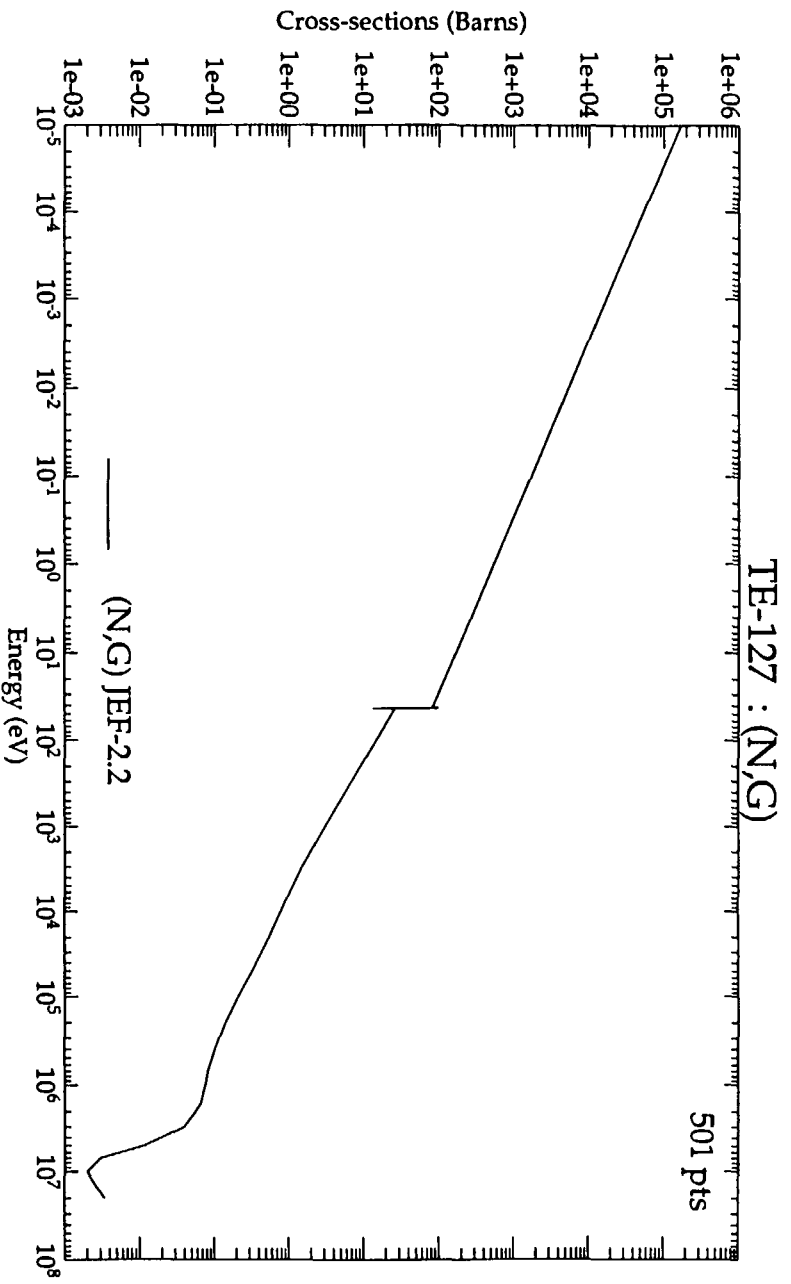


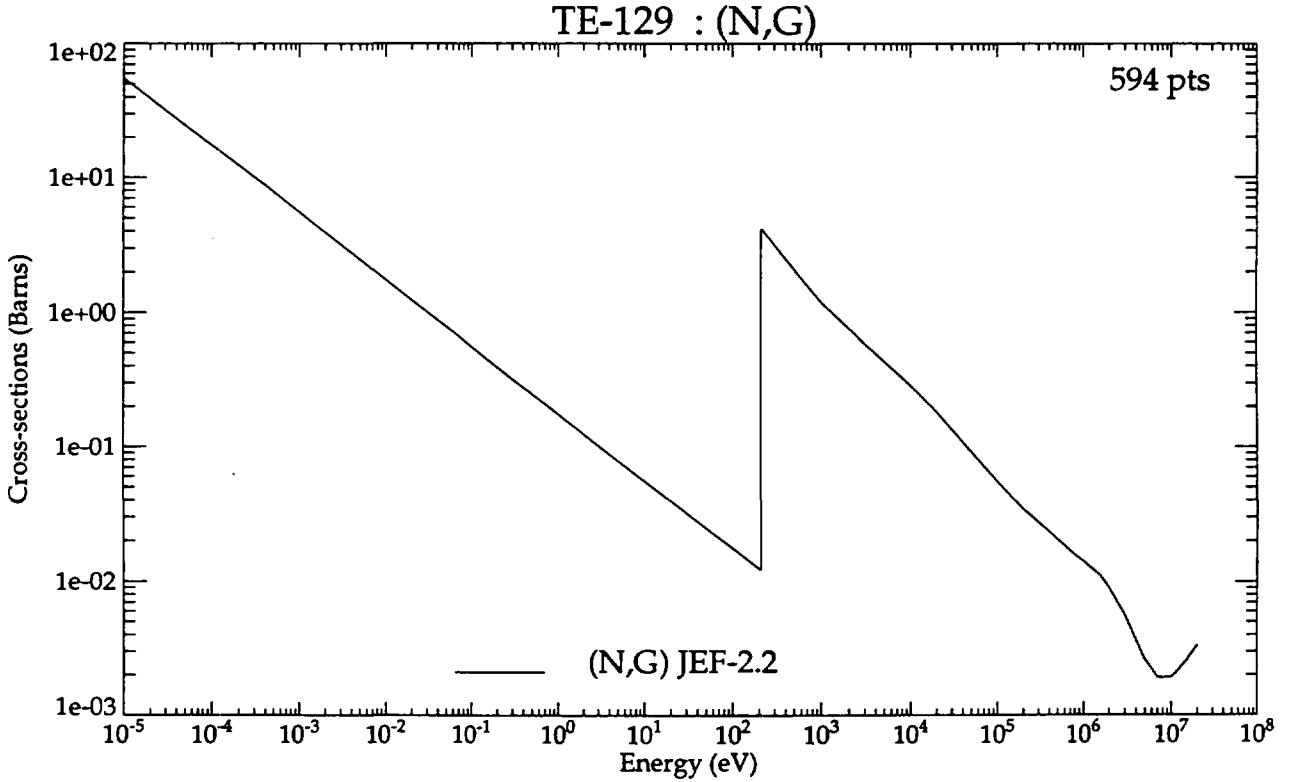
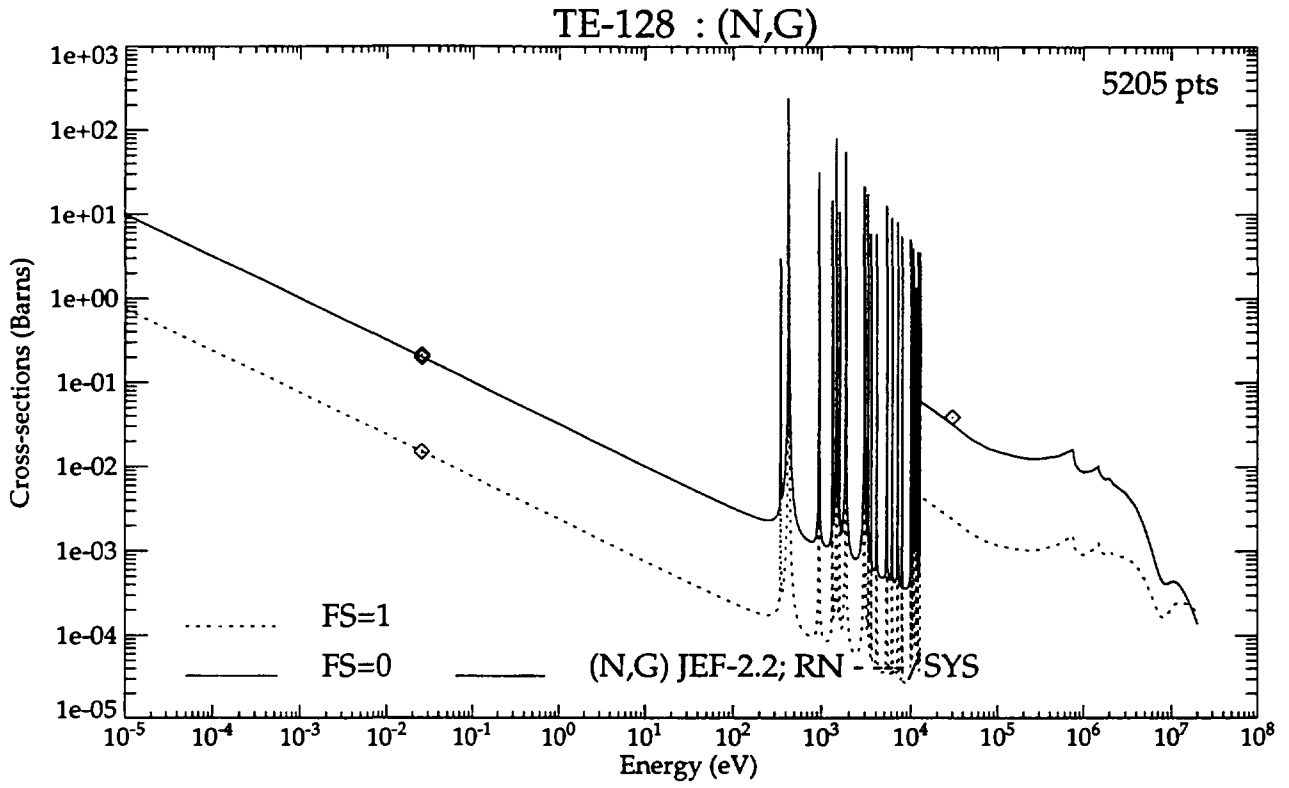


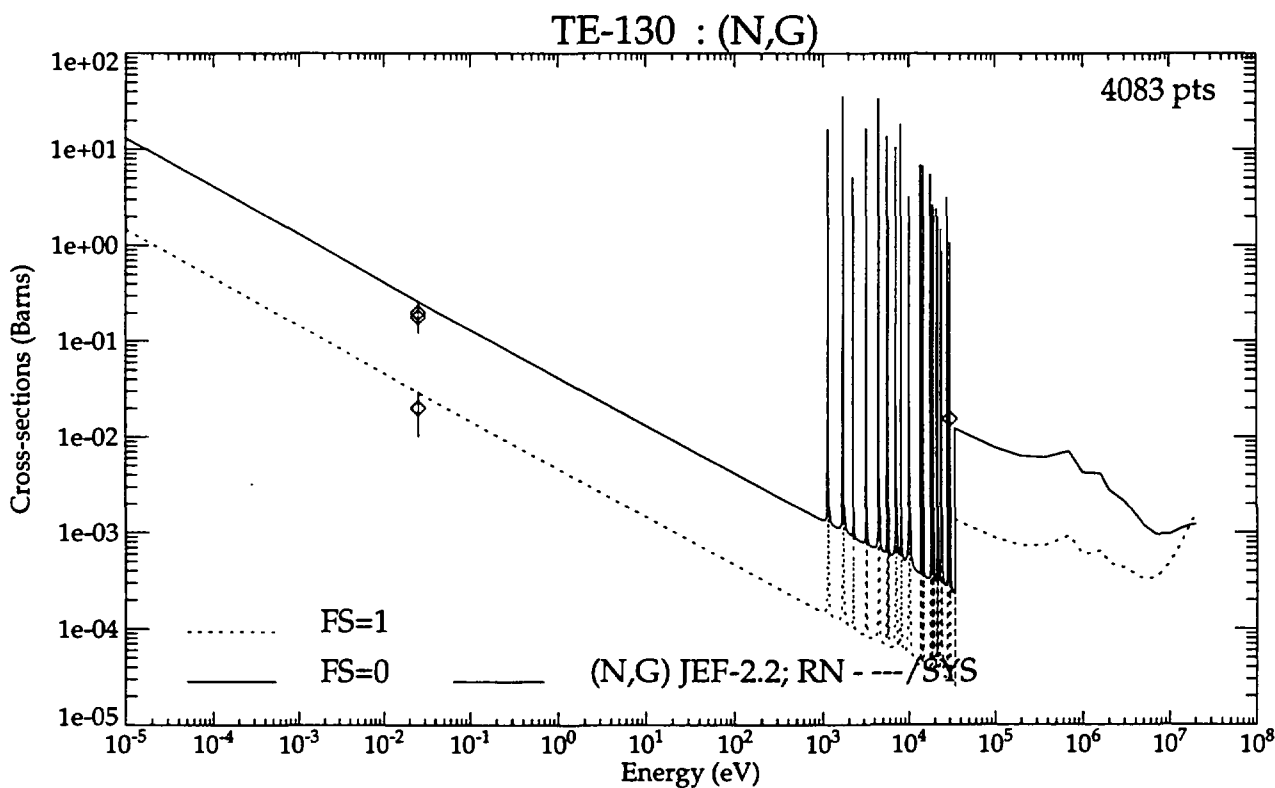
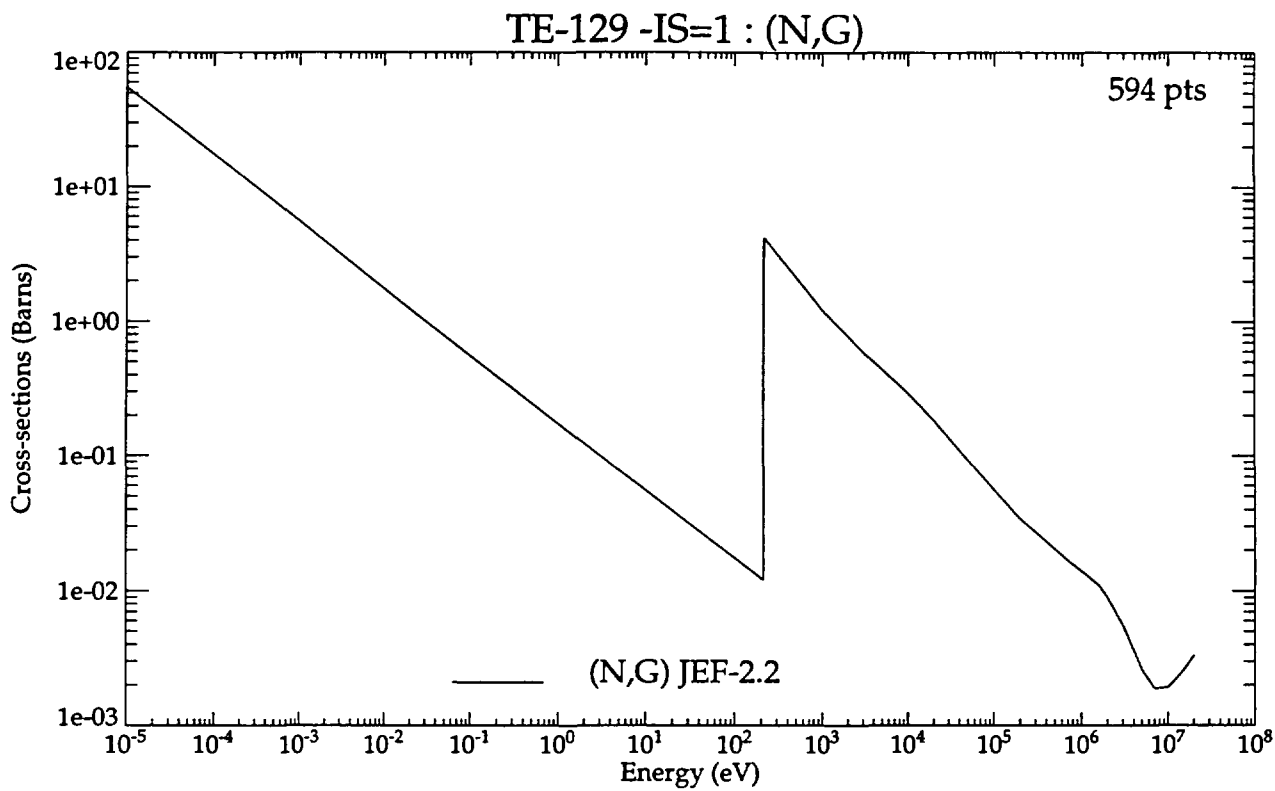


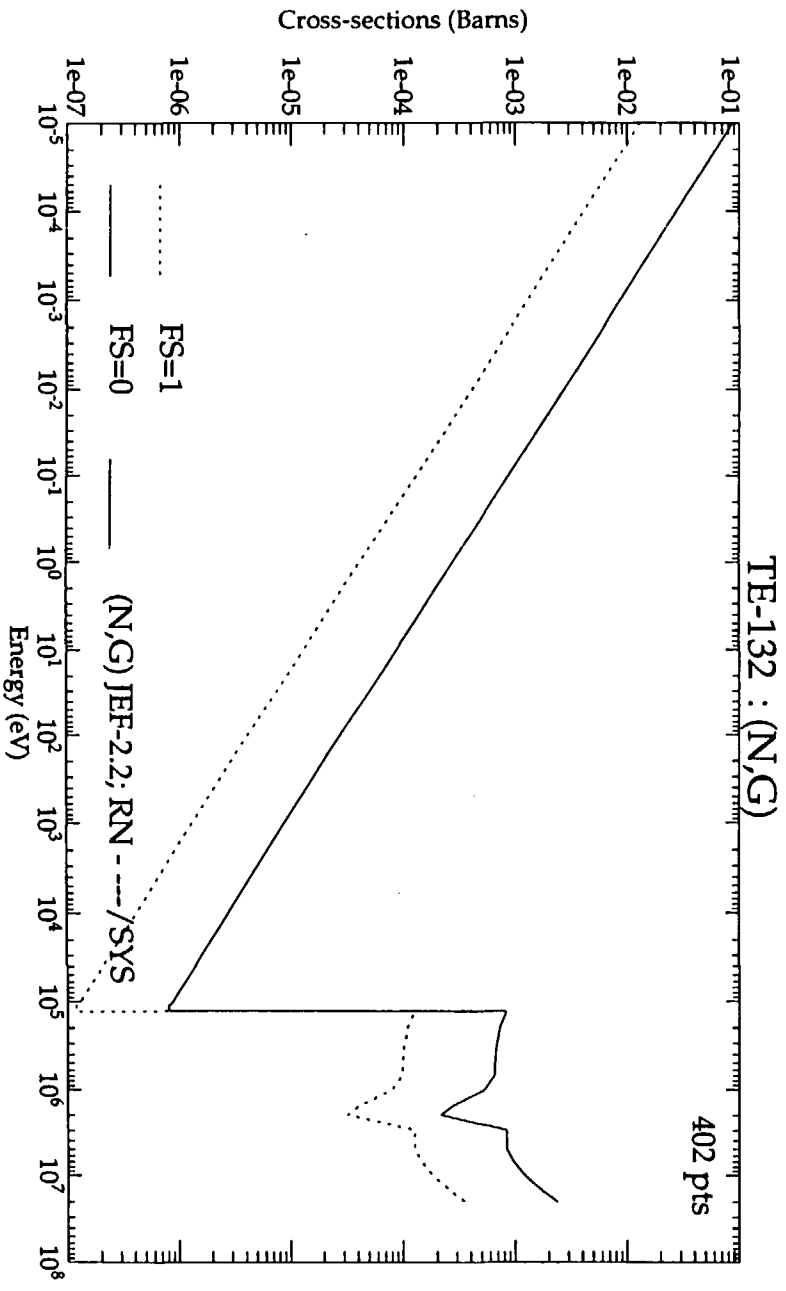
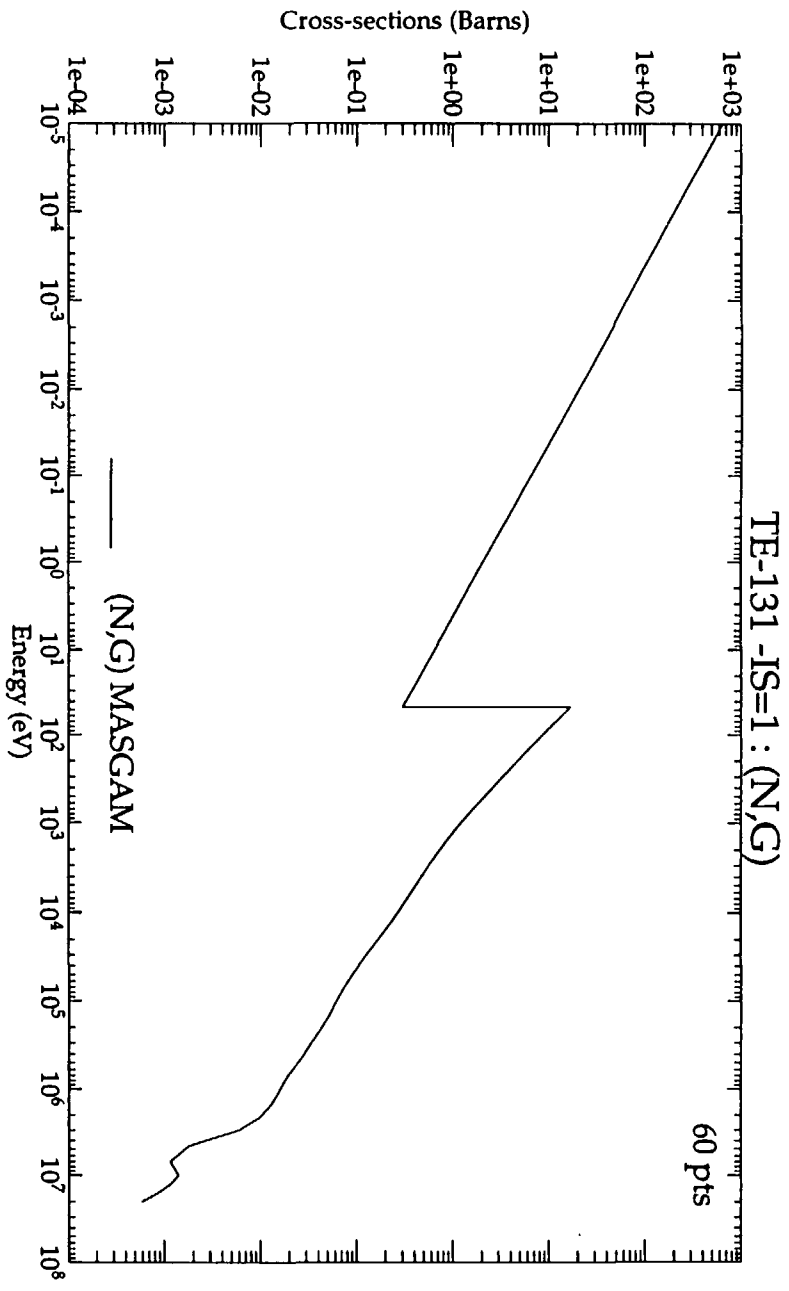


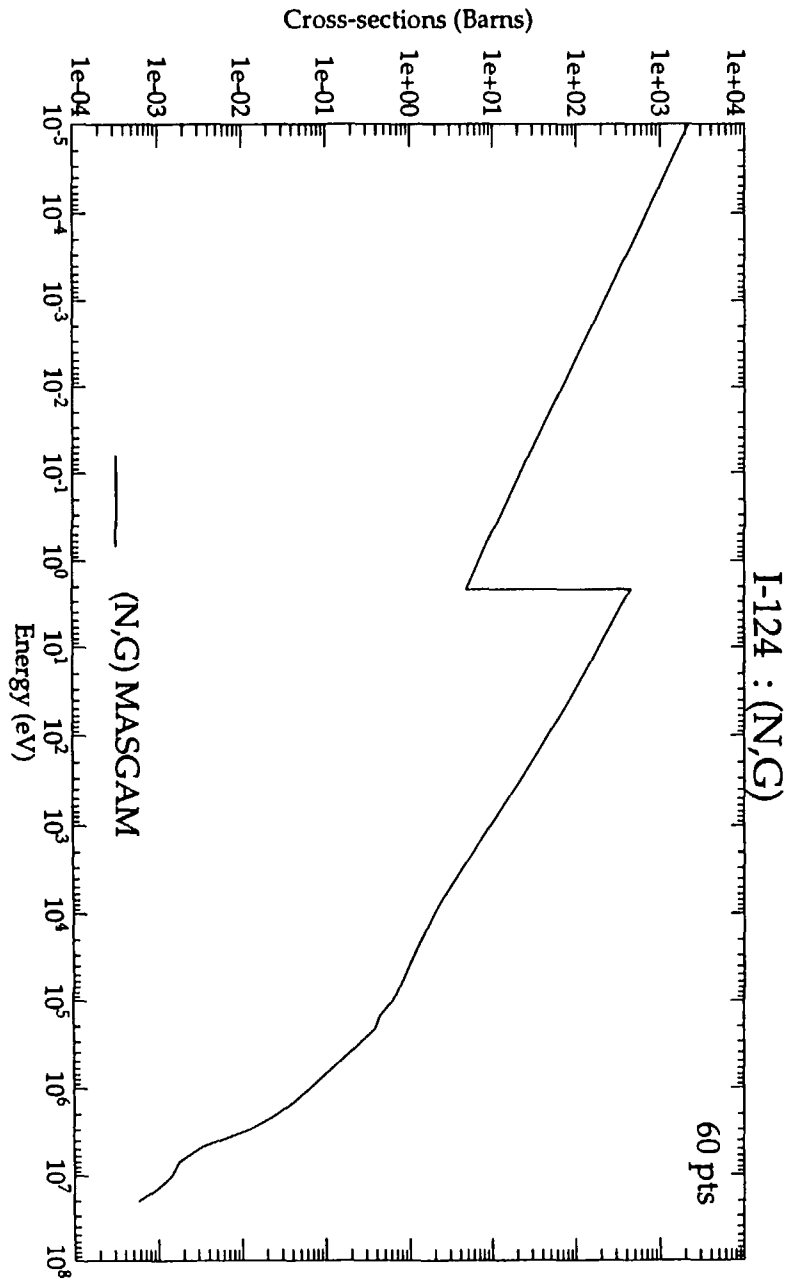
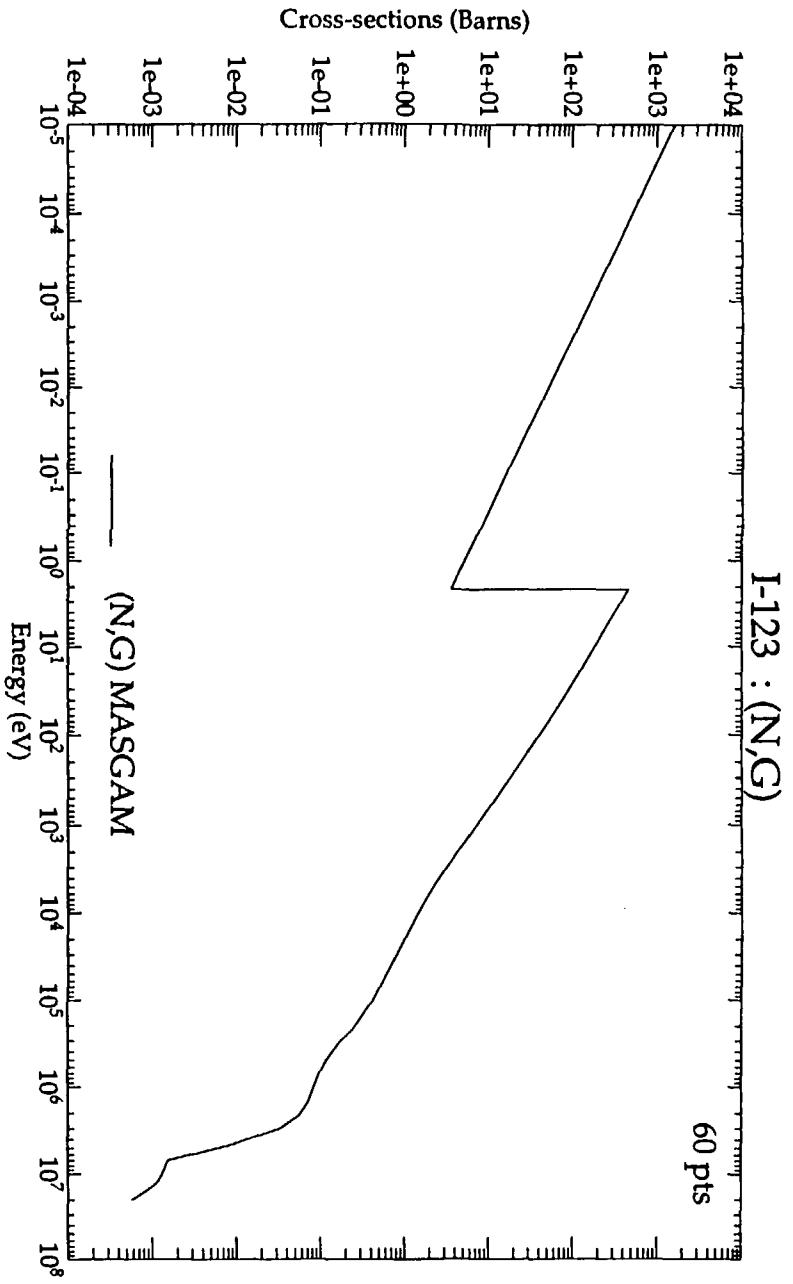


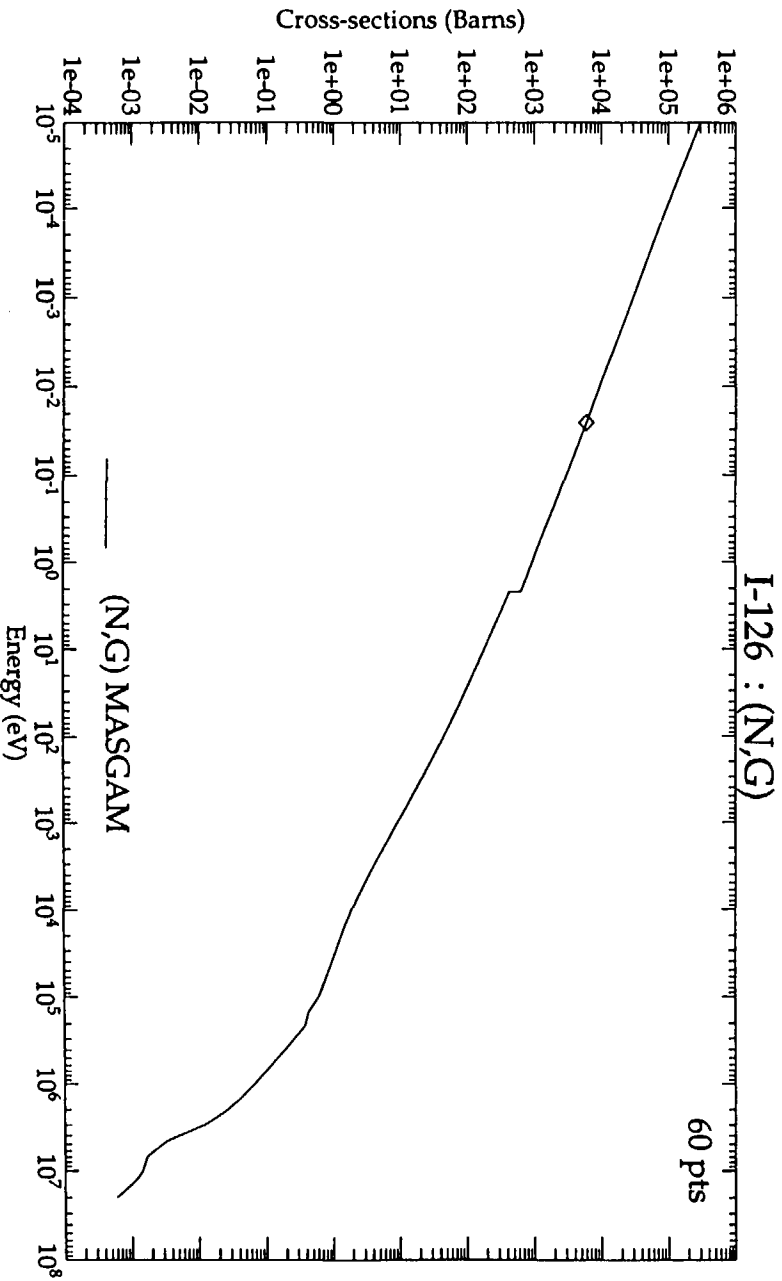
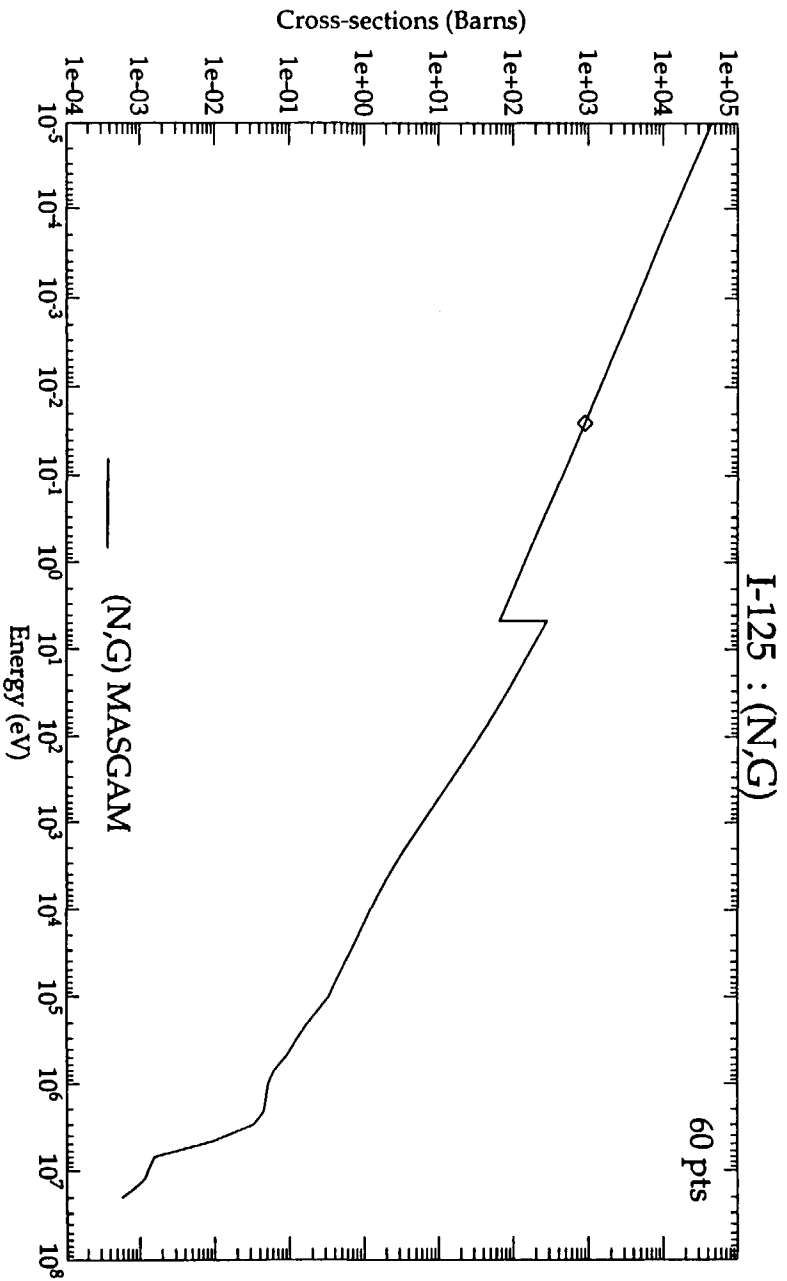


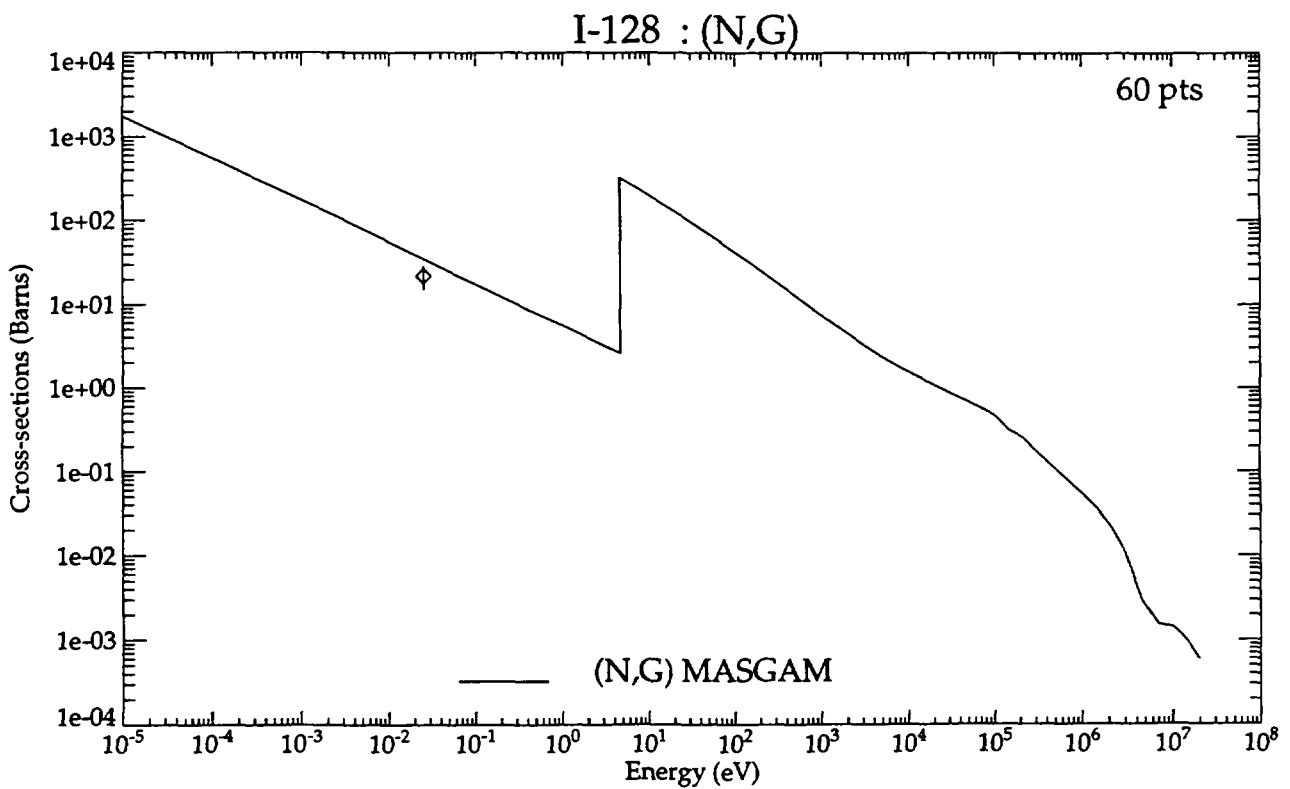
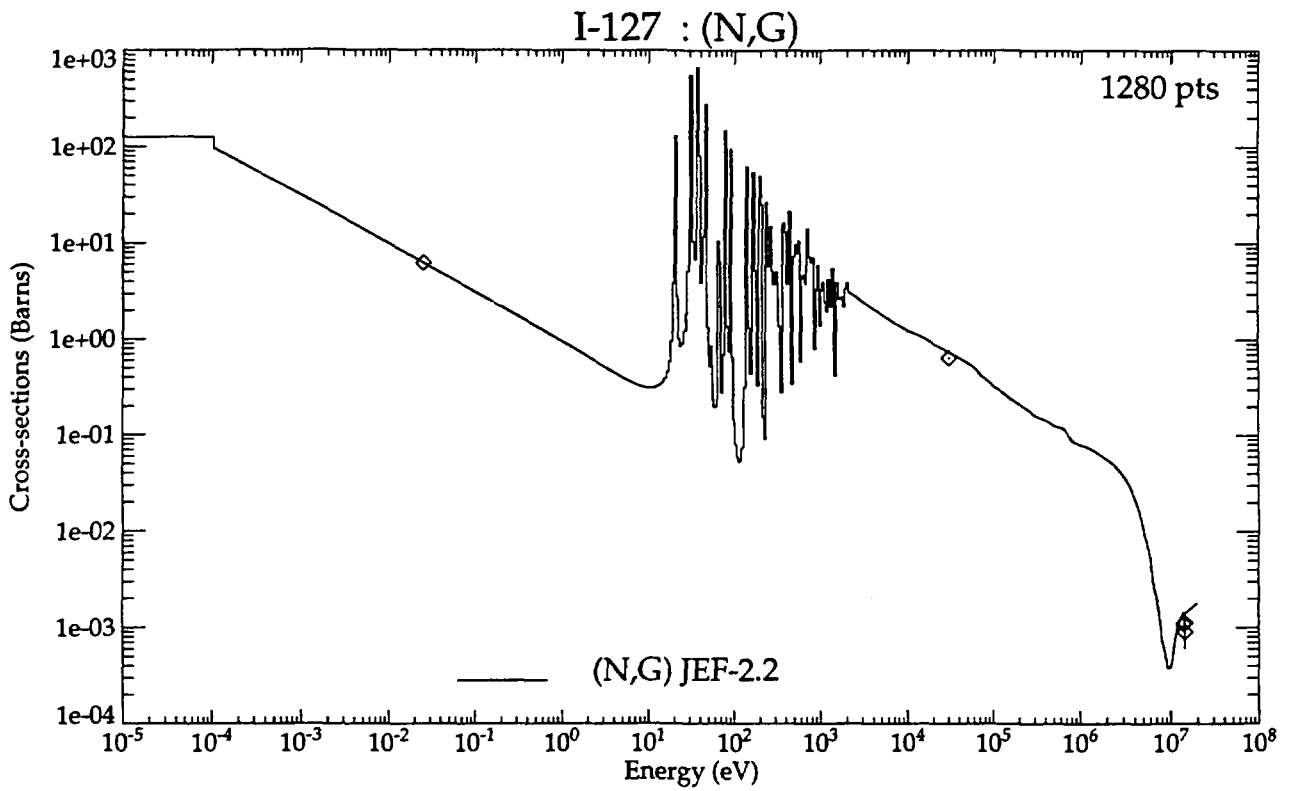


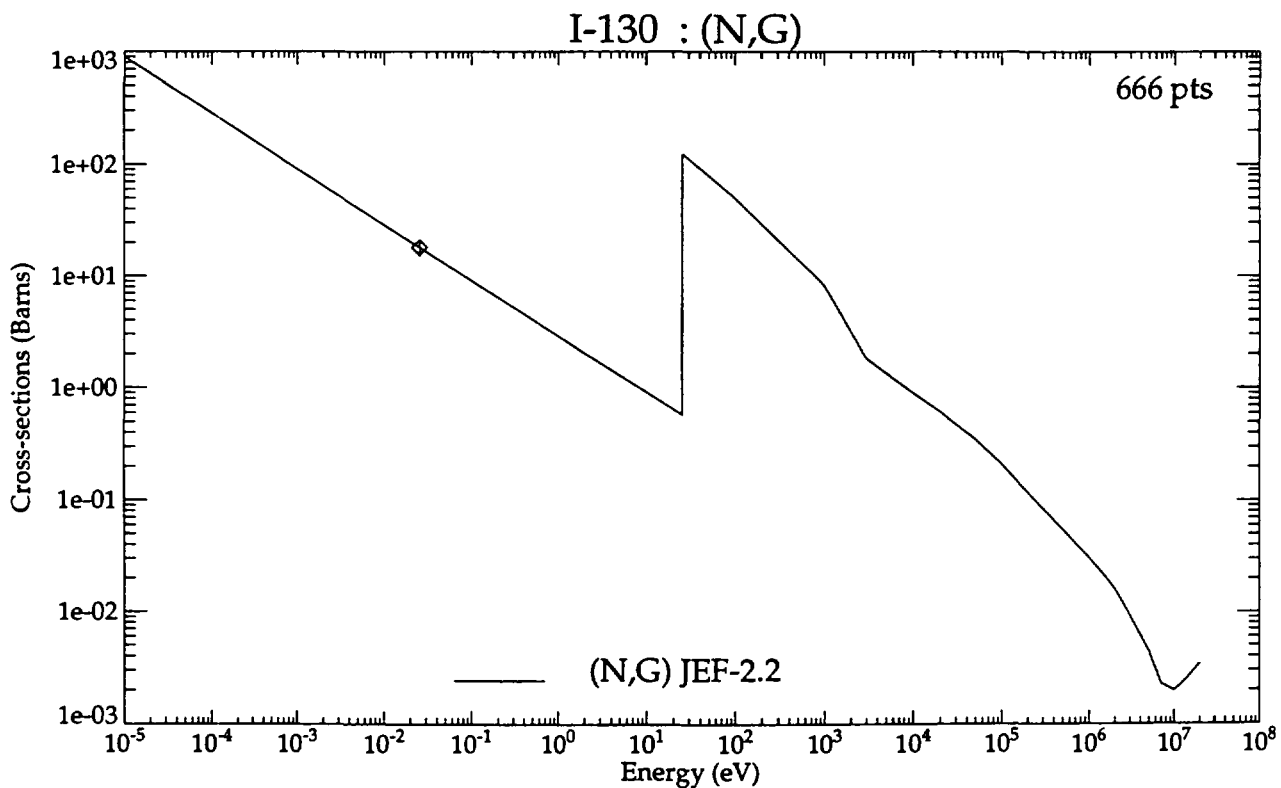
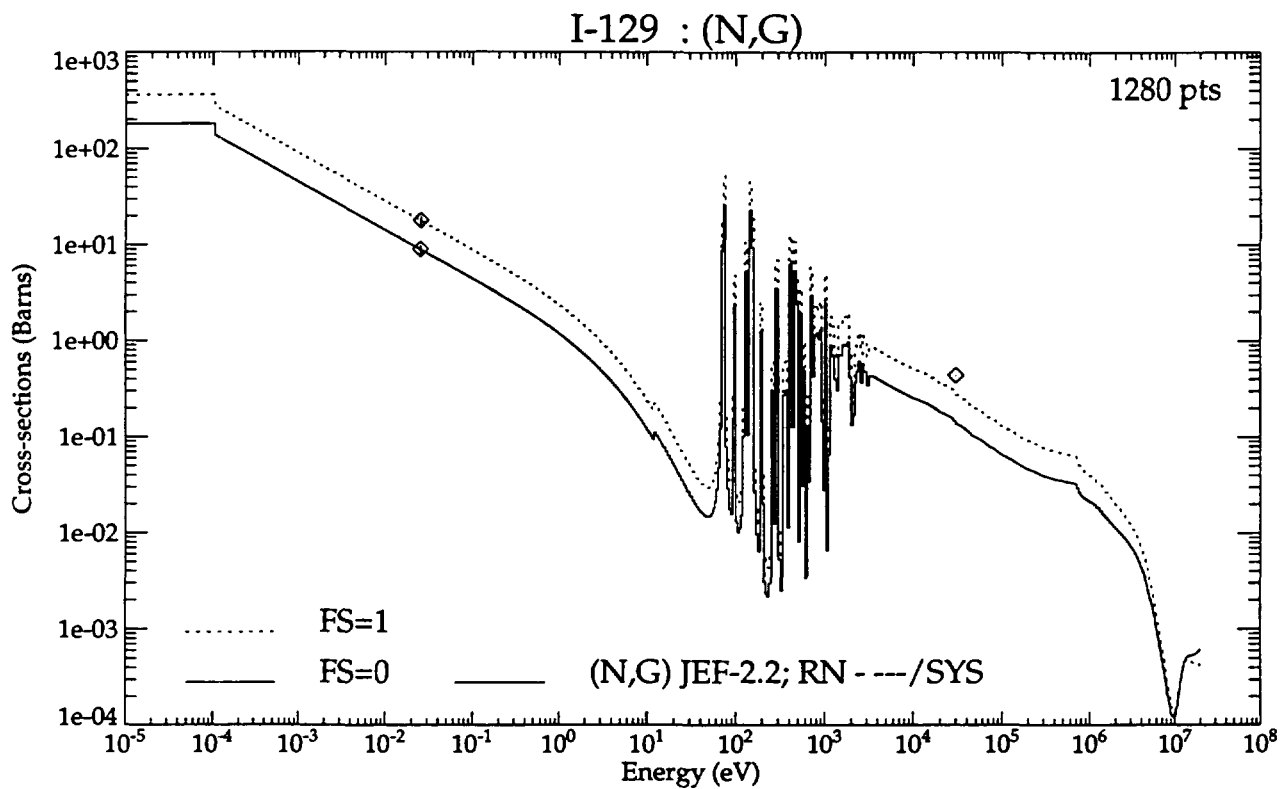




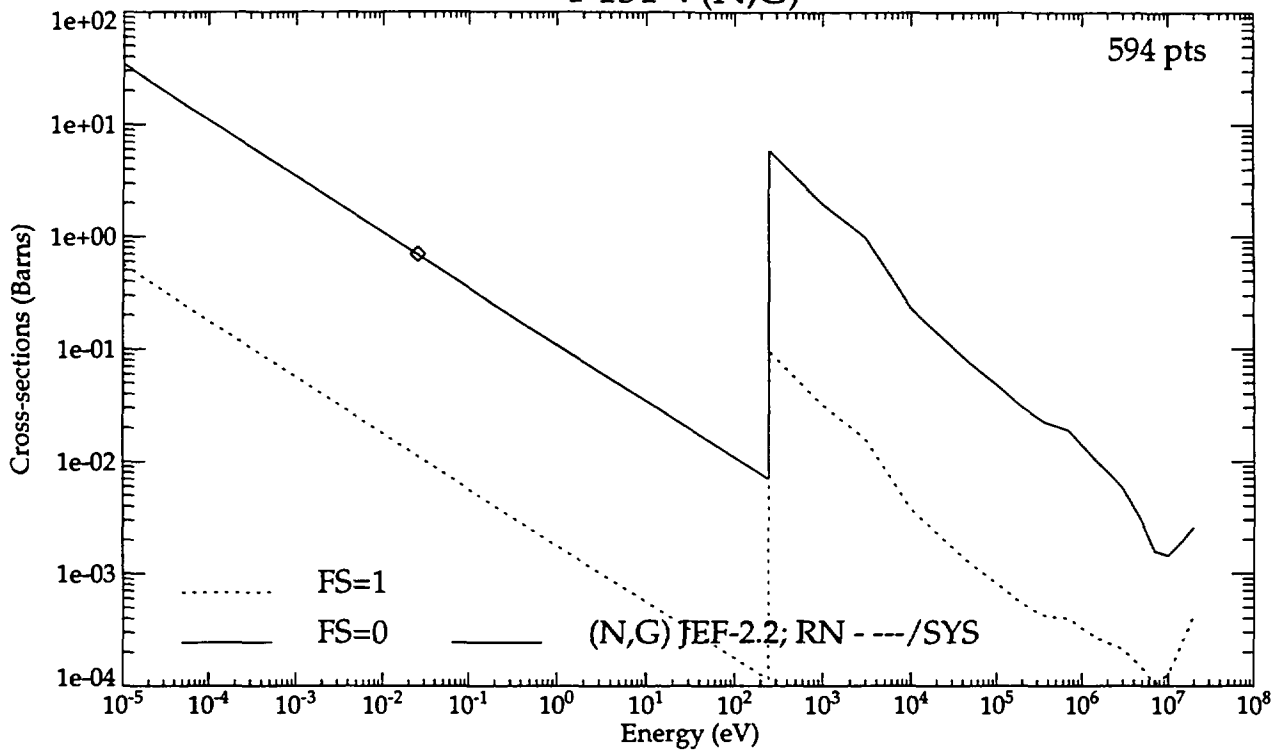




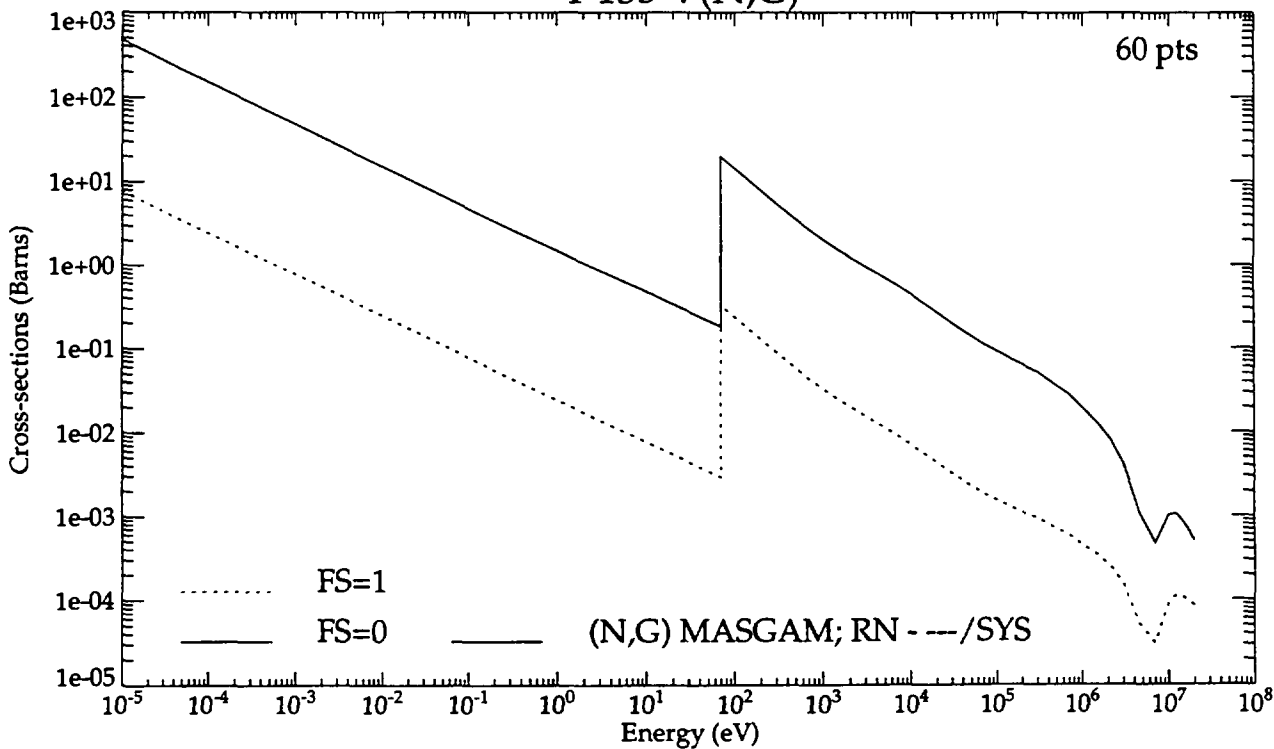


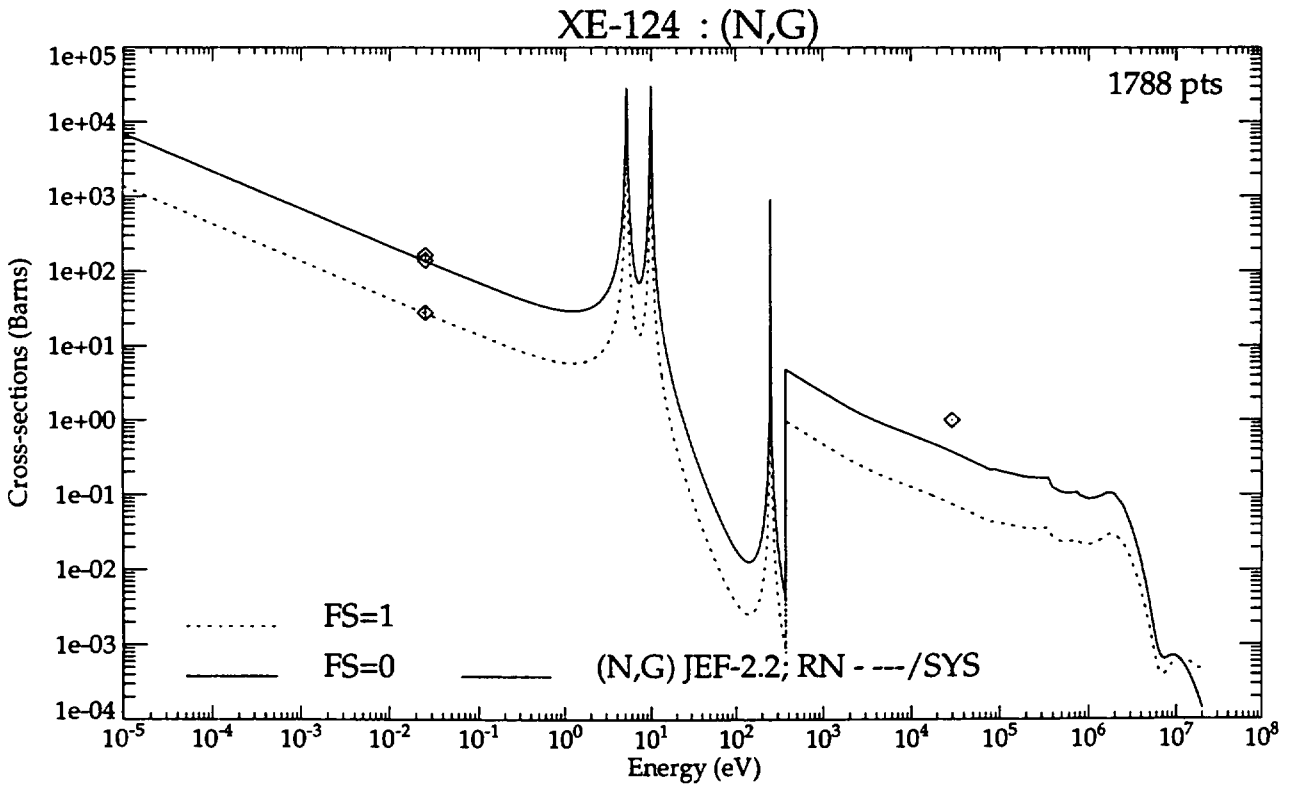
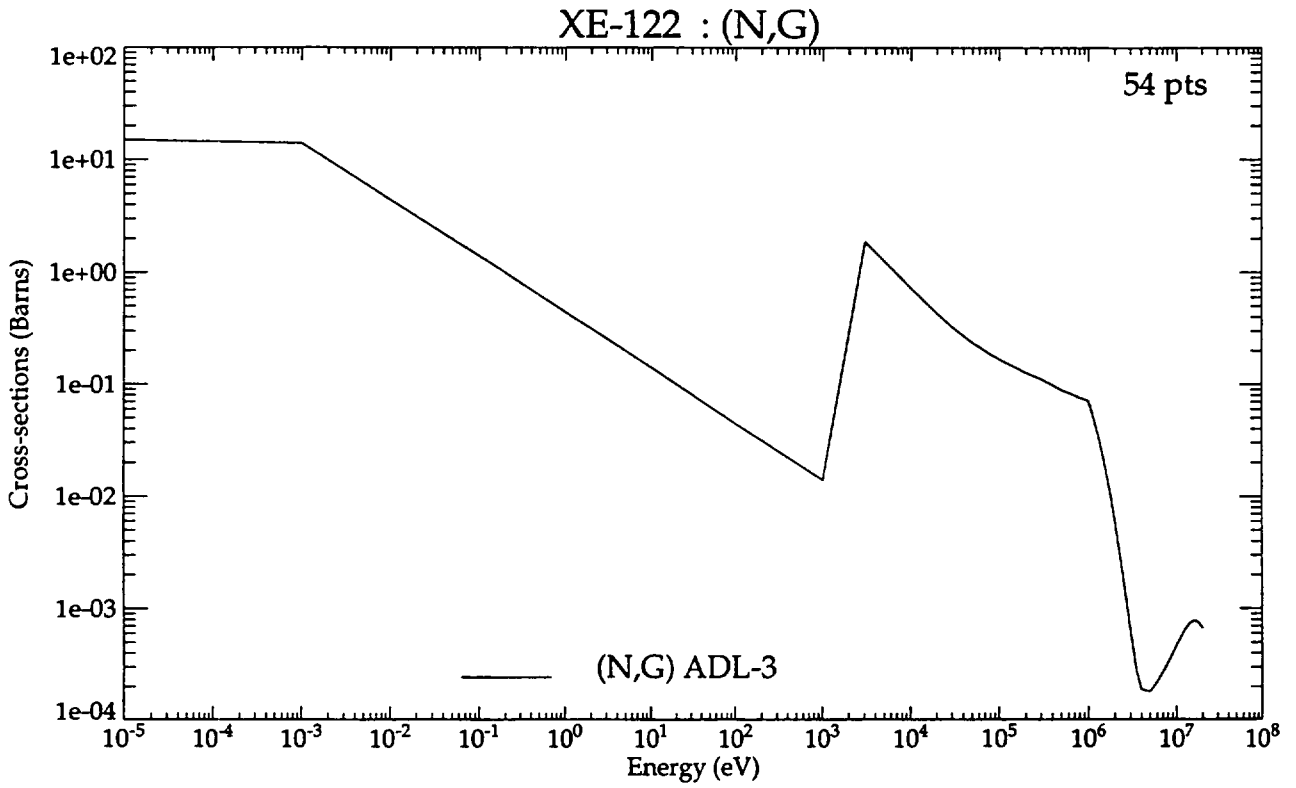


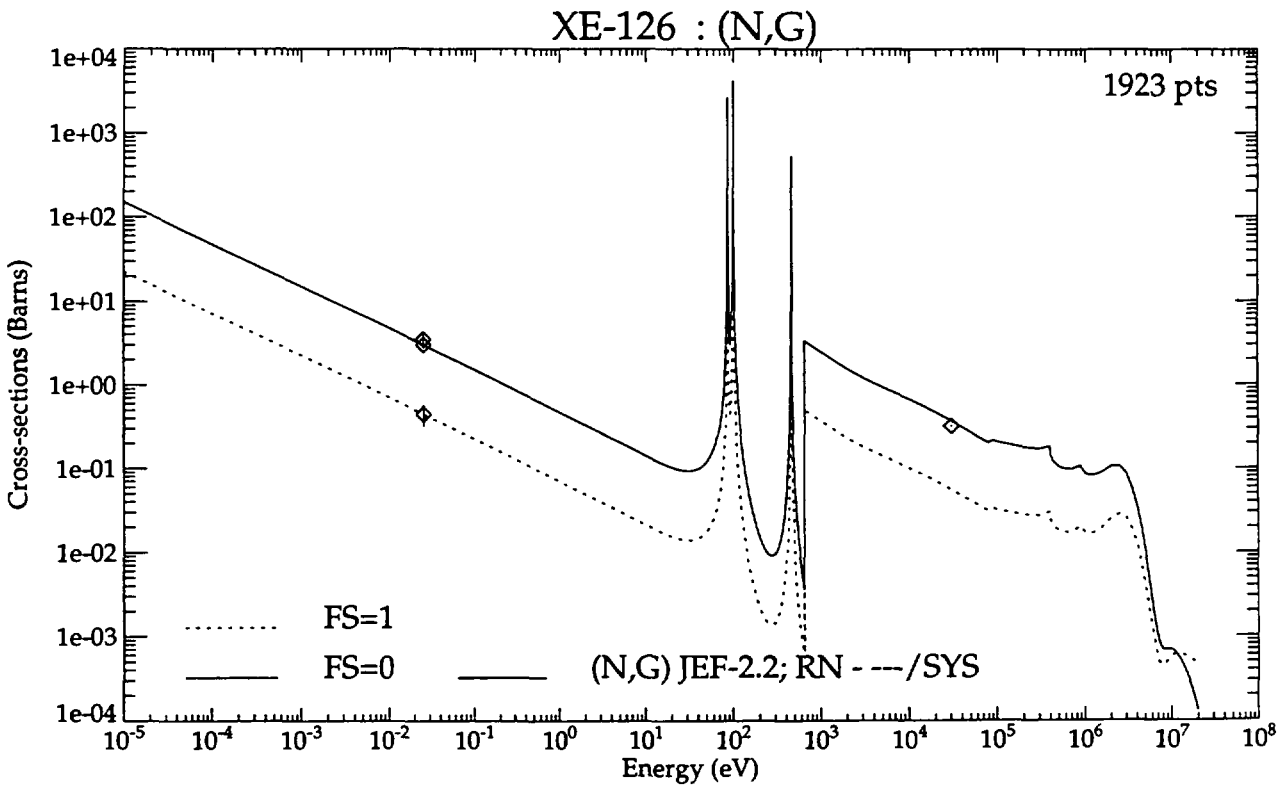
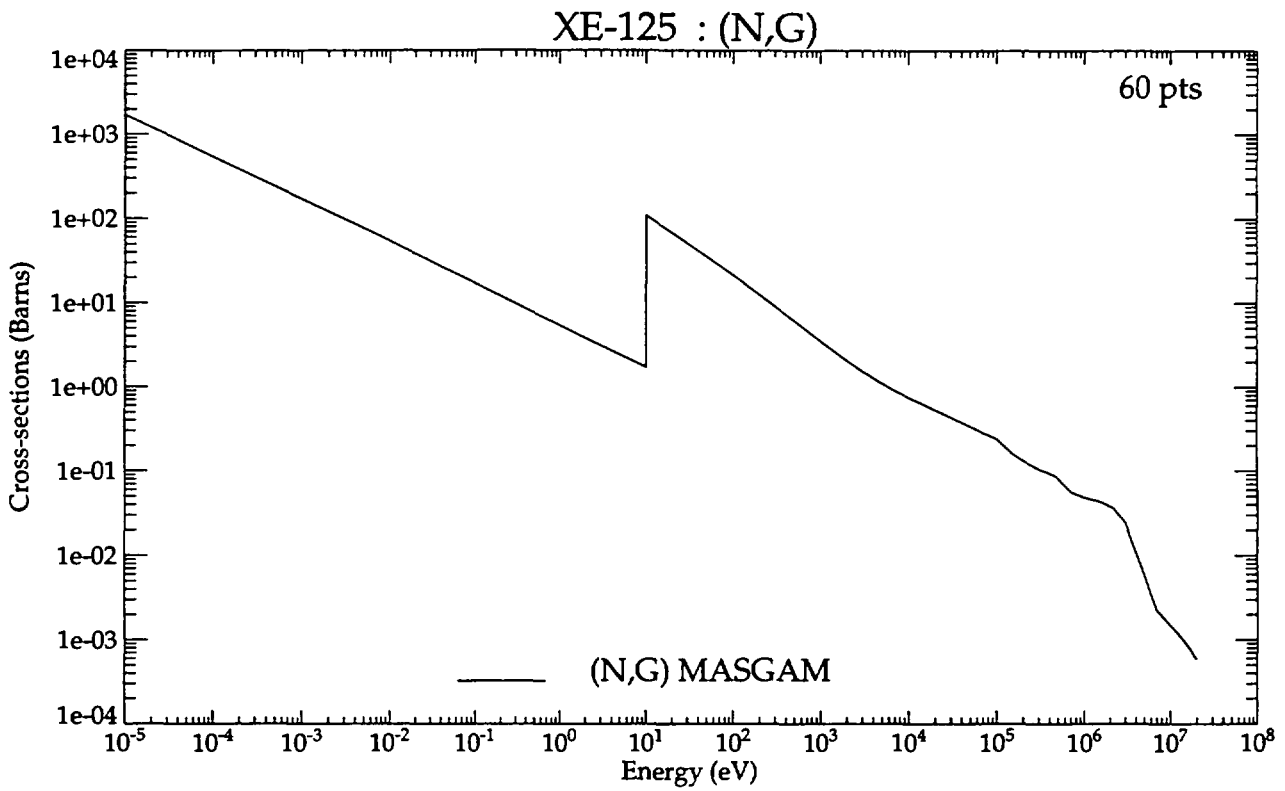
I-131 : (N,G)

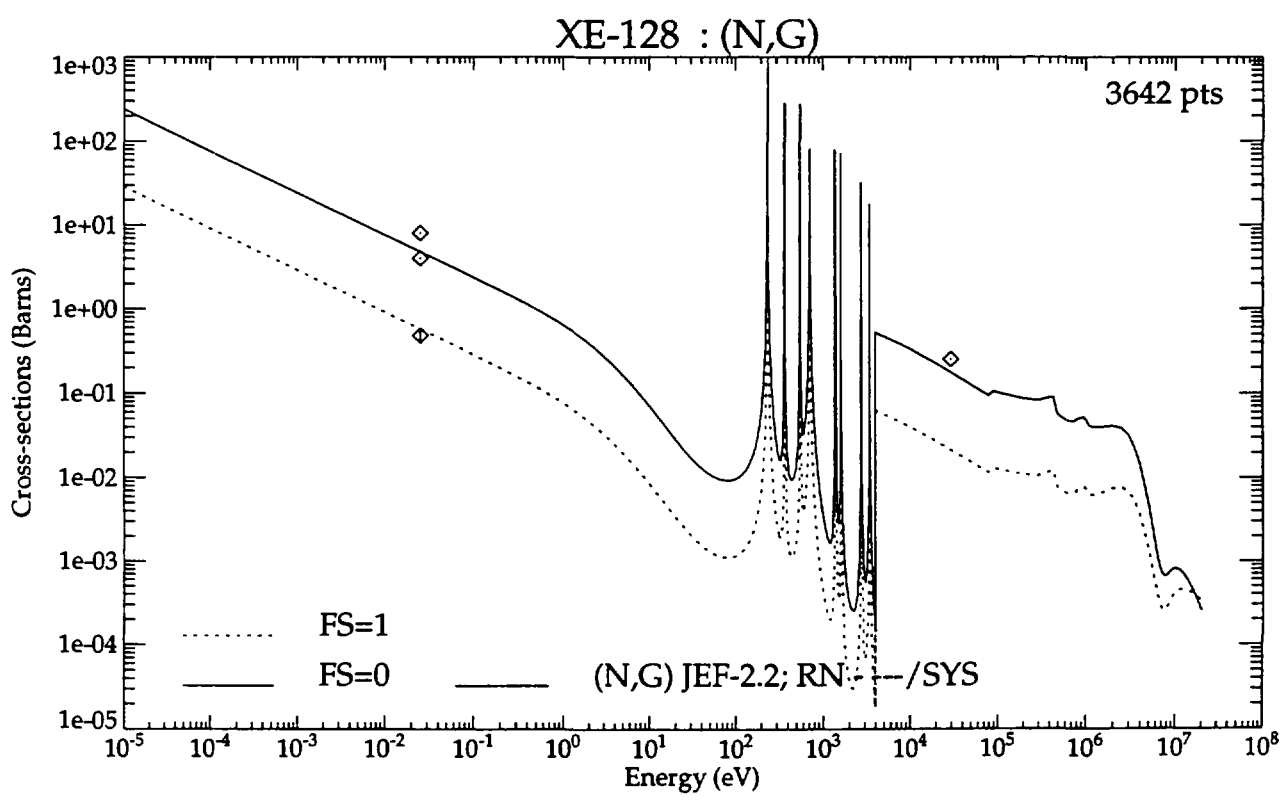
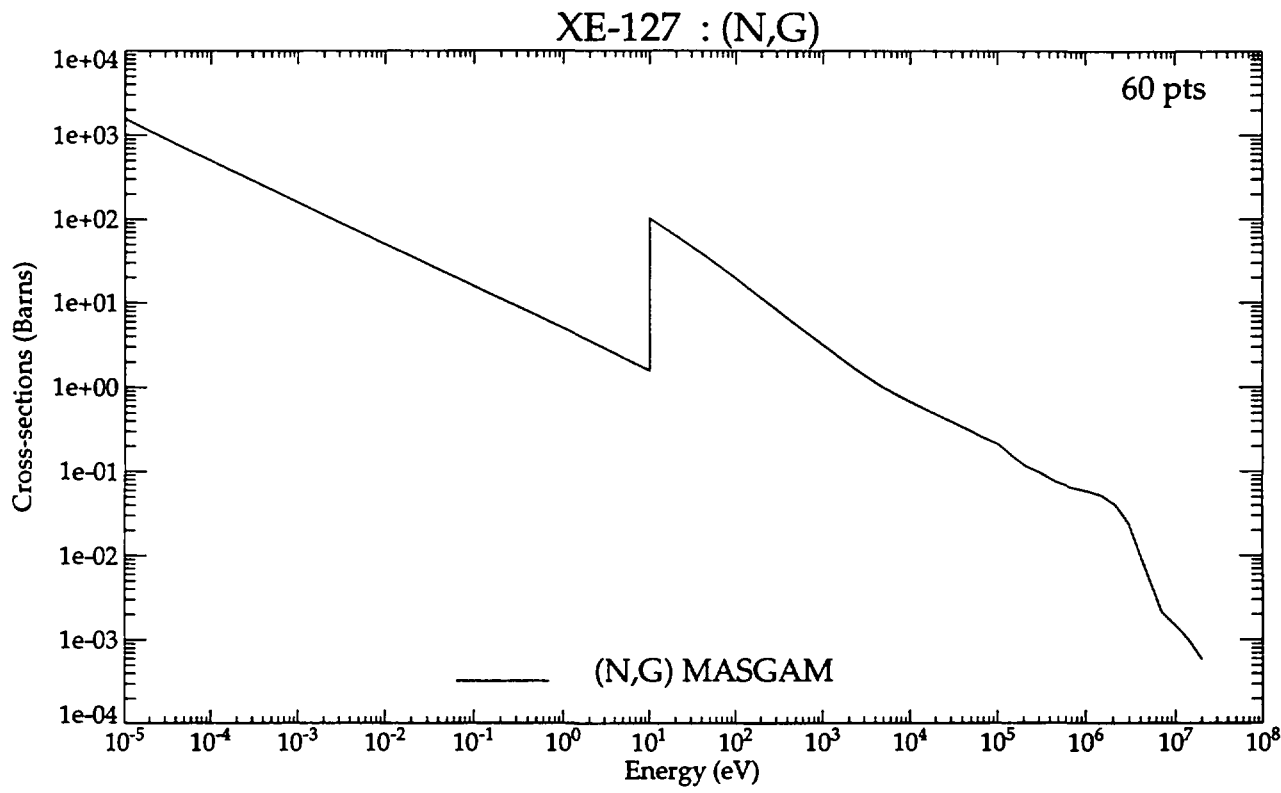


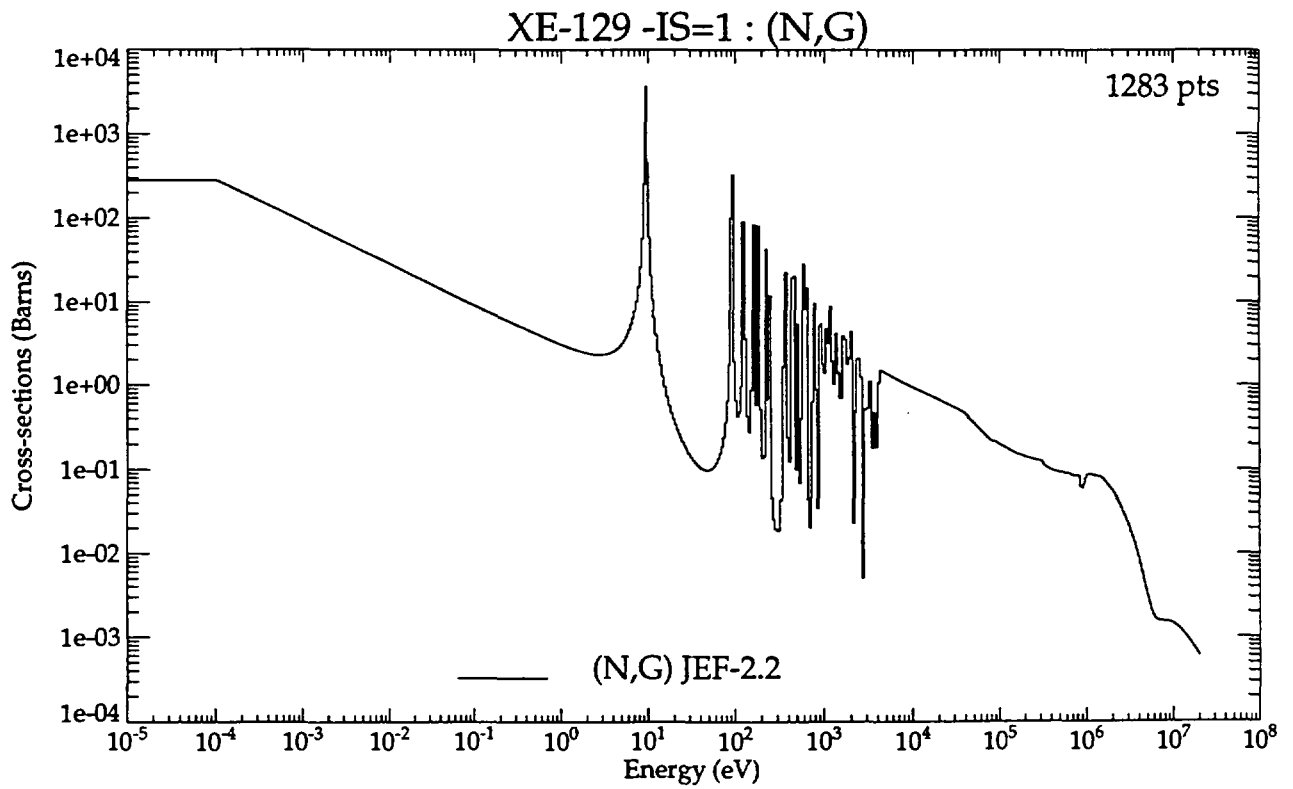
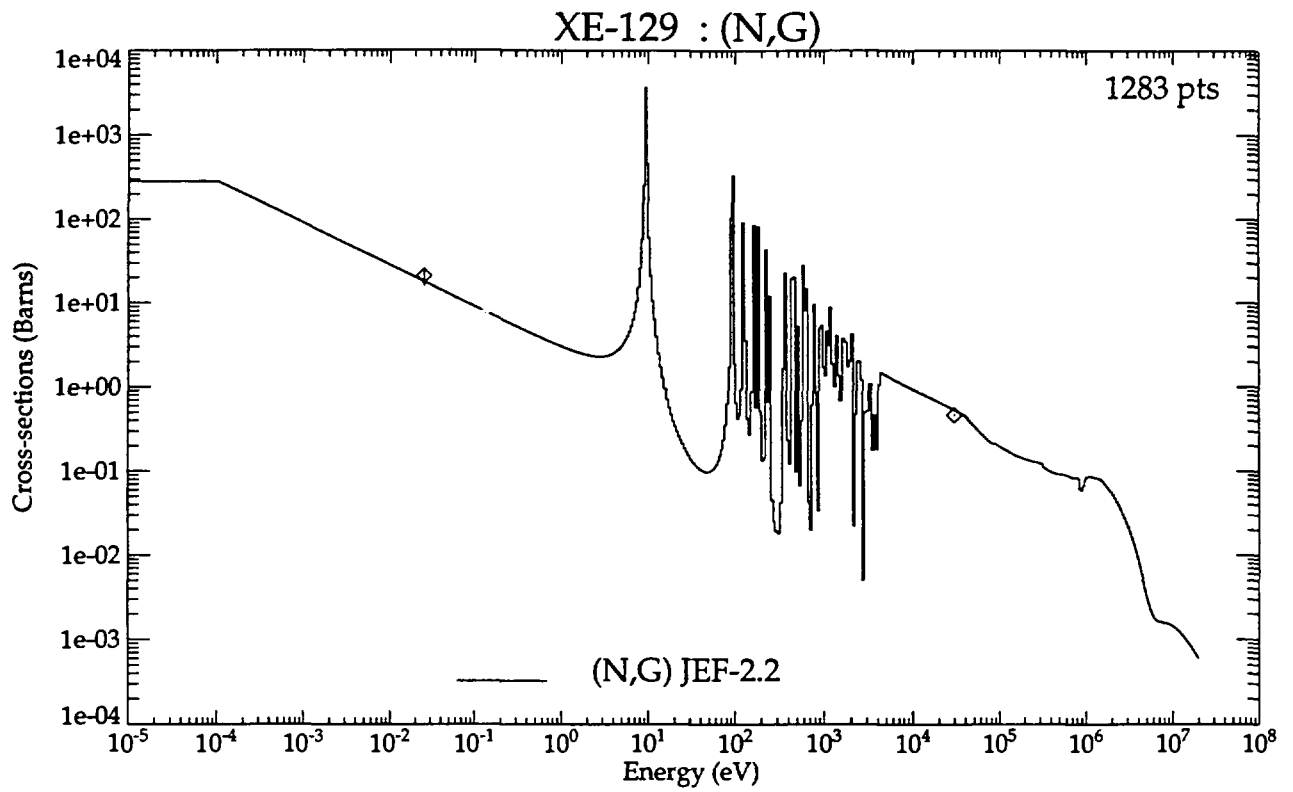
I-133 : (N,G)

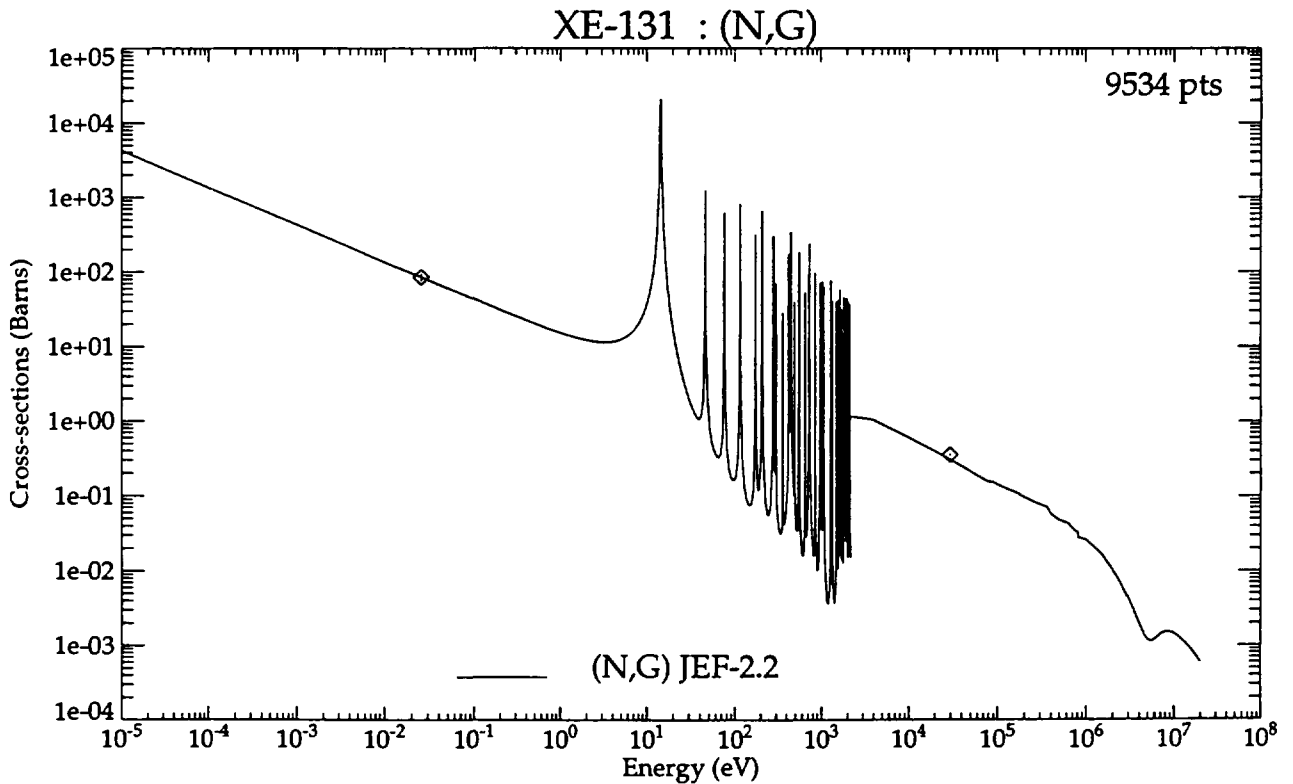
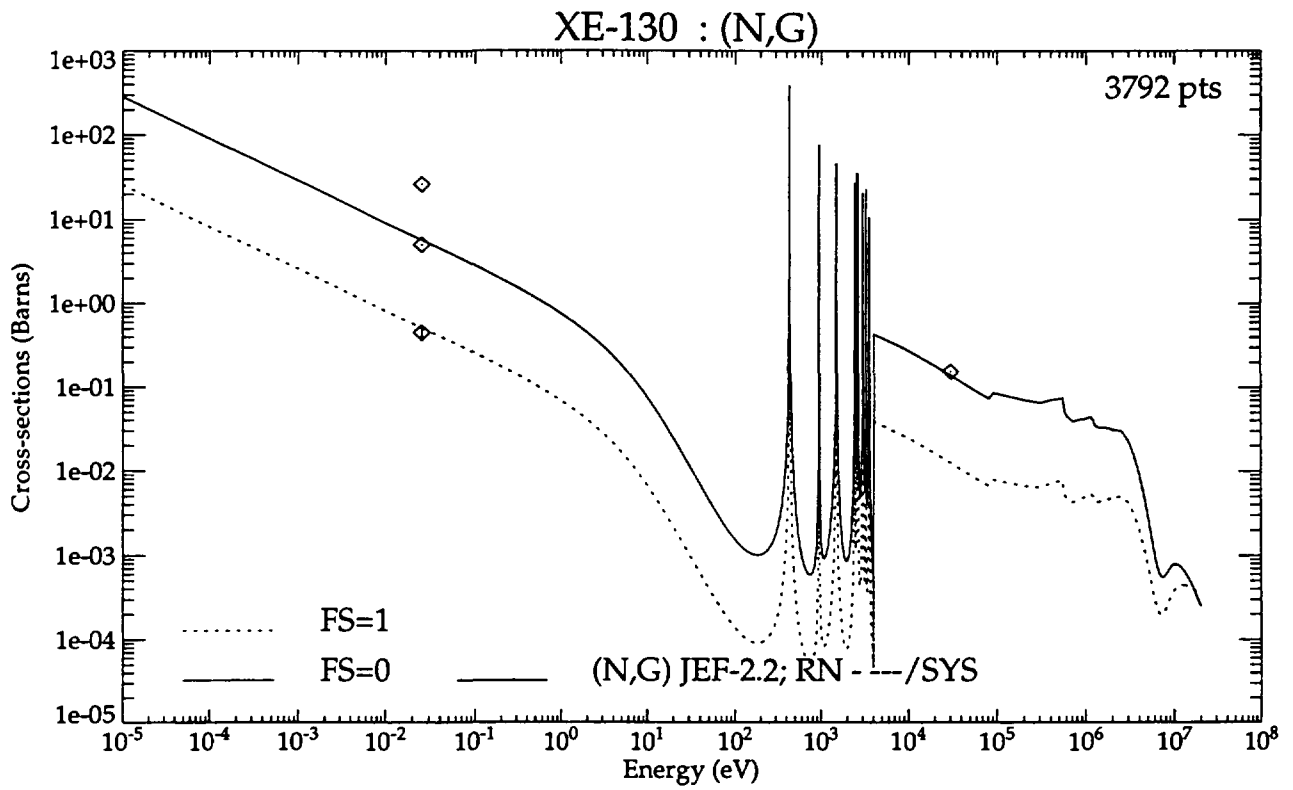


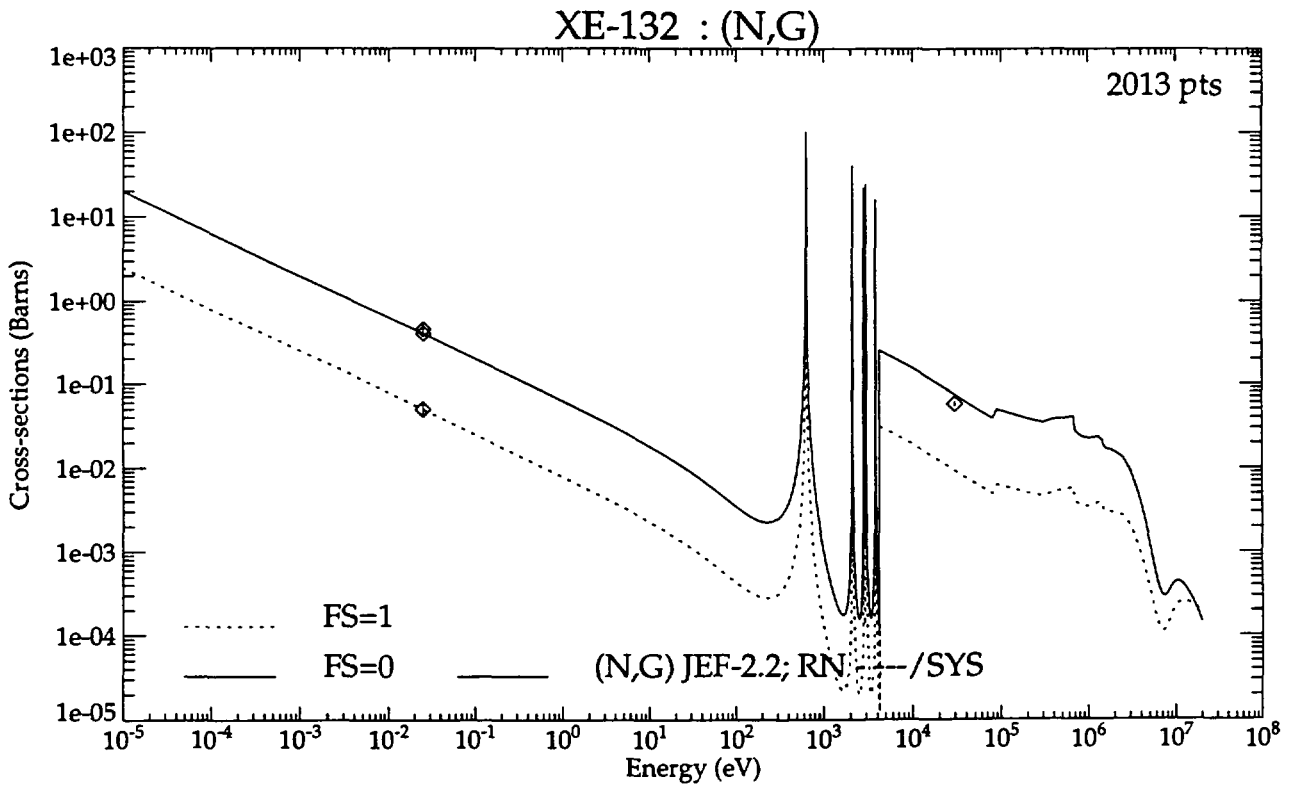
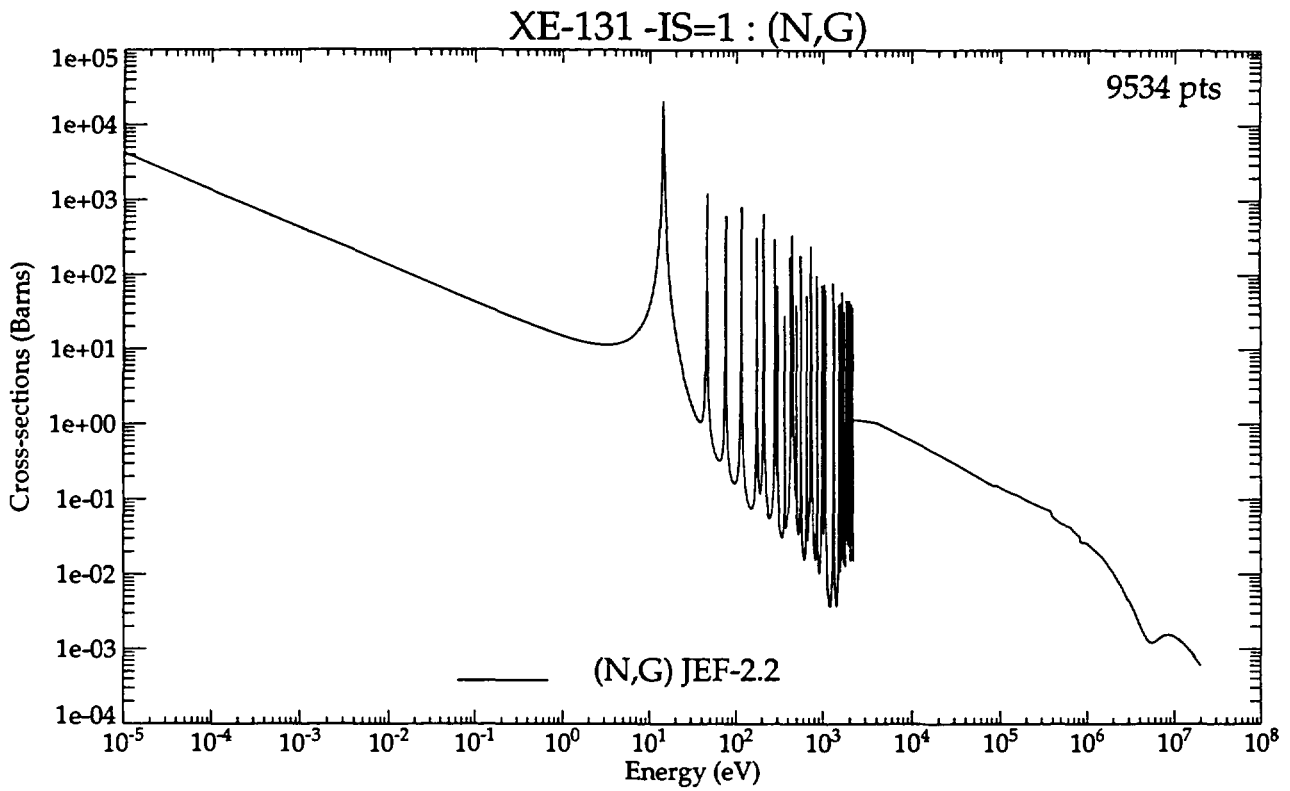


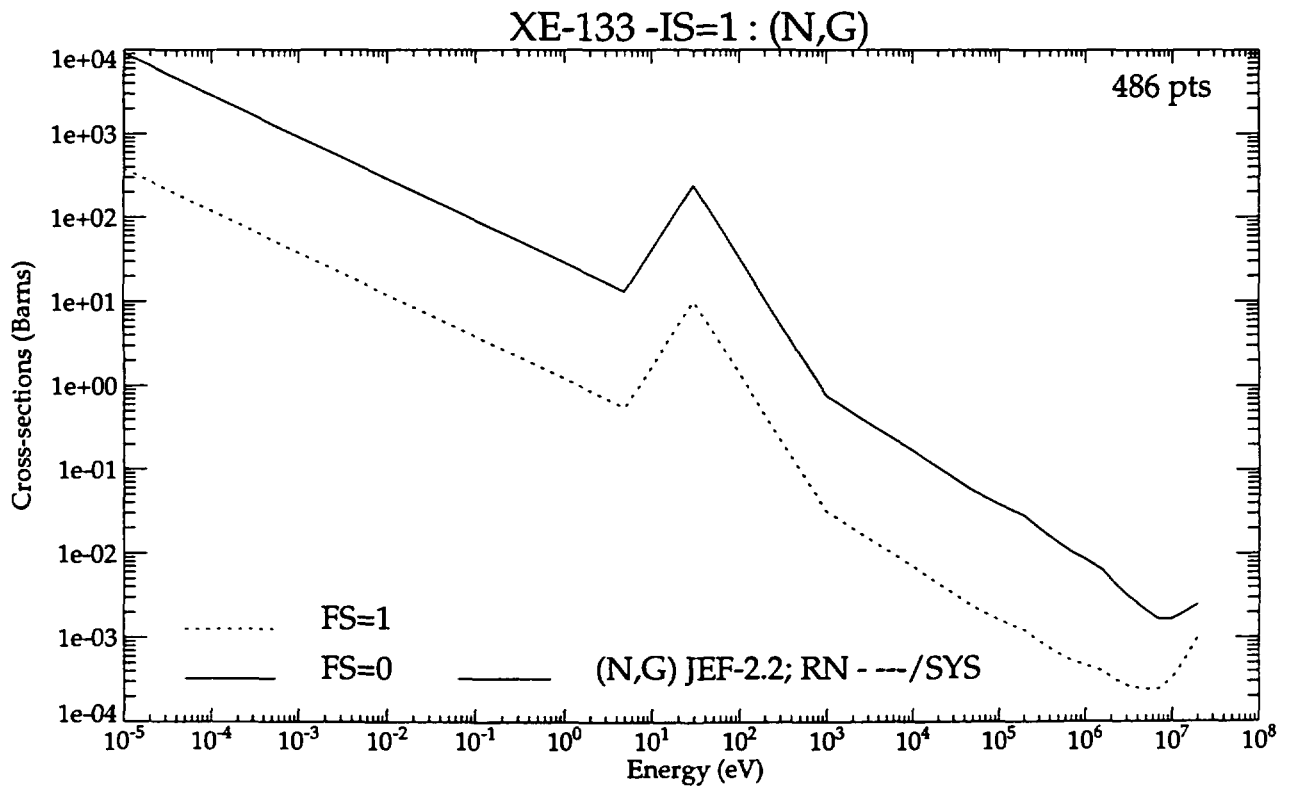
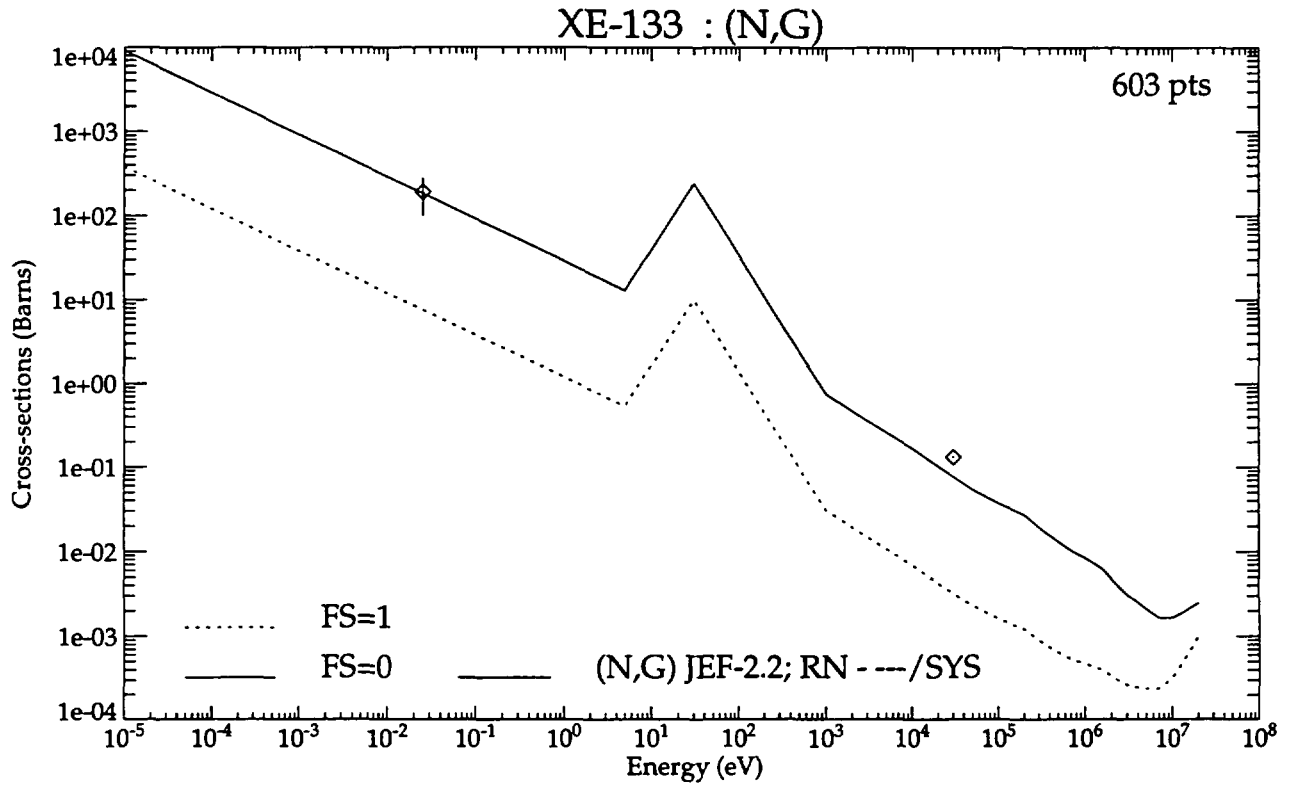


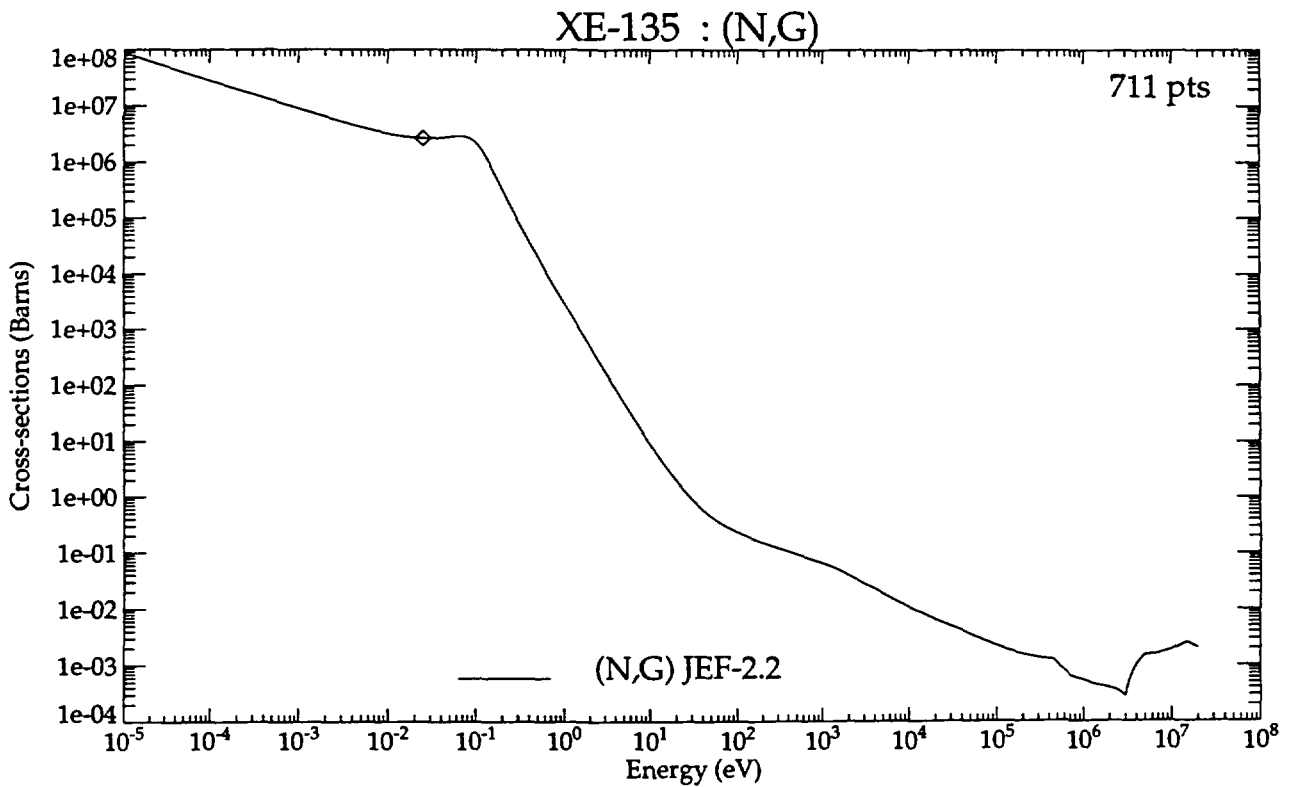
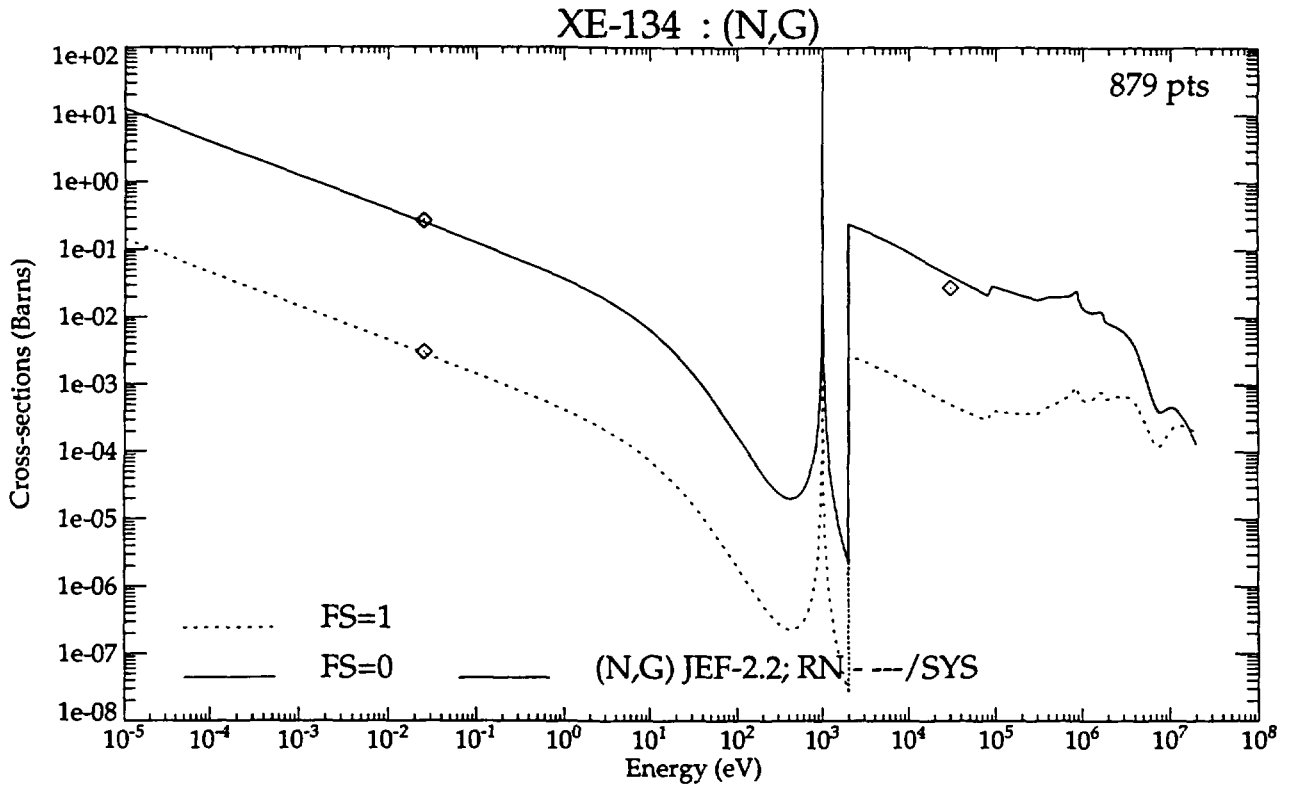


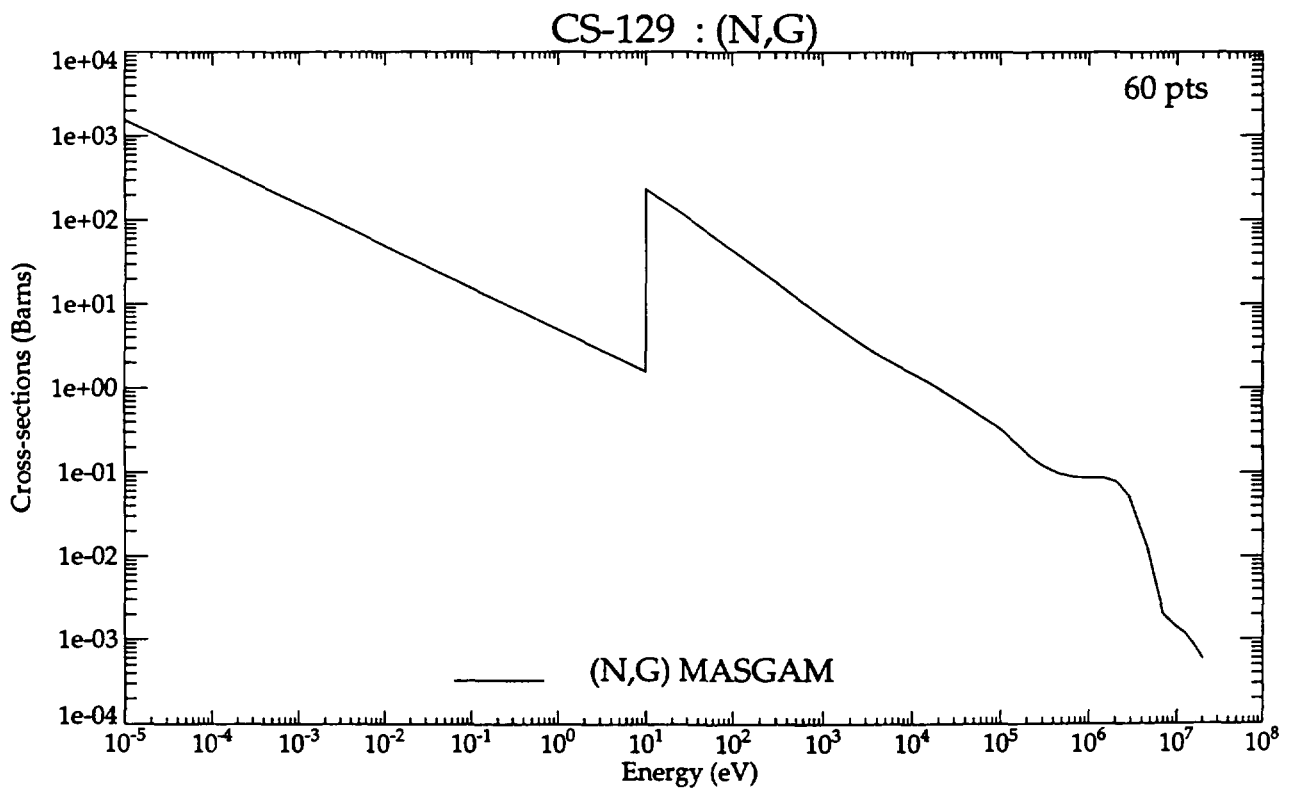
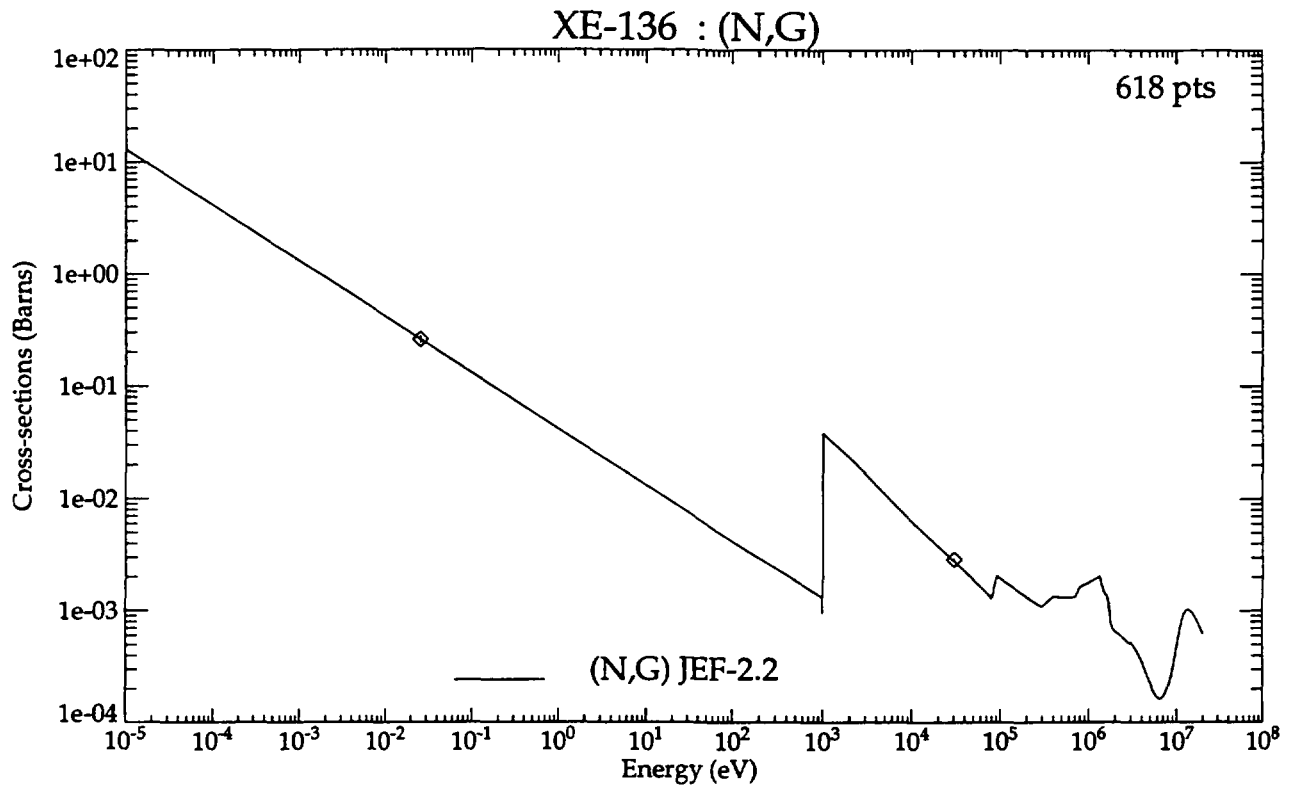


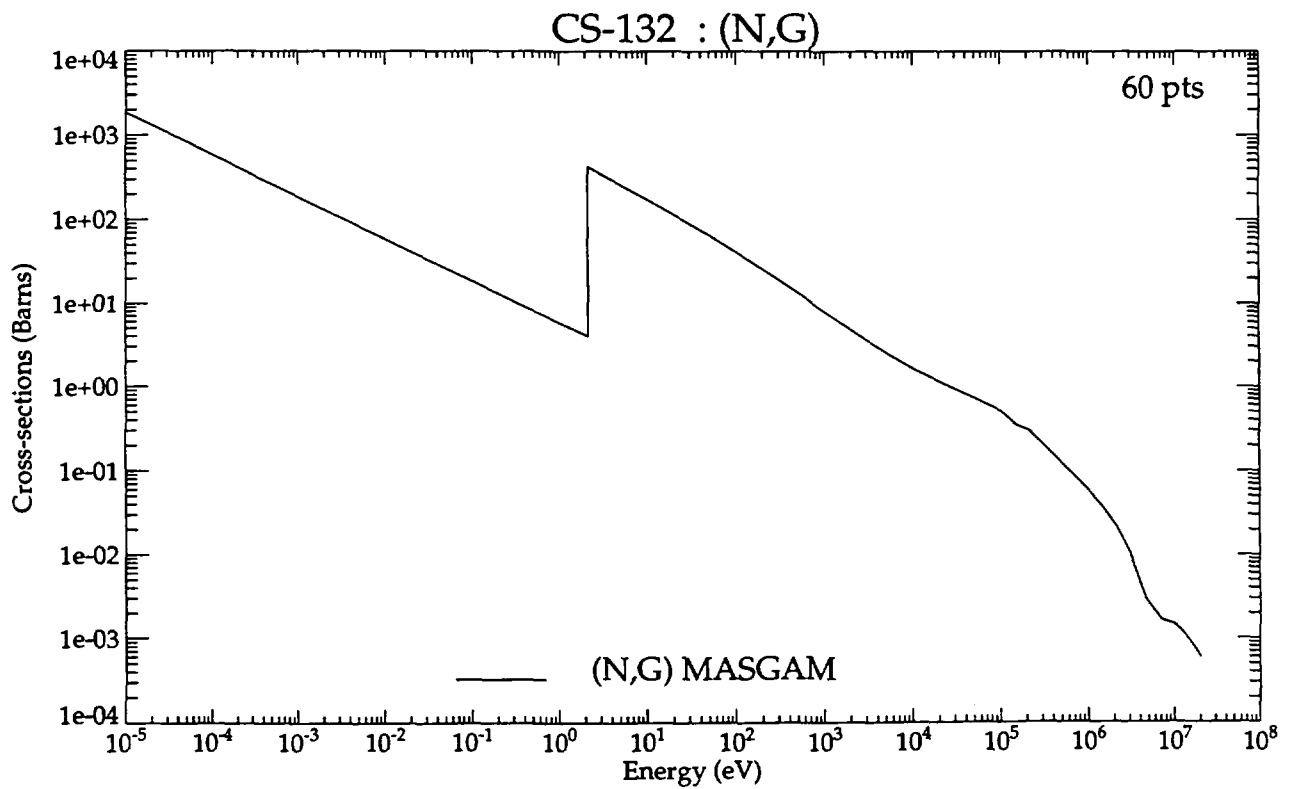
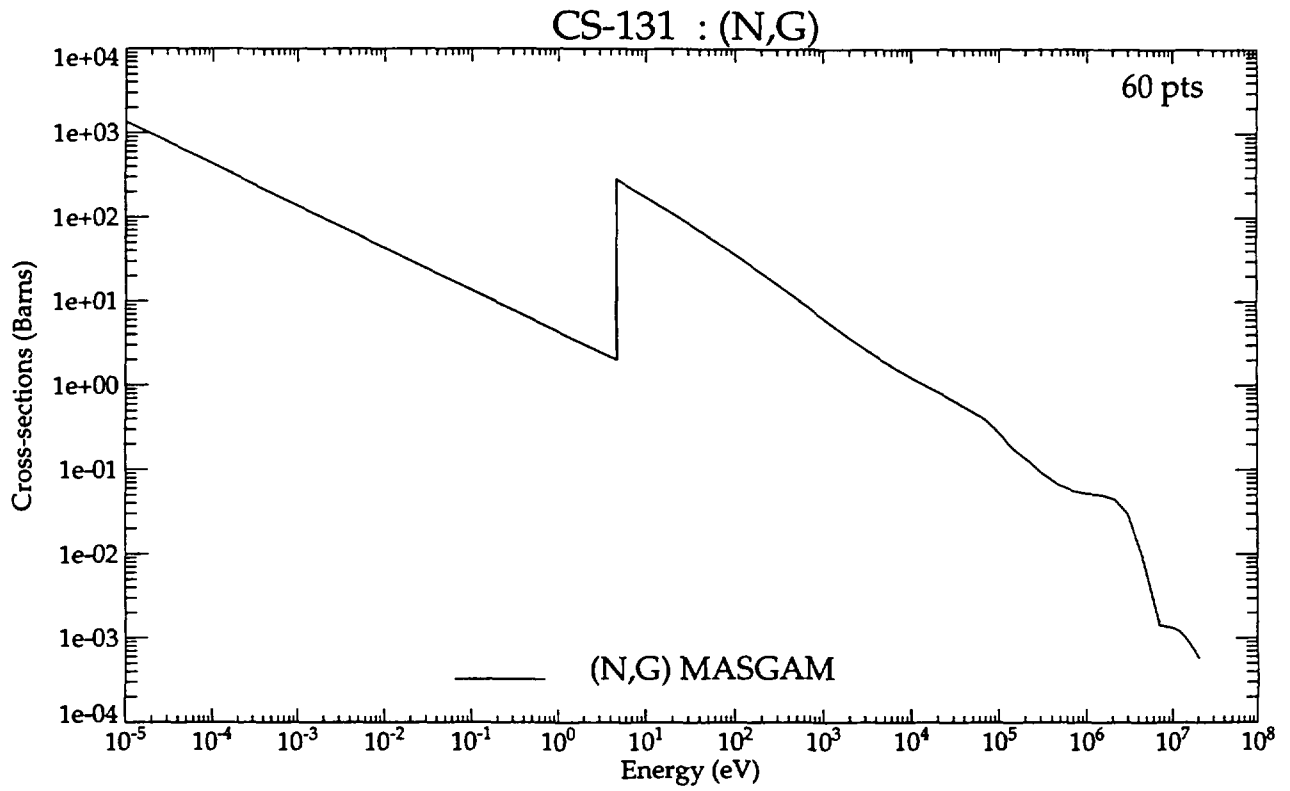


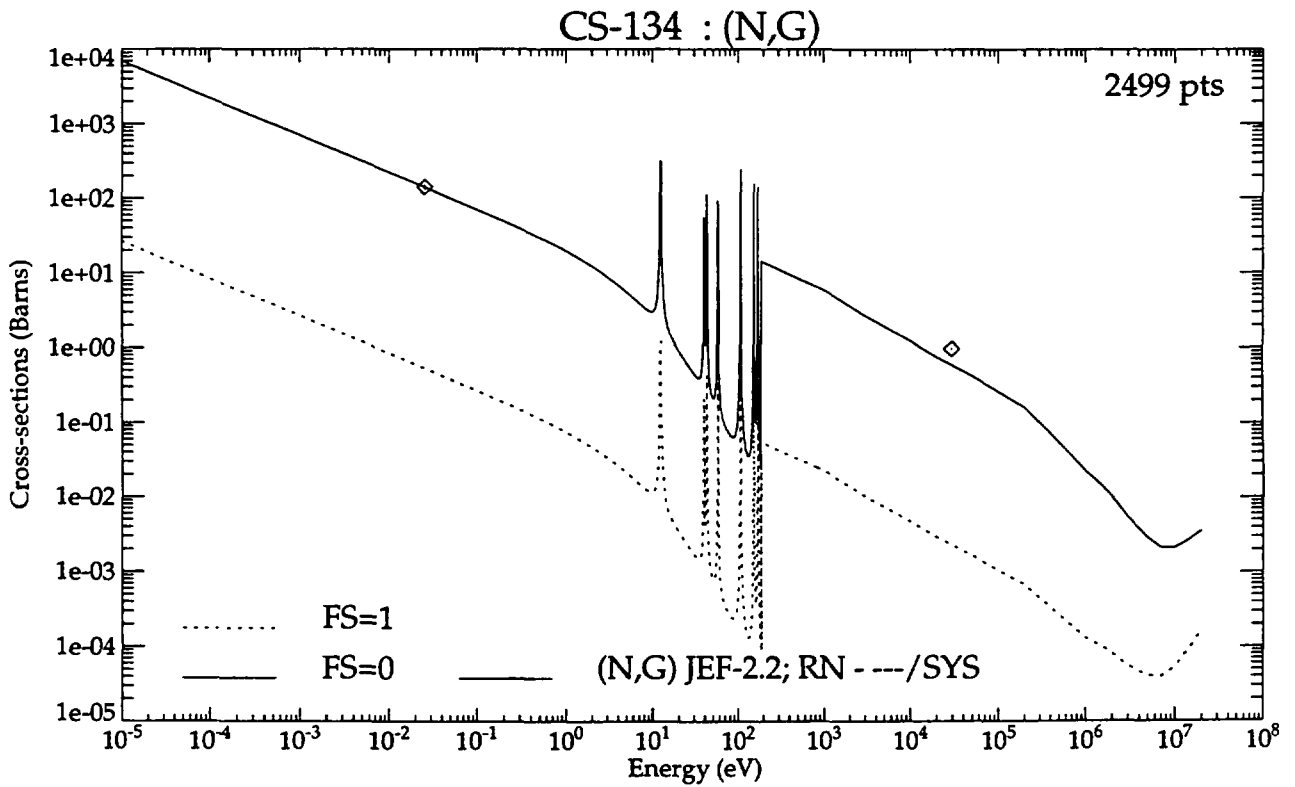
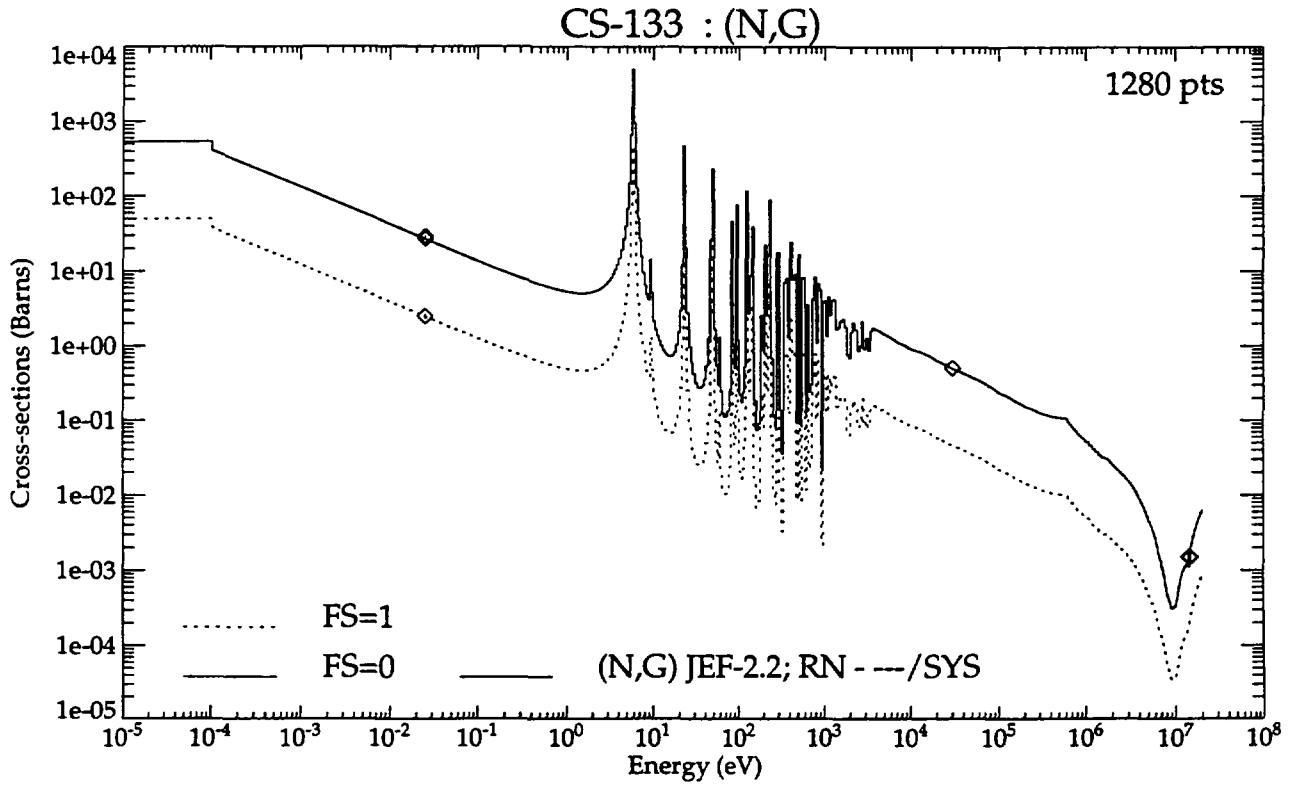


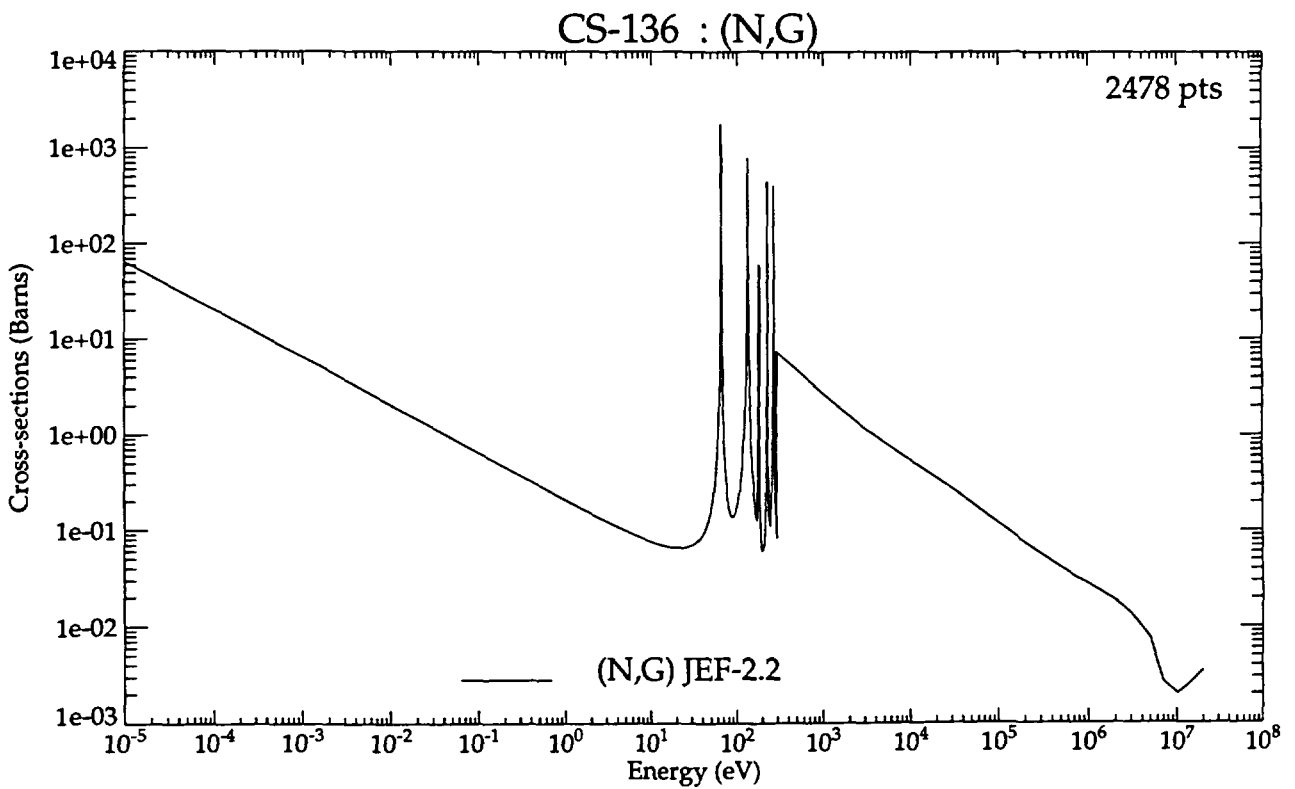
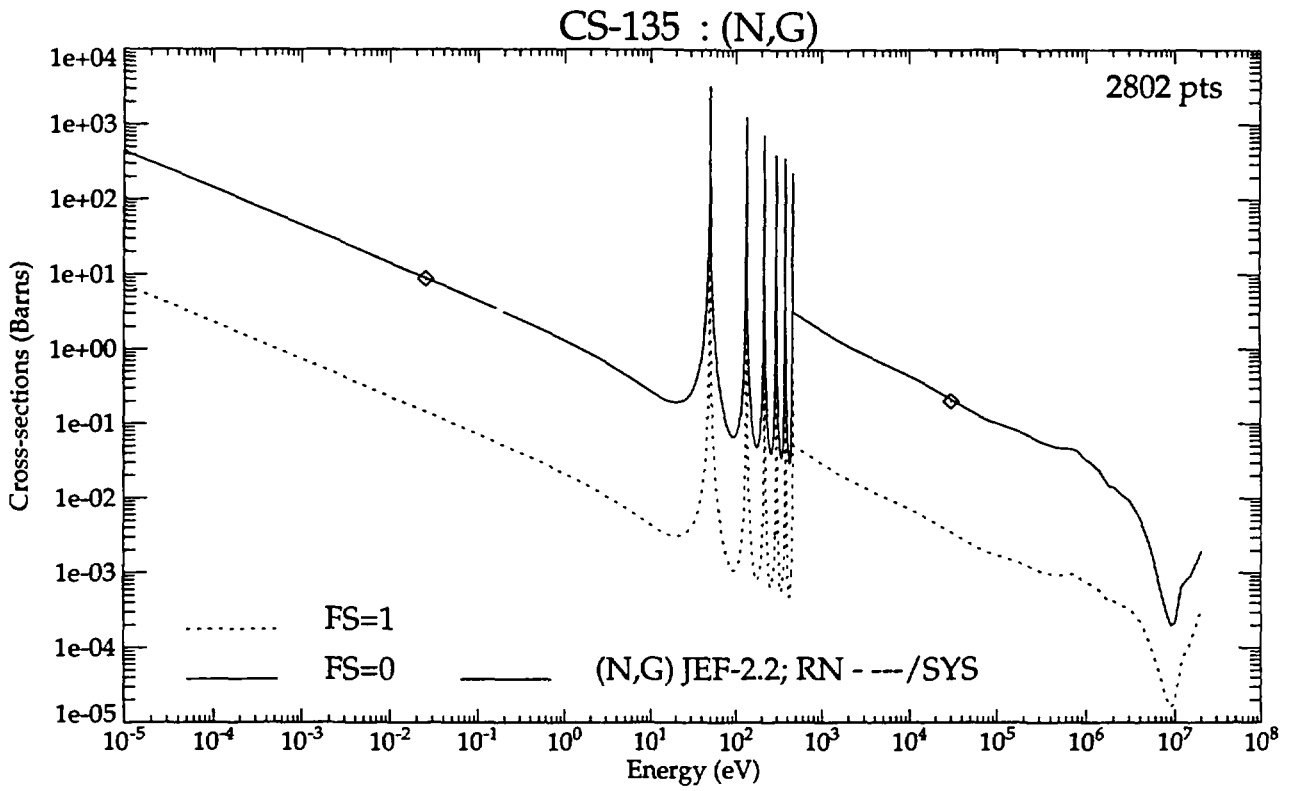


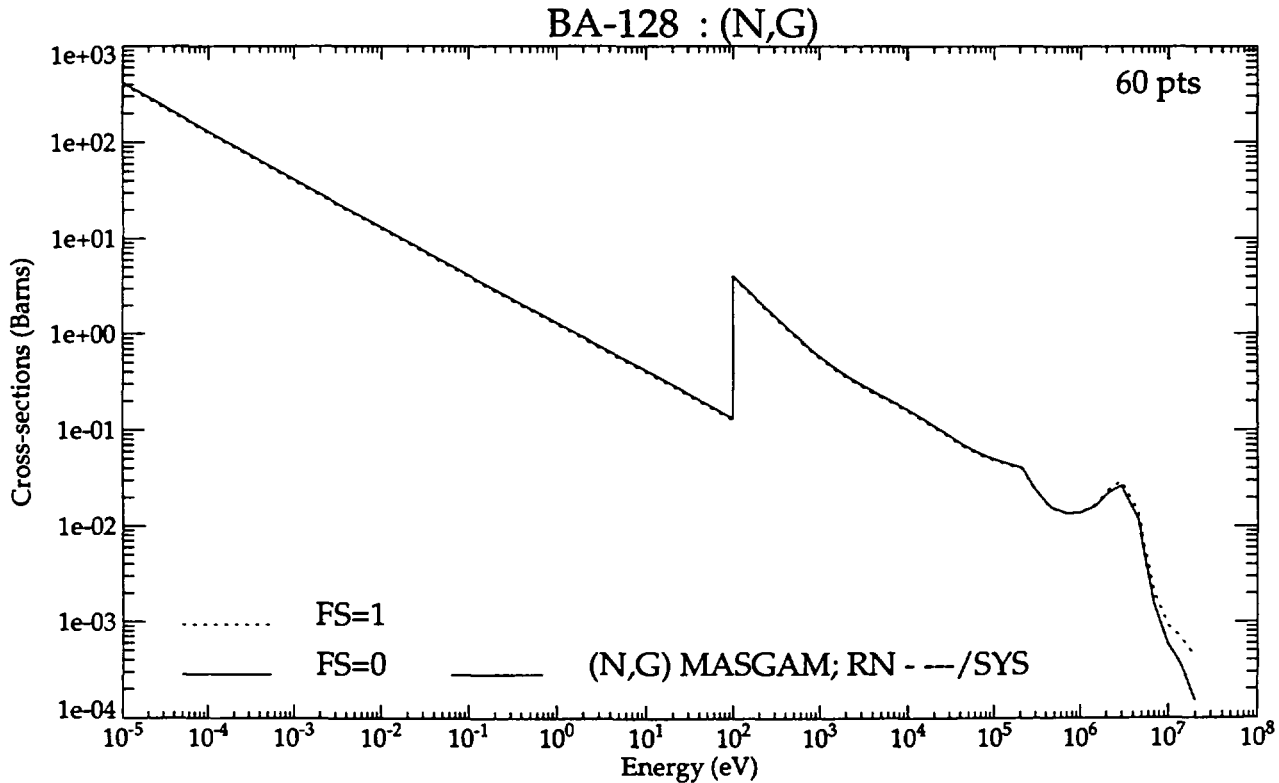
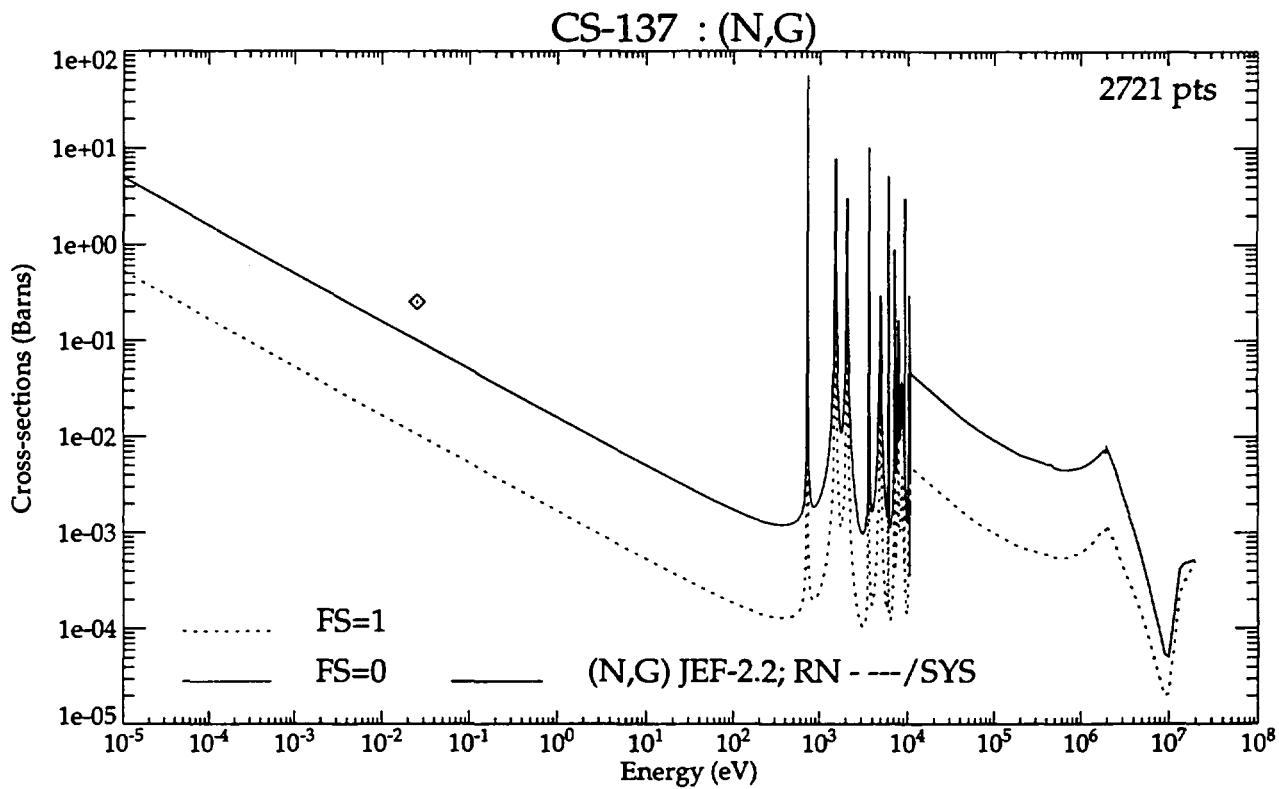


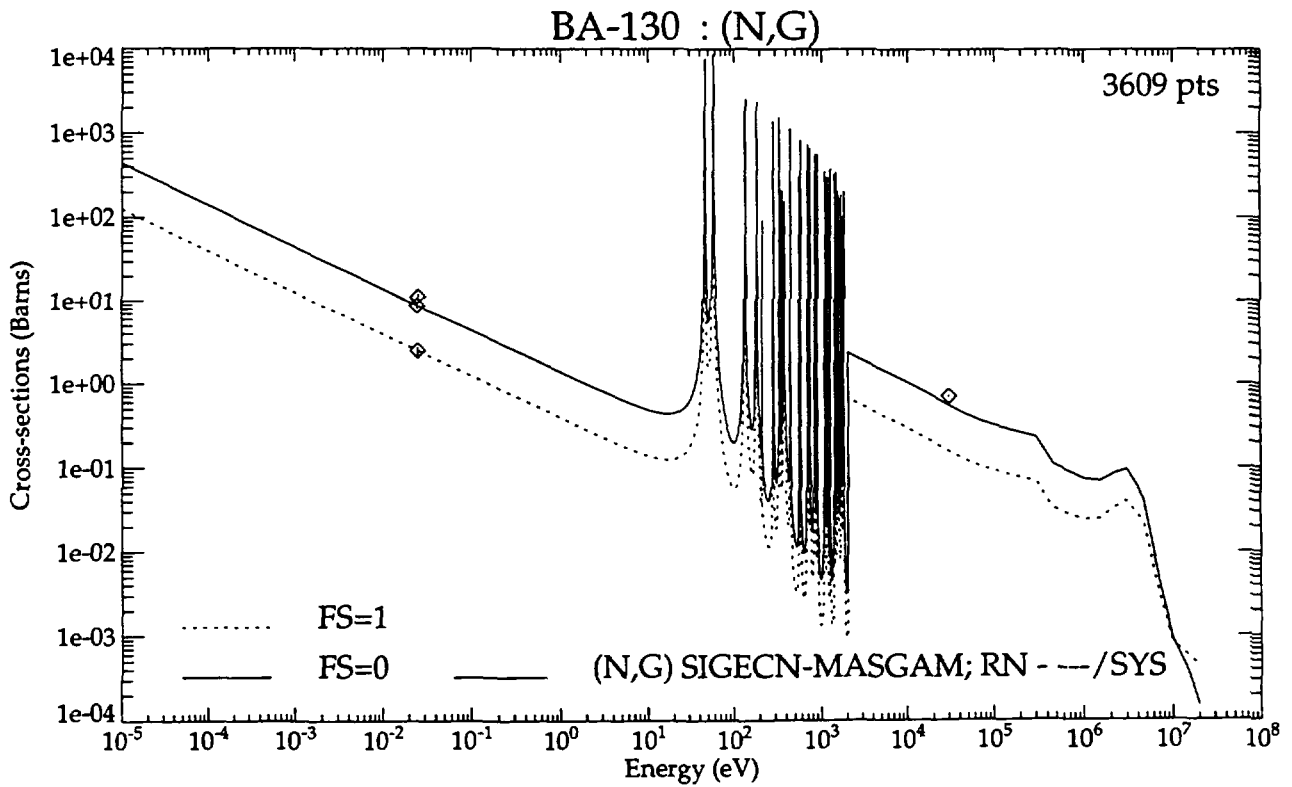
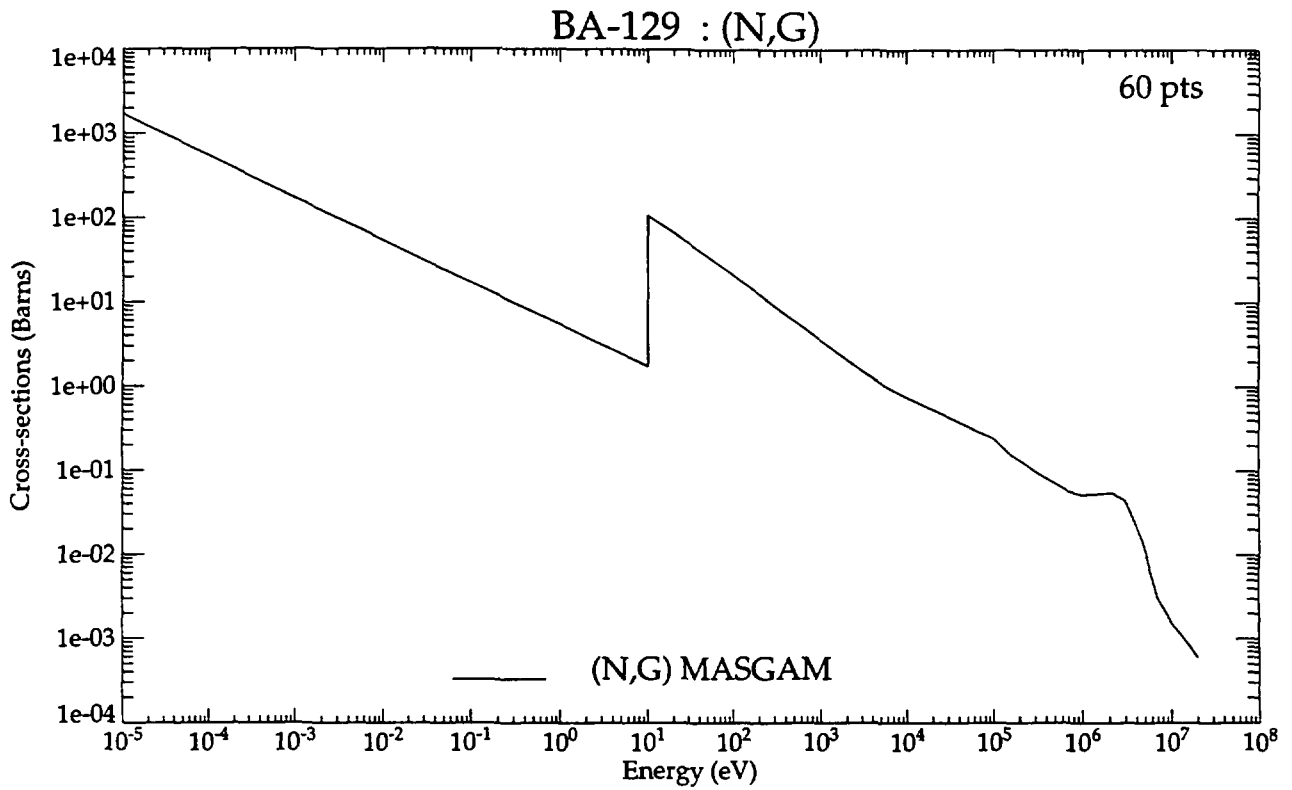


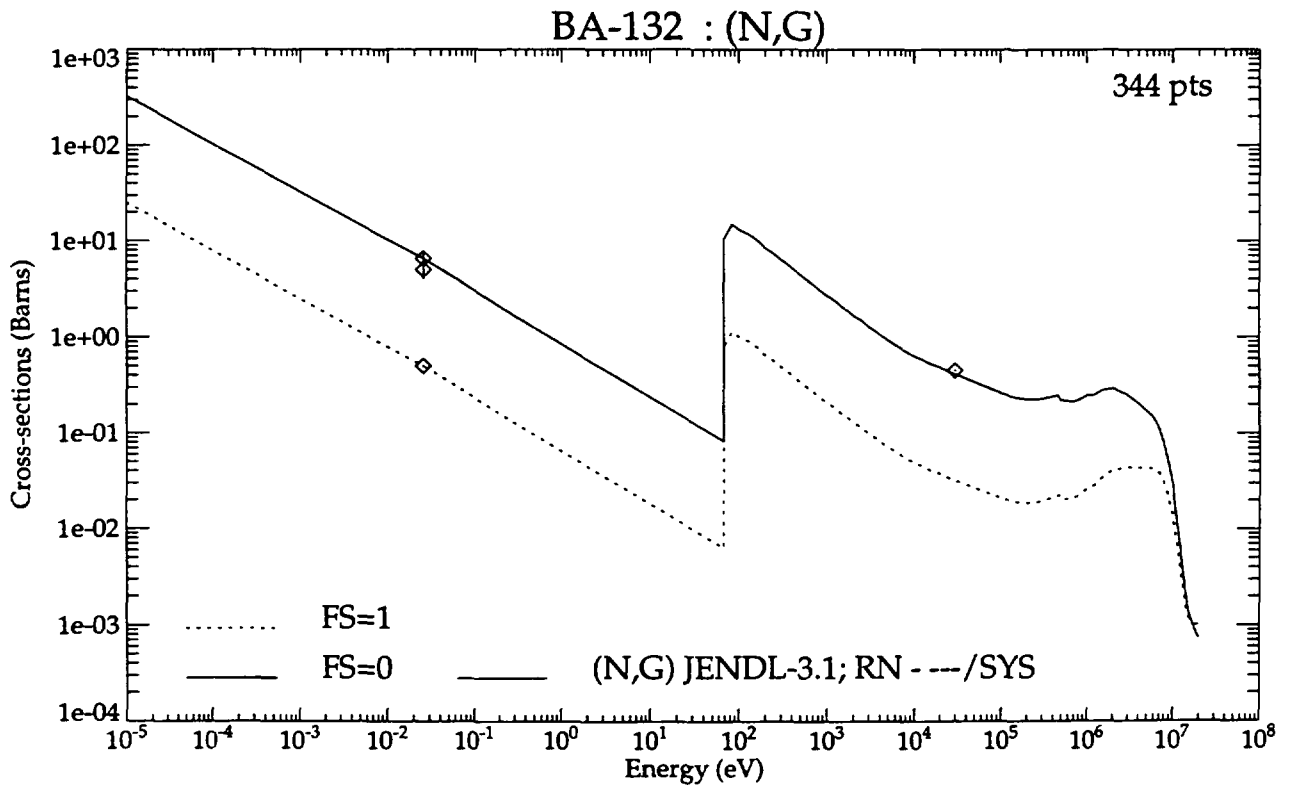
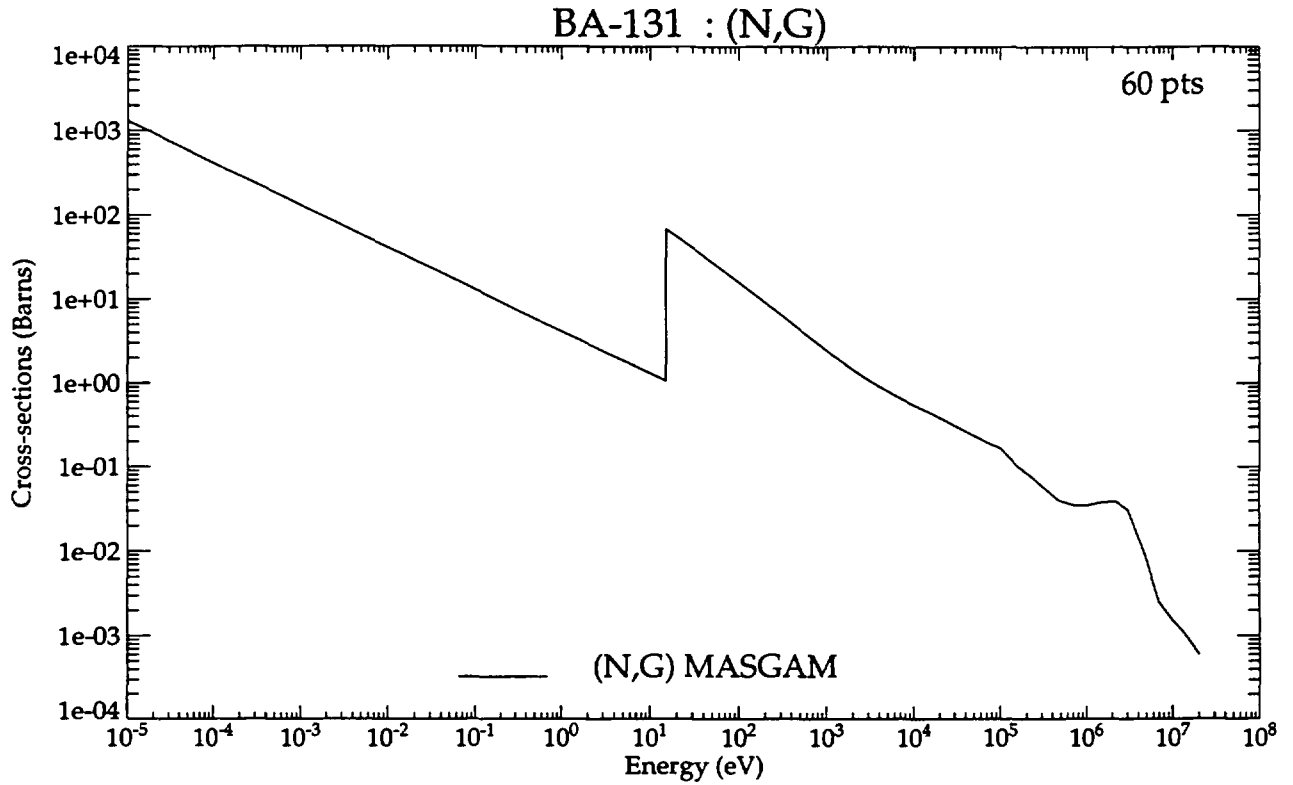


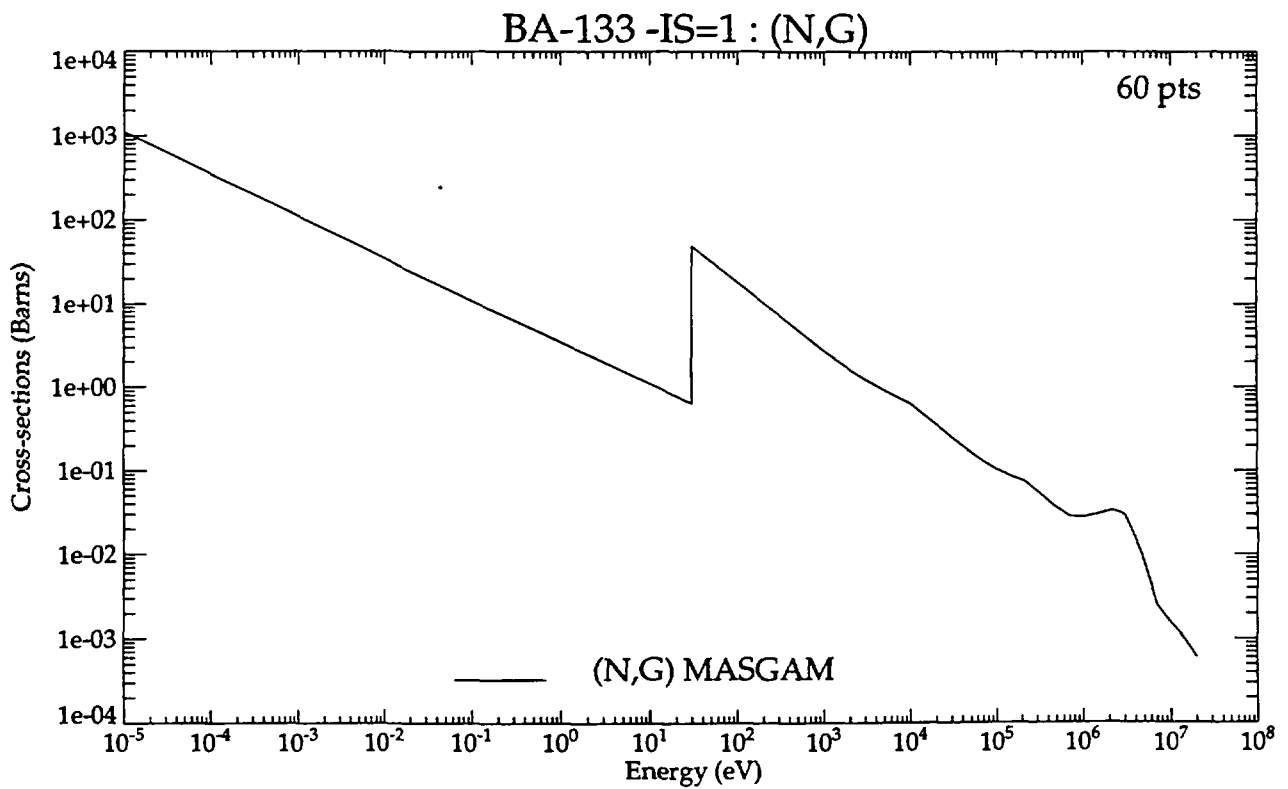
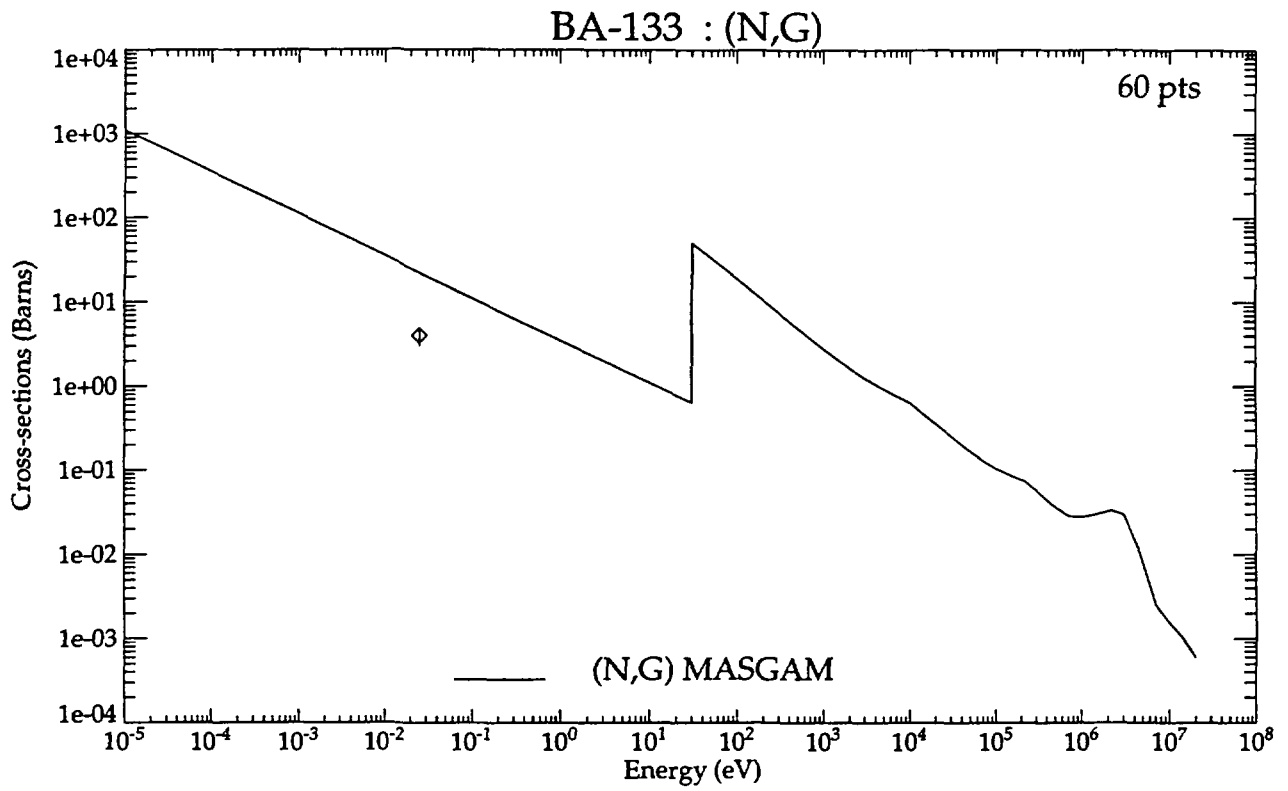


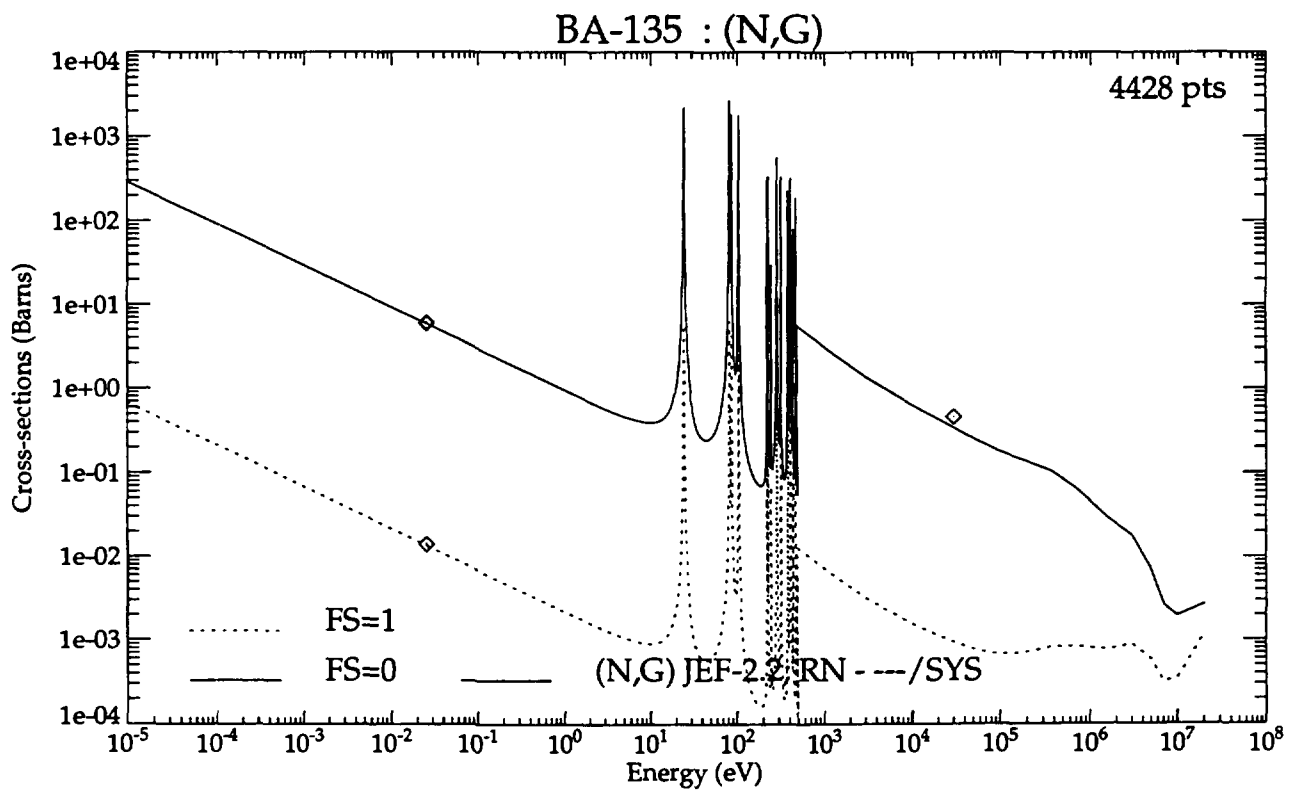
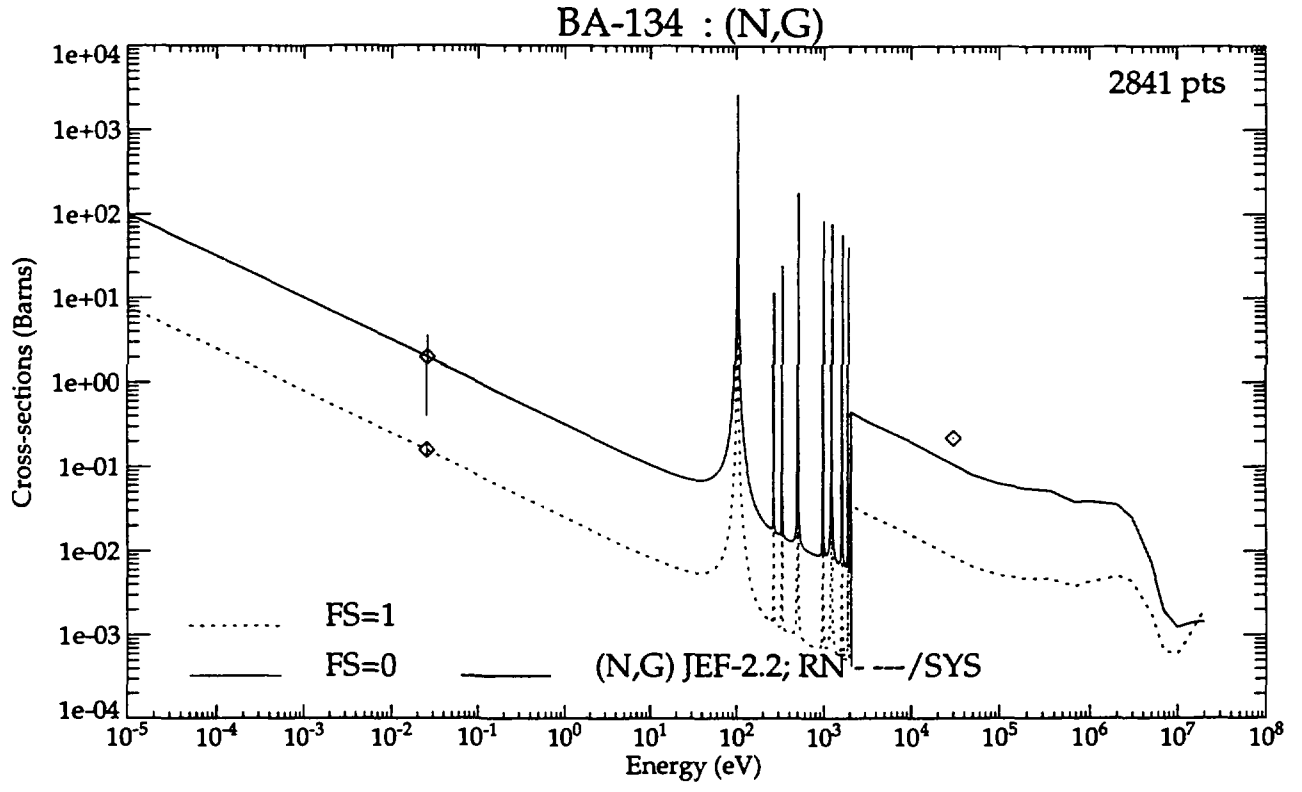


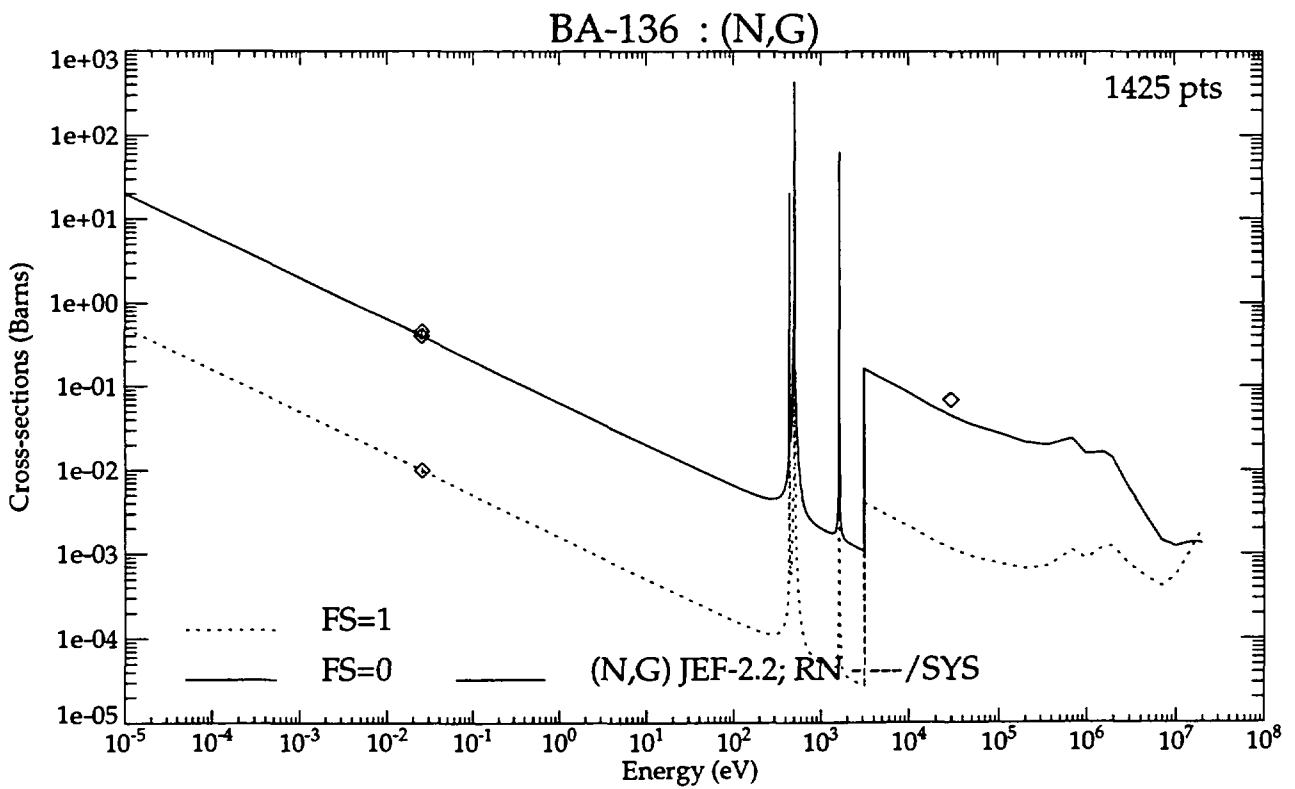
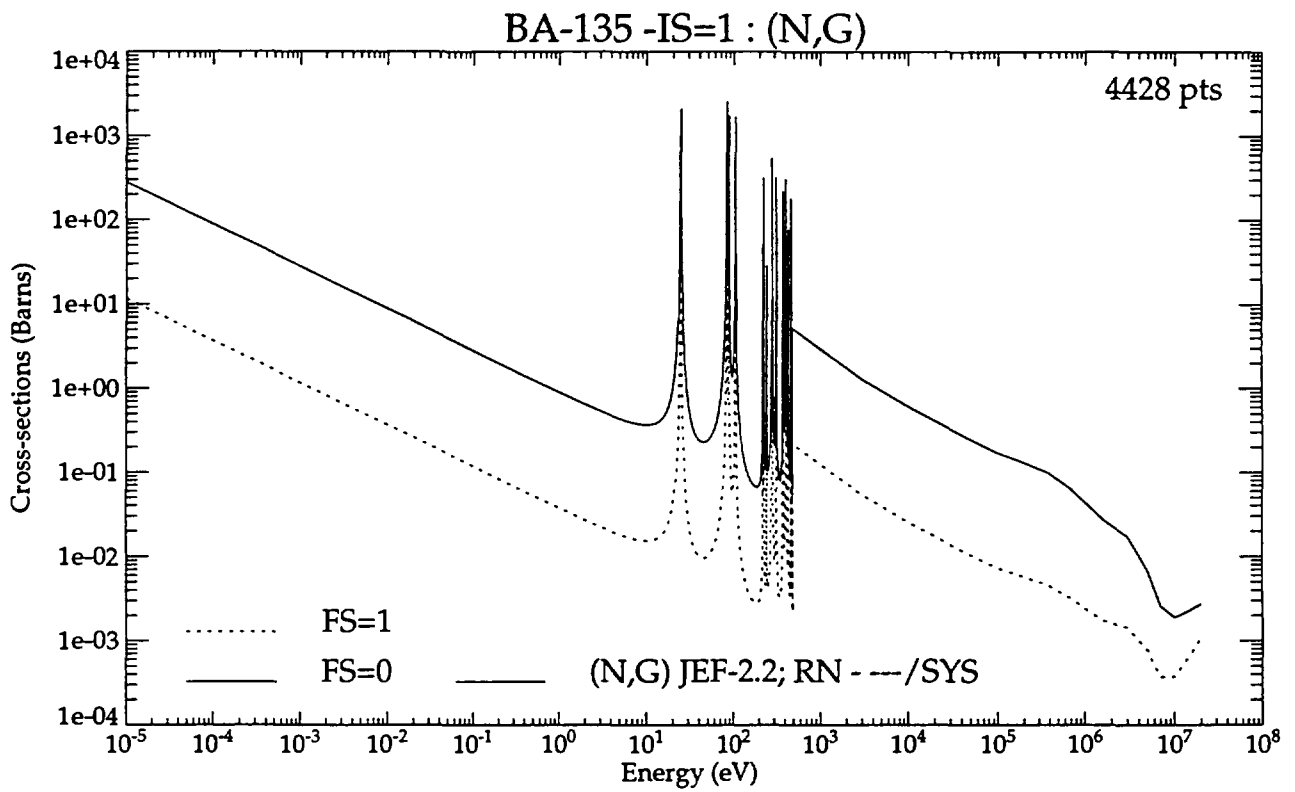


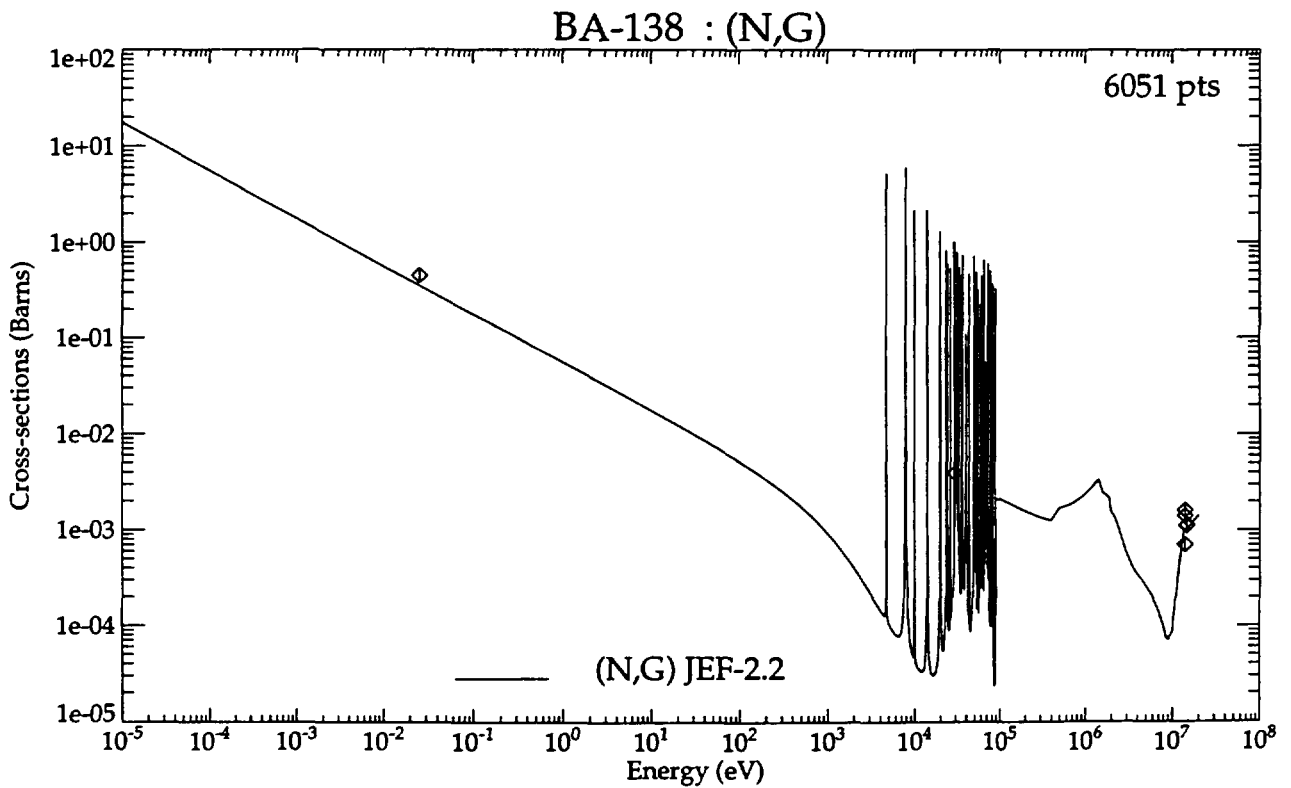
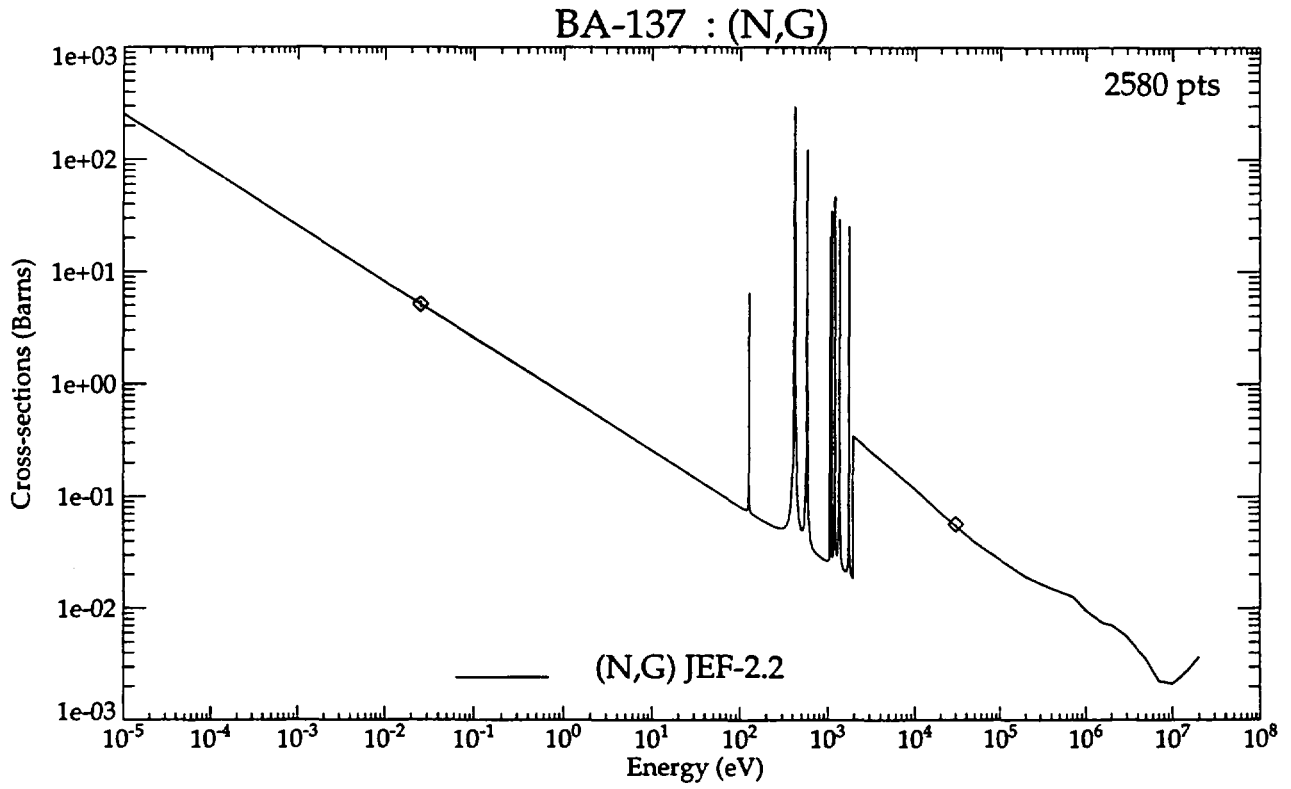


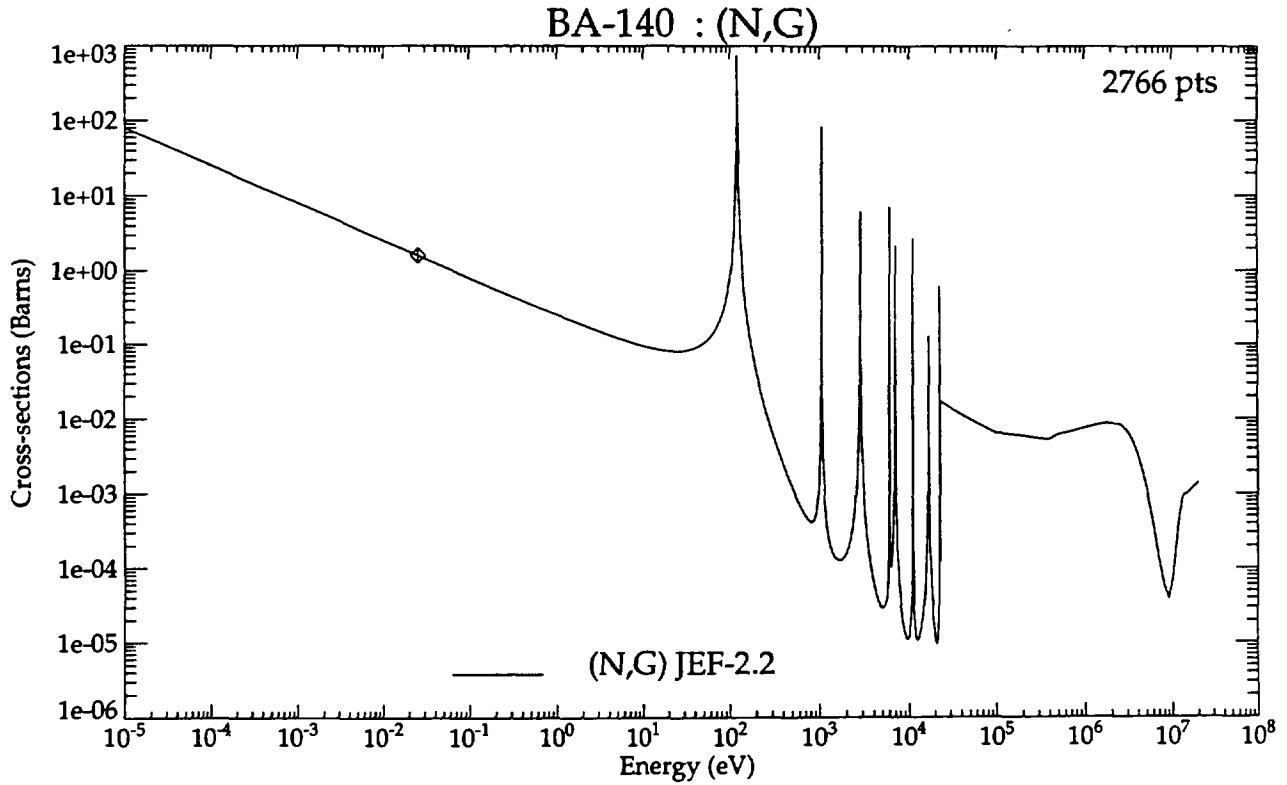
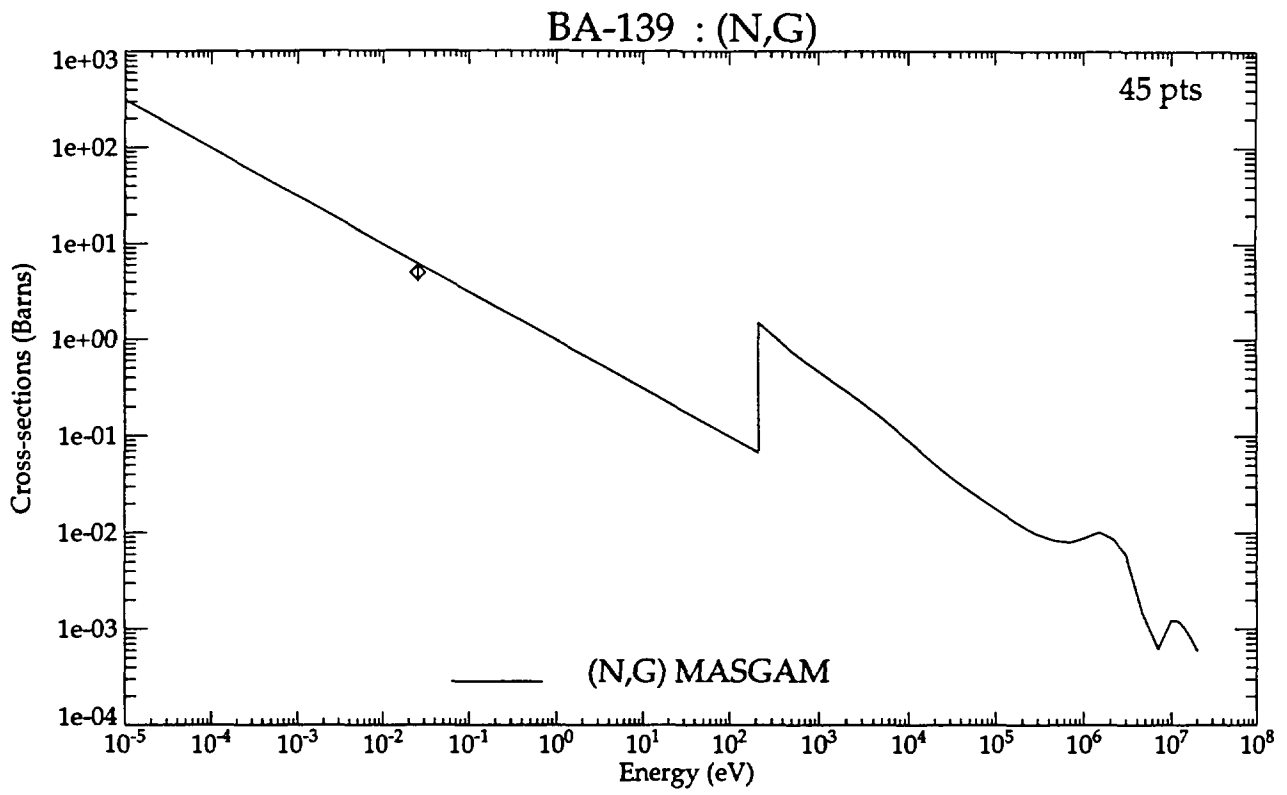


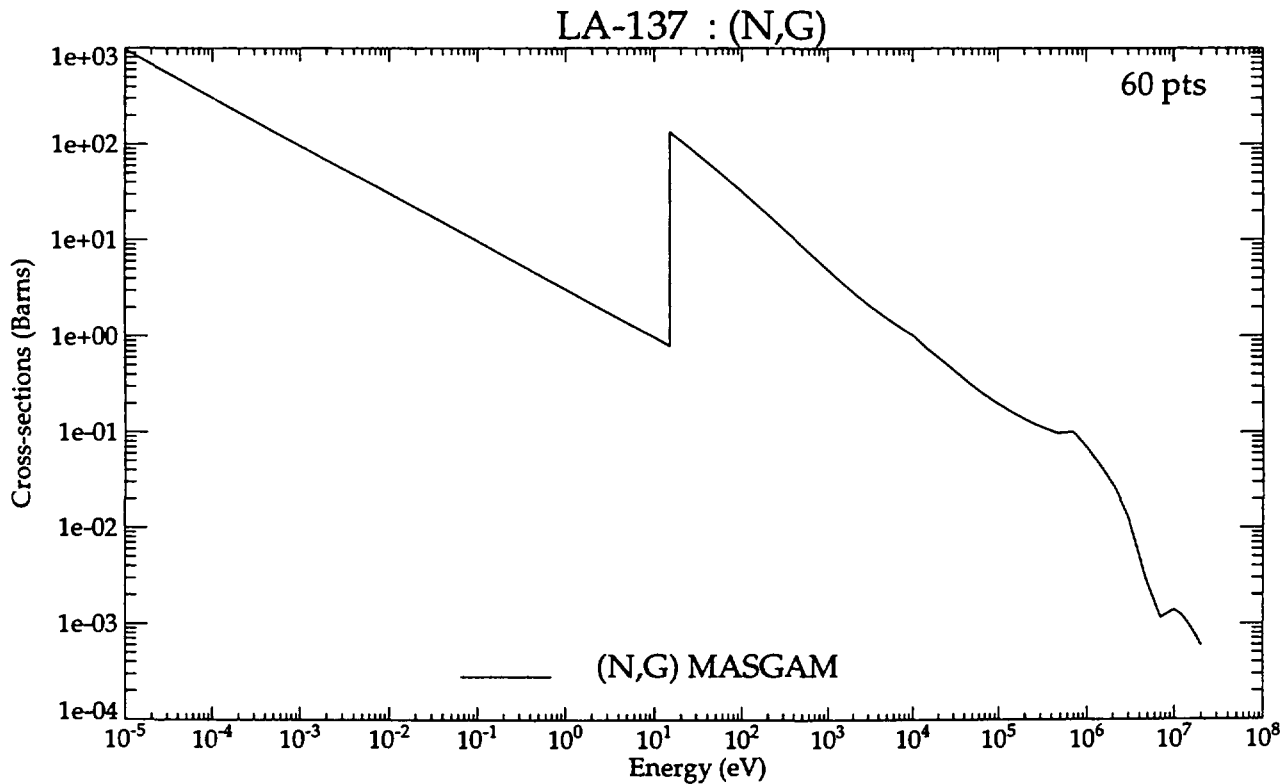
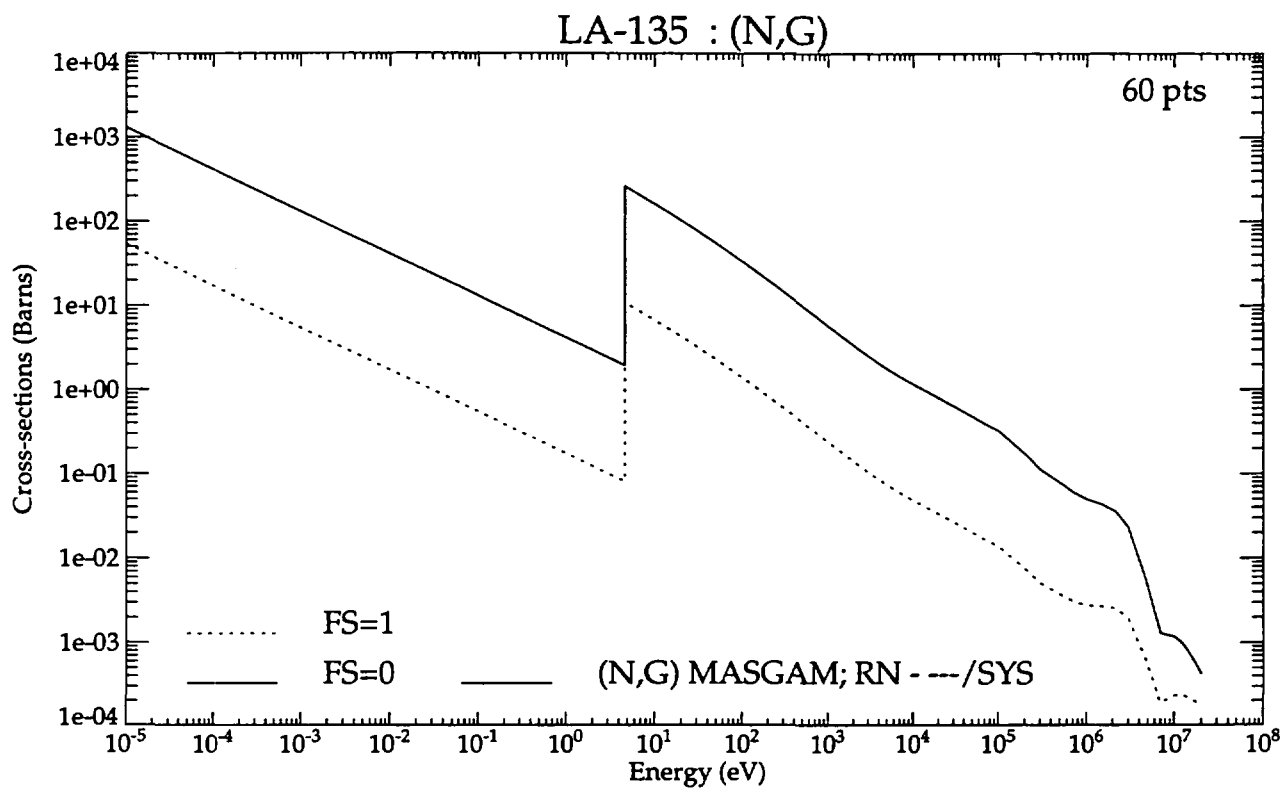




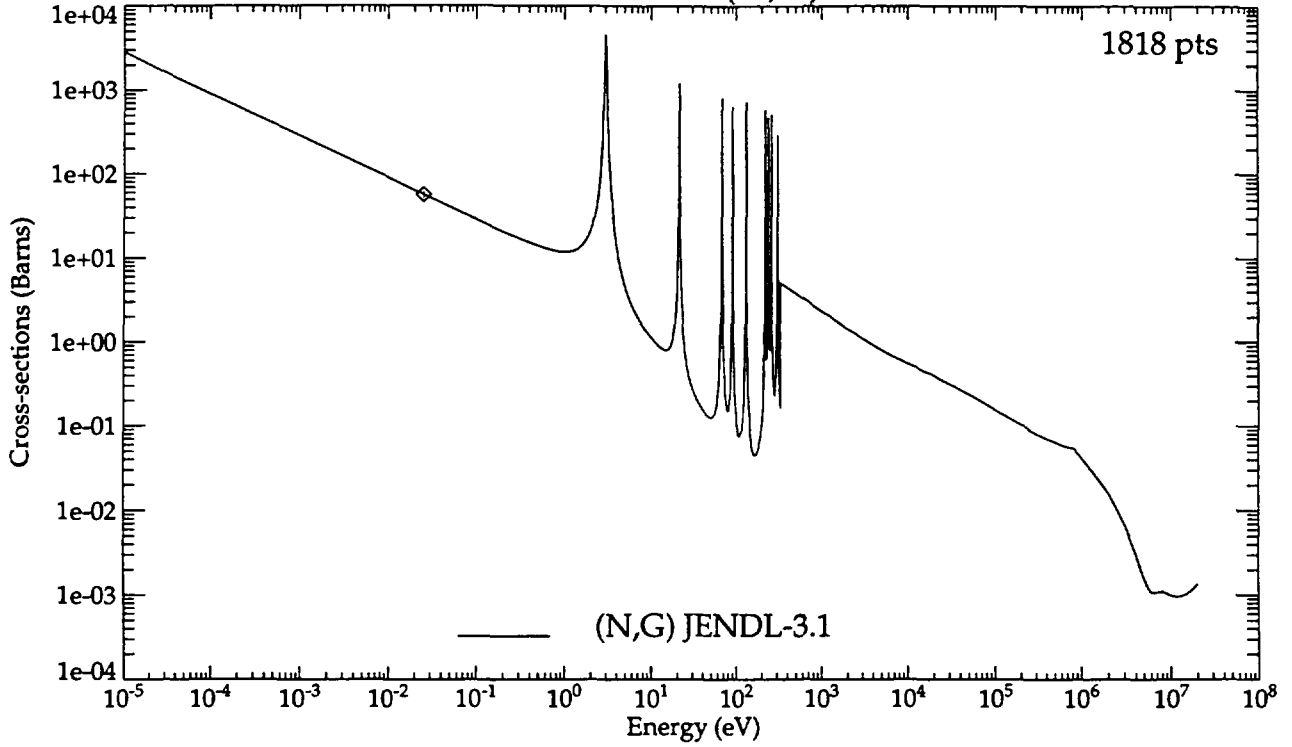




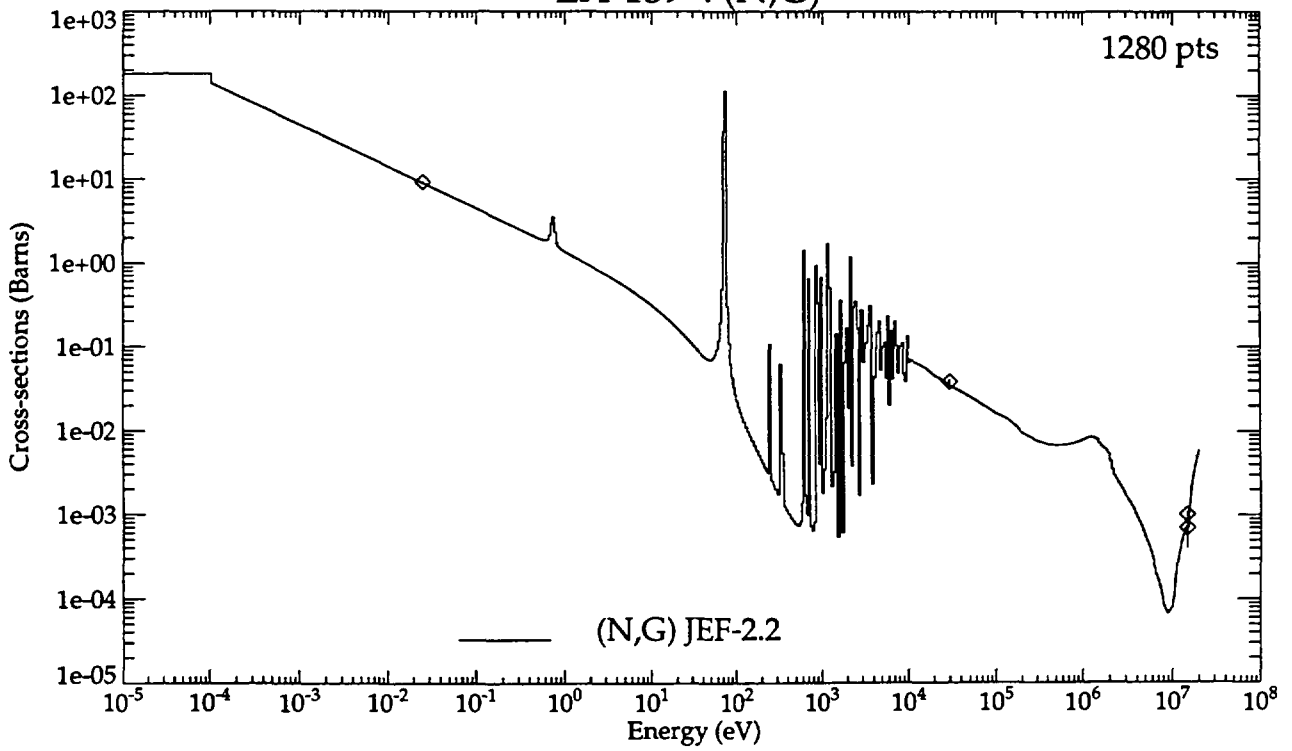


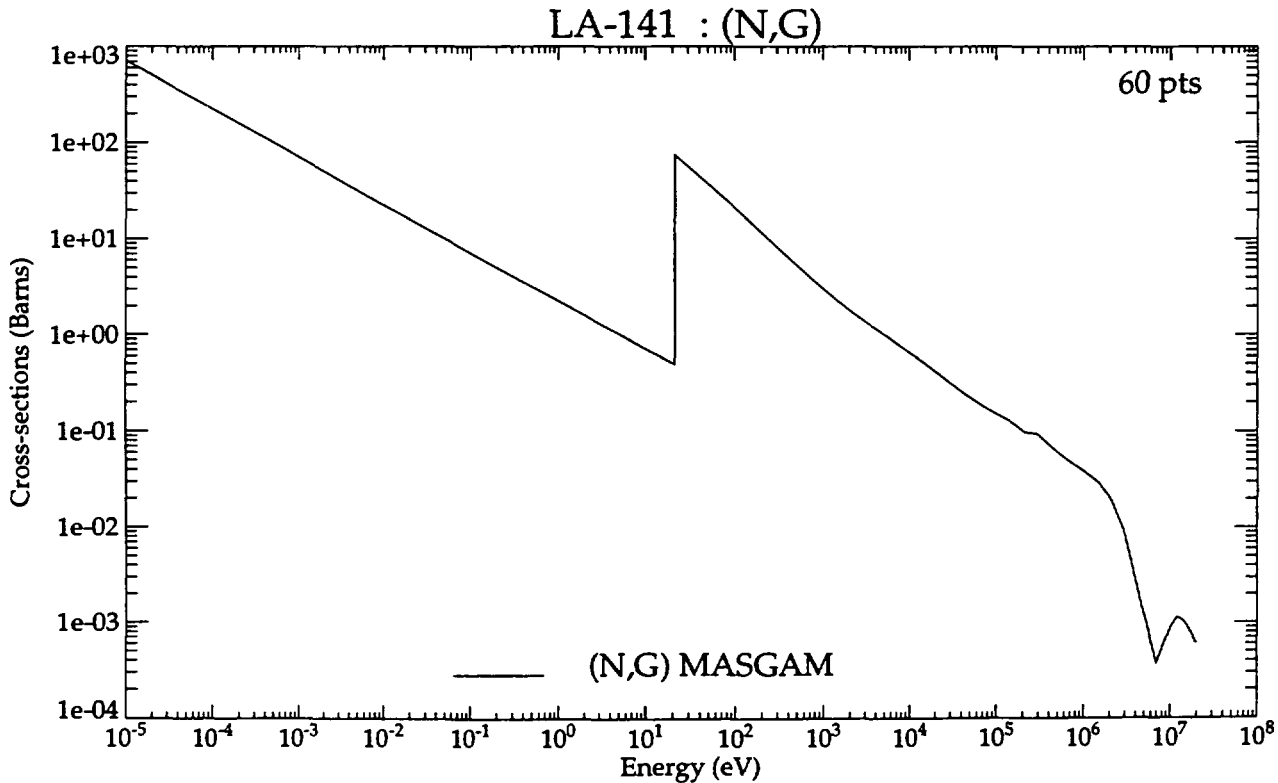
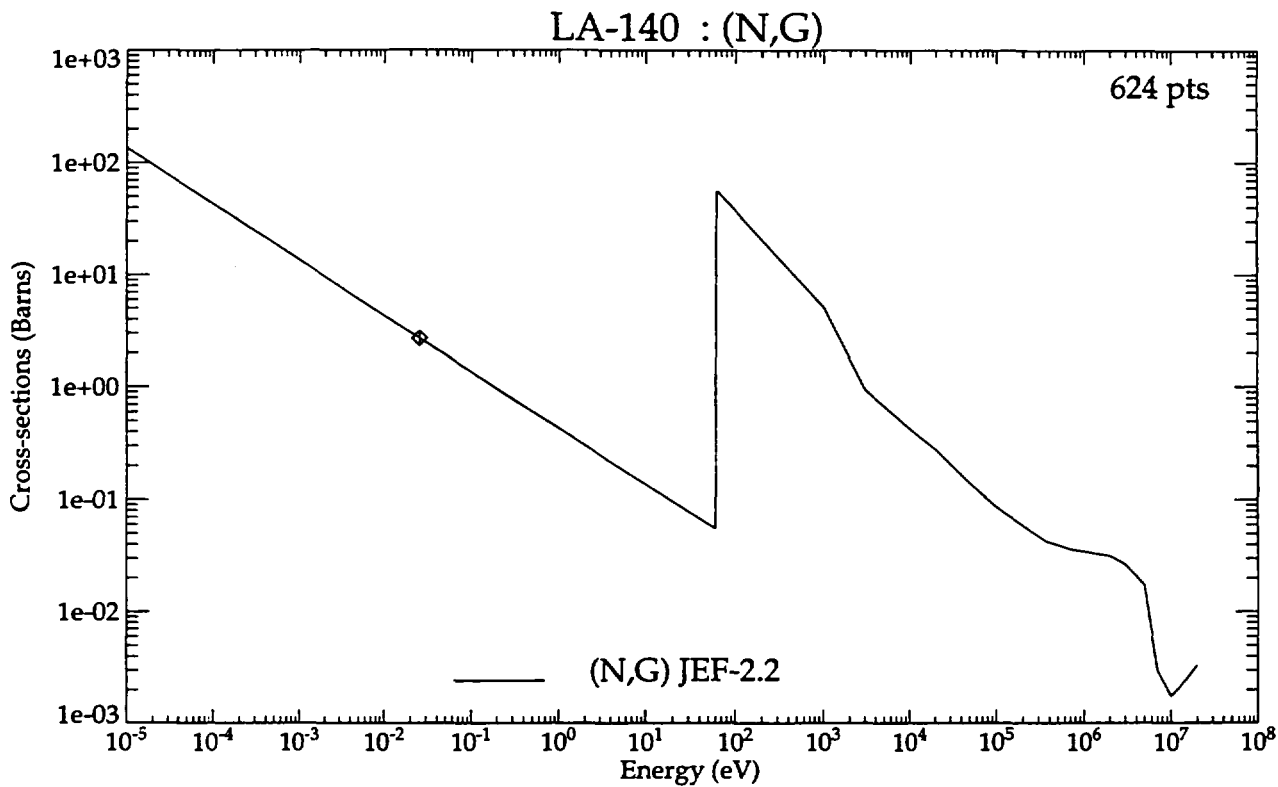


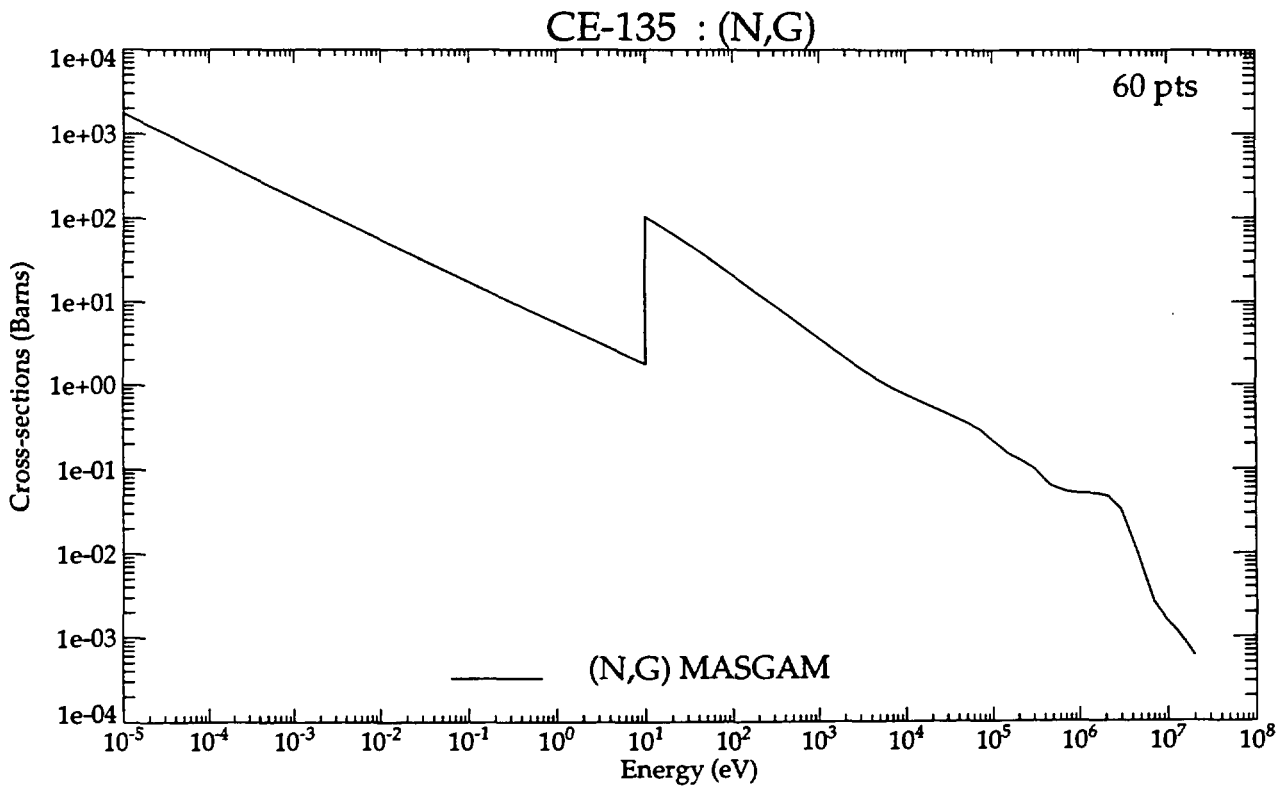
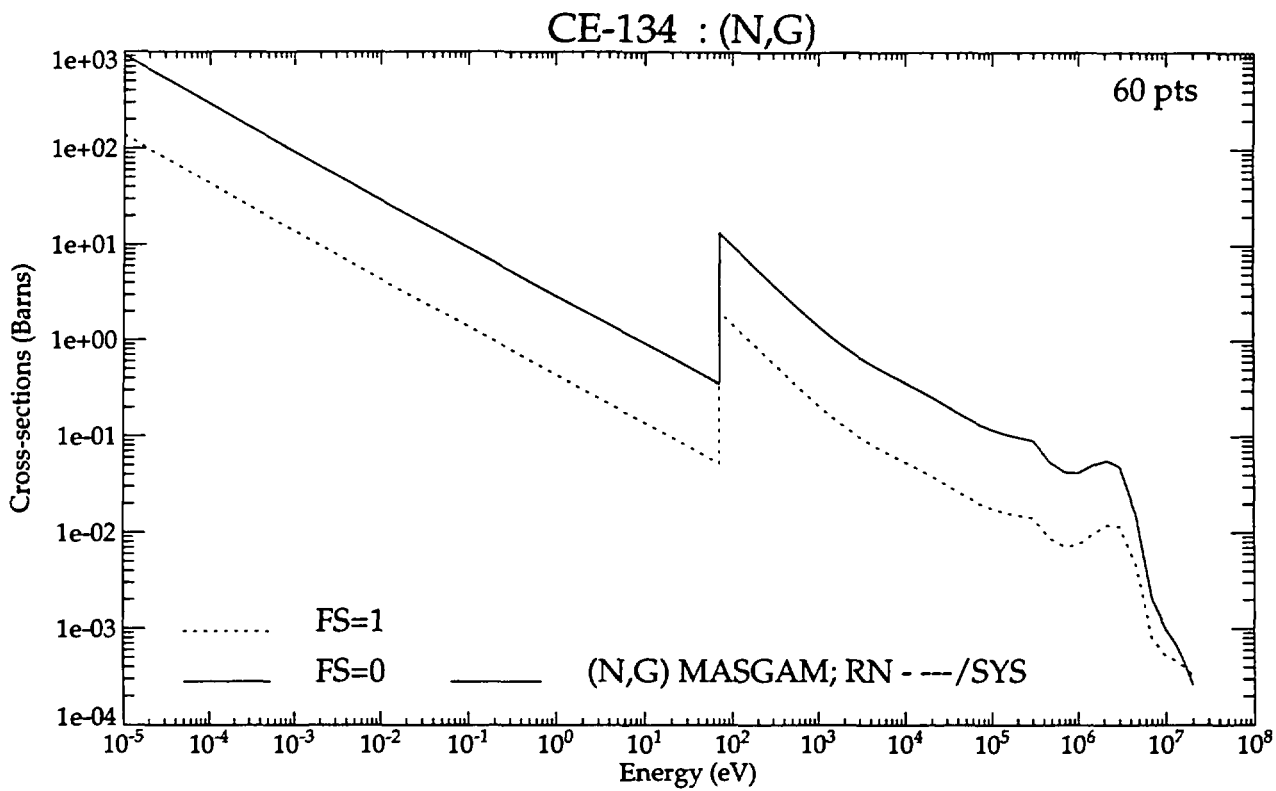
LA-138 : (N,G)

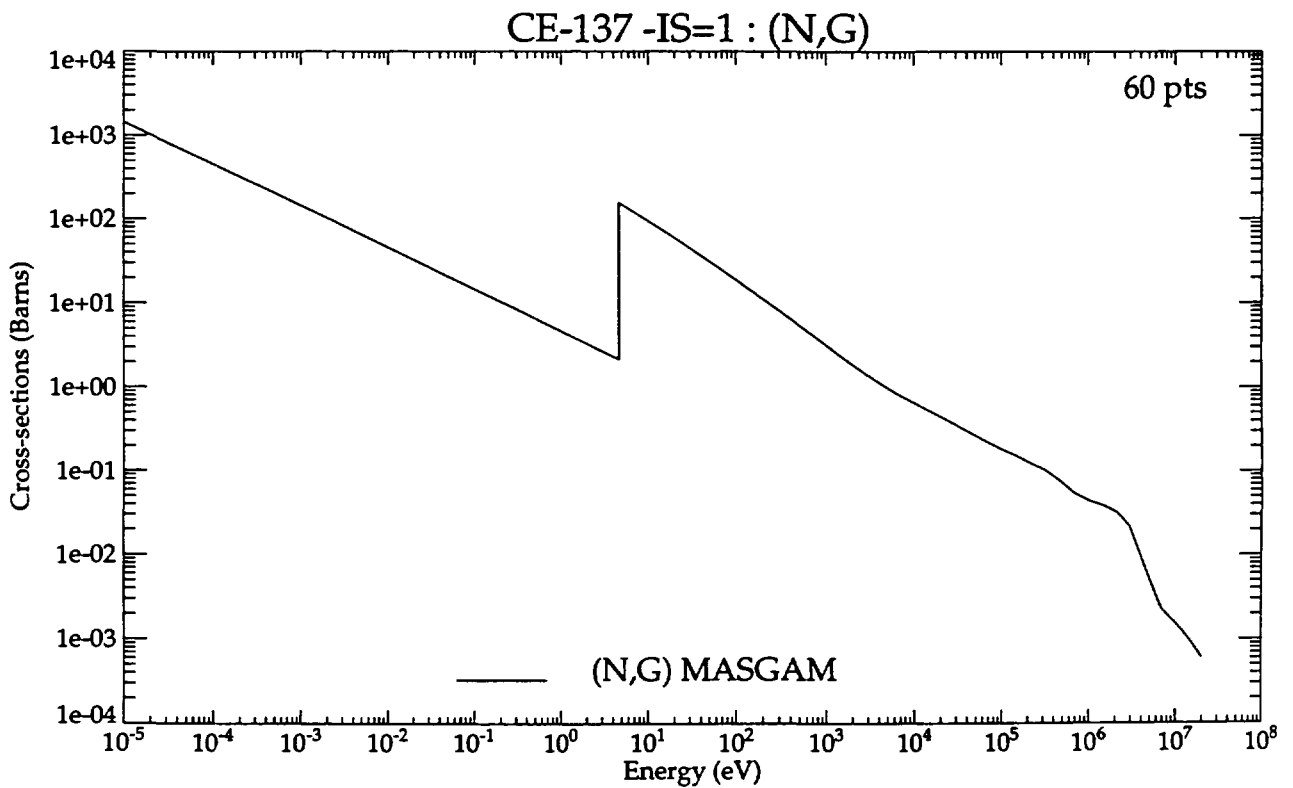
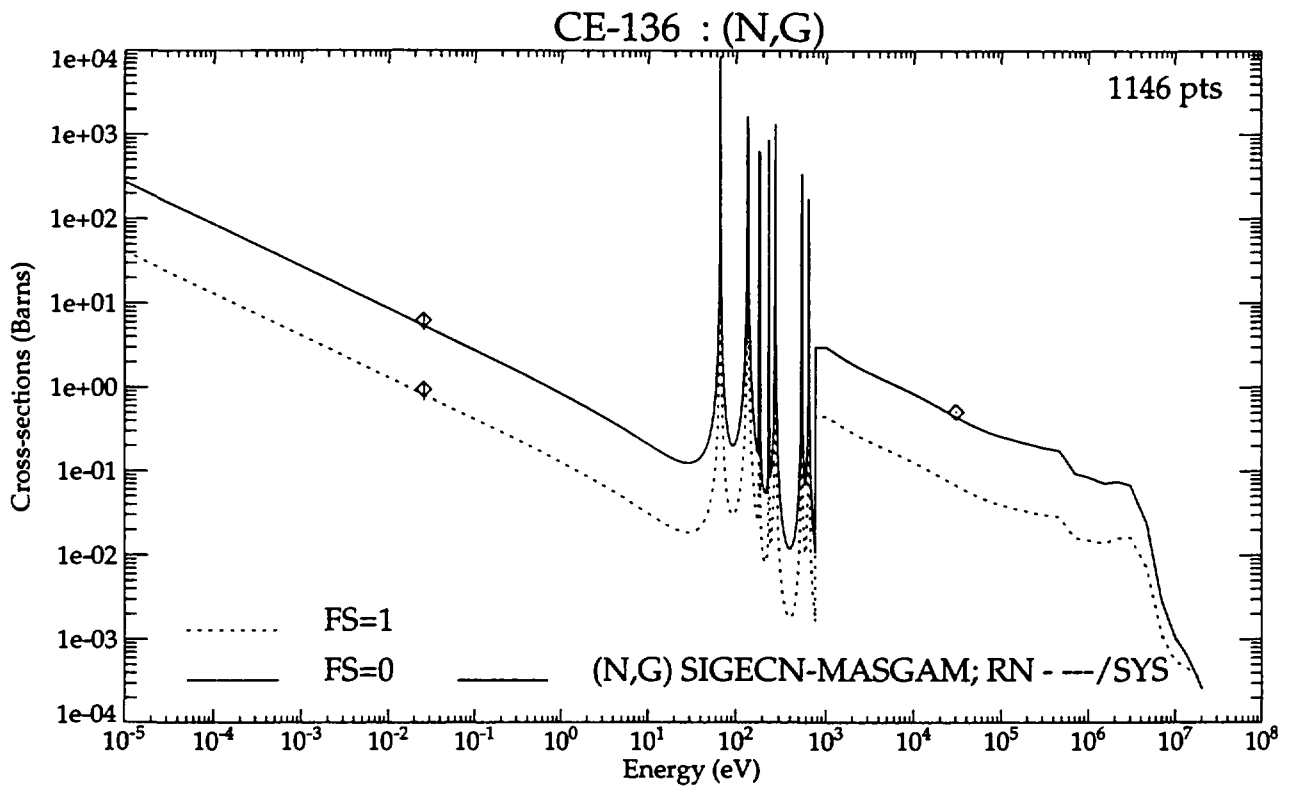


LA-139 : (N,G)

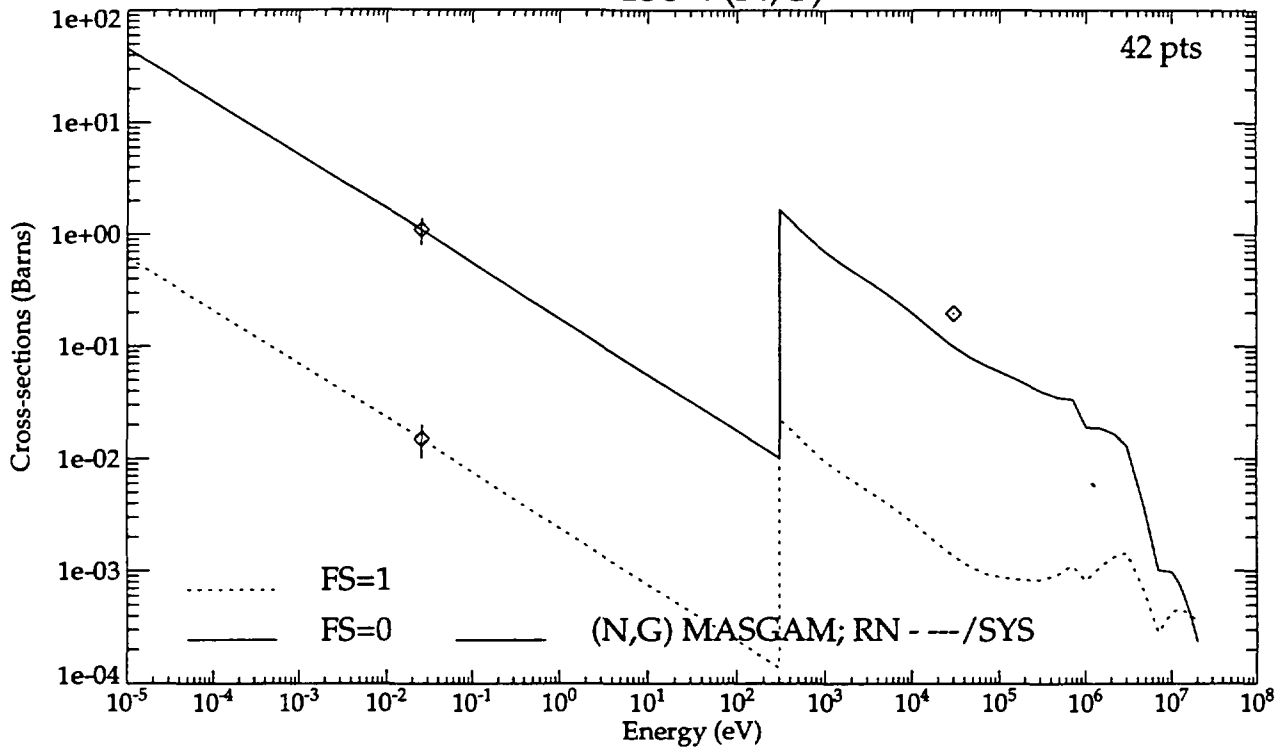




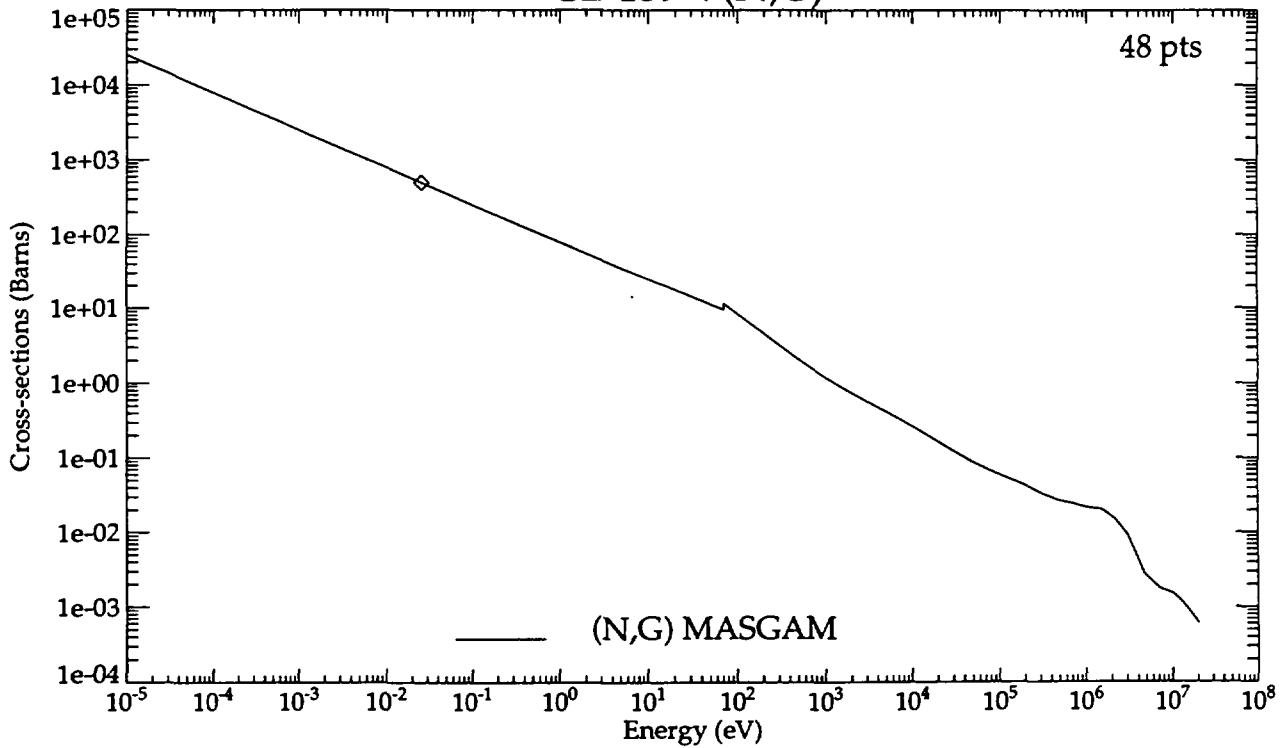


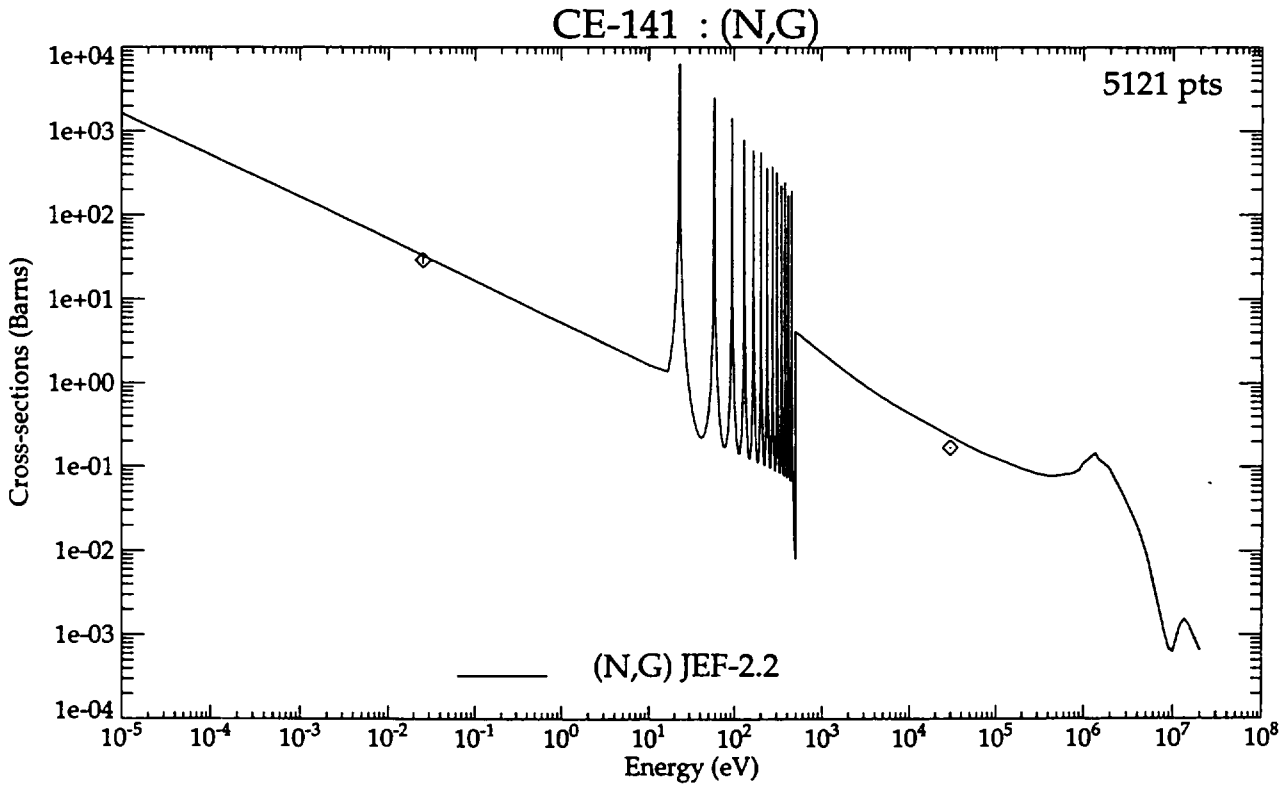
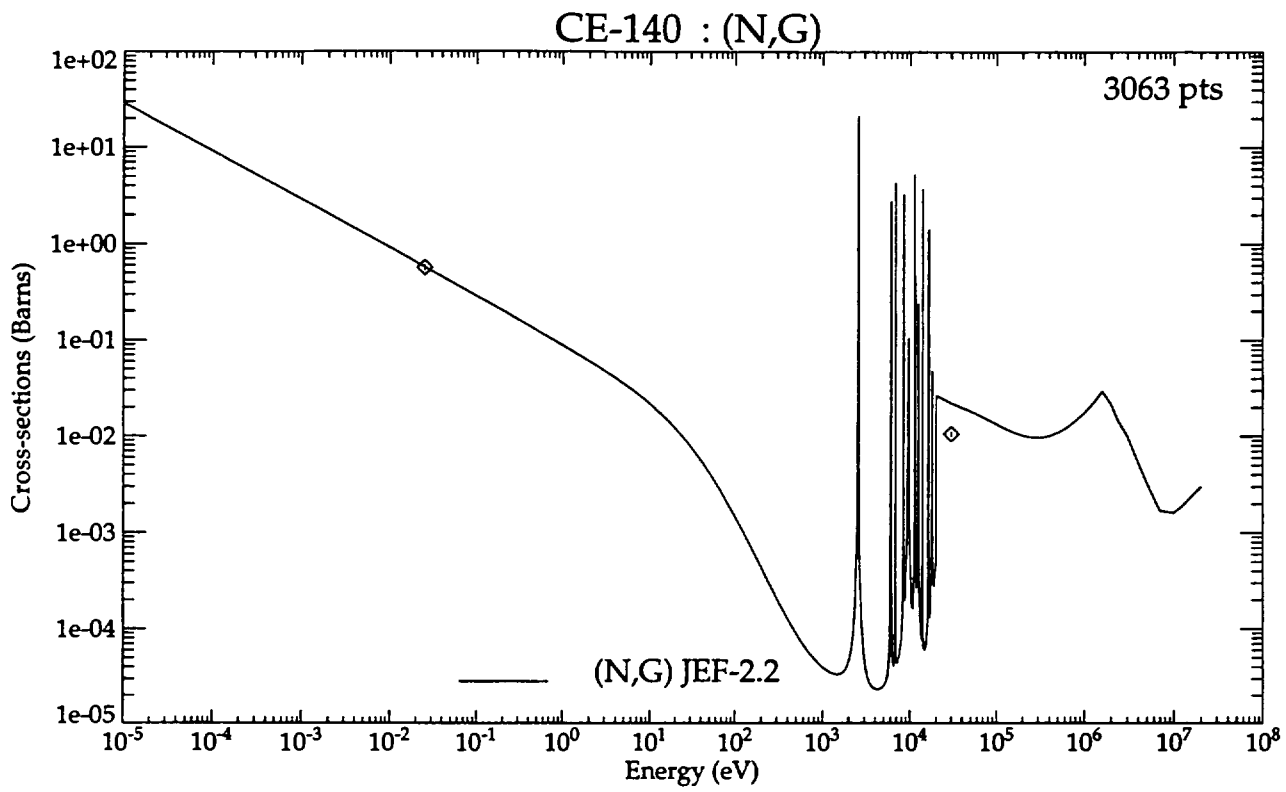


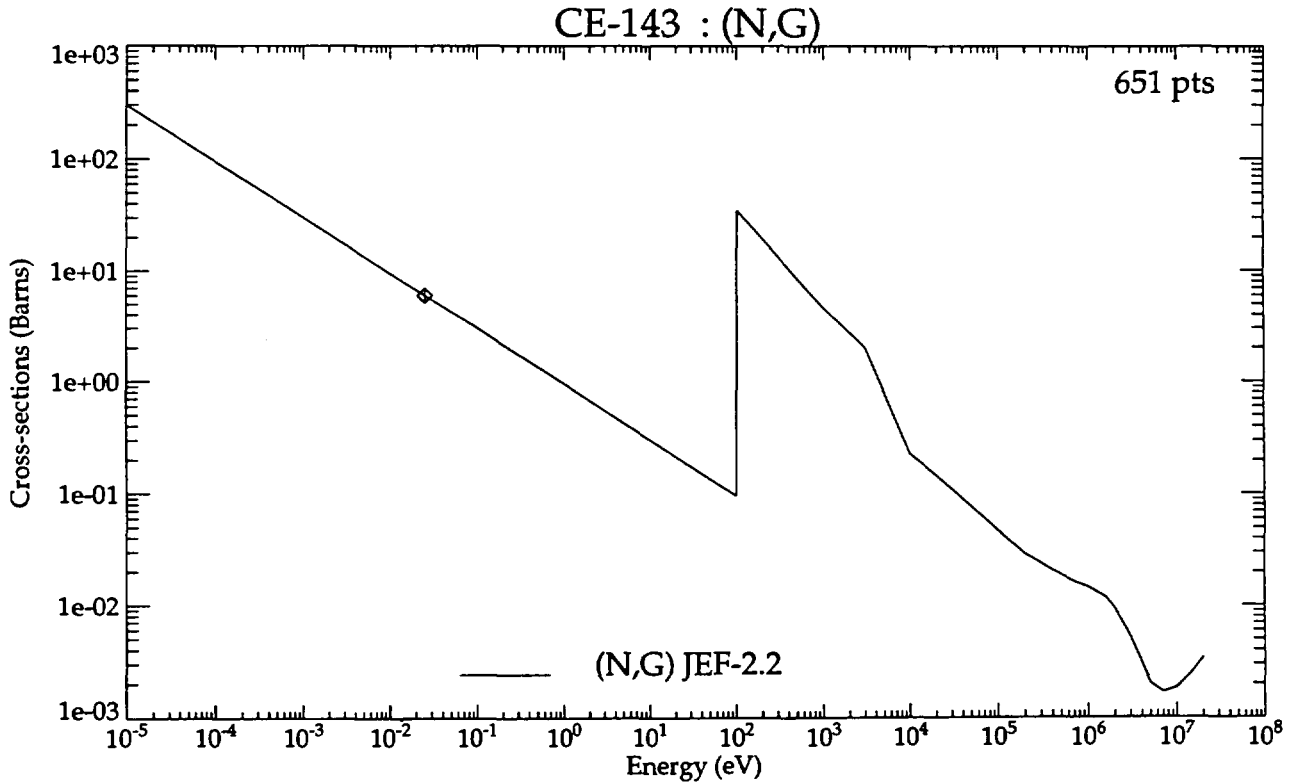
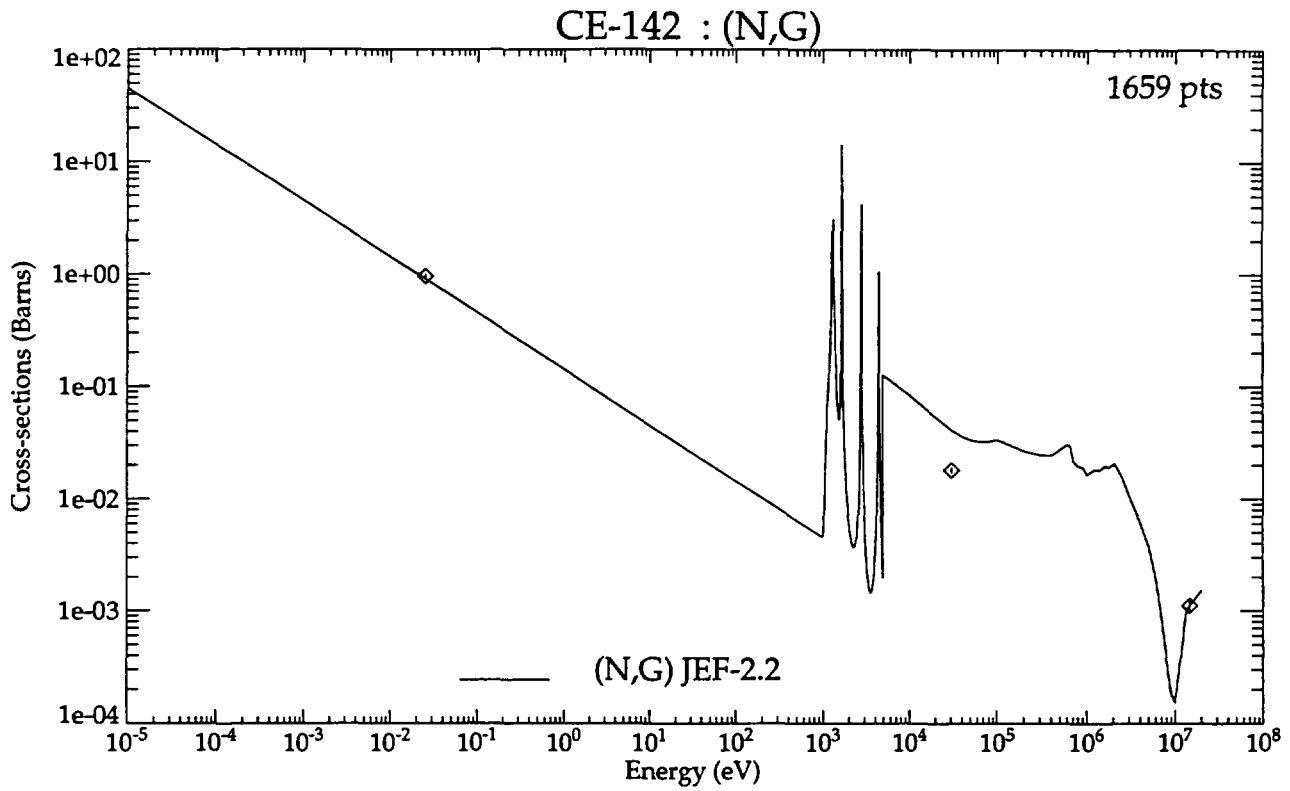
CE-138 : (N,G)

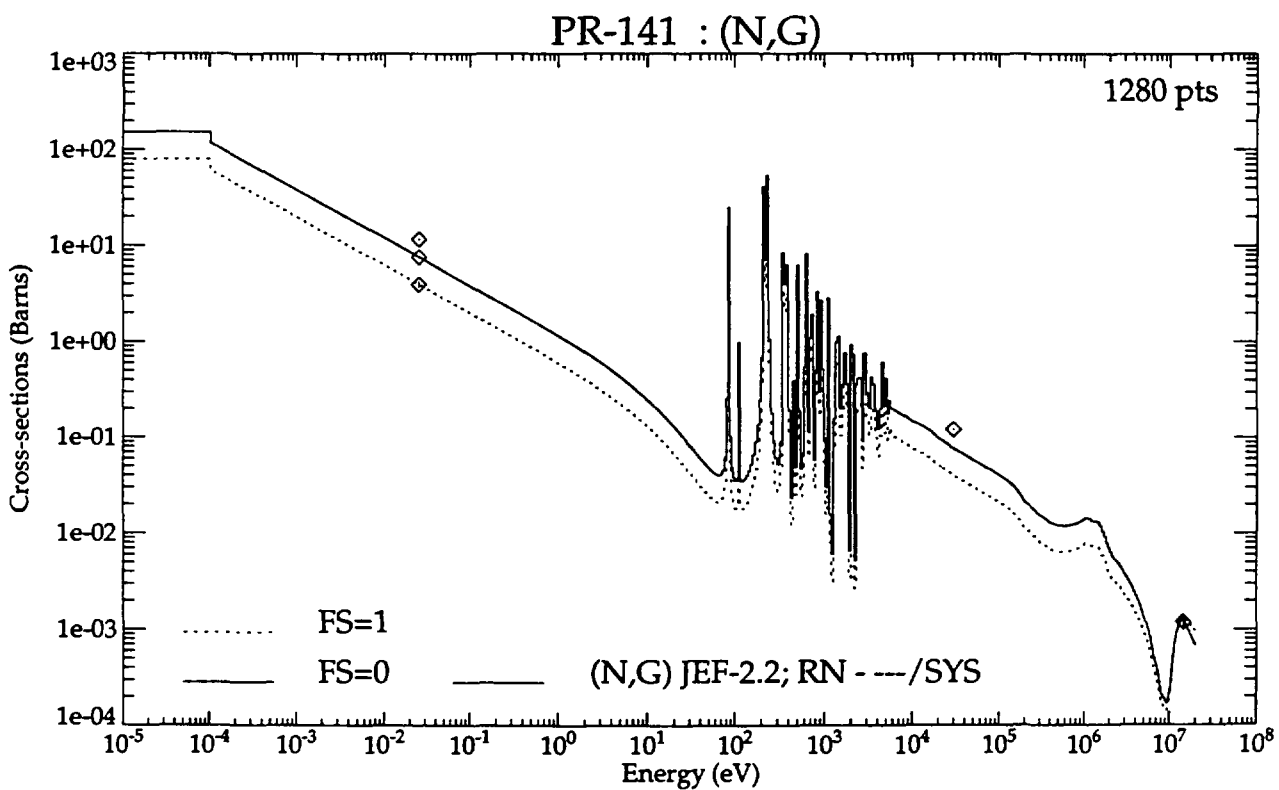
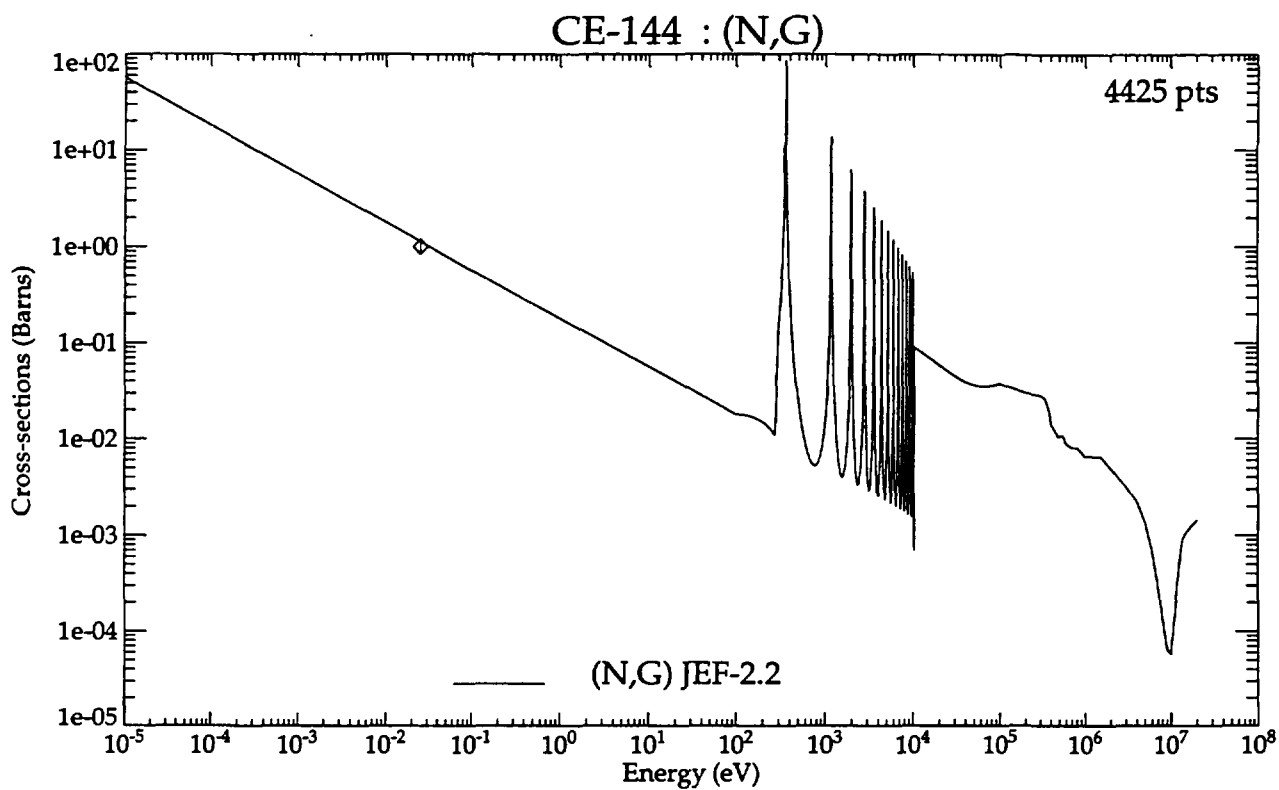


CE-139 : (N,G)

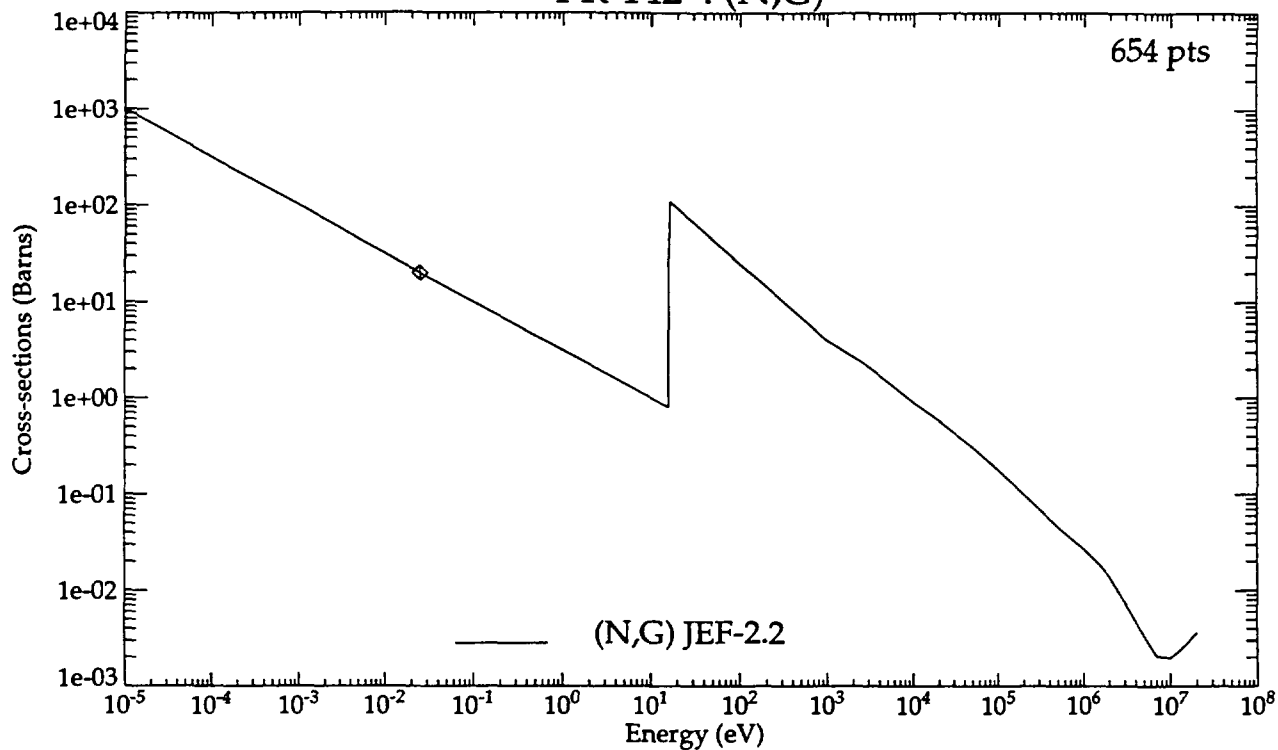




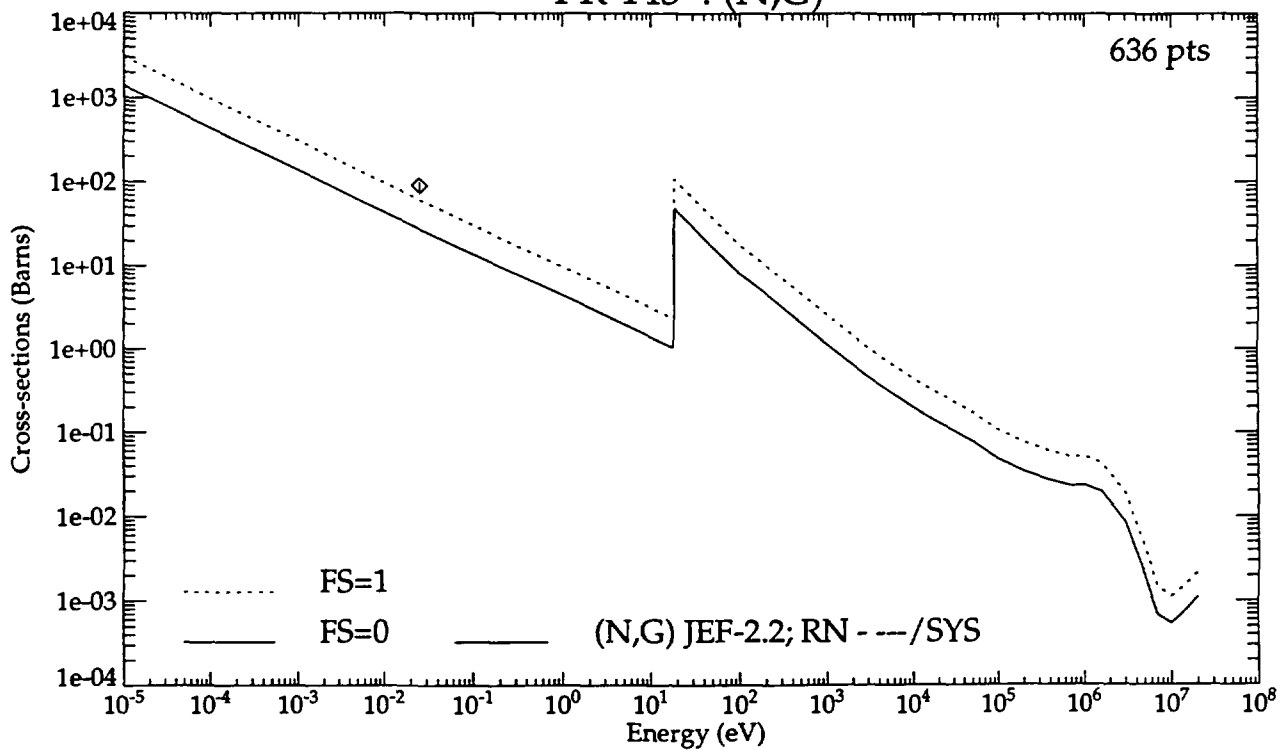


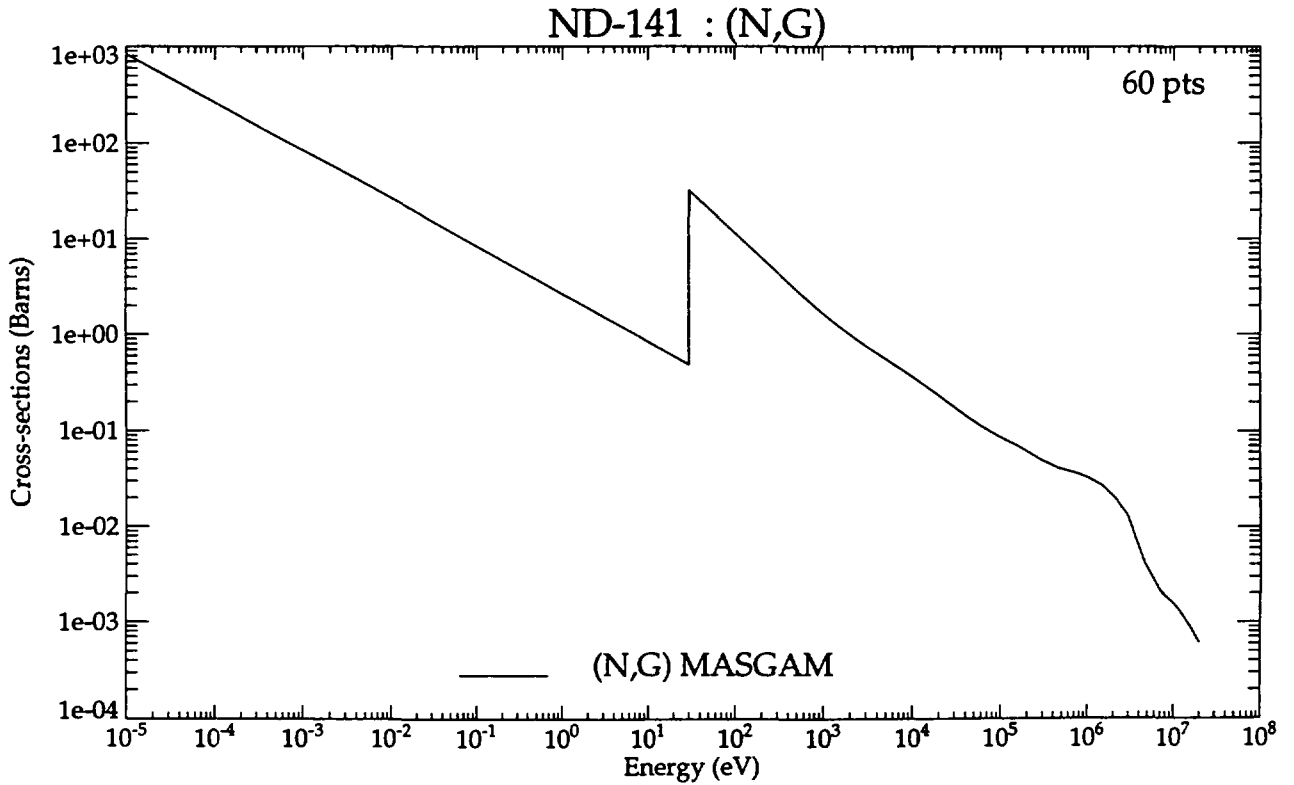
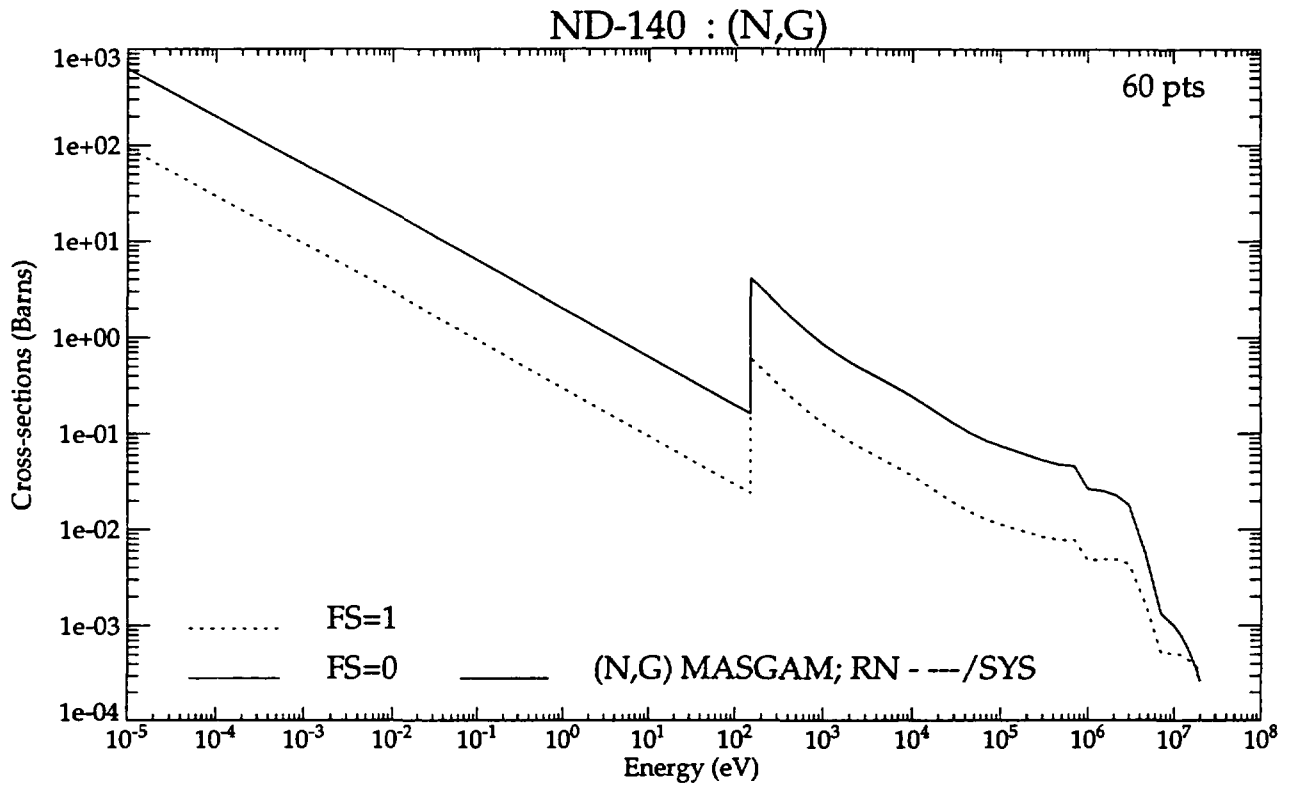


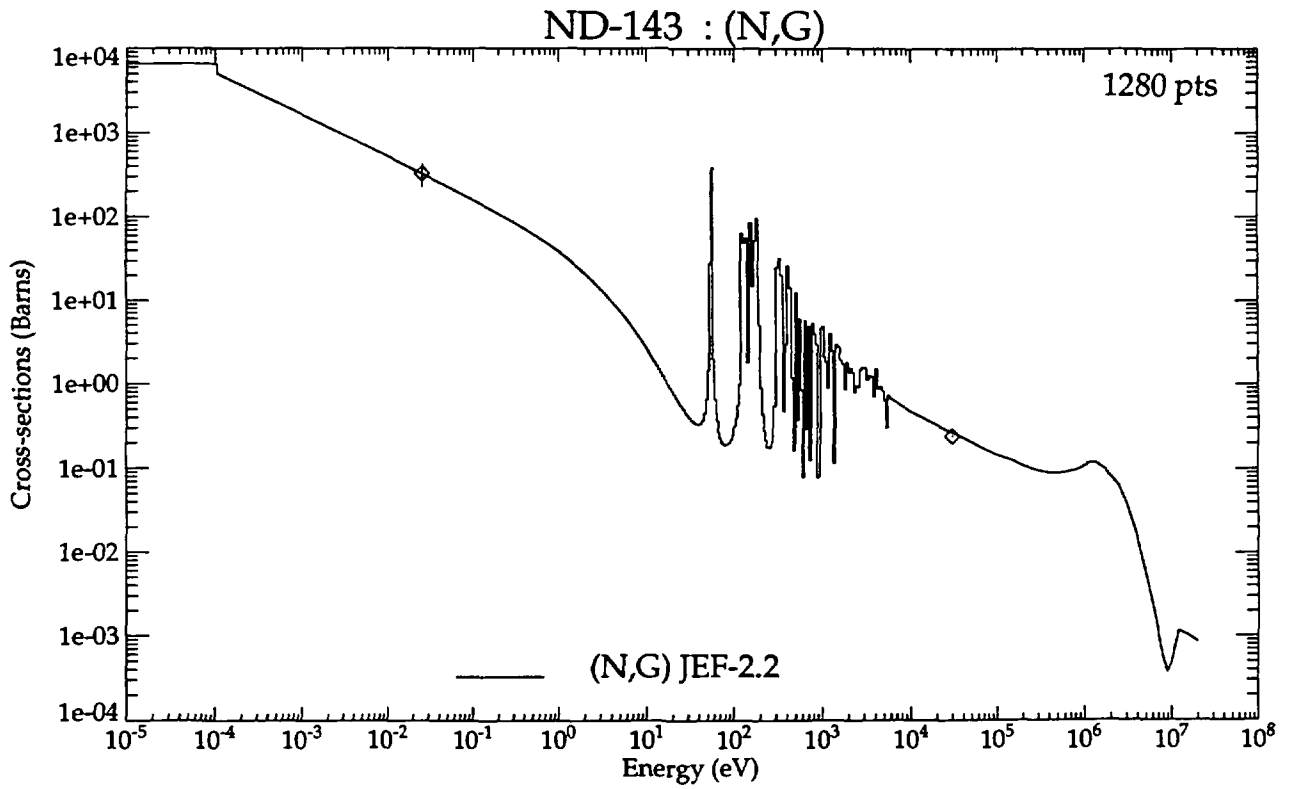
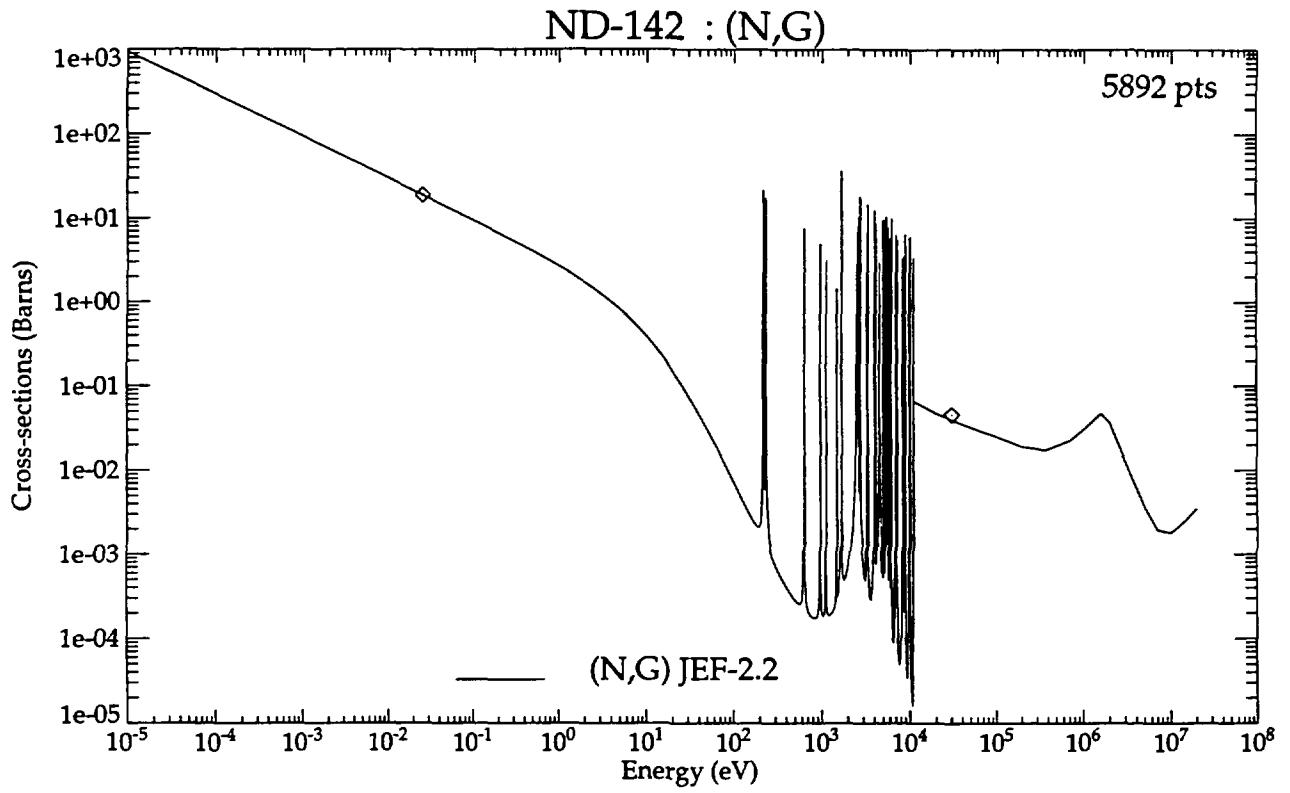
PR-142 : (N,G)

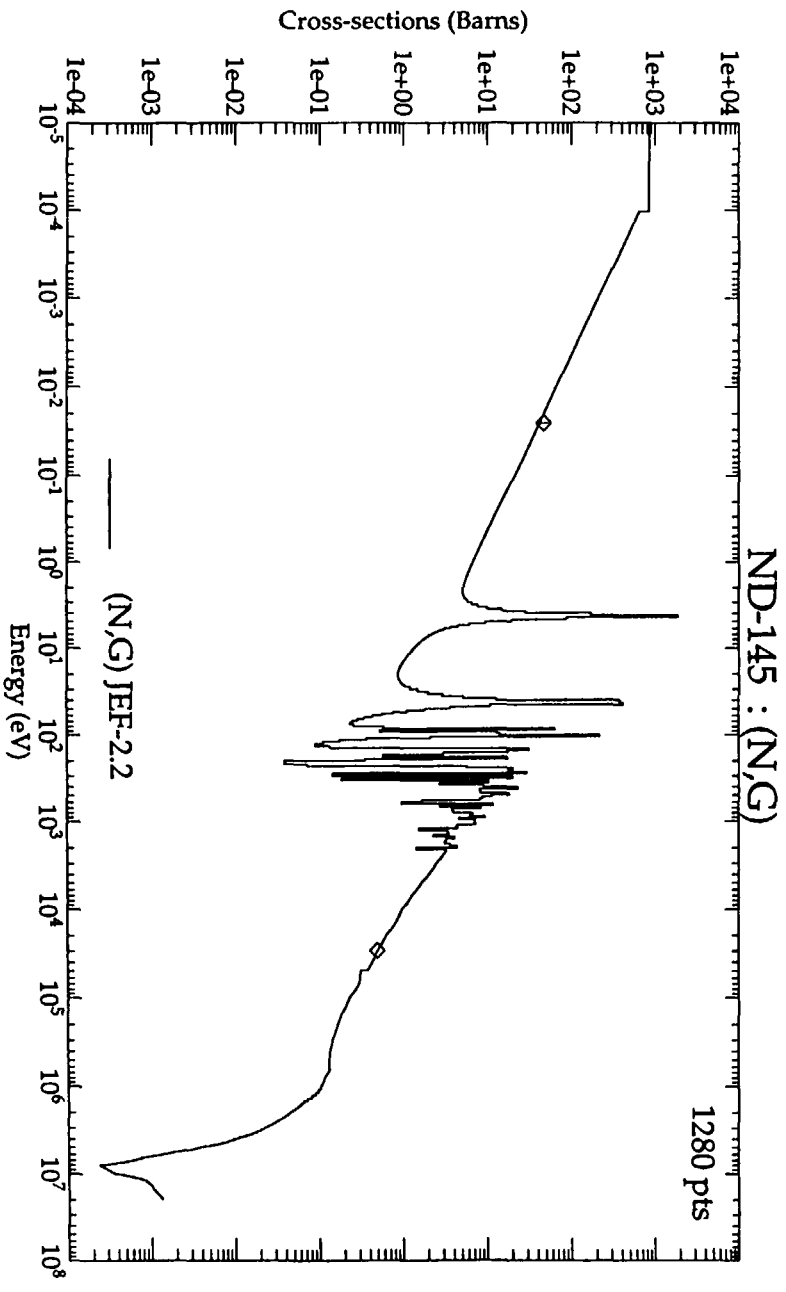
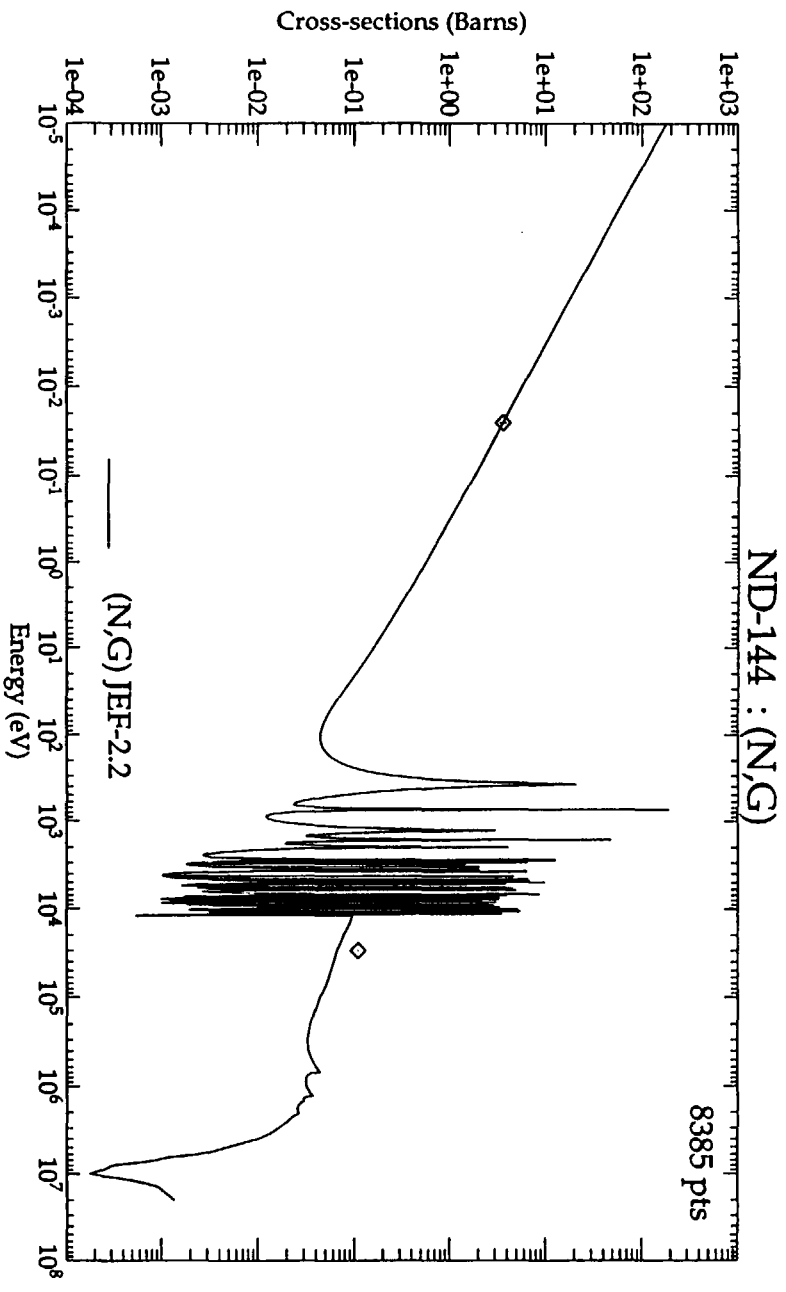


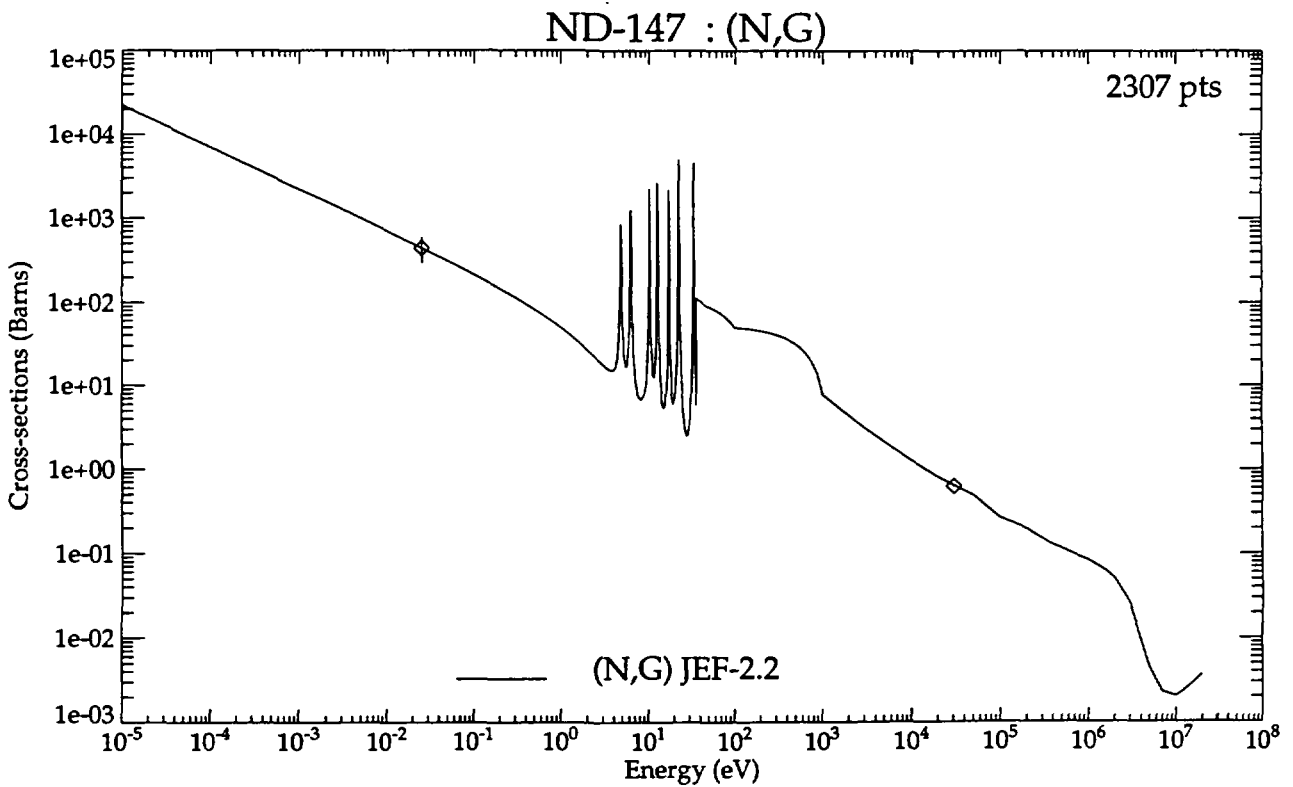
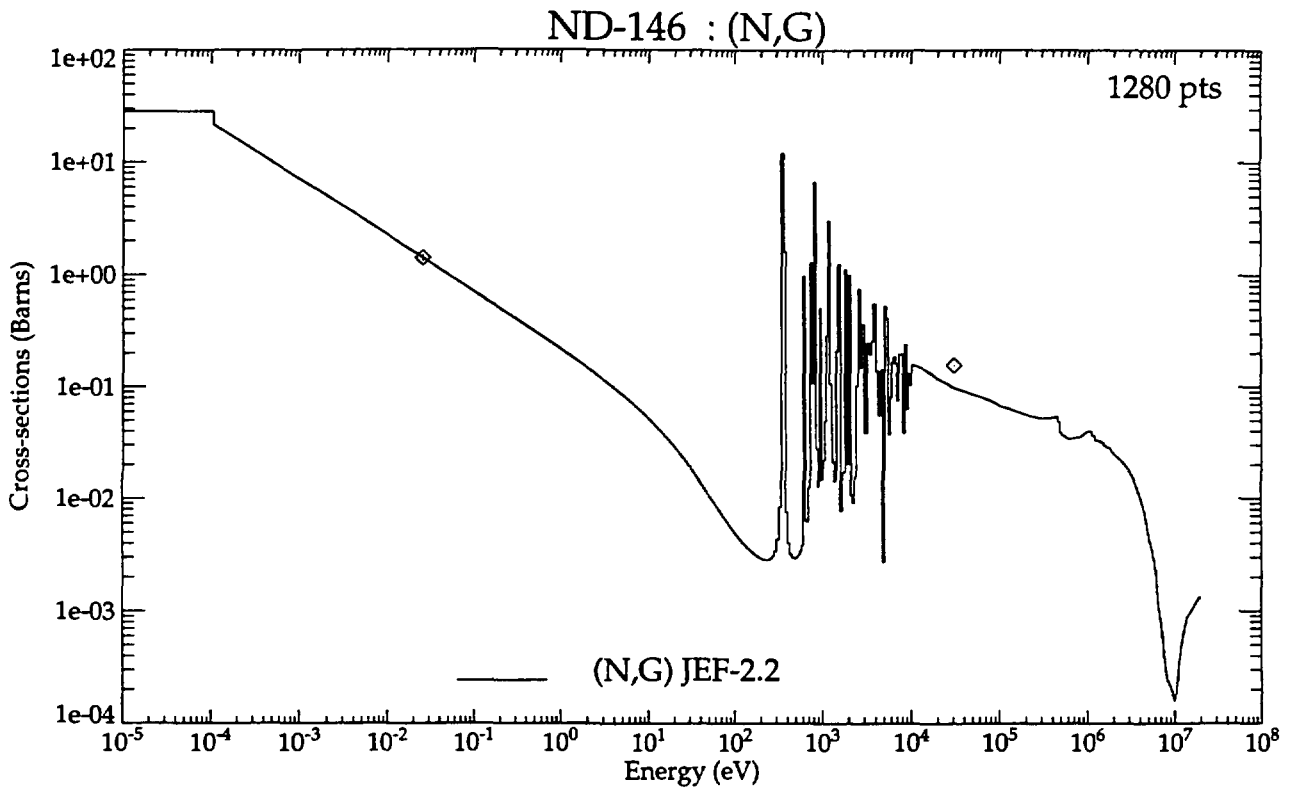
PR-143 : (N,G)

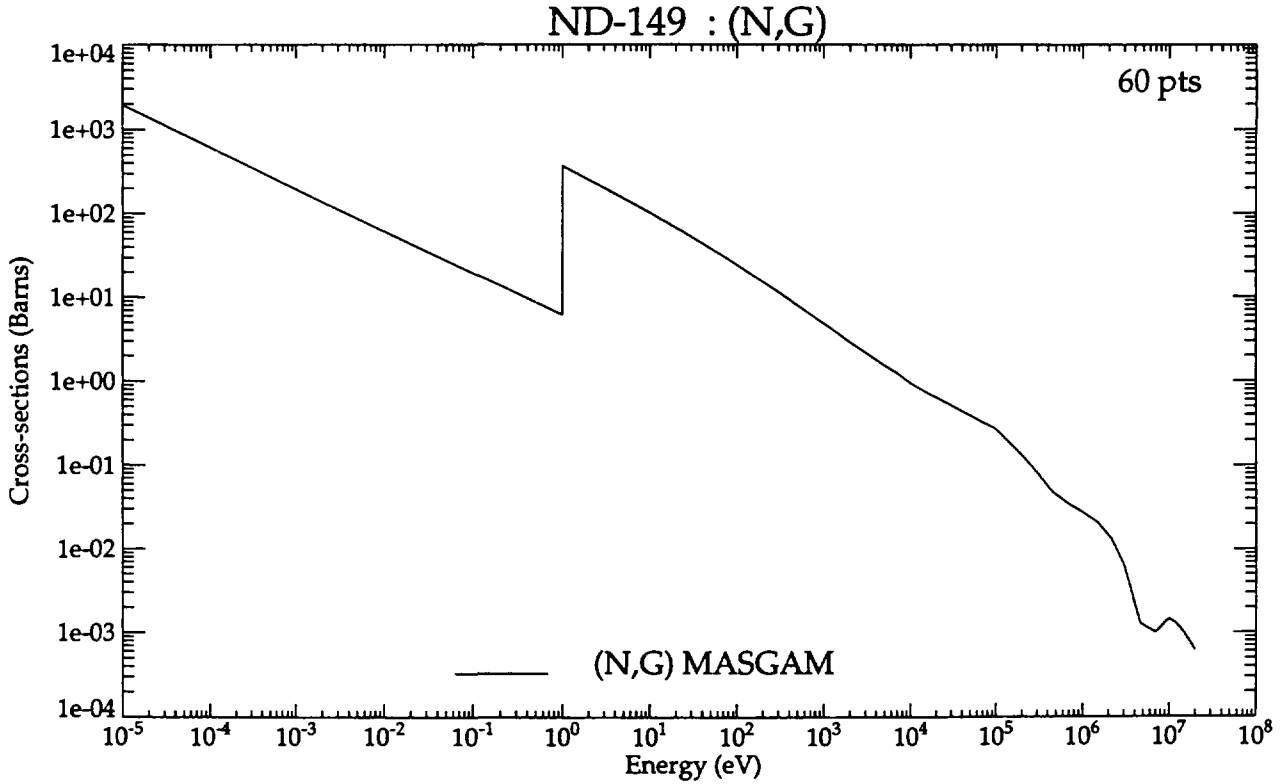
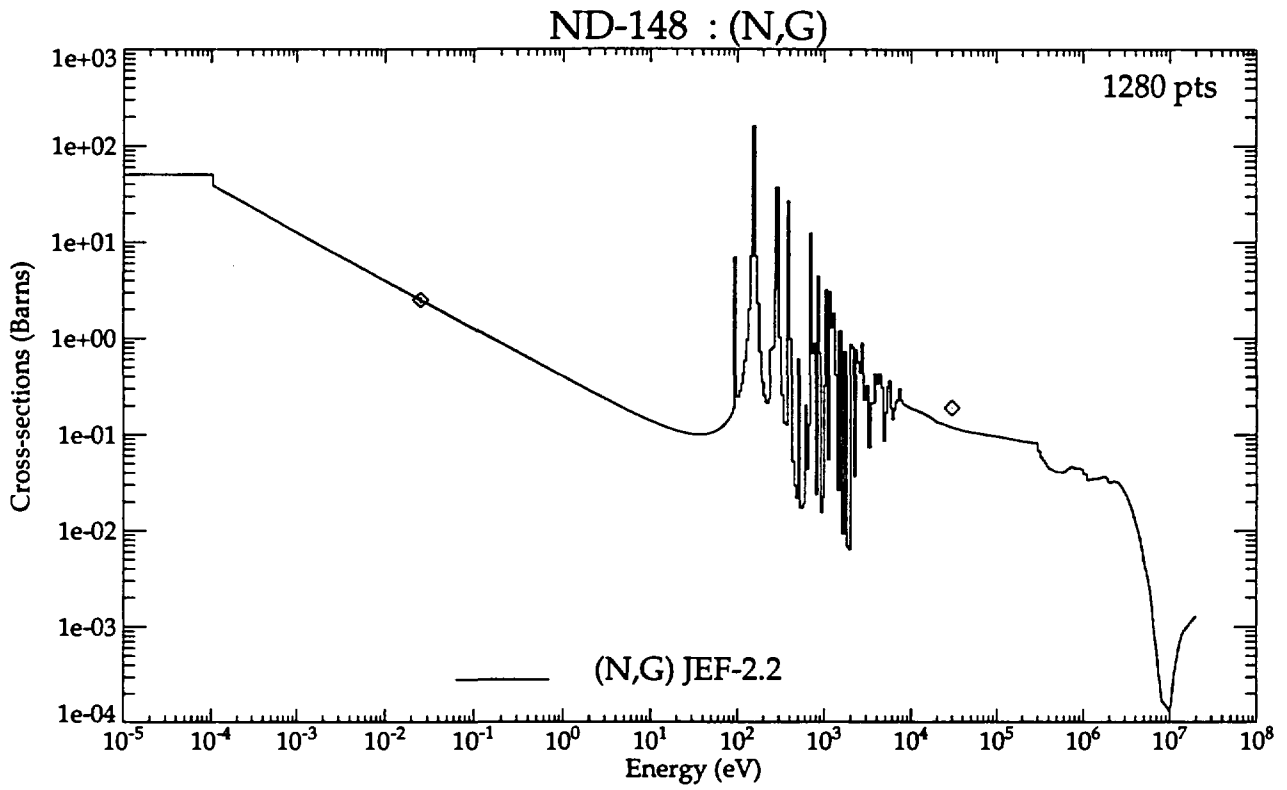


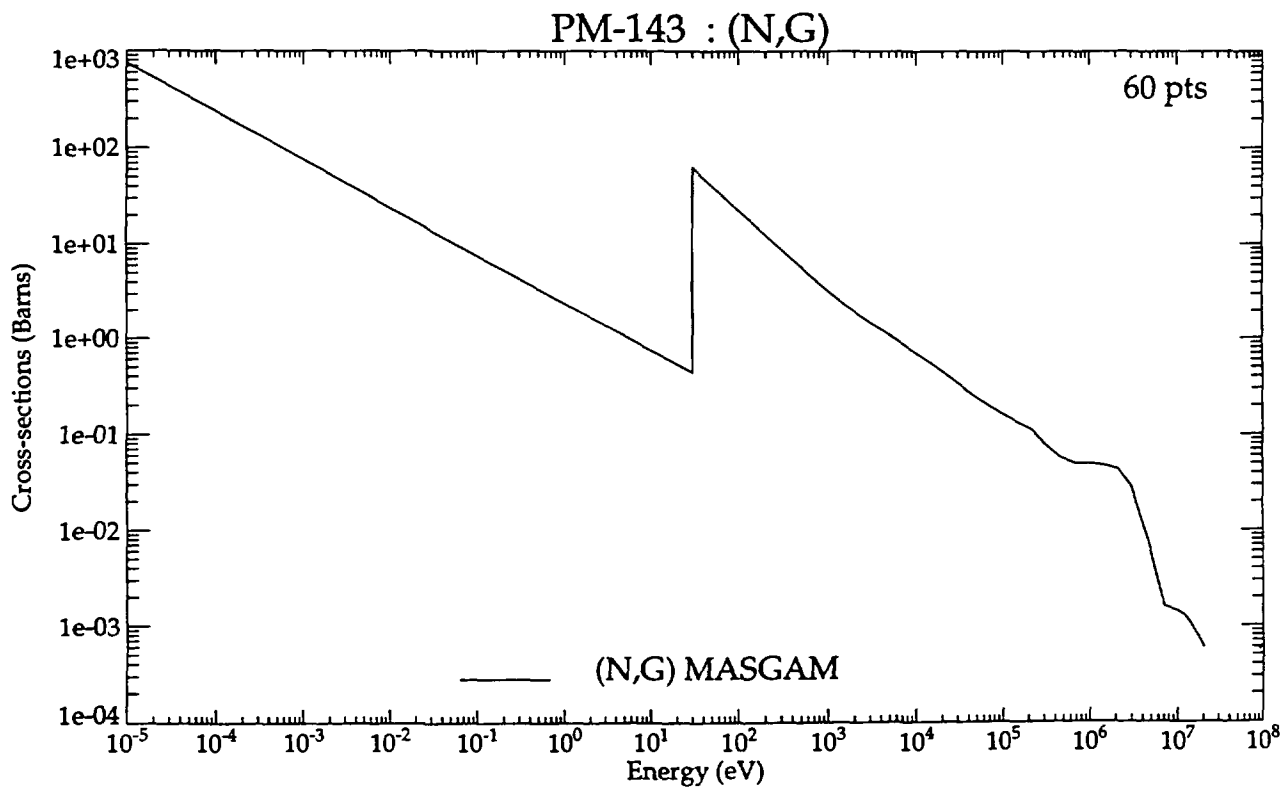
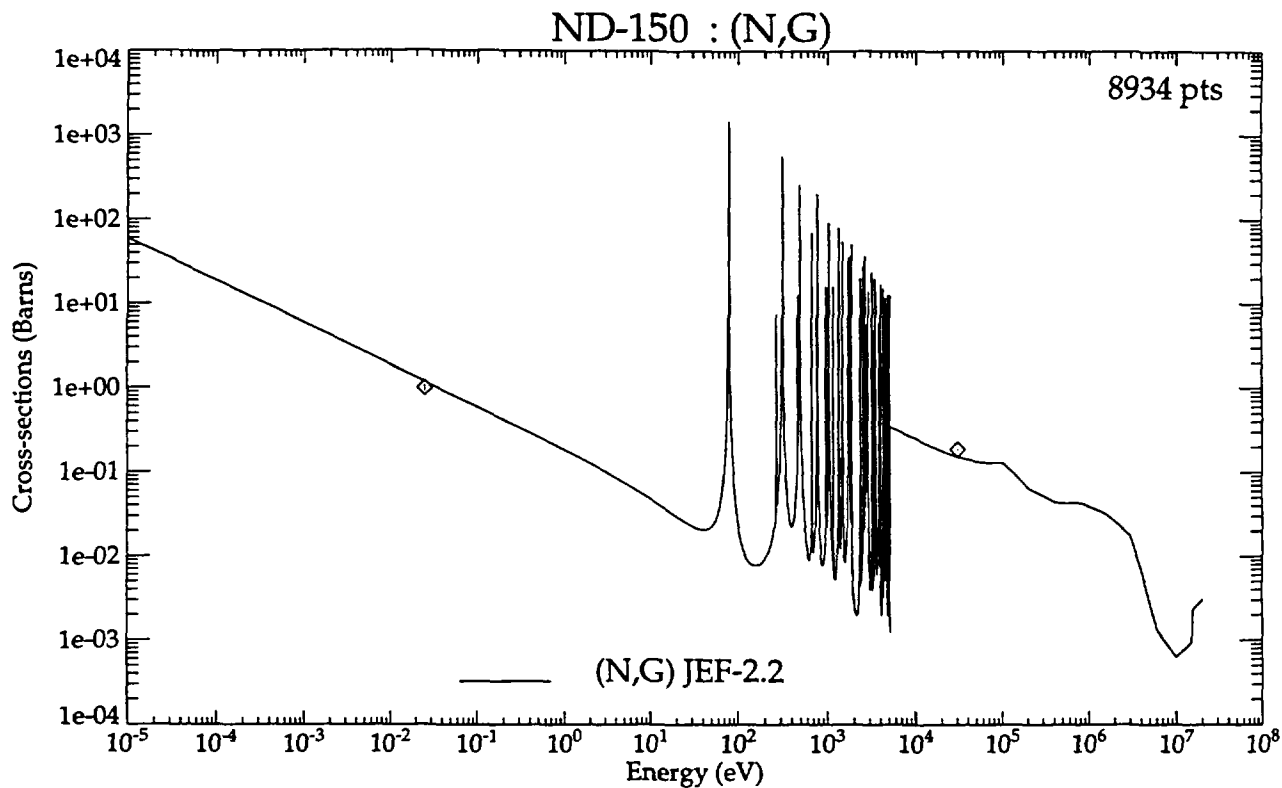


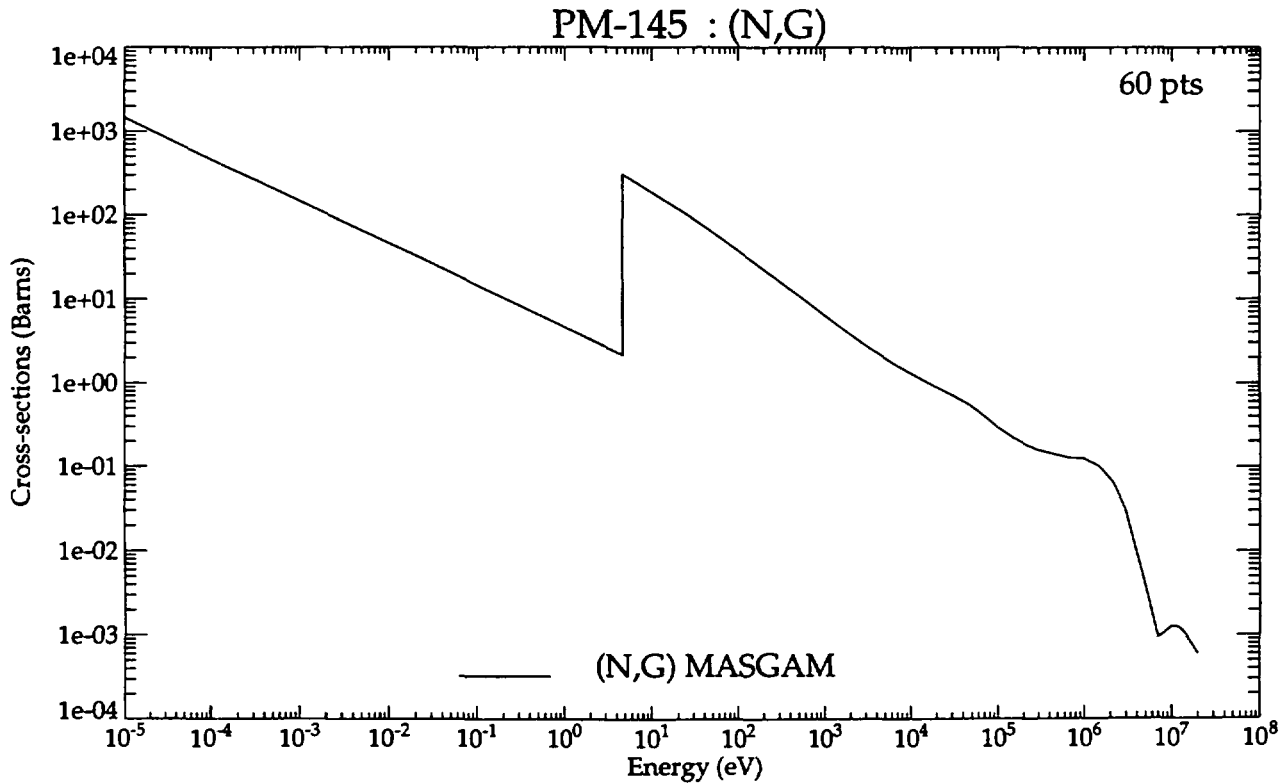
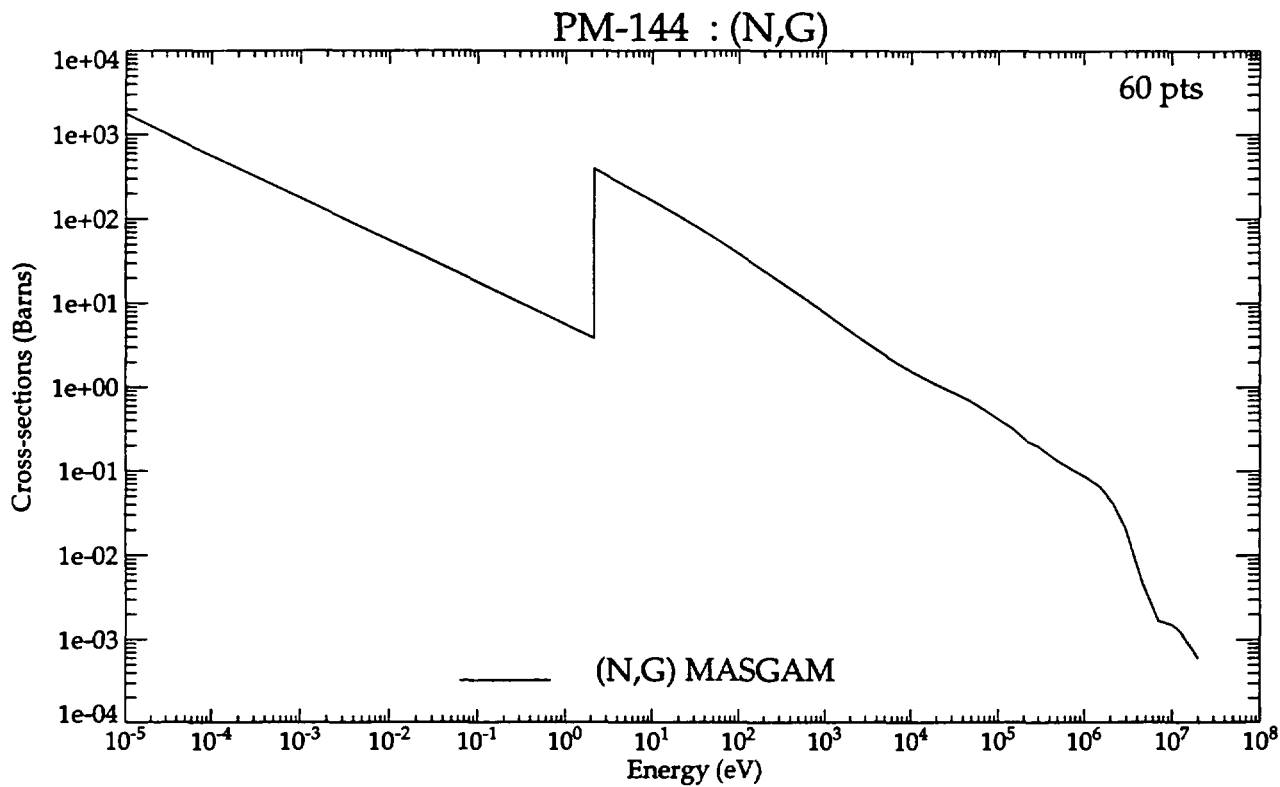


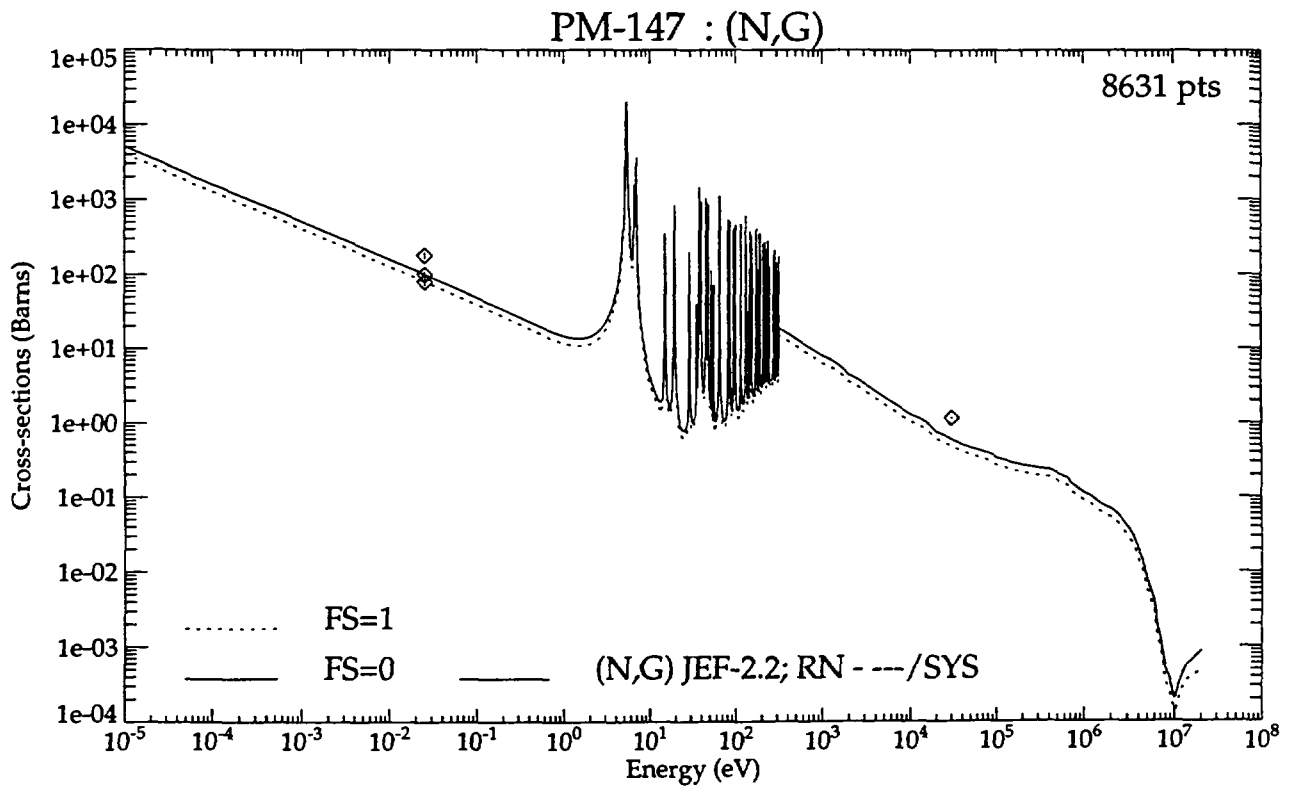
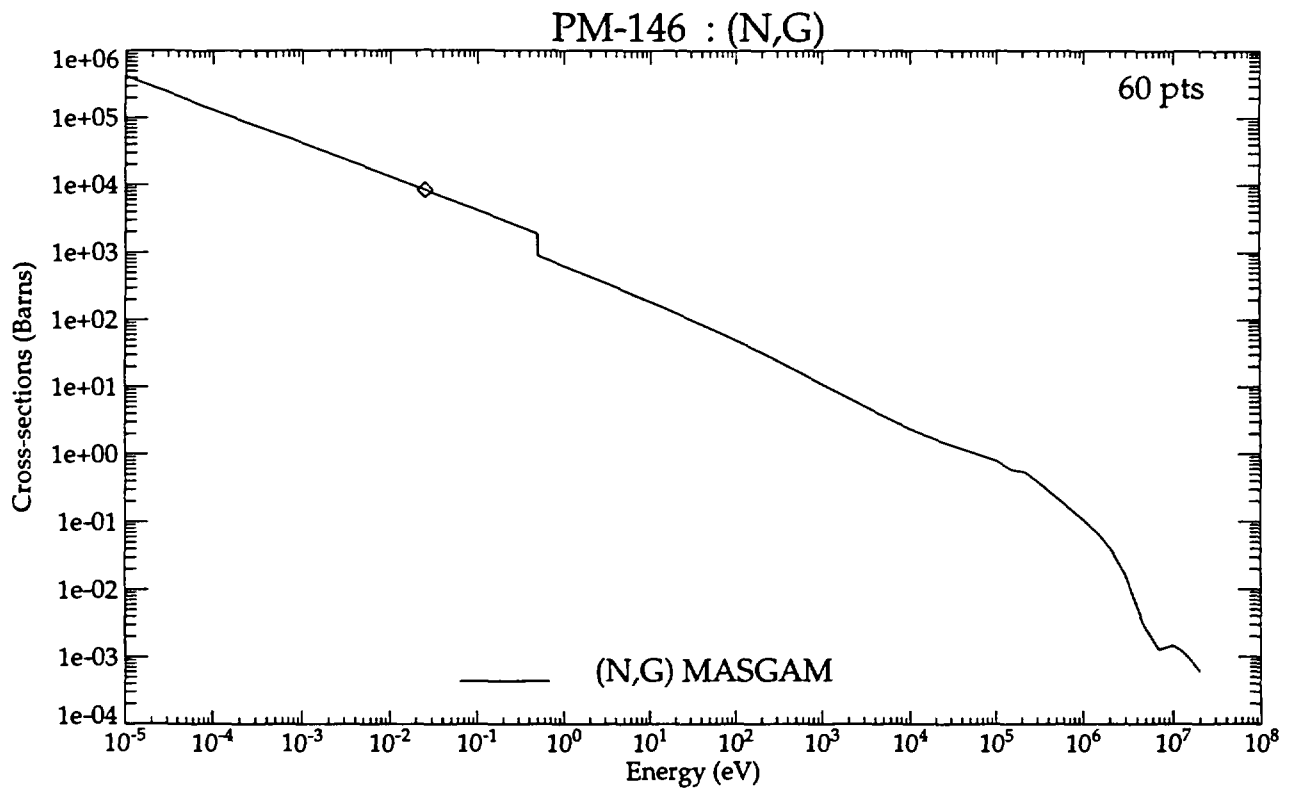


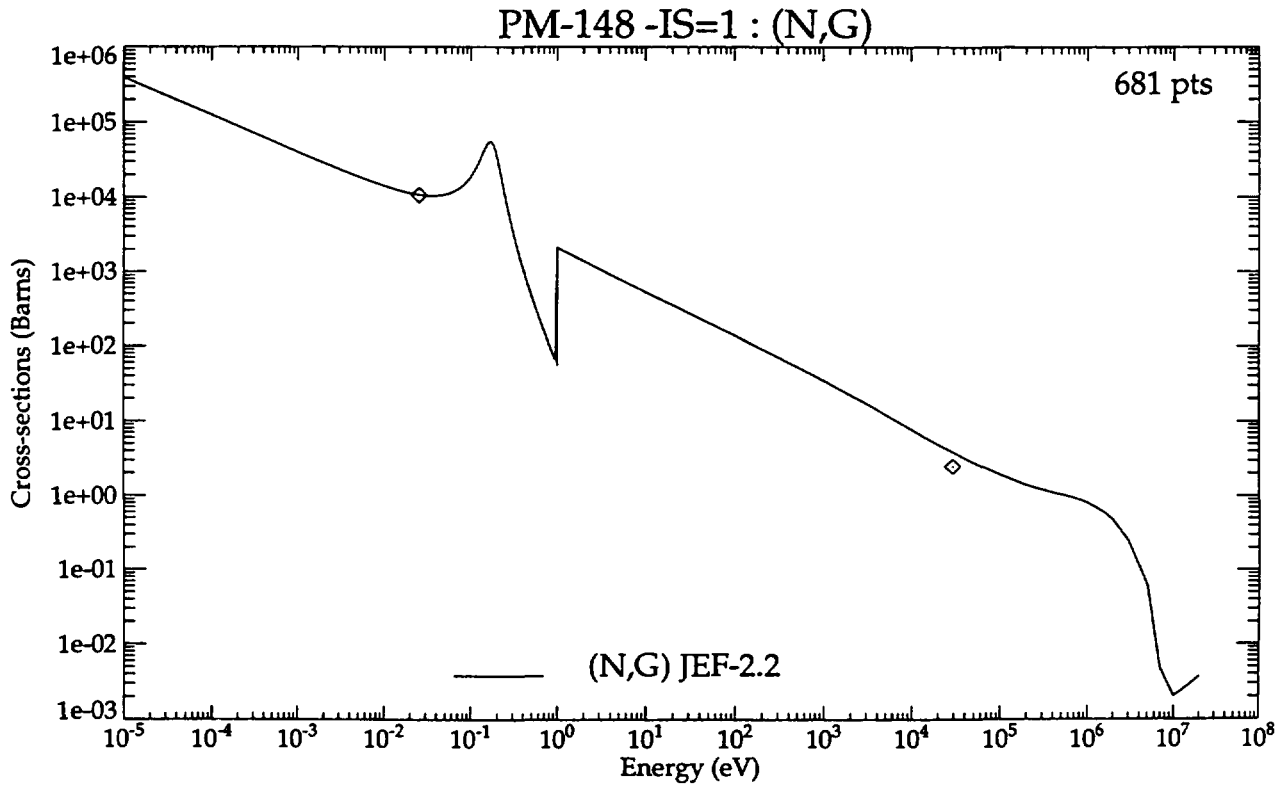
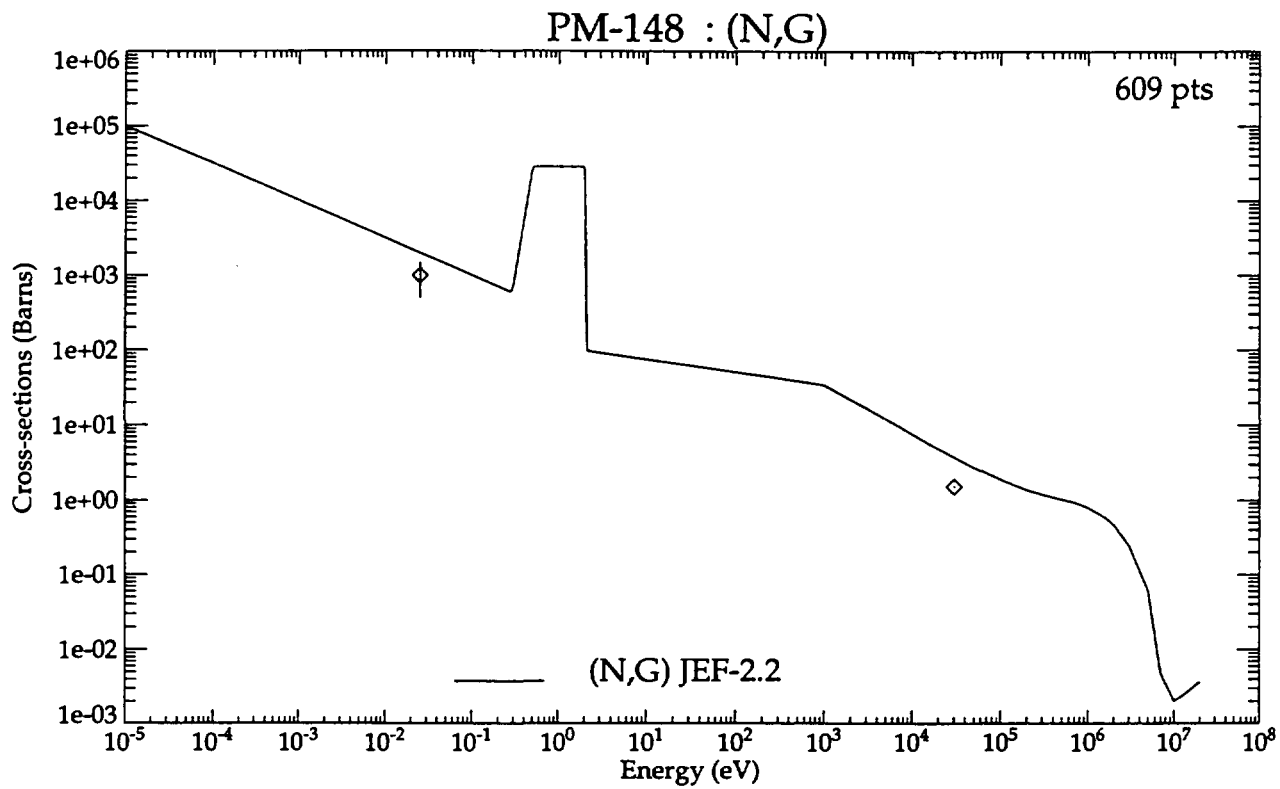


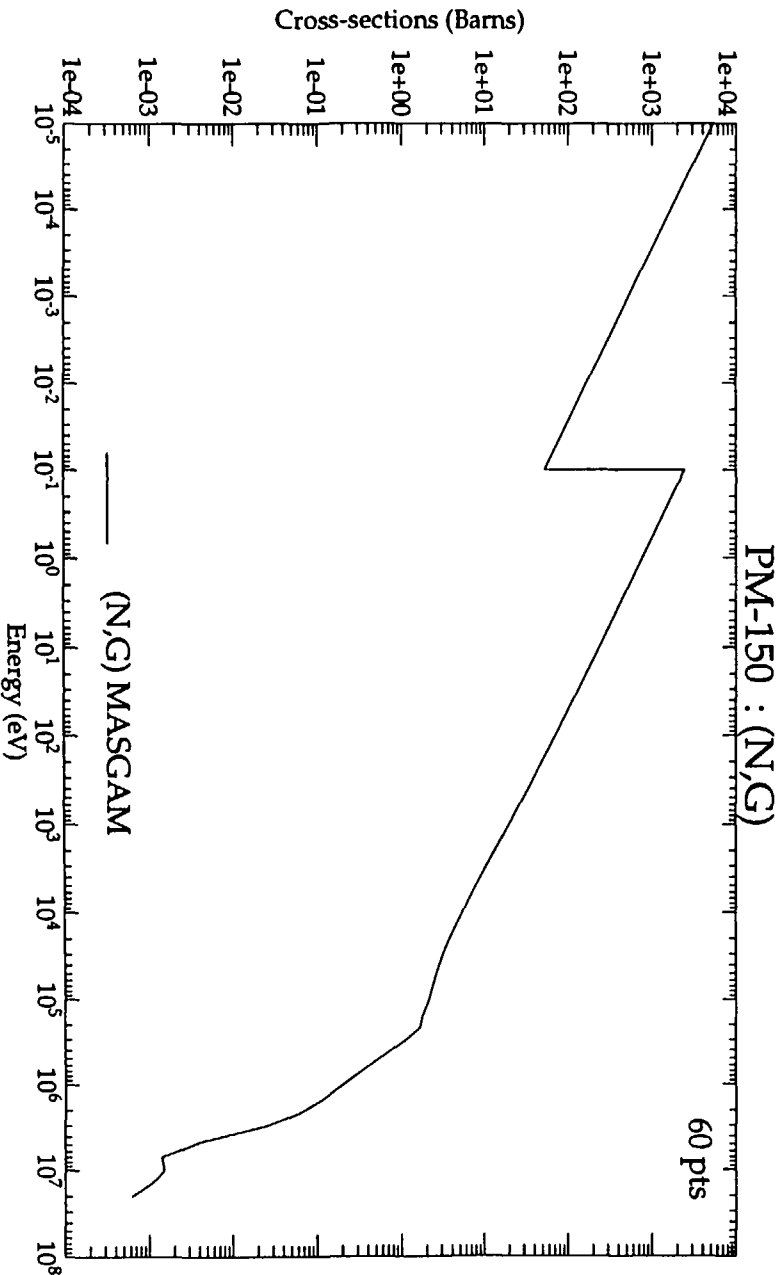
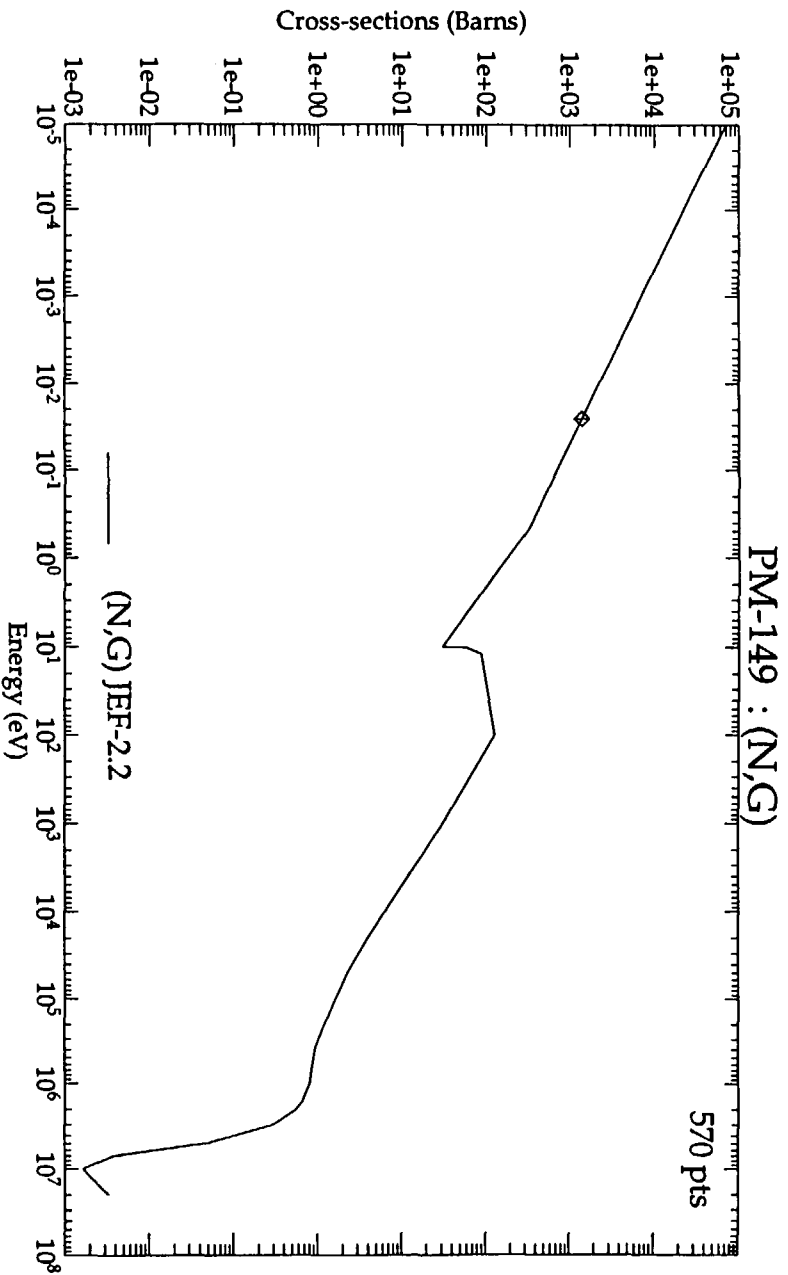


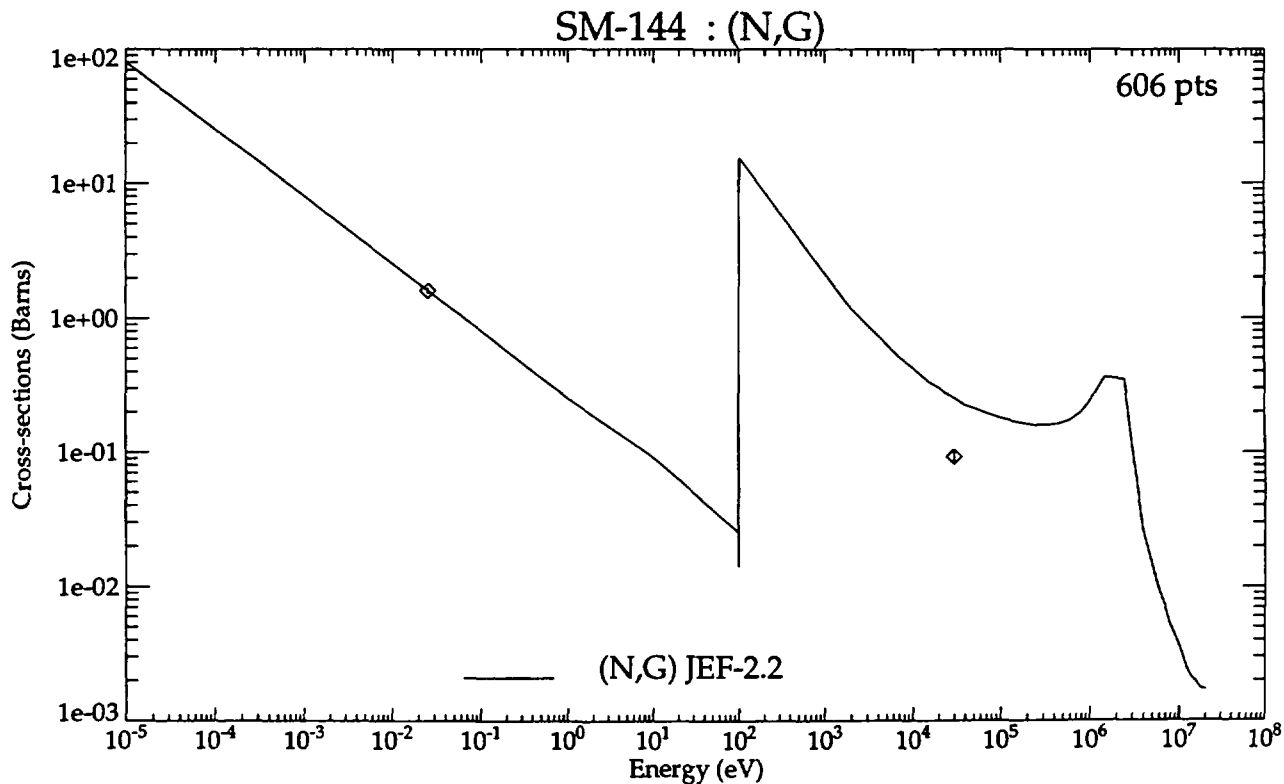
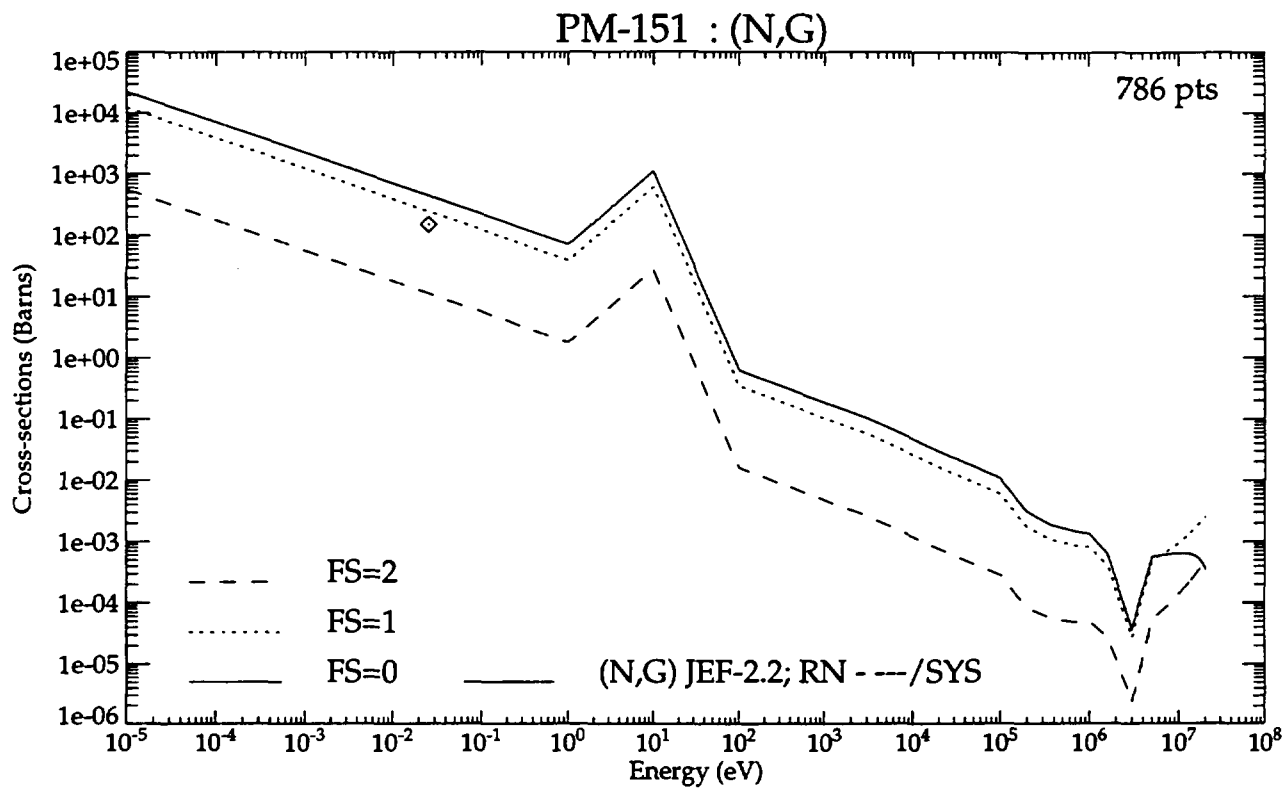


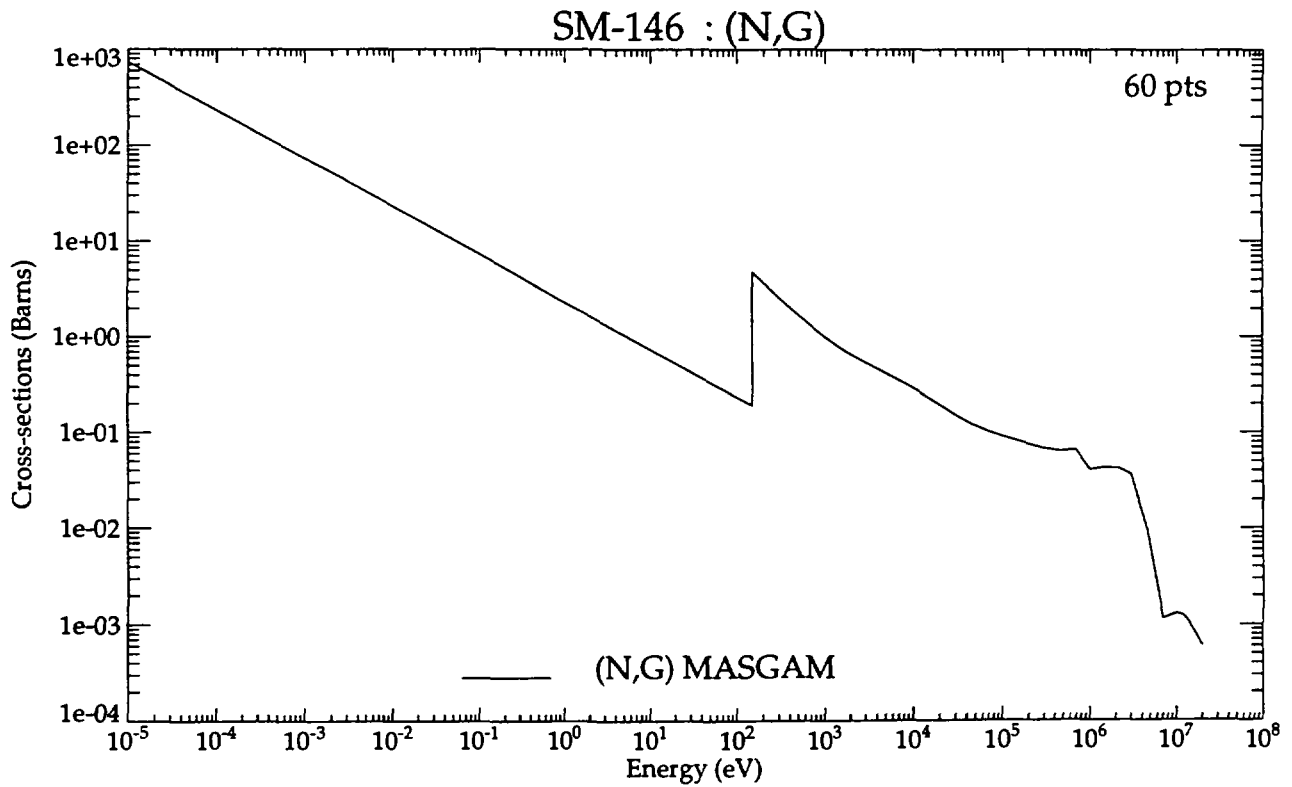
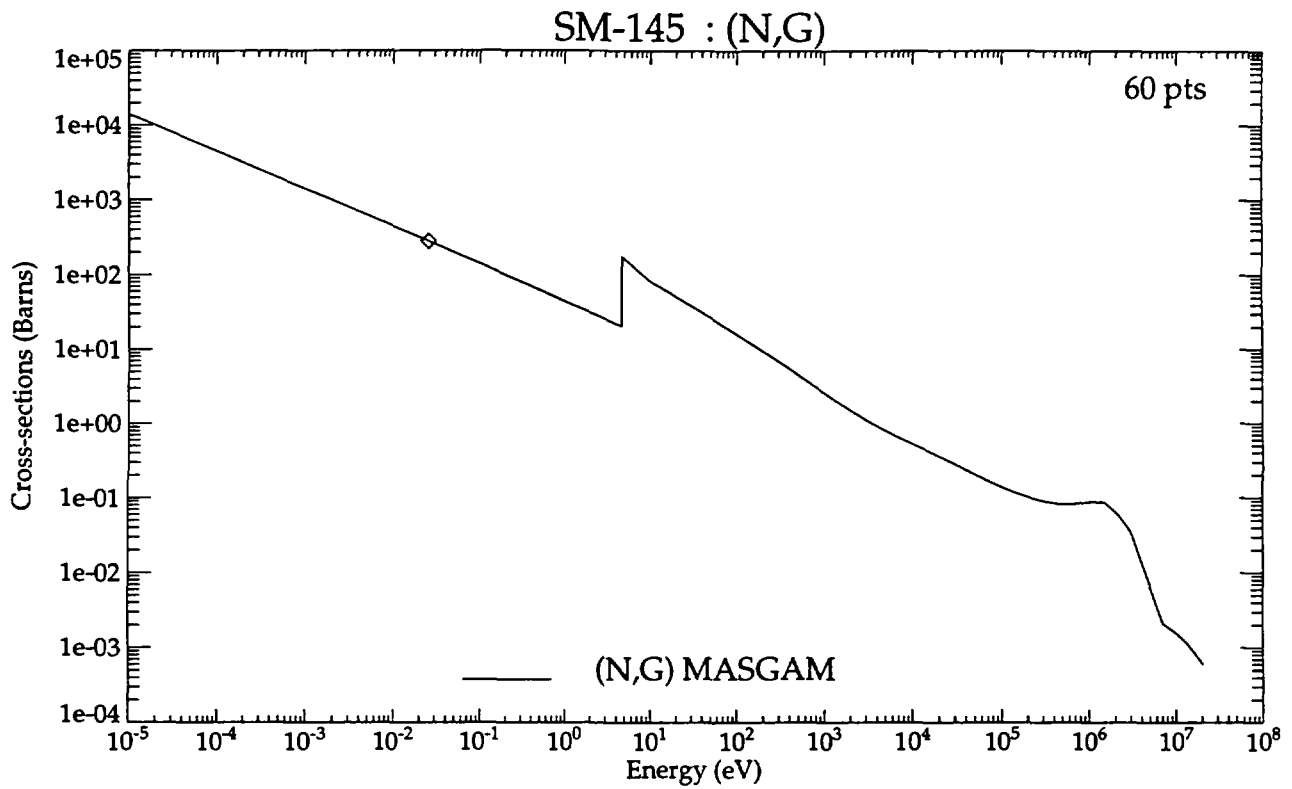


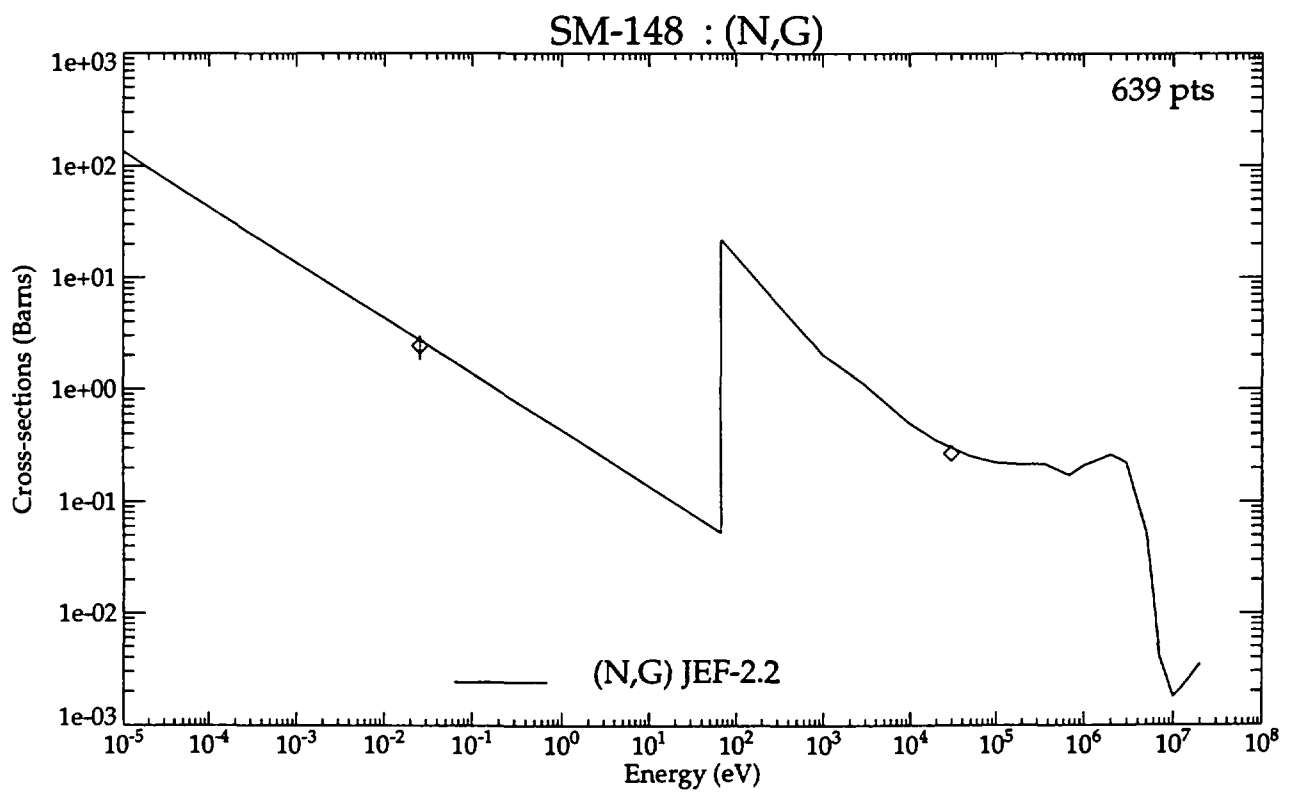
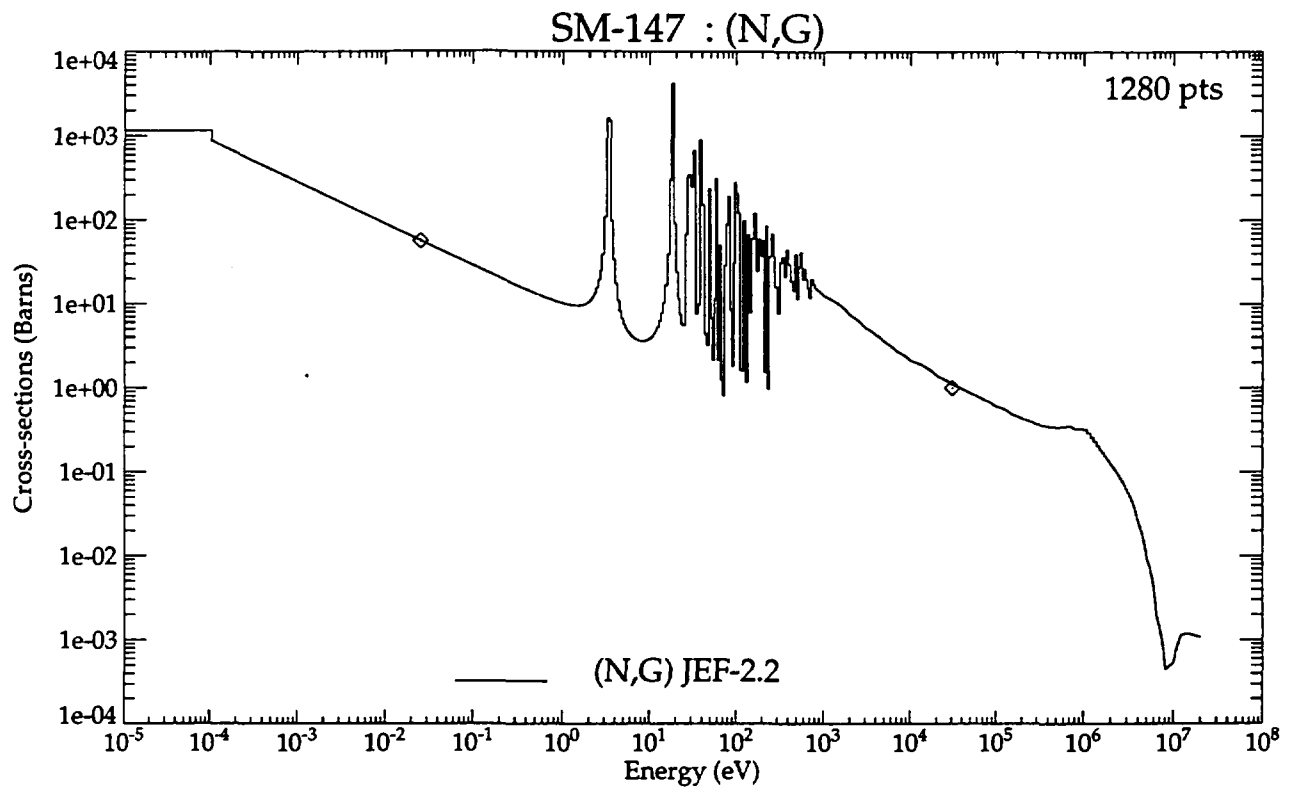


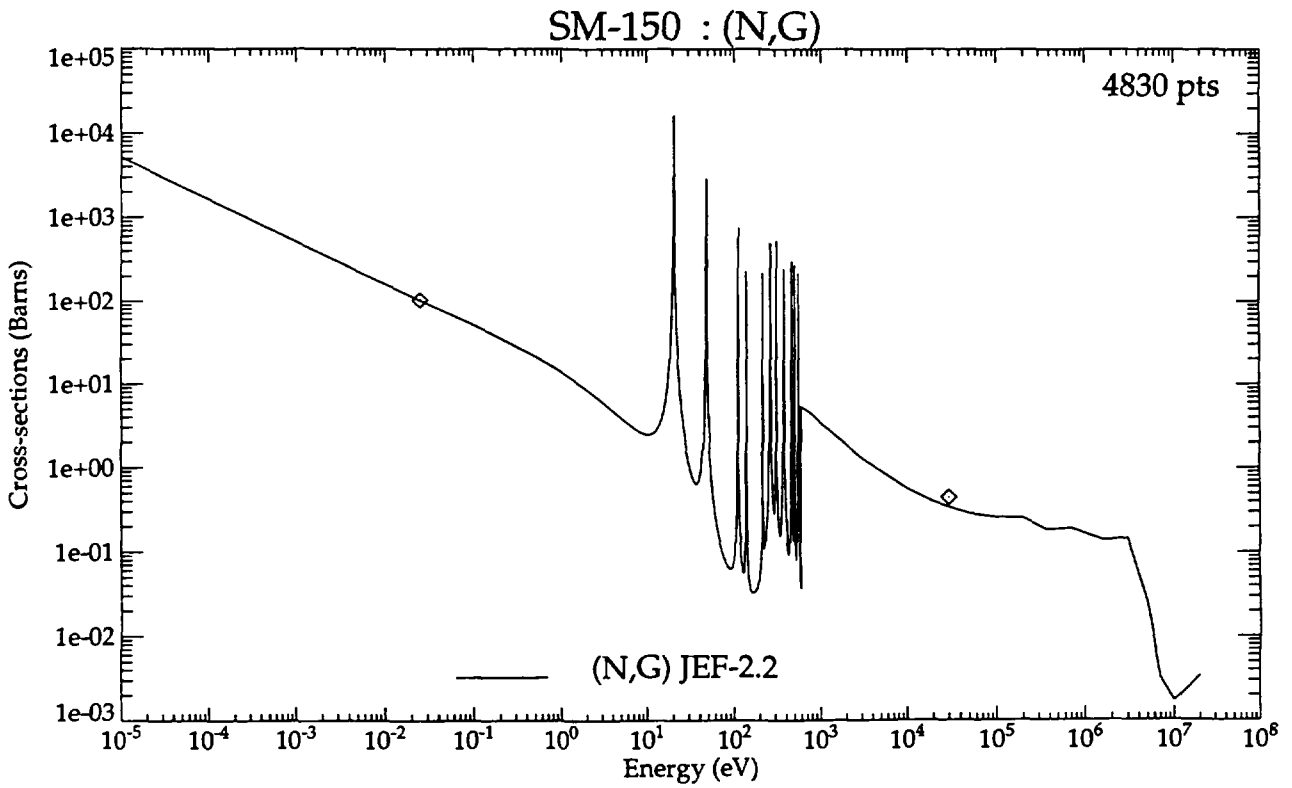
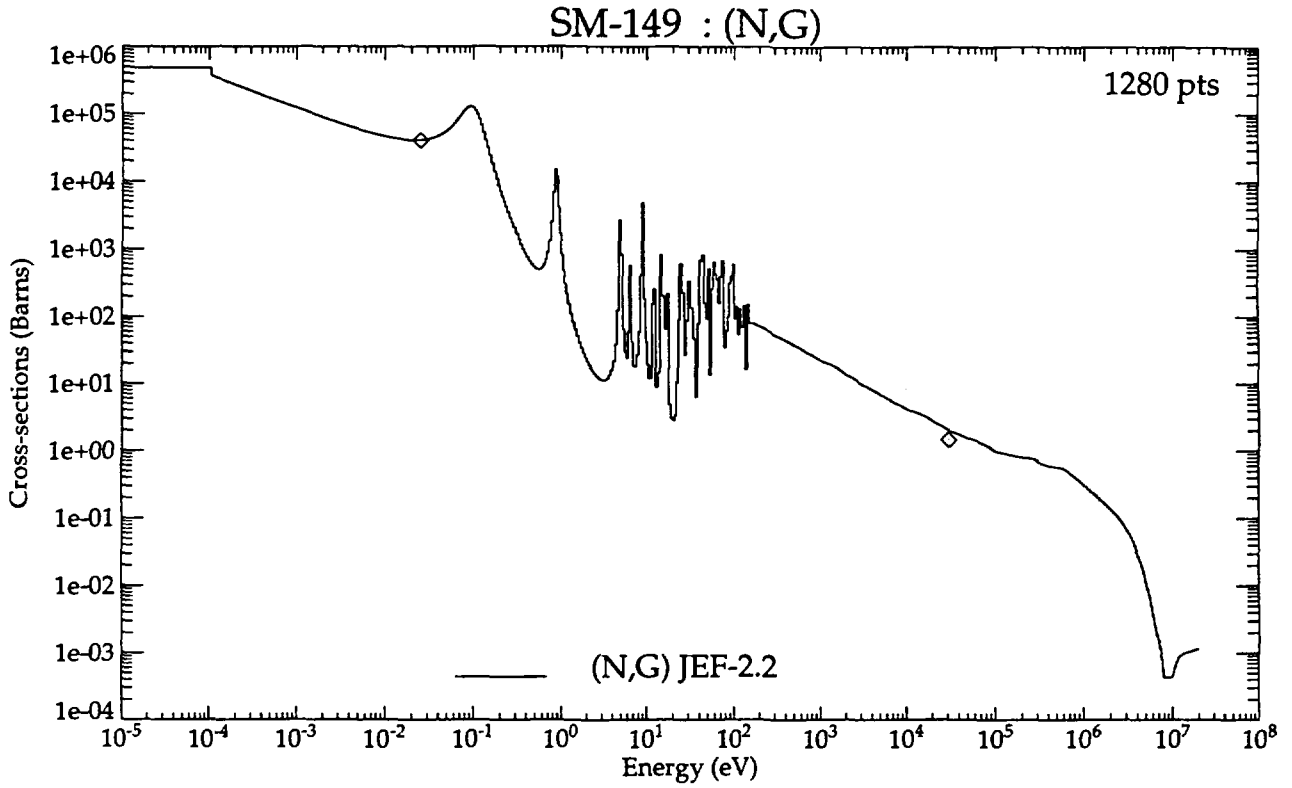


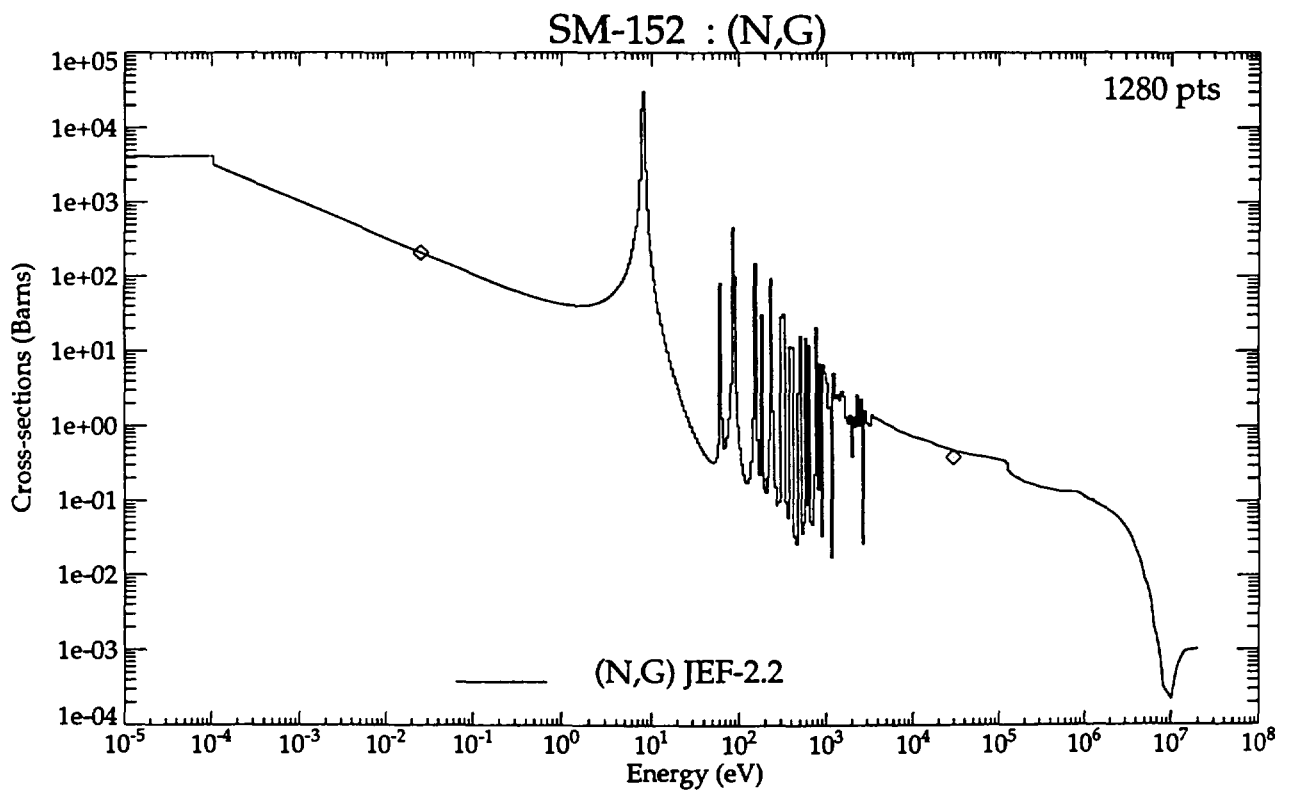
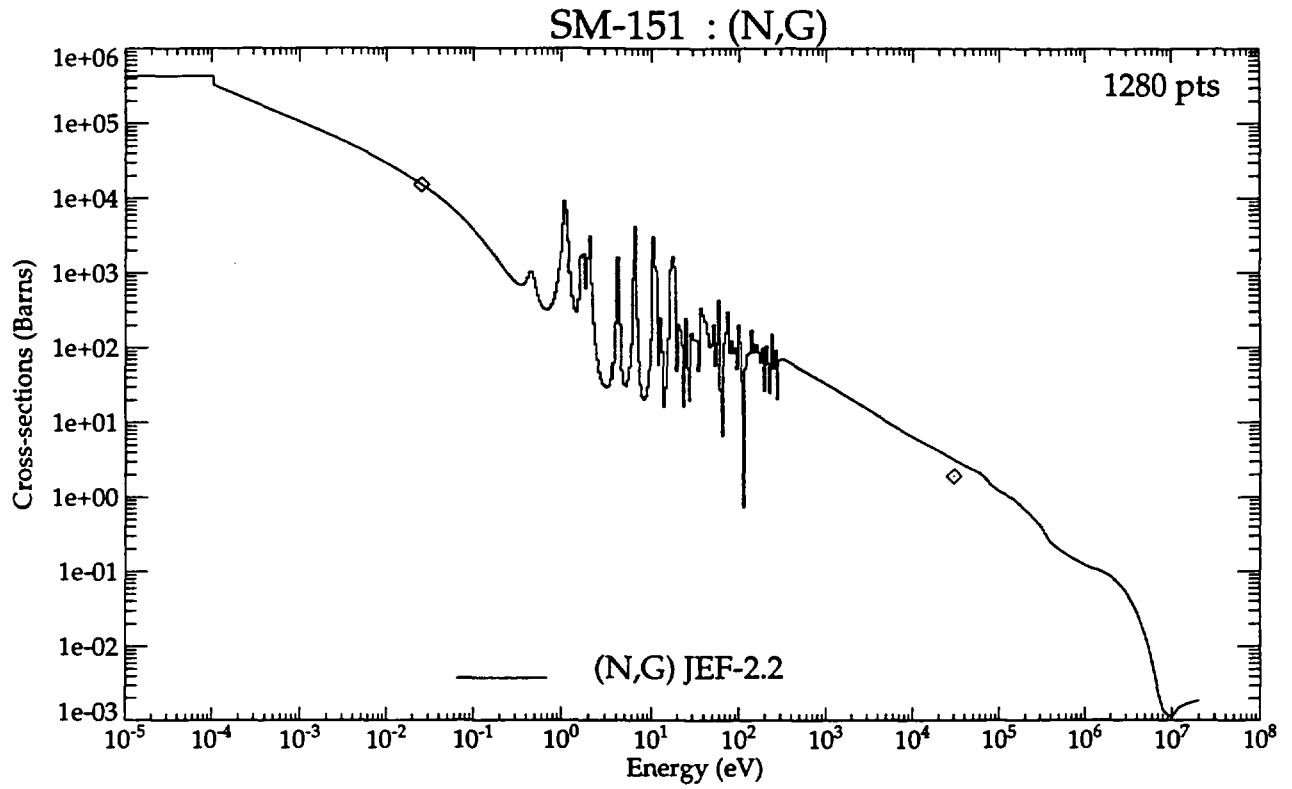


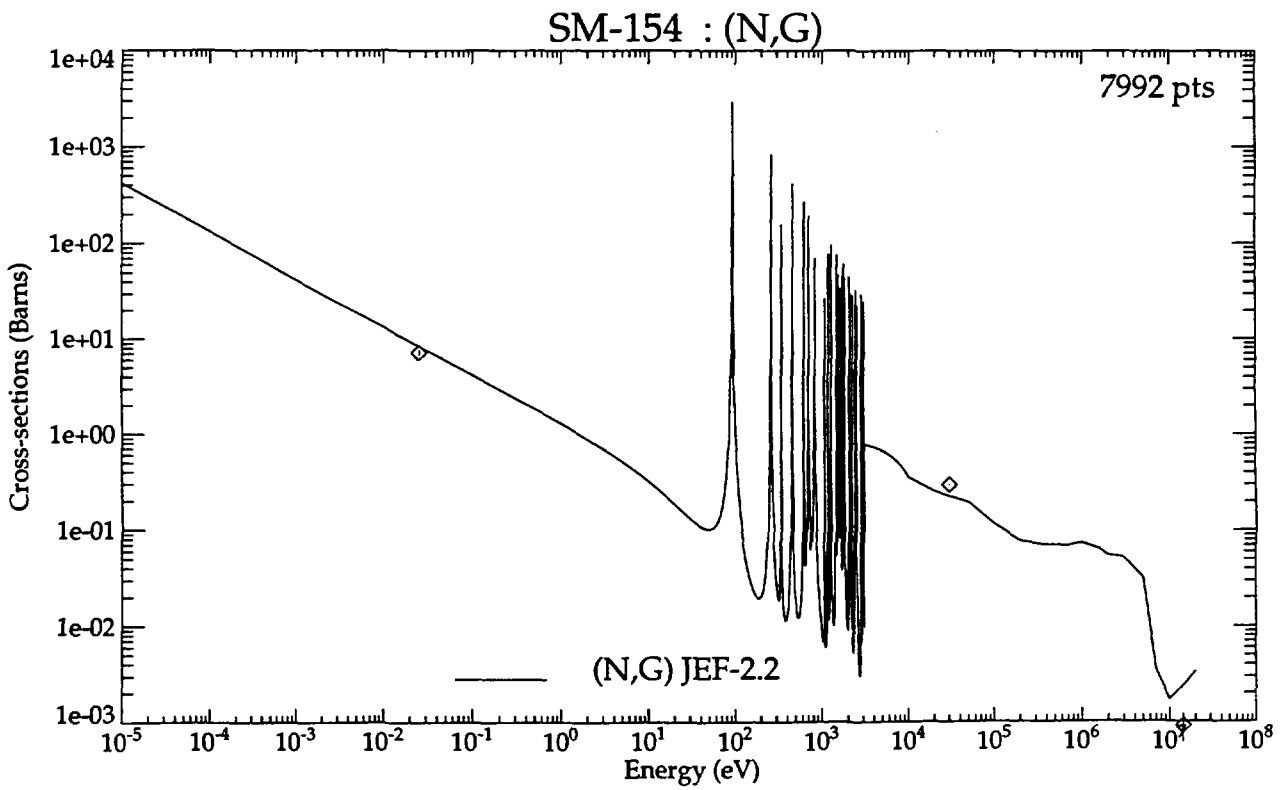
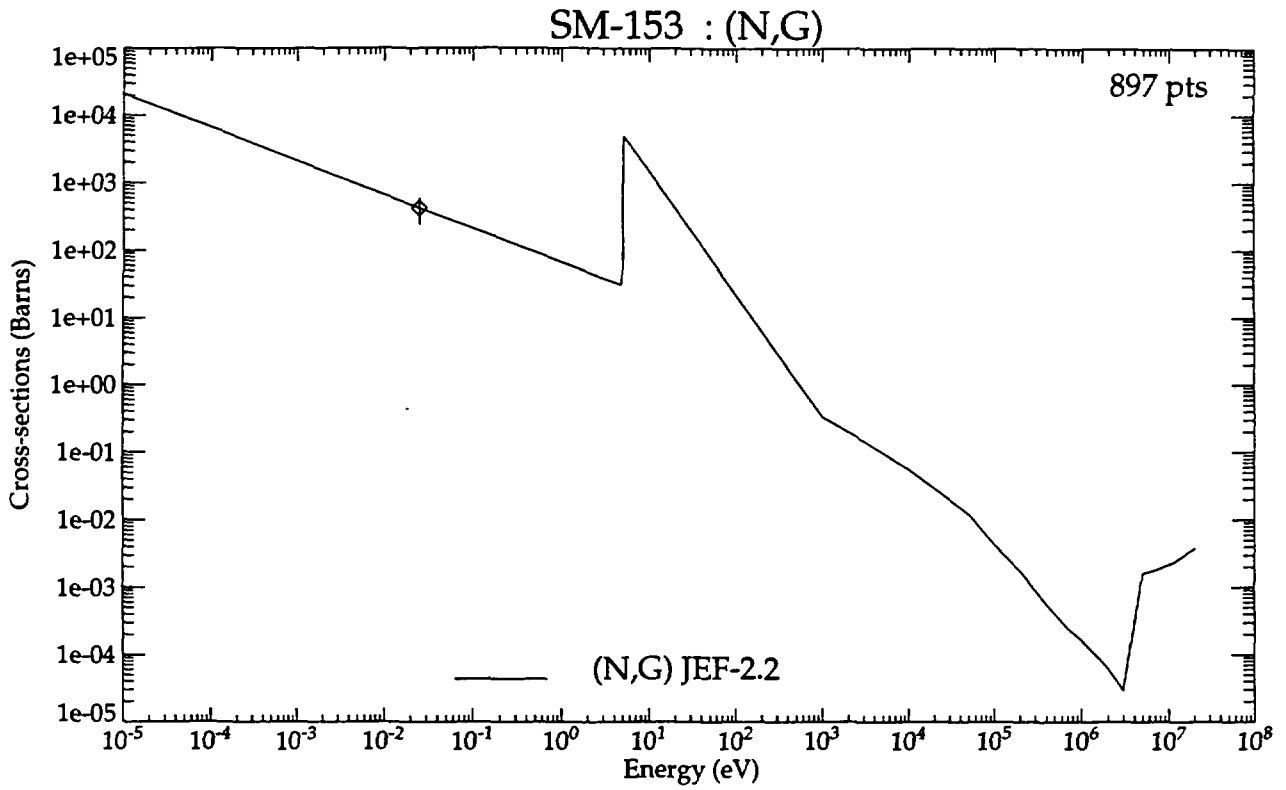


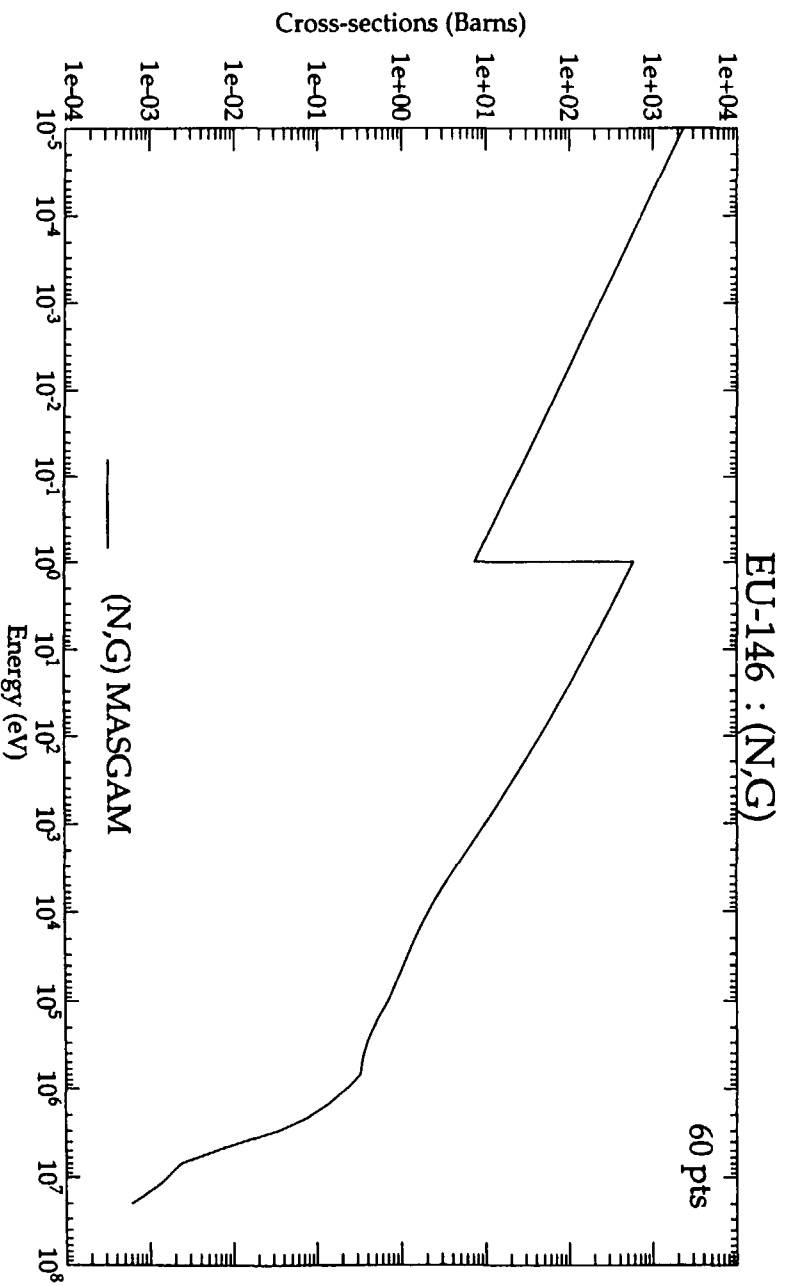
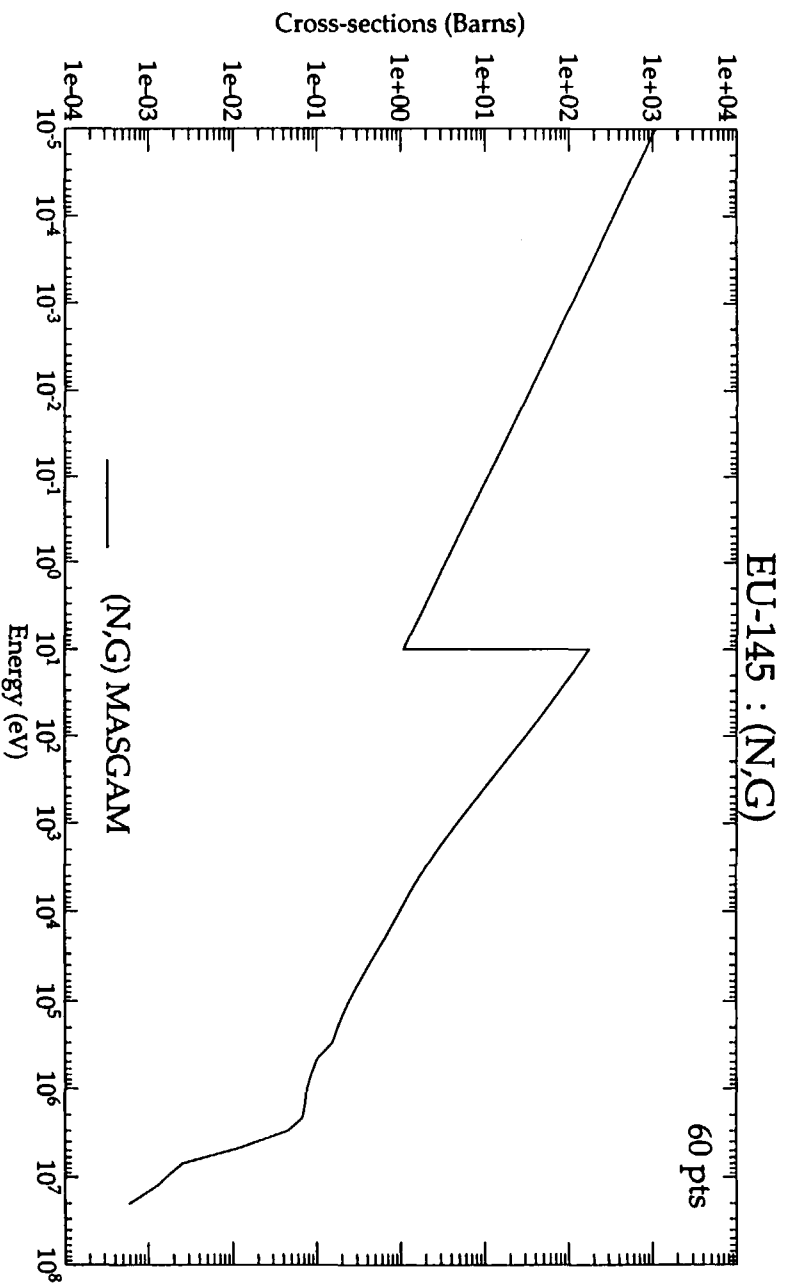


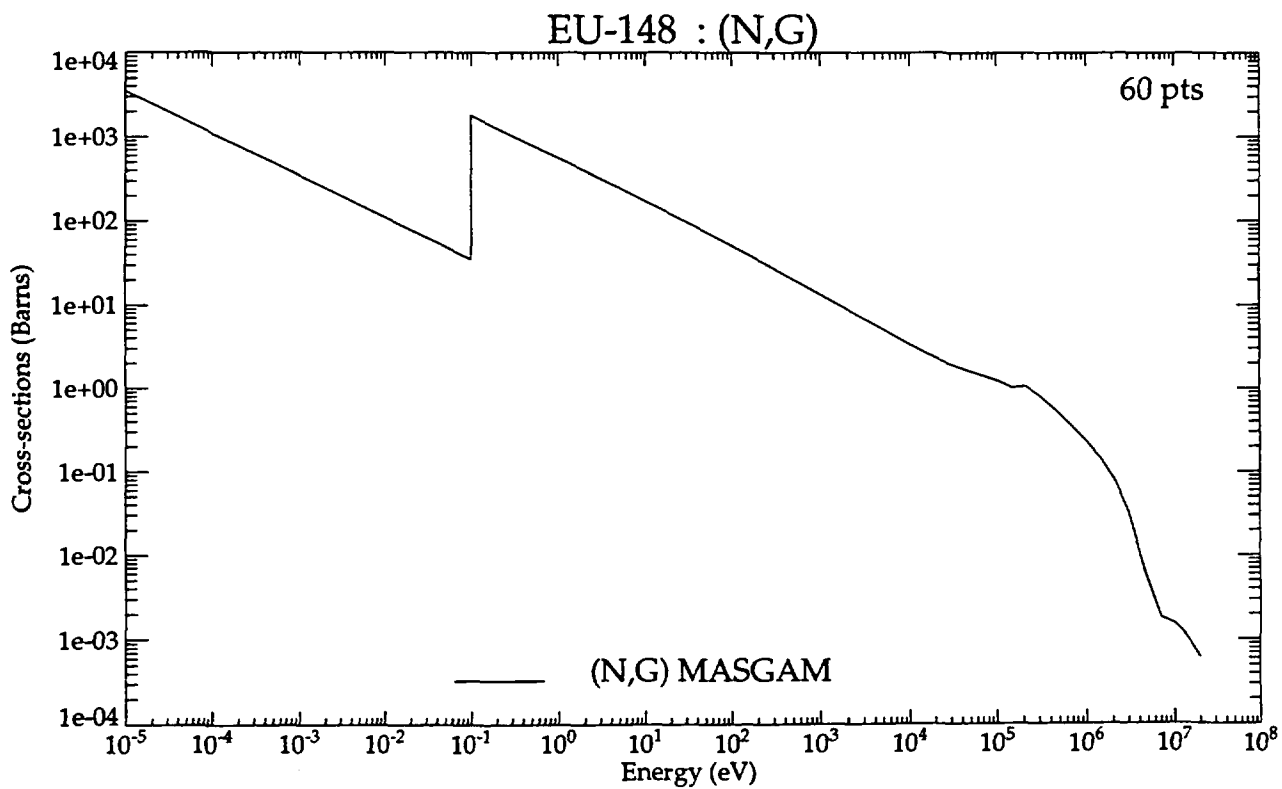
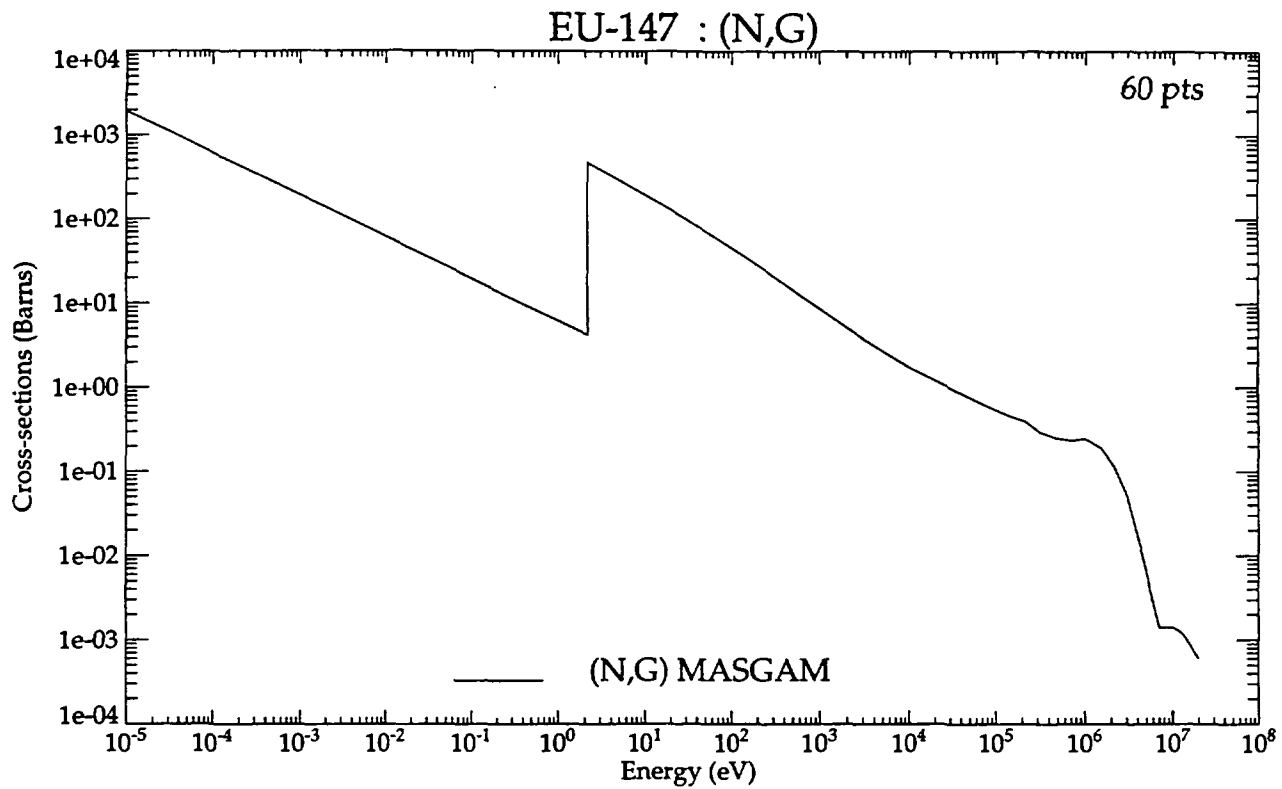


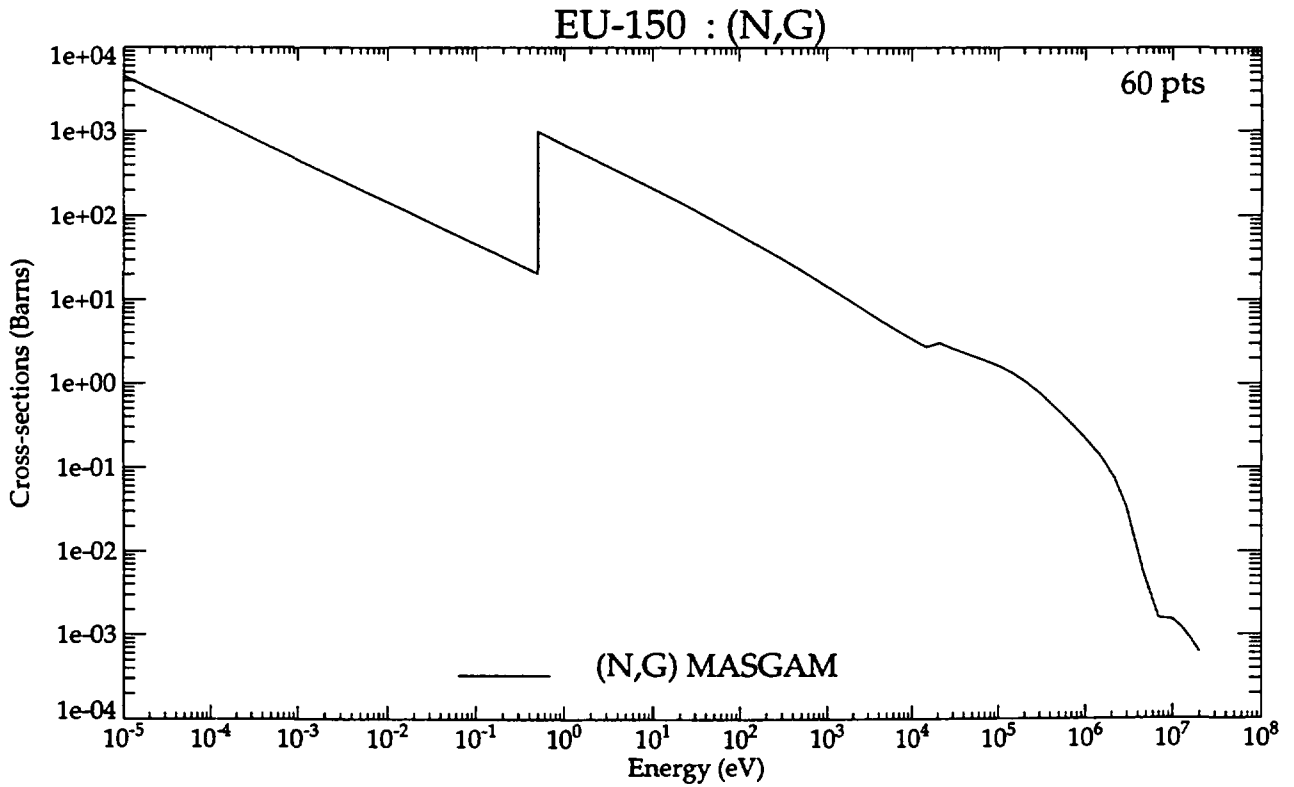
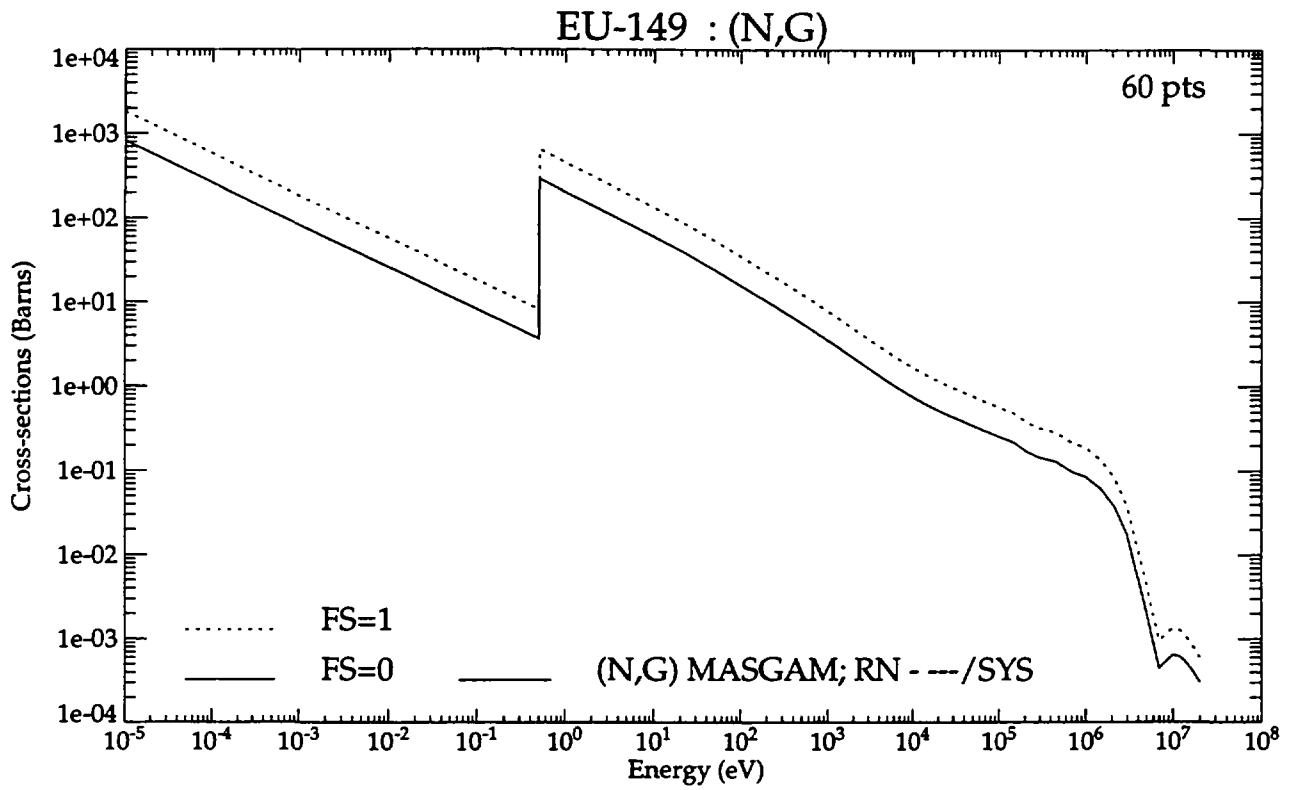


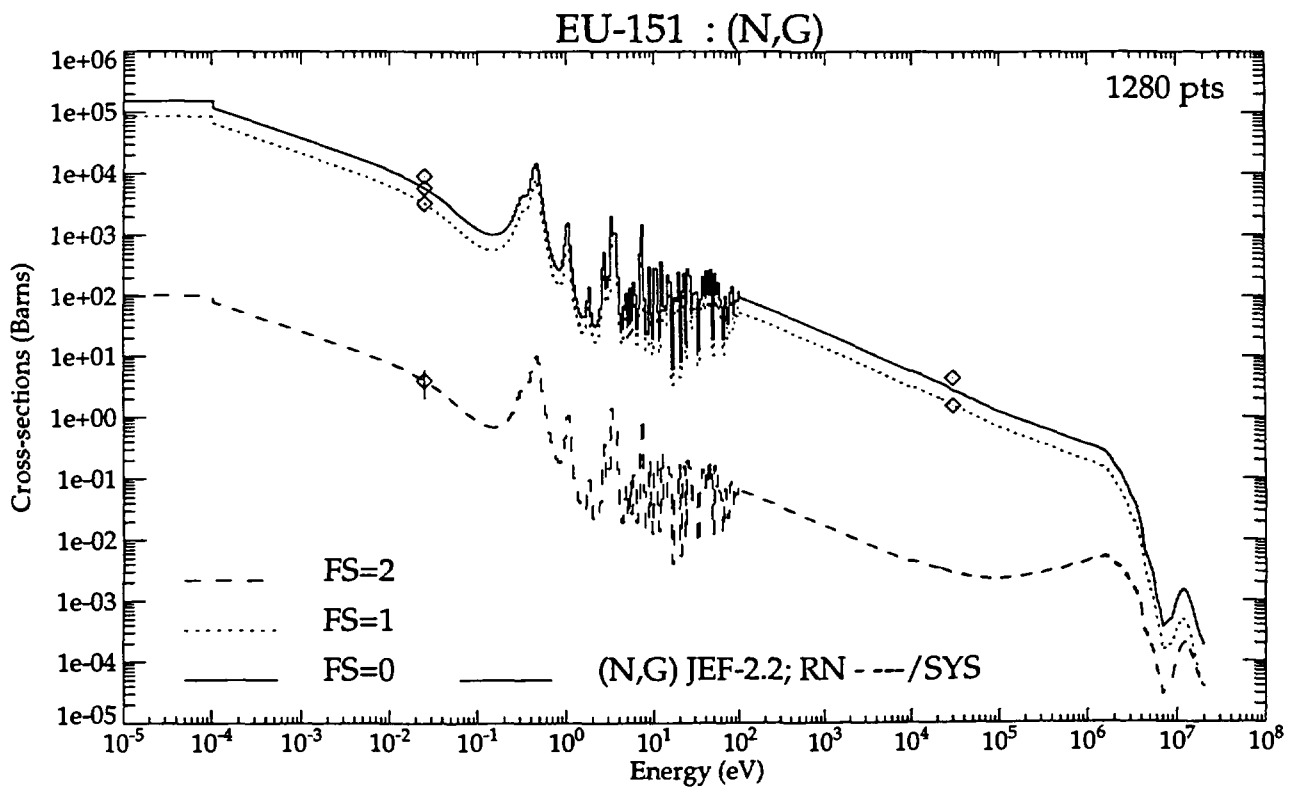
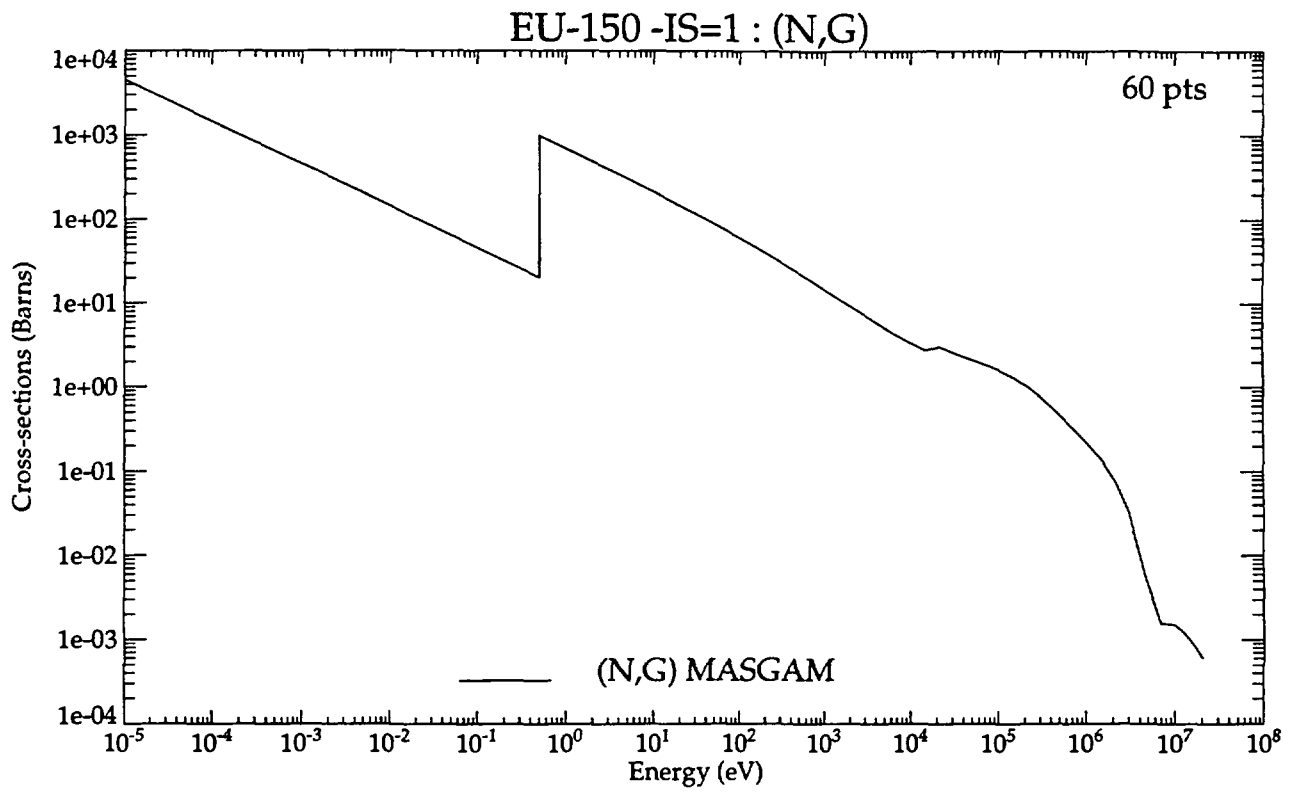


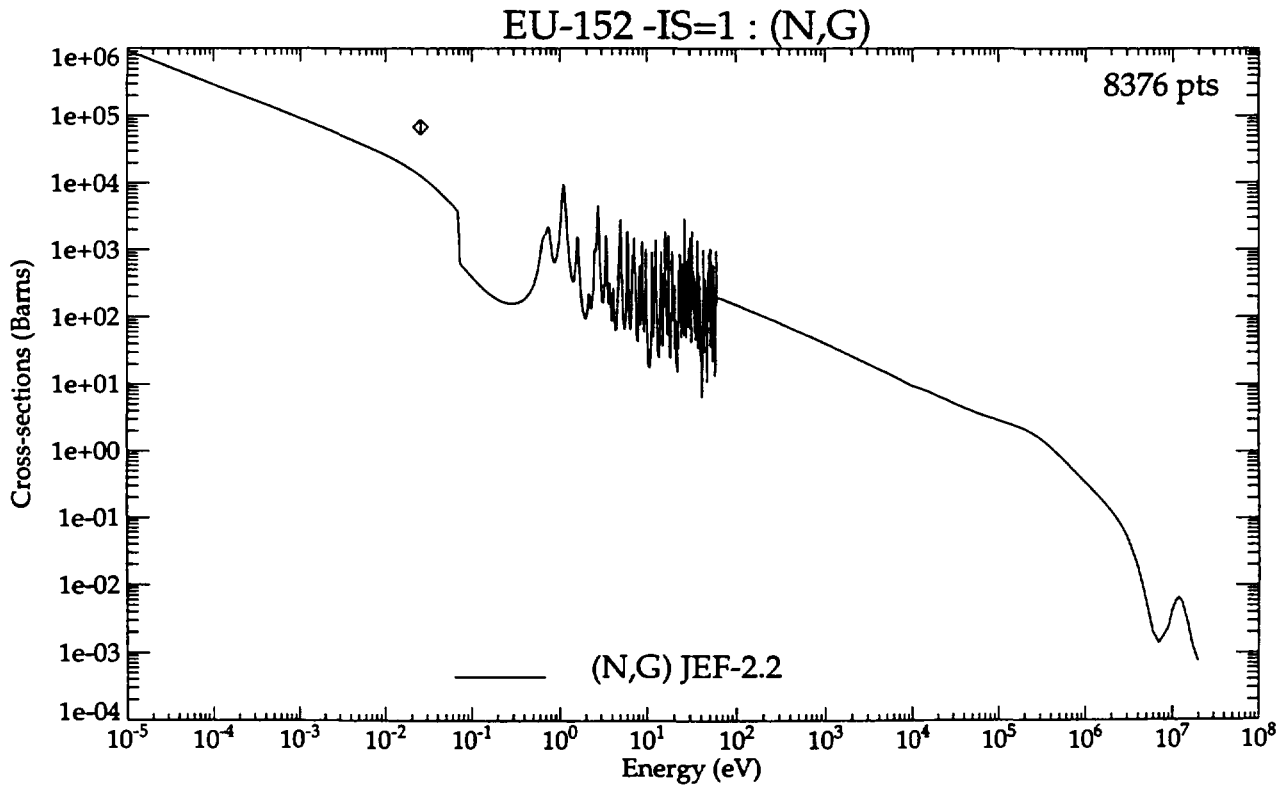
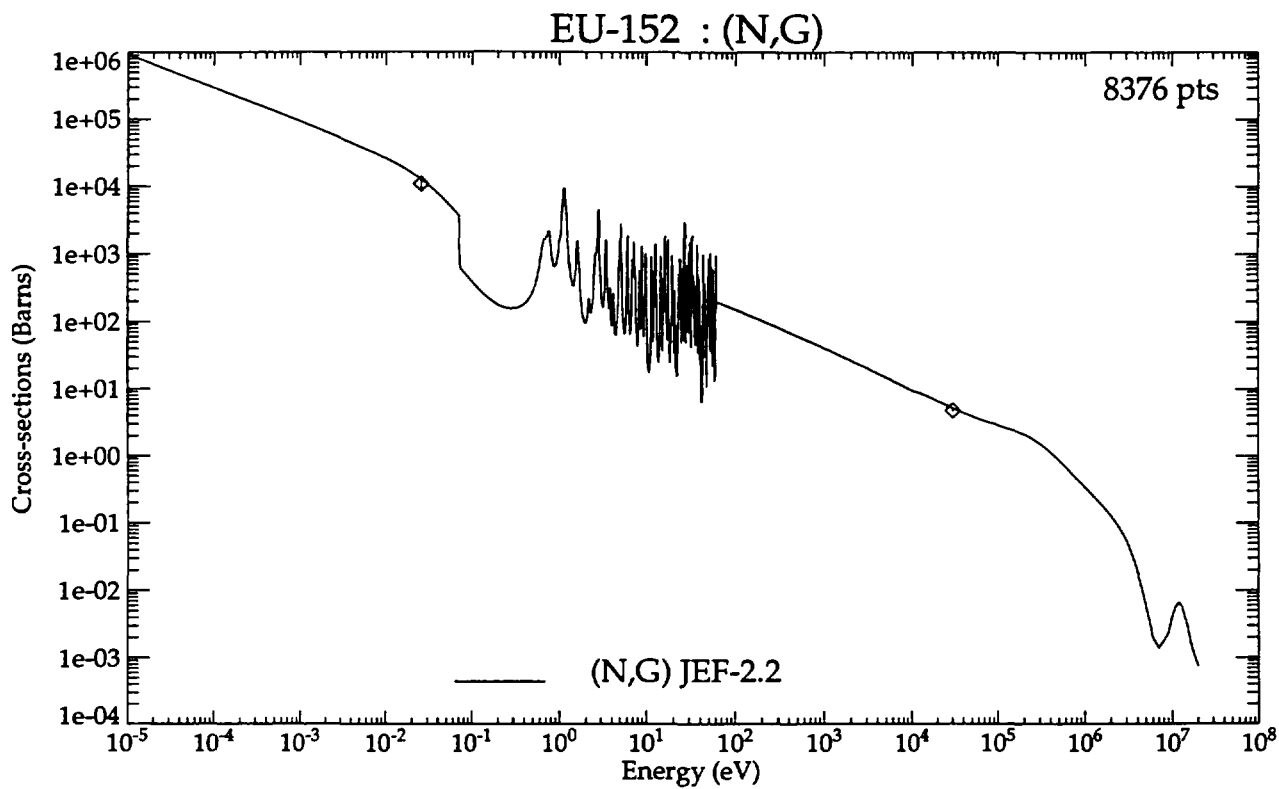


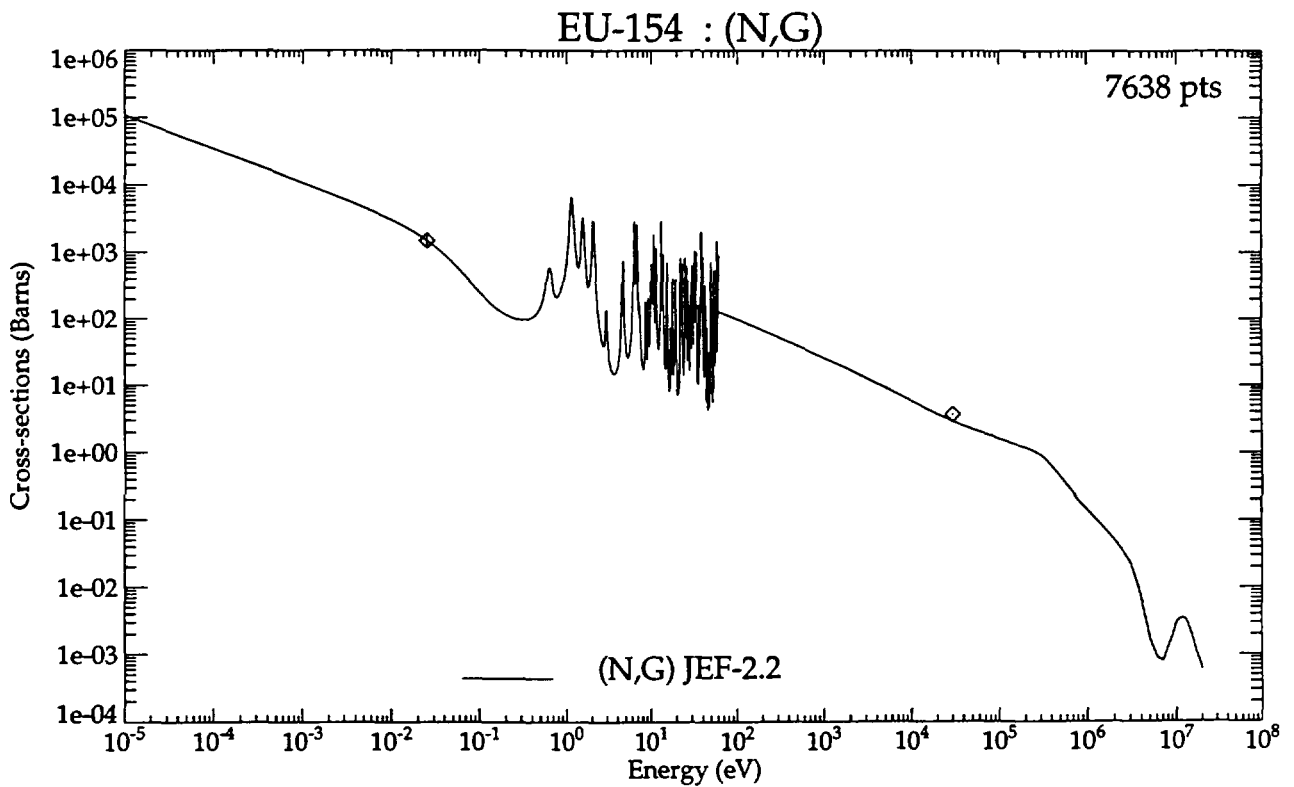
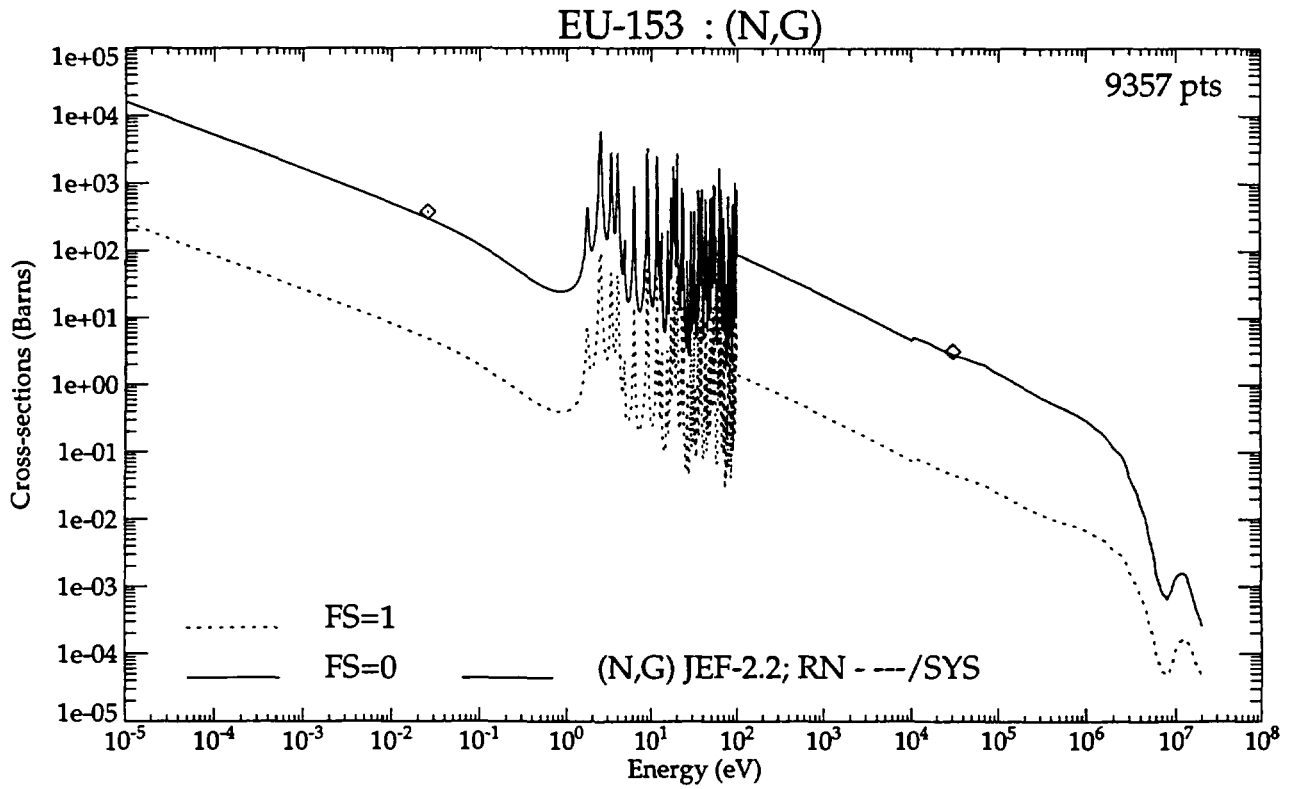


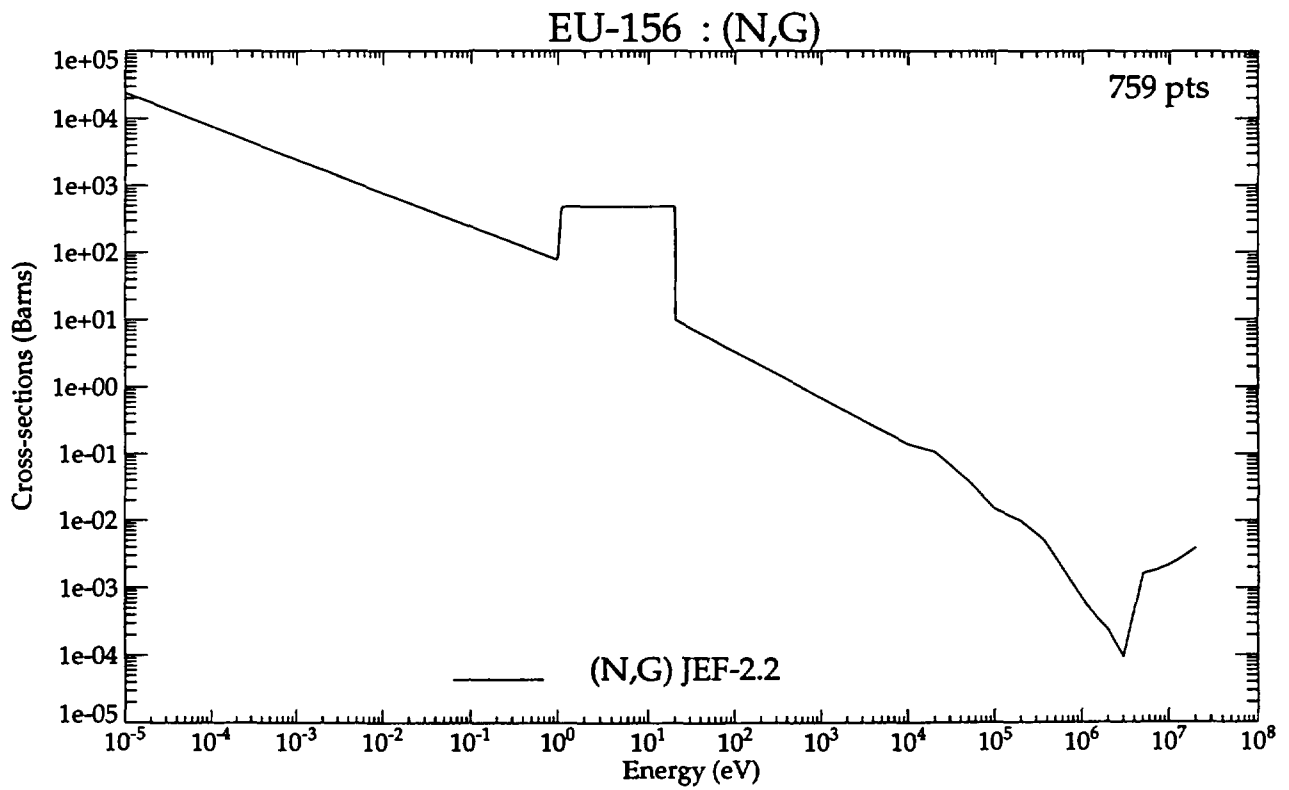
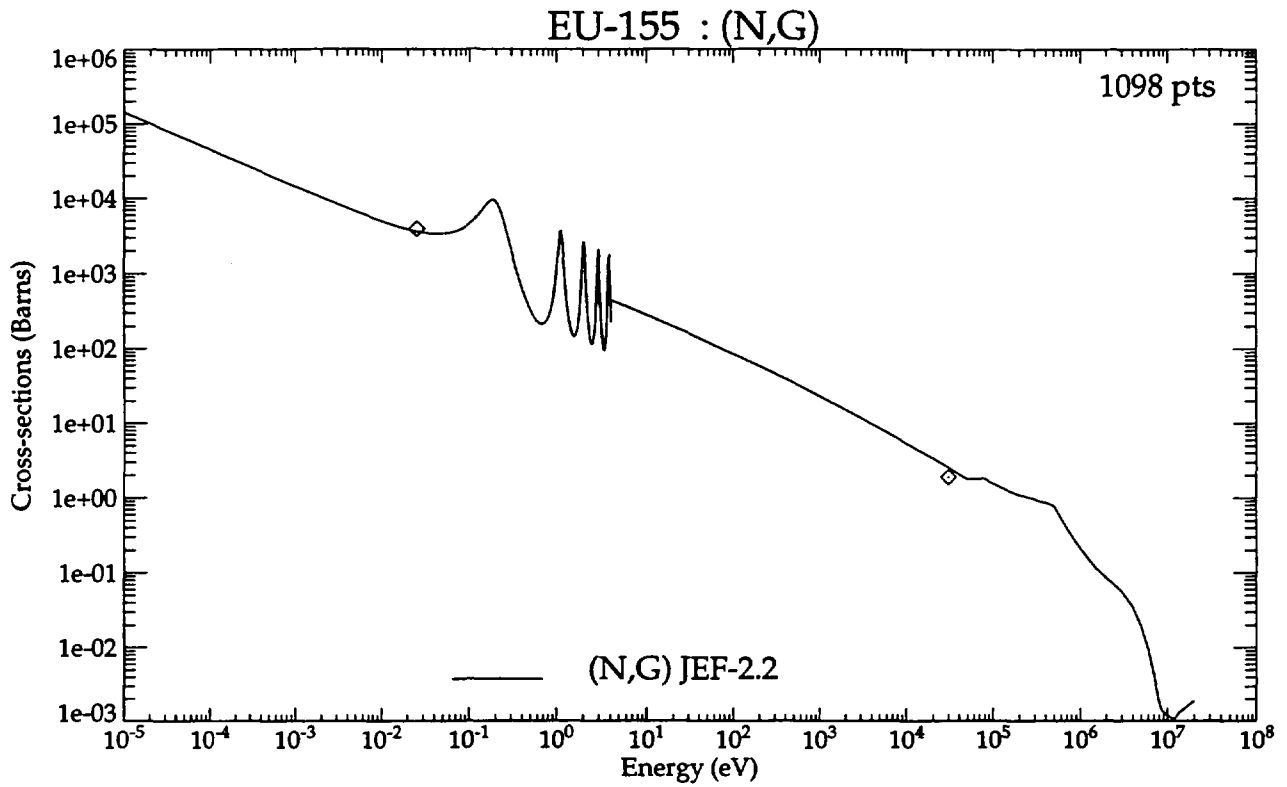


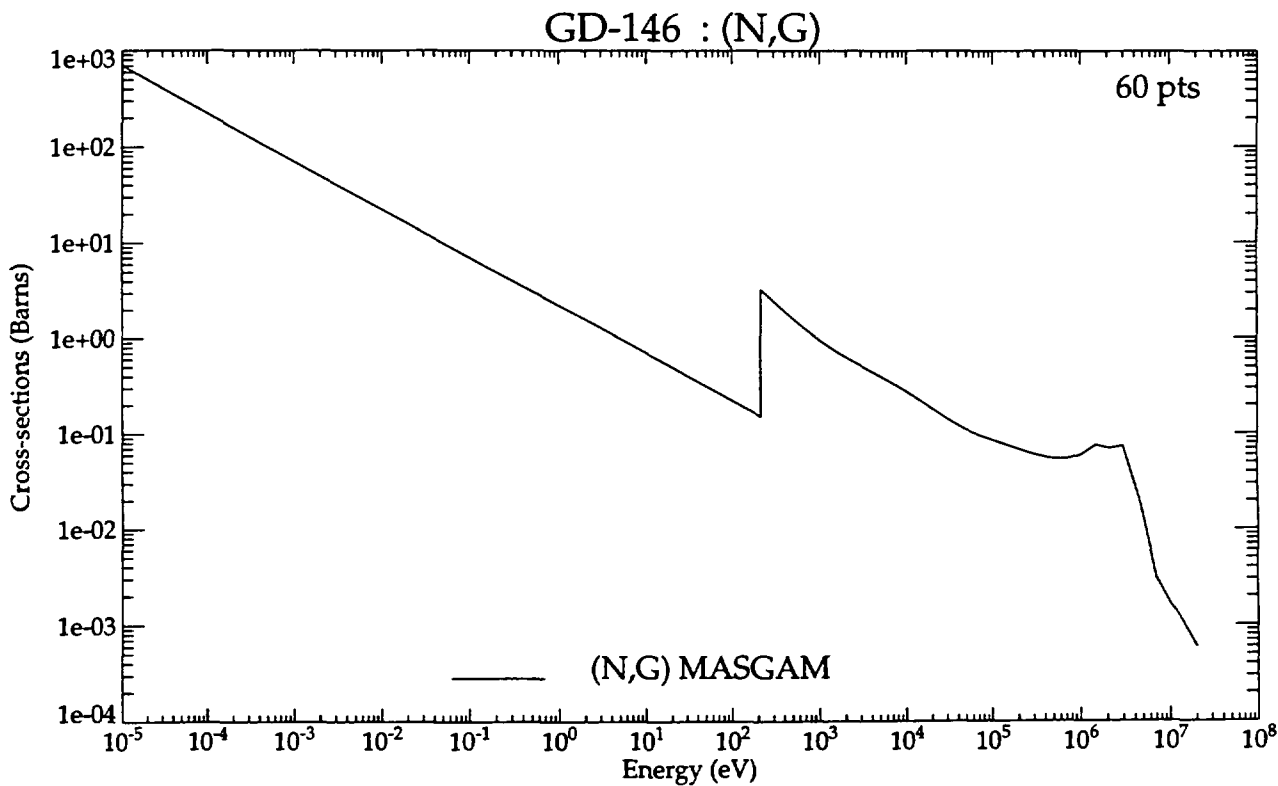
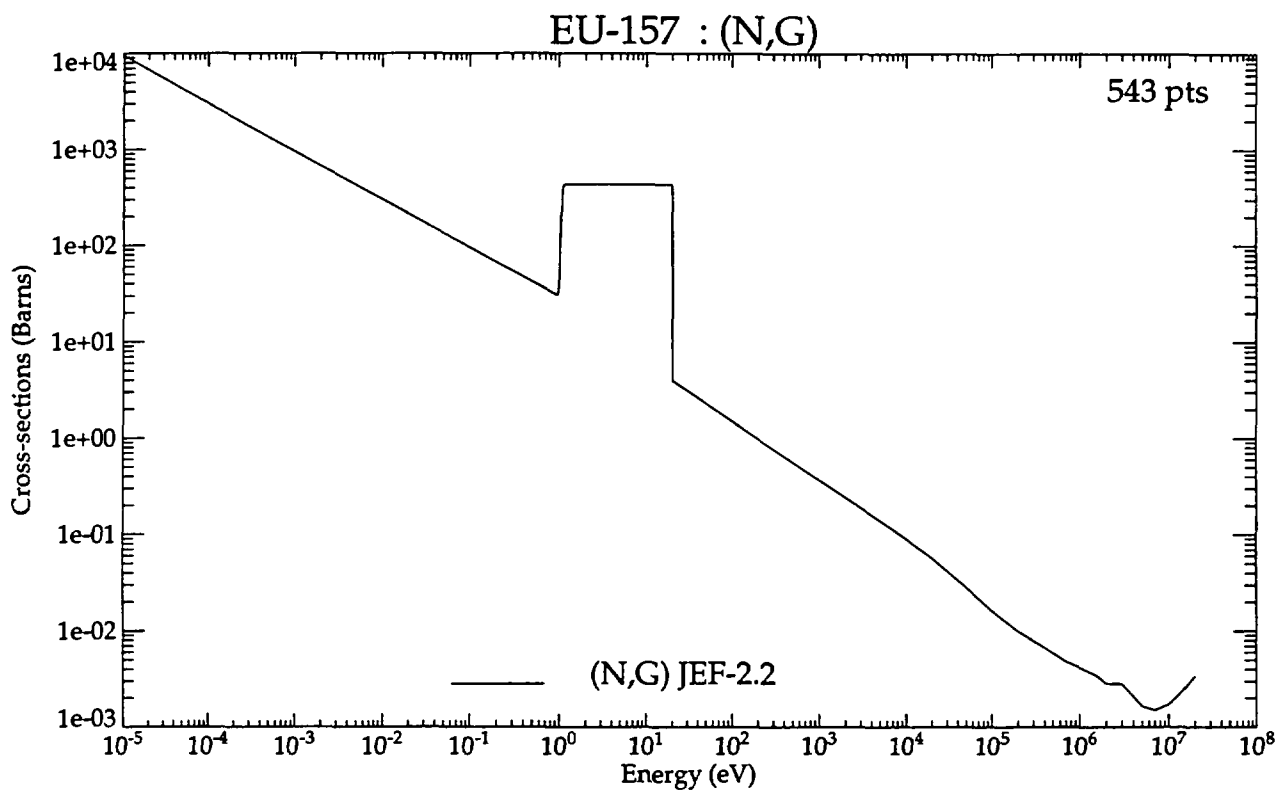


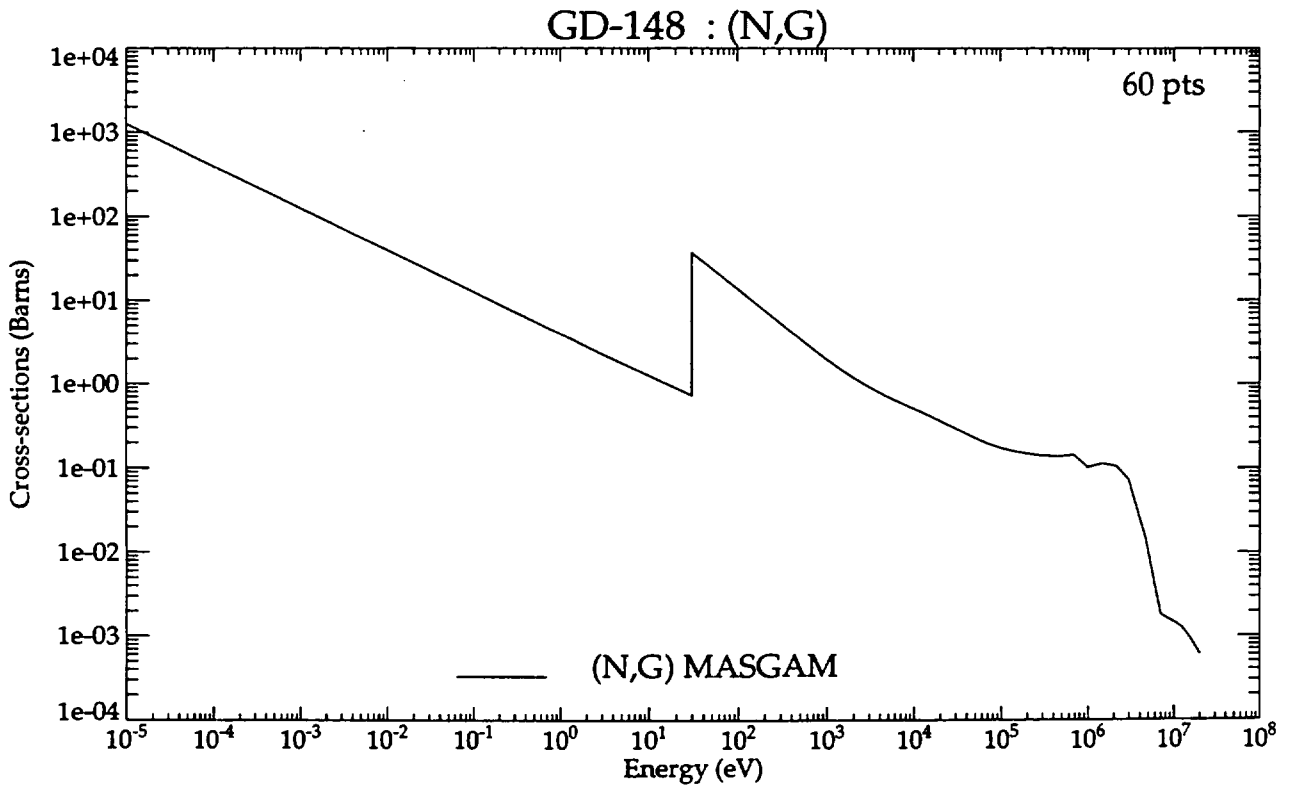
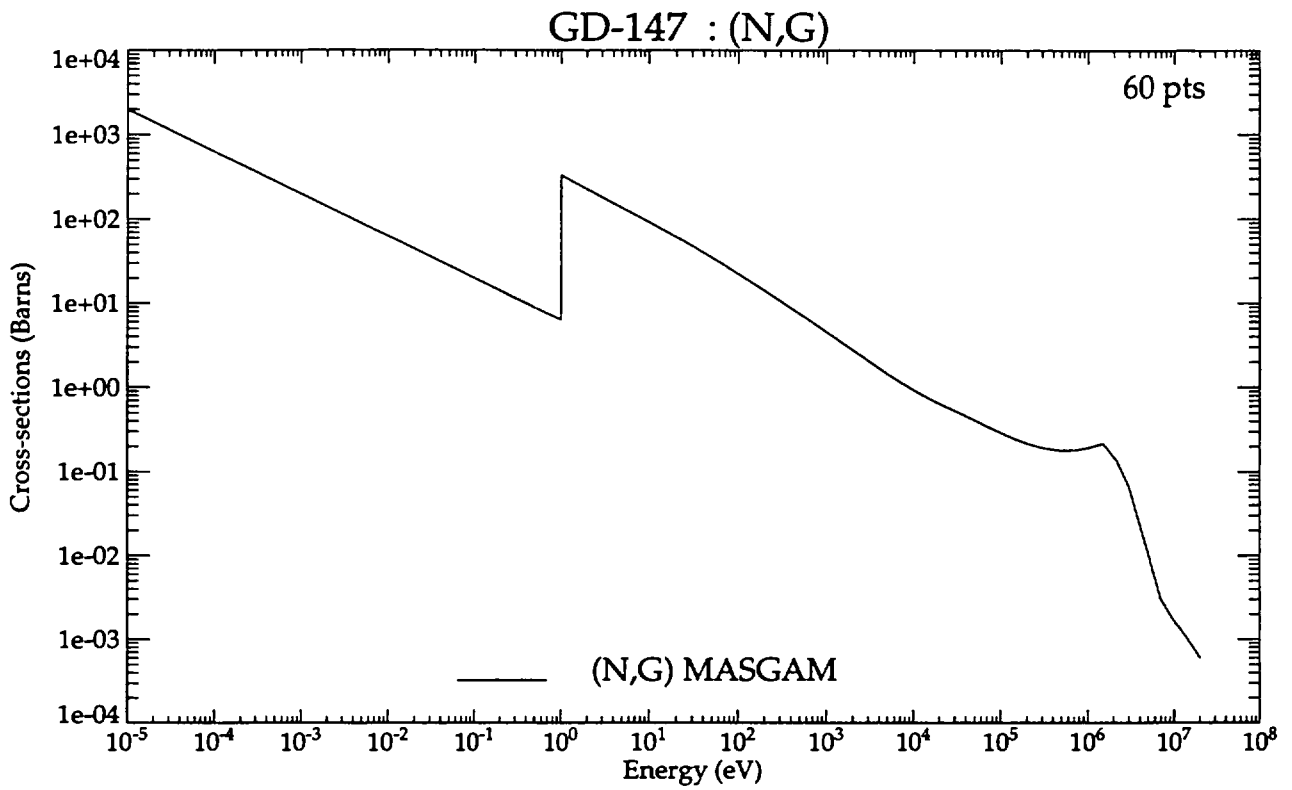




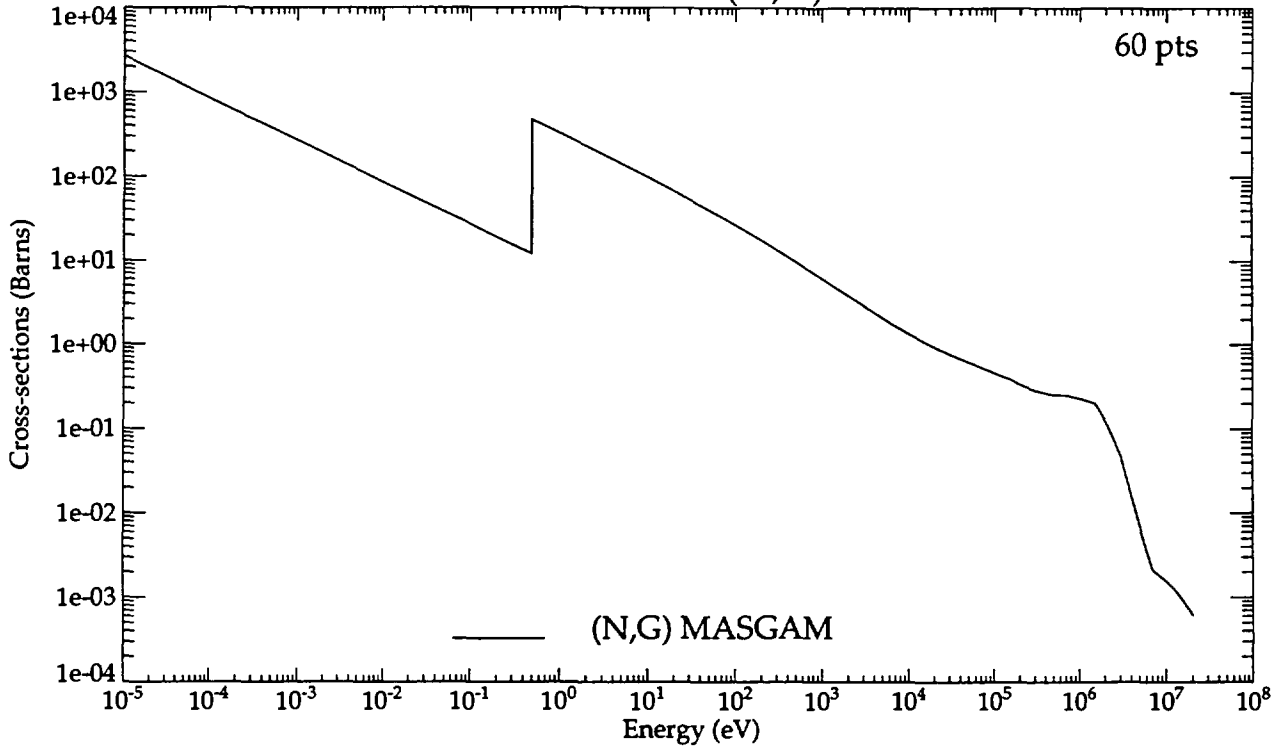




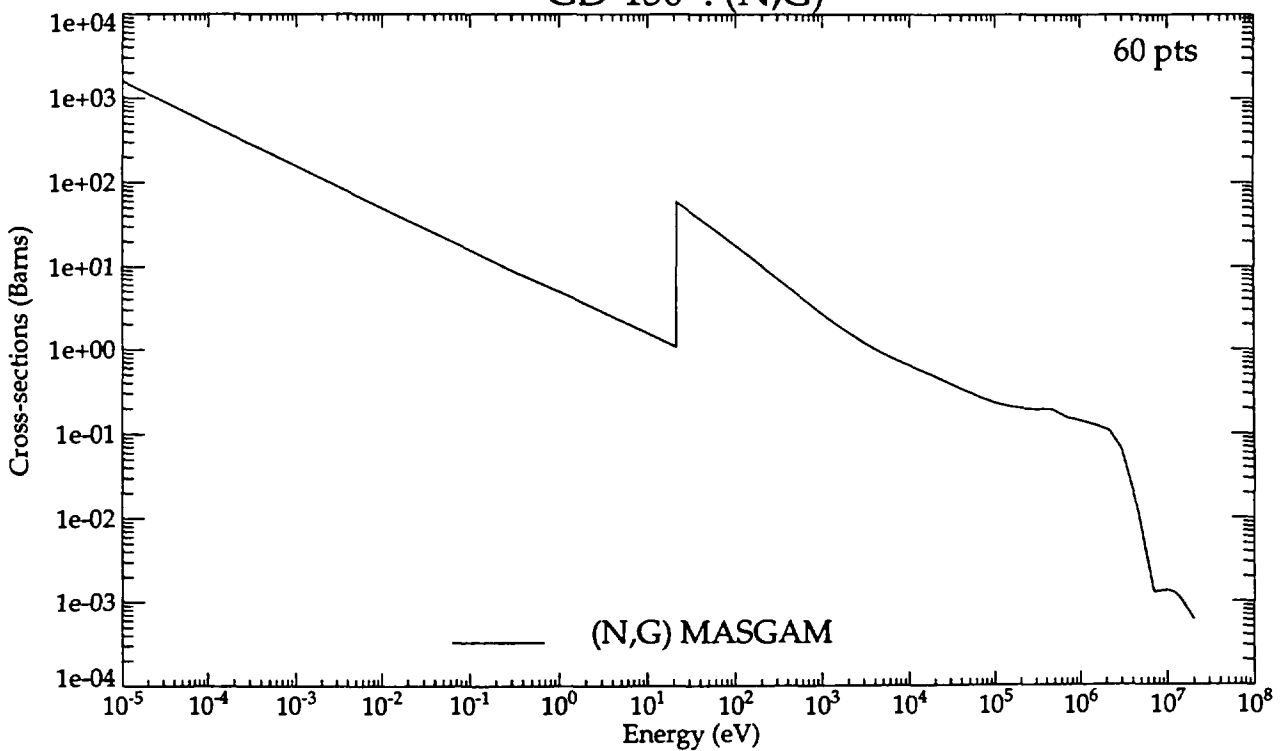


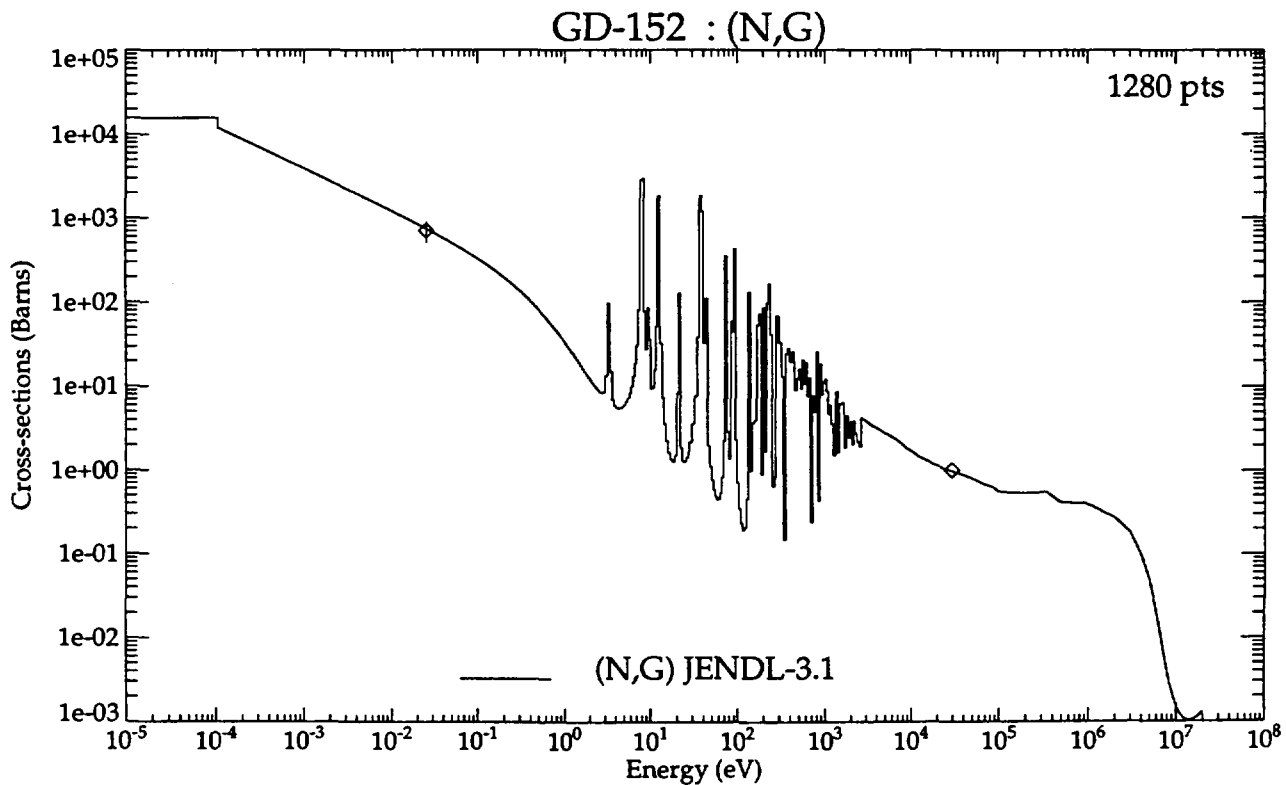
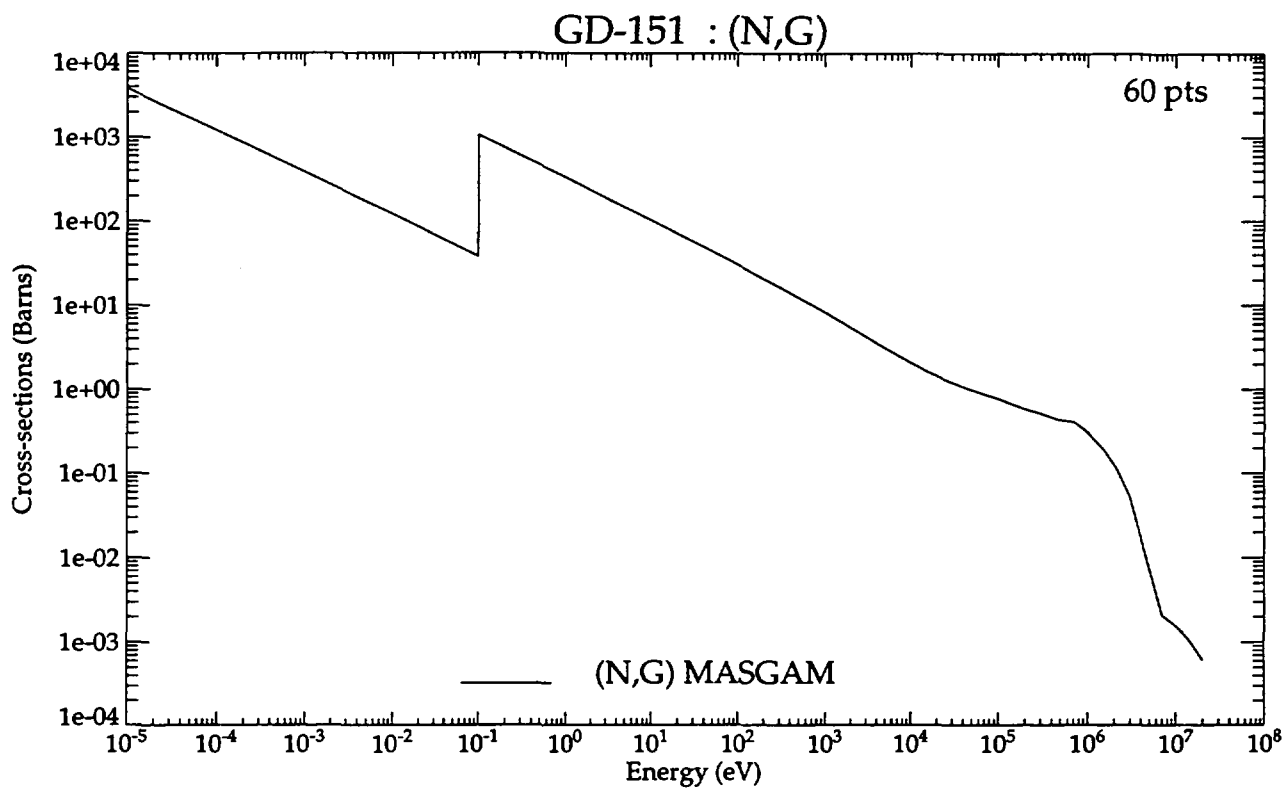


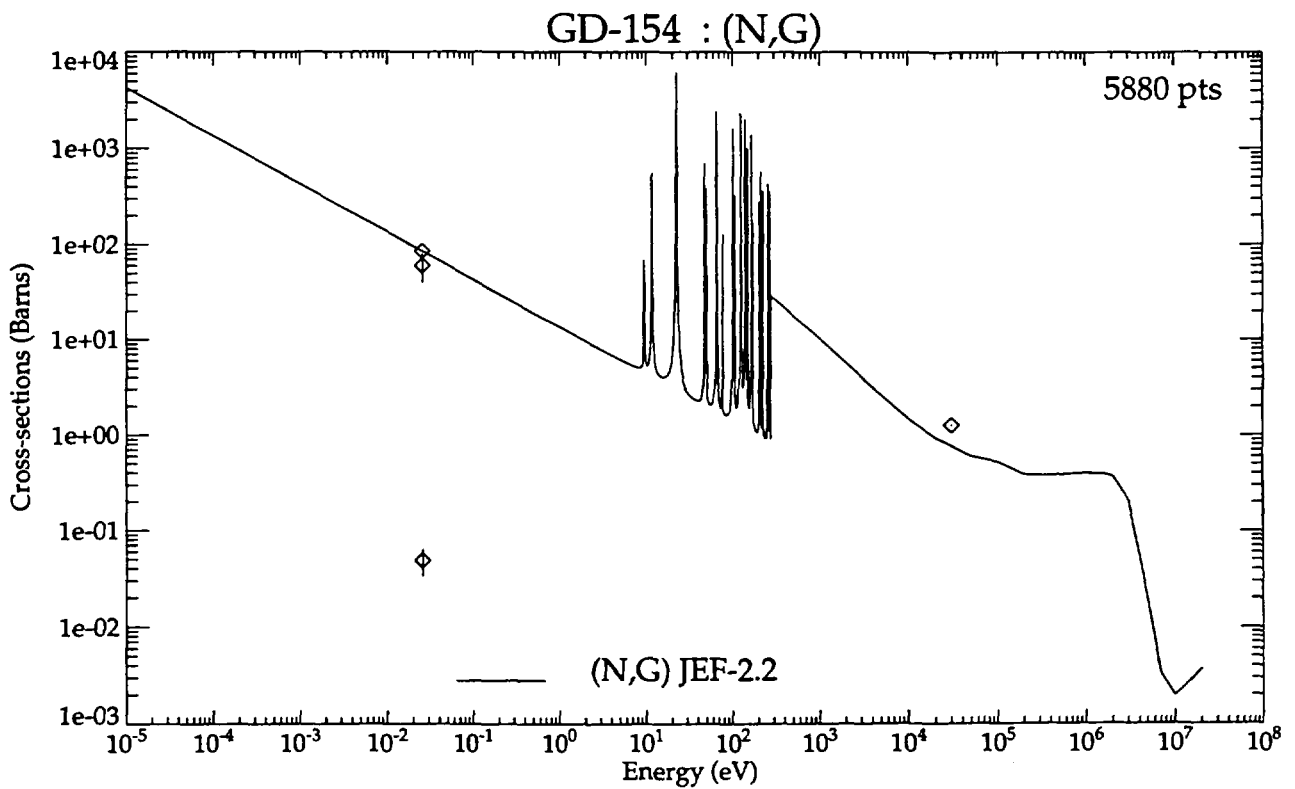
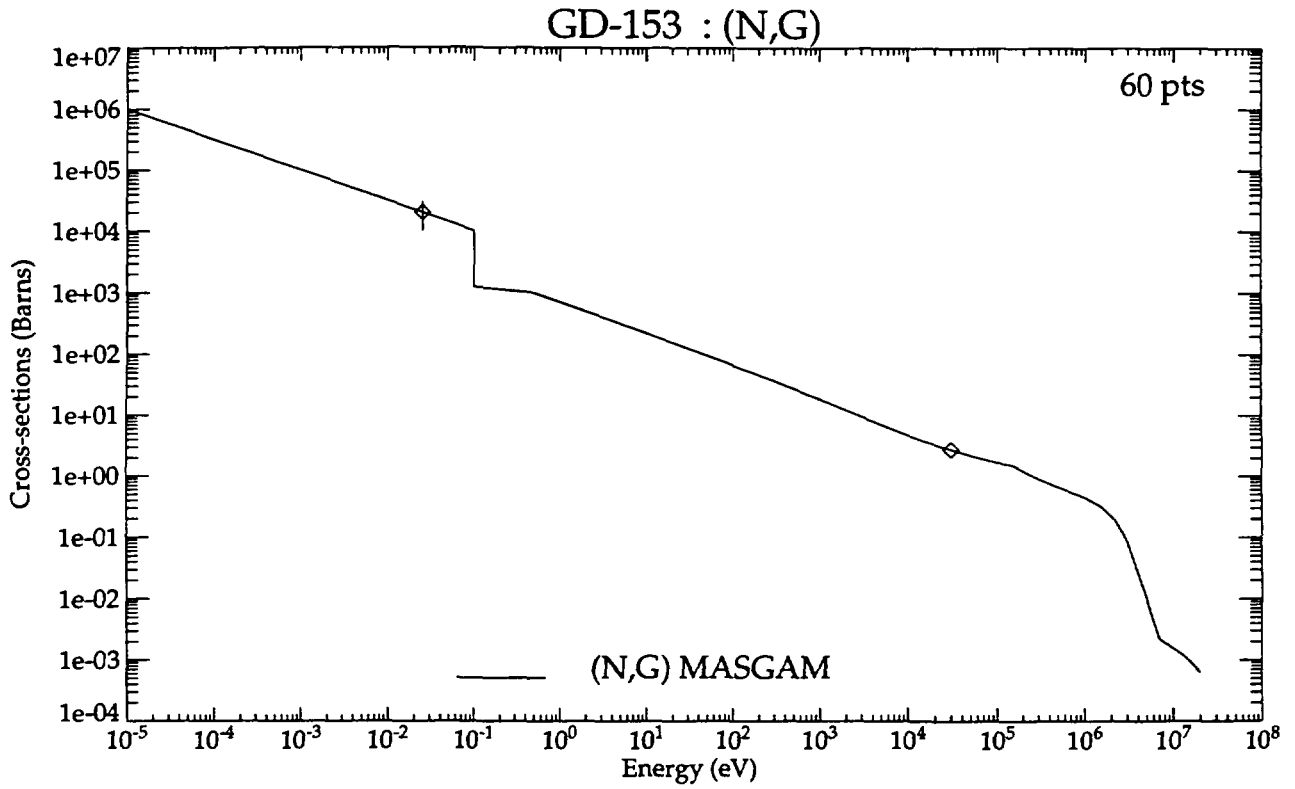
GD-149 : (N,G)

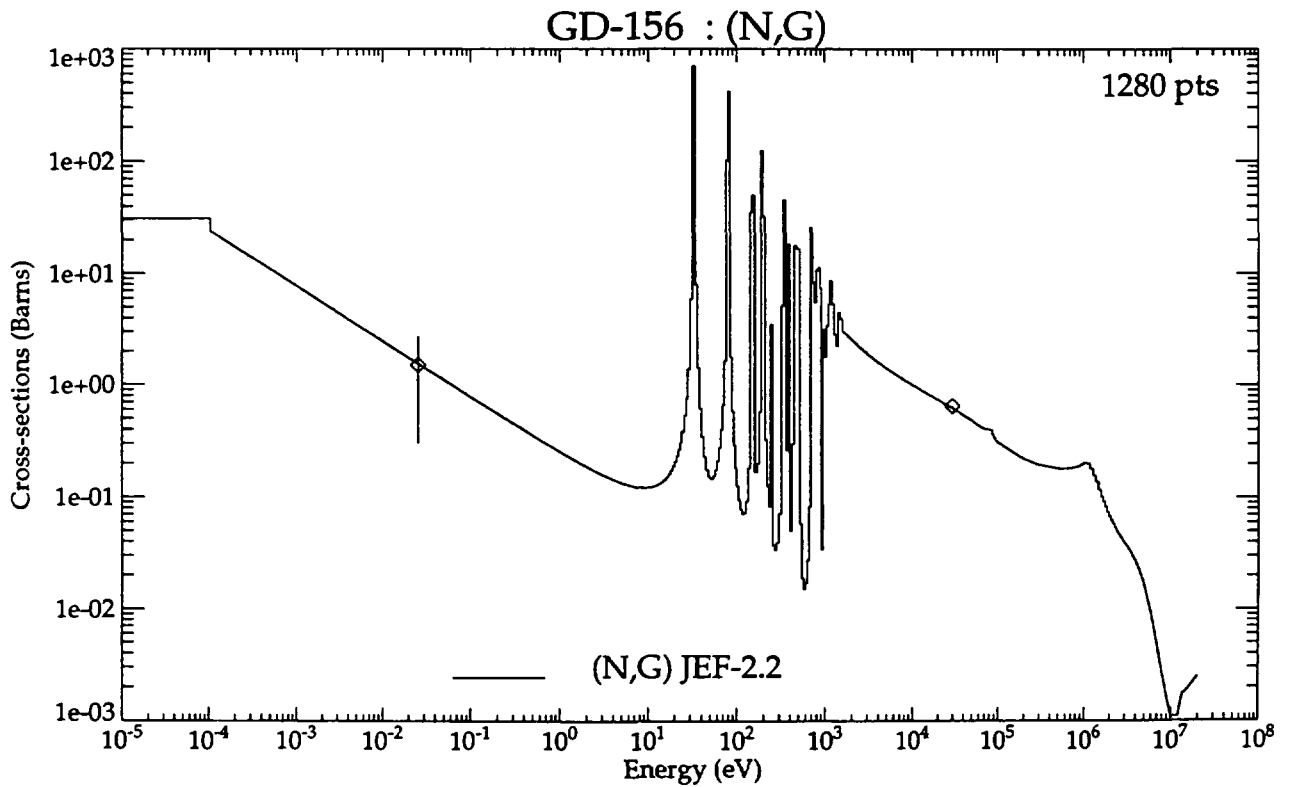
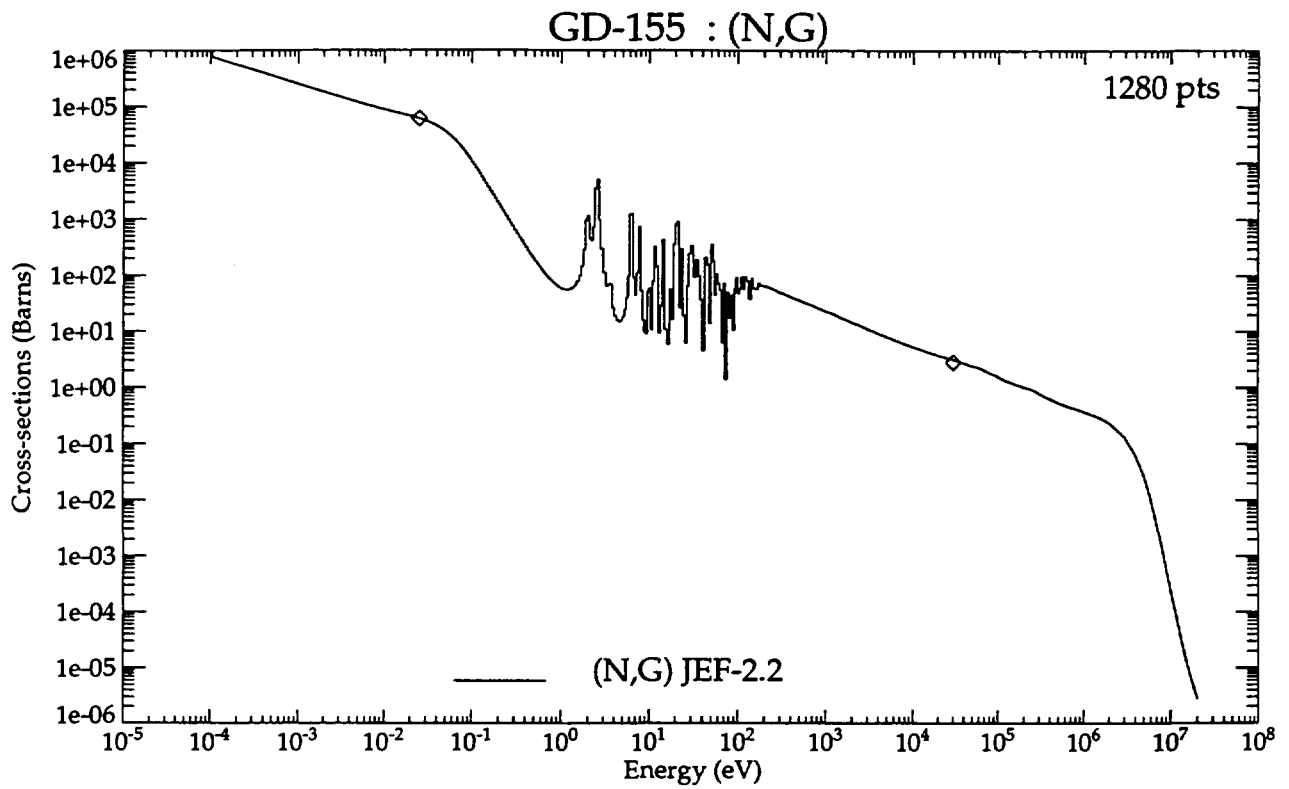


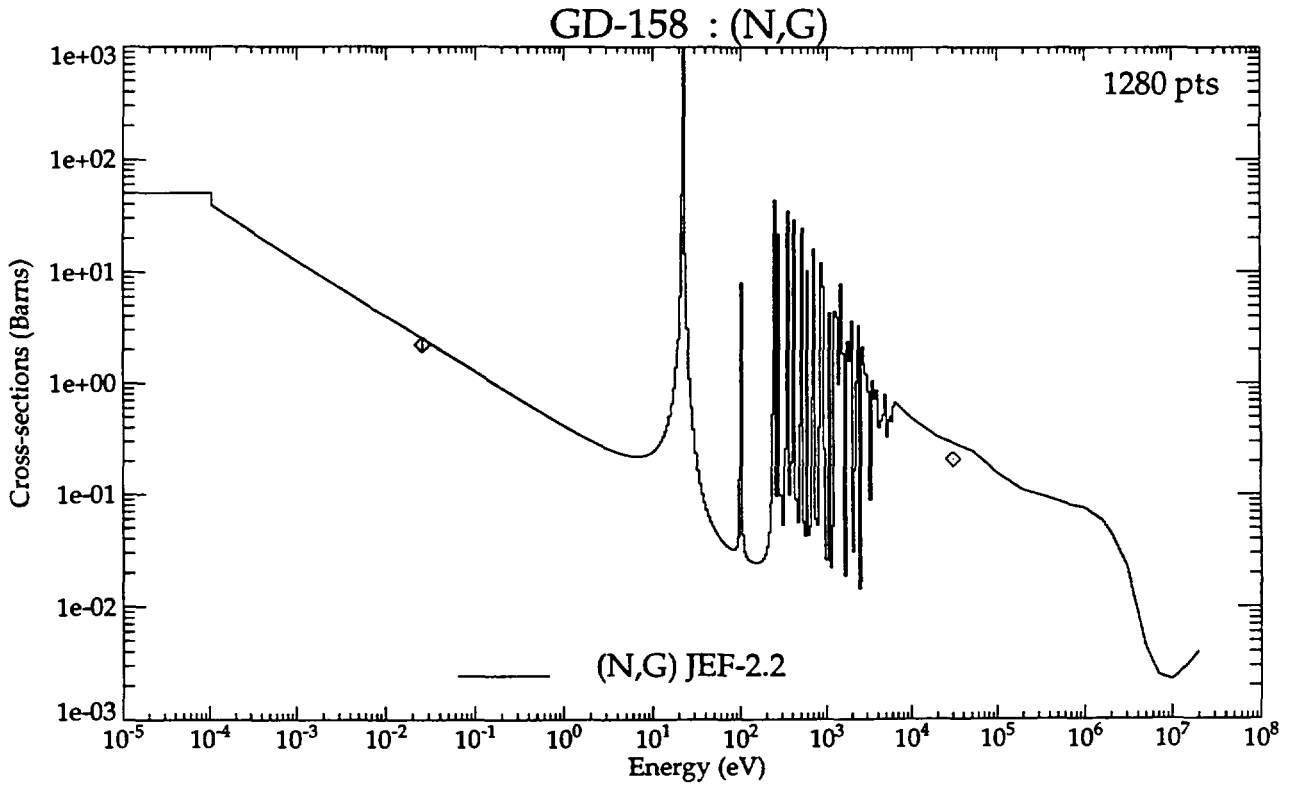
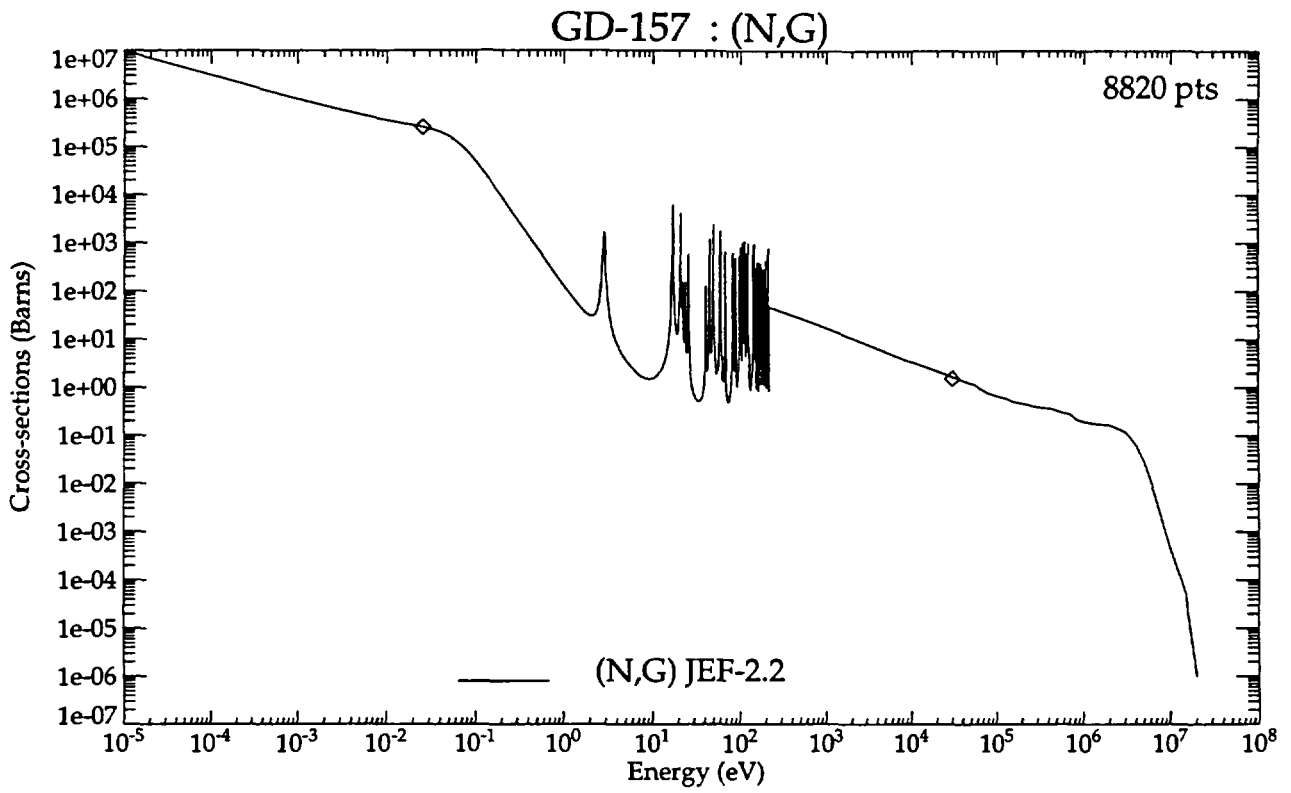
GD-150 : (N,G)

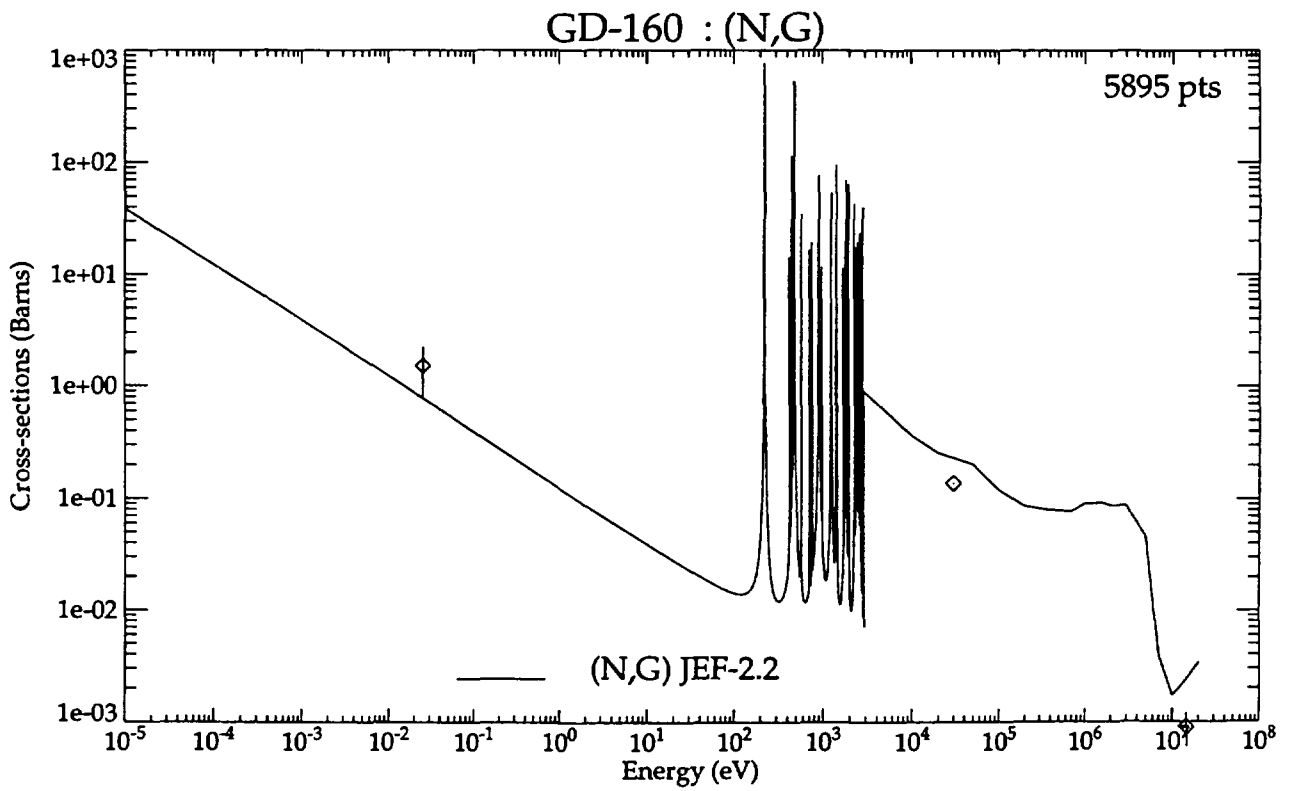
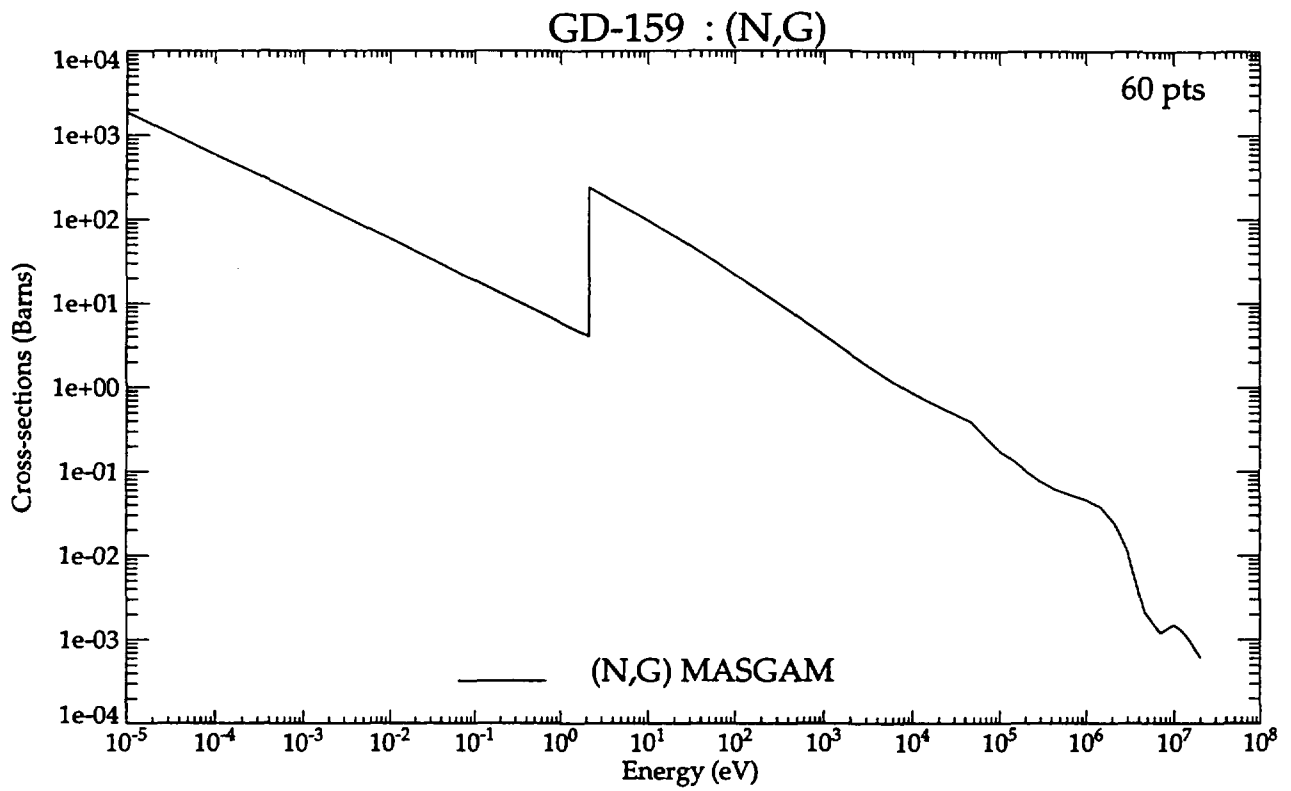


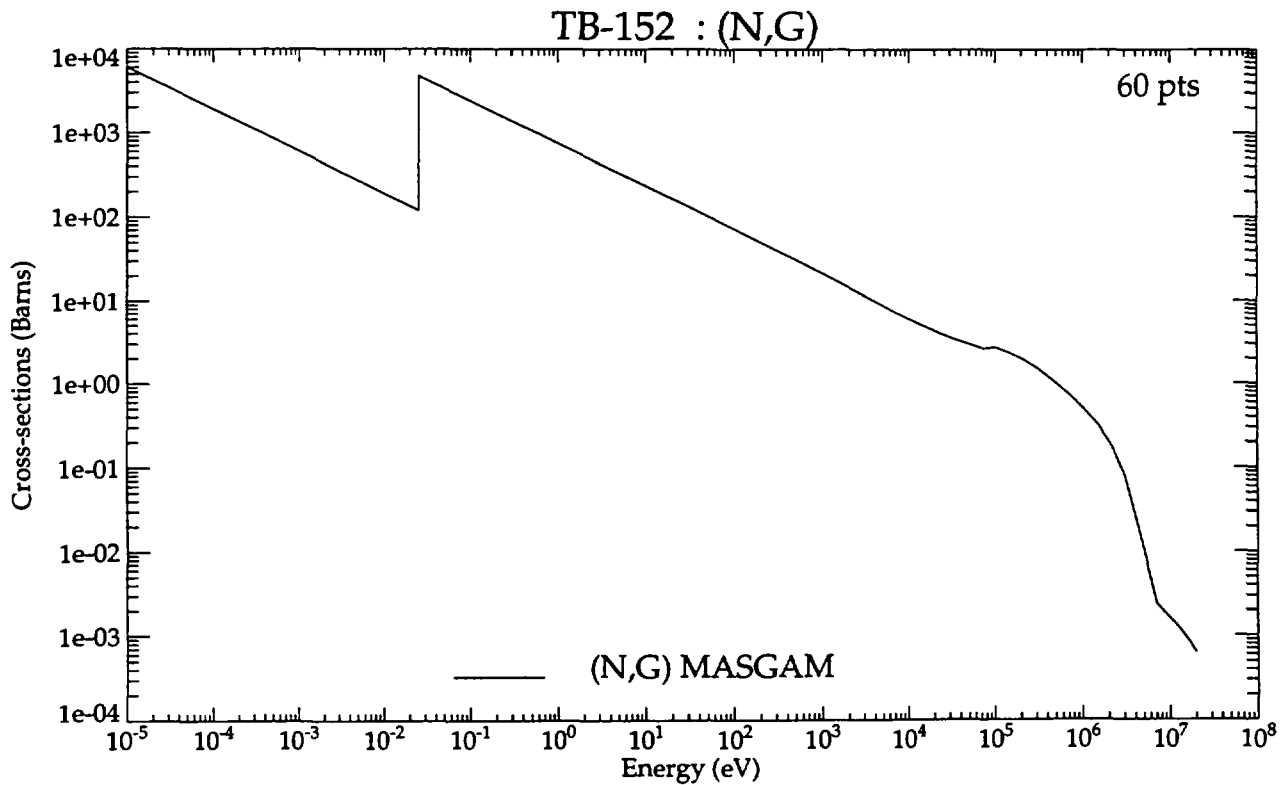
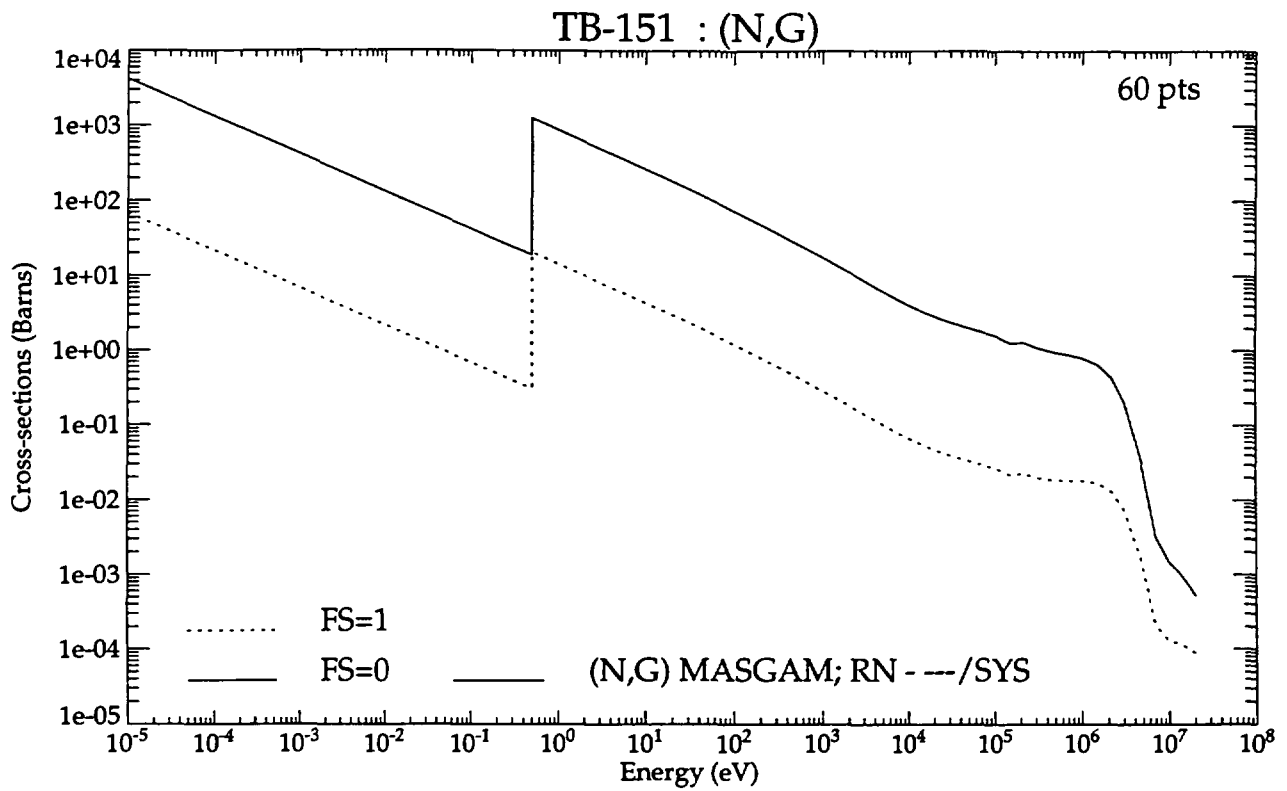


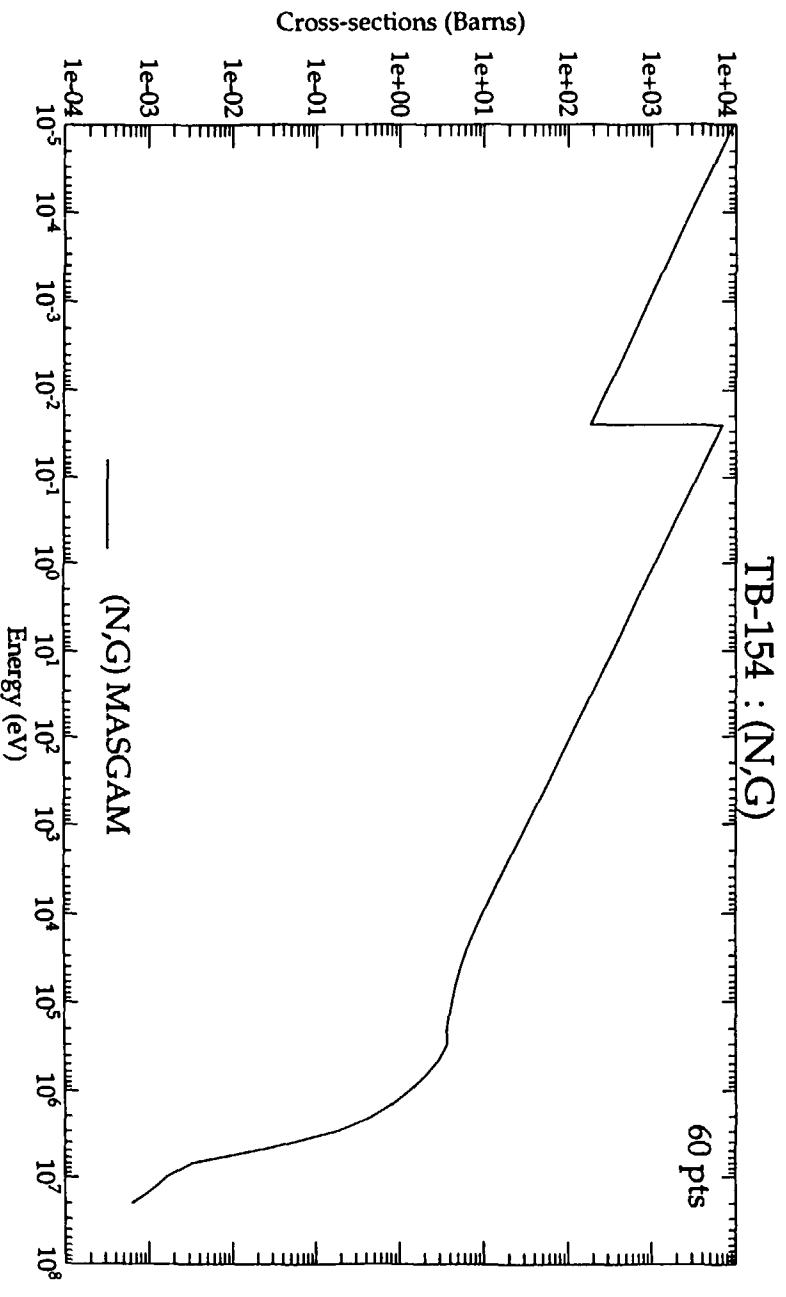
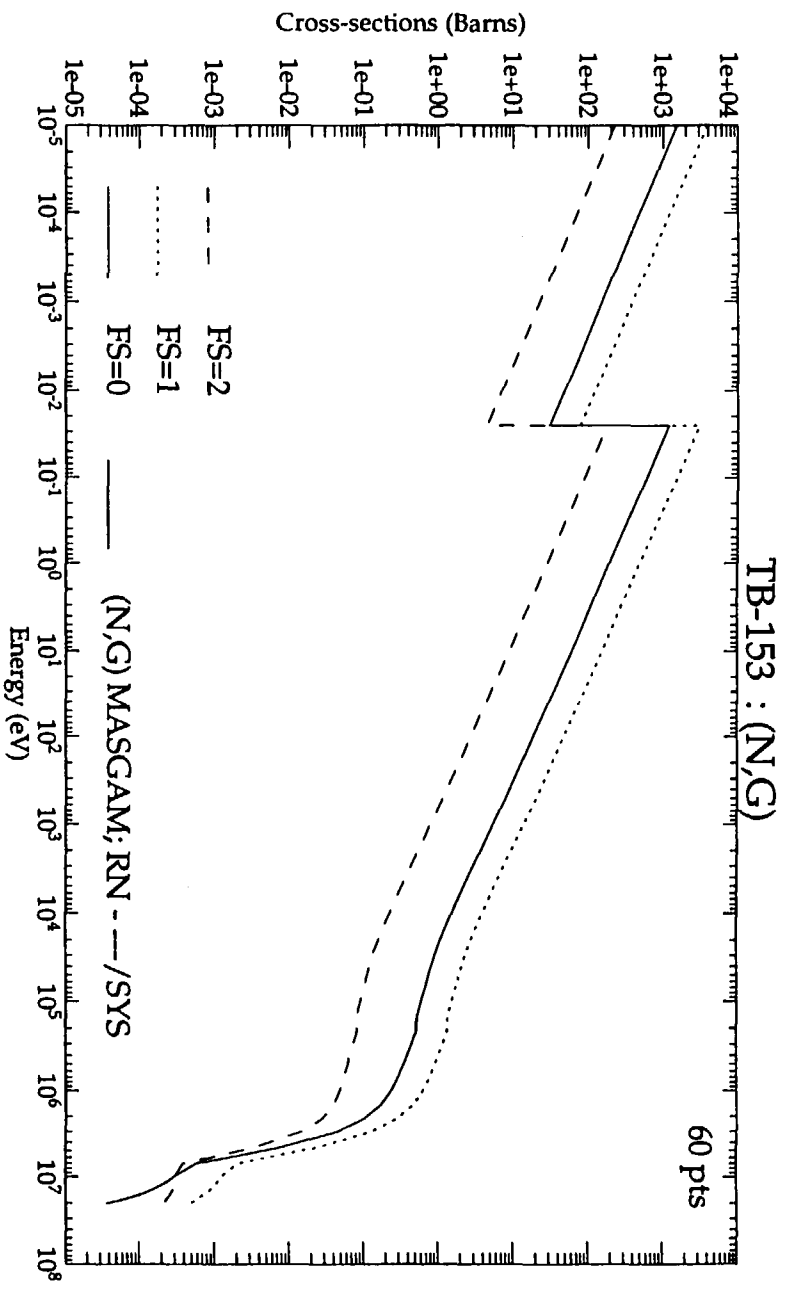


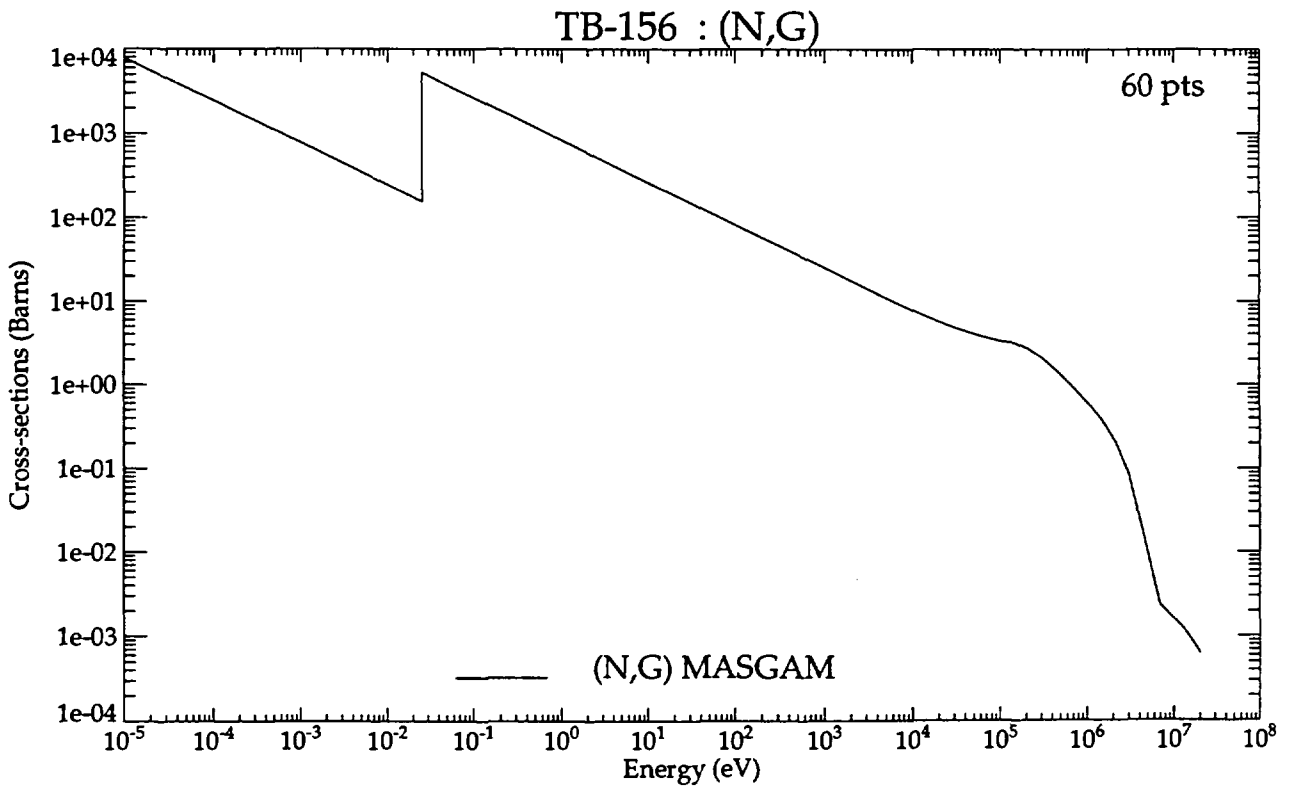
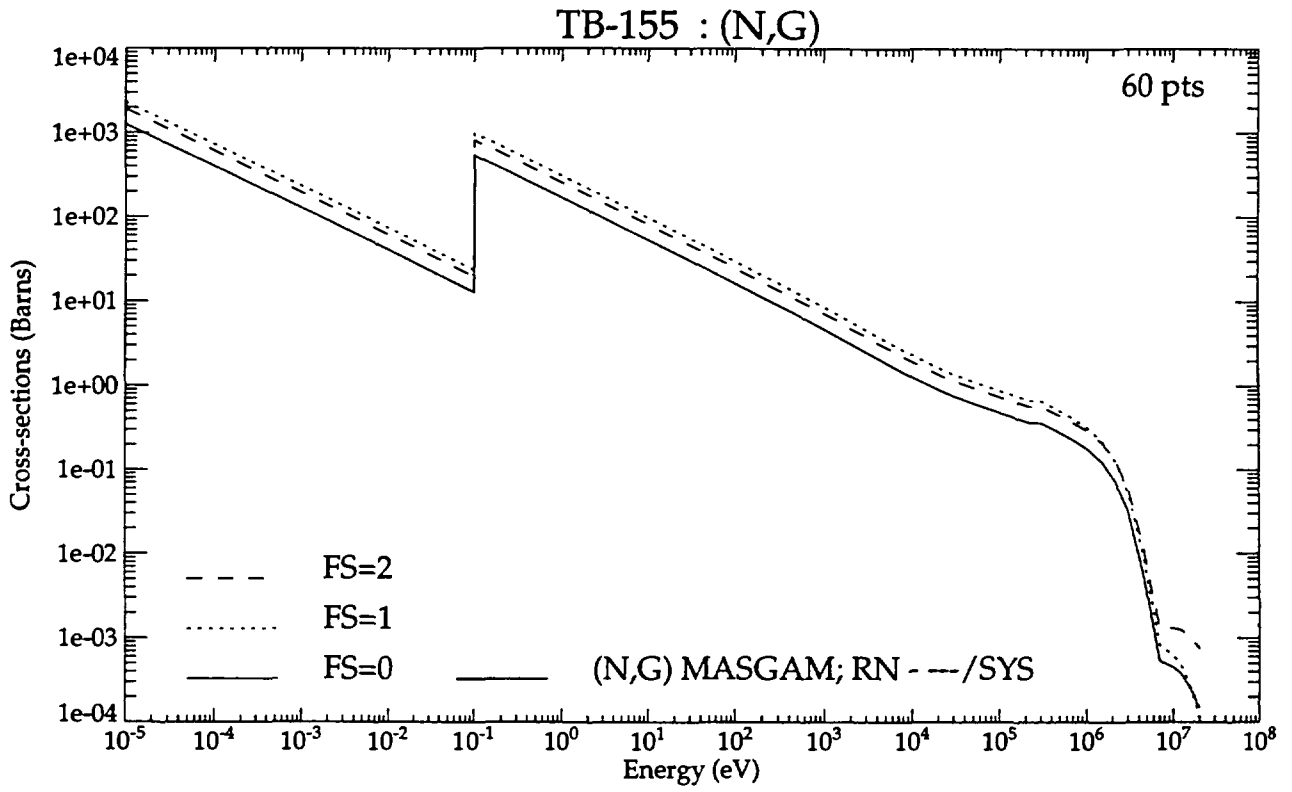


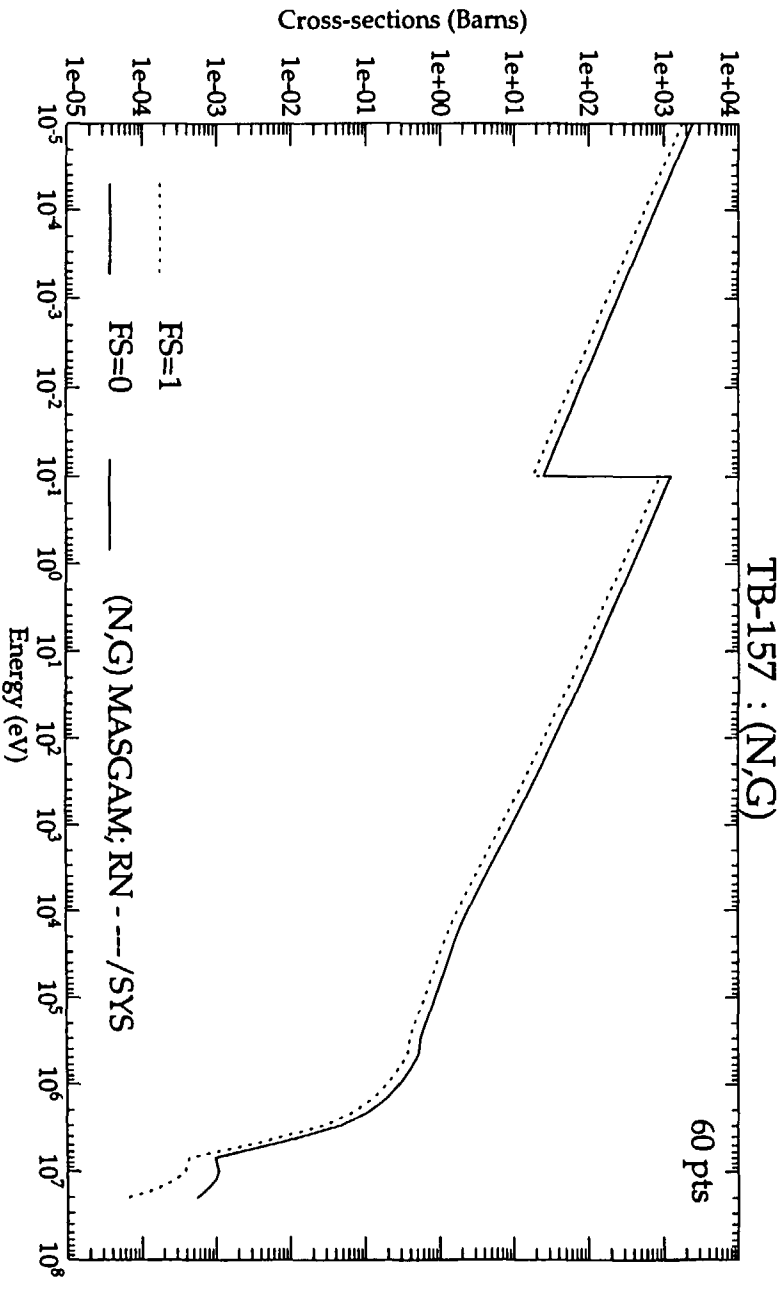
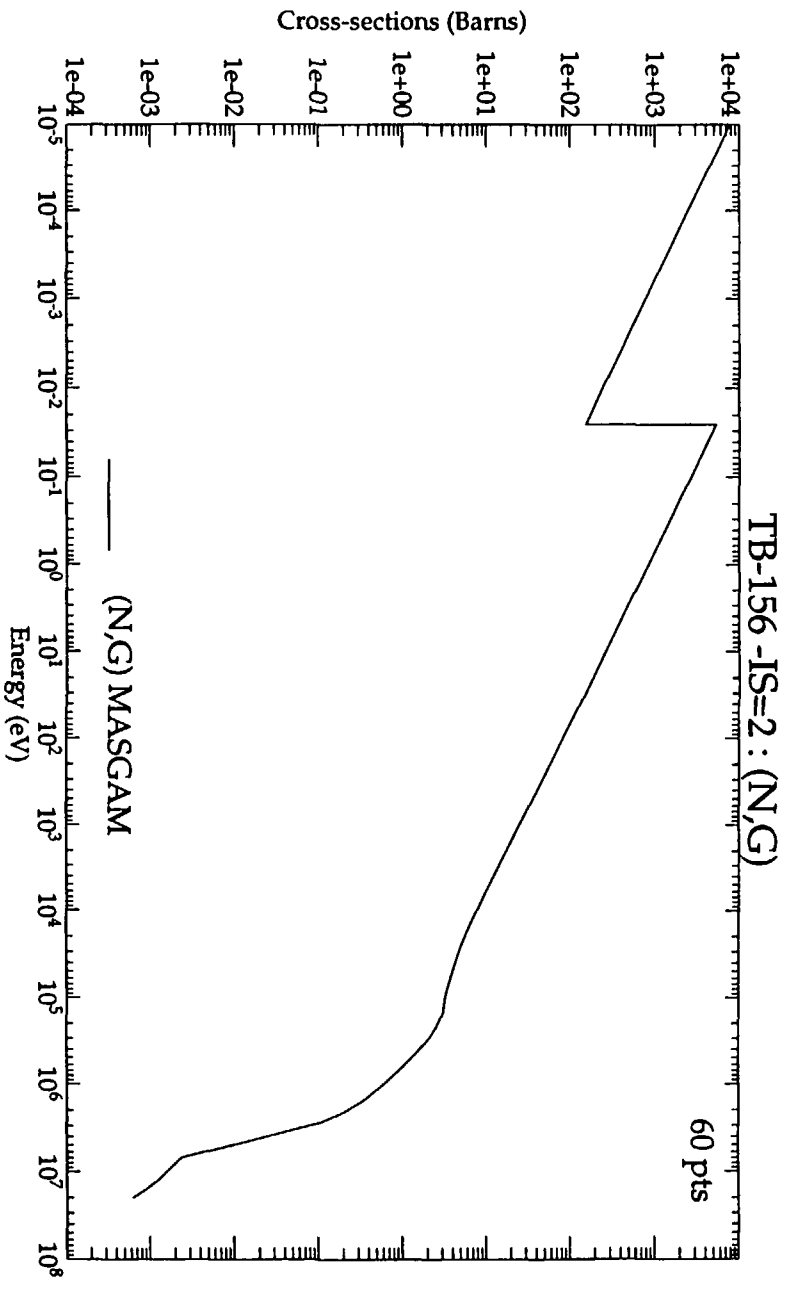


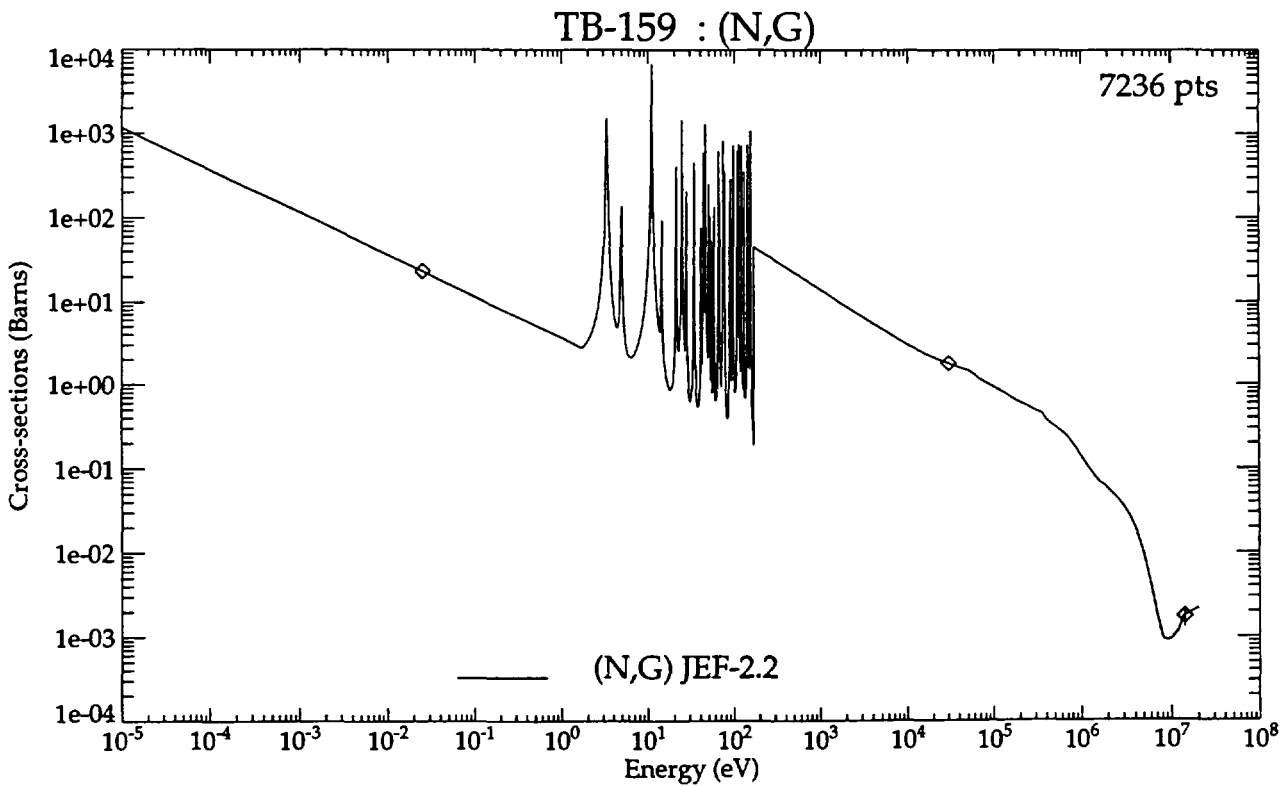
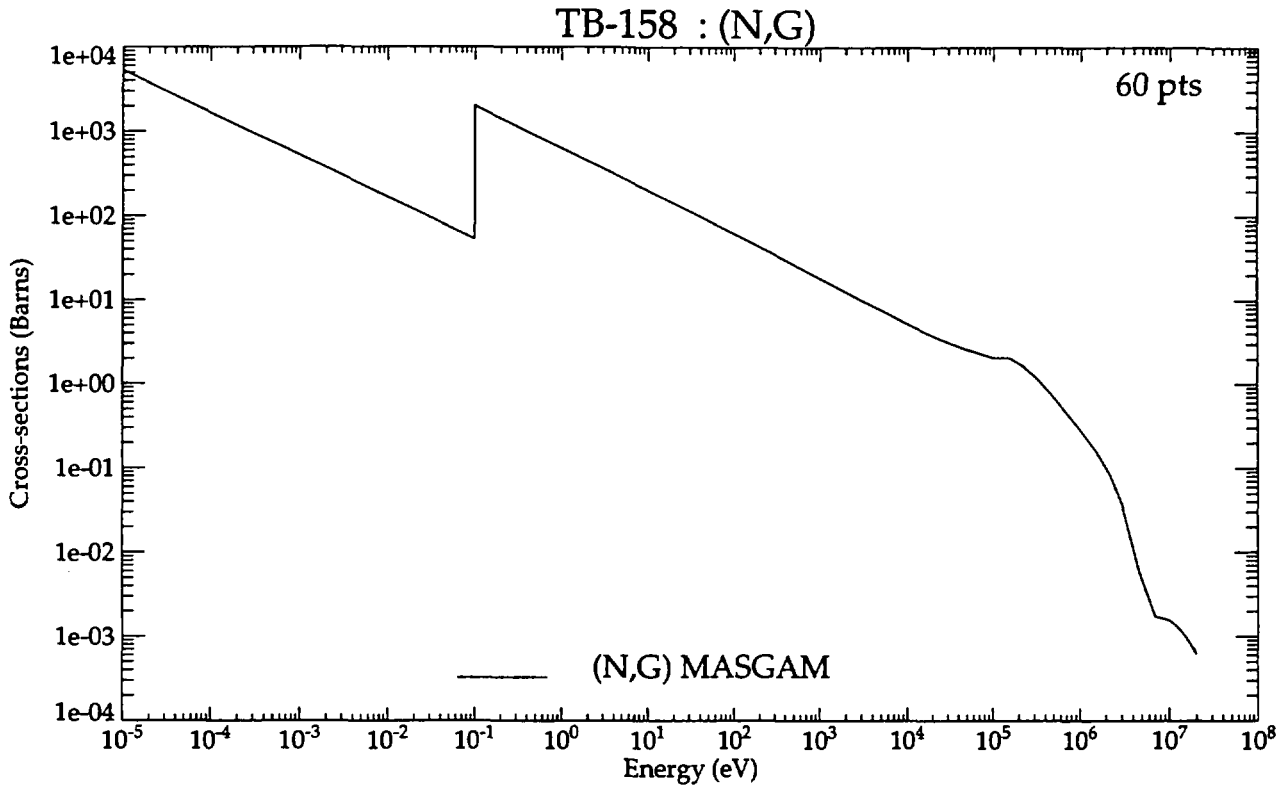


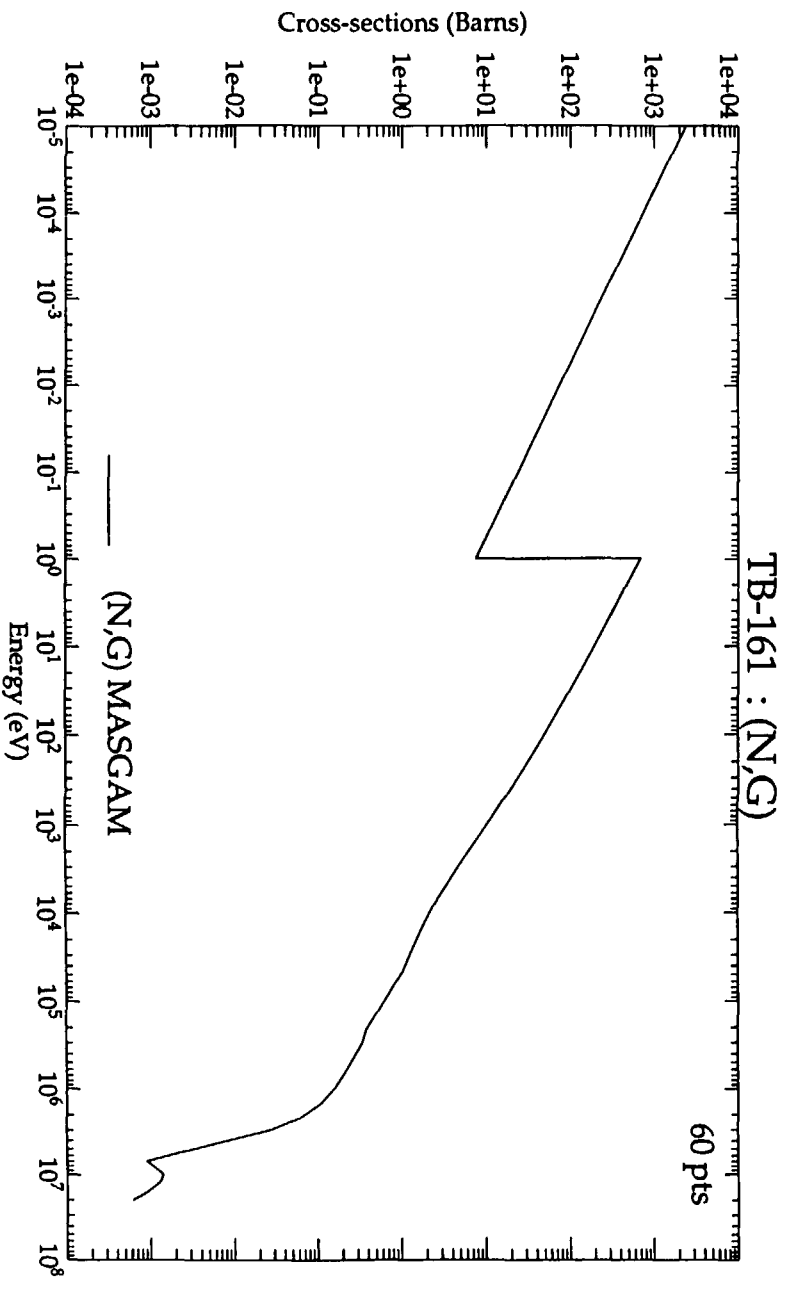
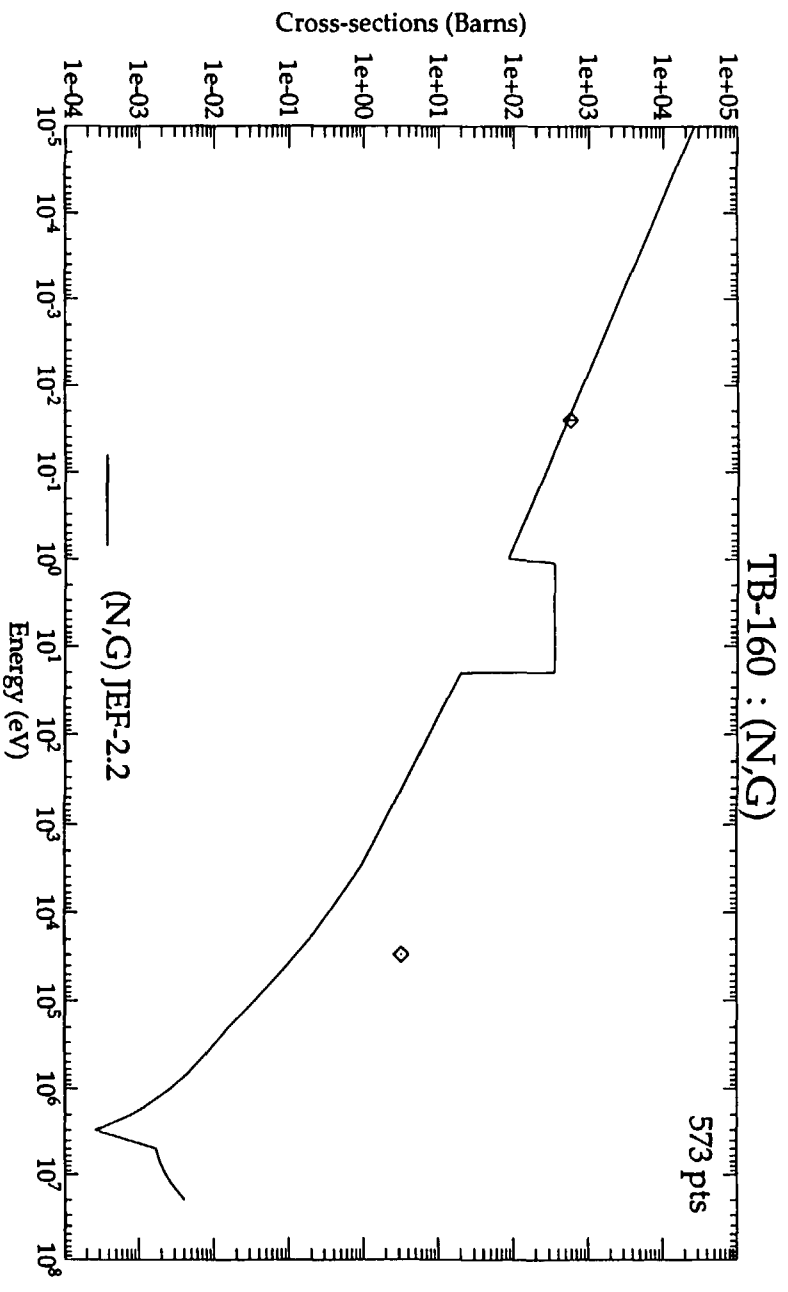


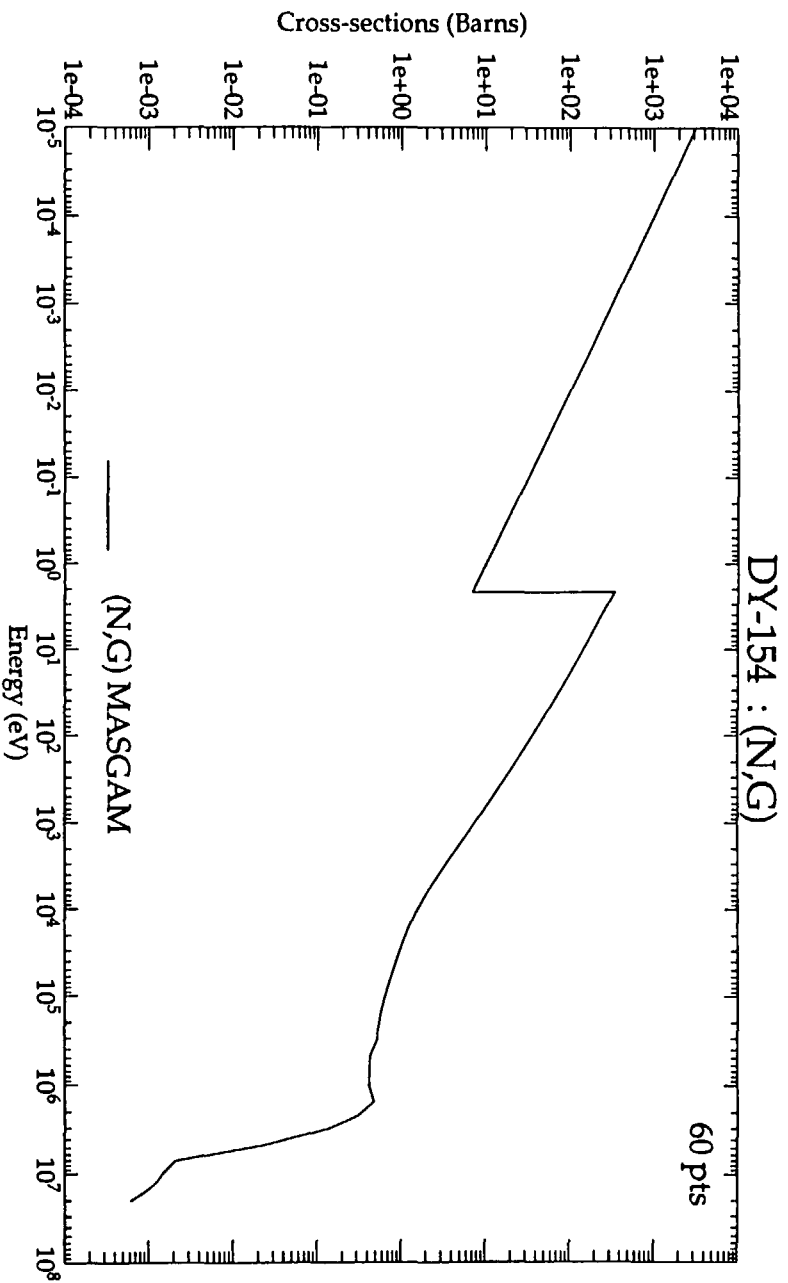
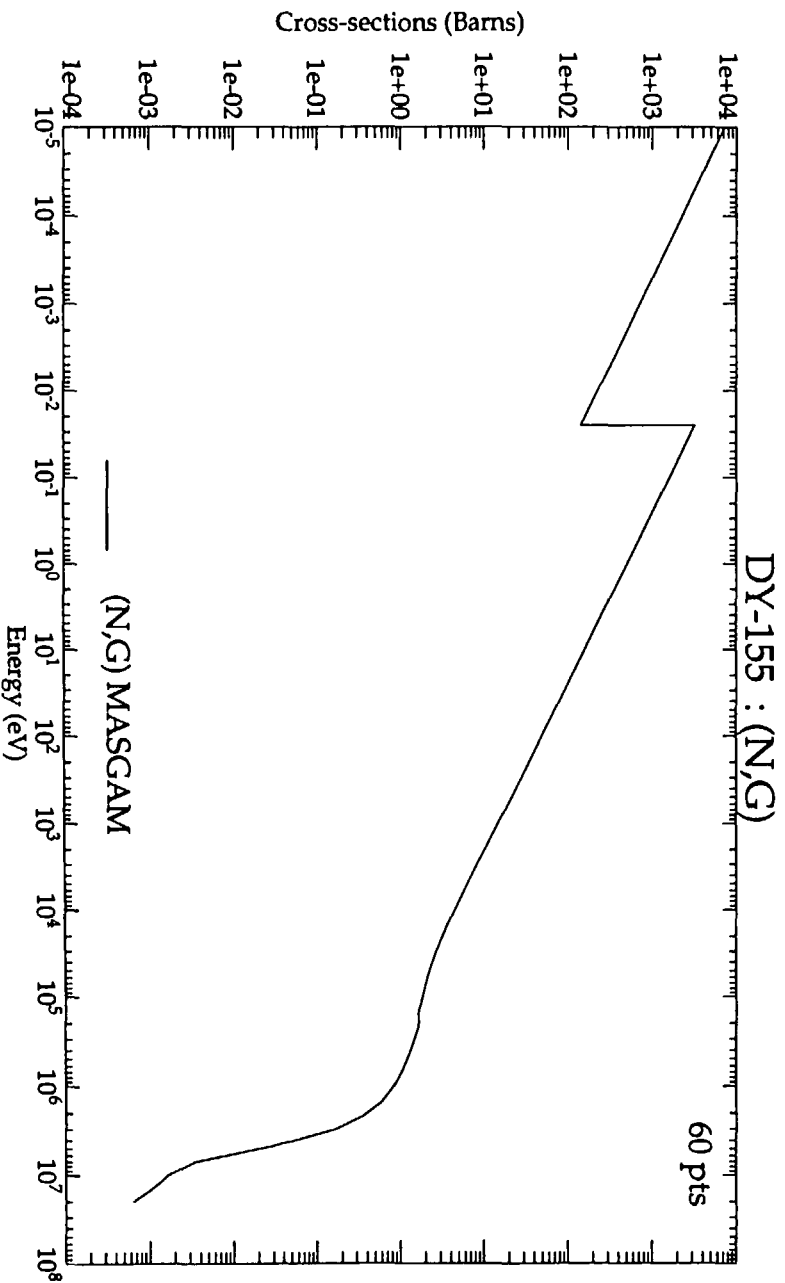


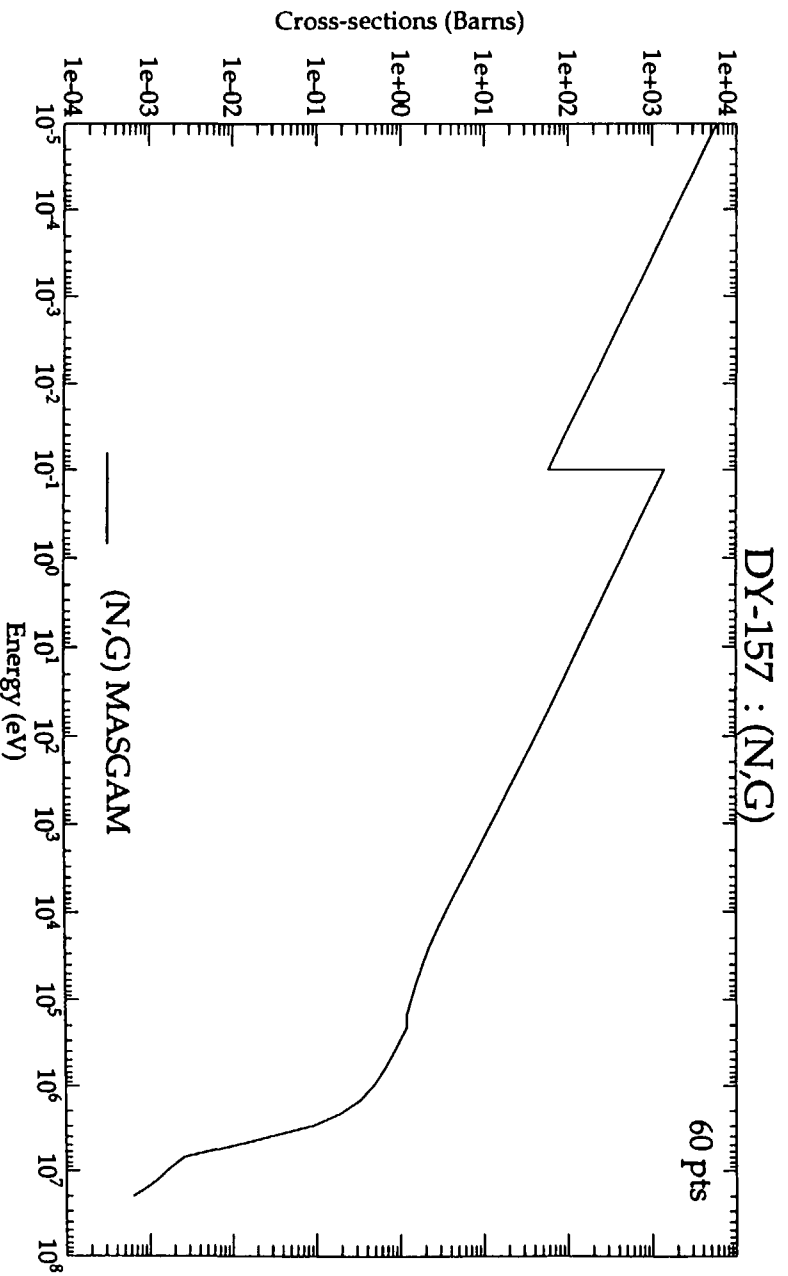
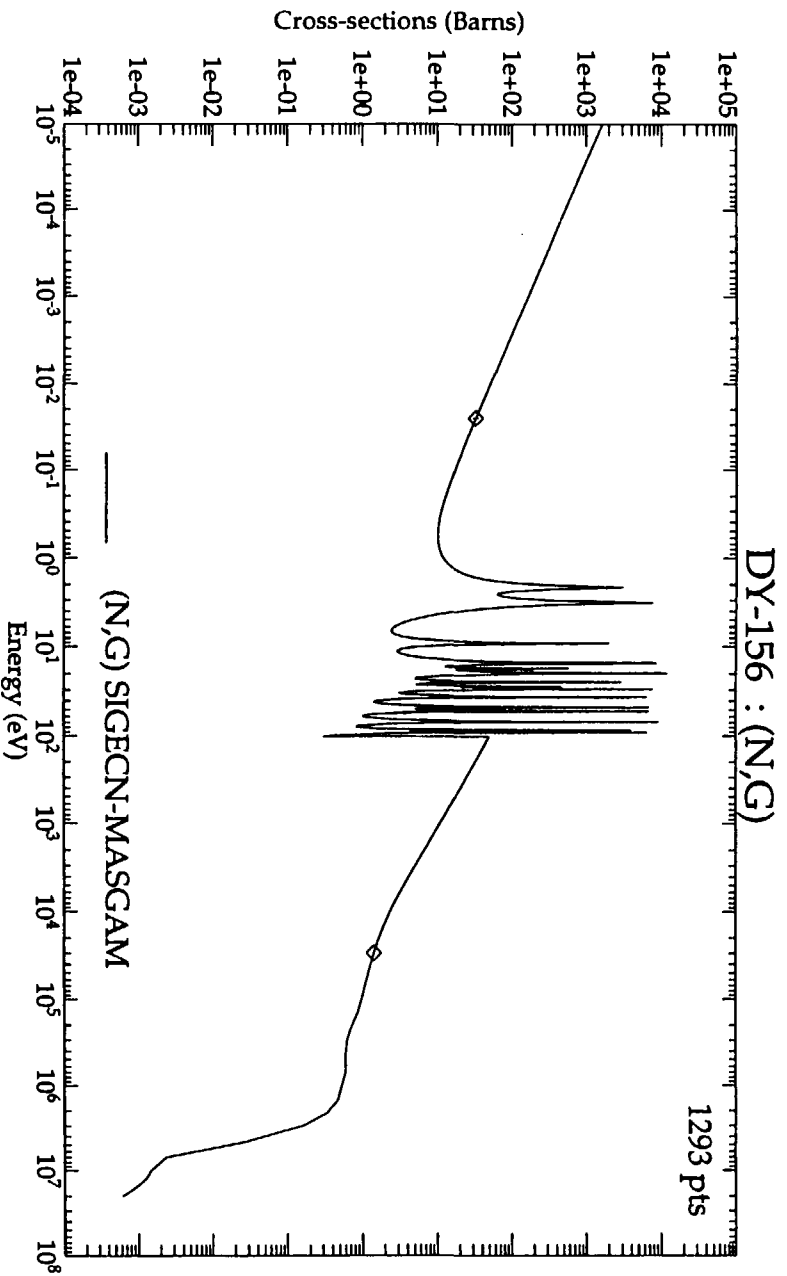


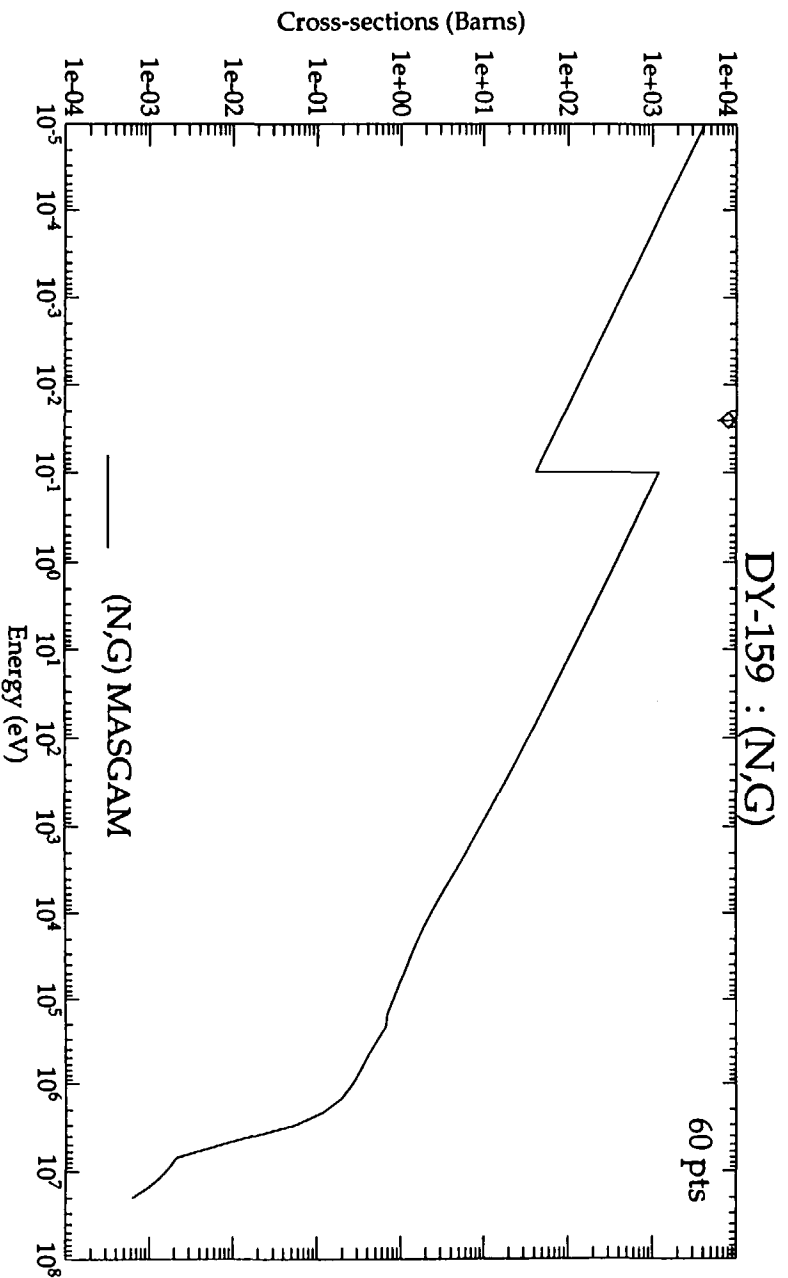
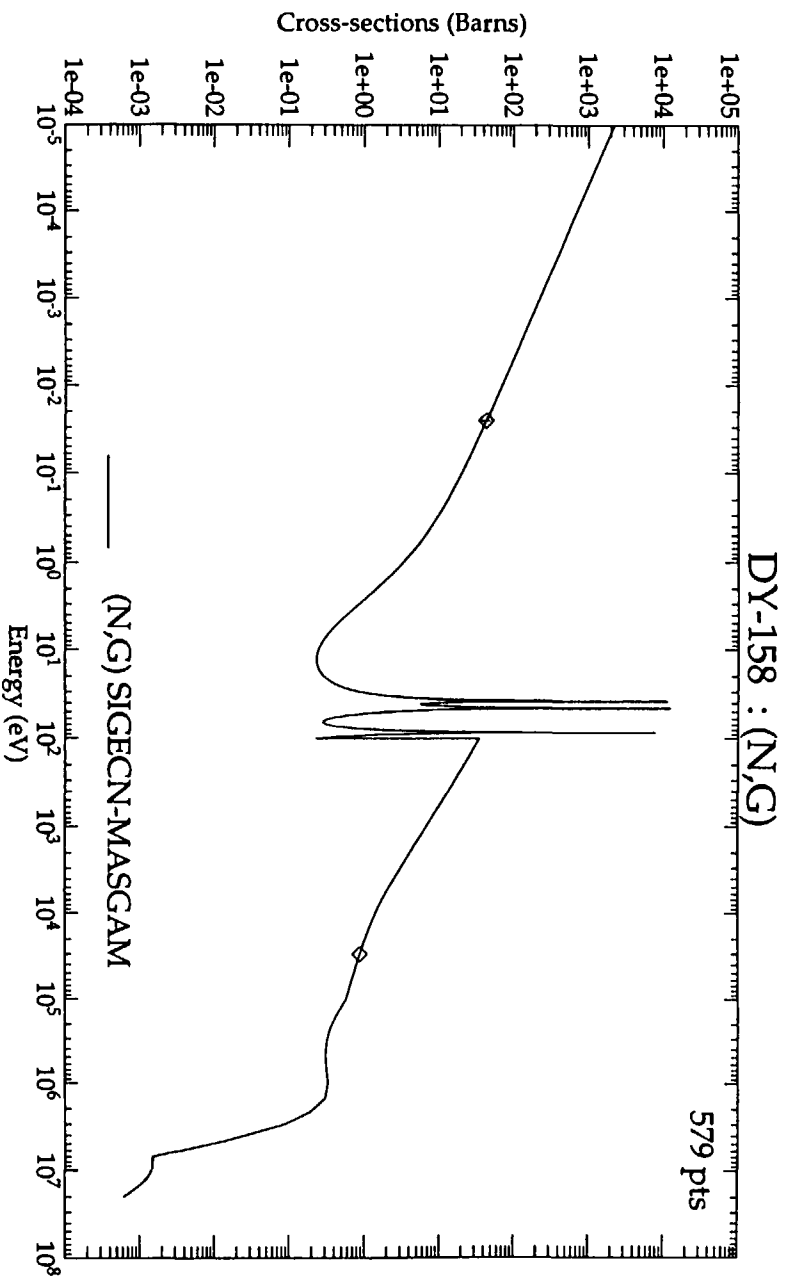


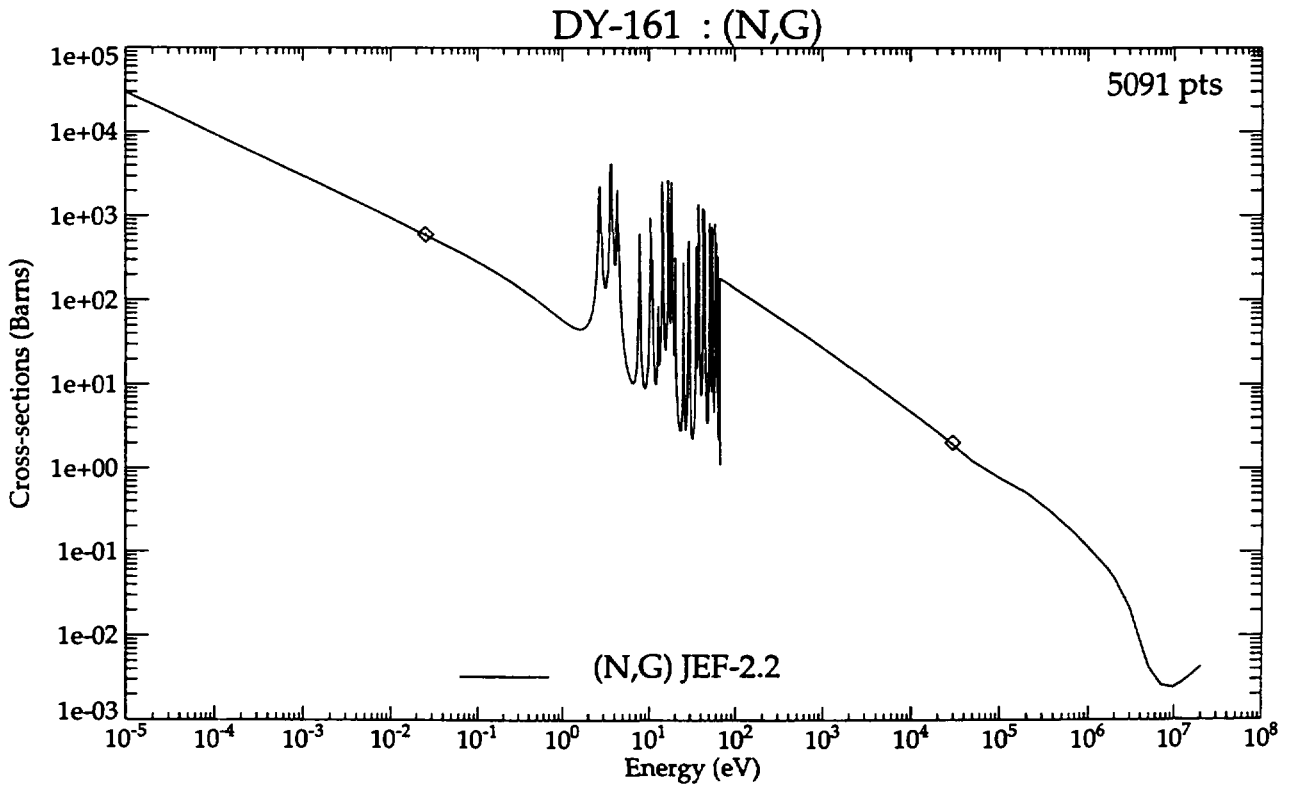
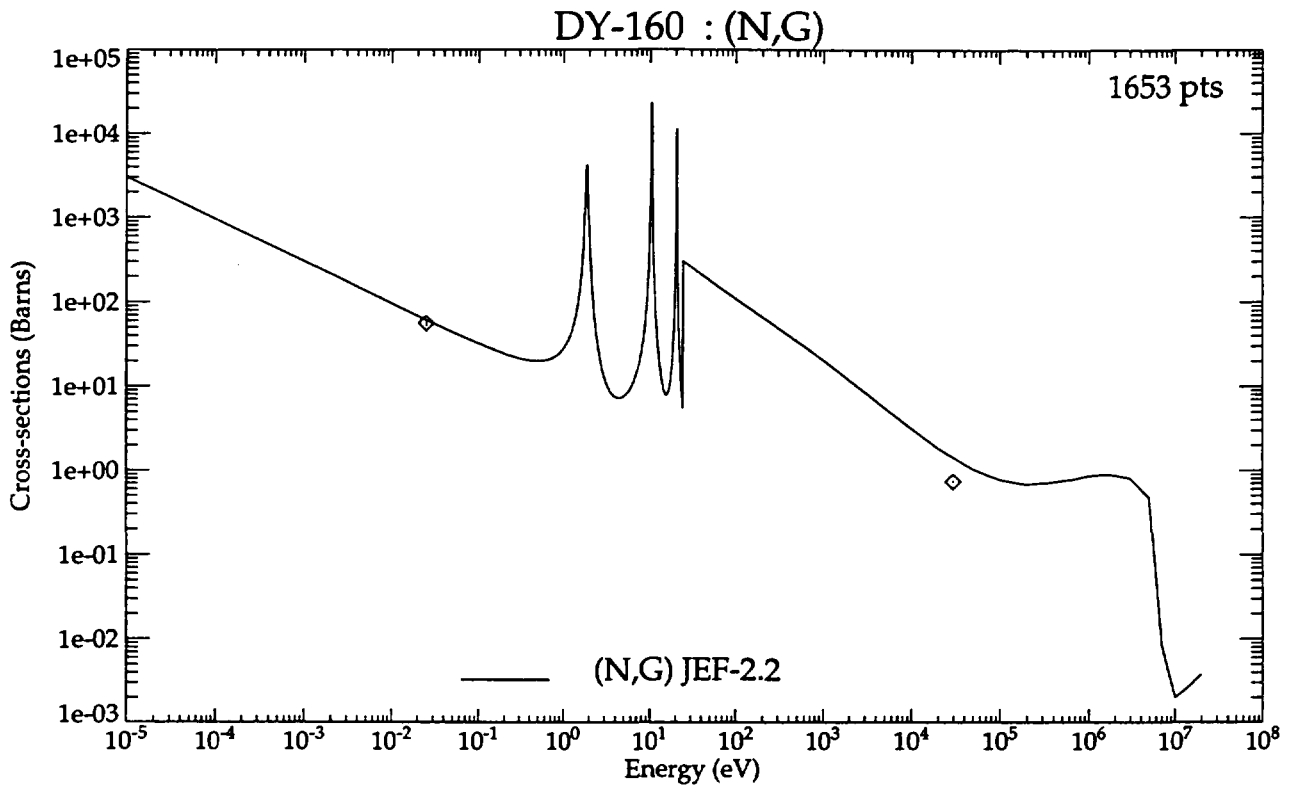


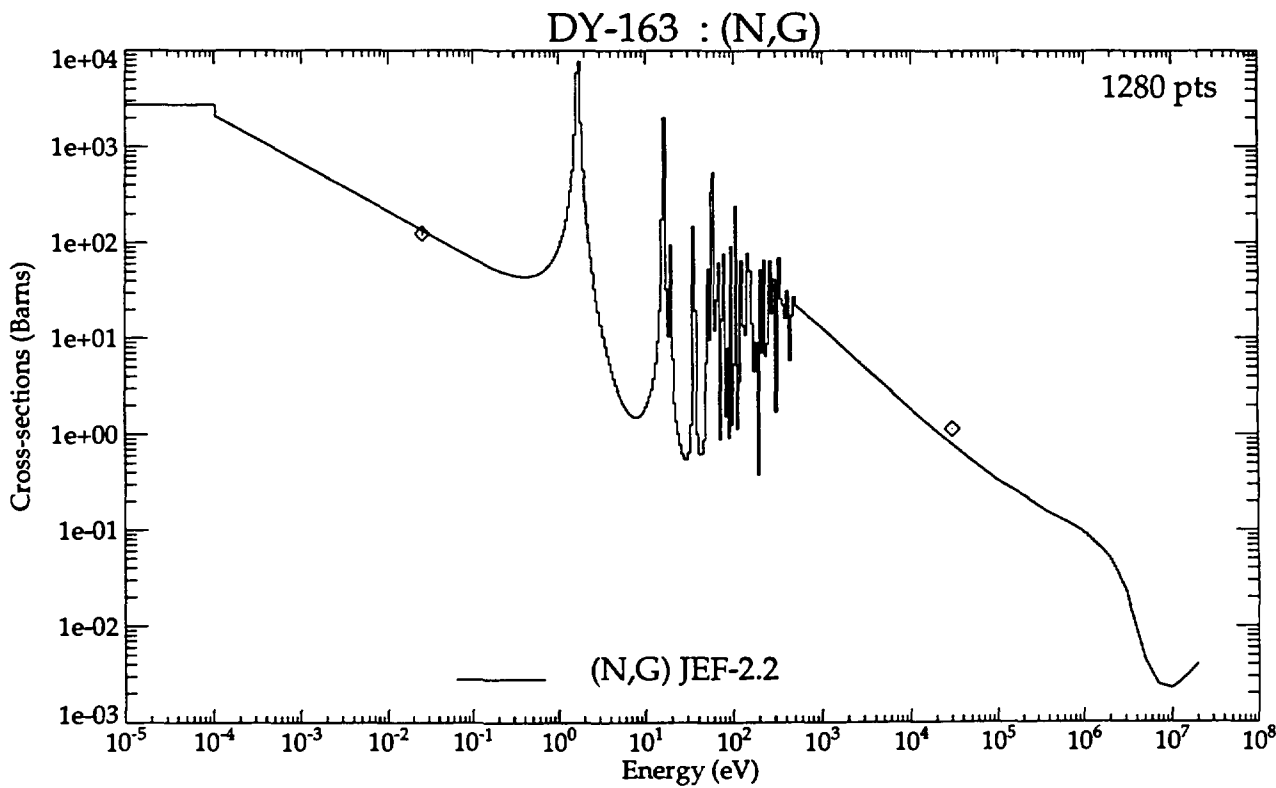
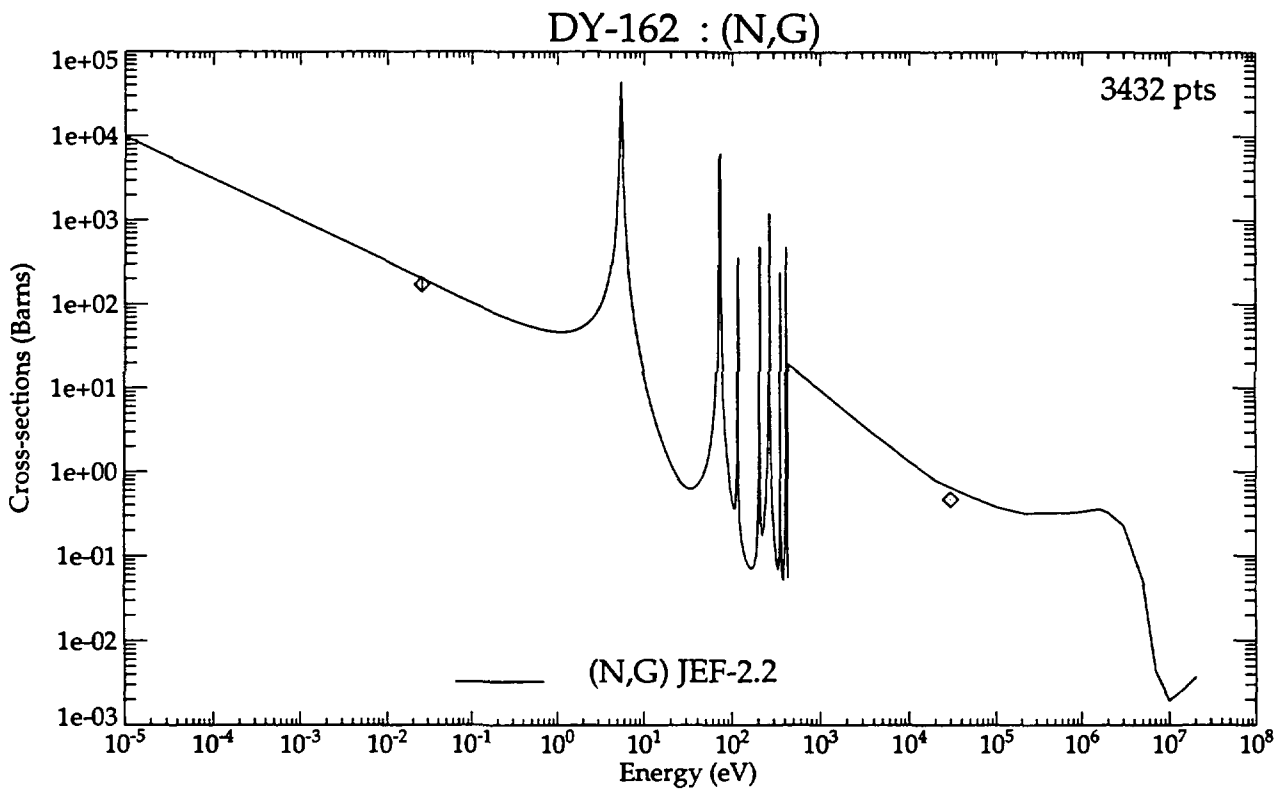


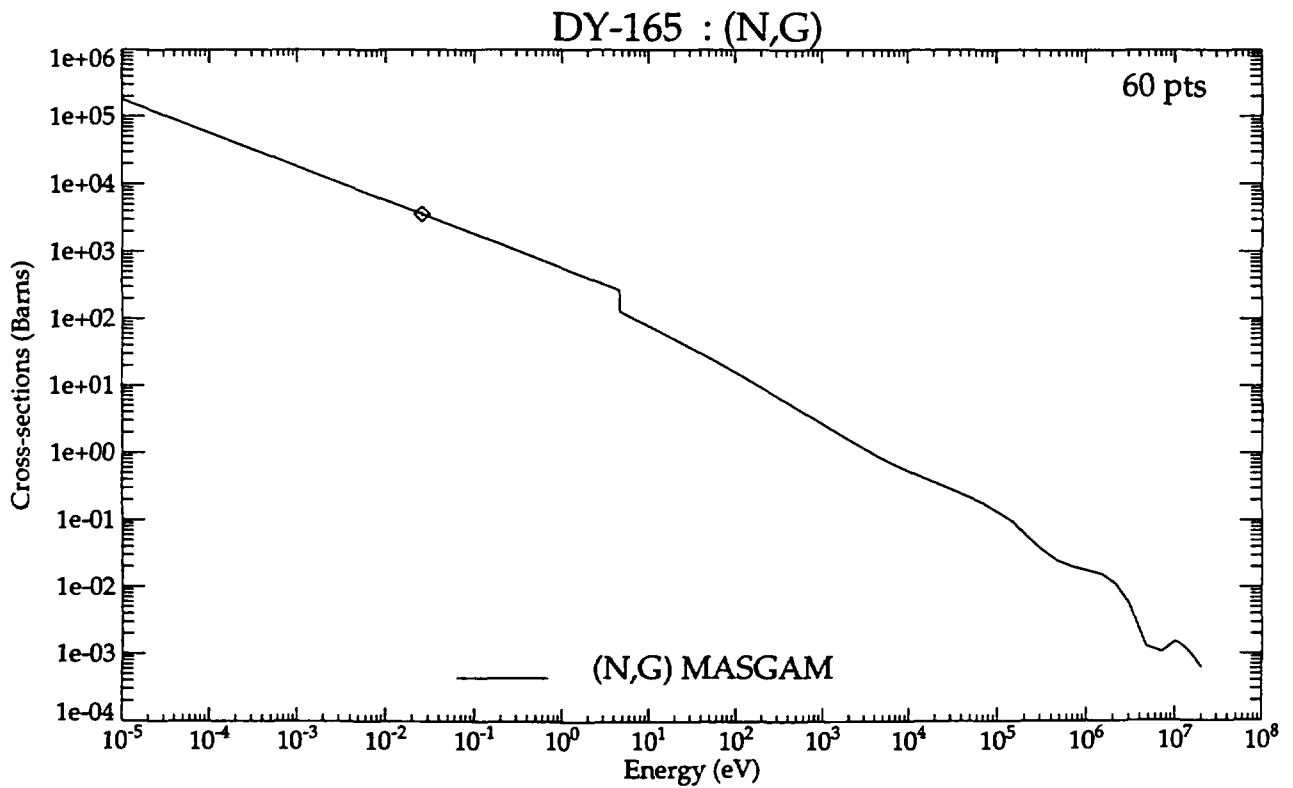
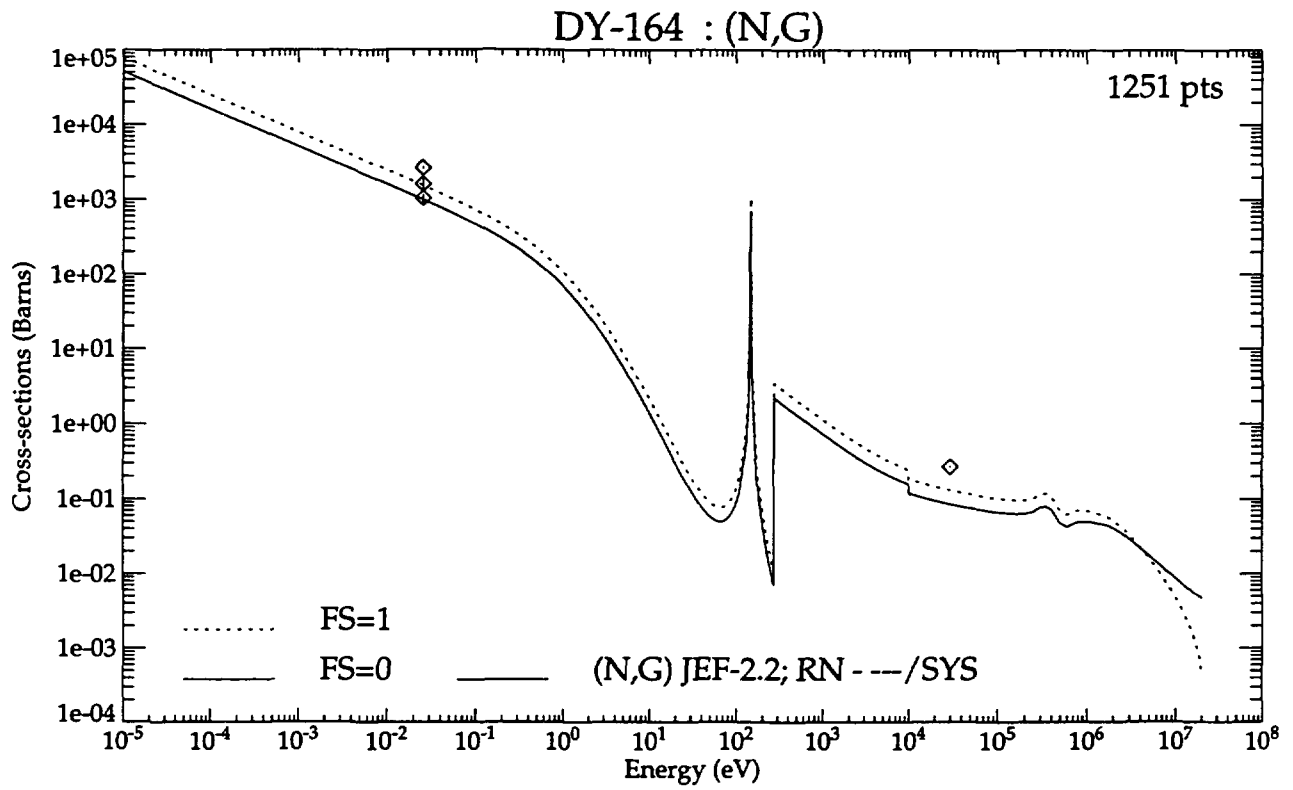


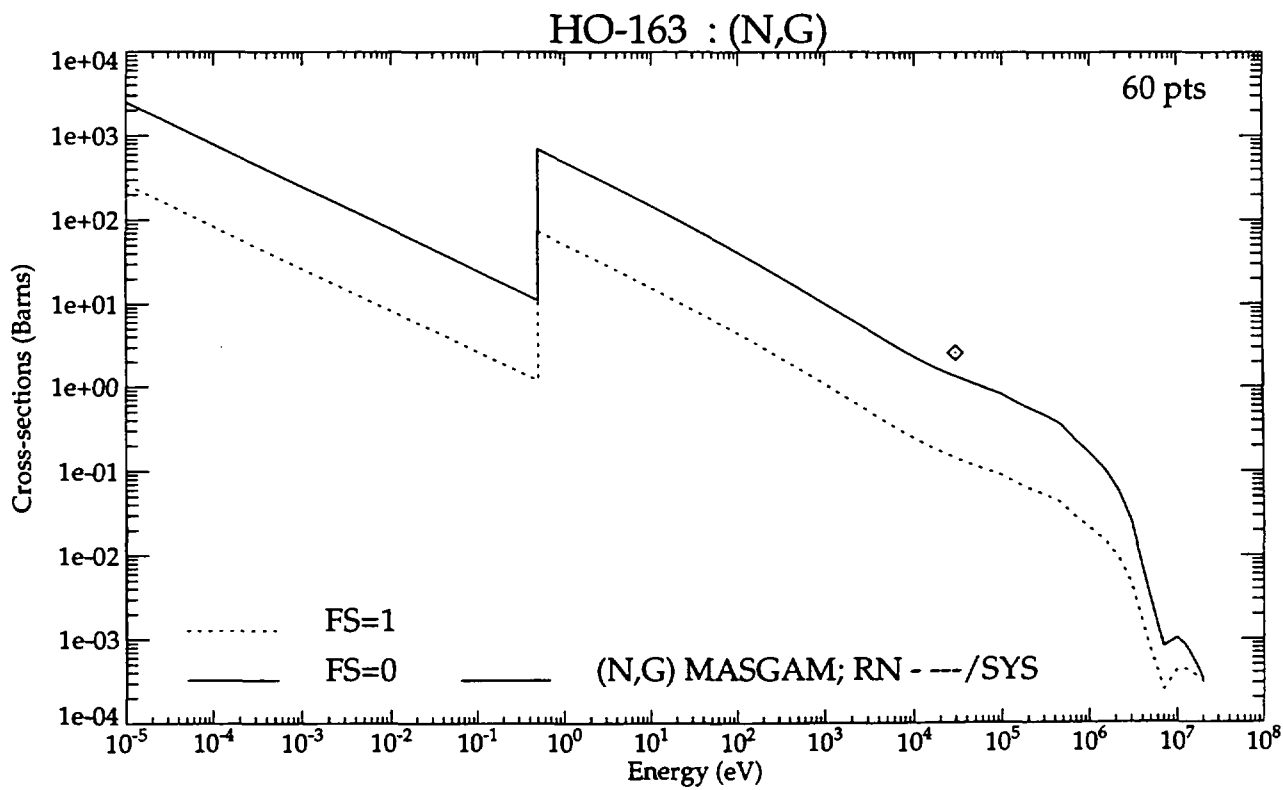
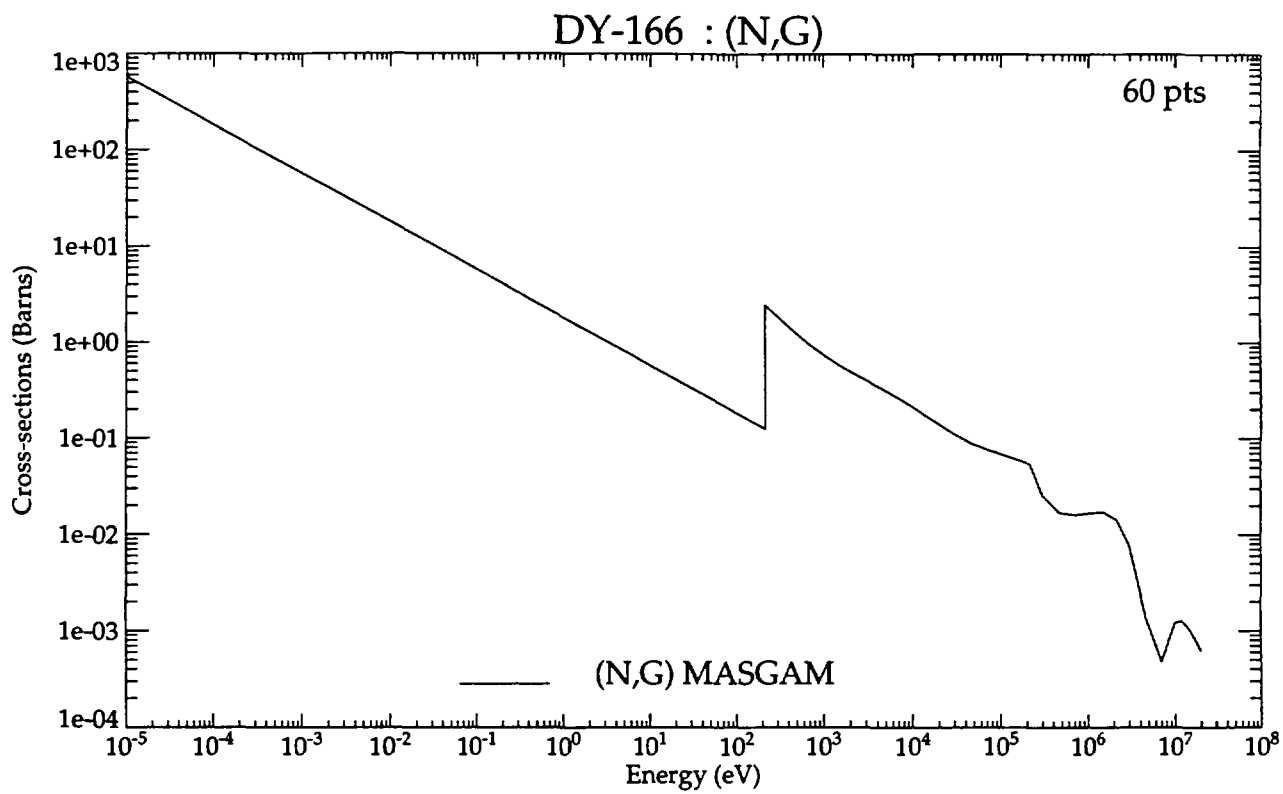


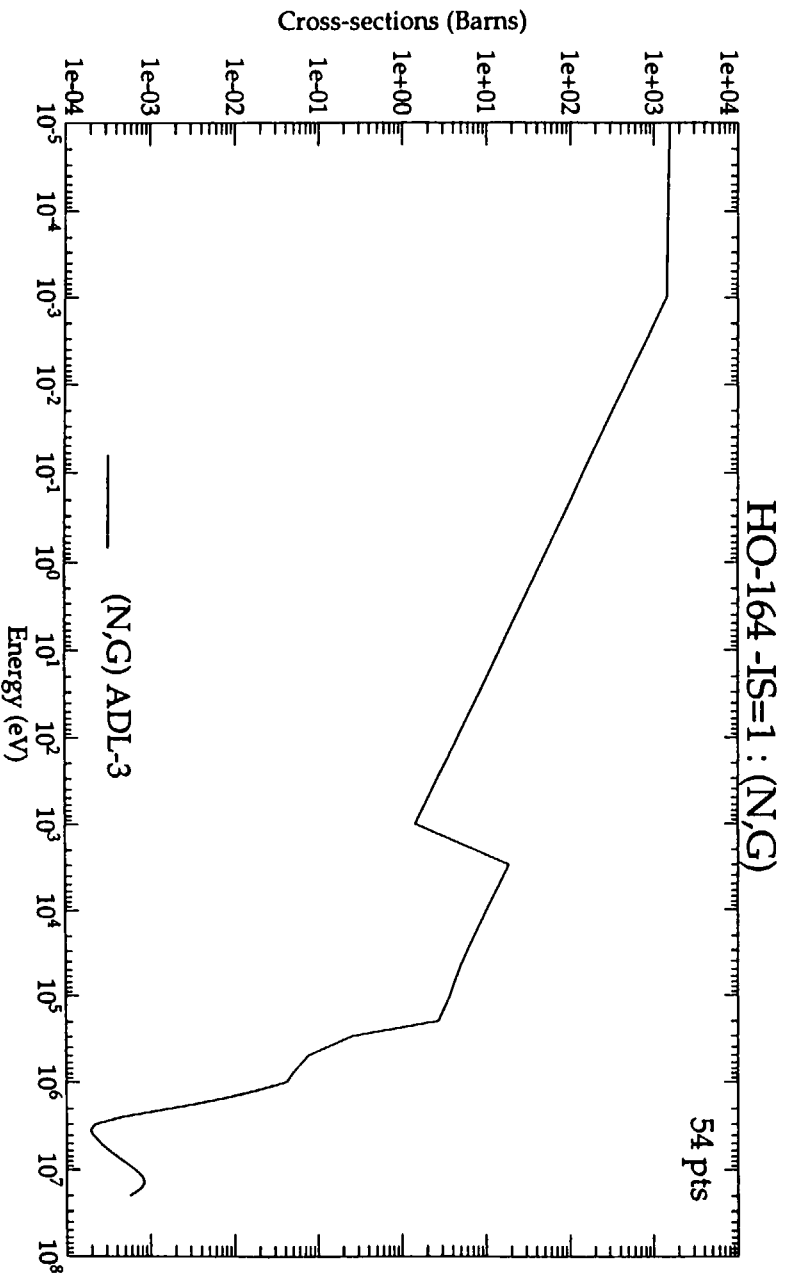
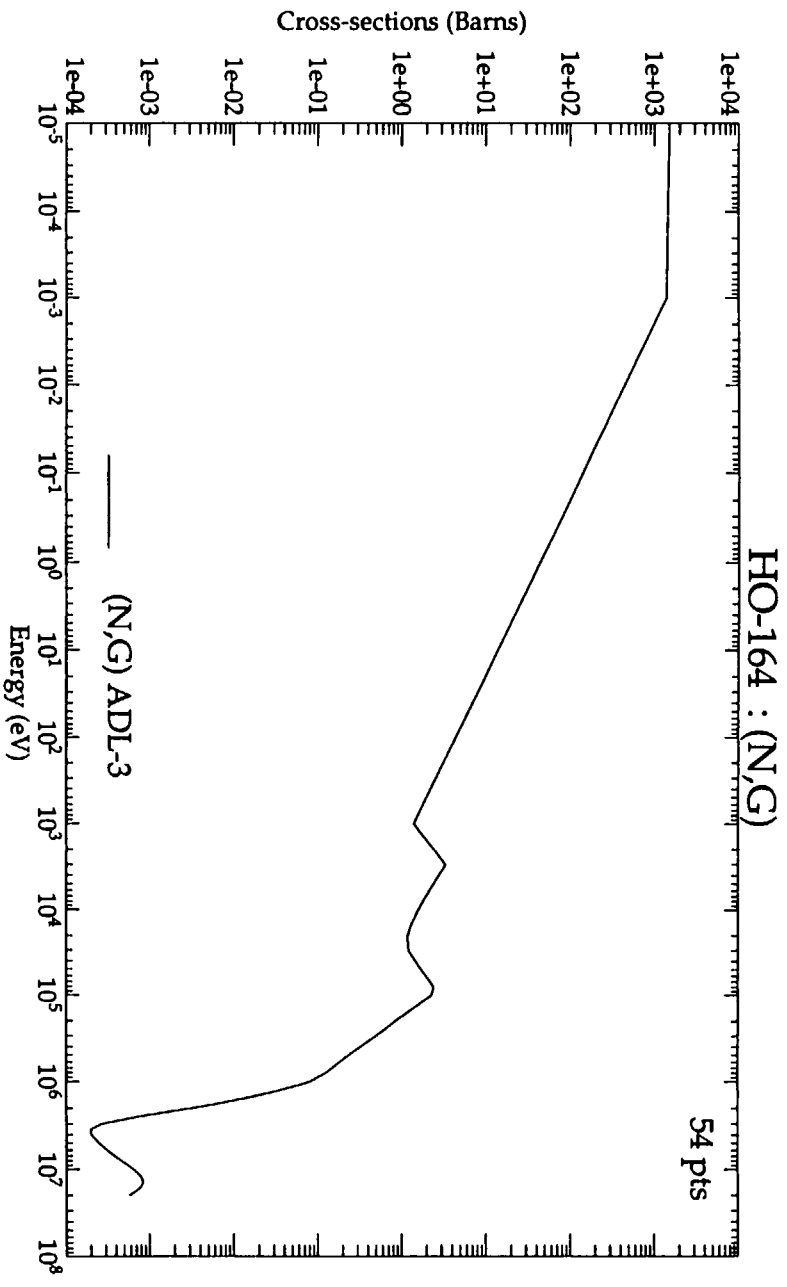


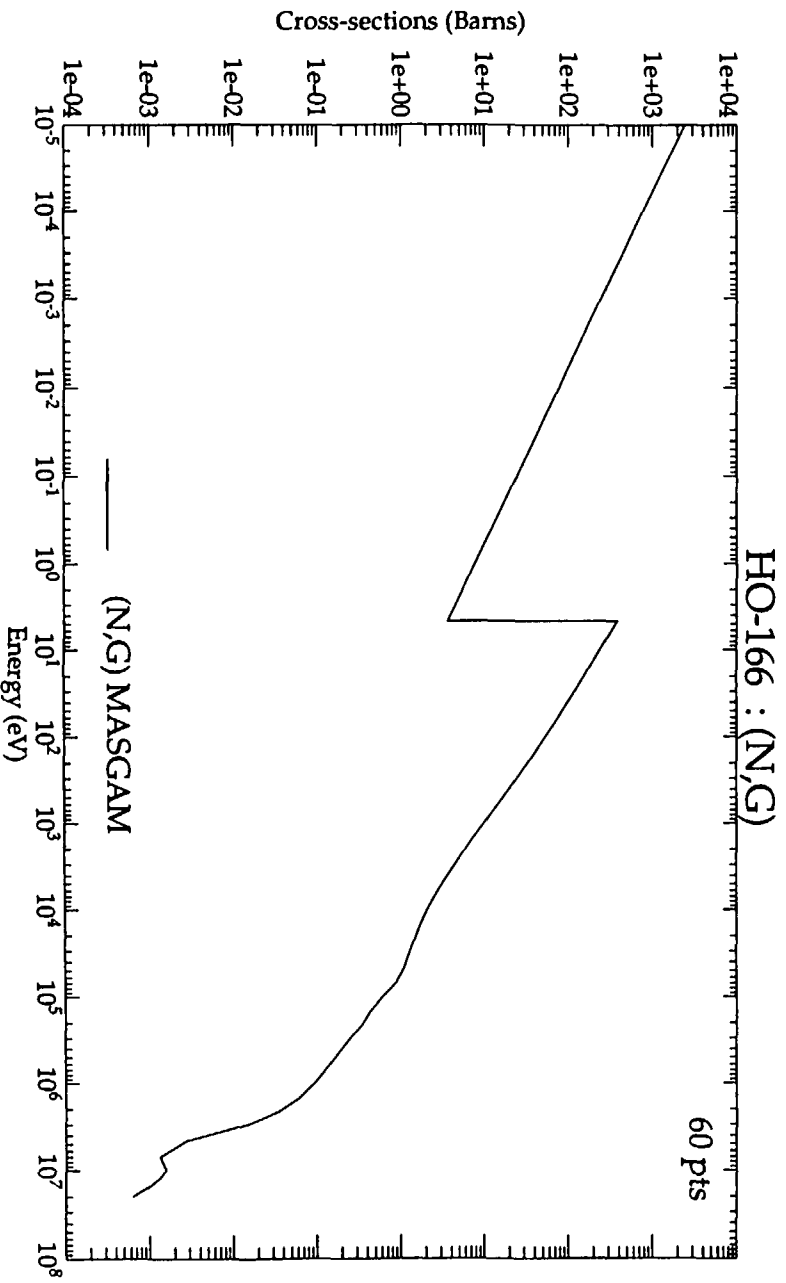
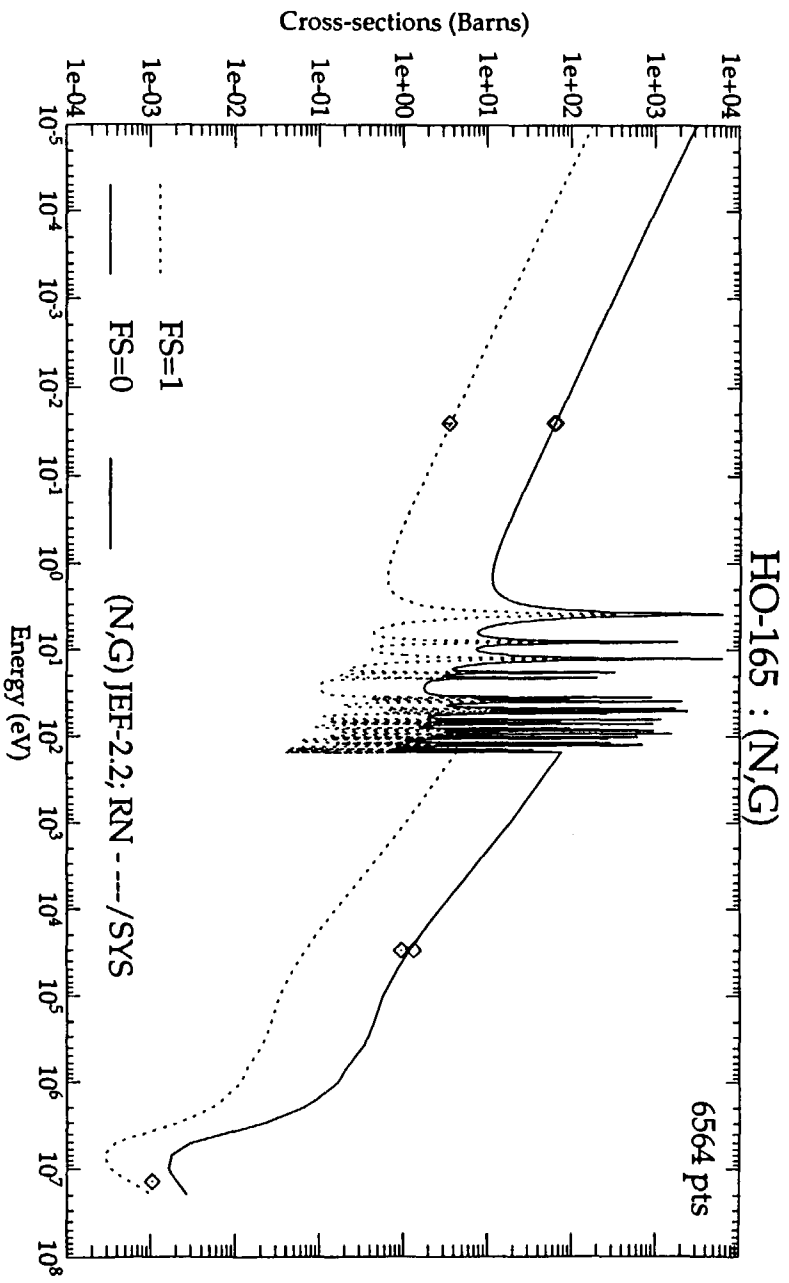


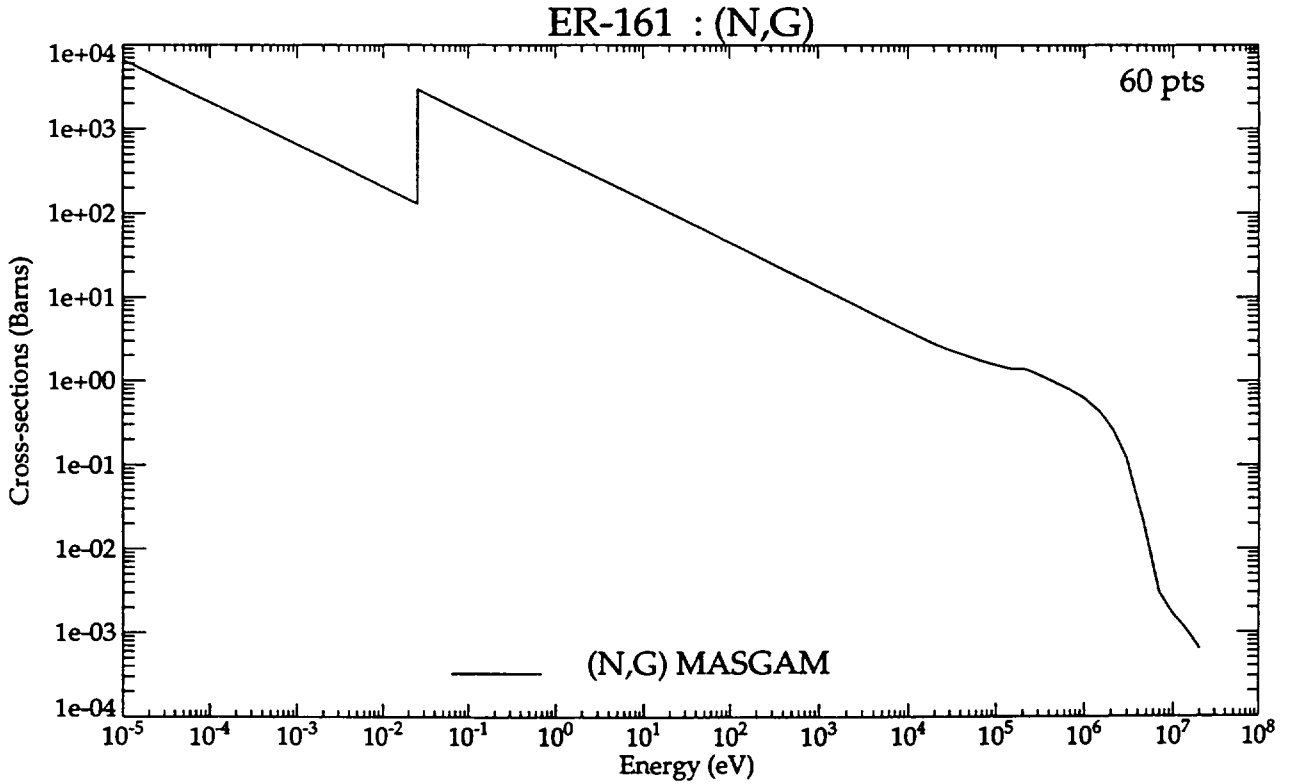
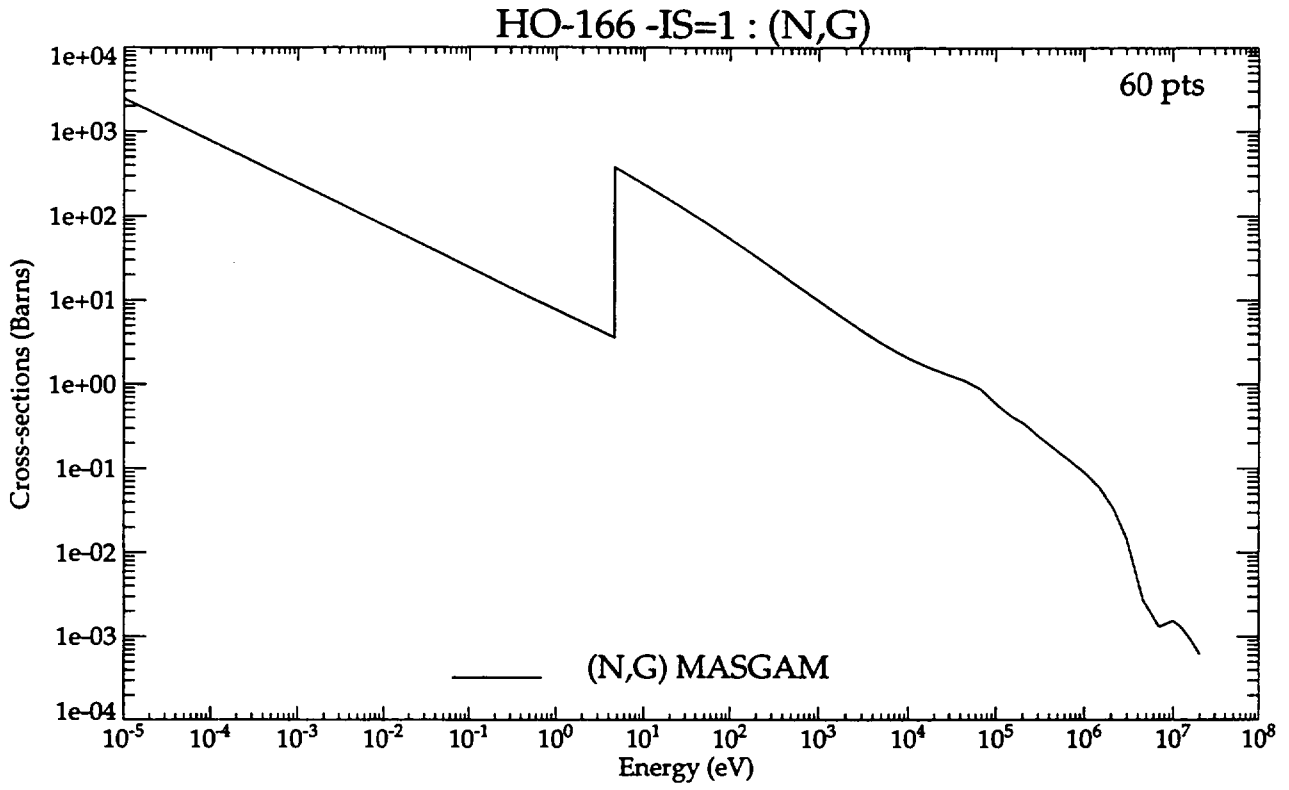


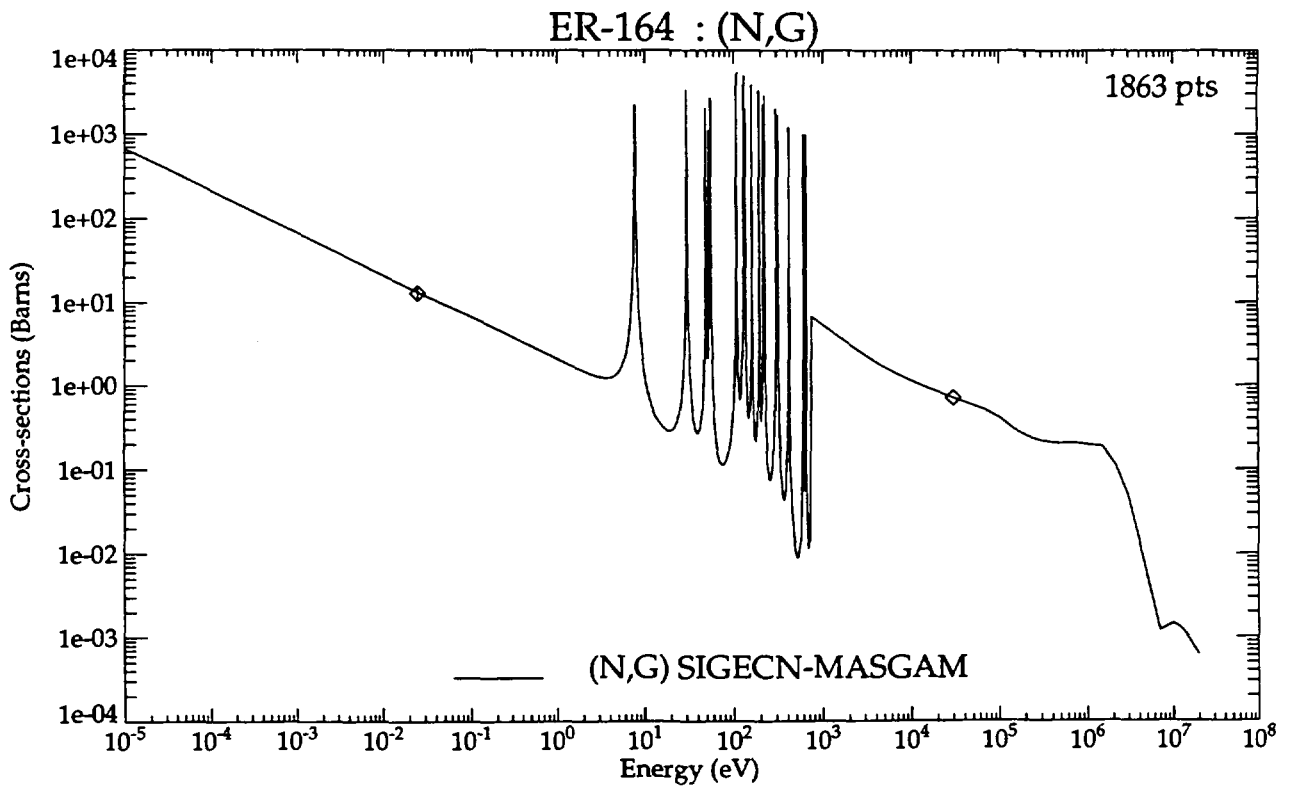
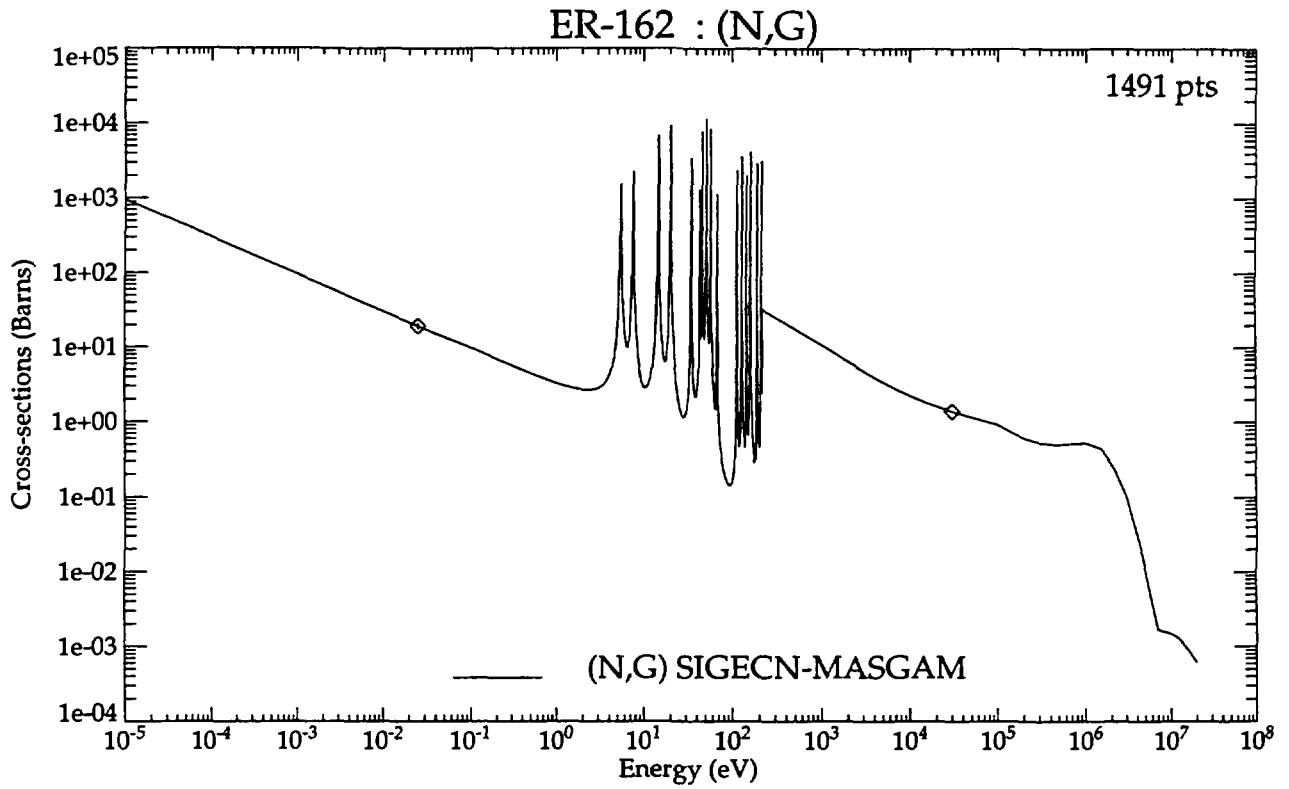


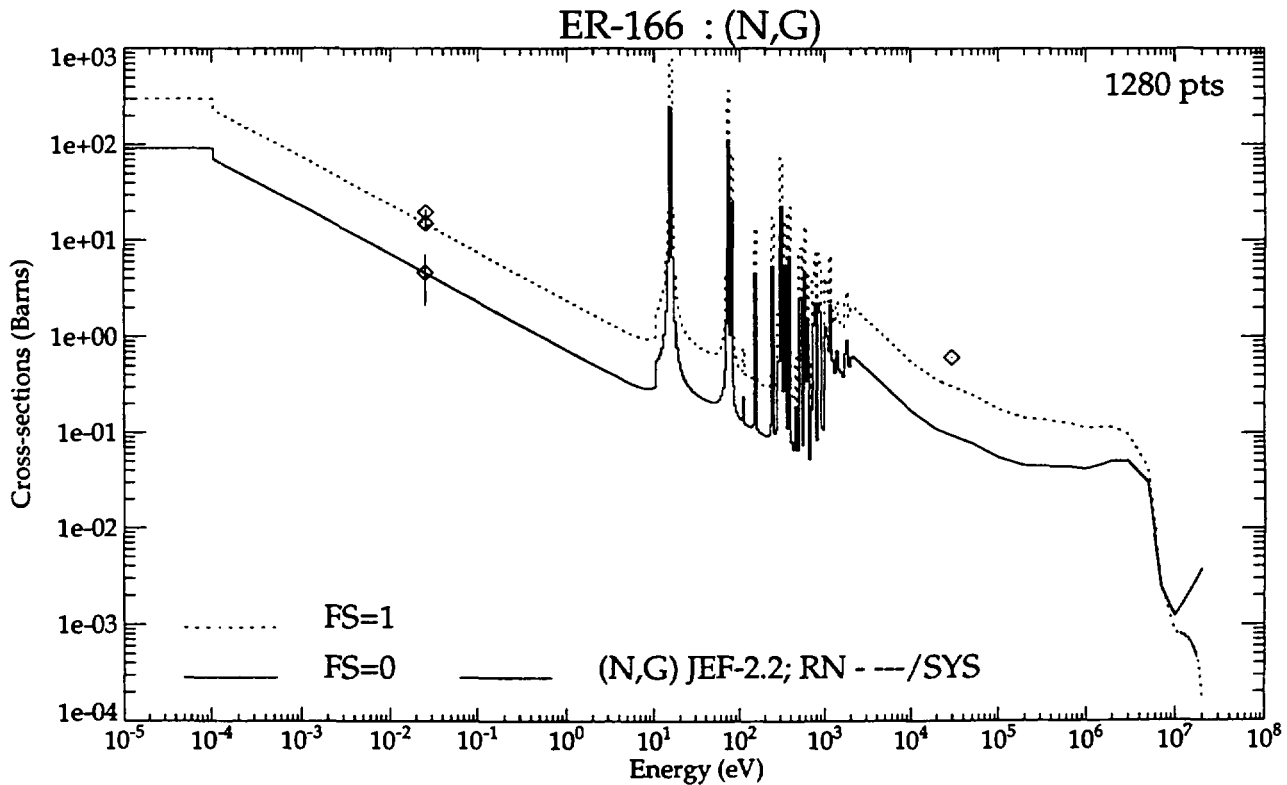
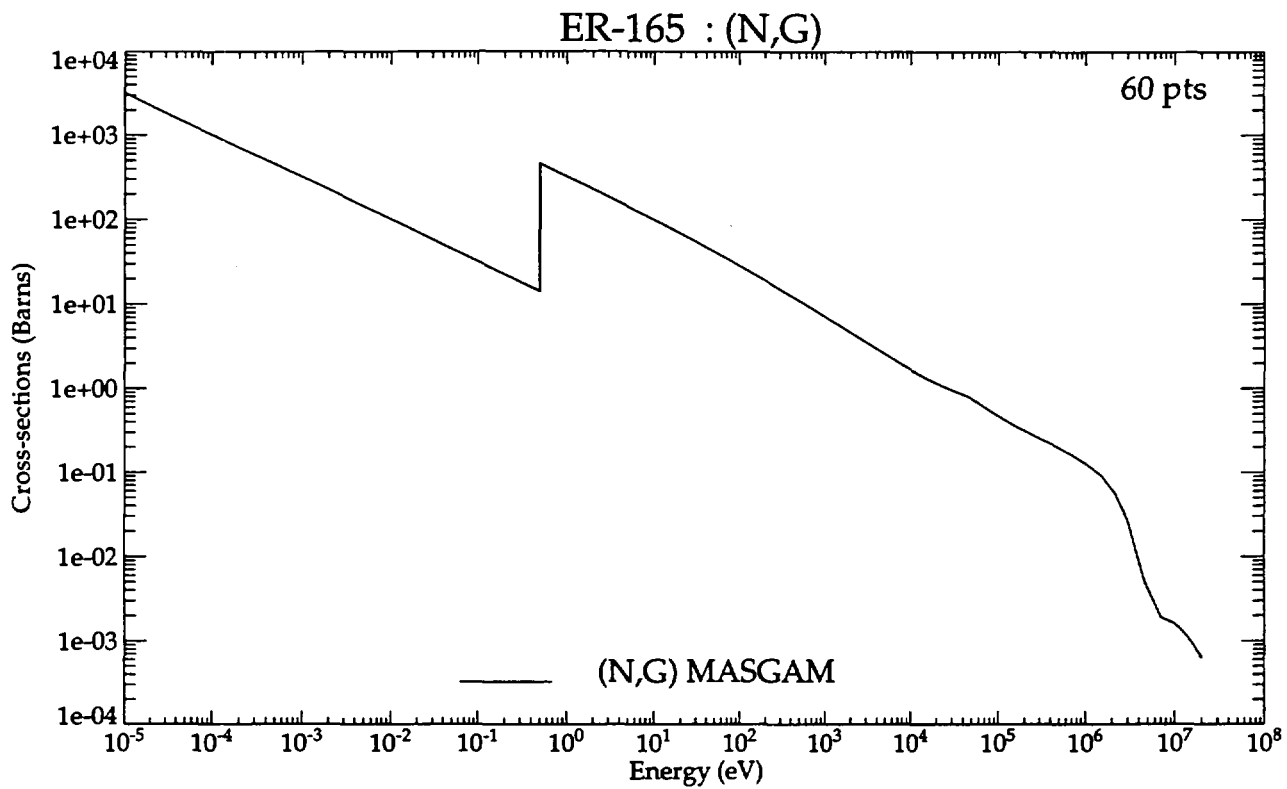


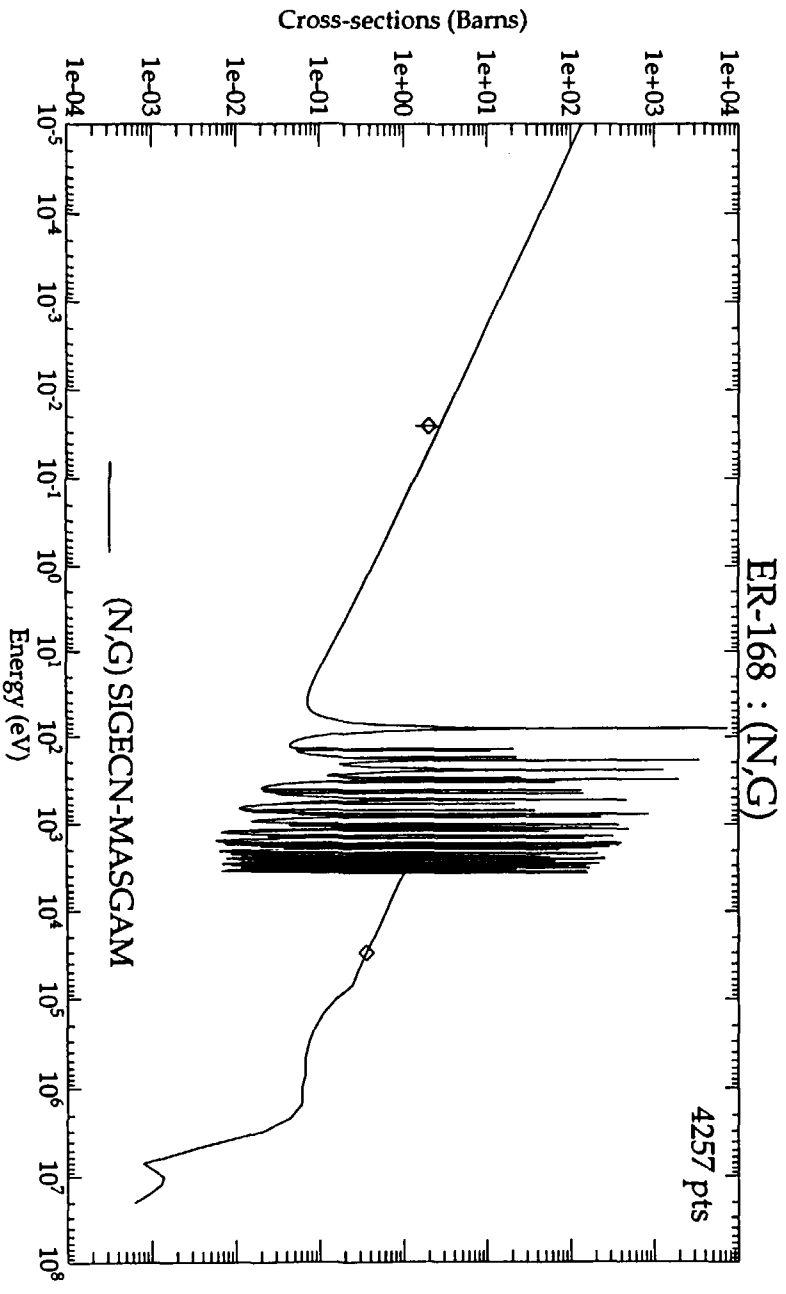
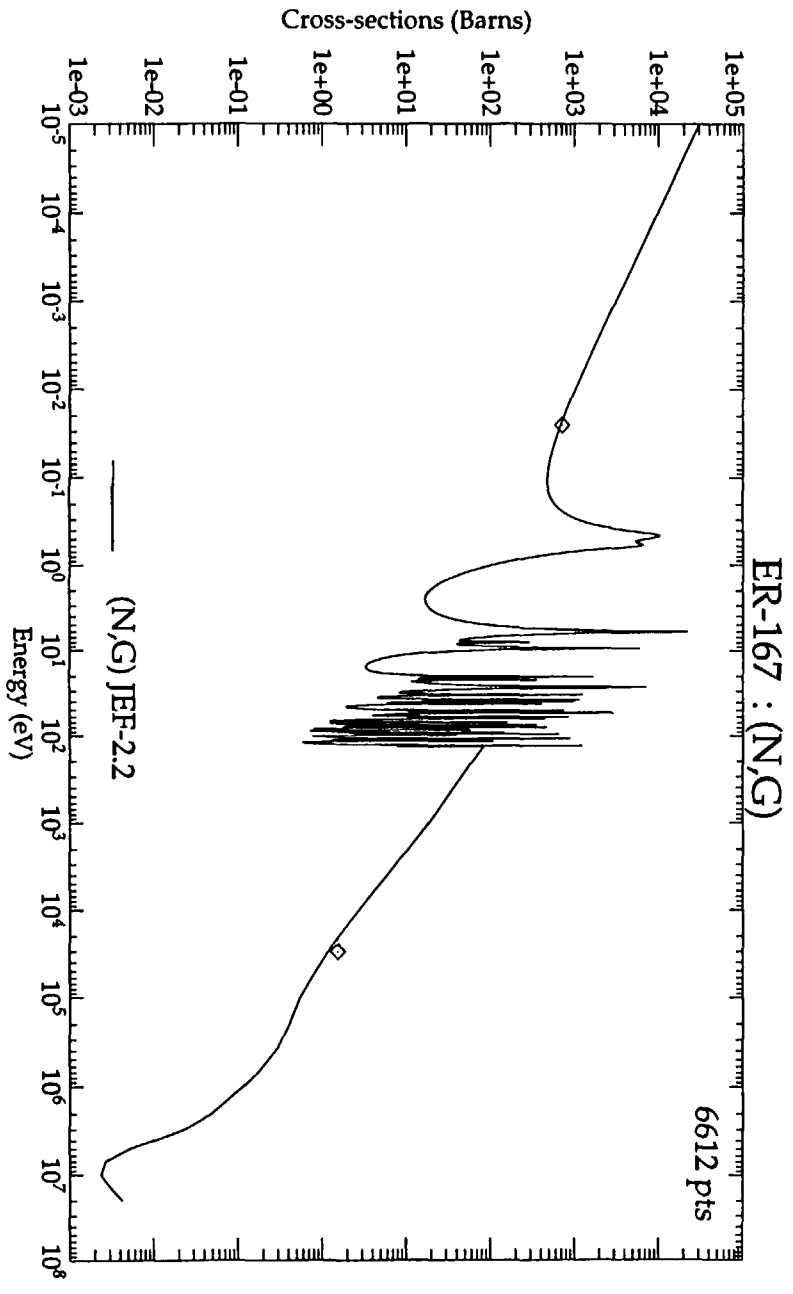


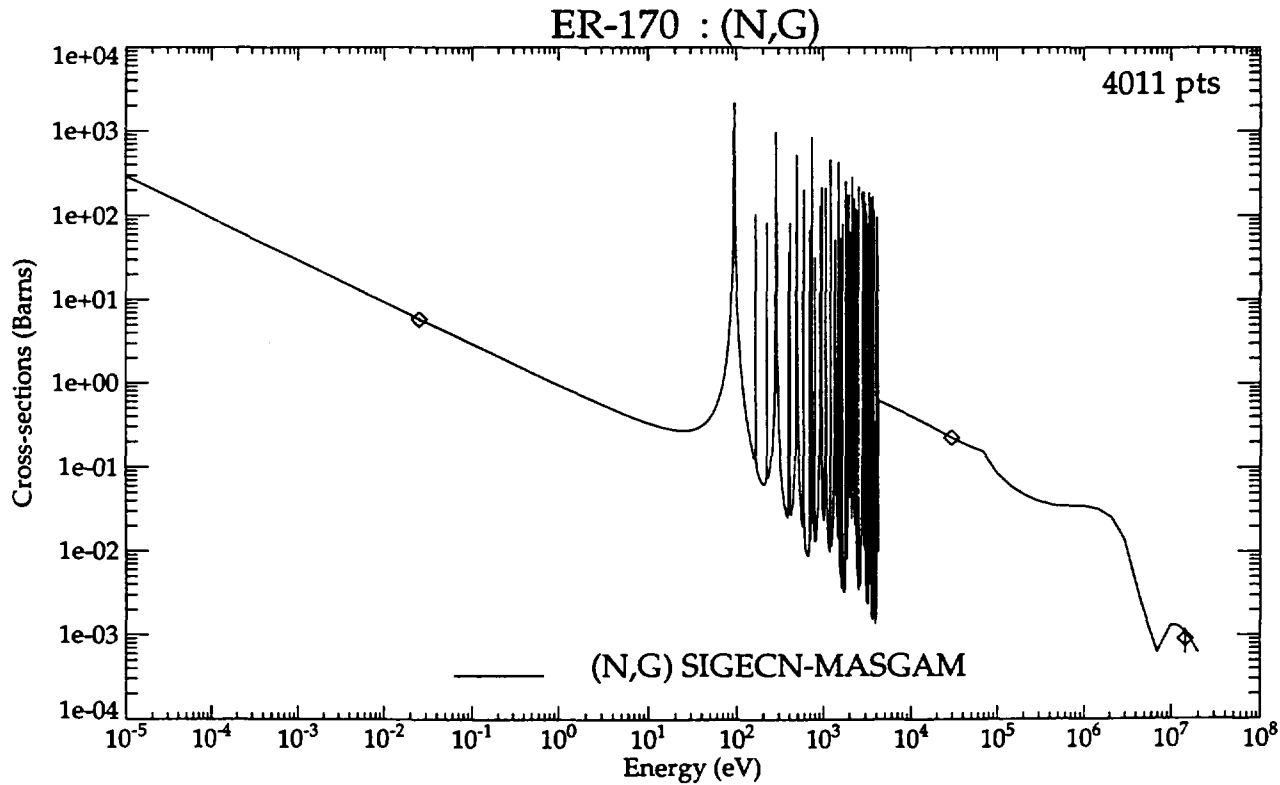
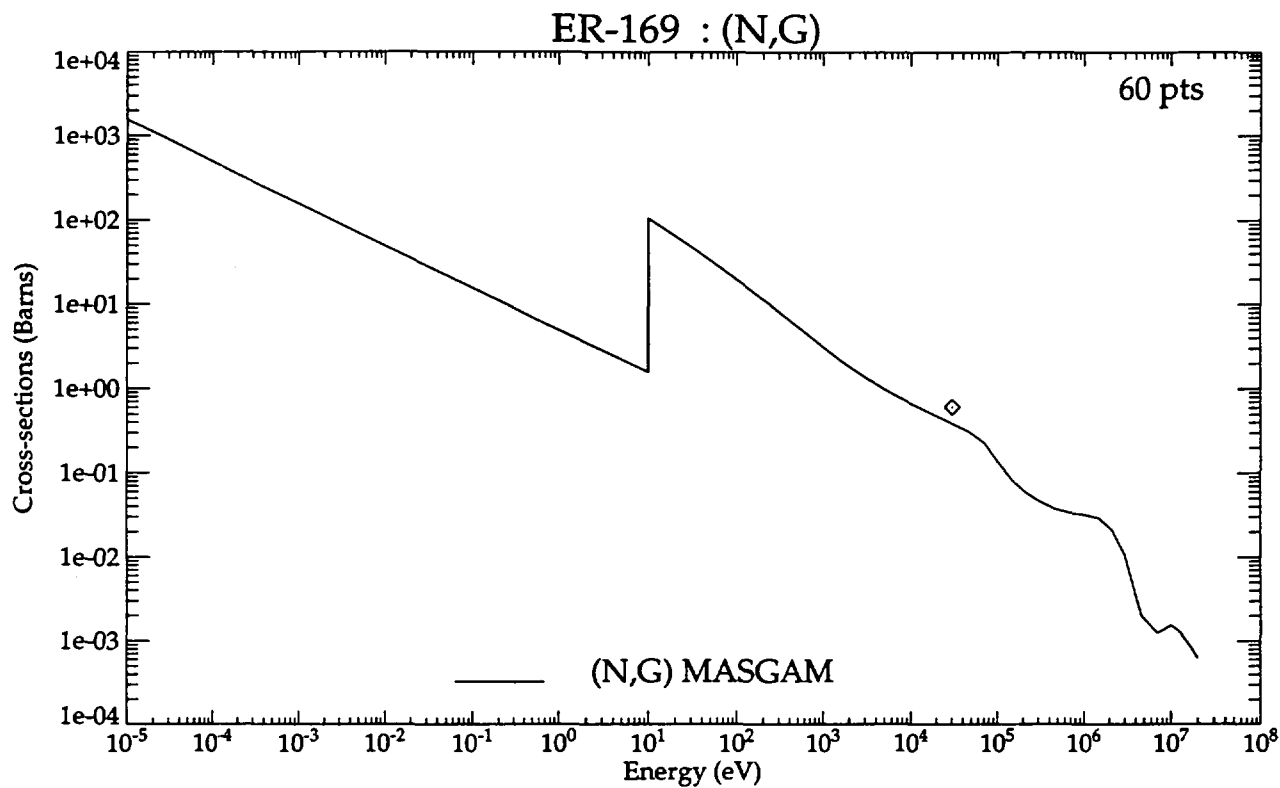


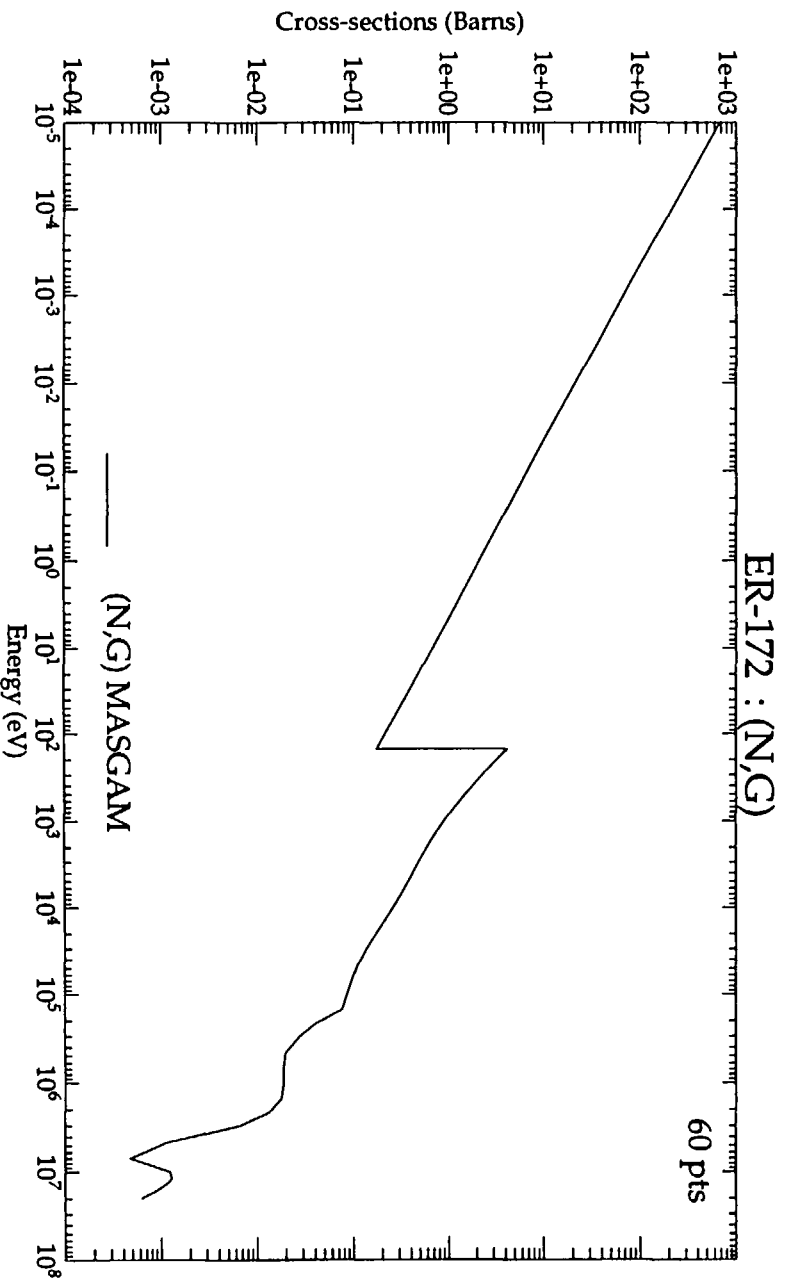
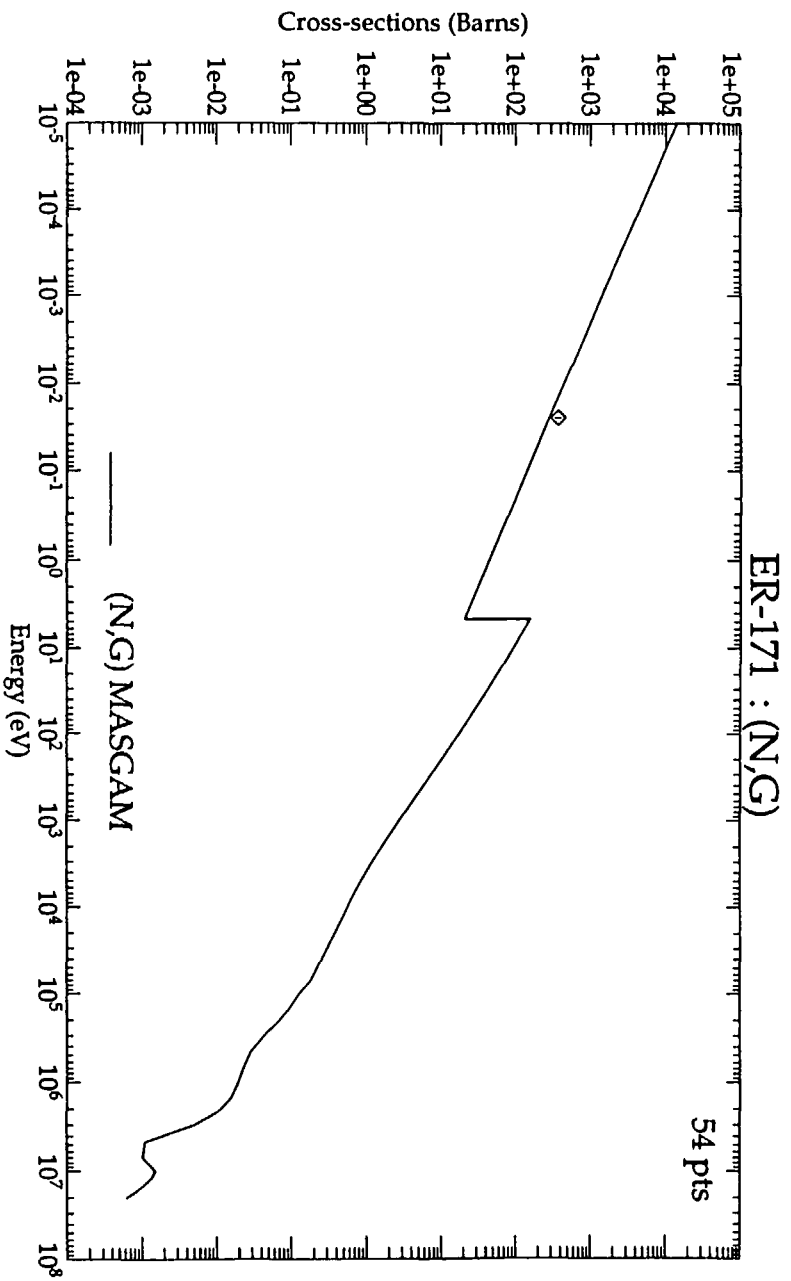


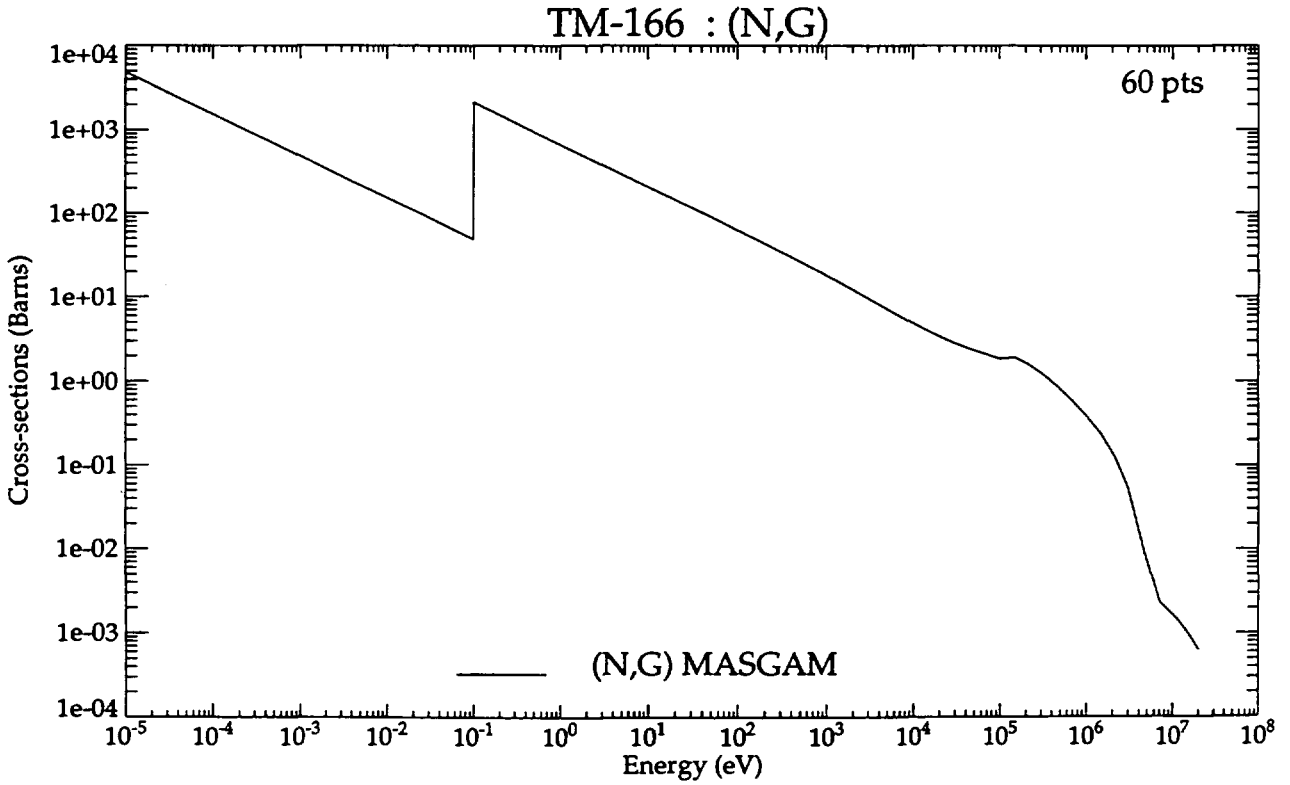
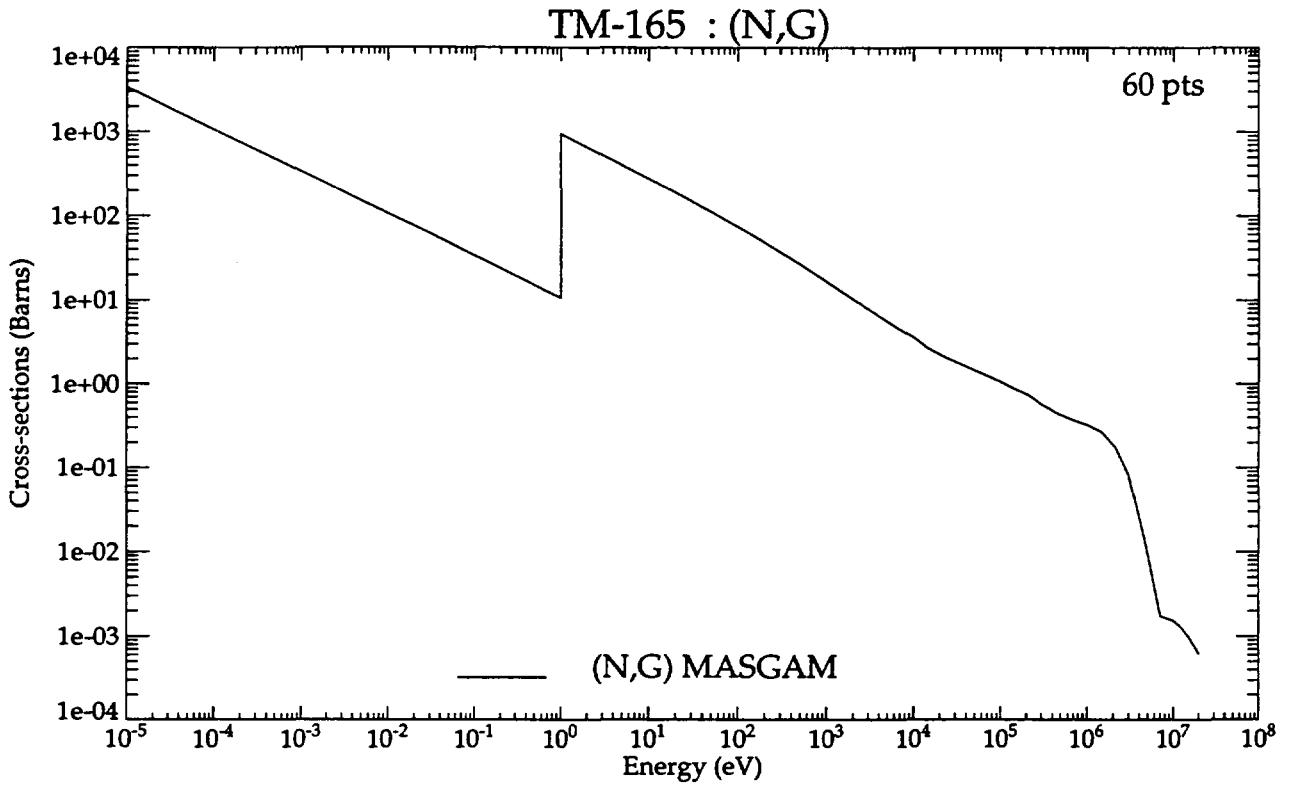


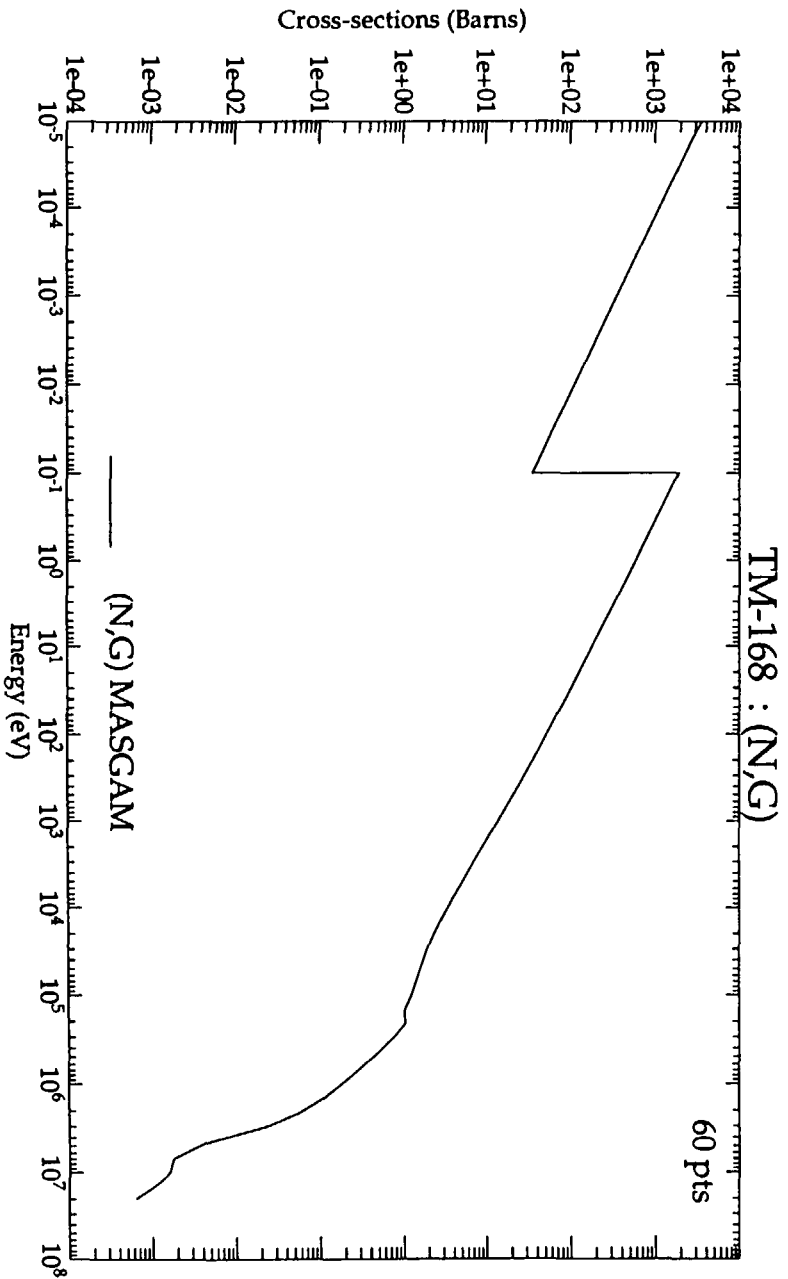
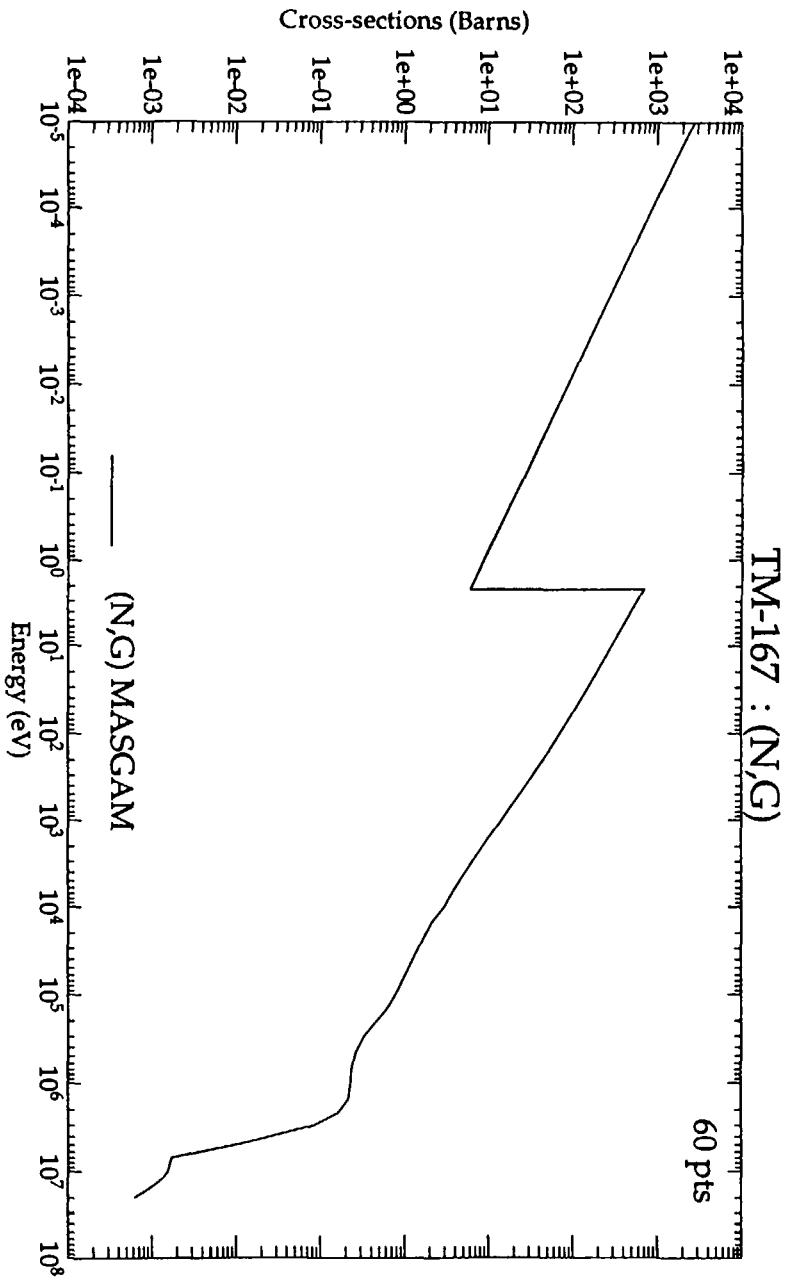


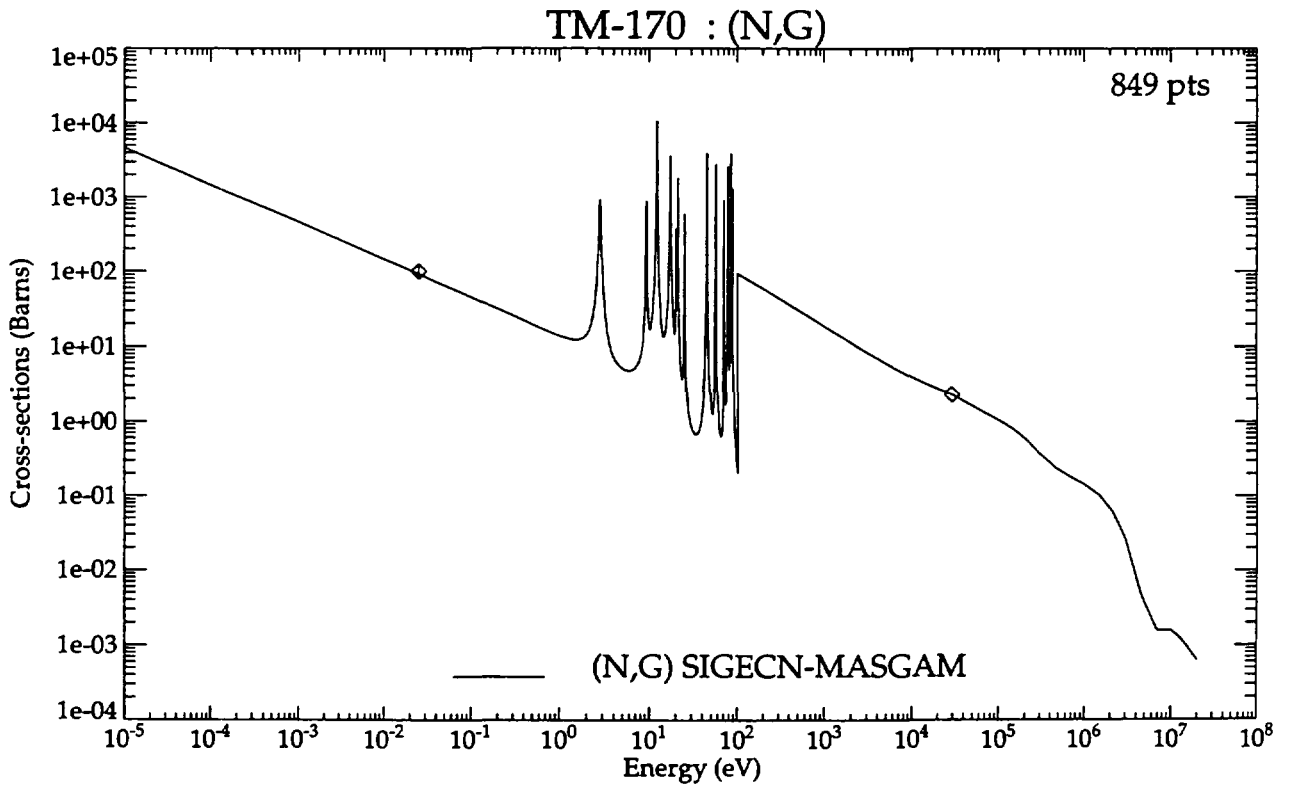
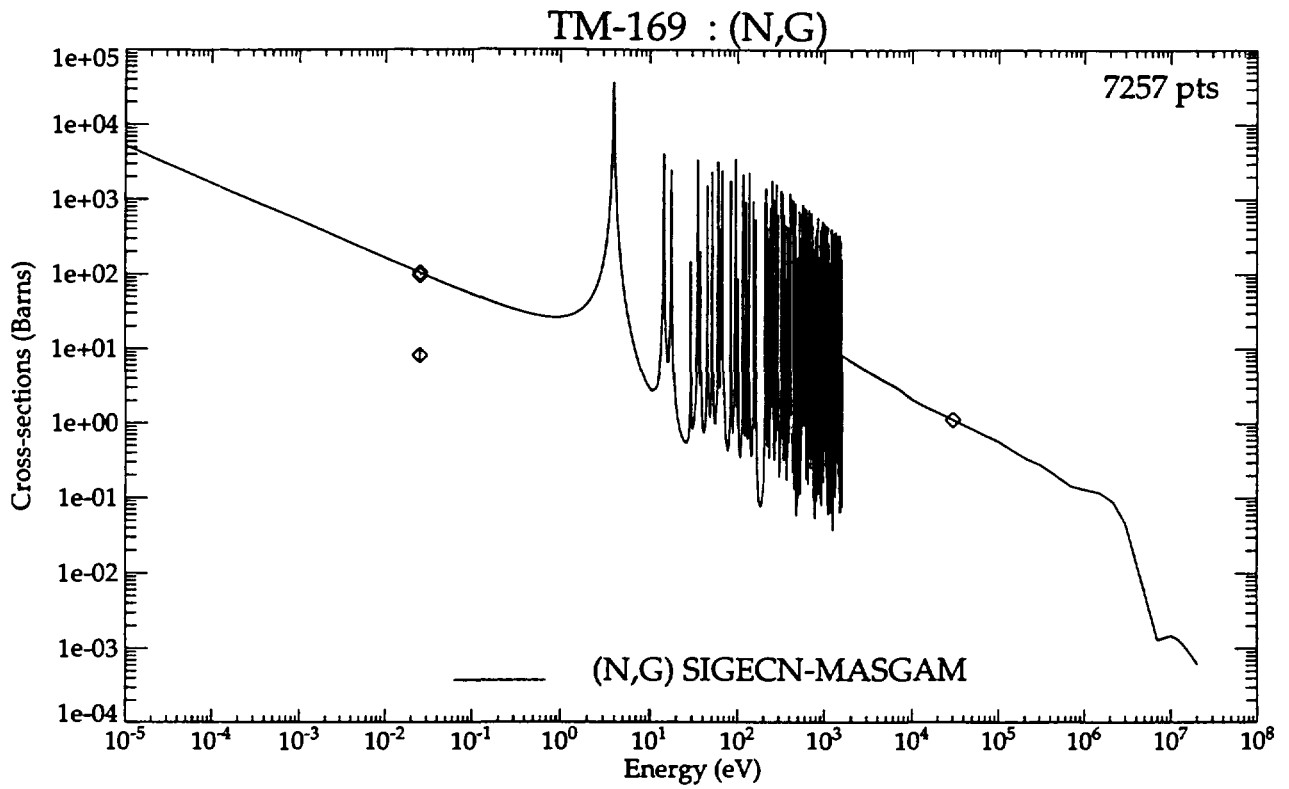


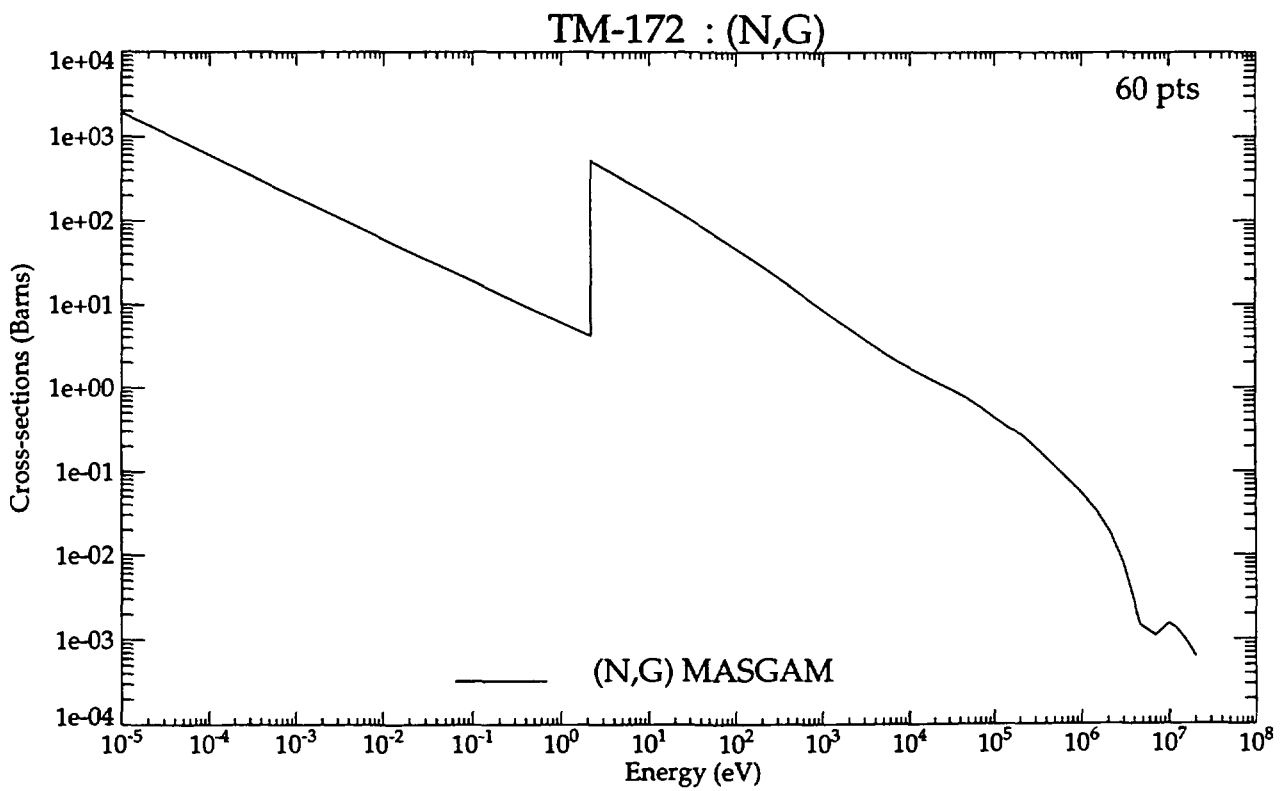
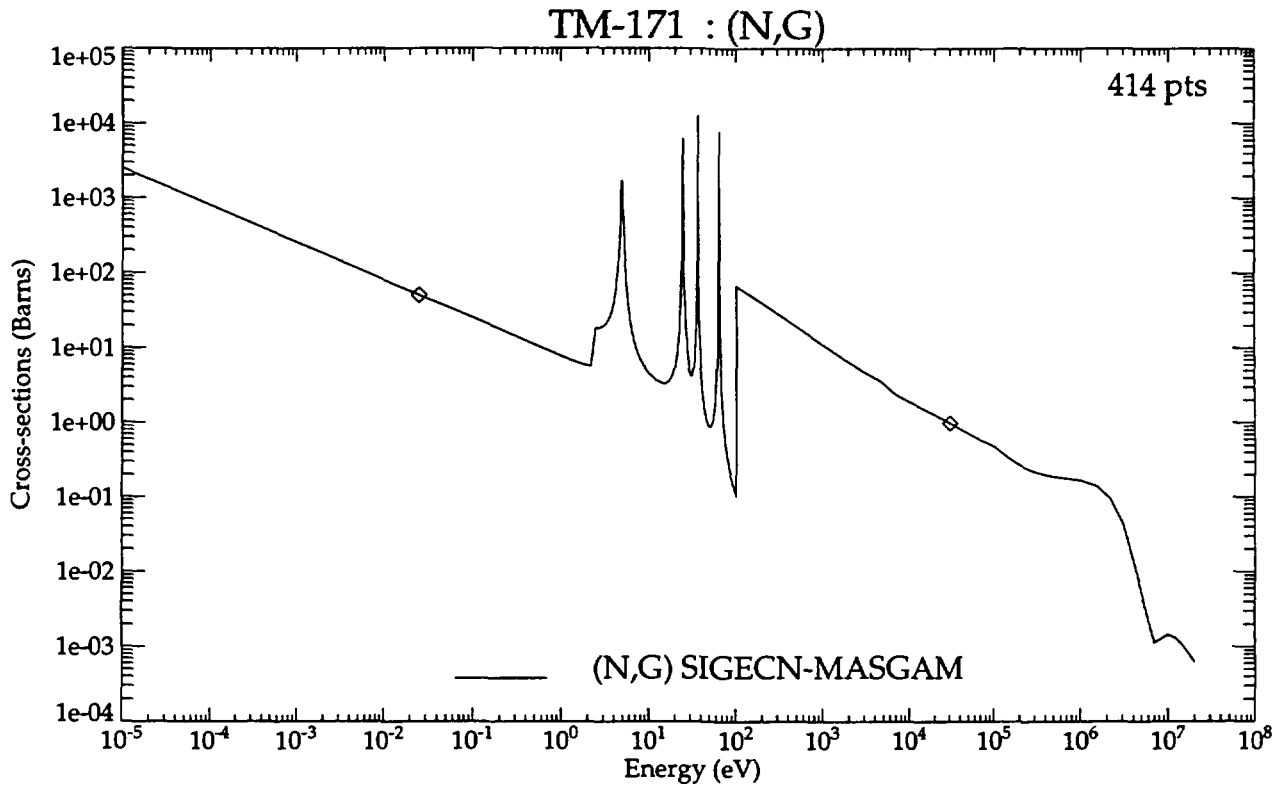


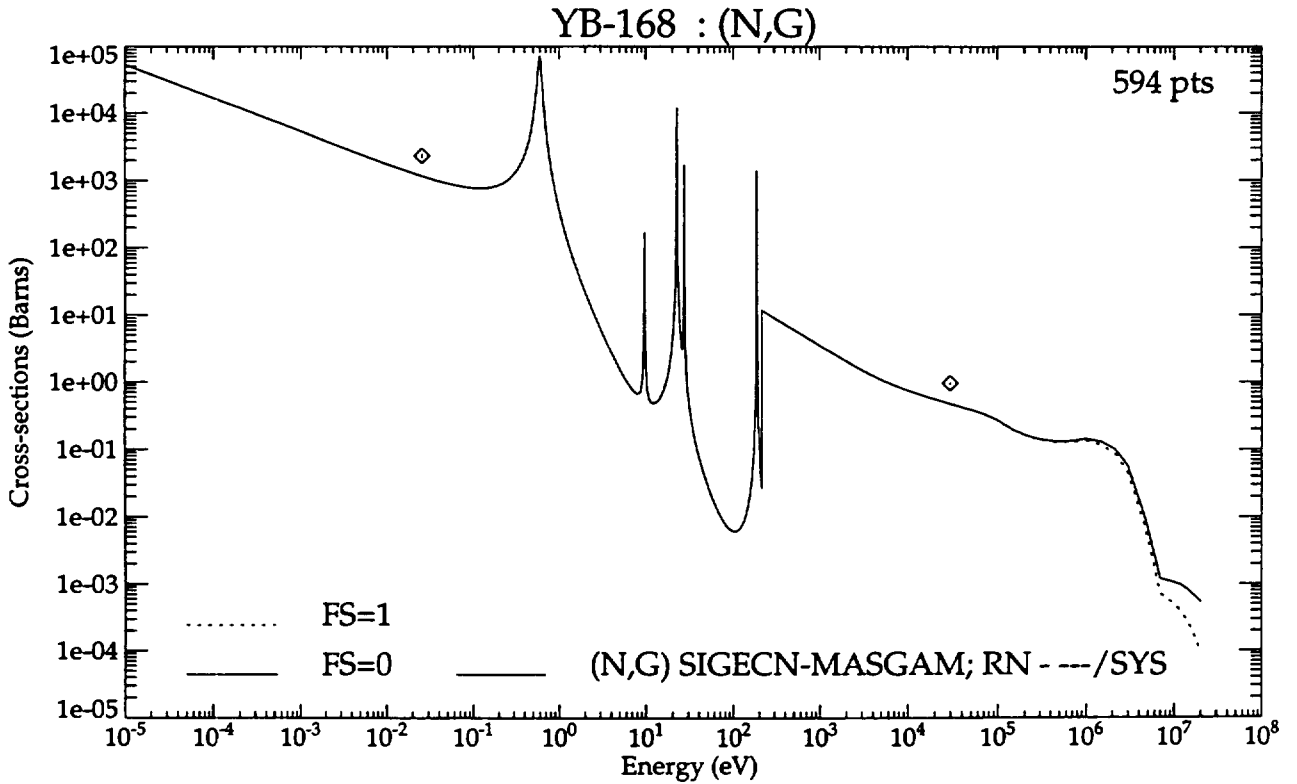
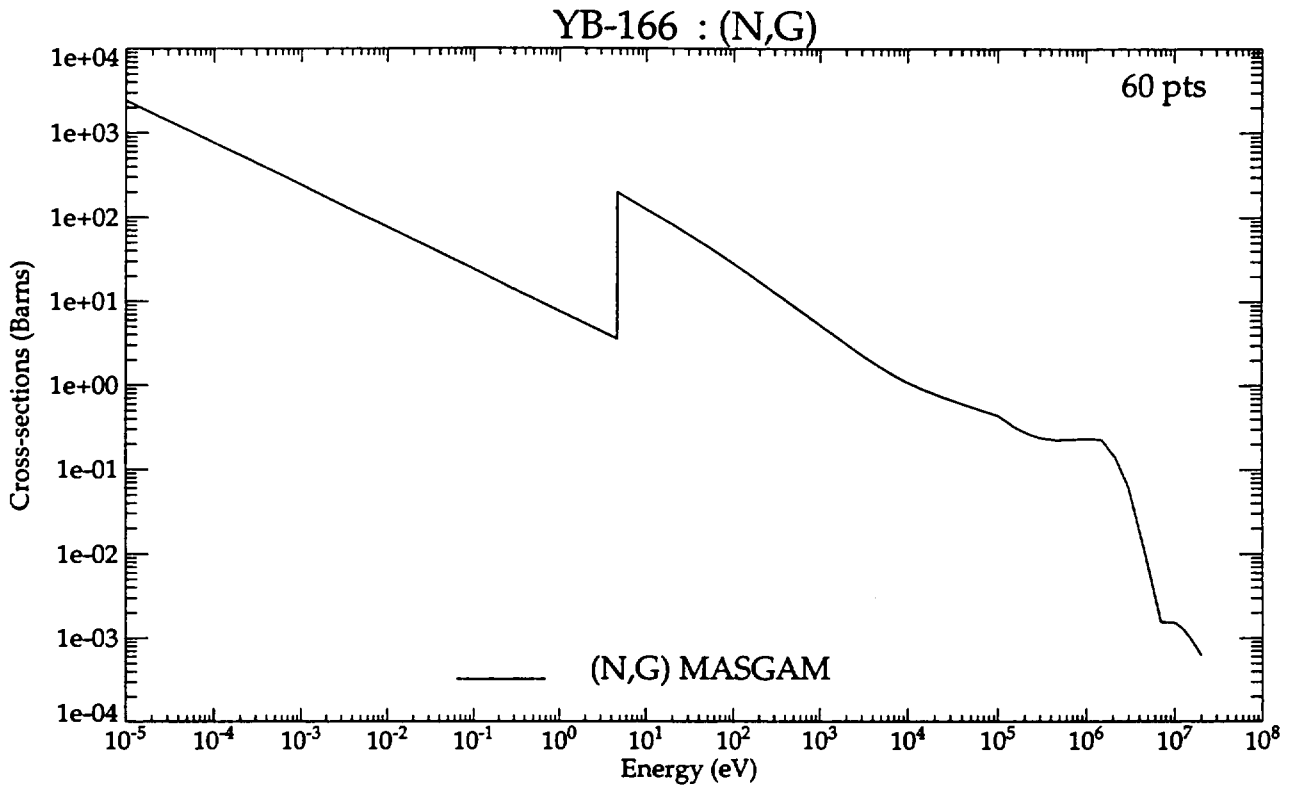


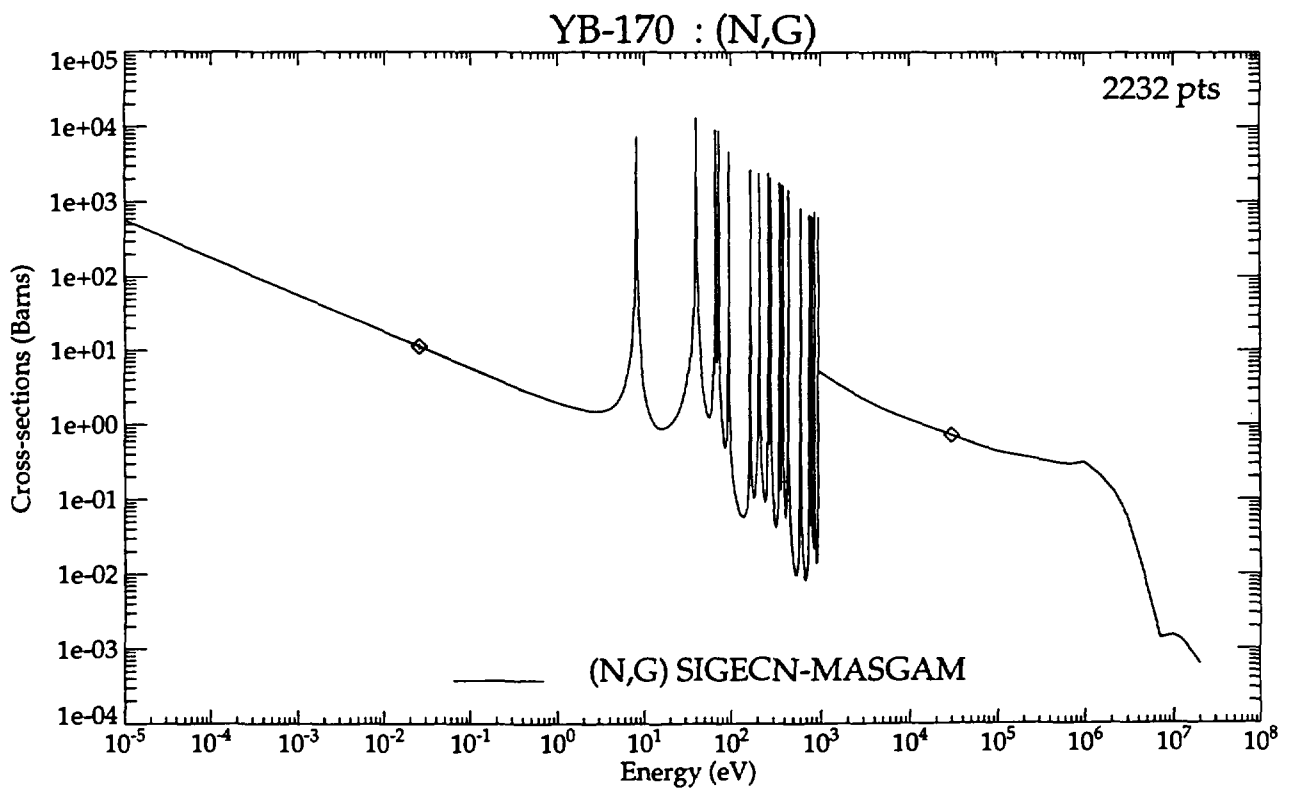
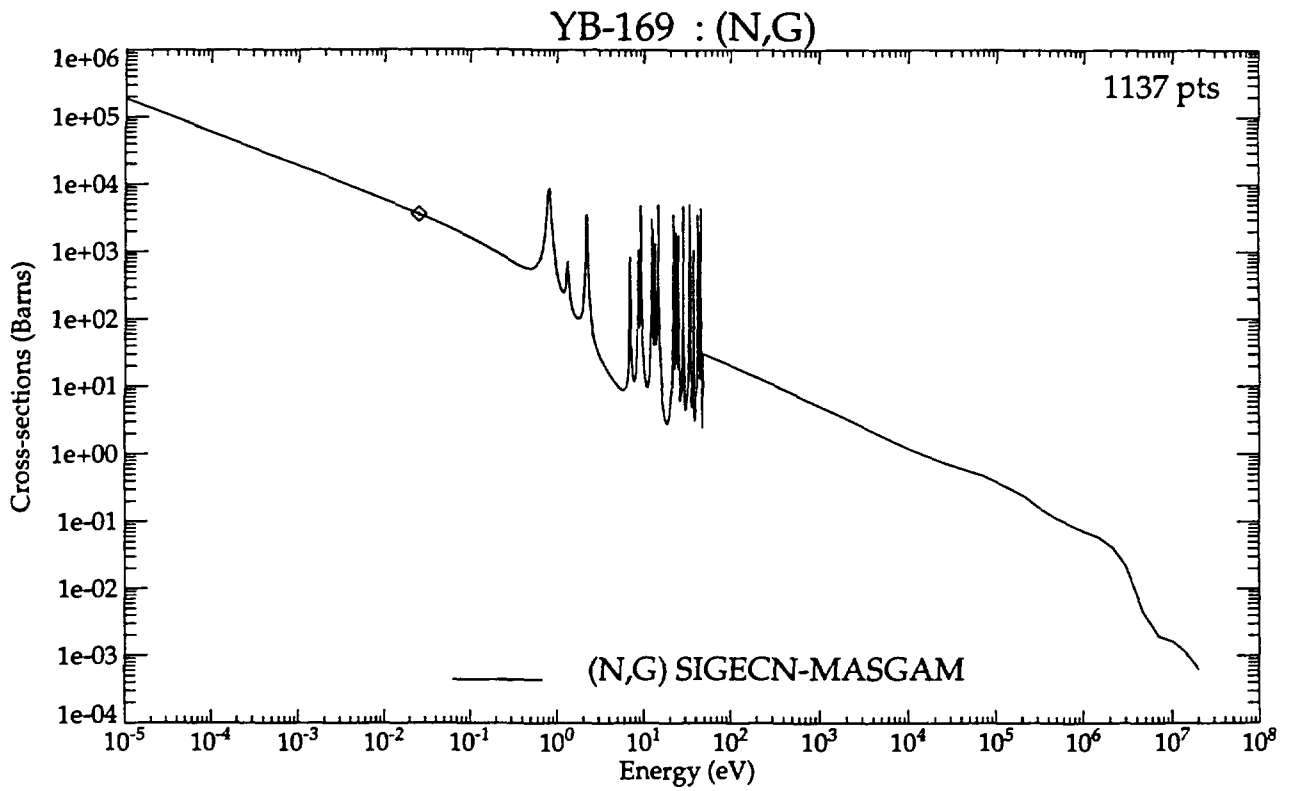


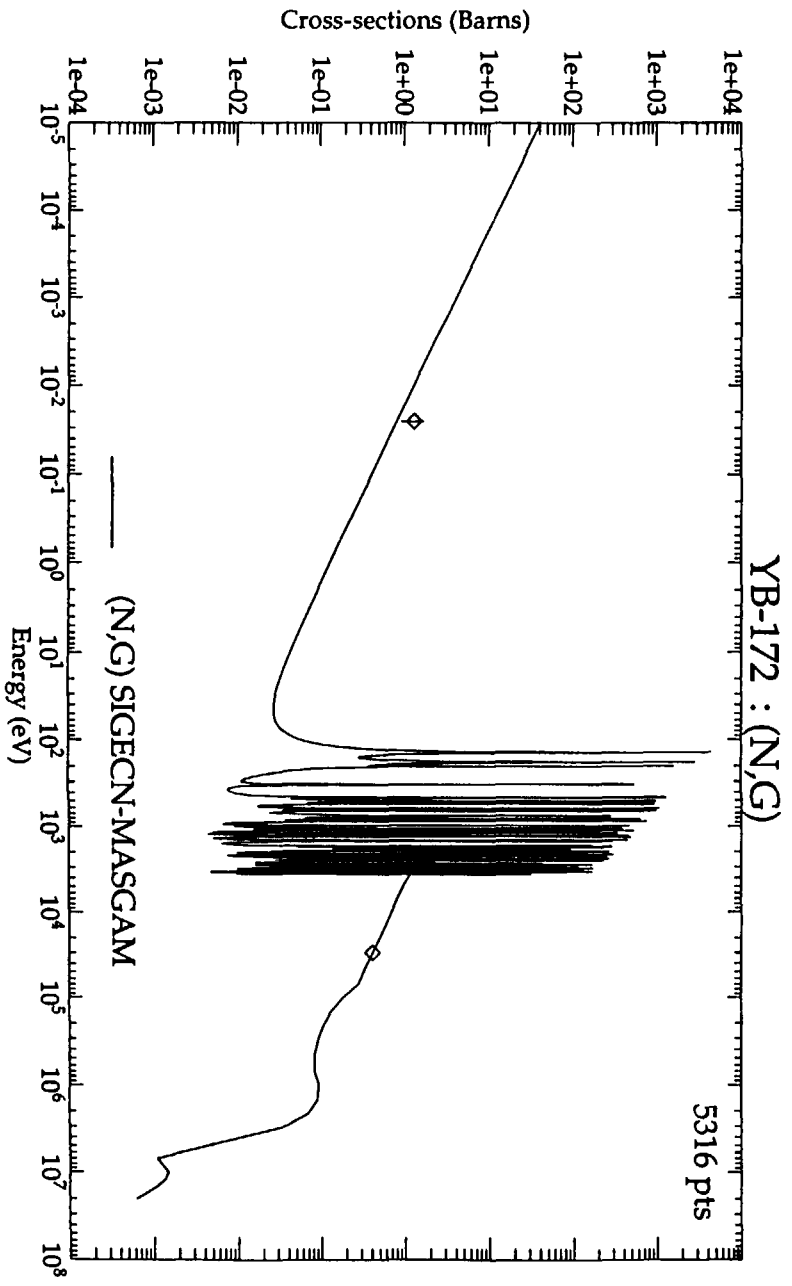
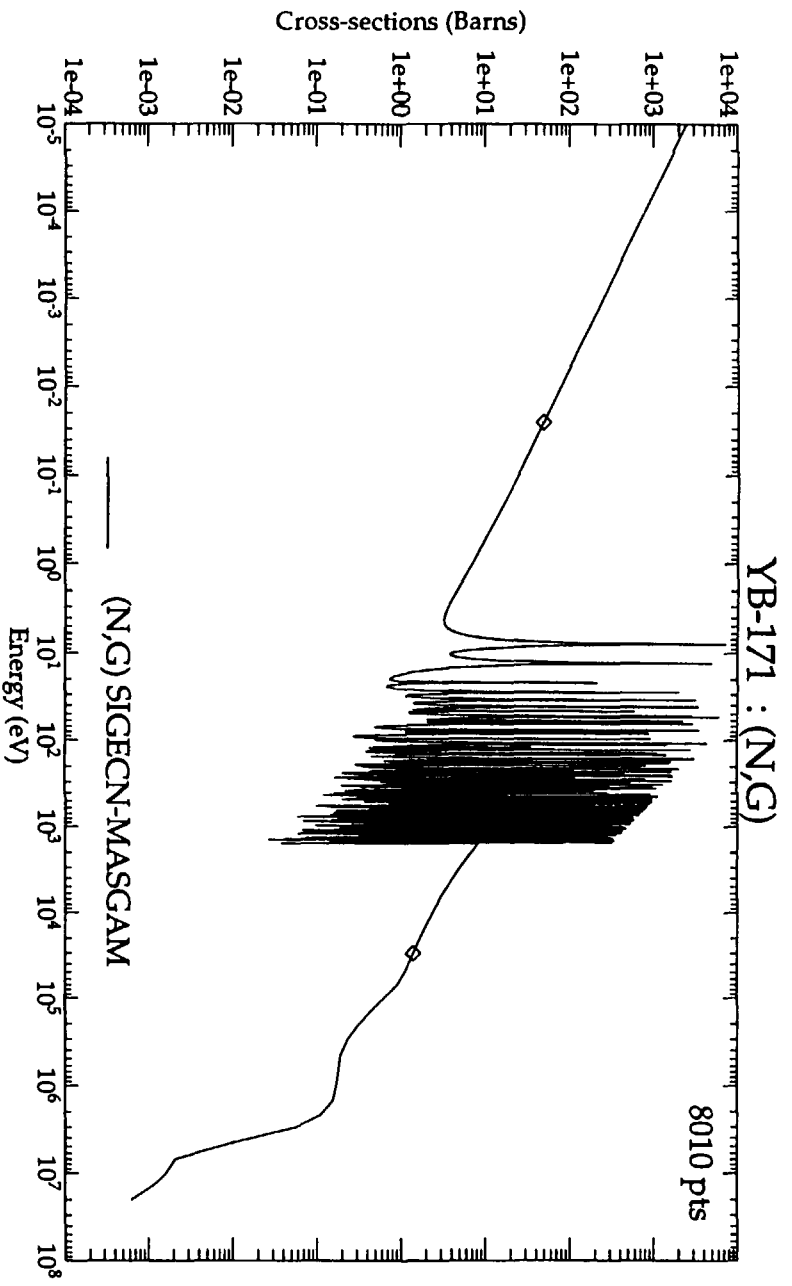


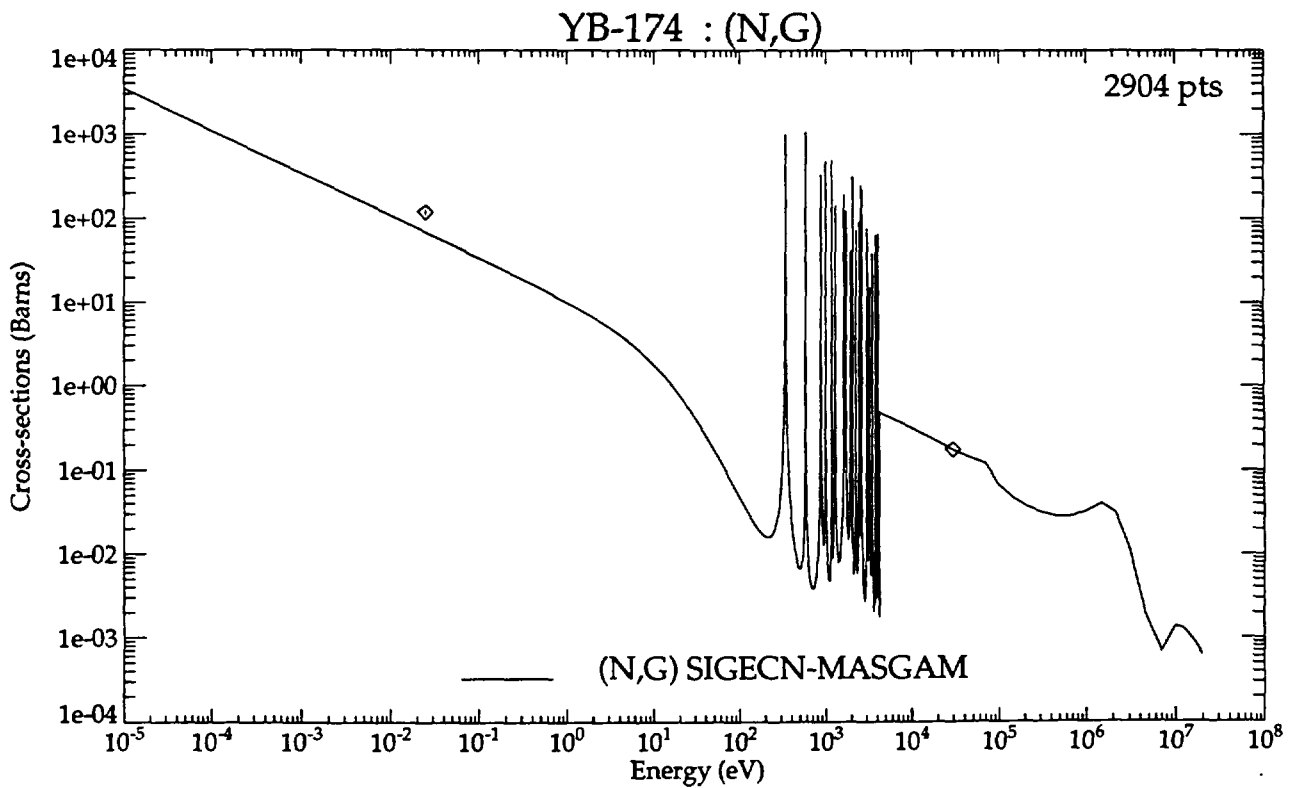
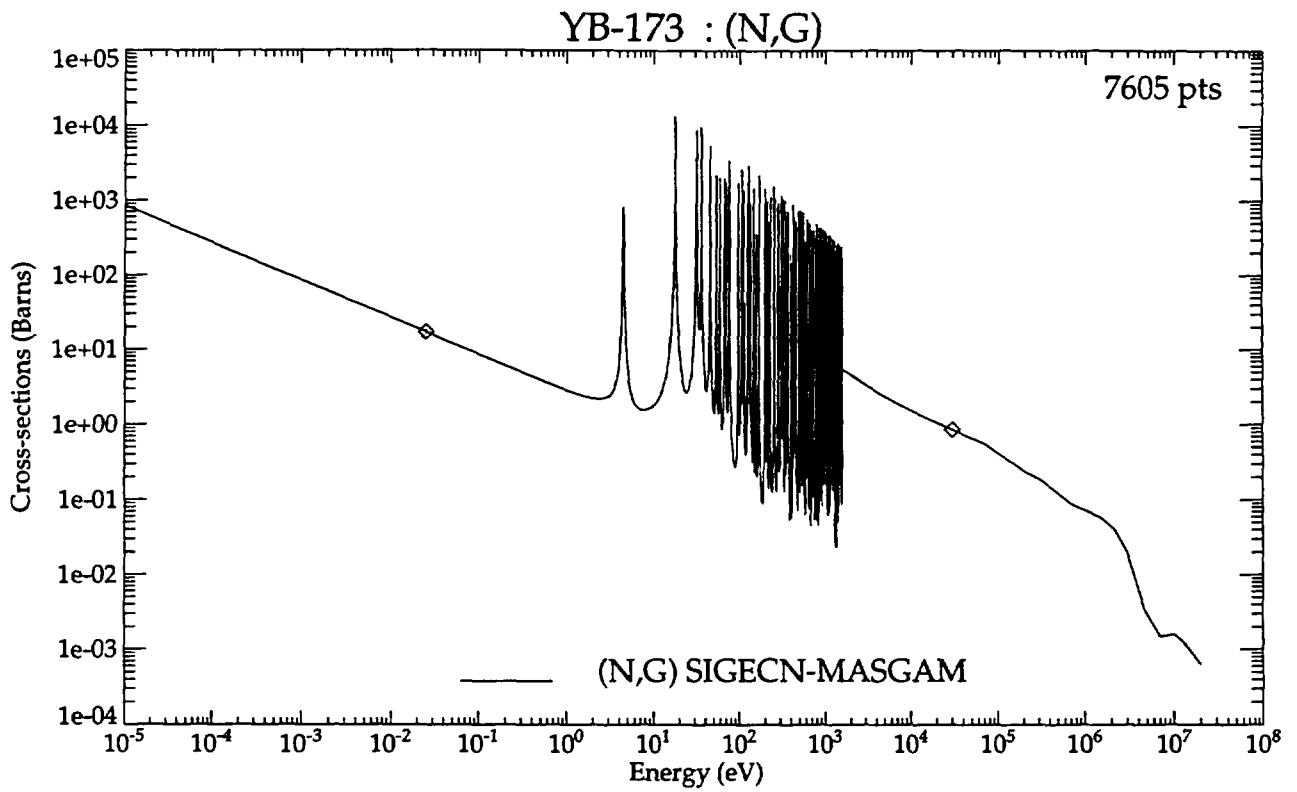


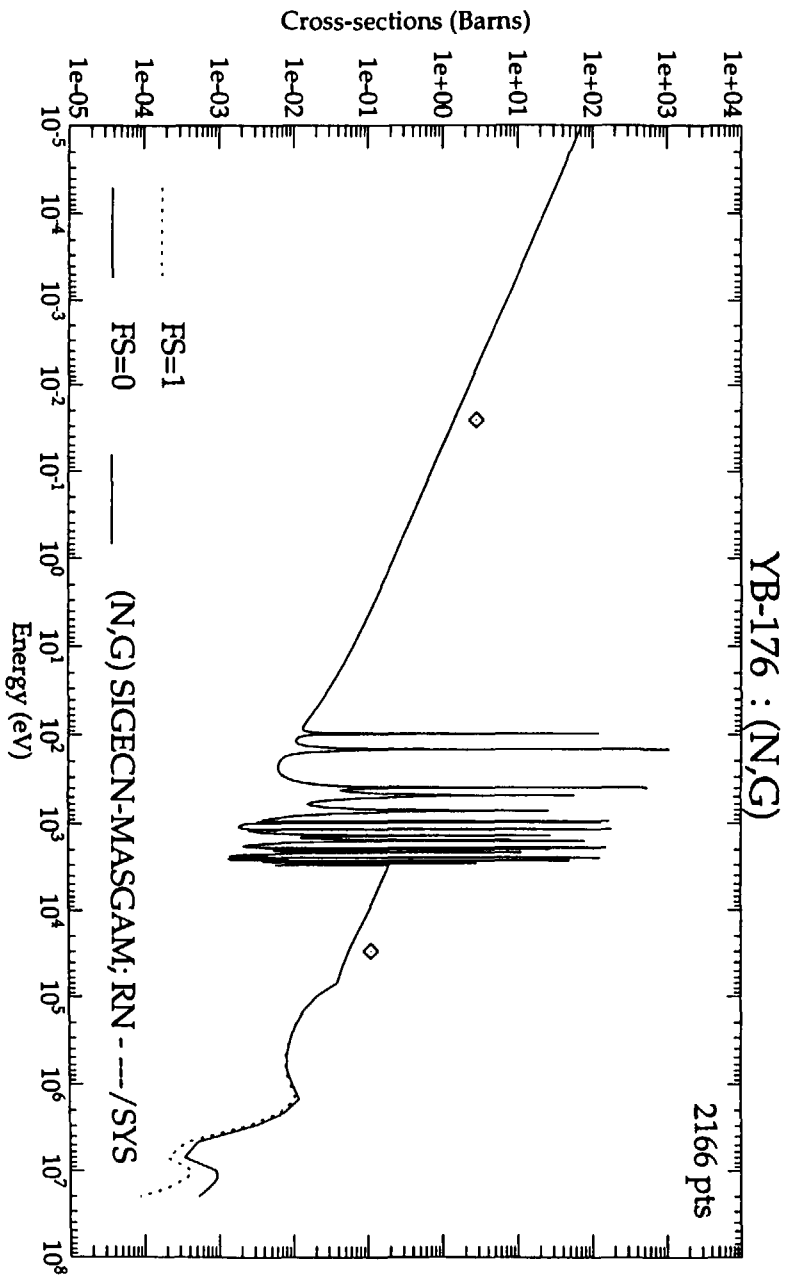
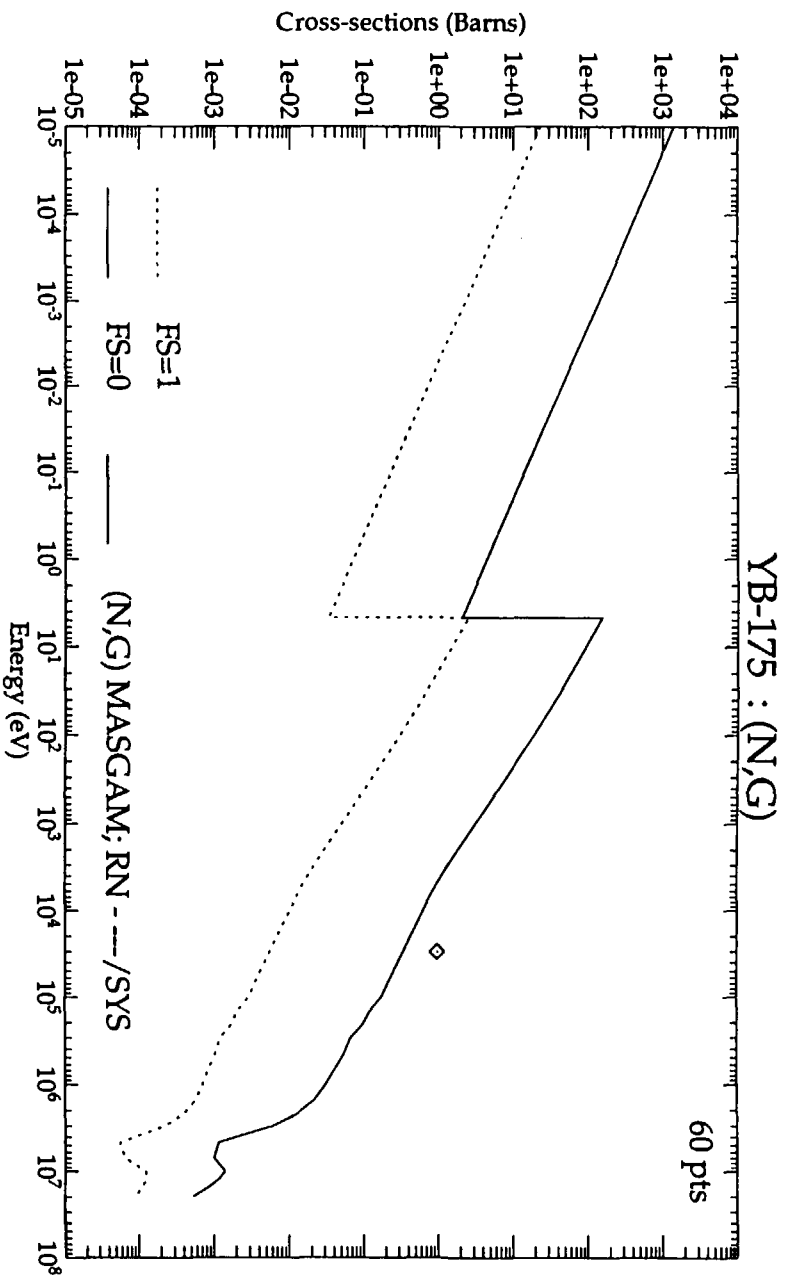


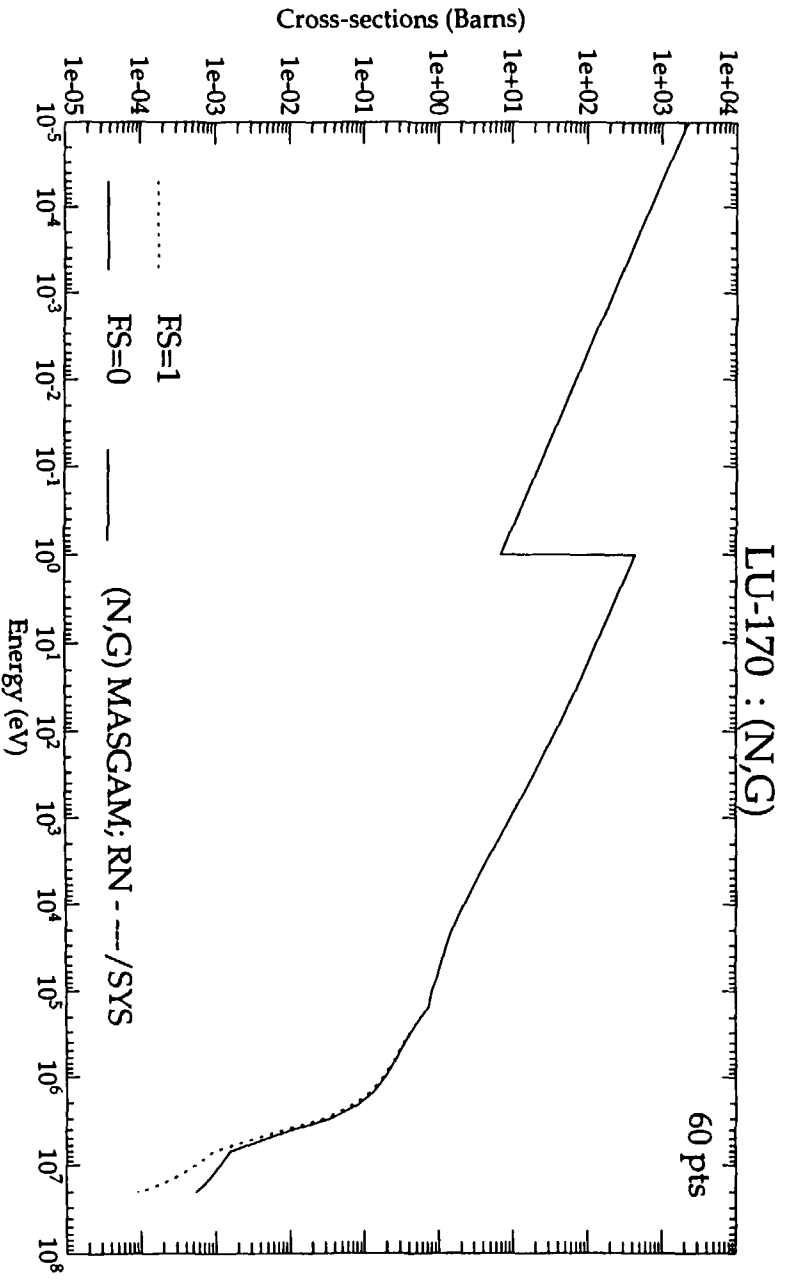
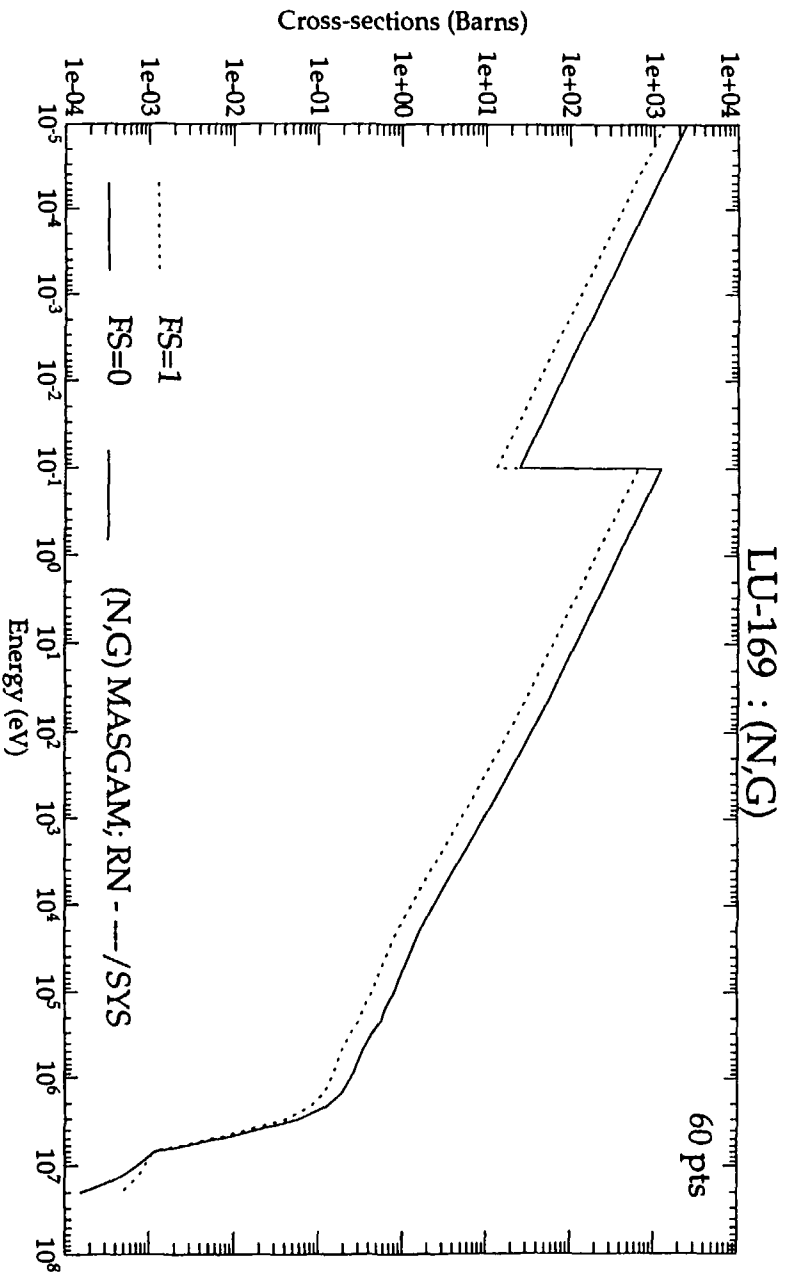


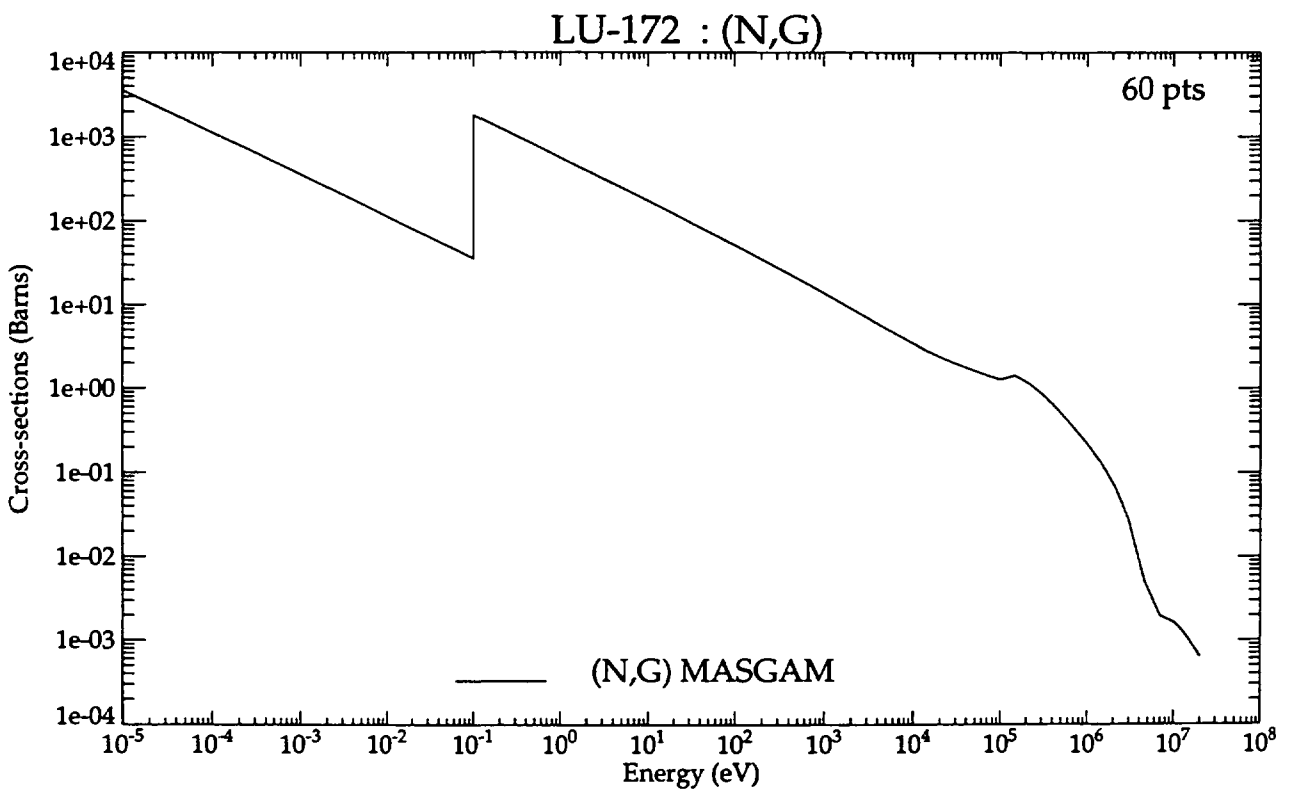
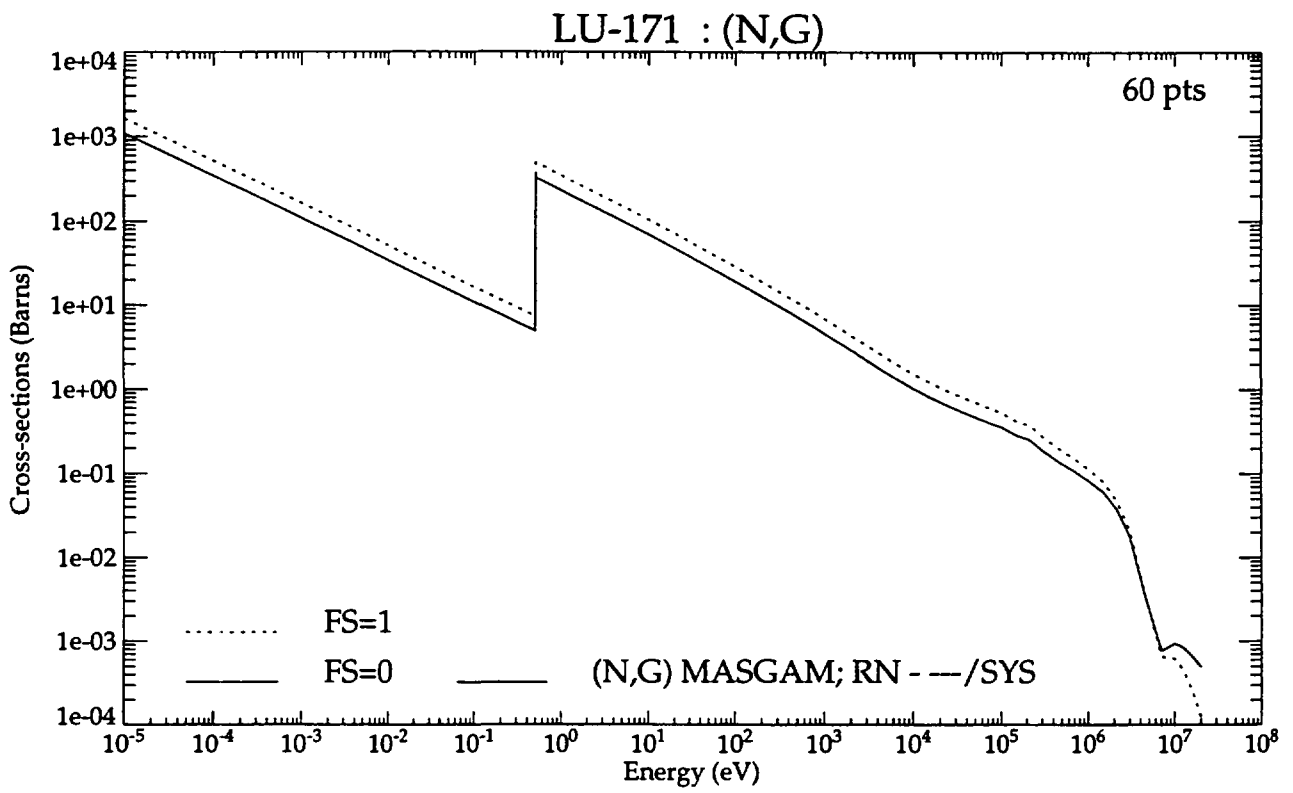


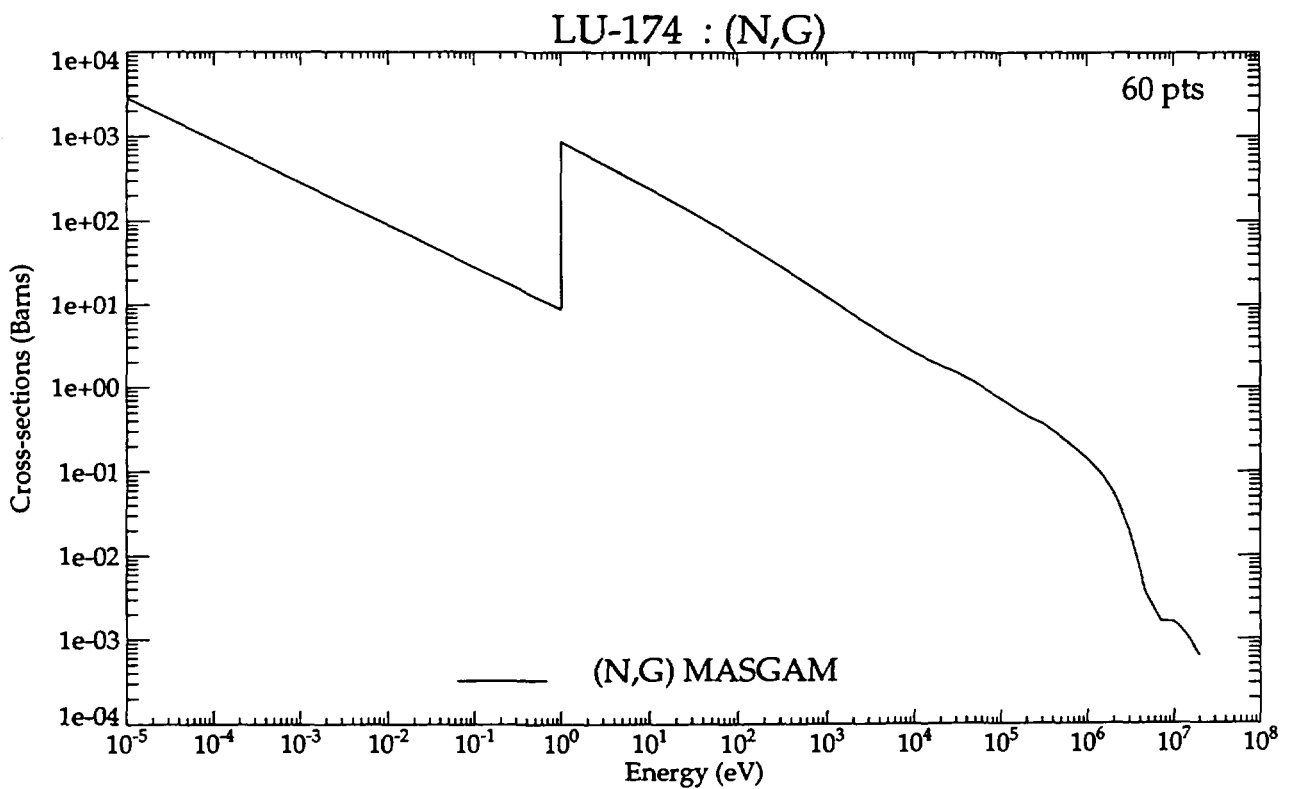
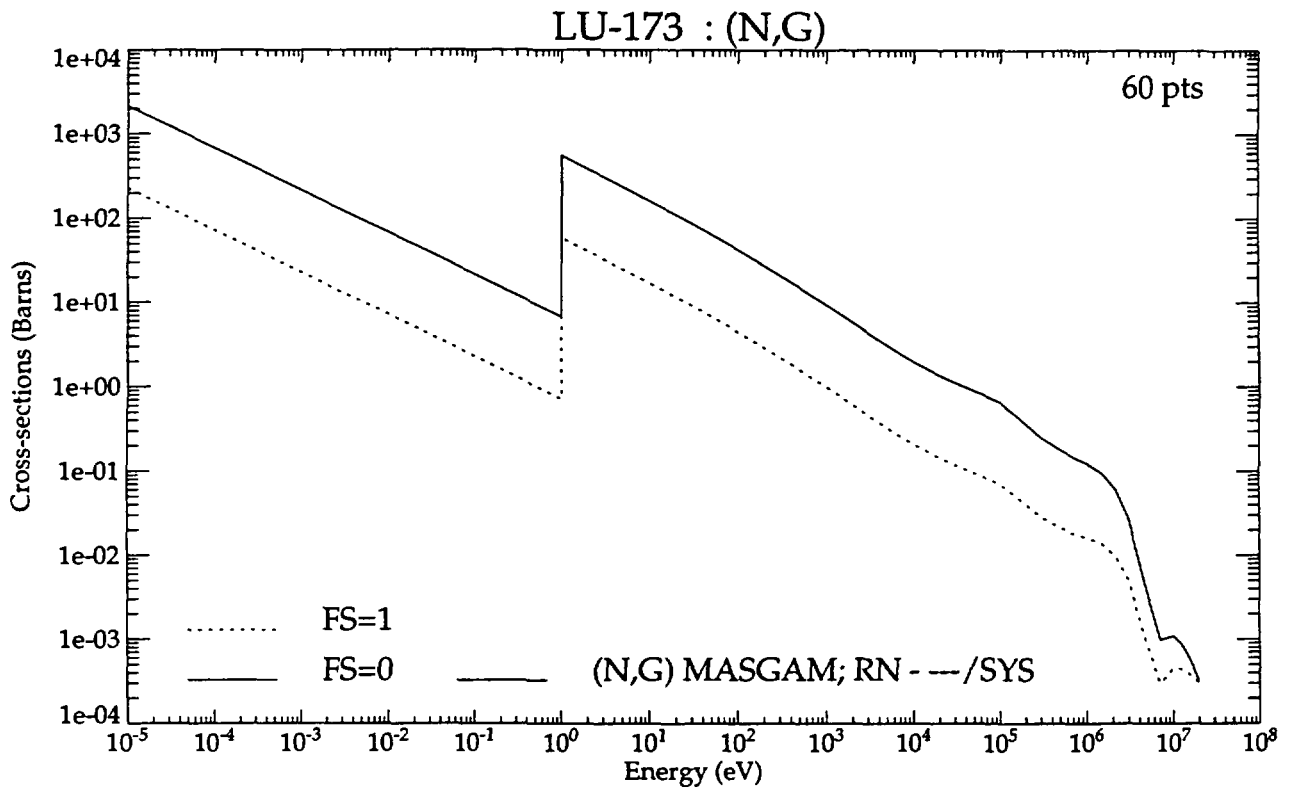


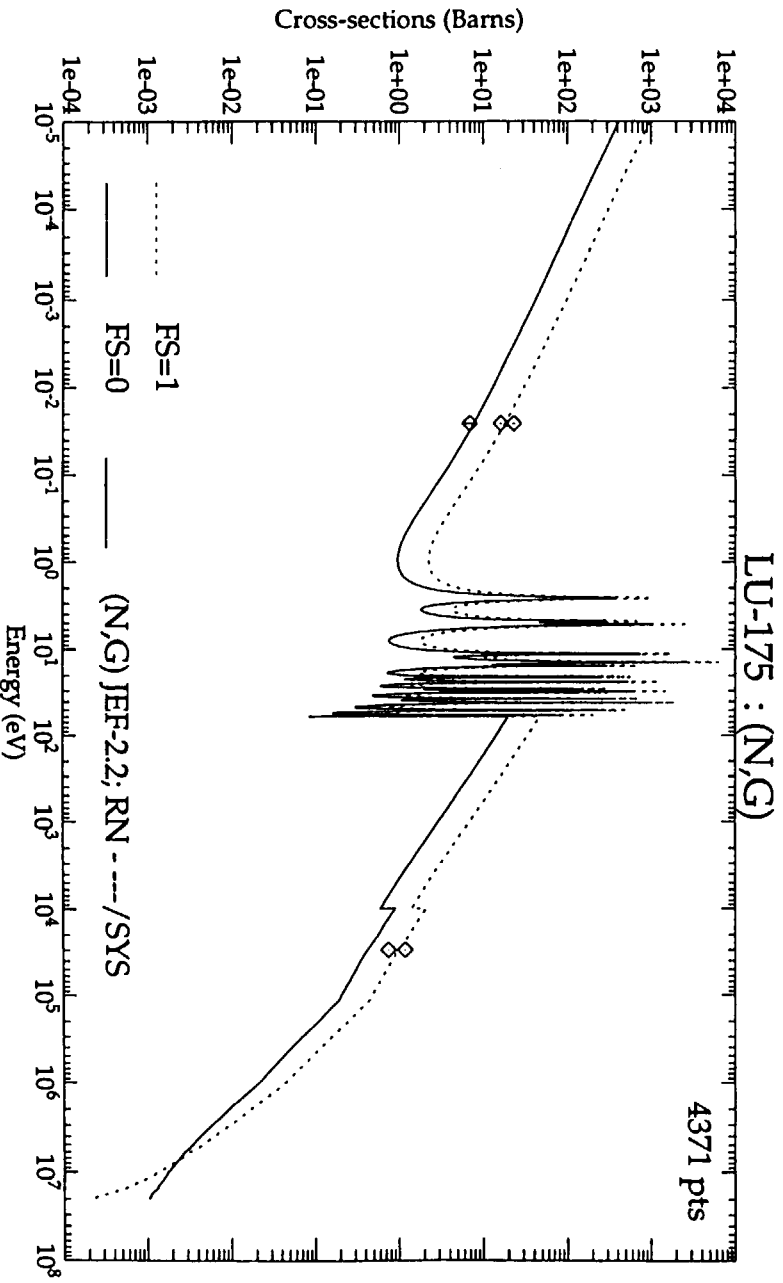
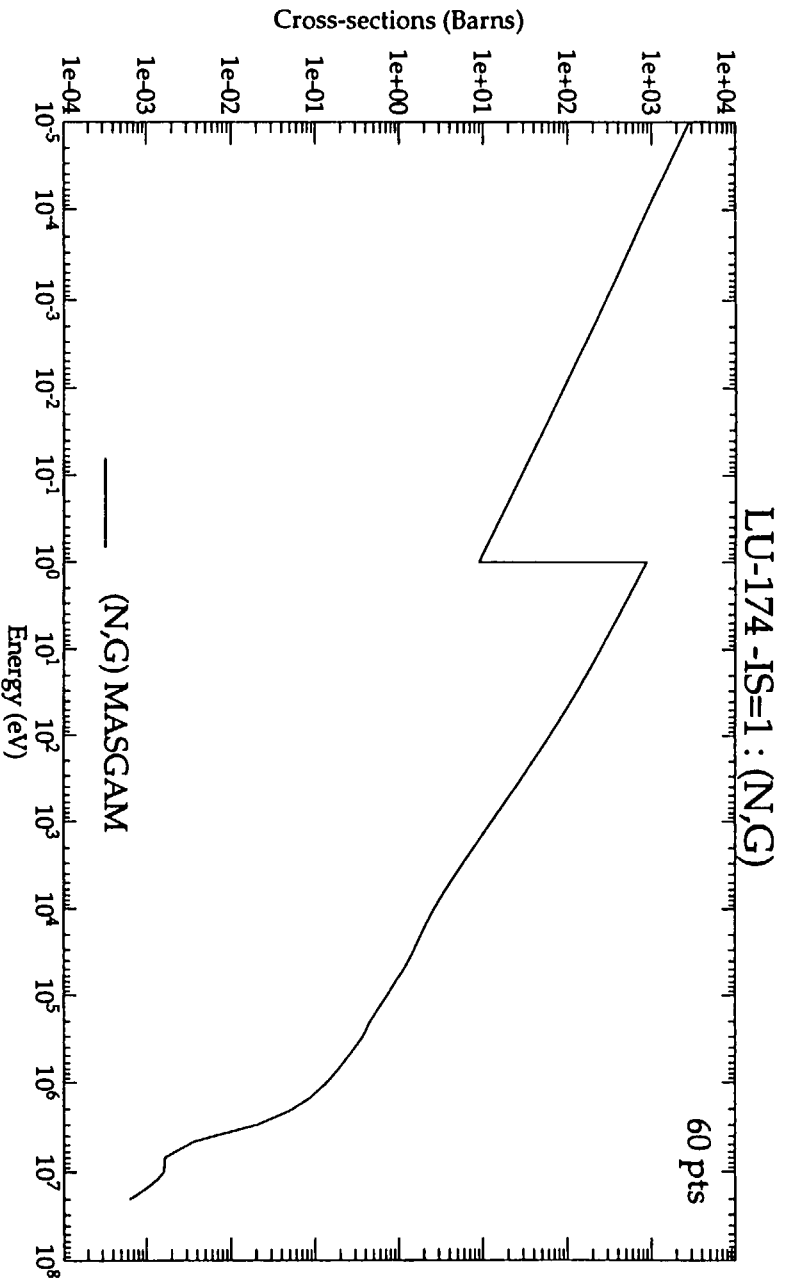


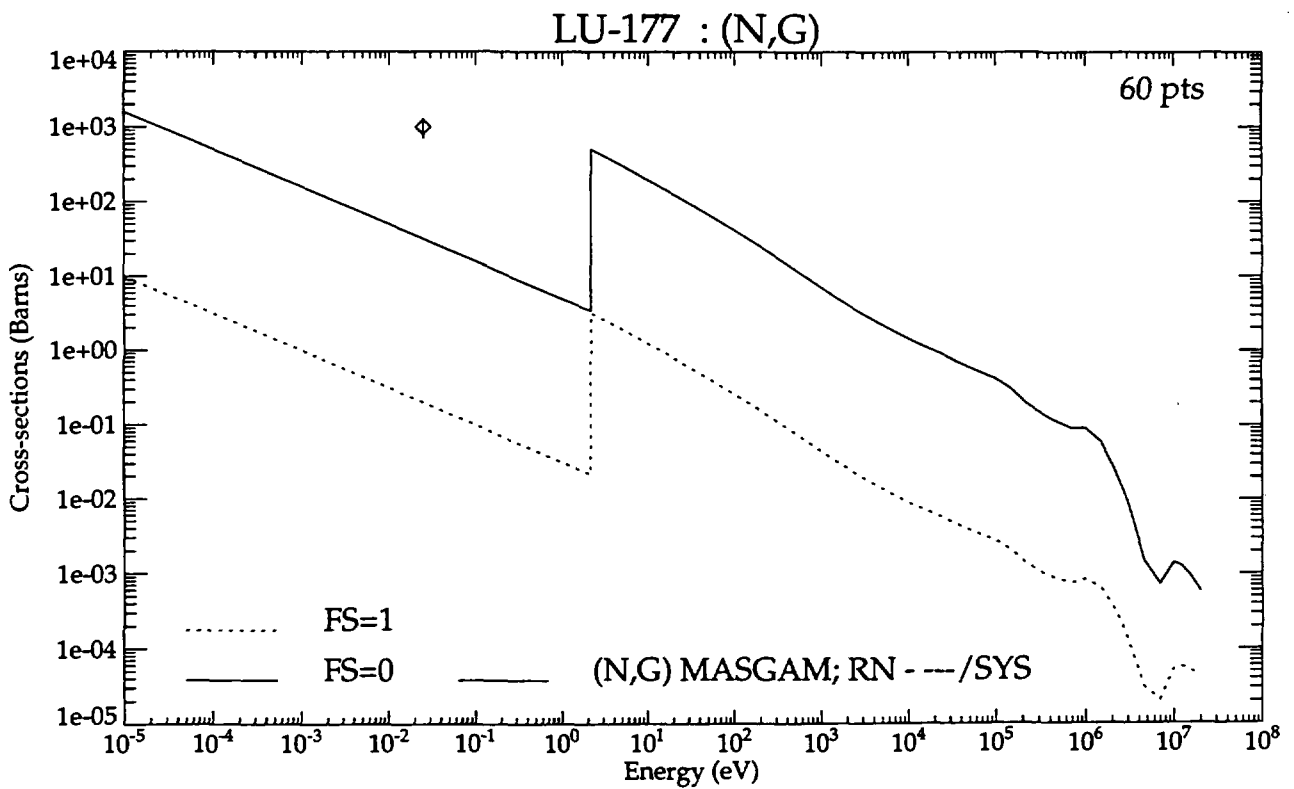
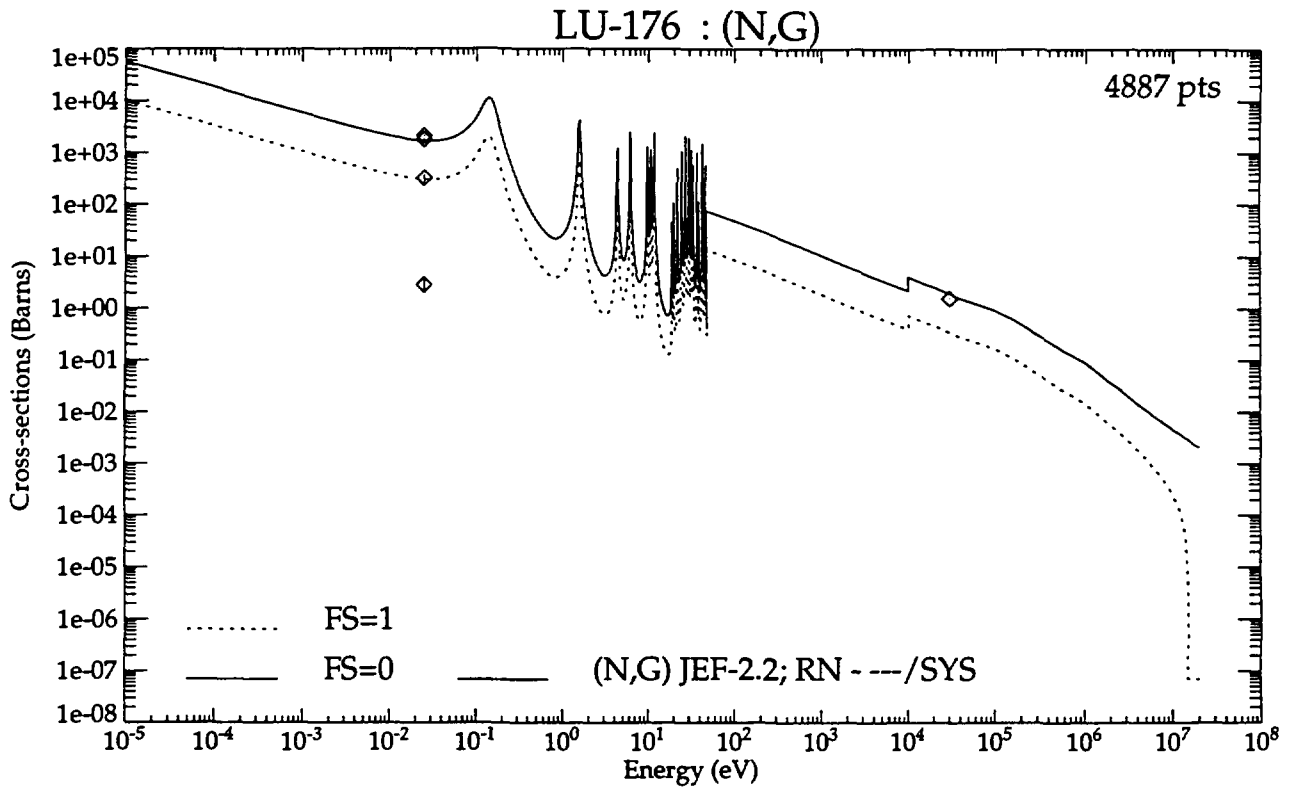




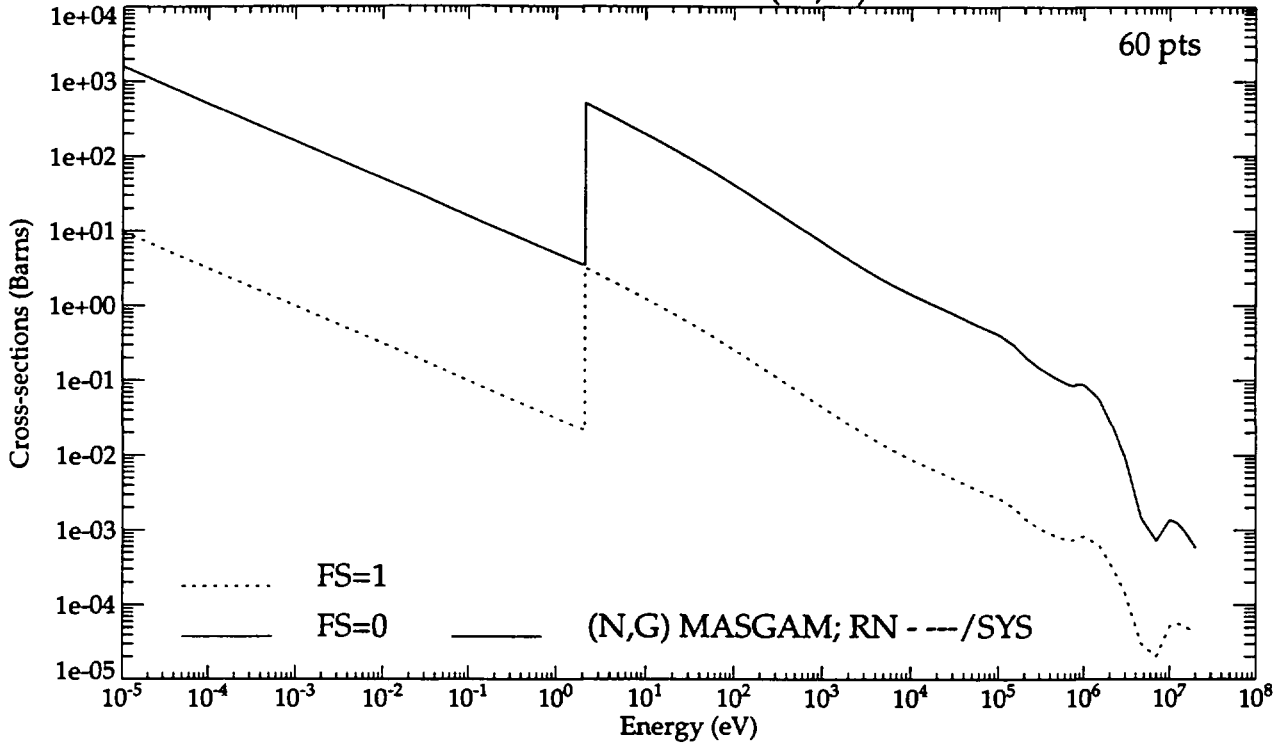




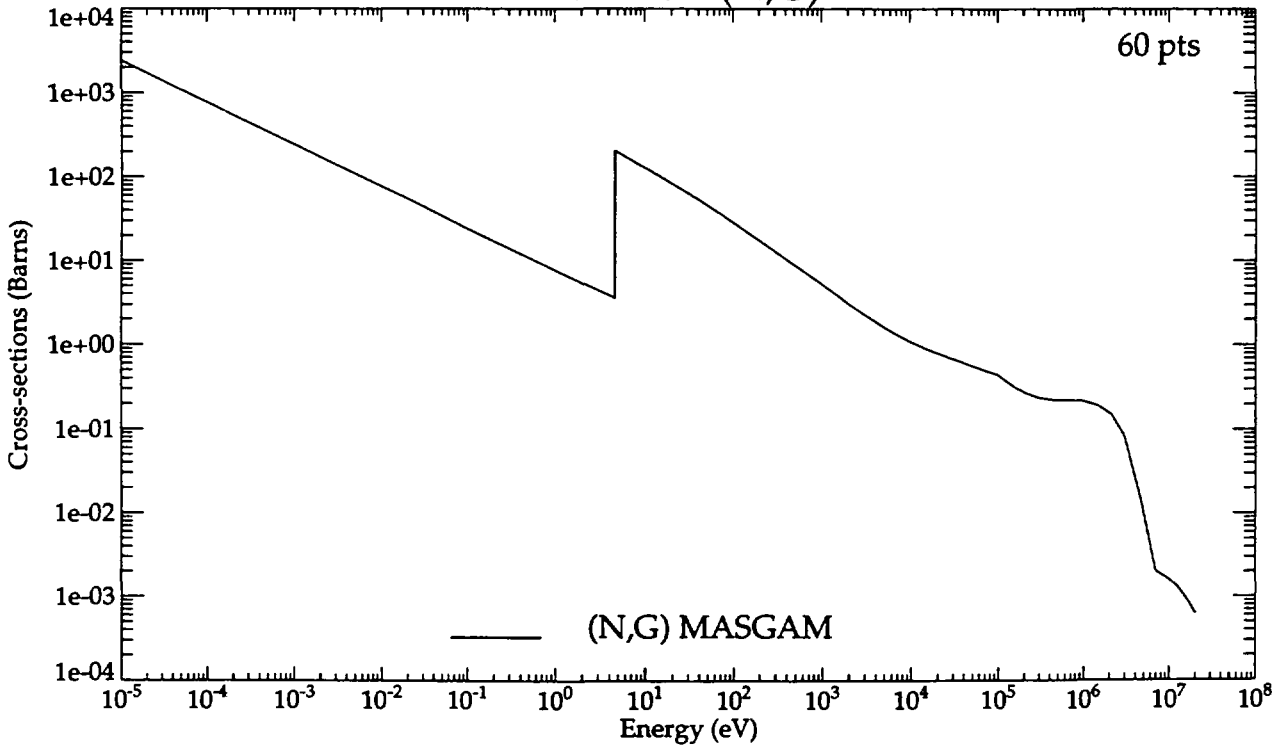


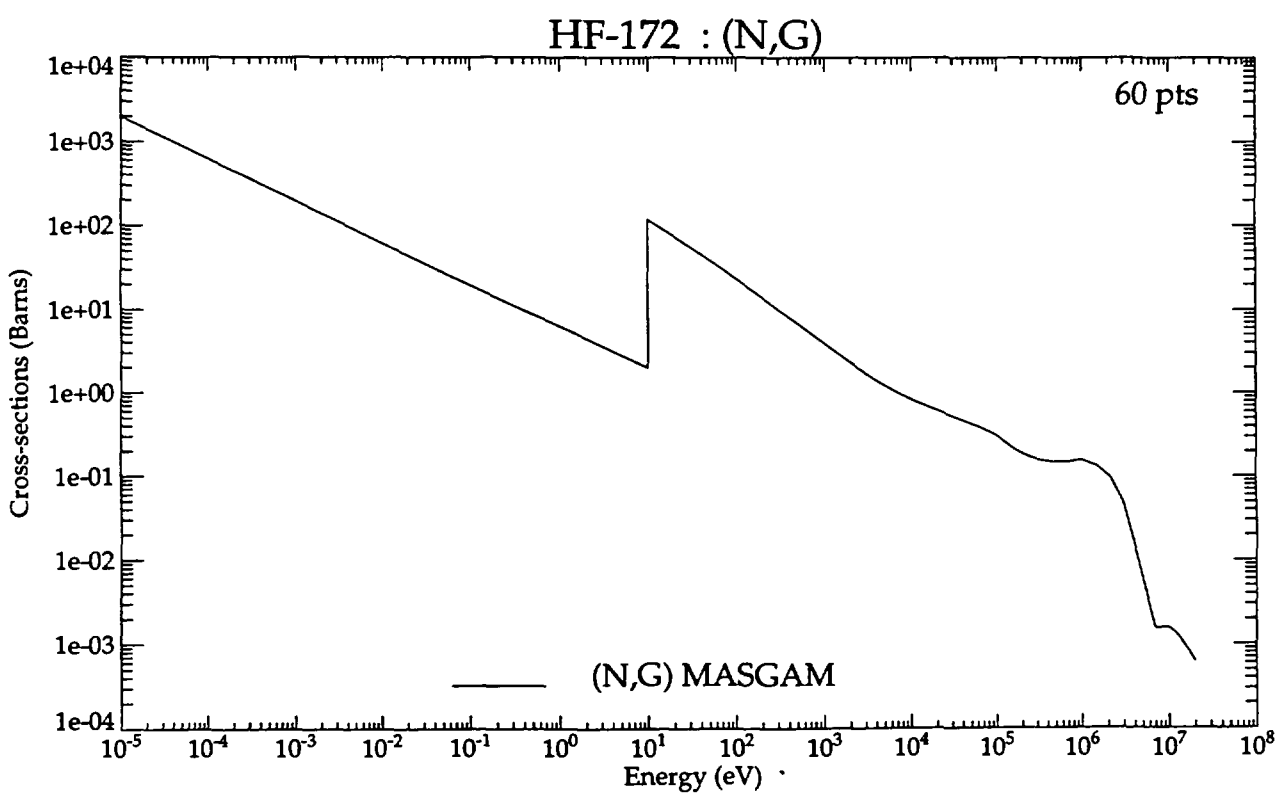
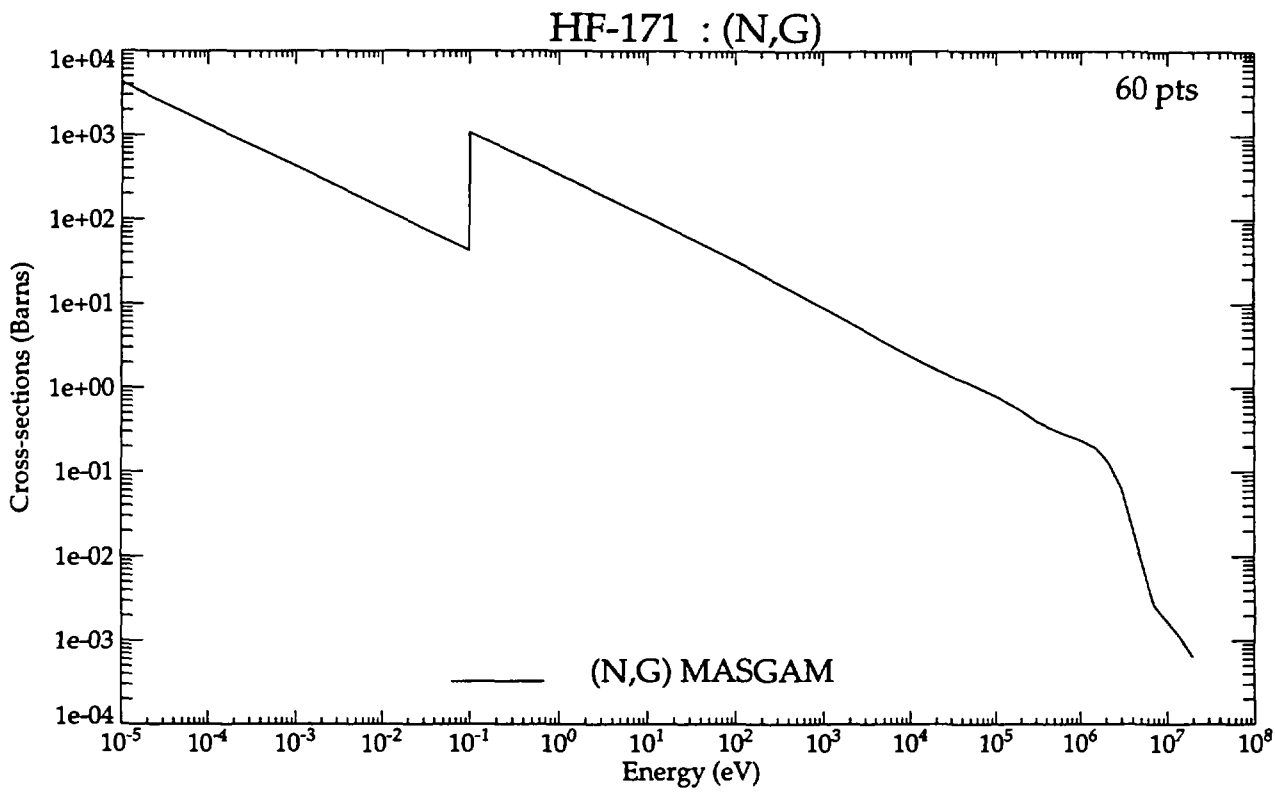


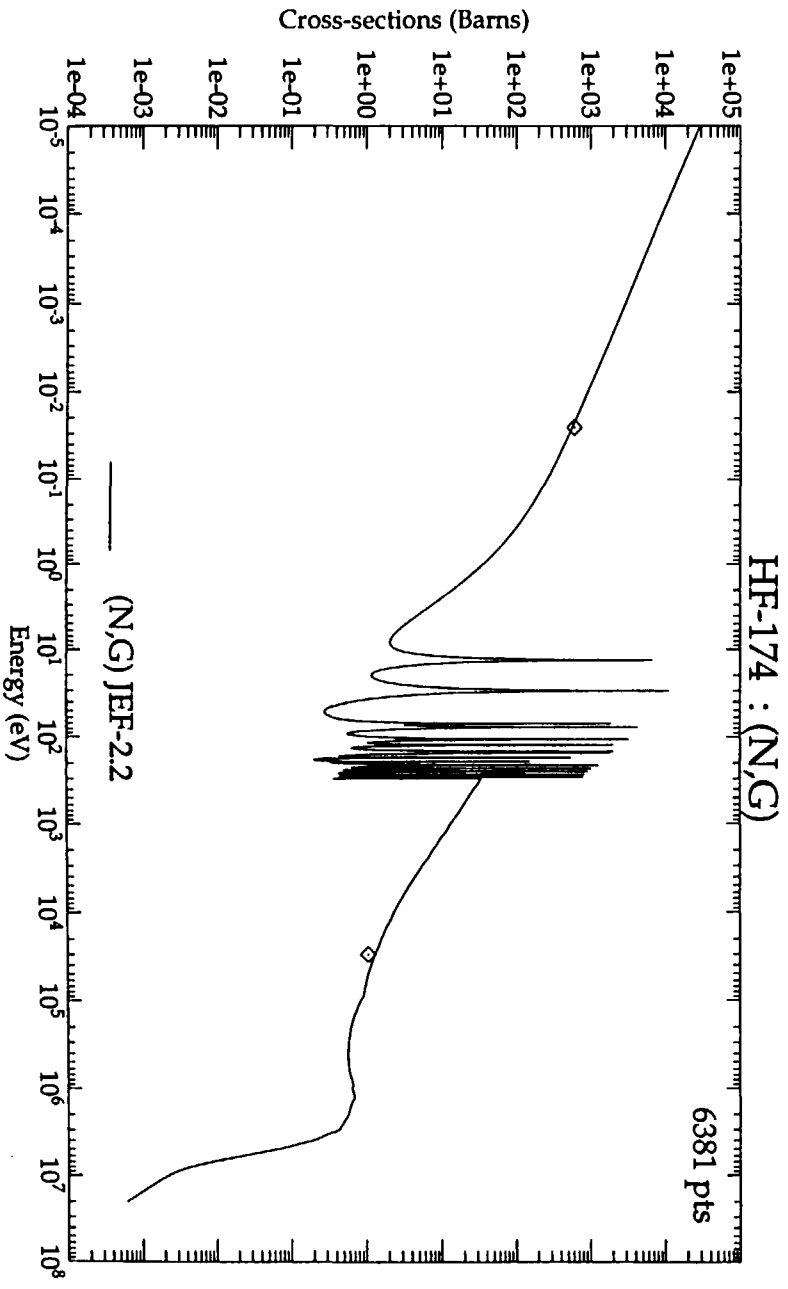
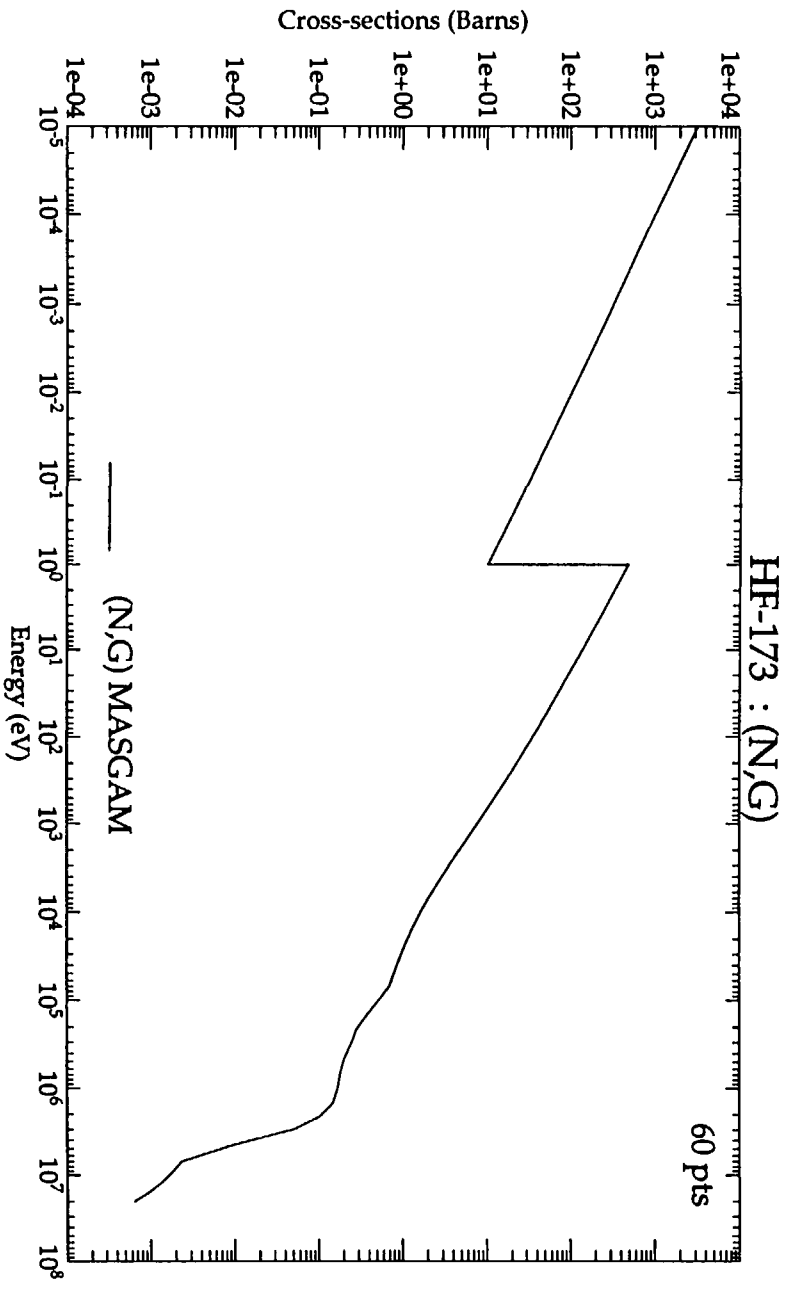
LU-177 -IS=1 : (N,G)

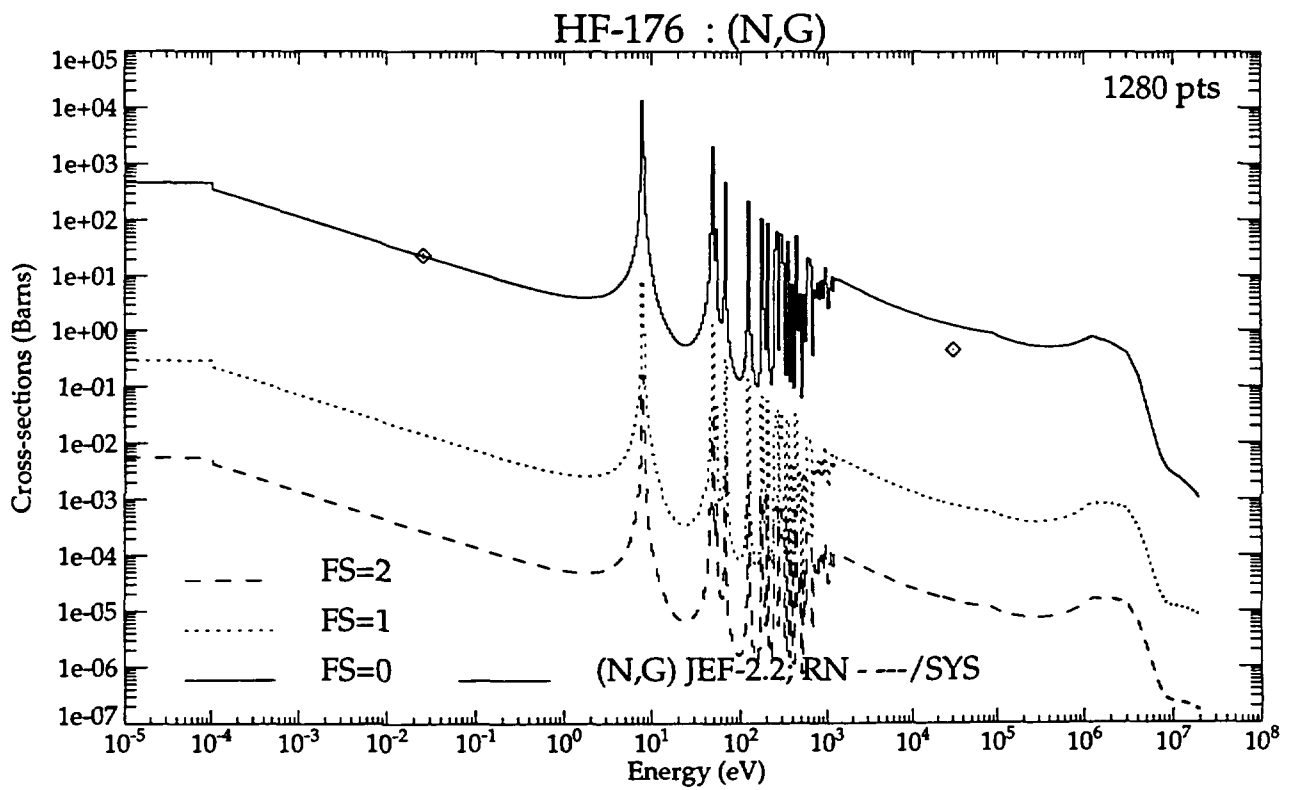
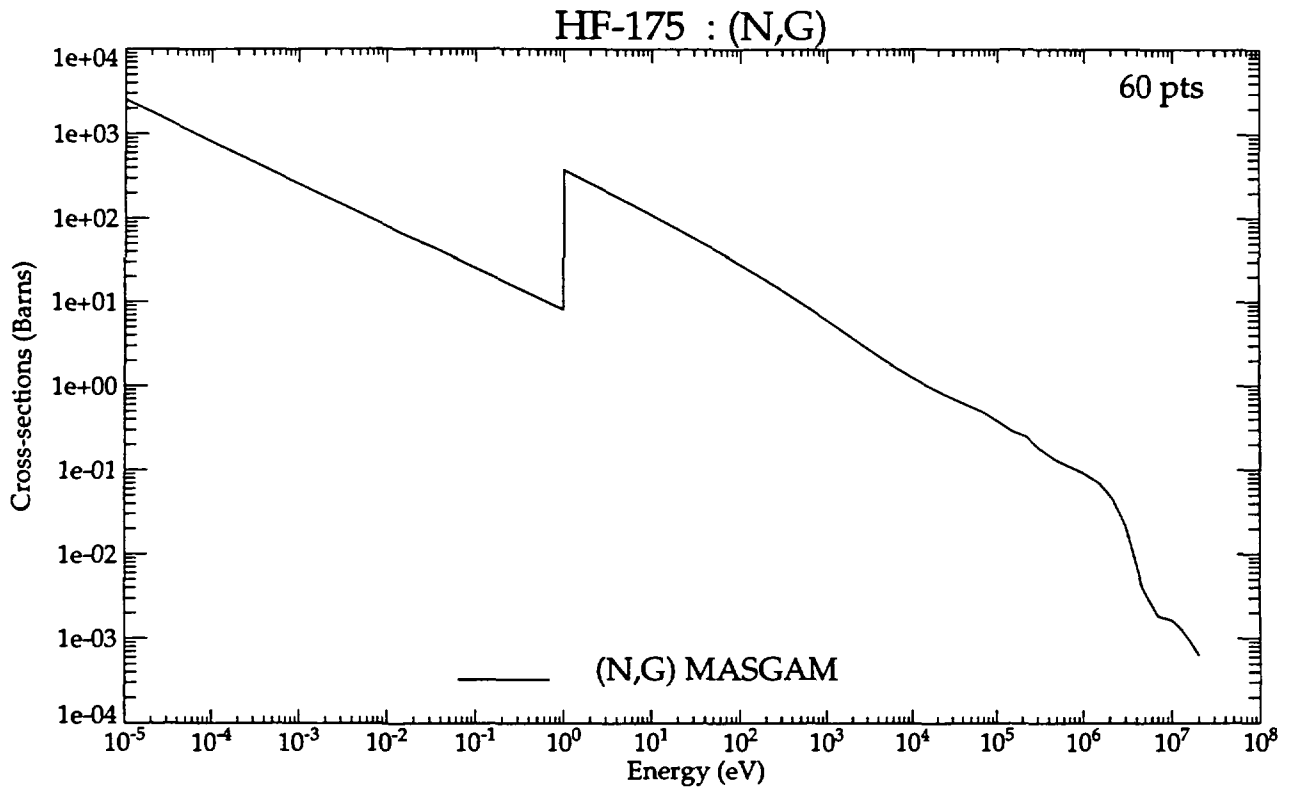


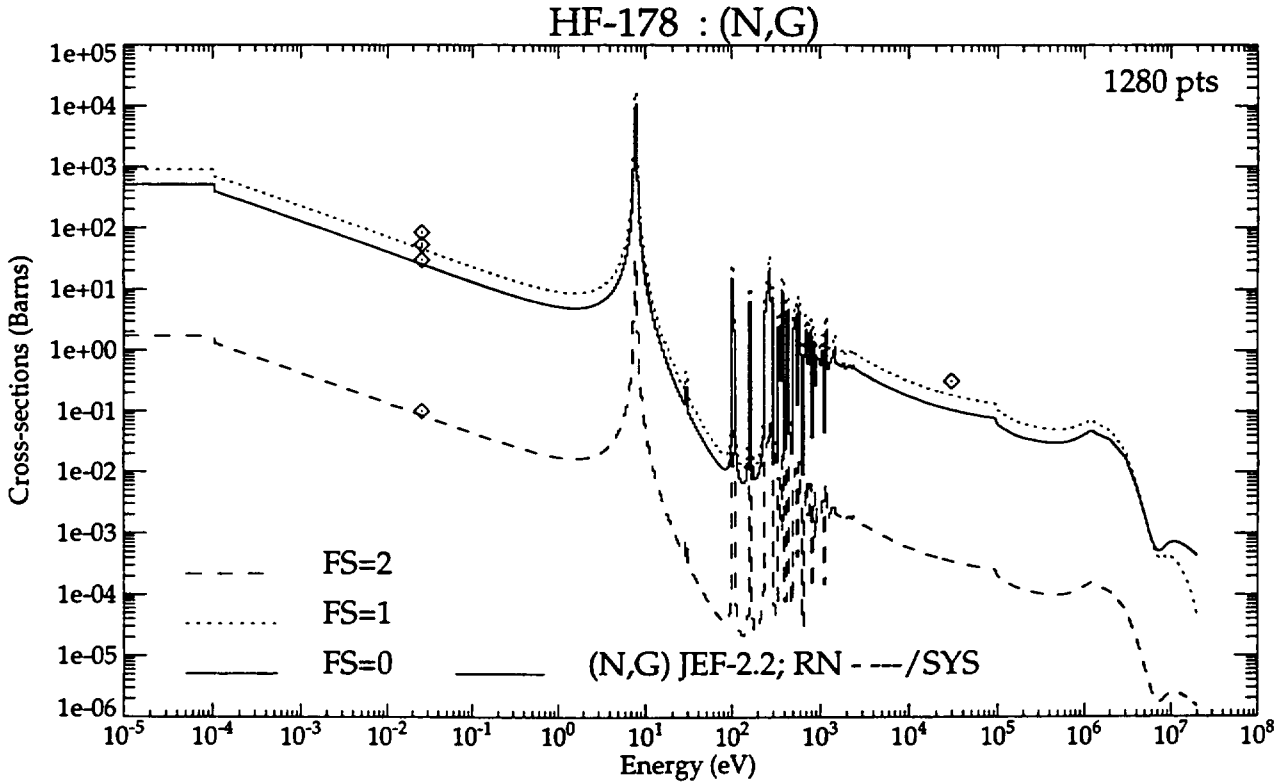
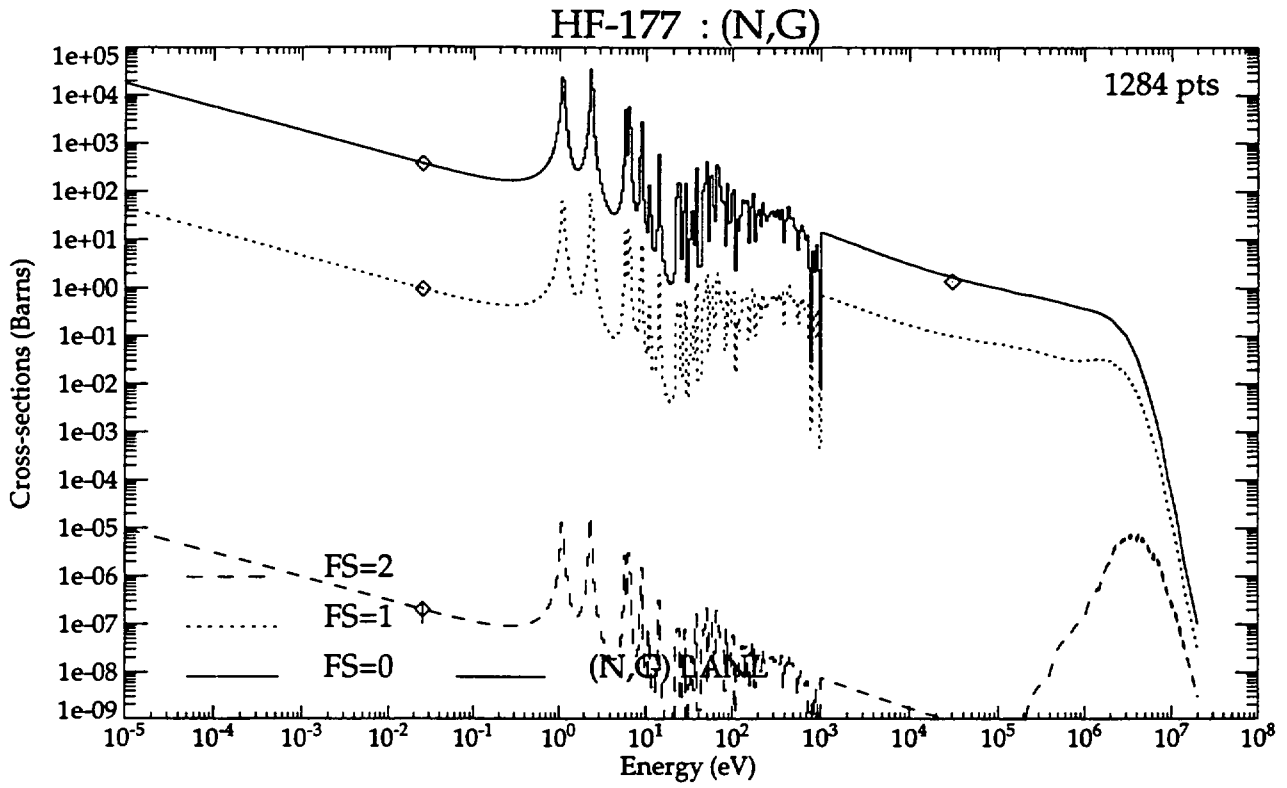
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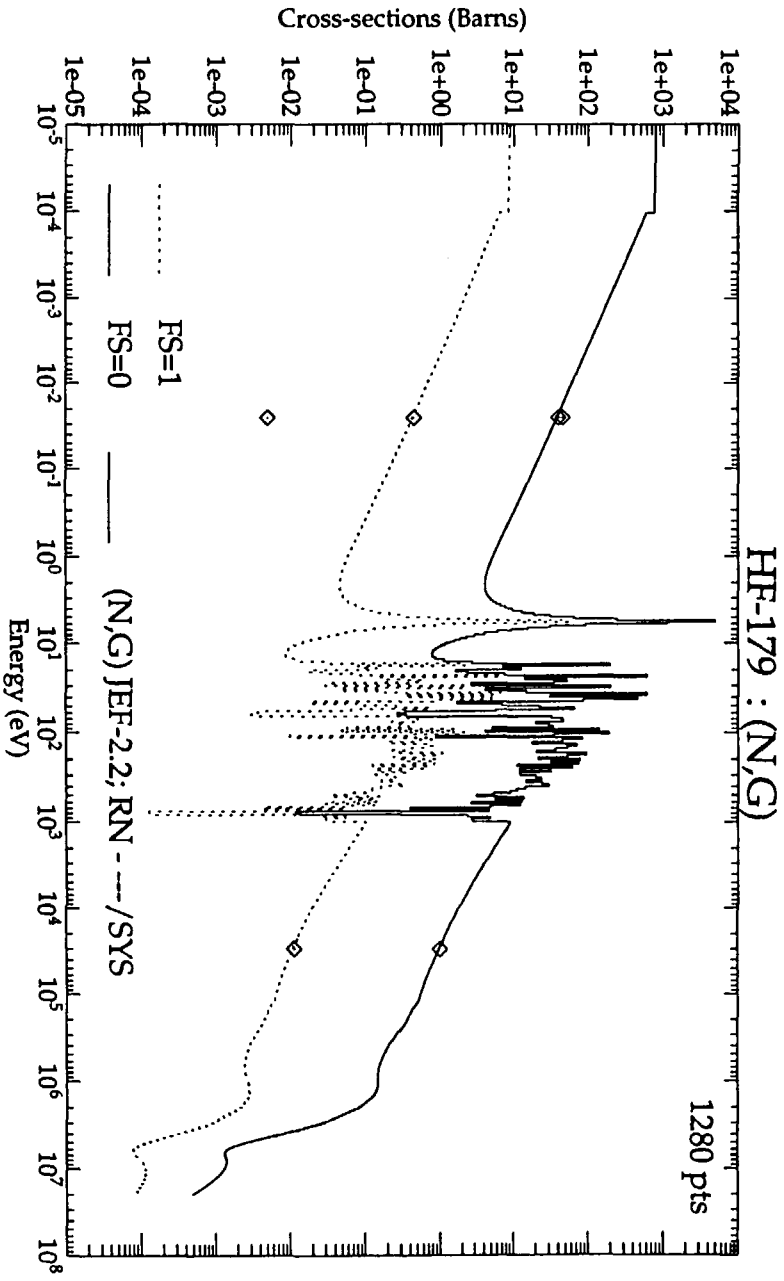
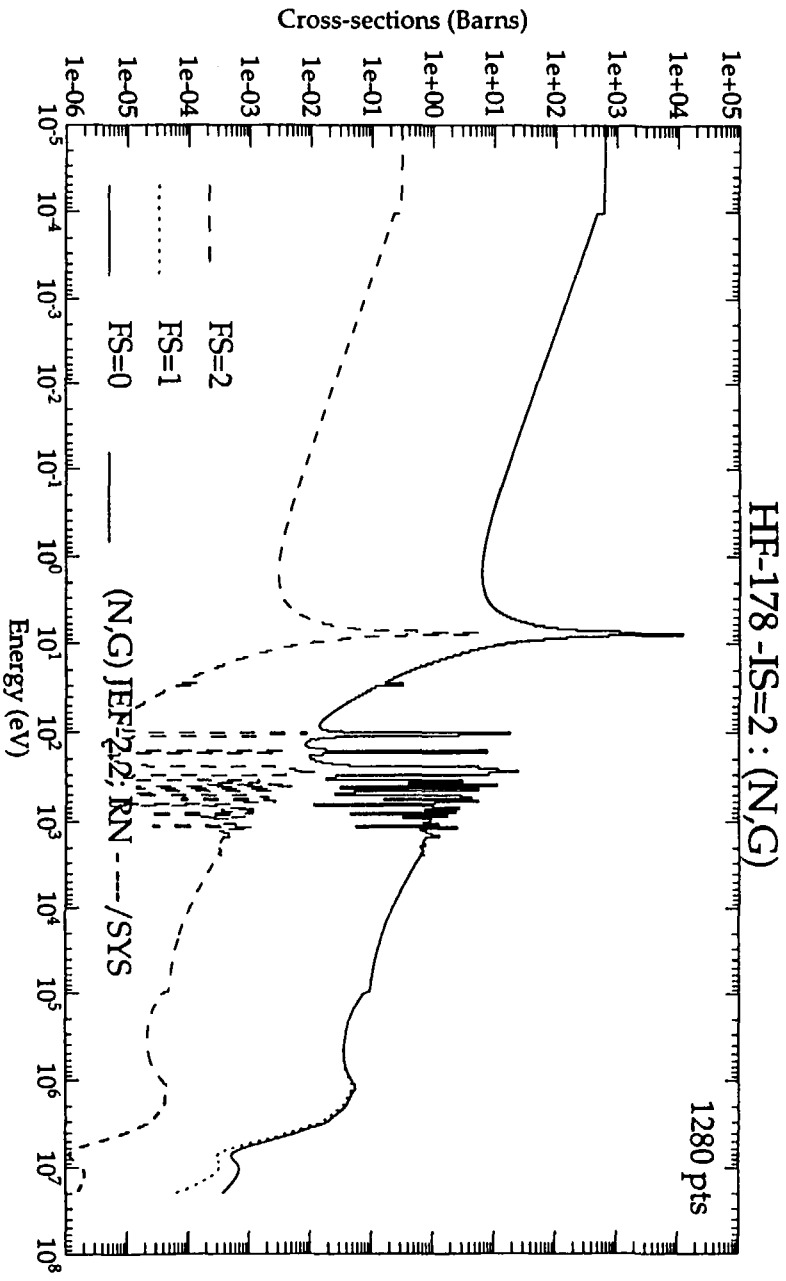


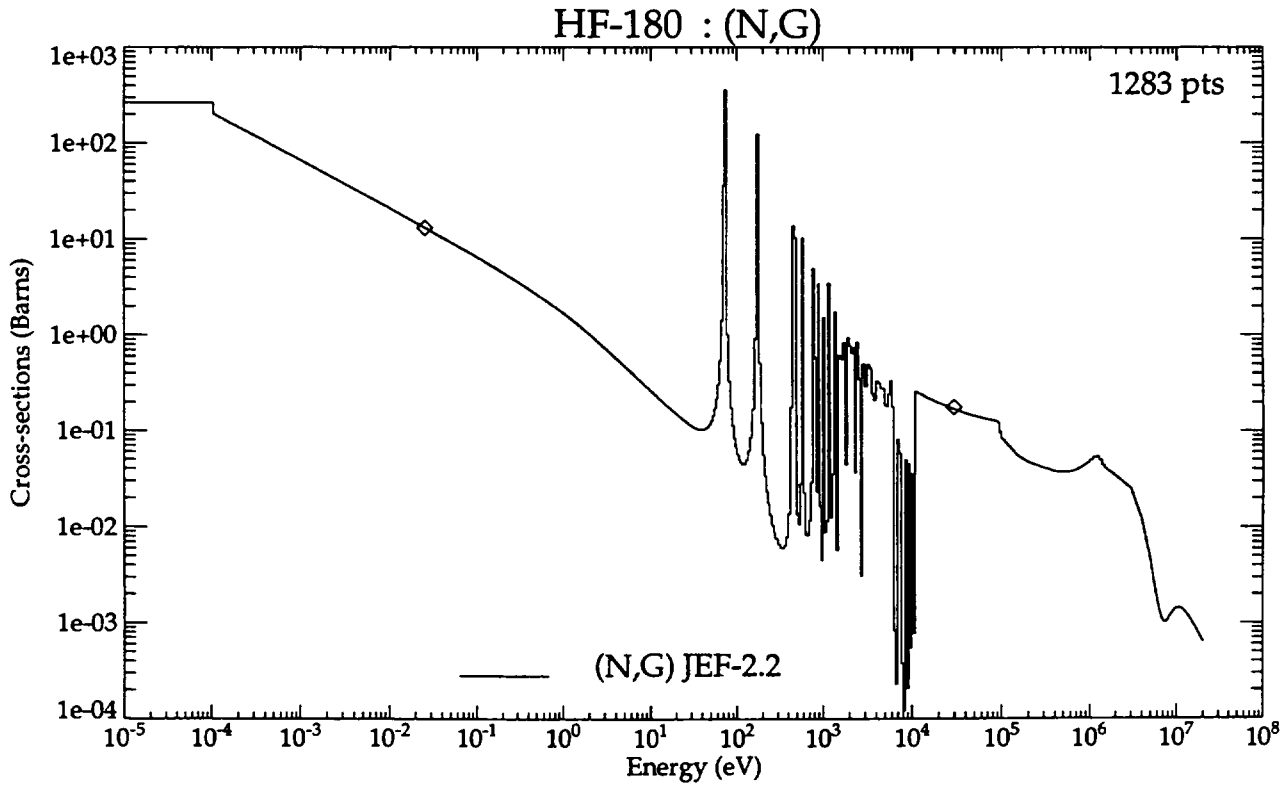
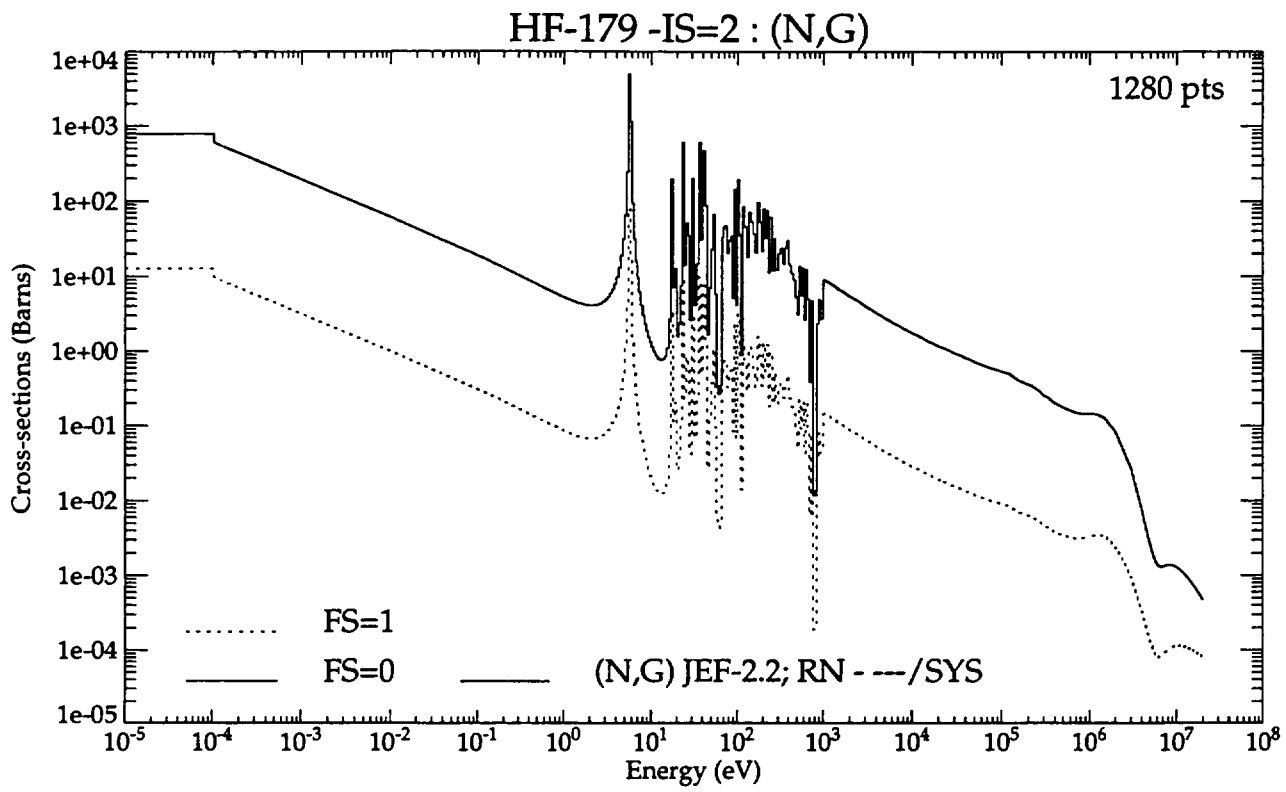


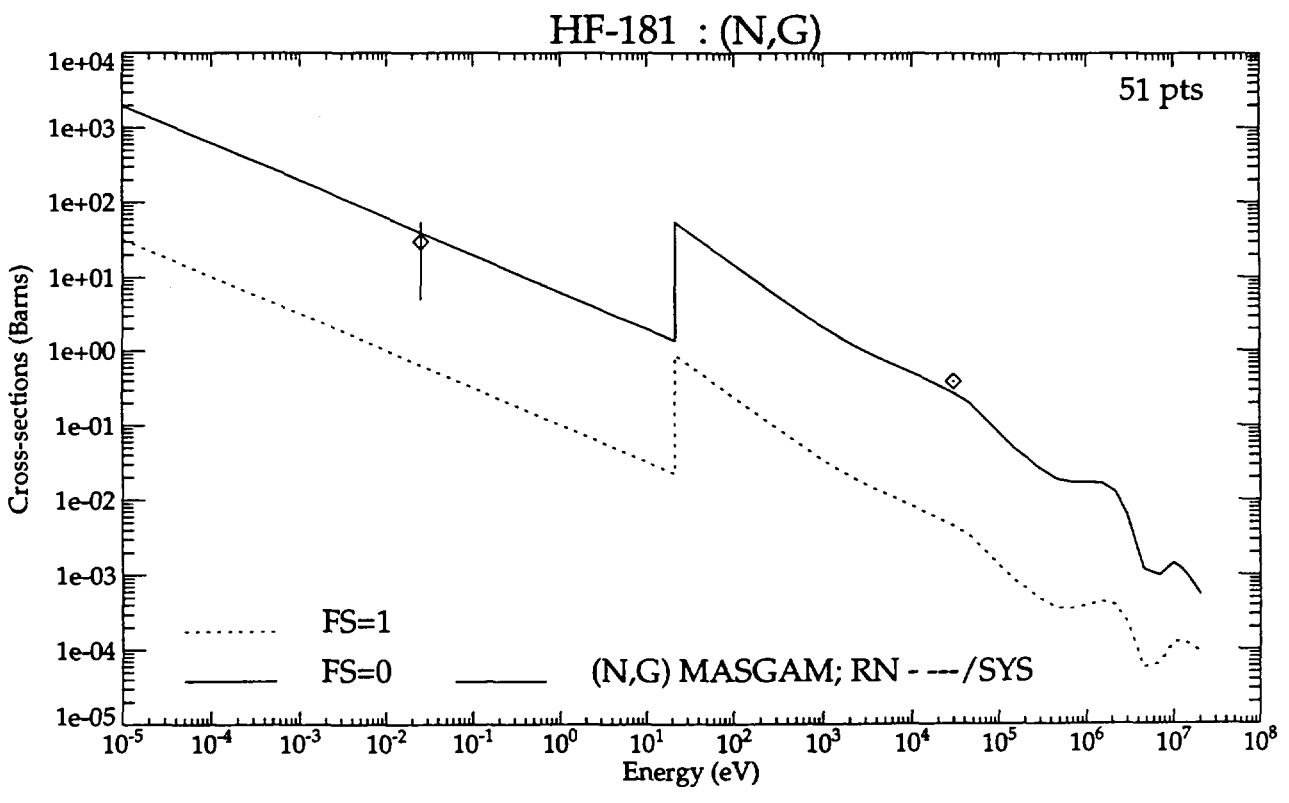
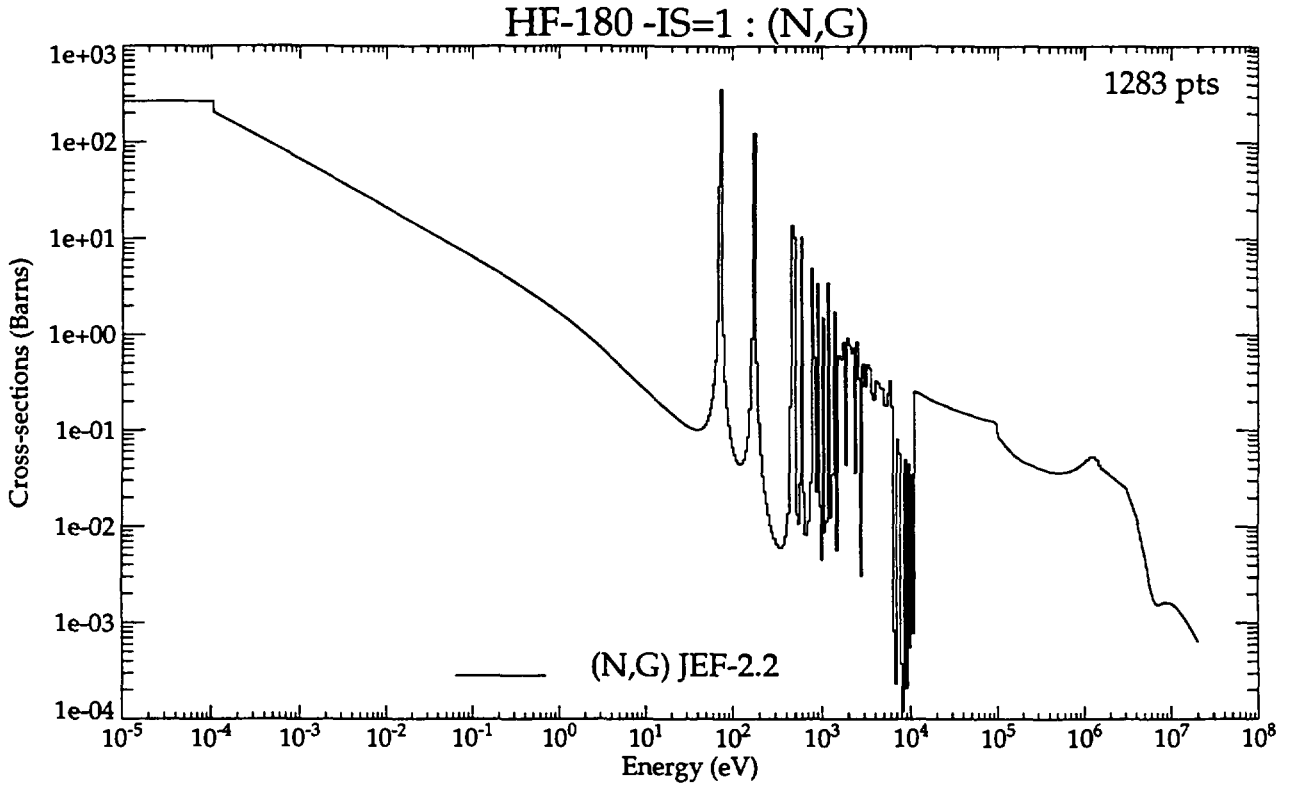


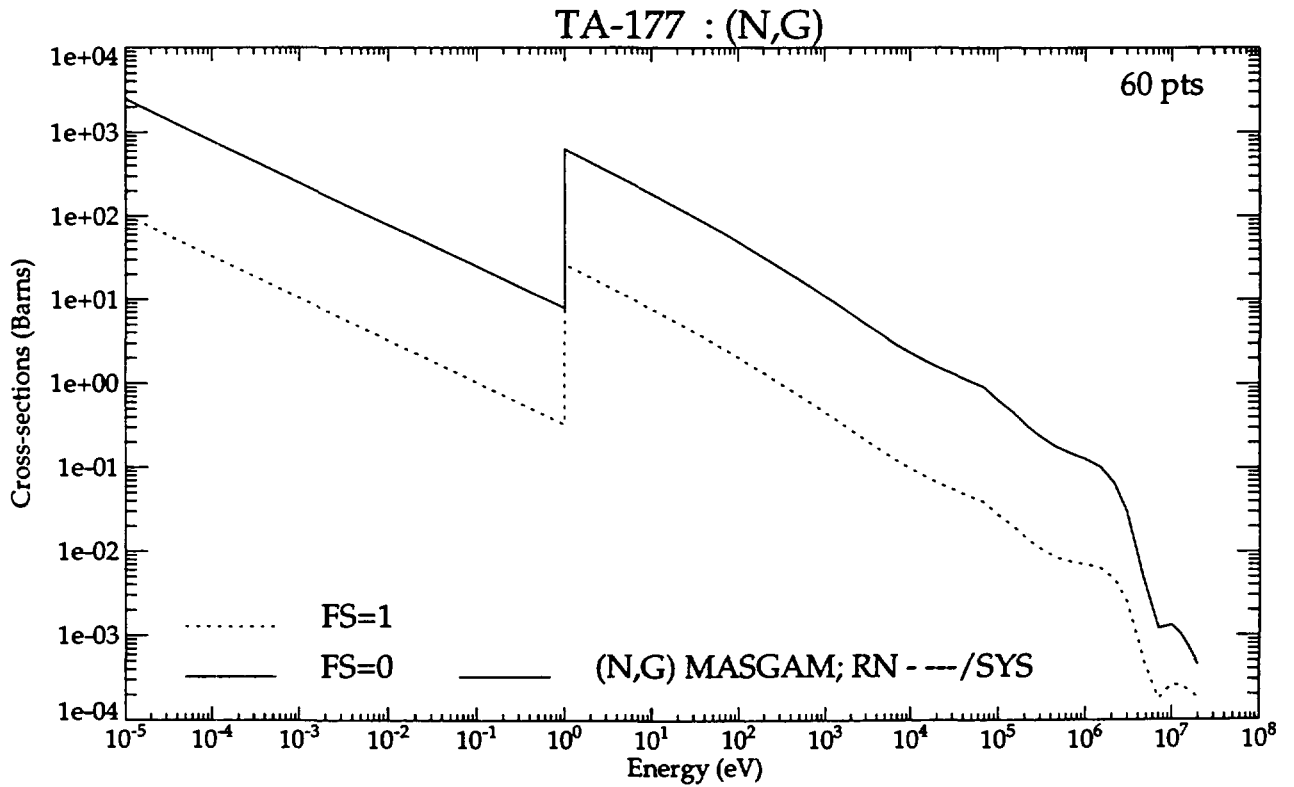
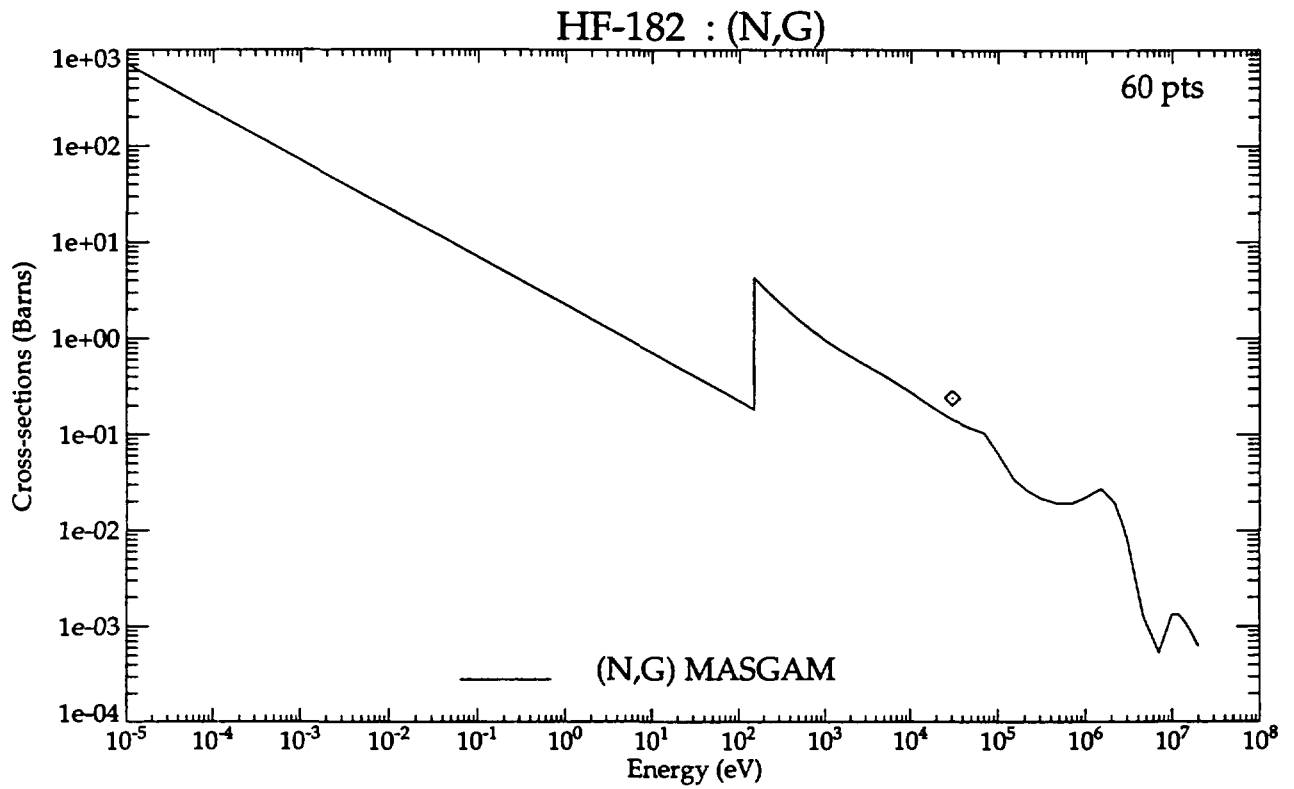


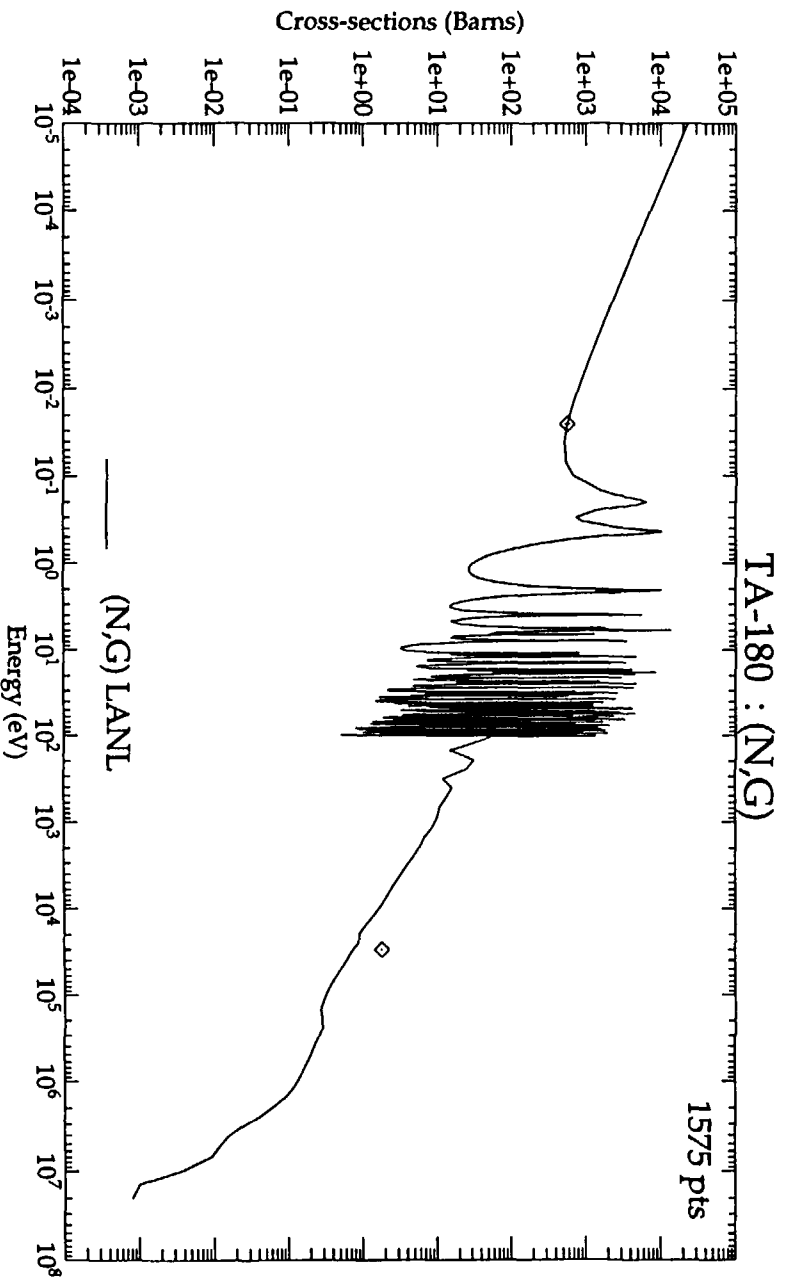
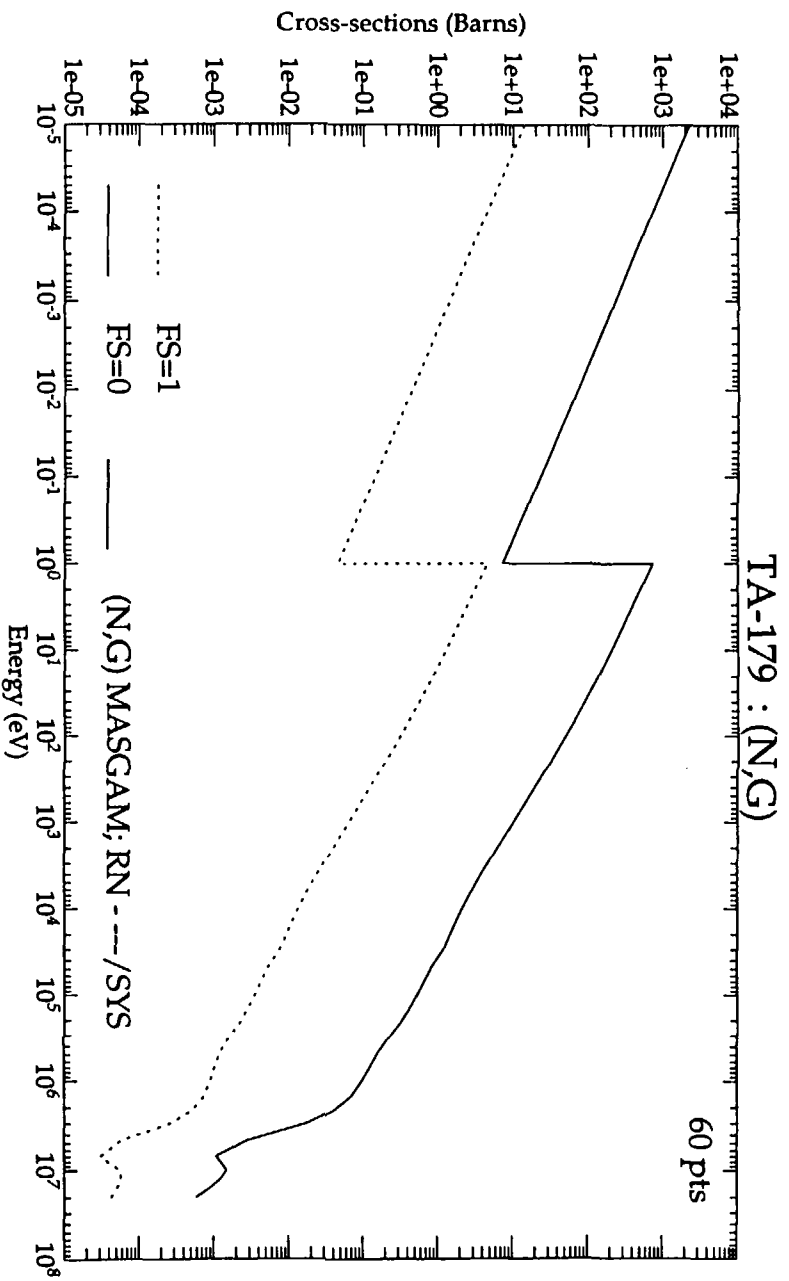


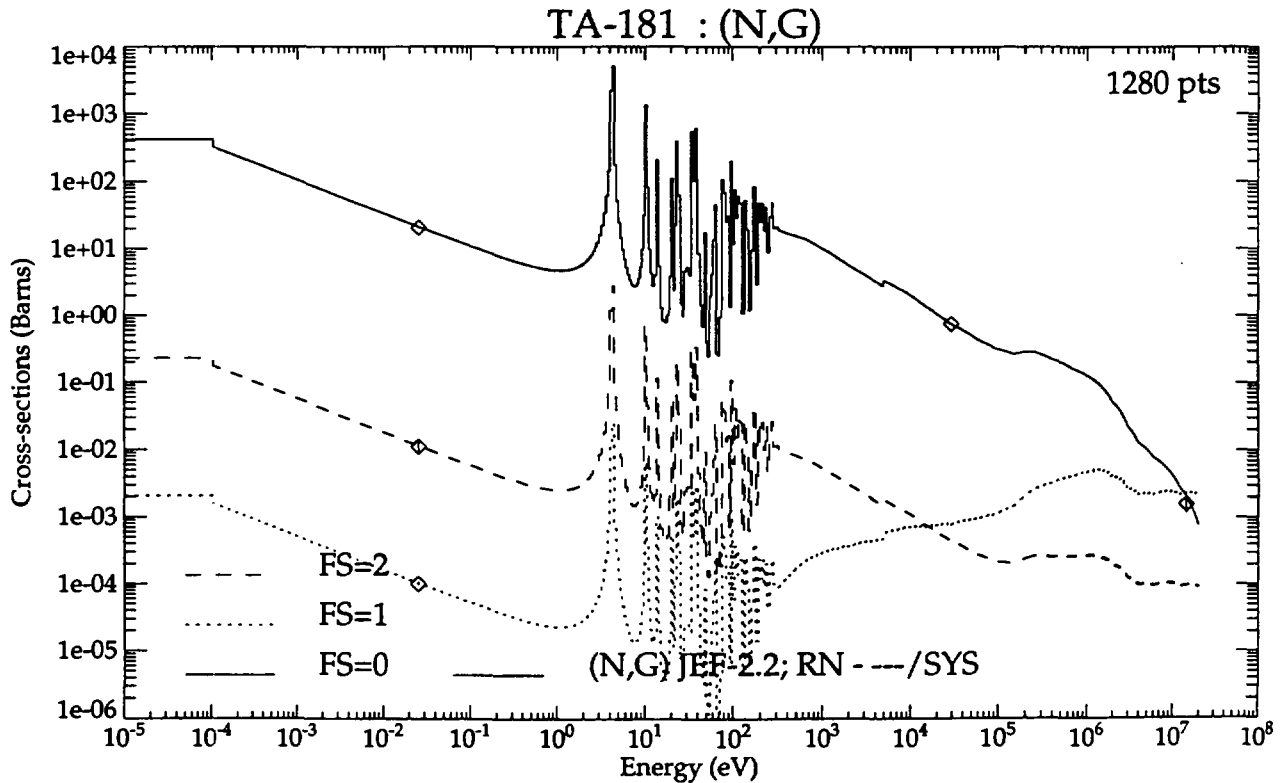
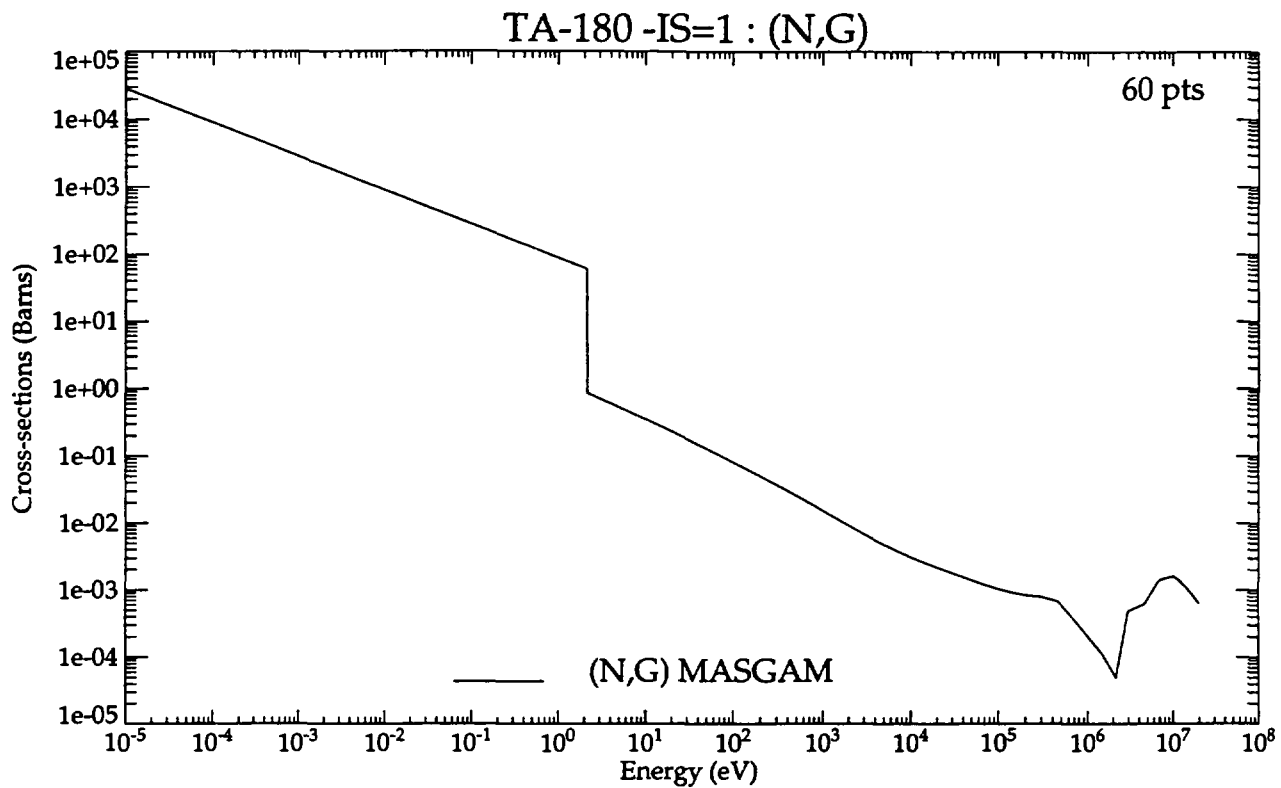


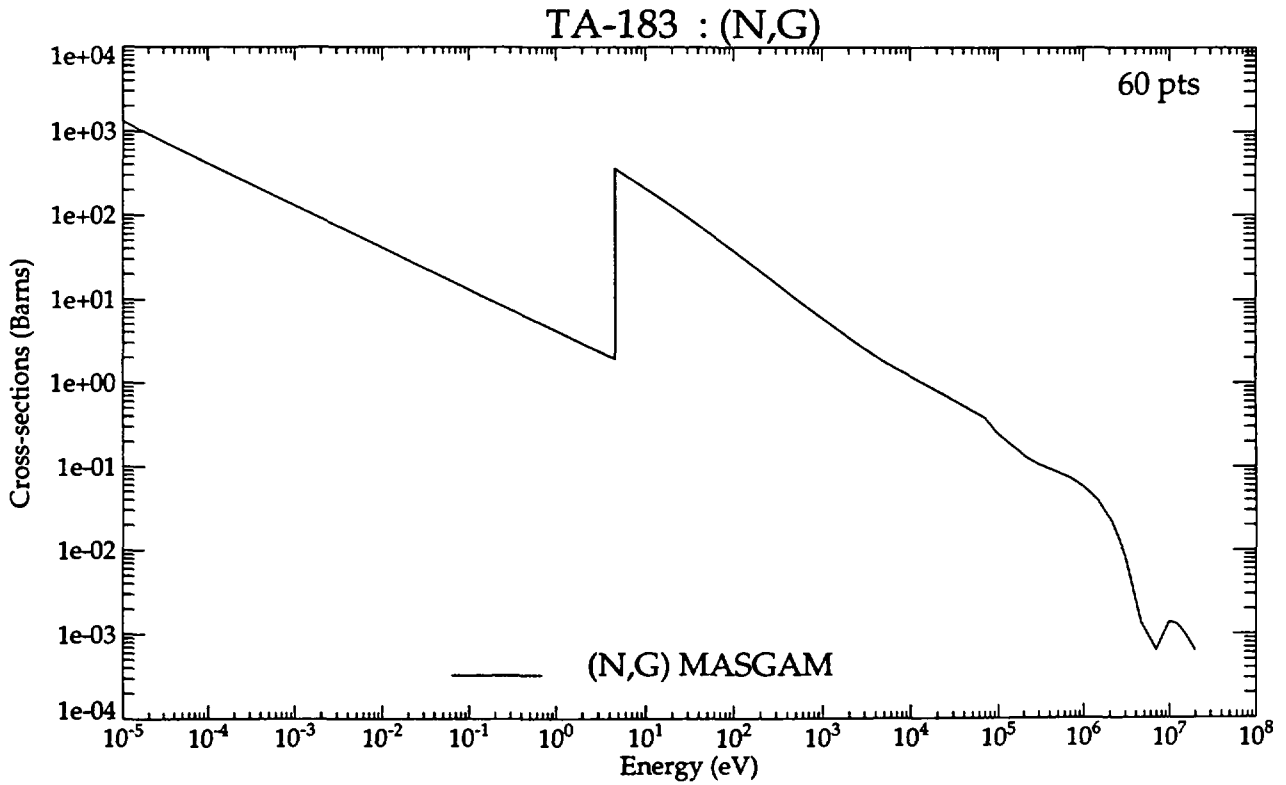
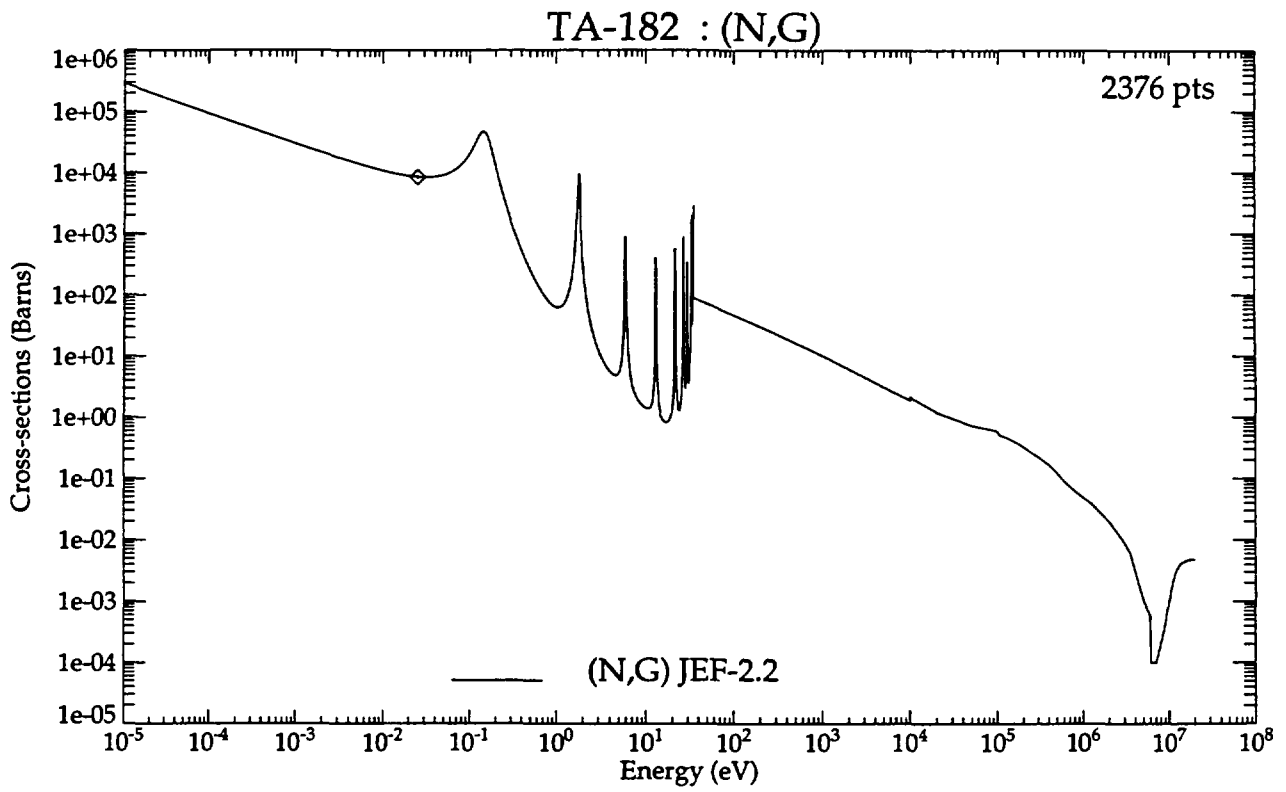


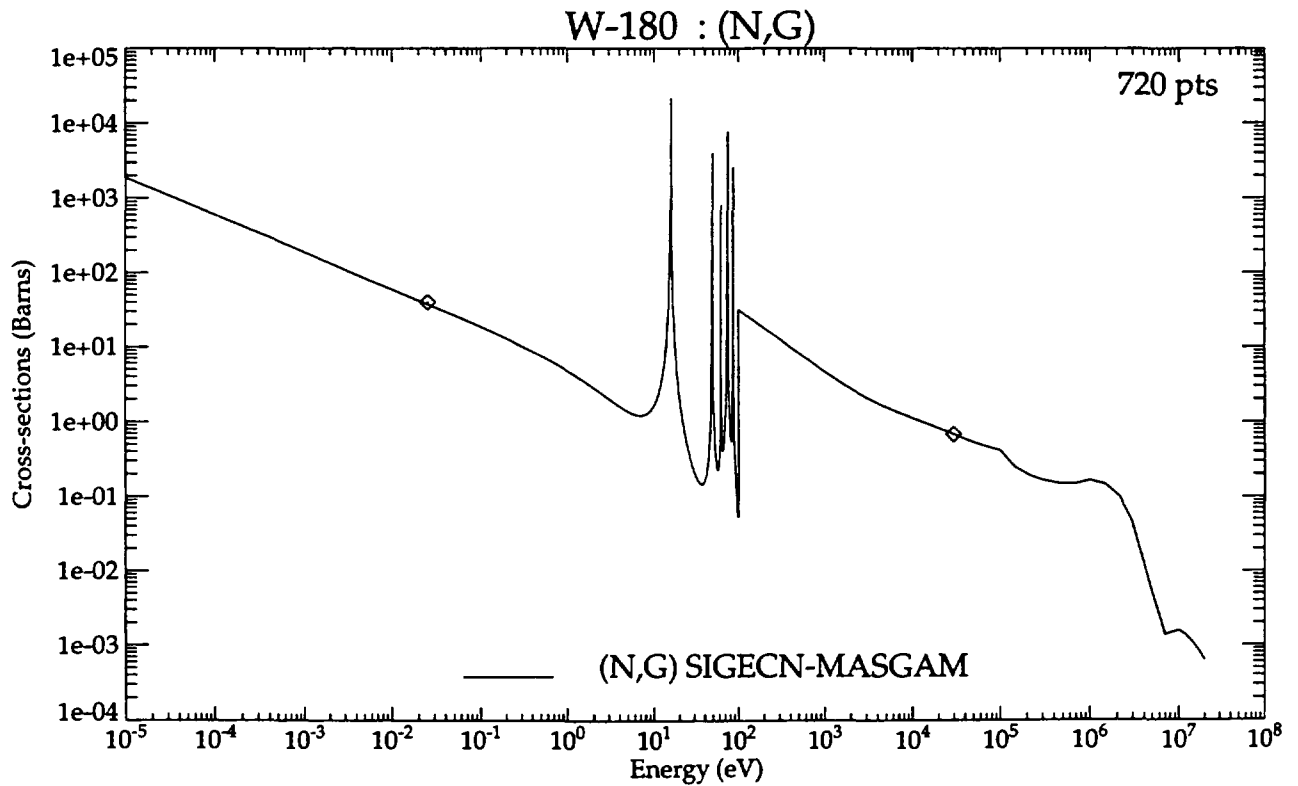
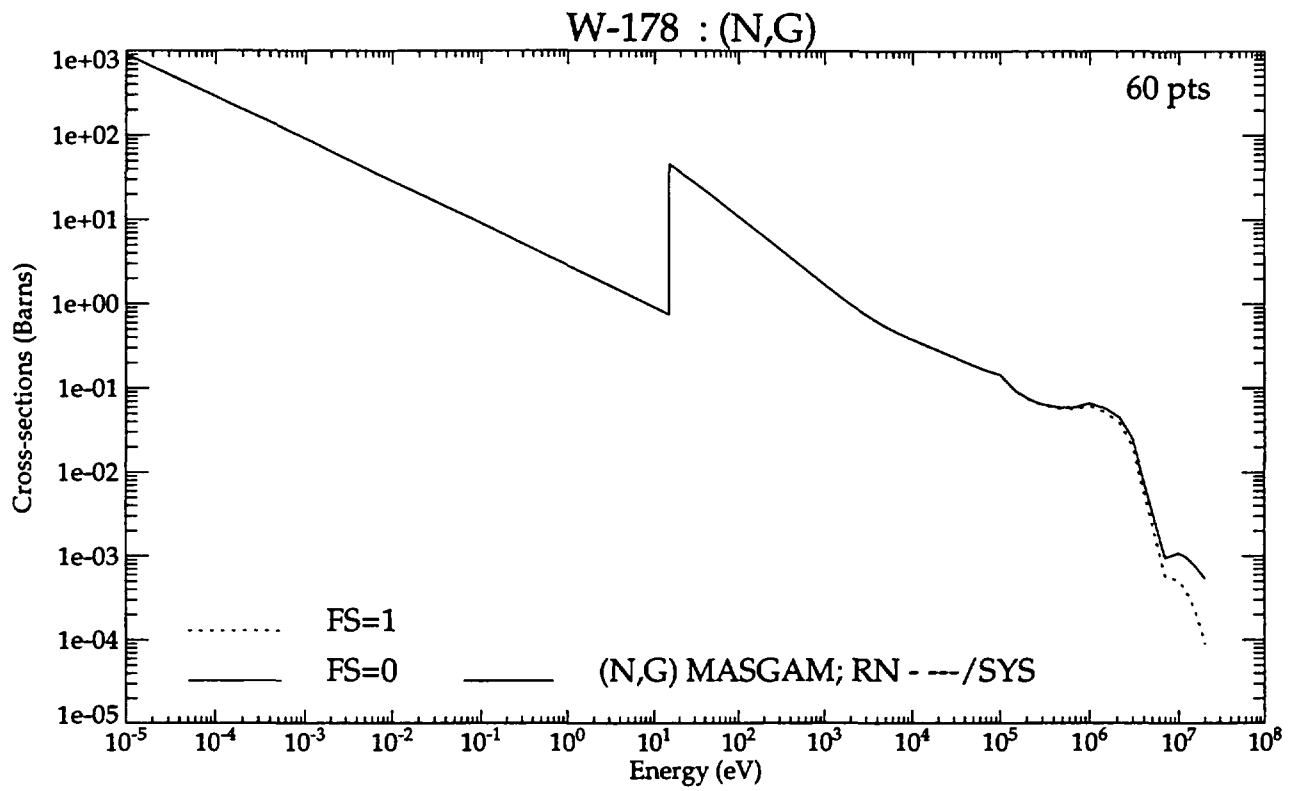


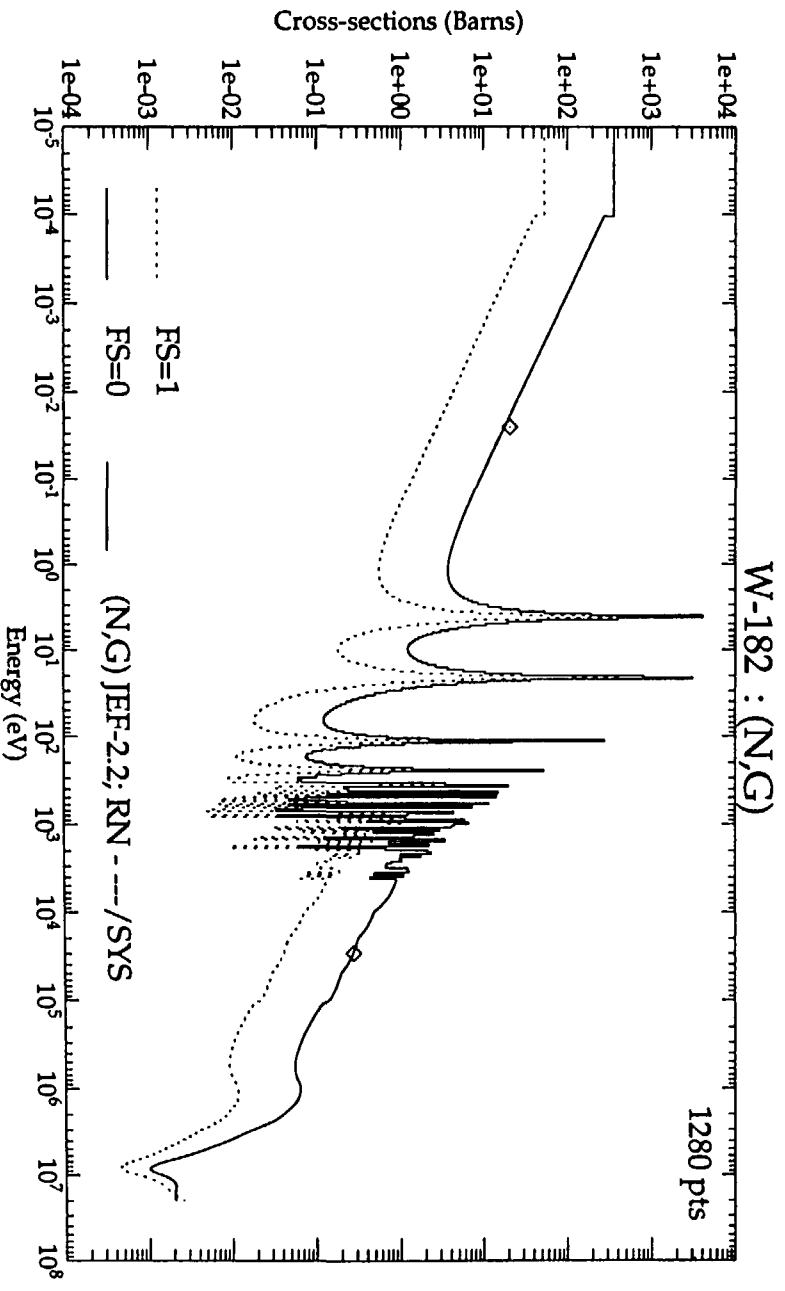
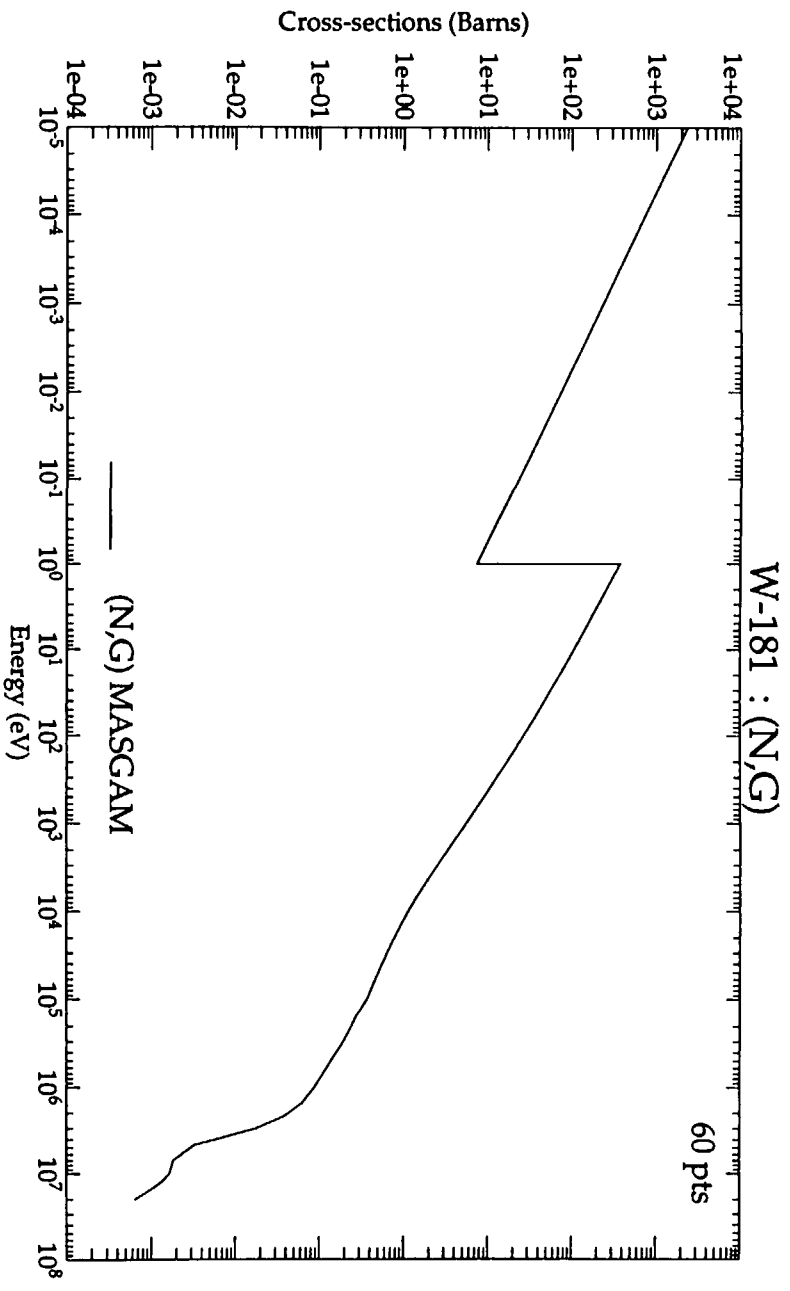


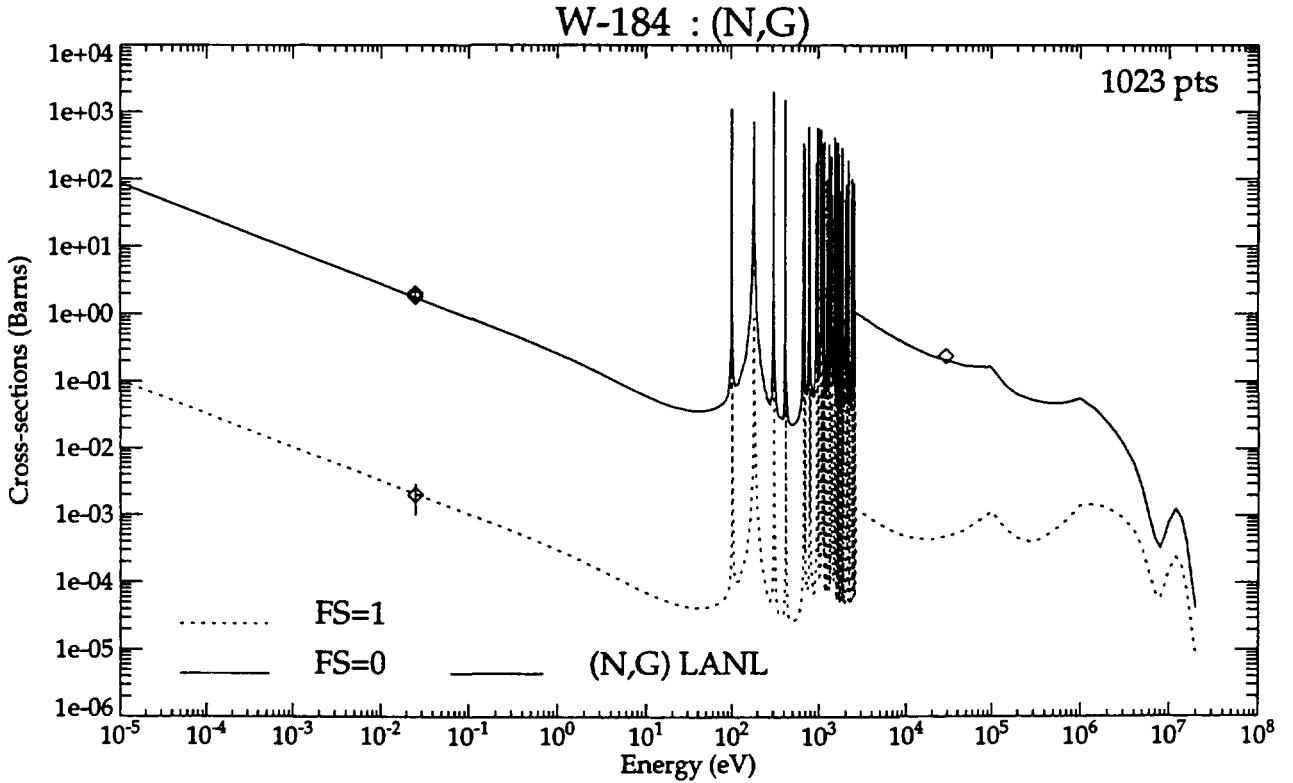
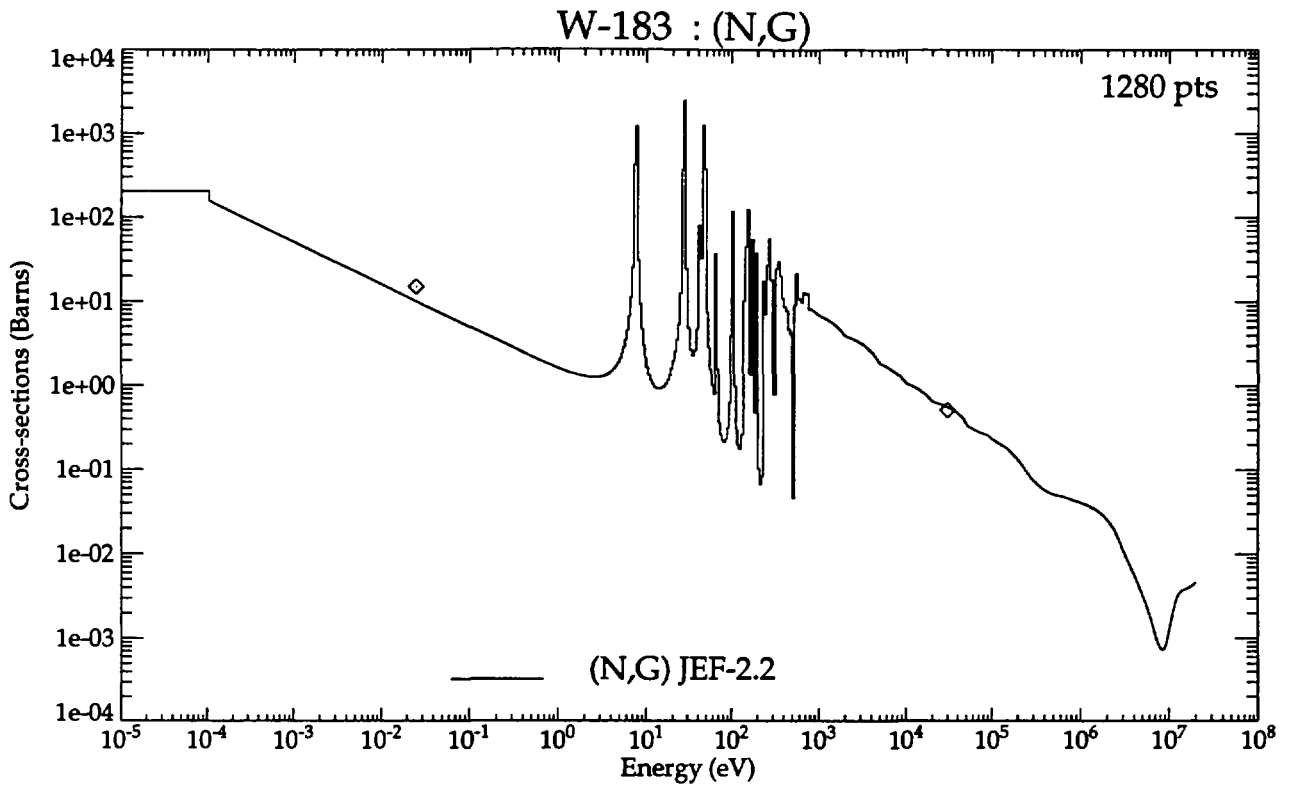


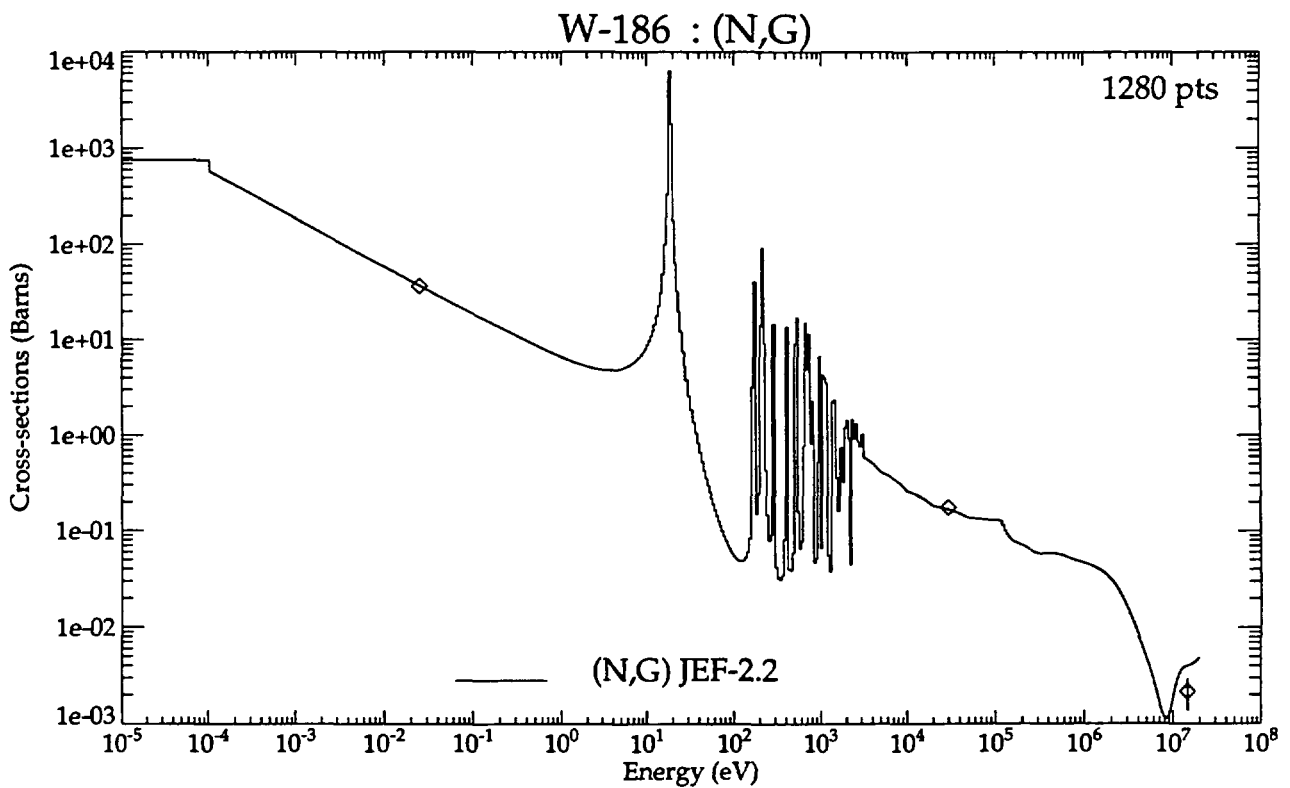
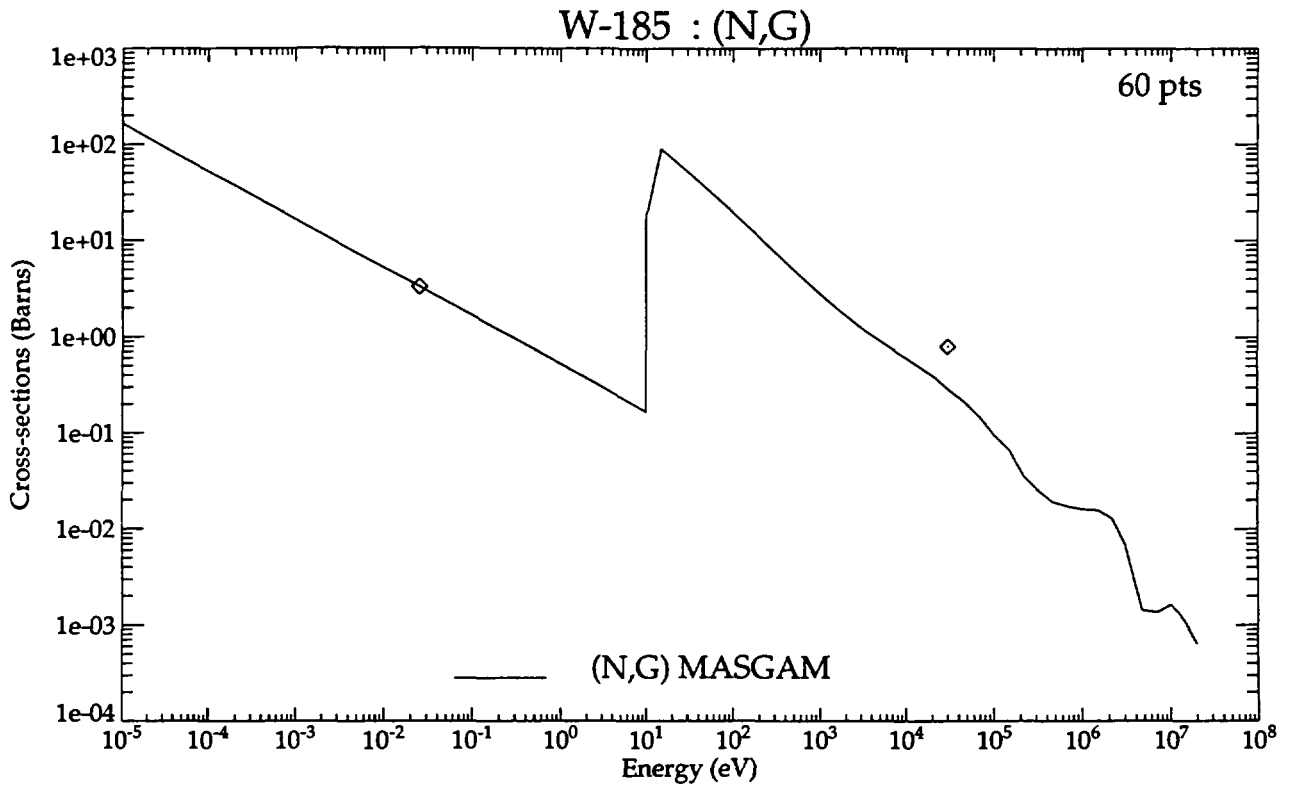


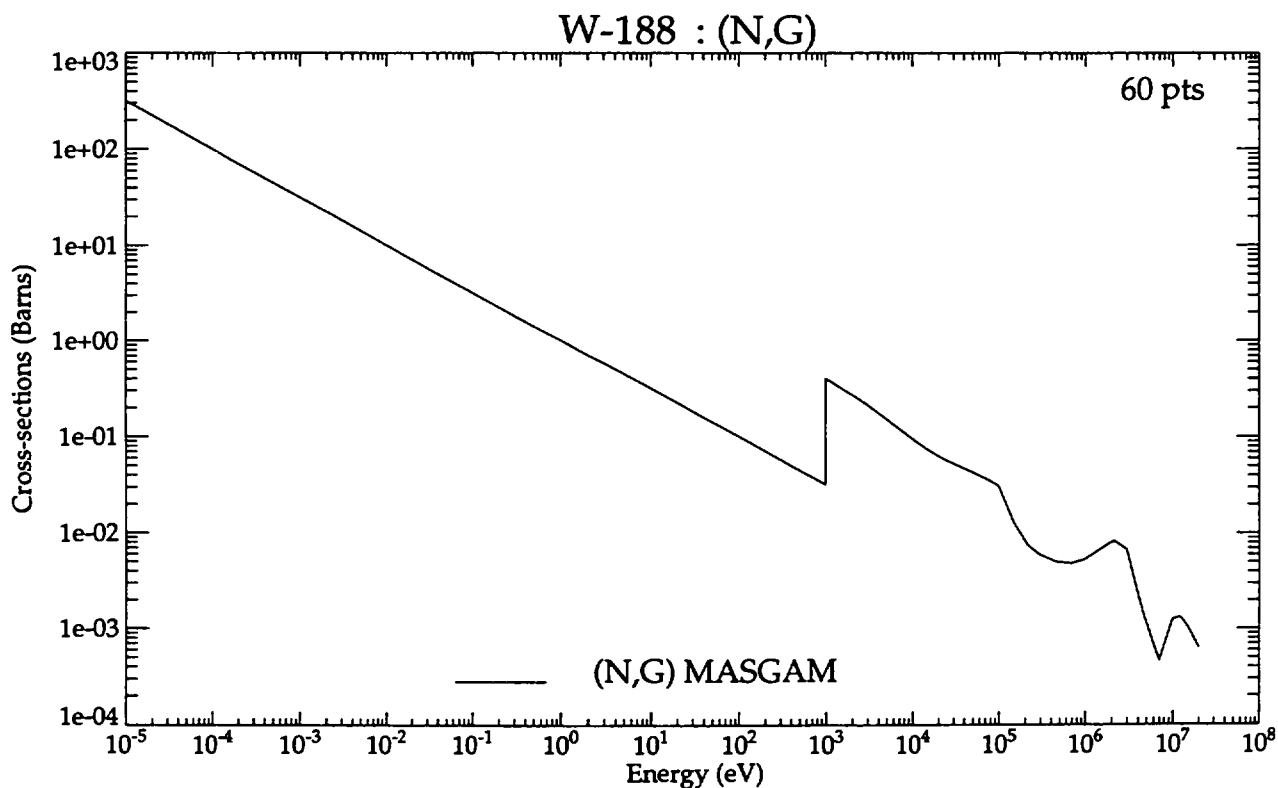
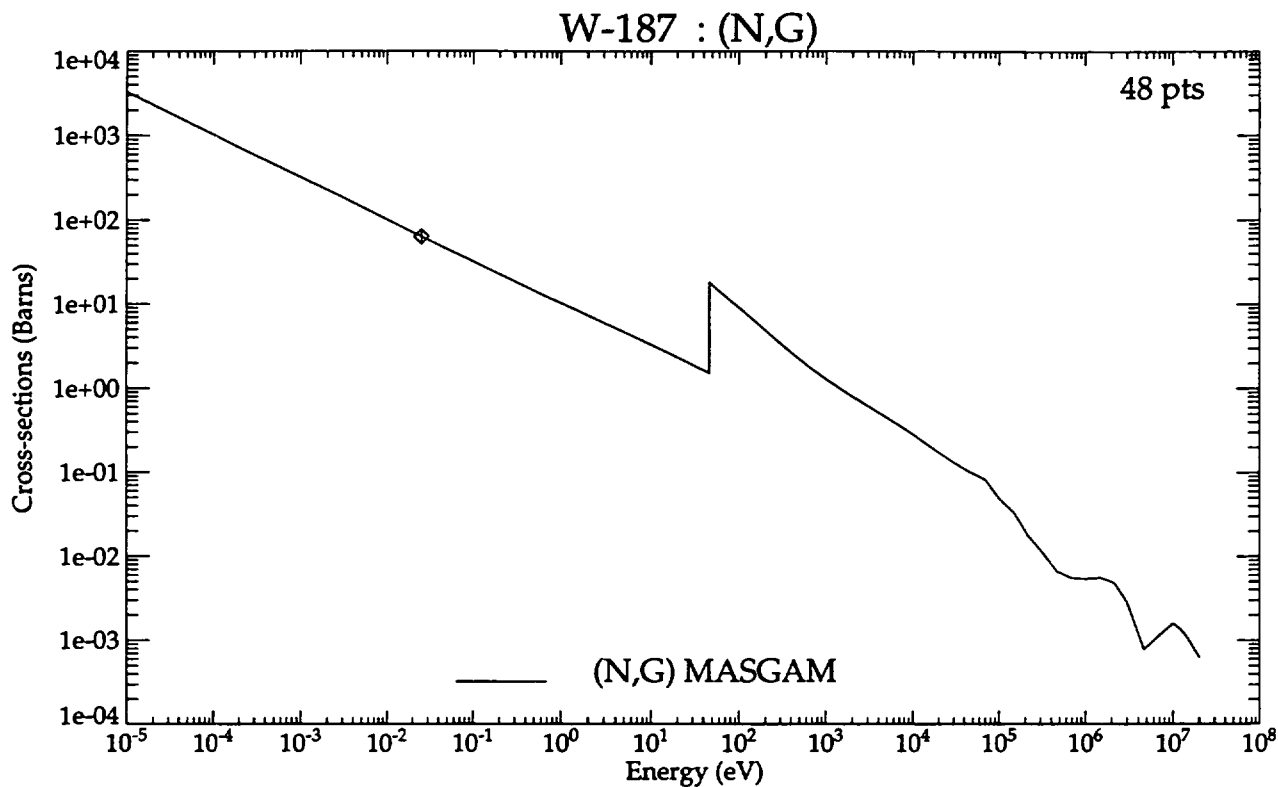


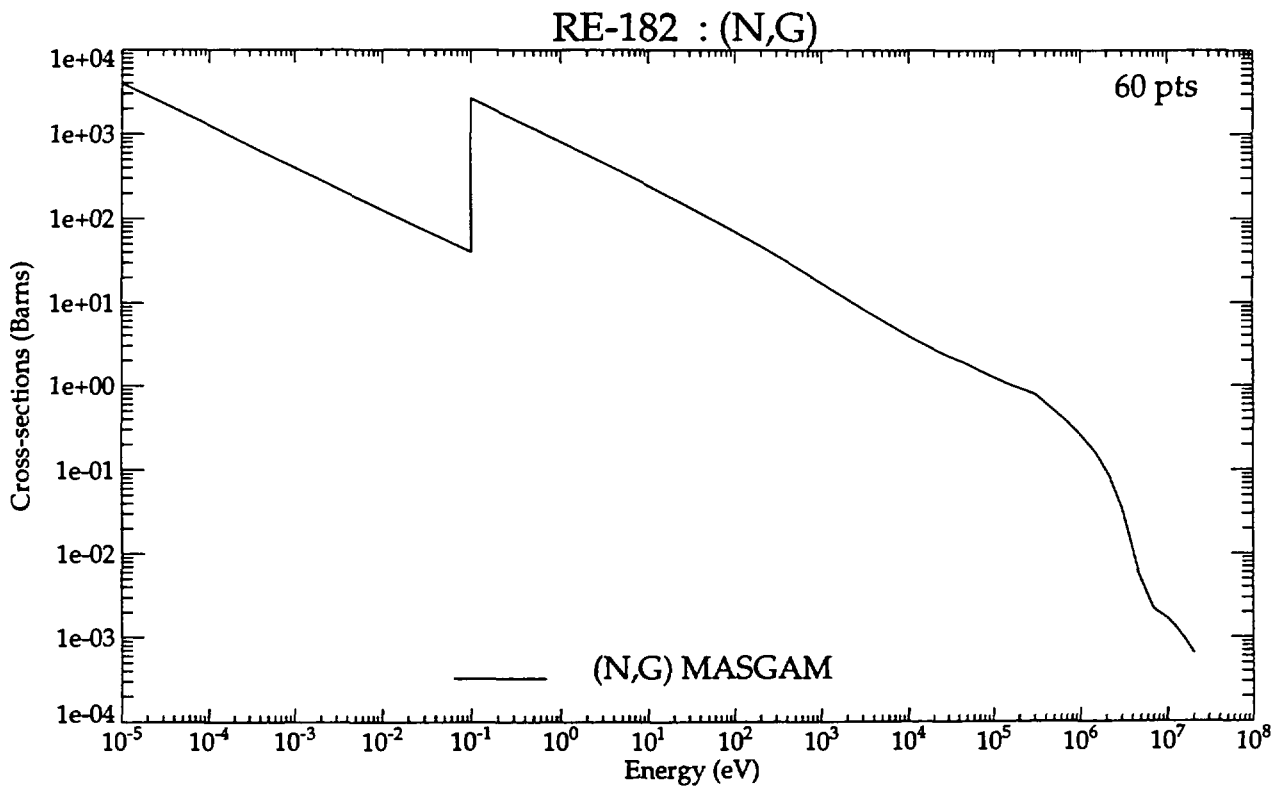
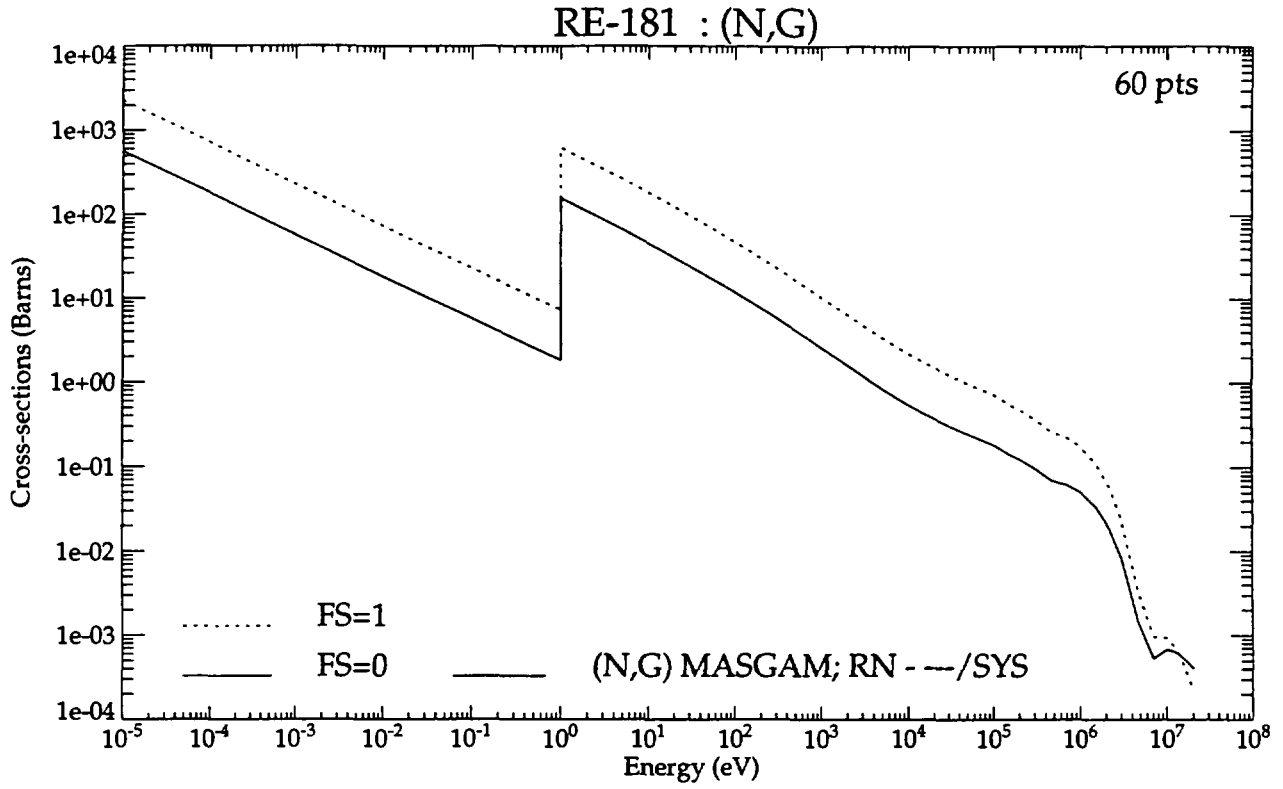


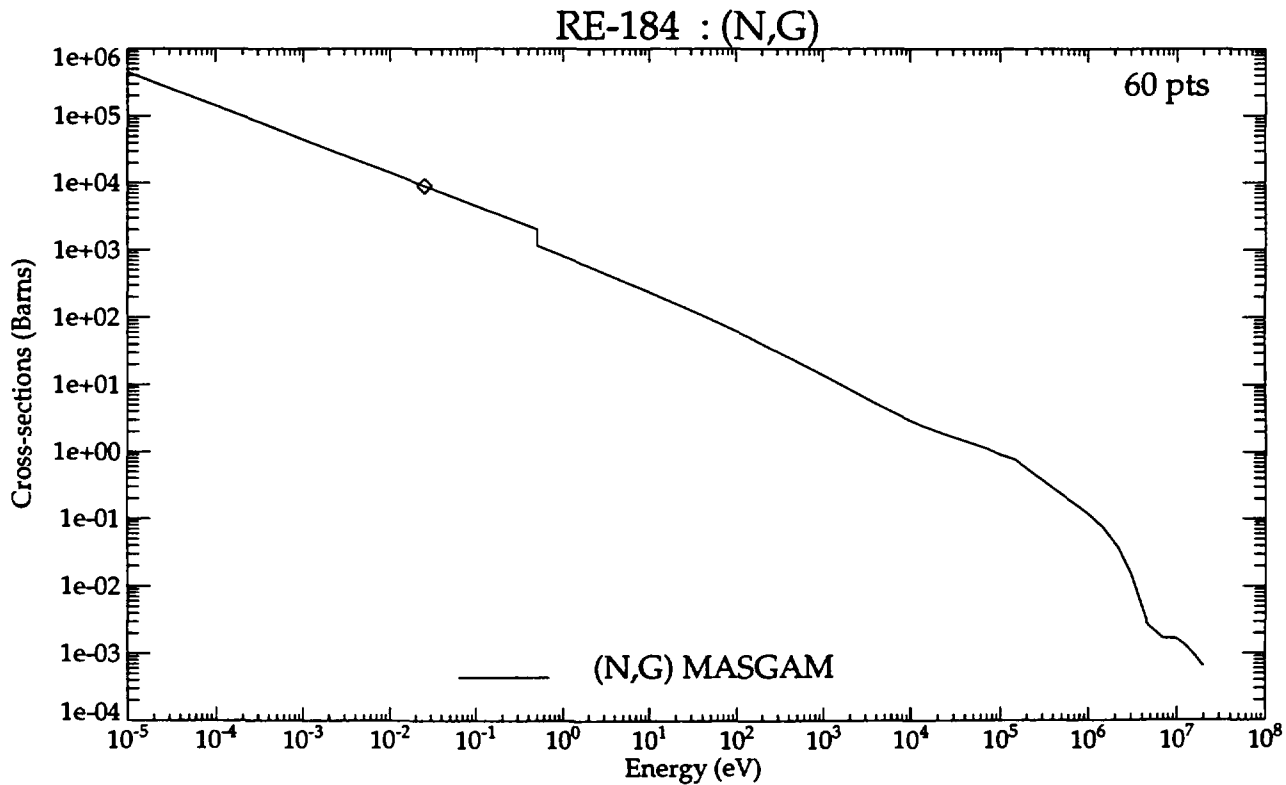
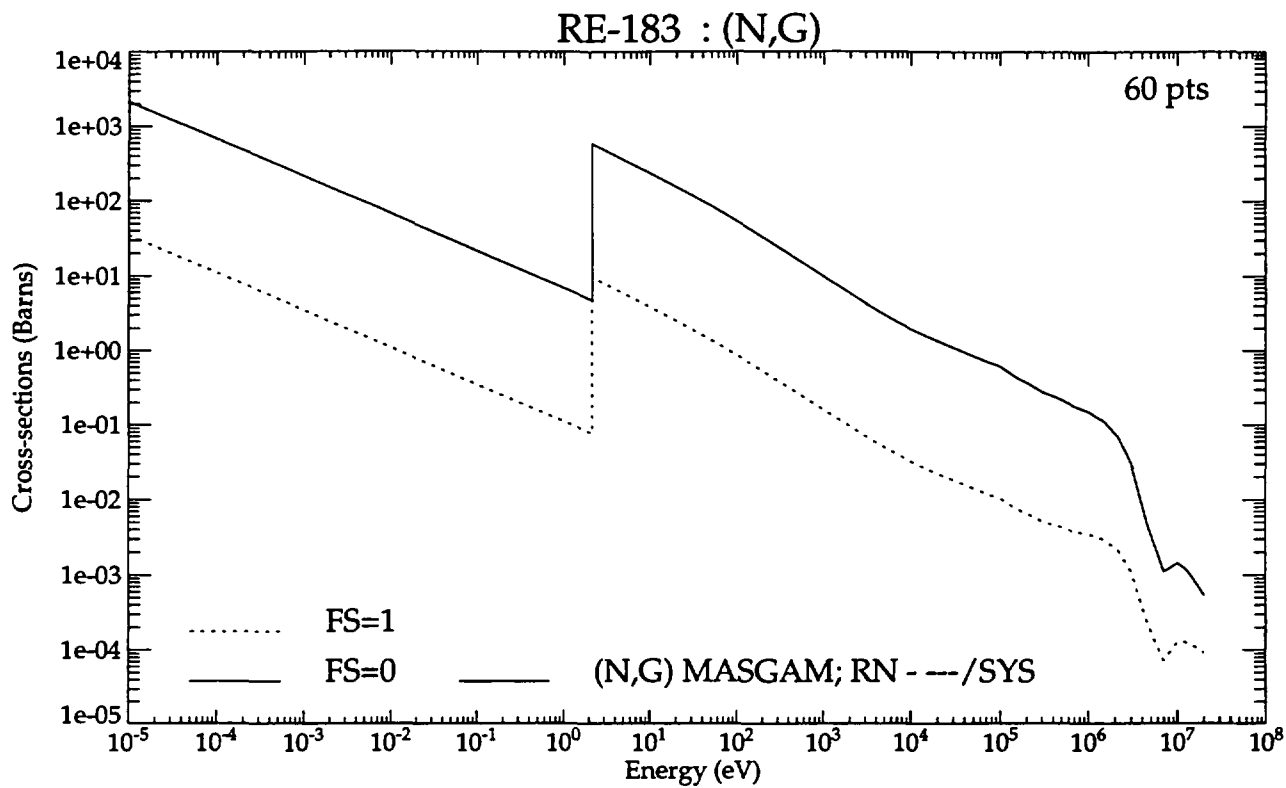


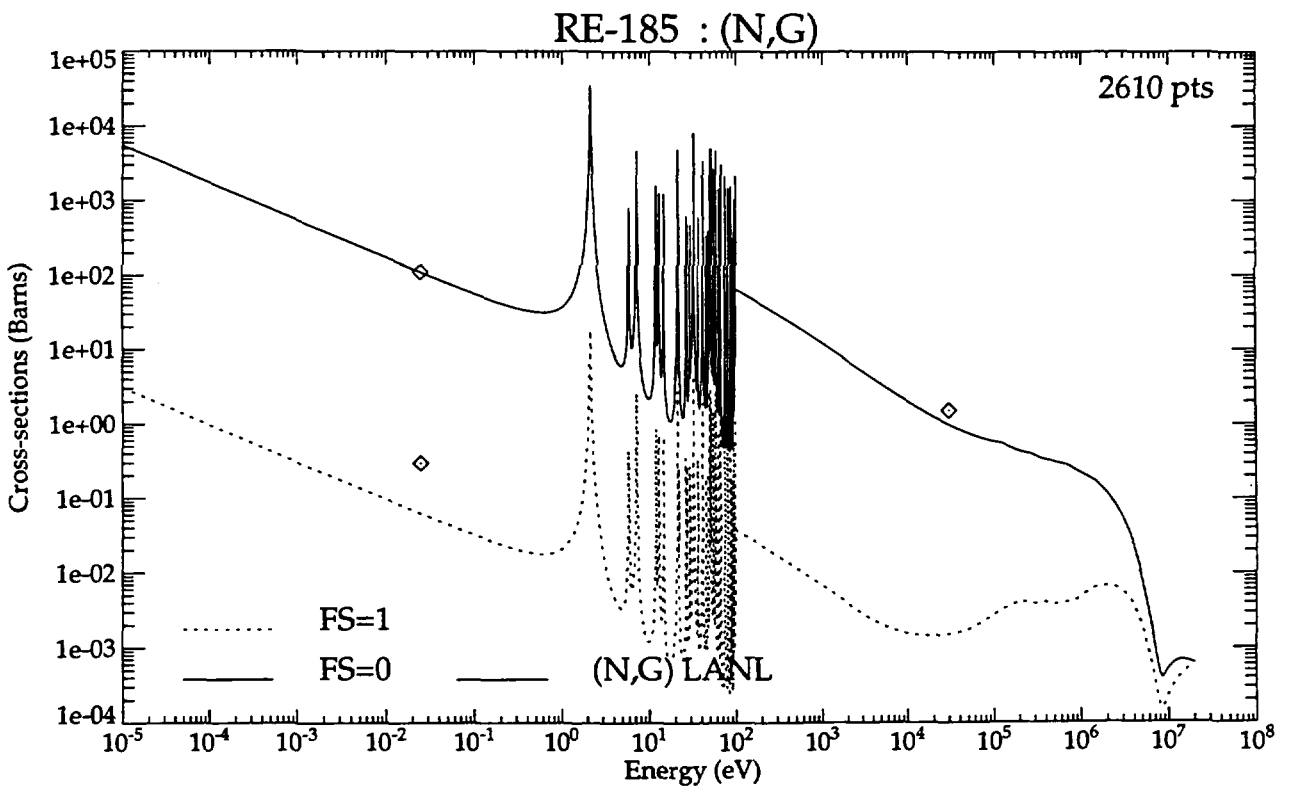
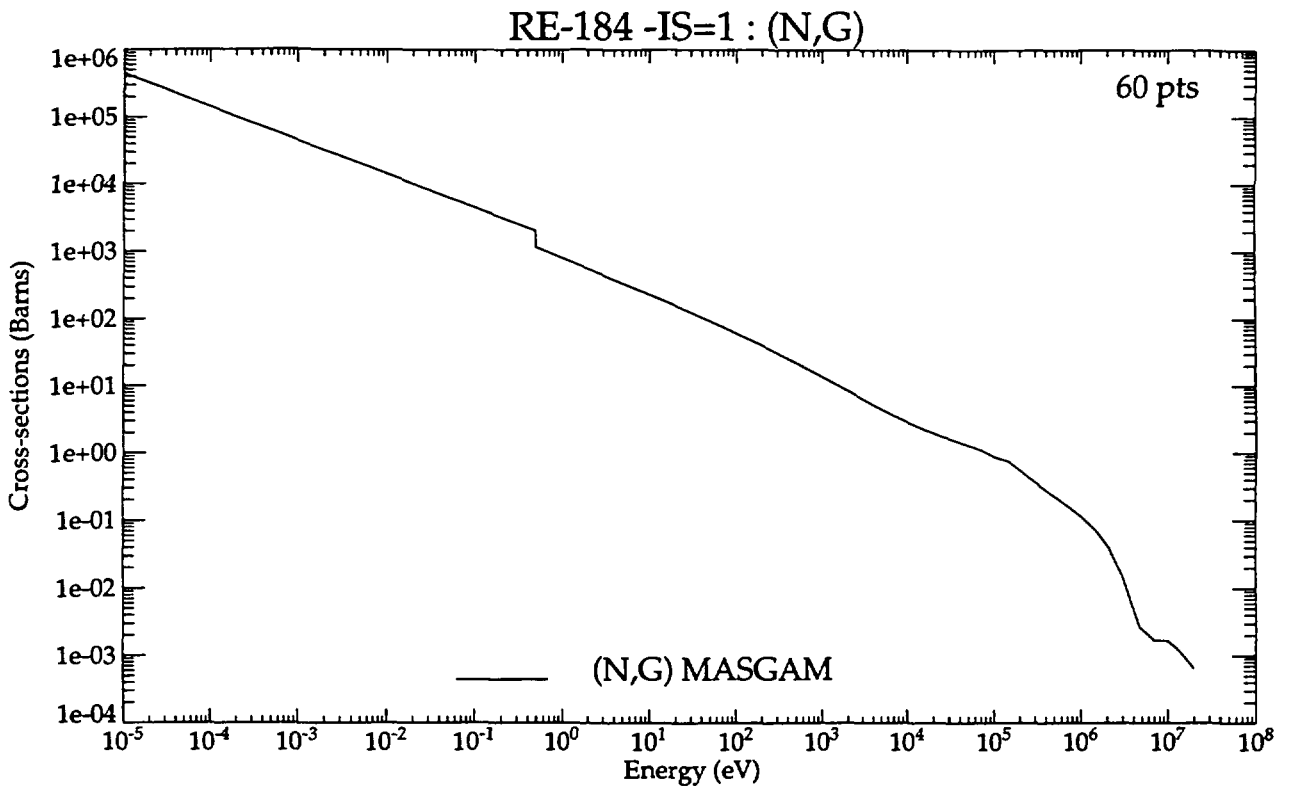


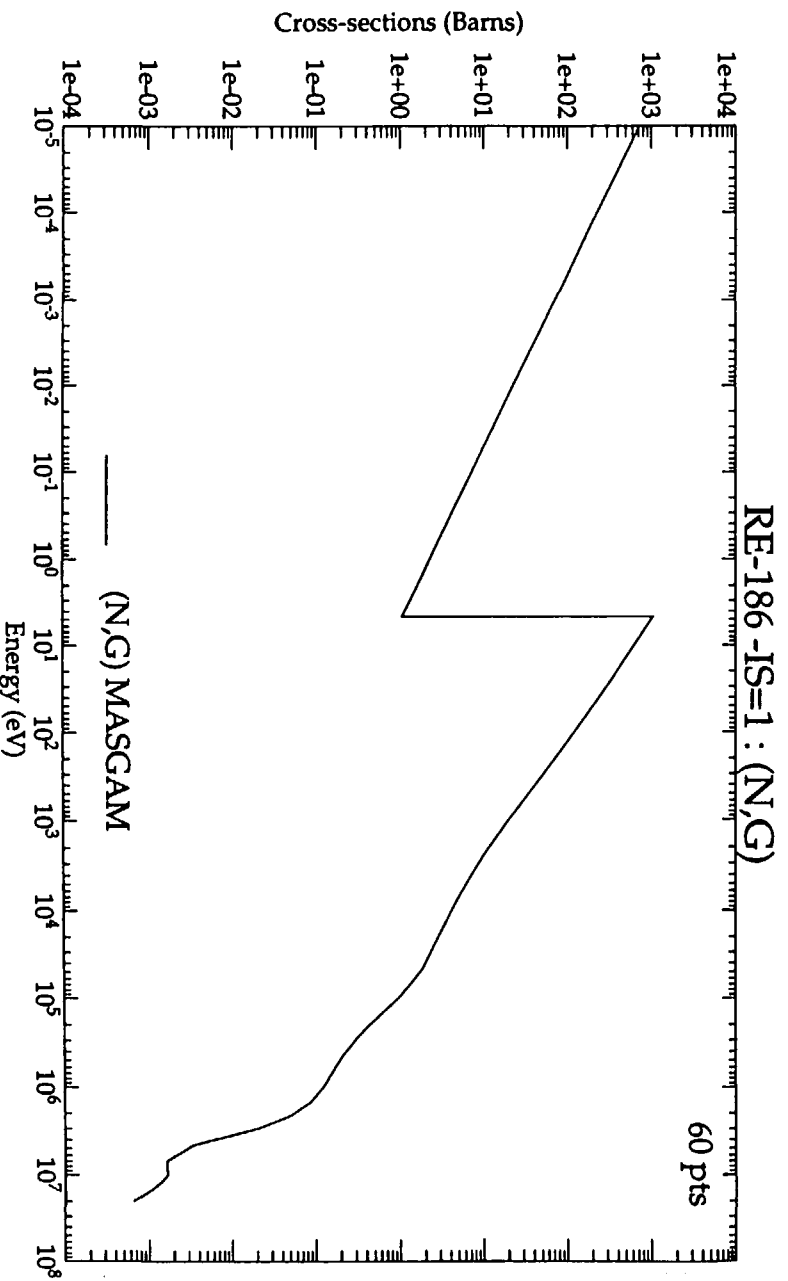
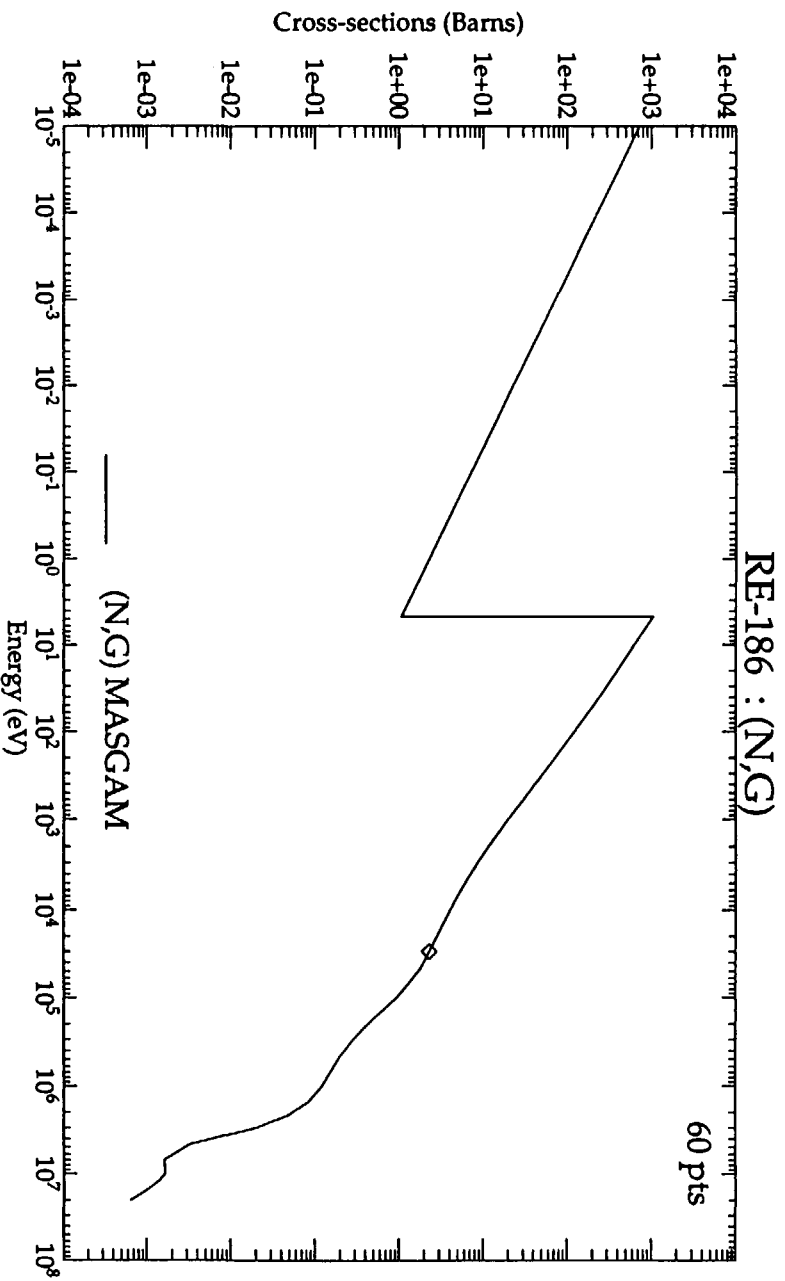


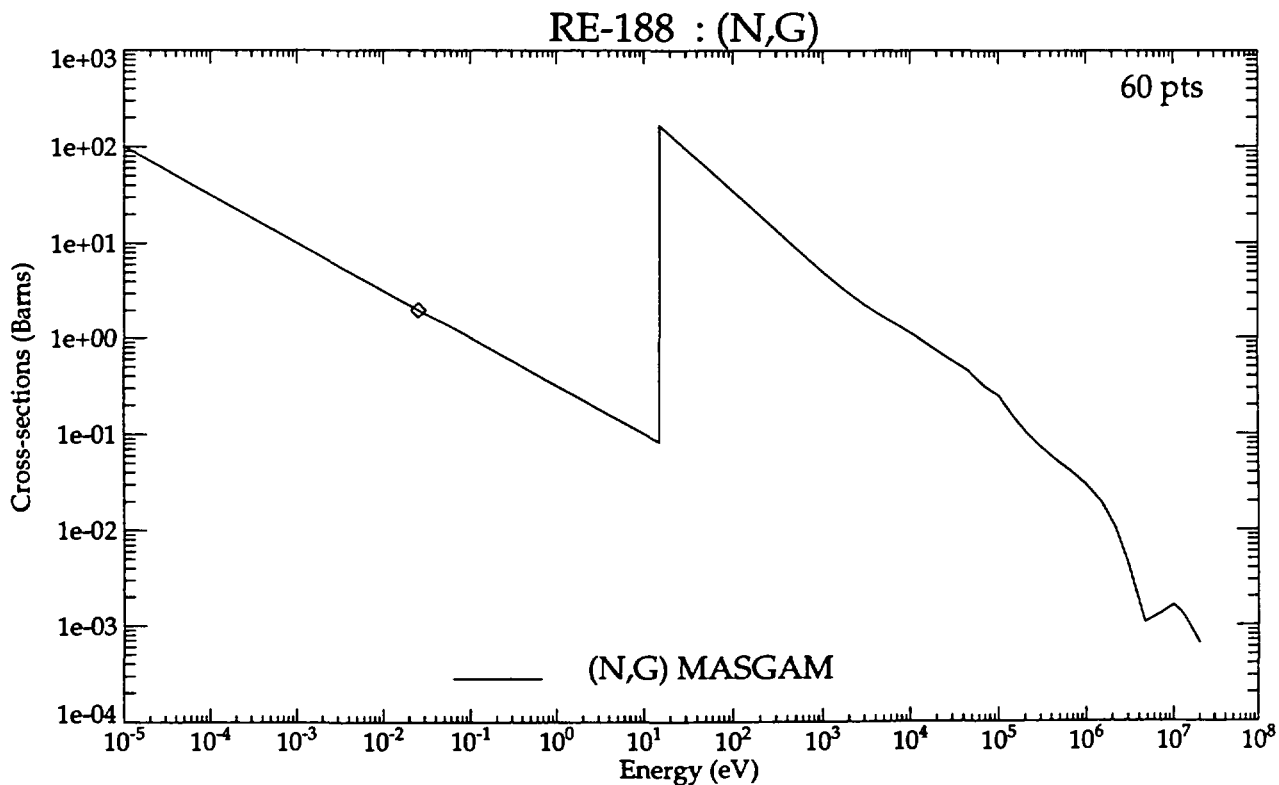
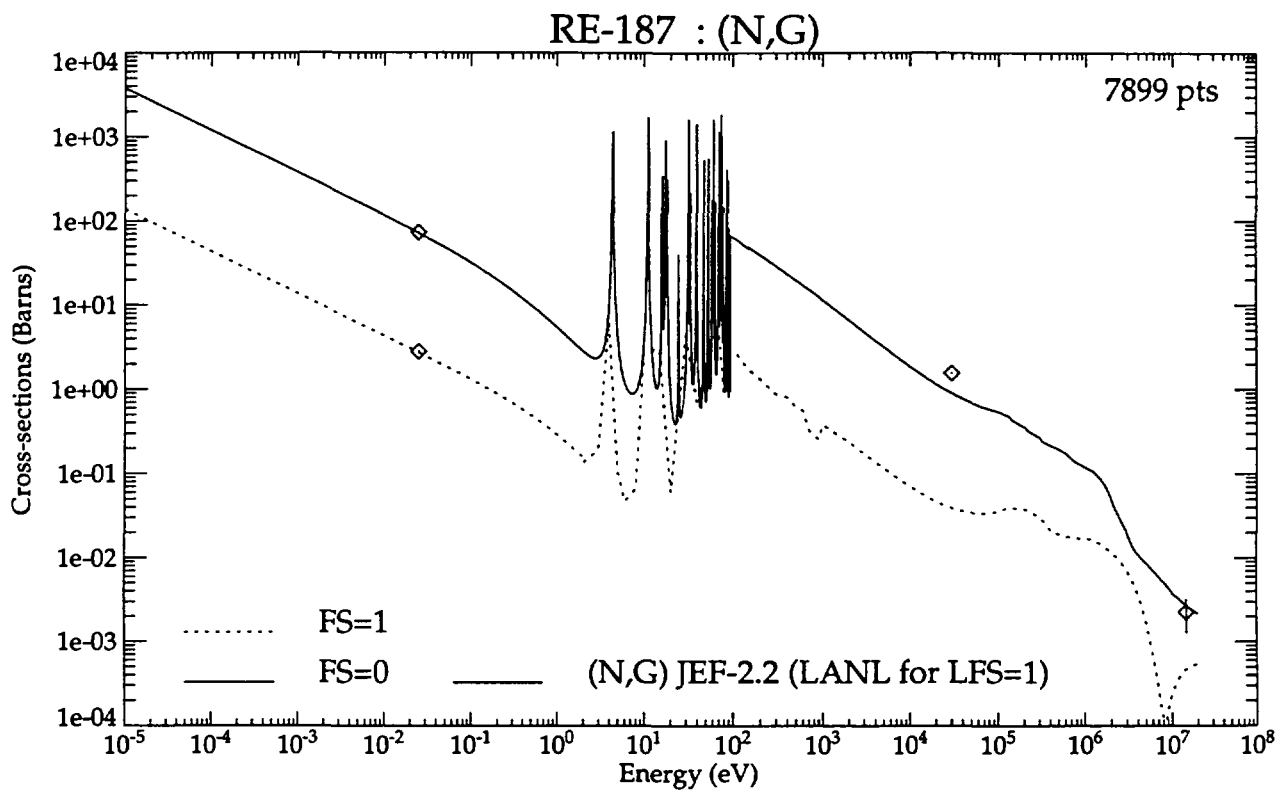


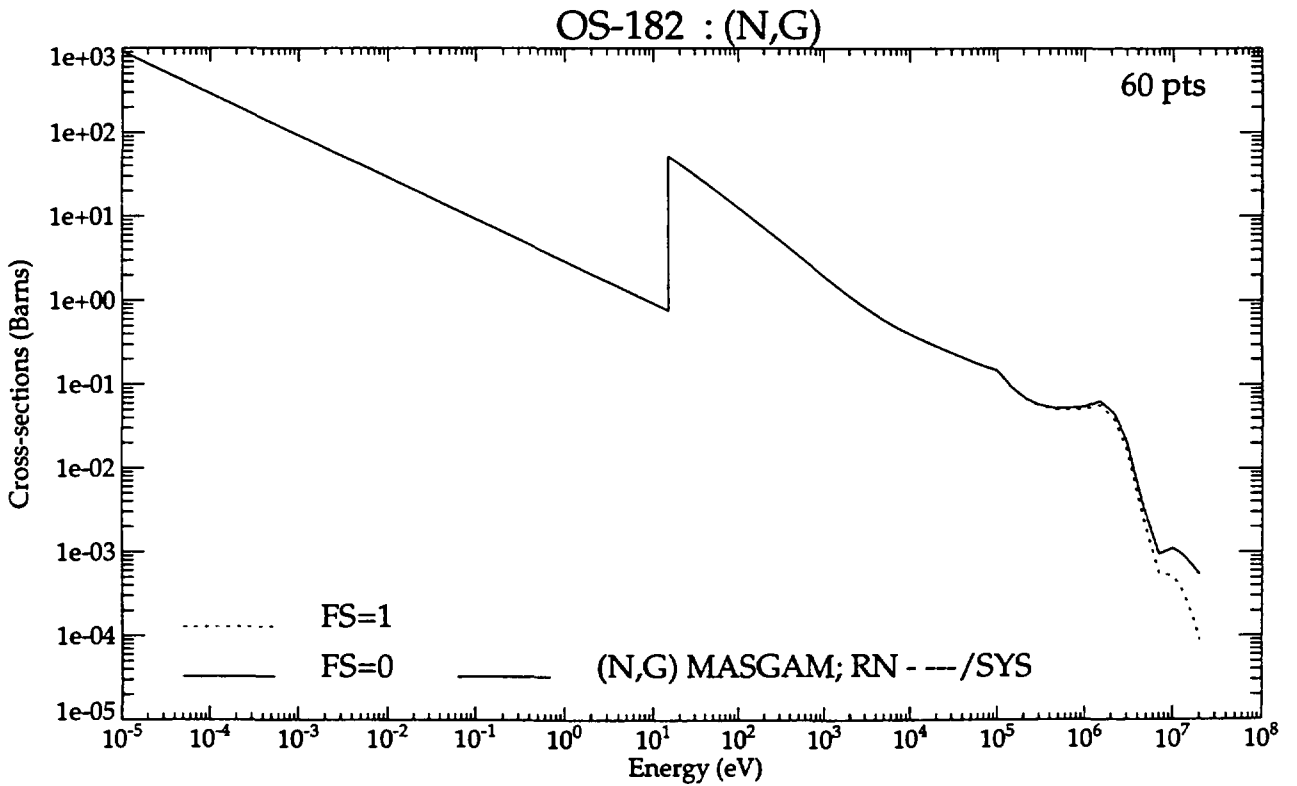
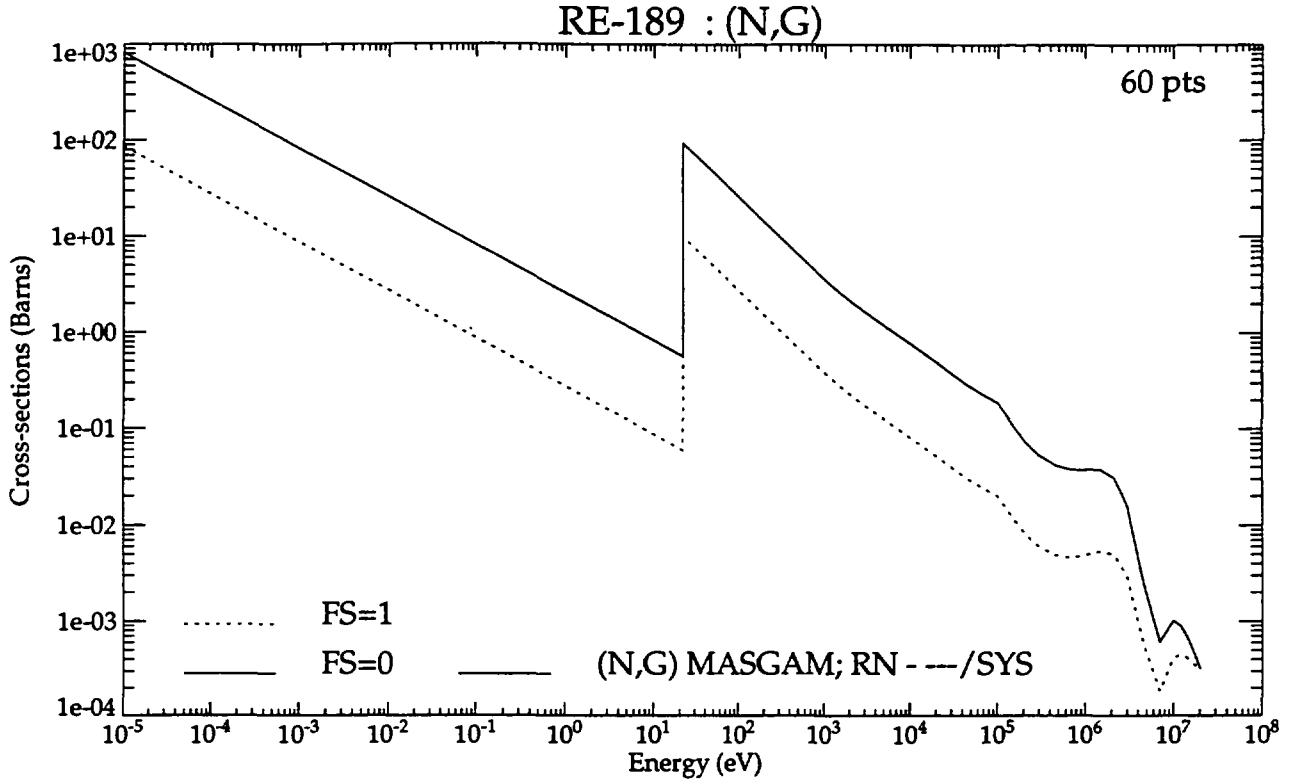


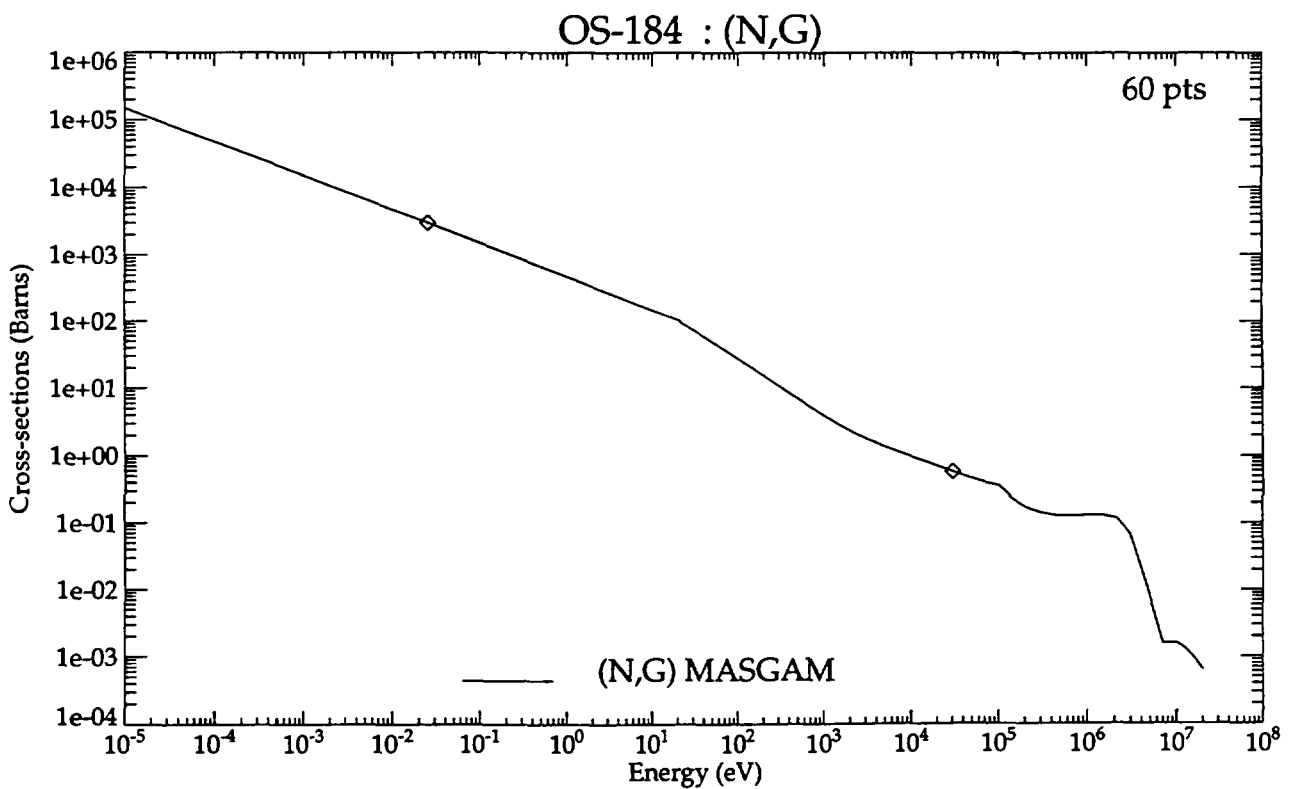
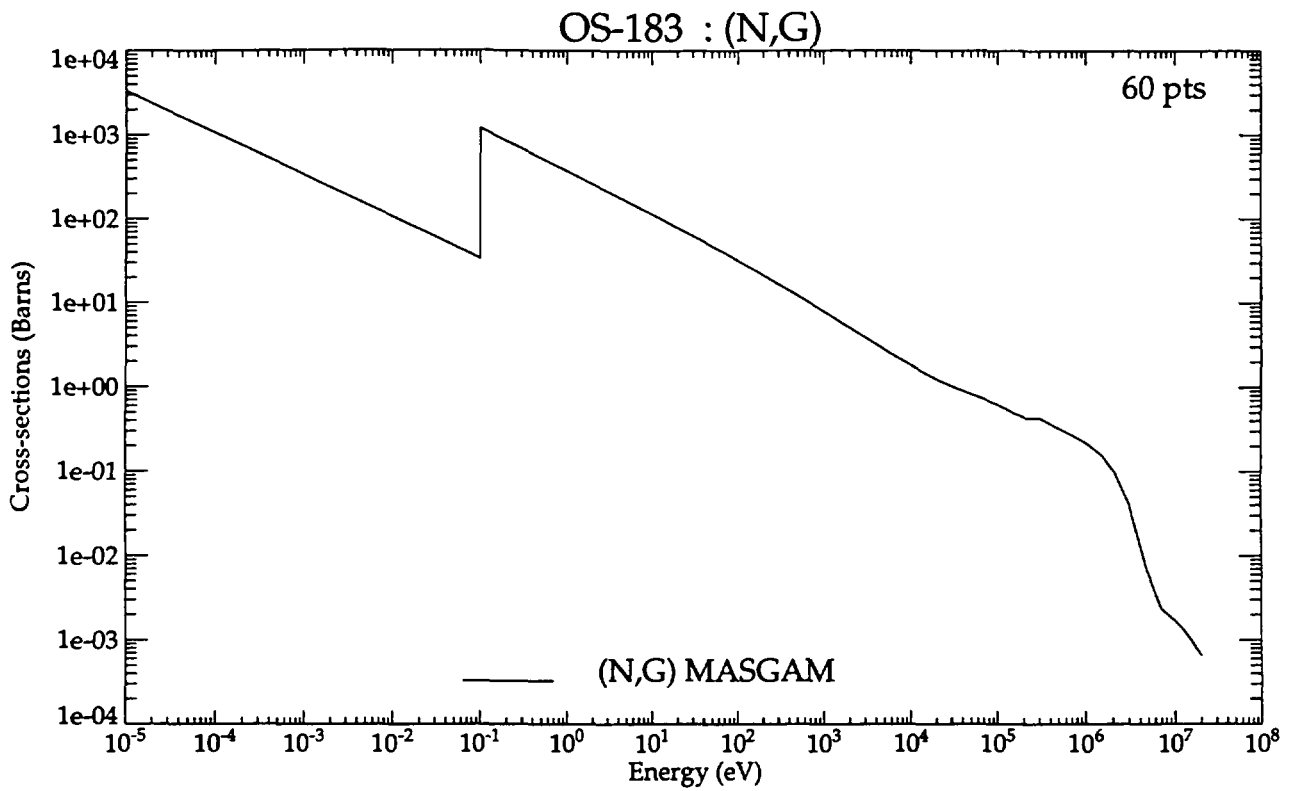


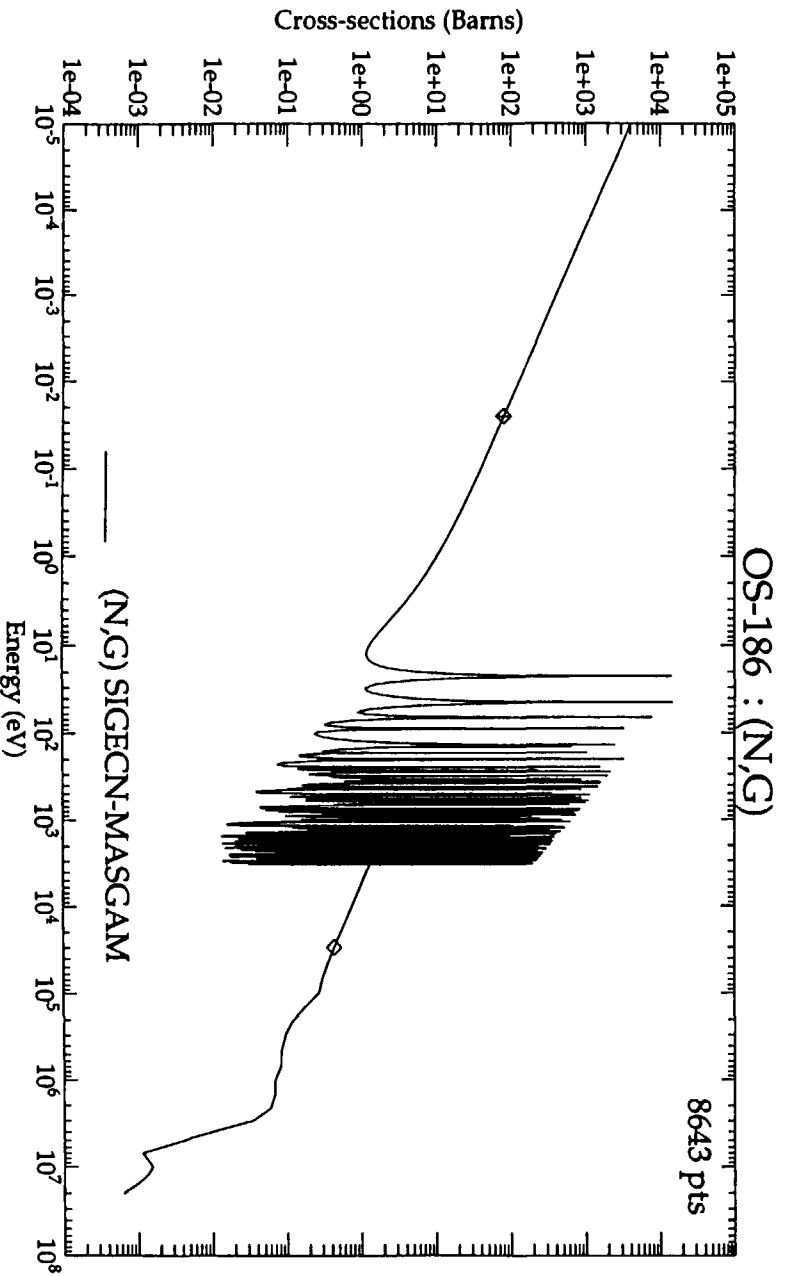
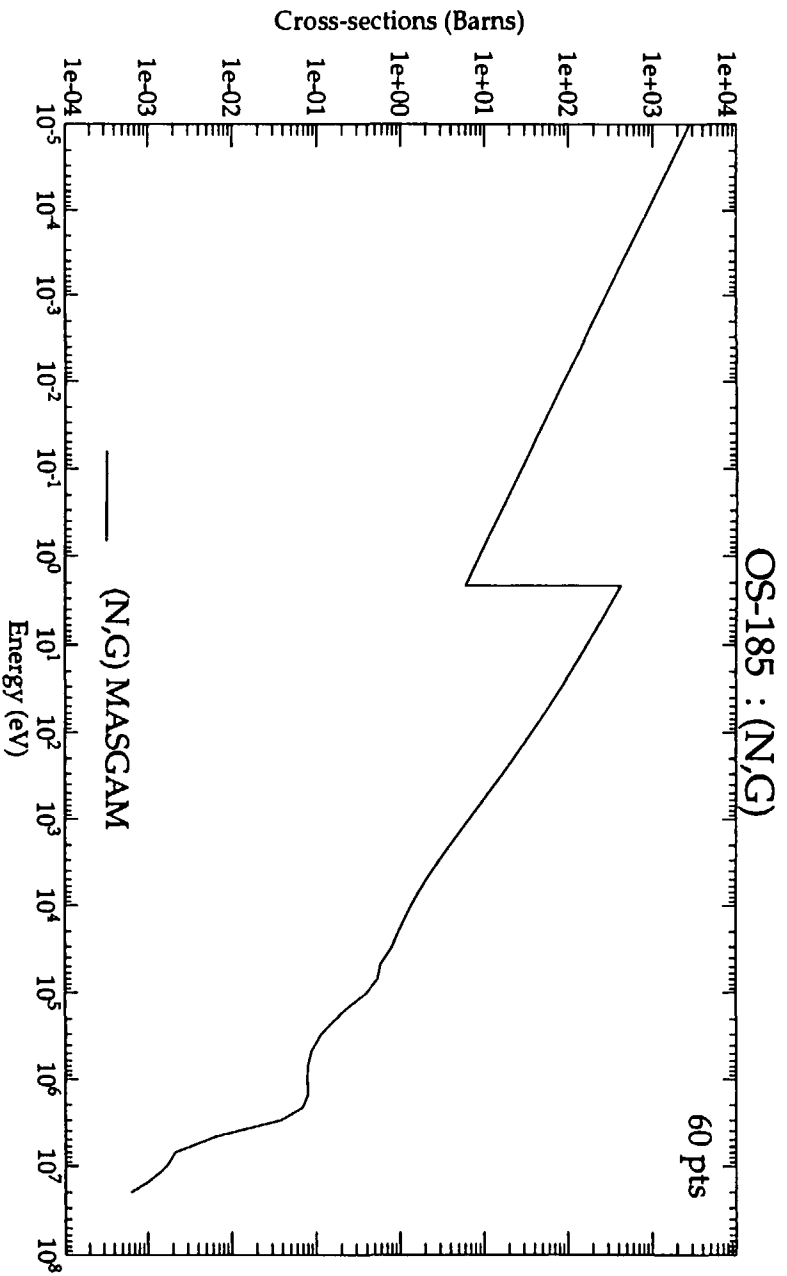


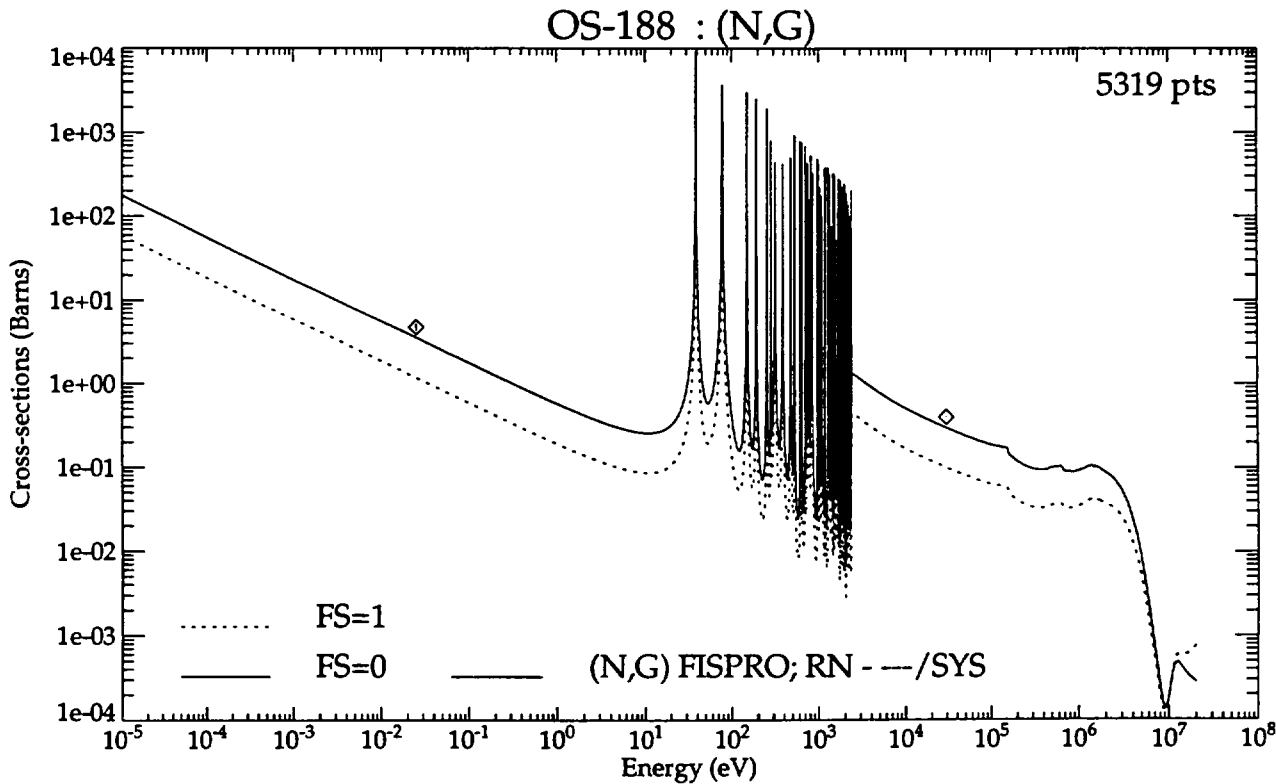
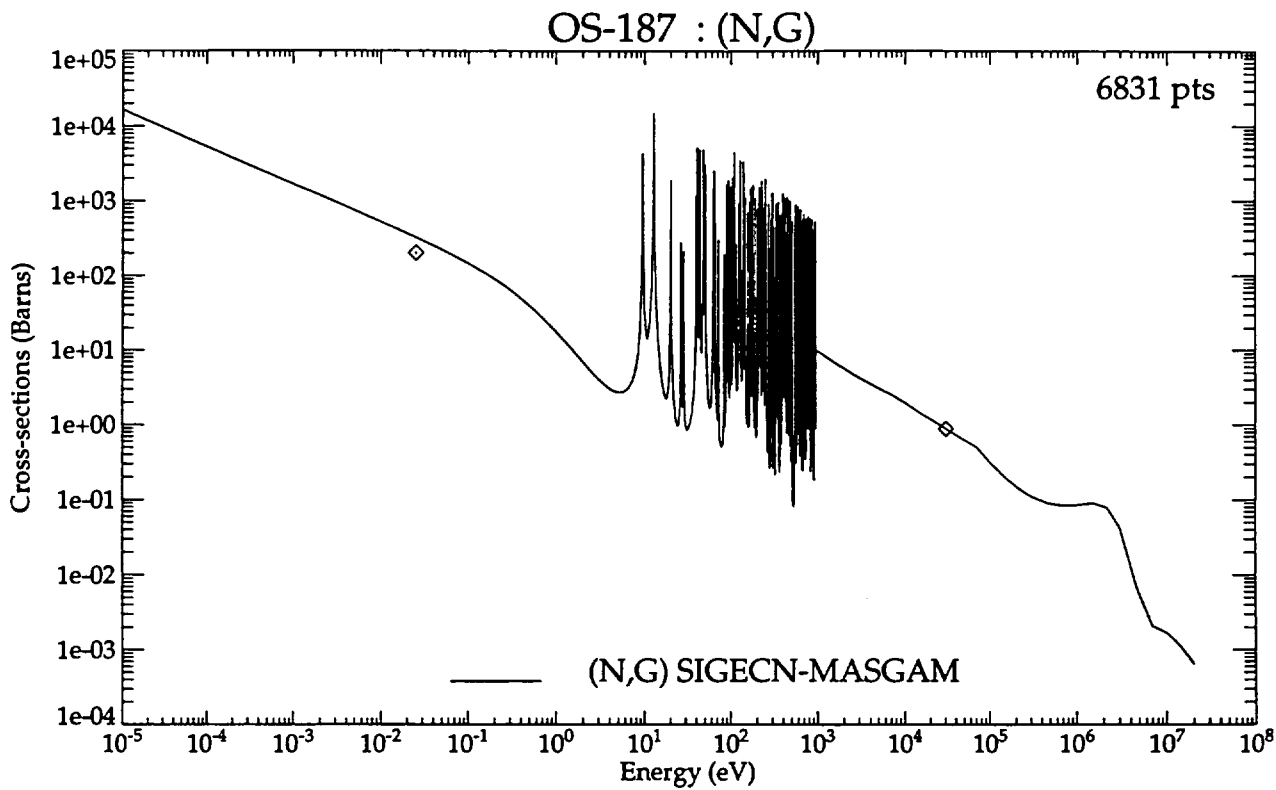


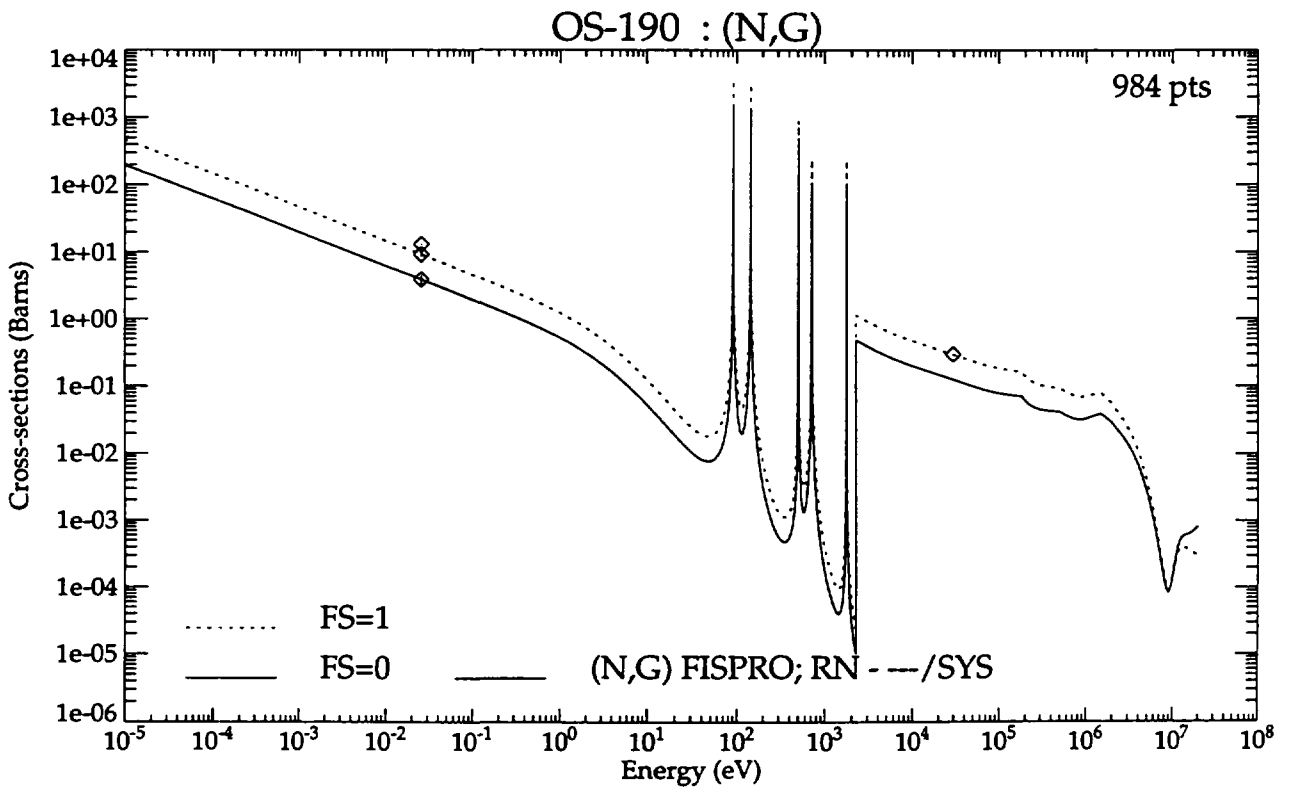
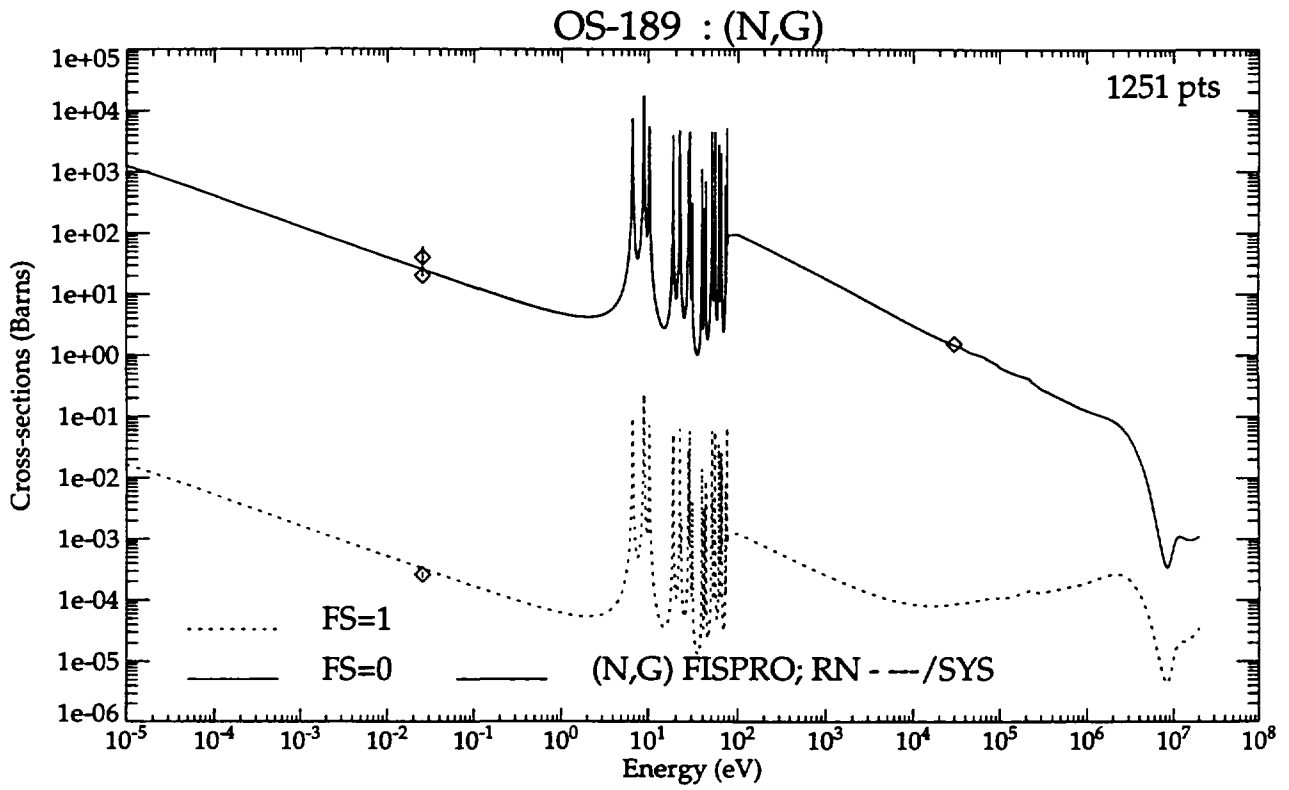


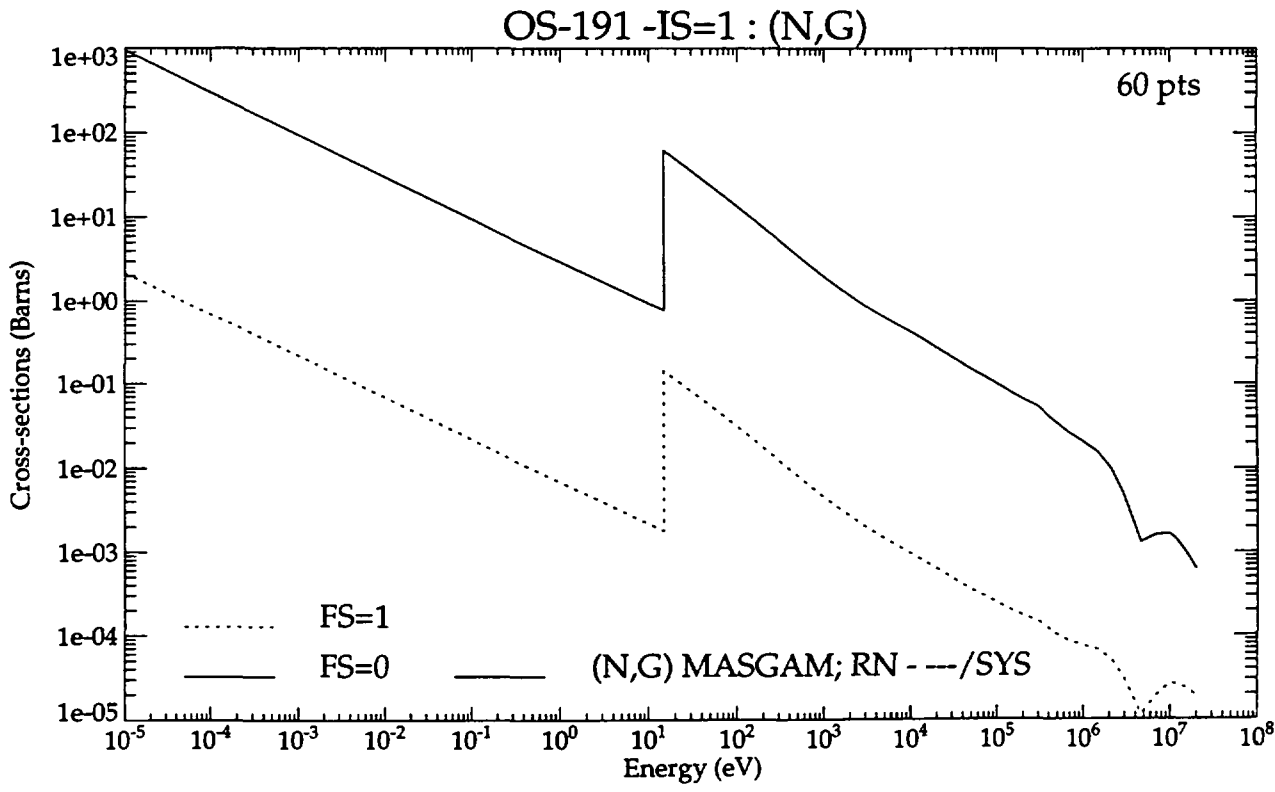
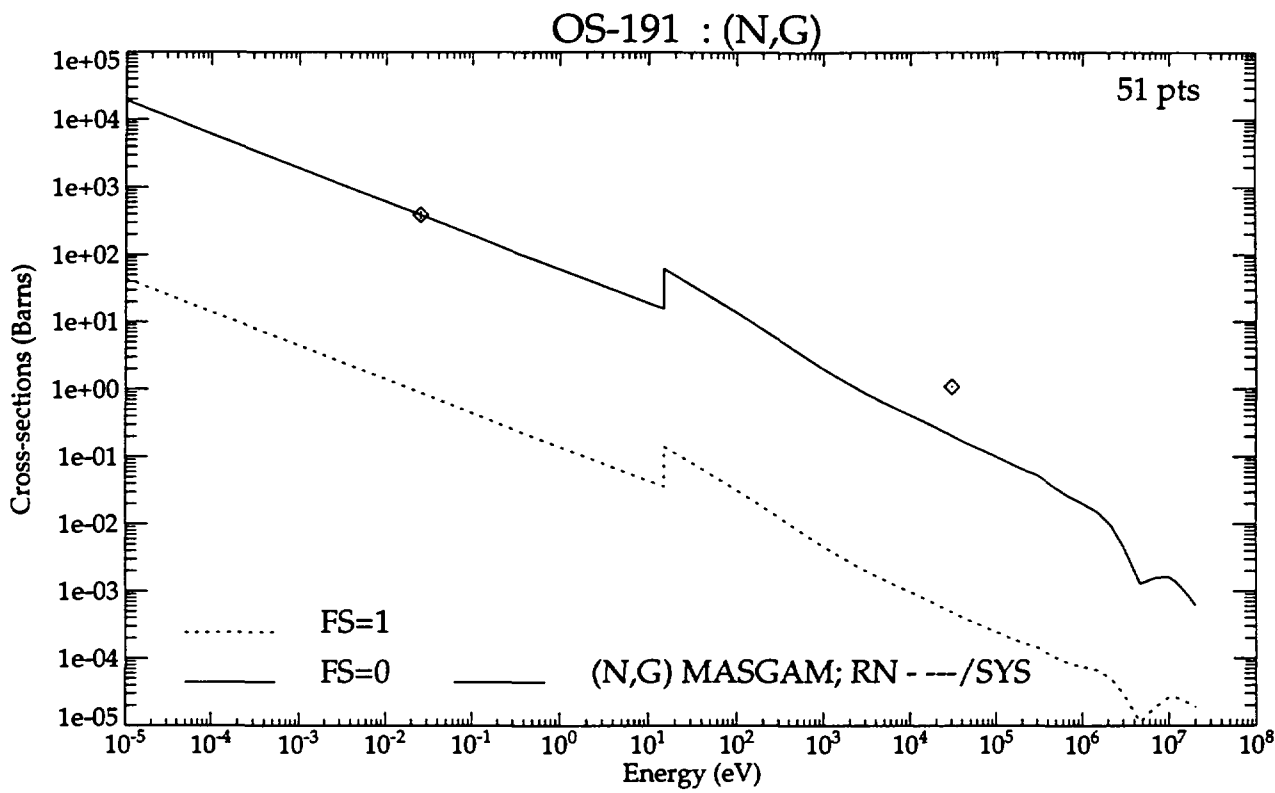


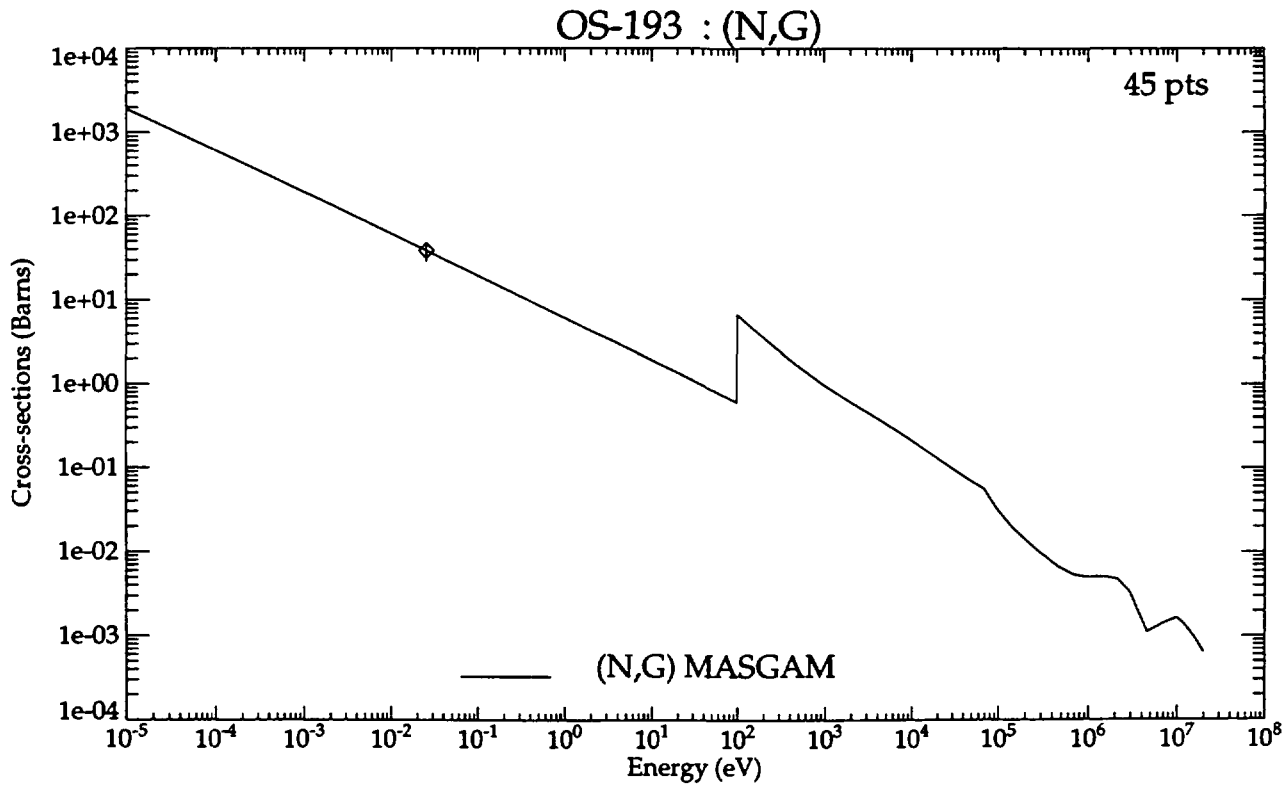
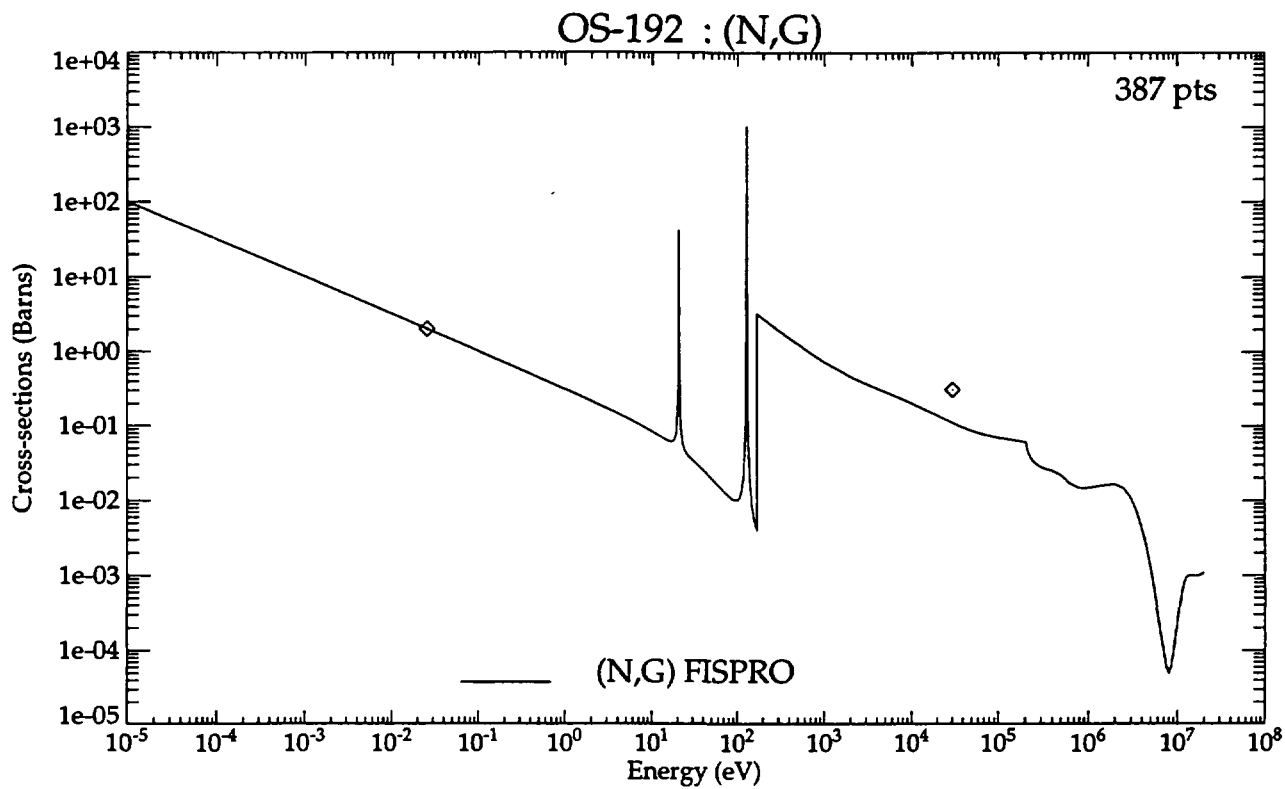


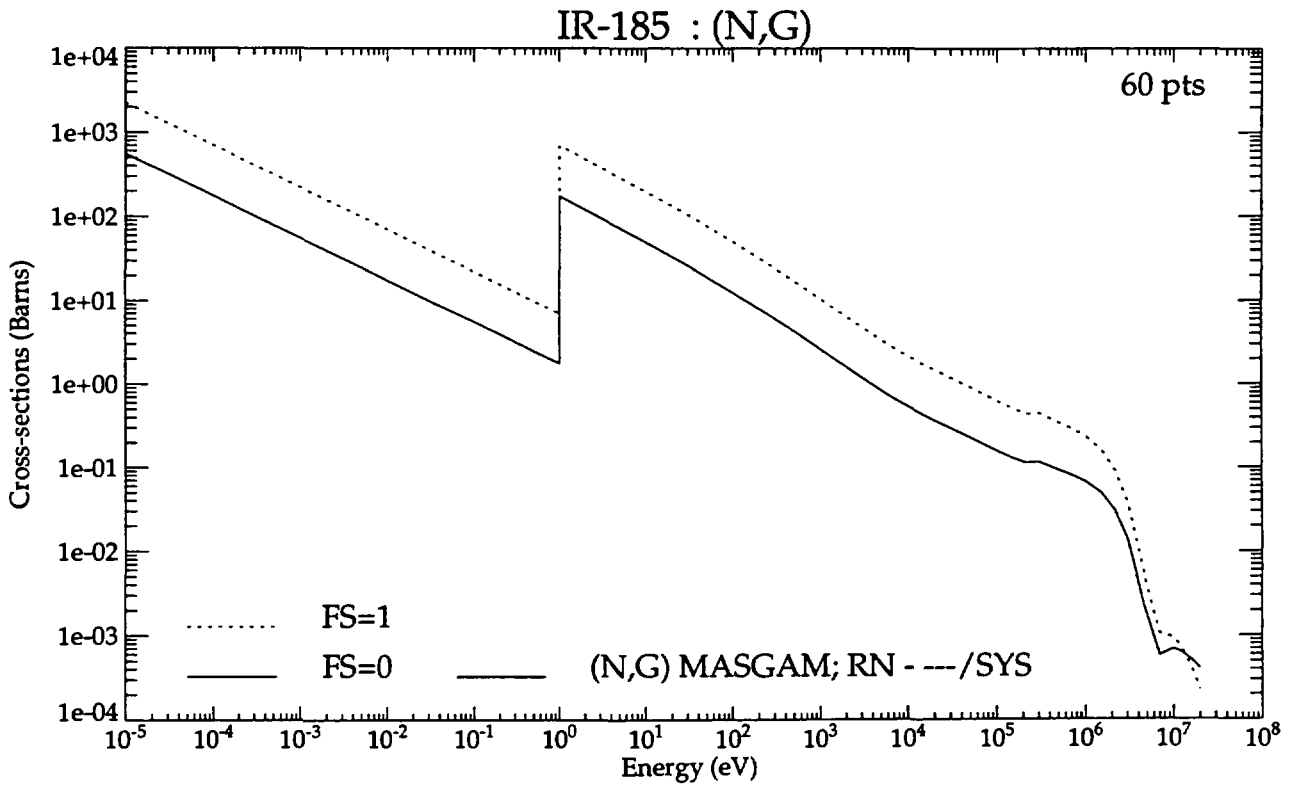
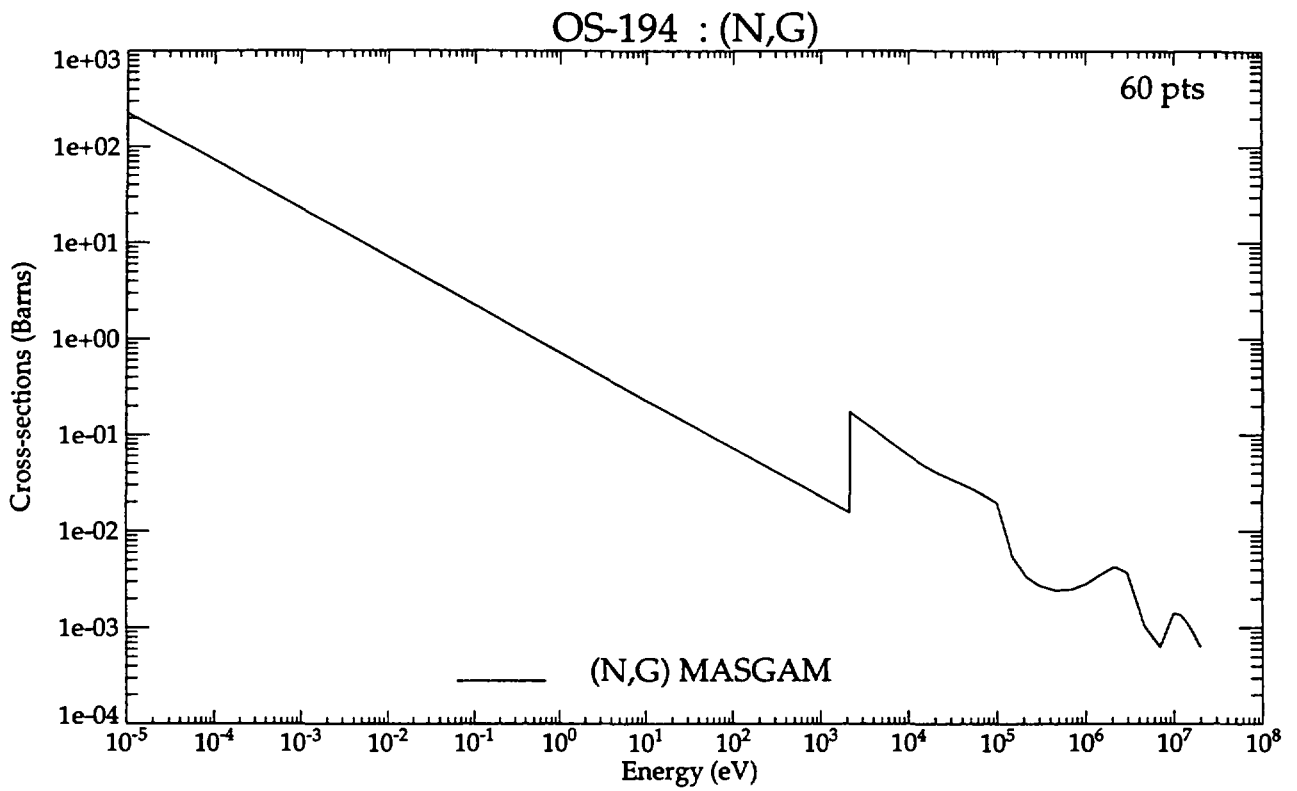


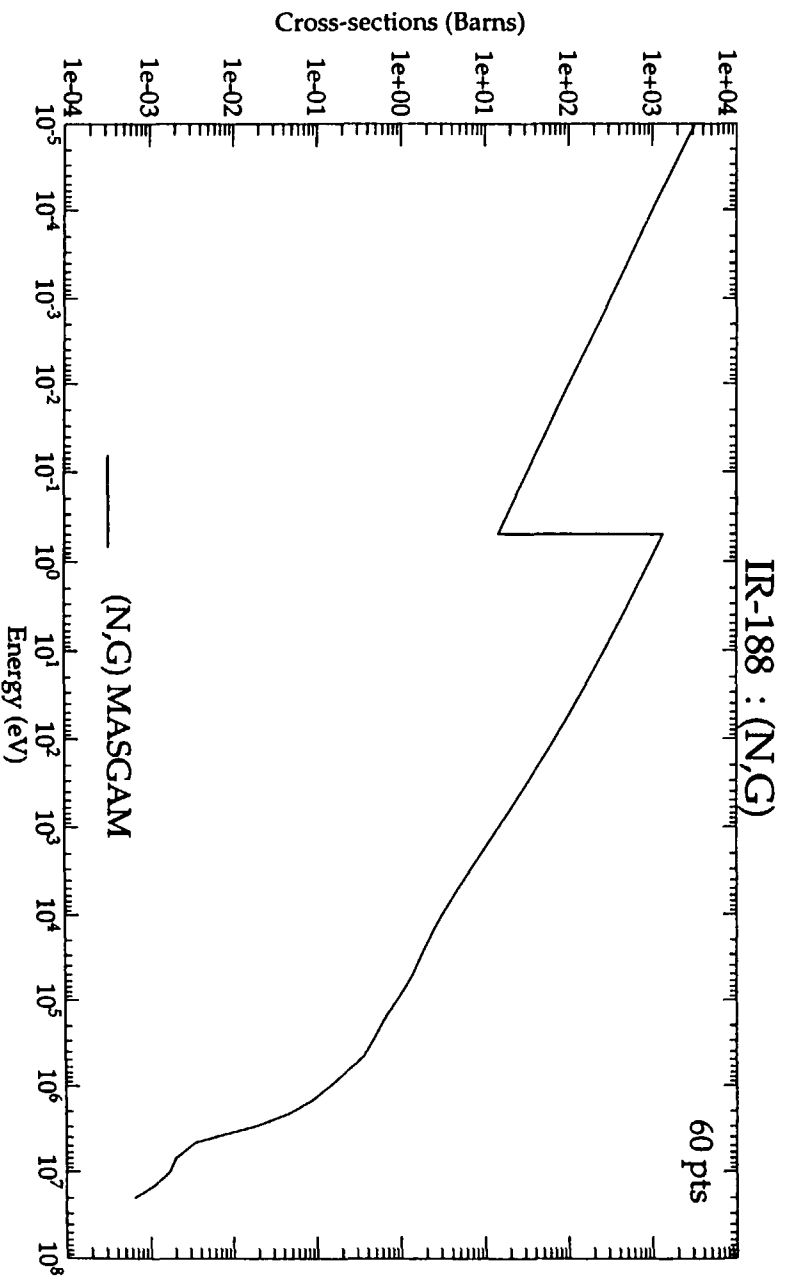
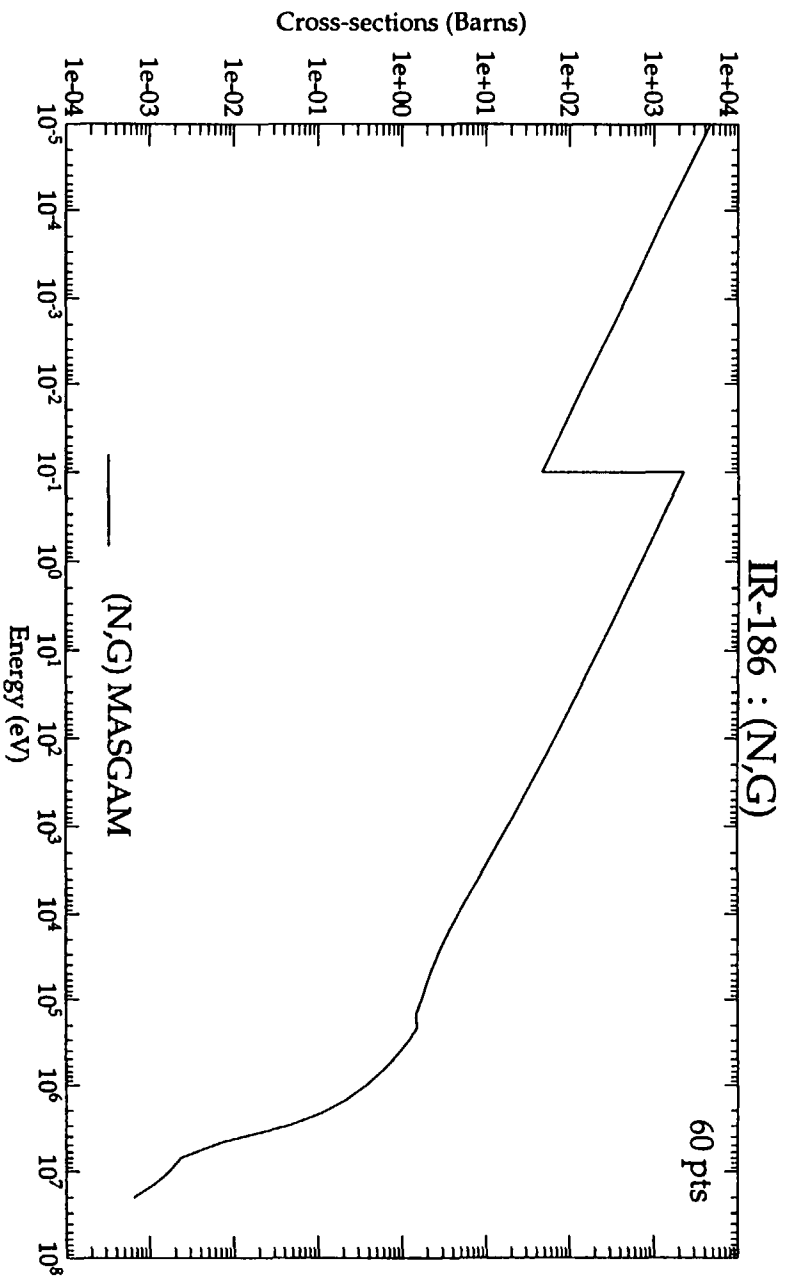




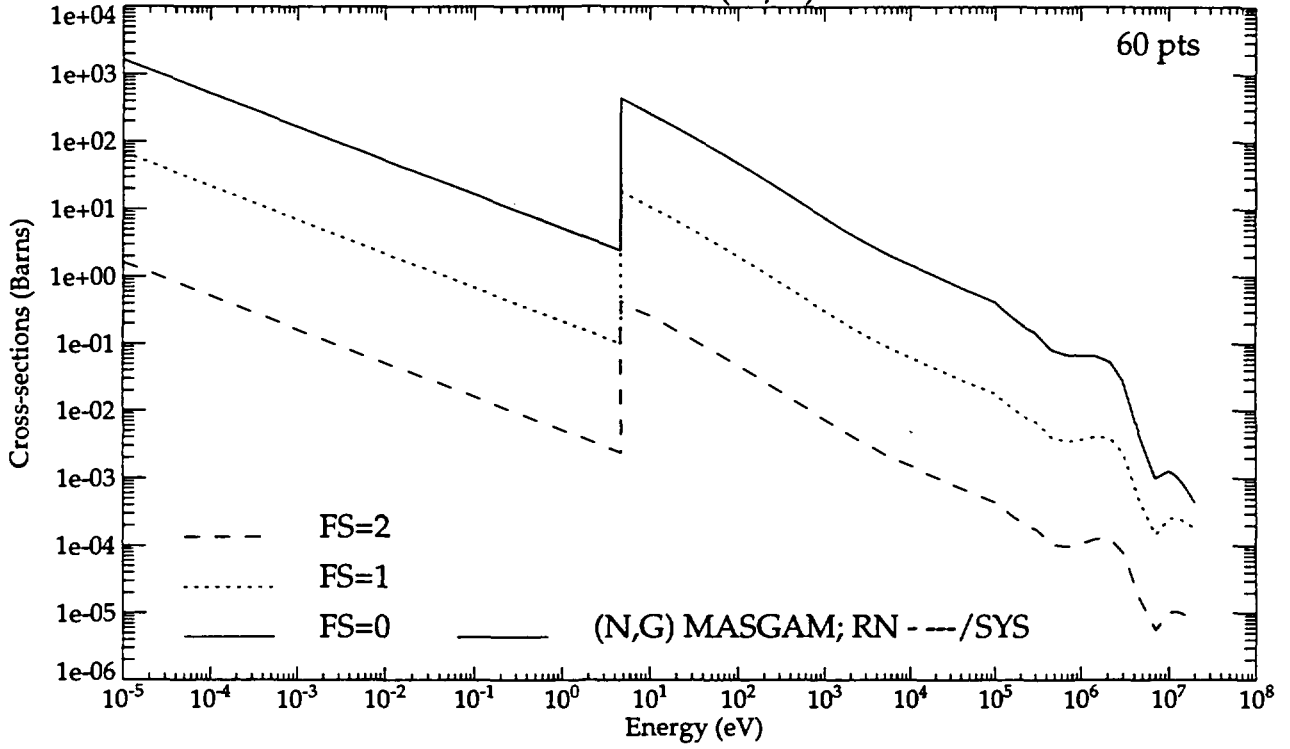




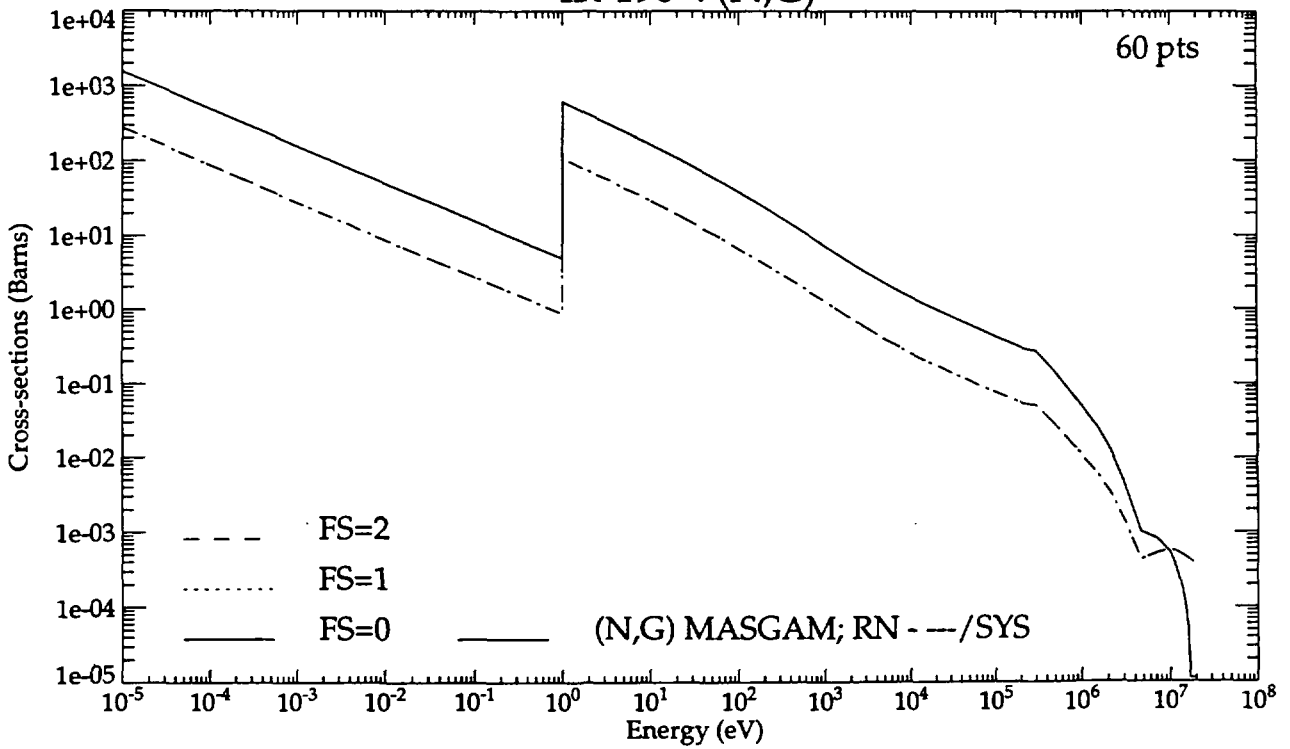


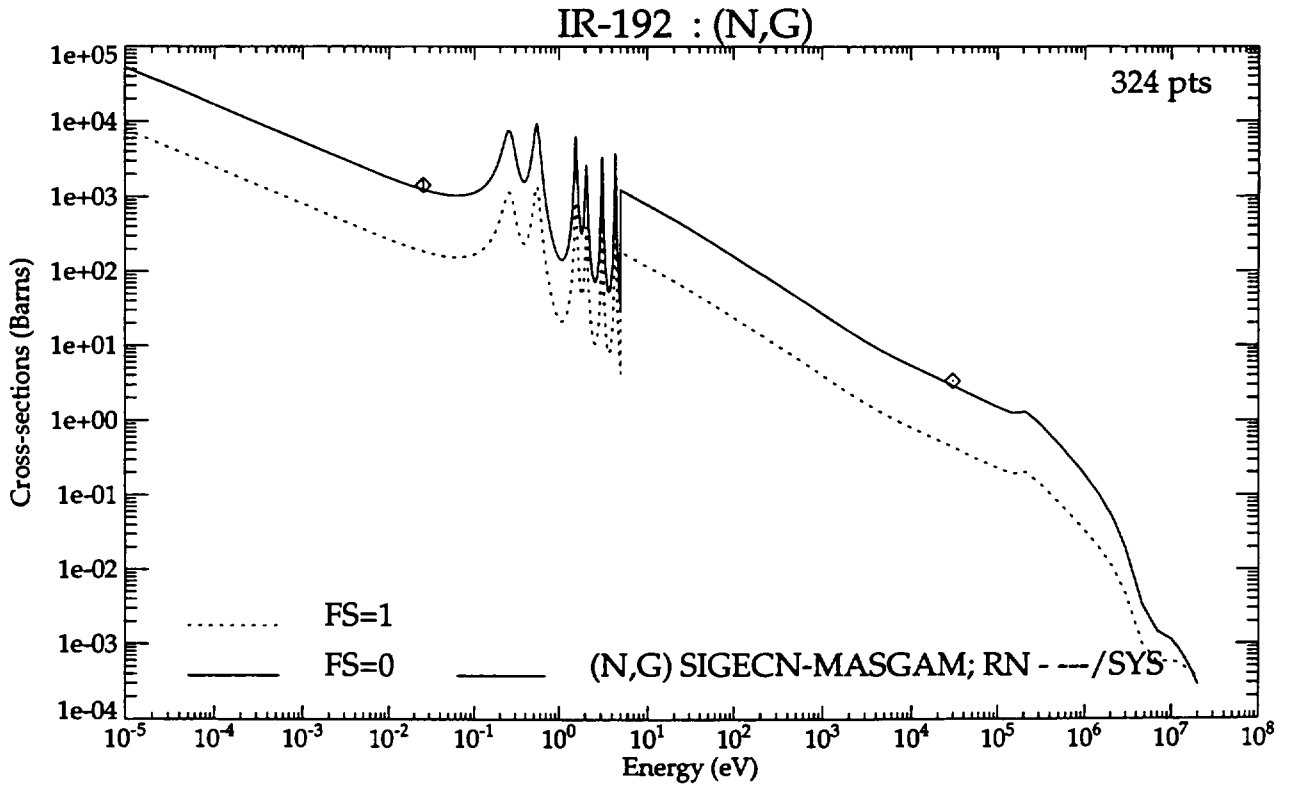
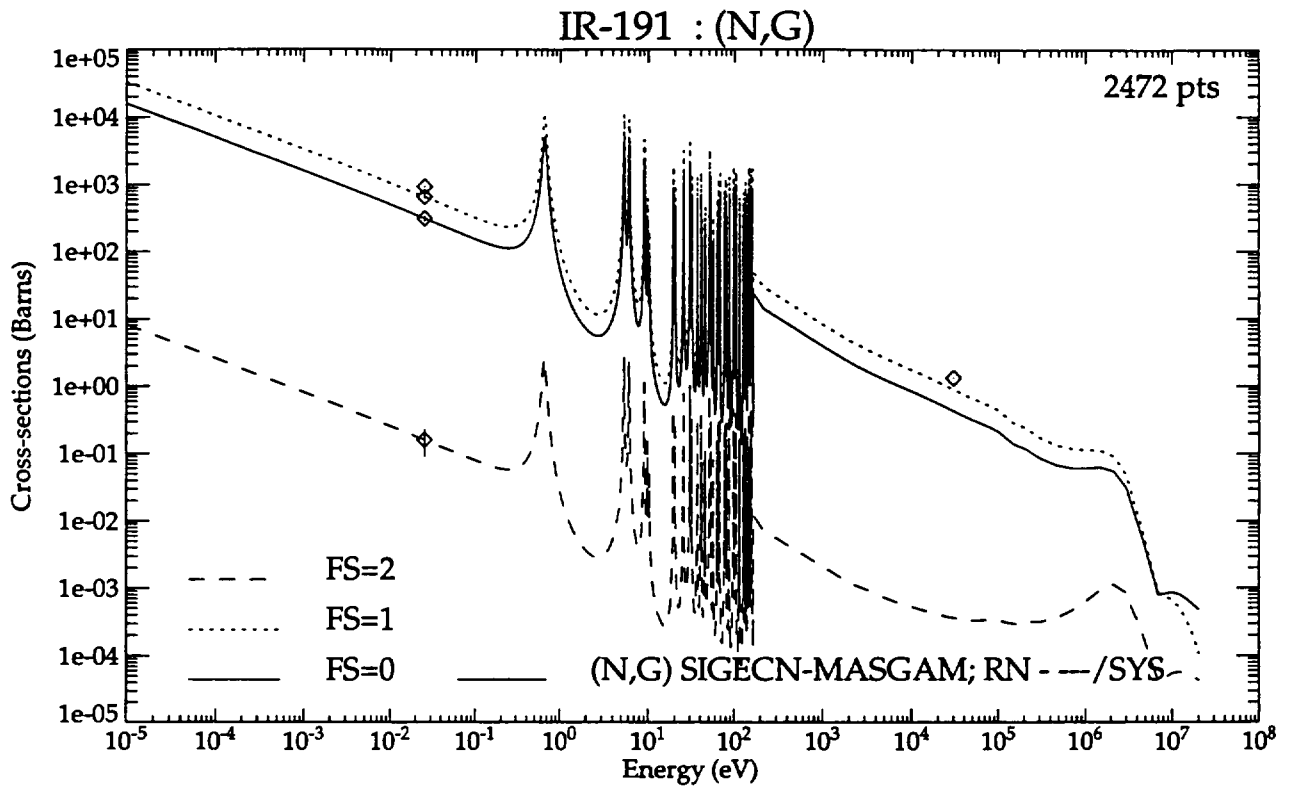


IR-189 : (N,G)

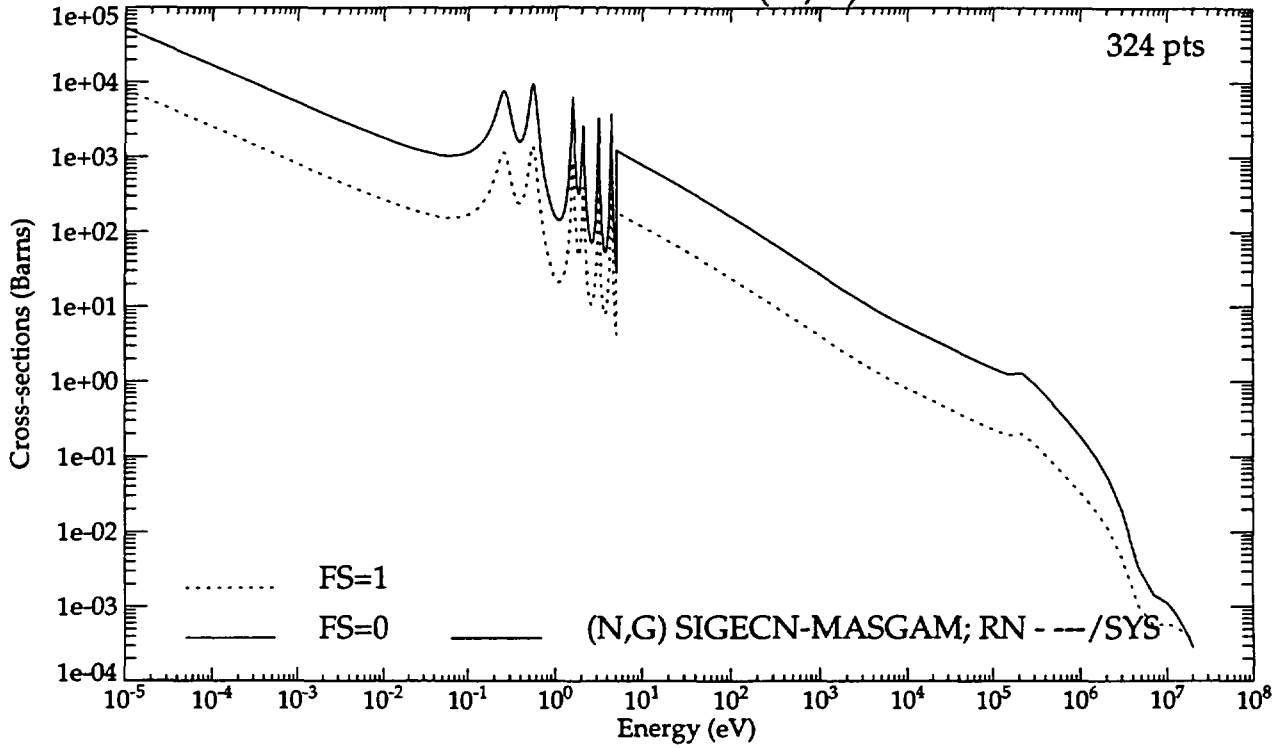


IR-190 : (N,G)

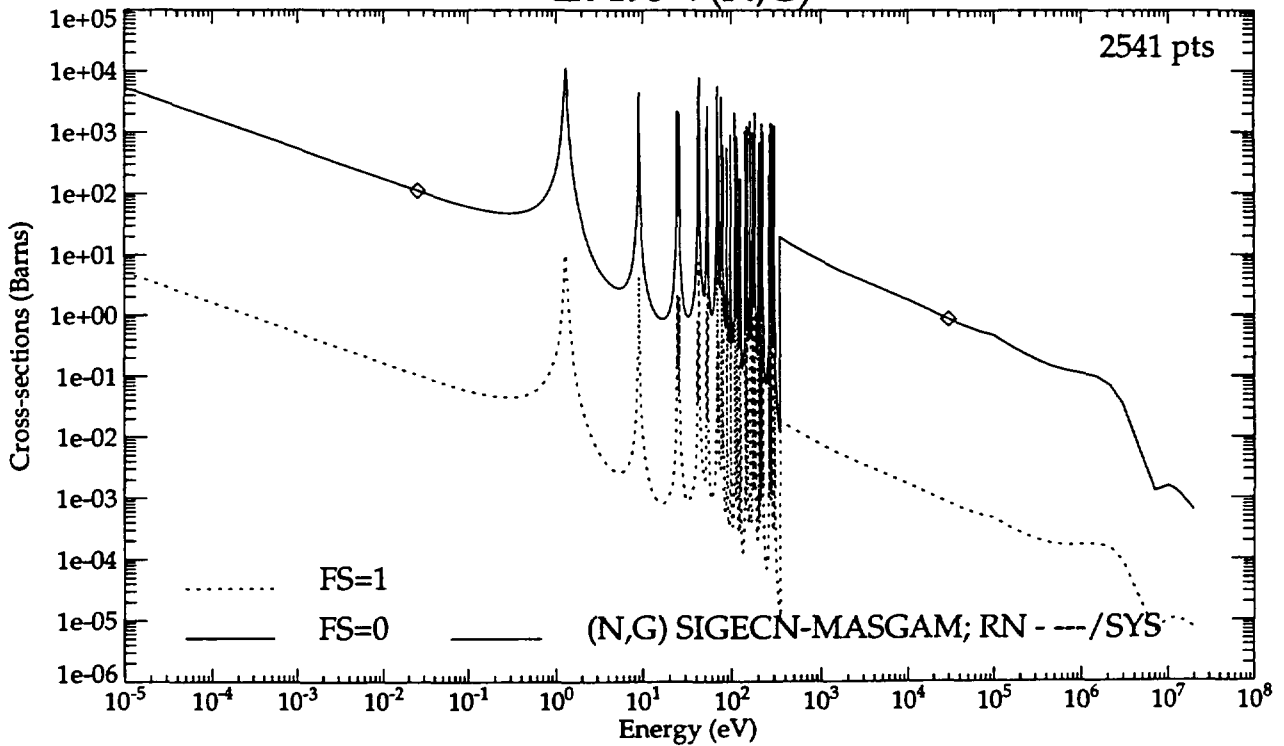


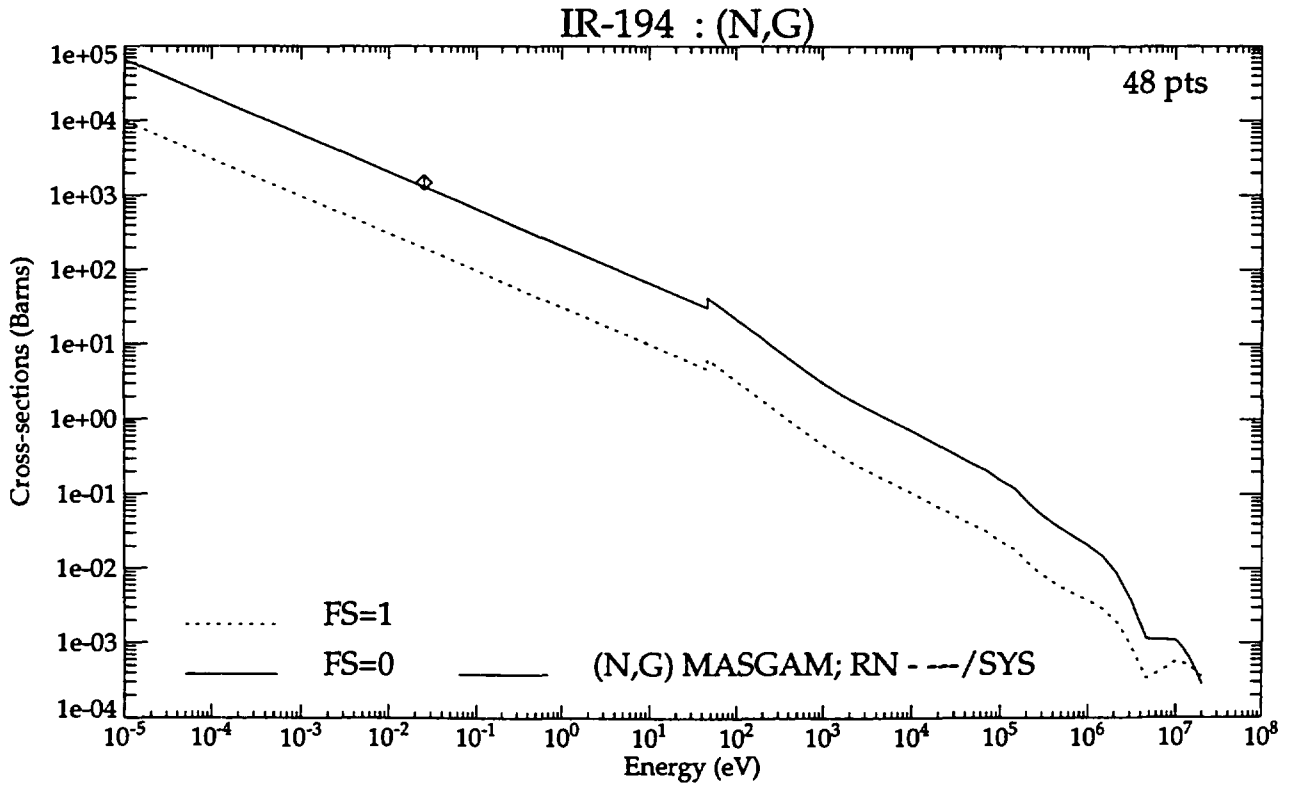
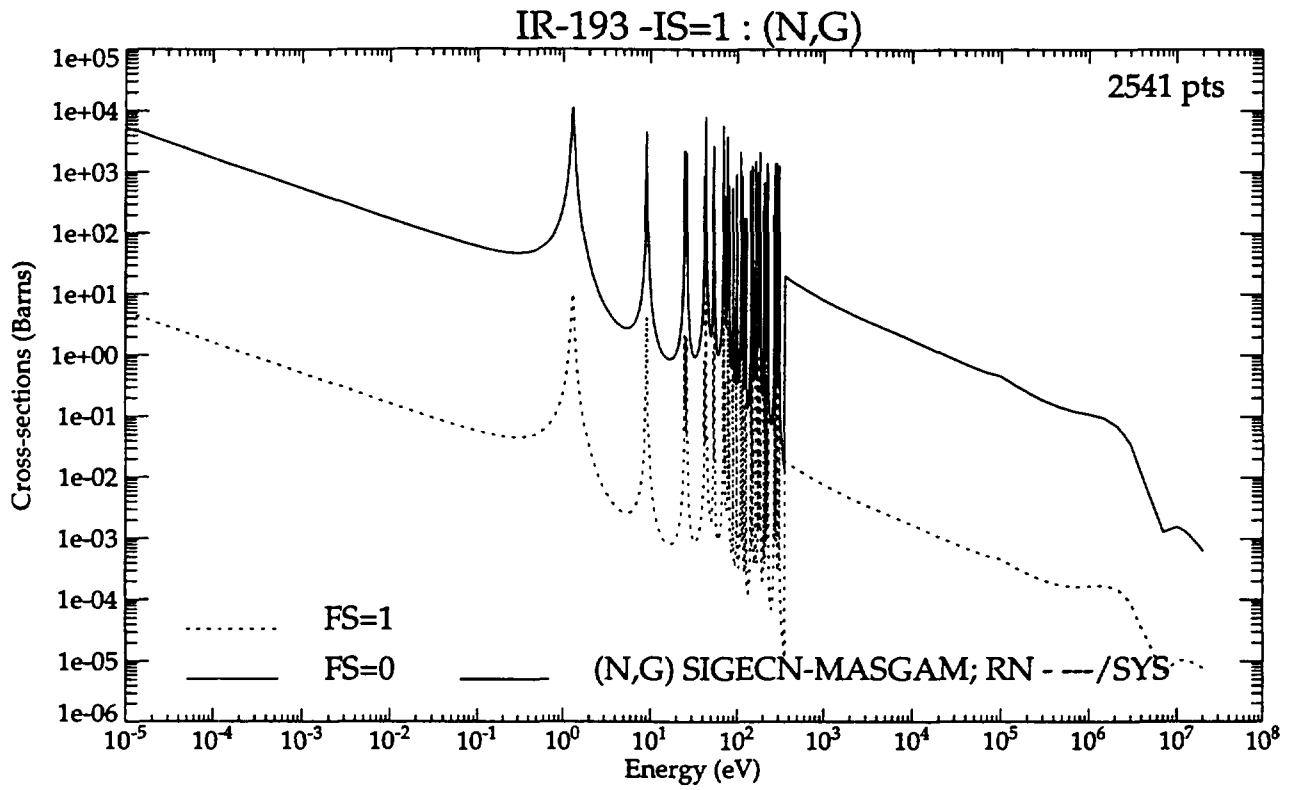


IR-192 -IS=2 : (N,G)

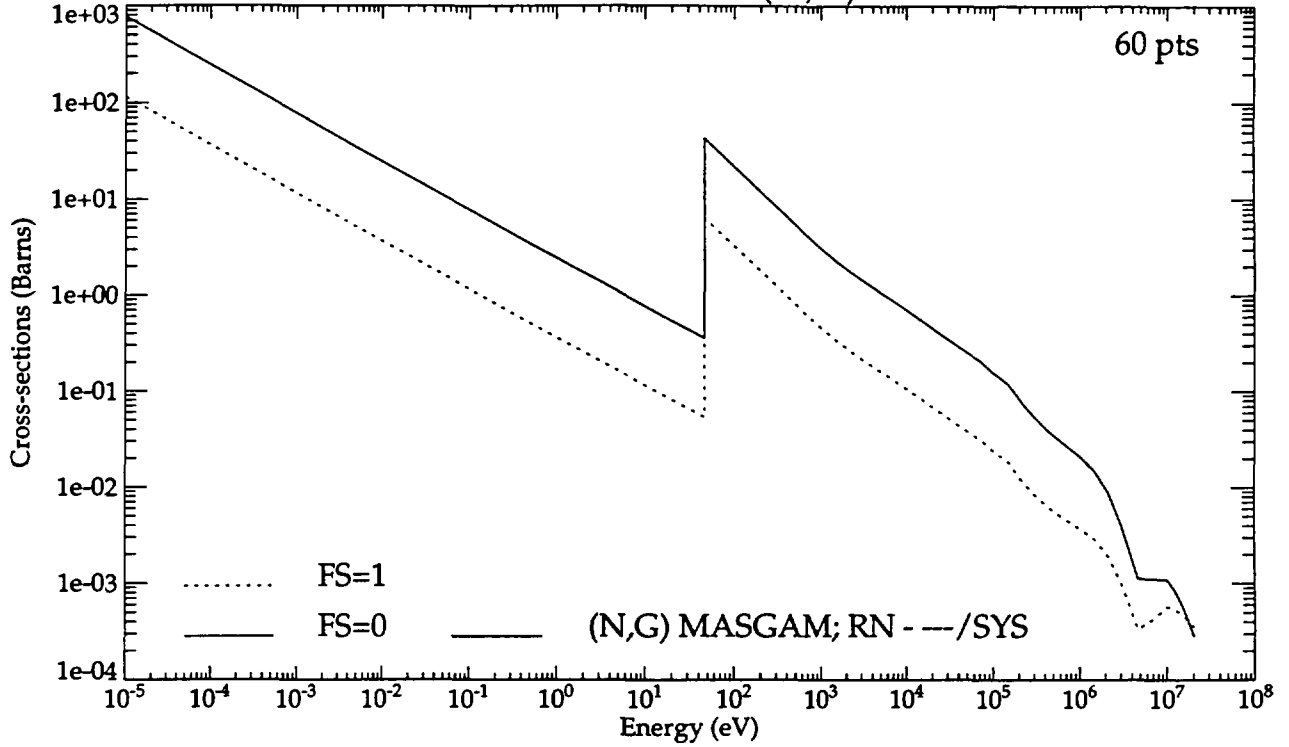


IR-193 : (N,G)

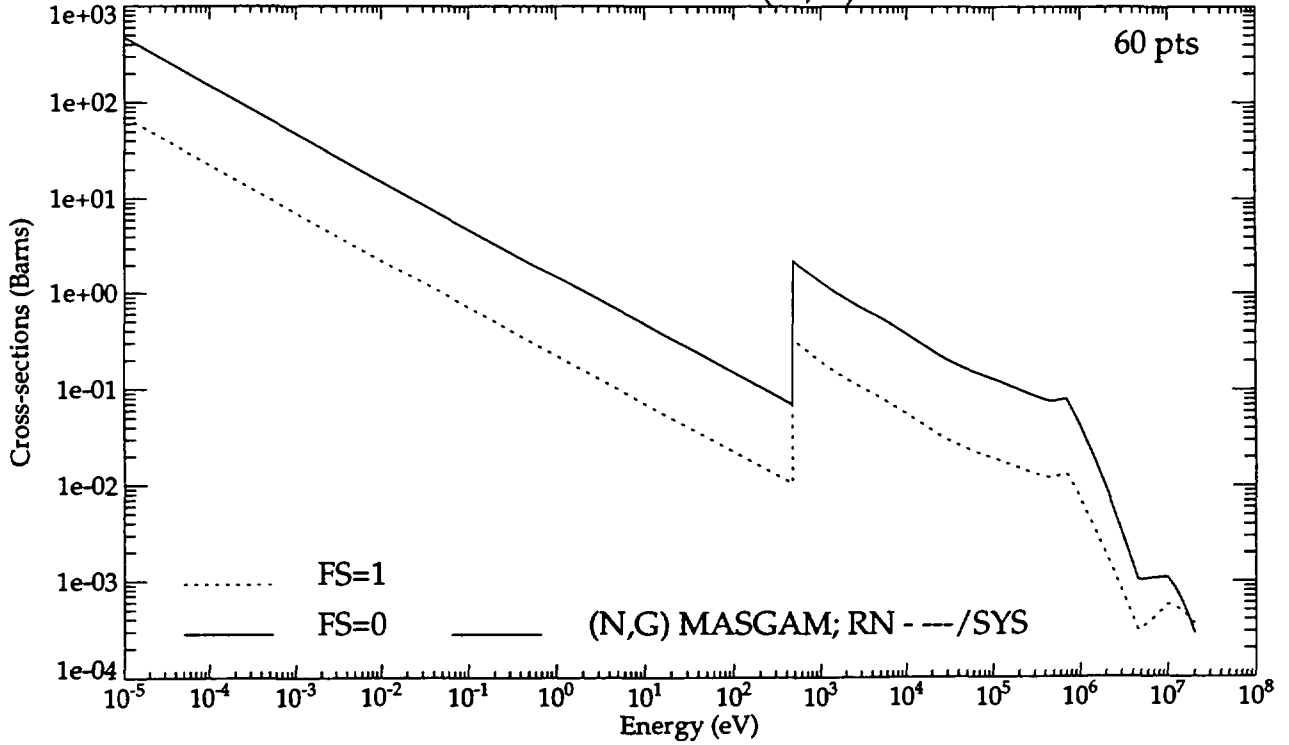


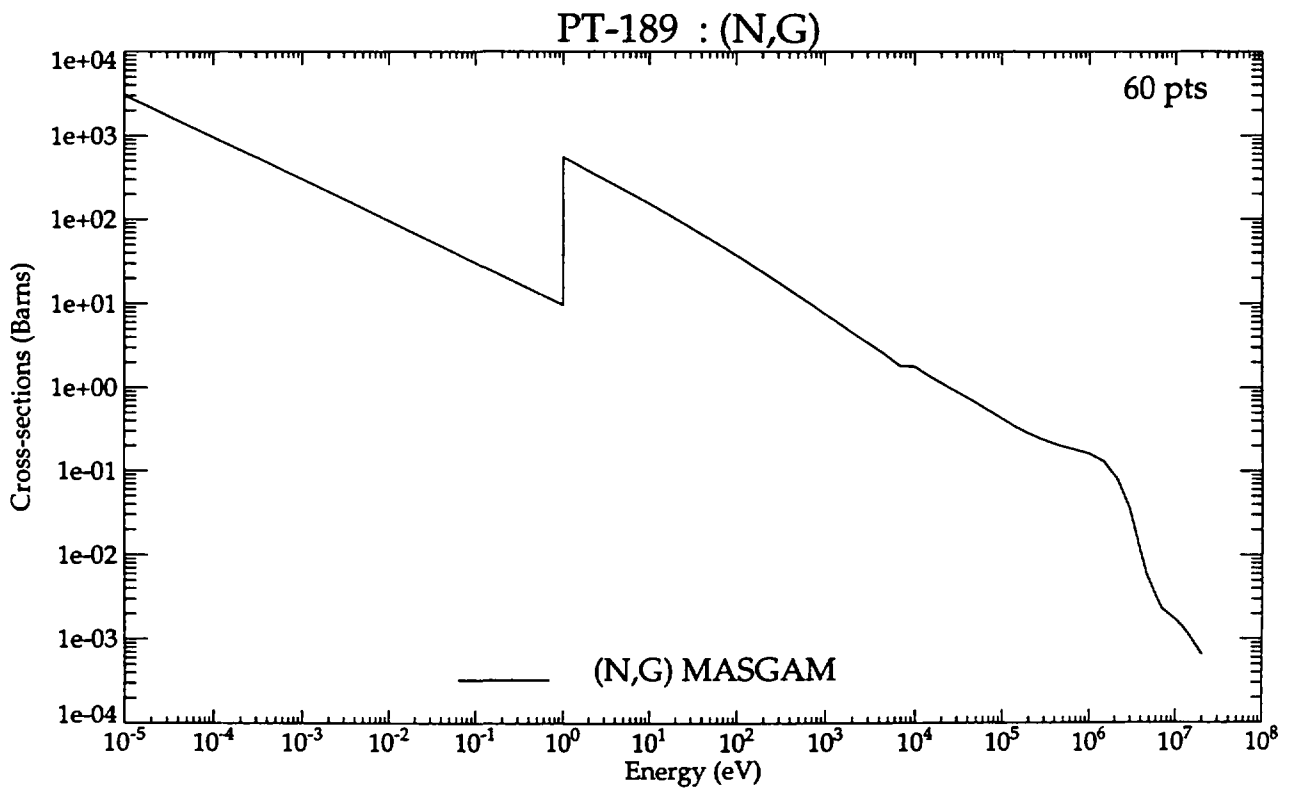
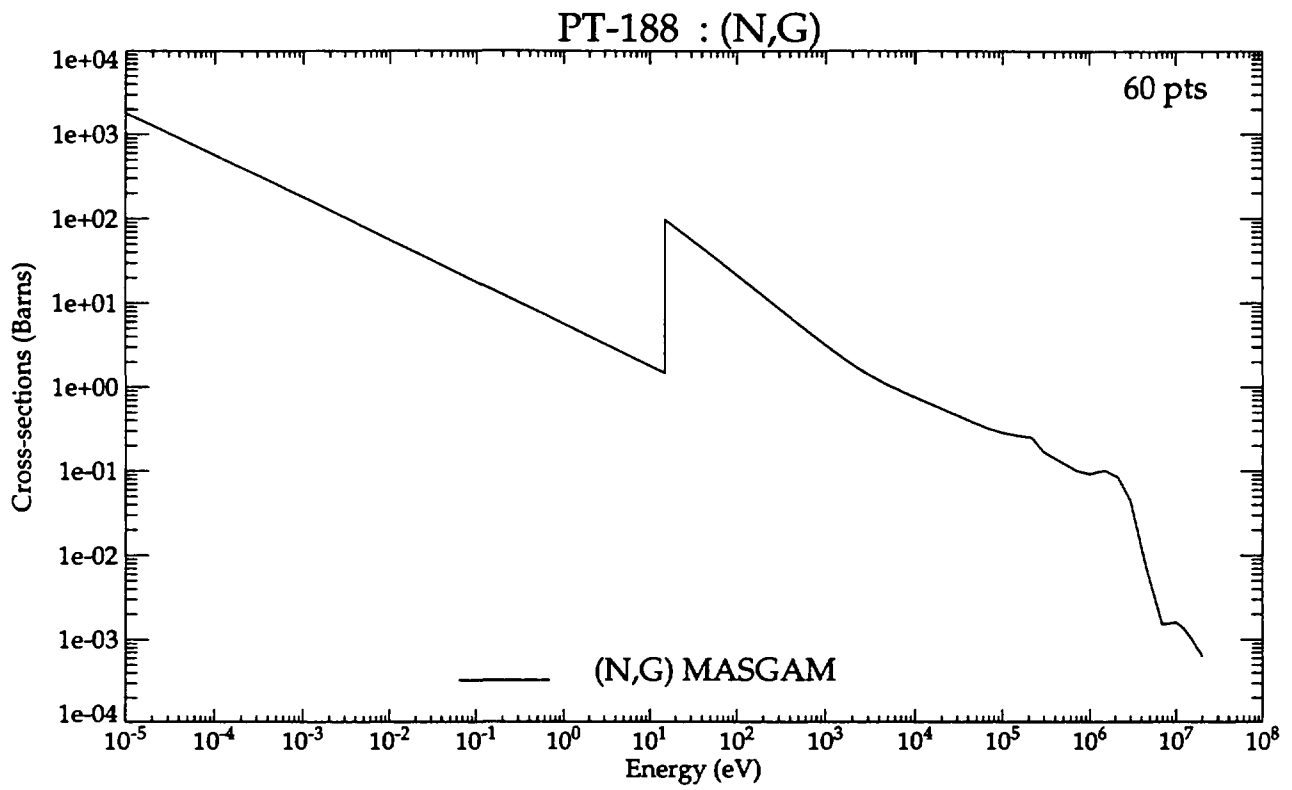


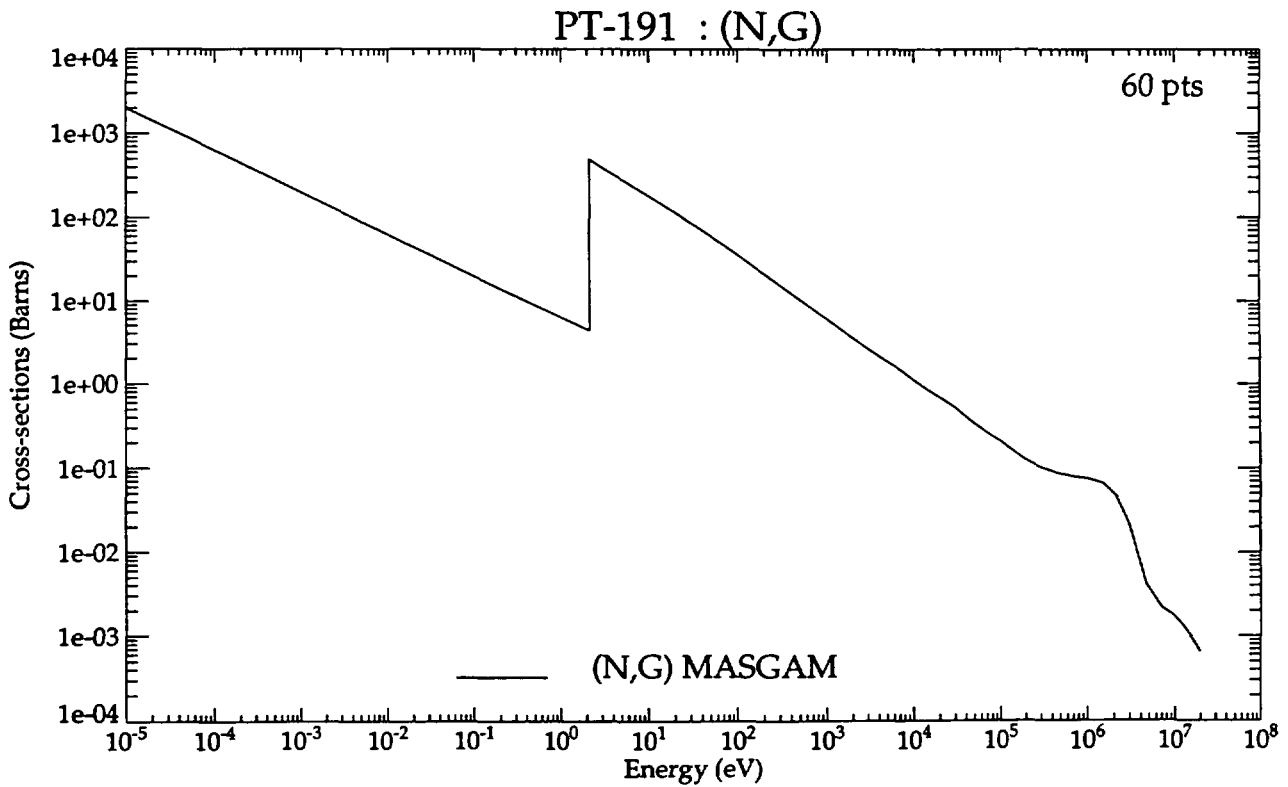
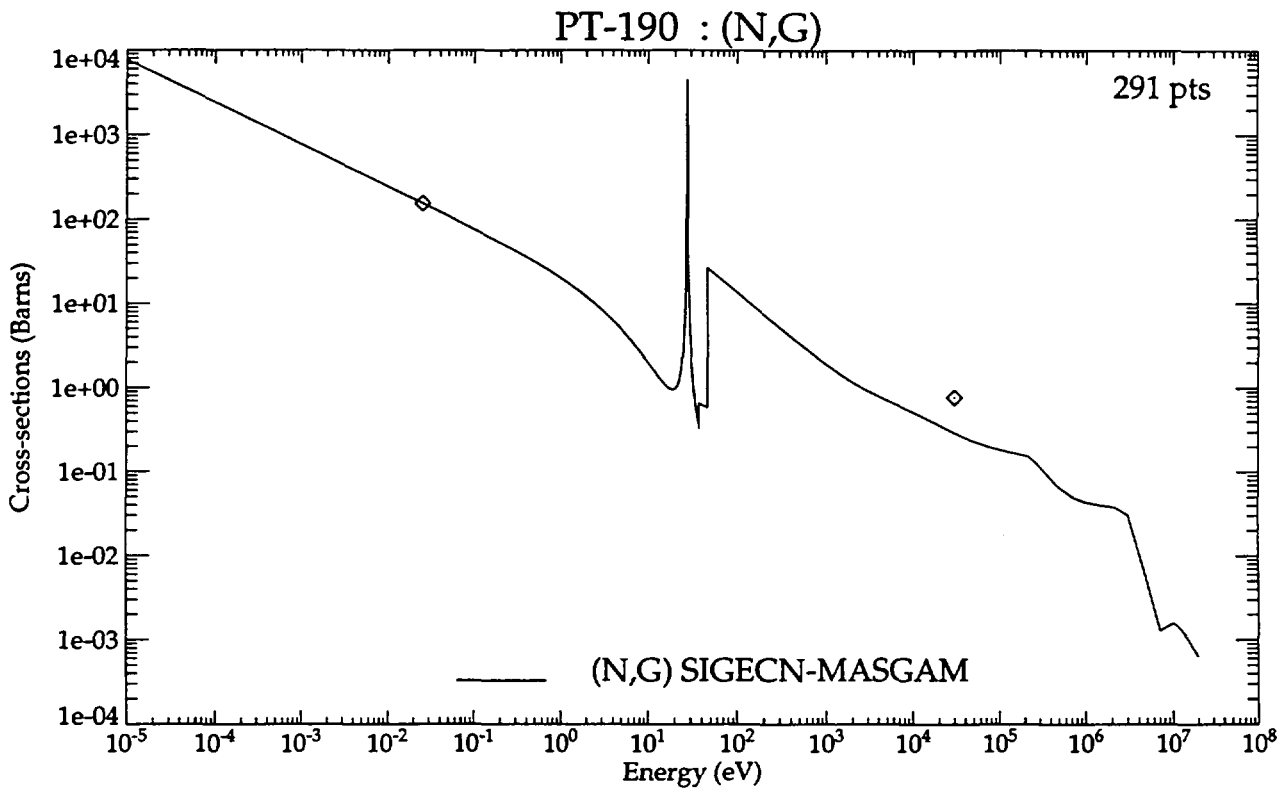
IR-194 -IS=1 : (N,G)

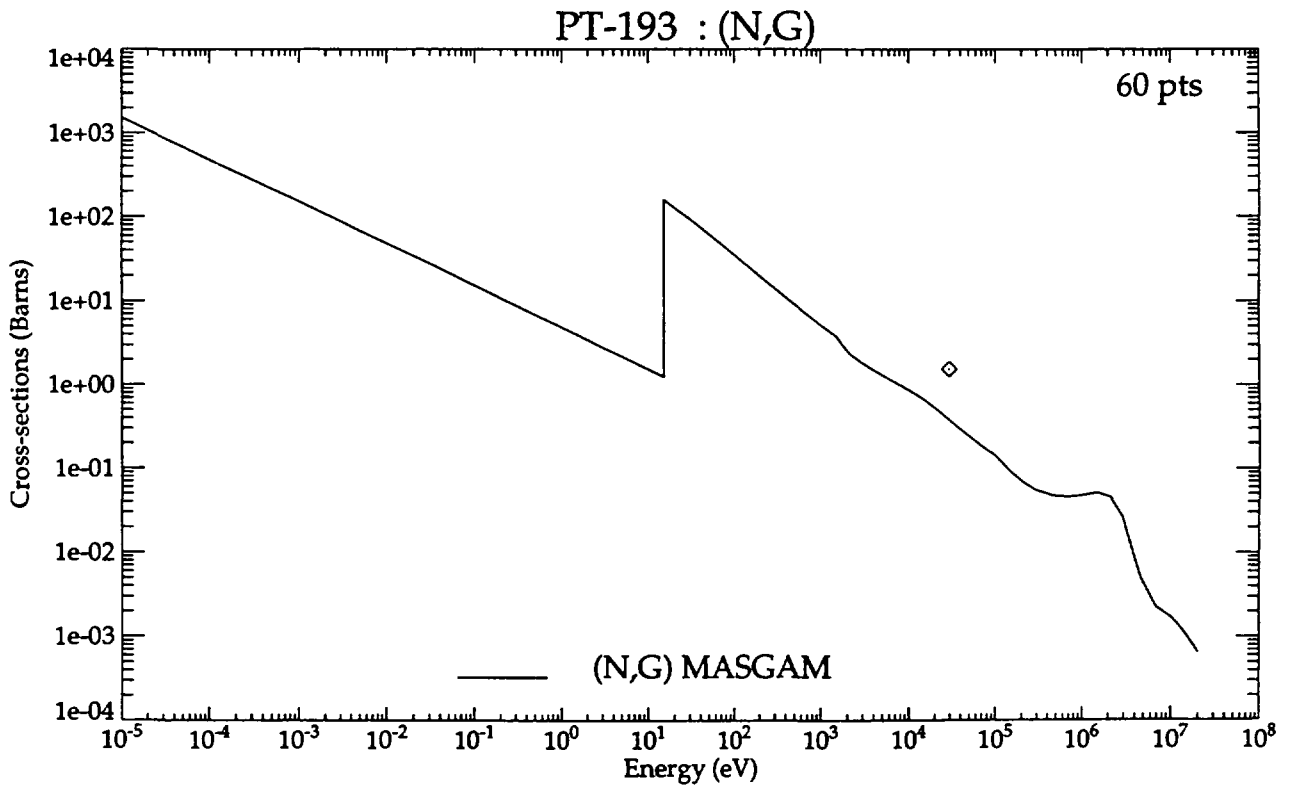
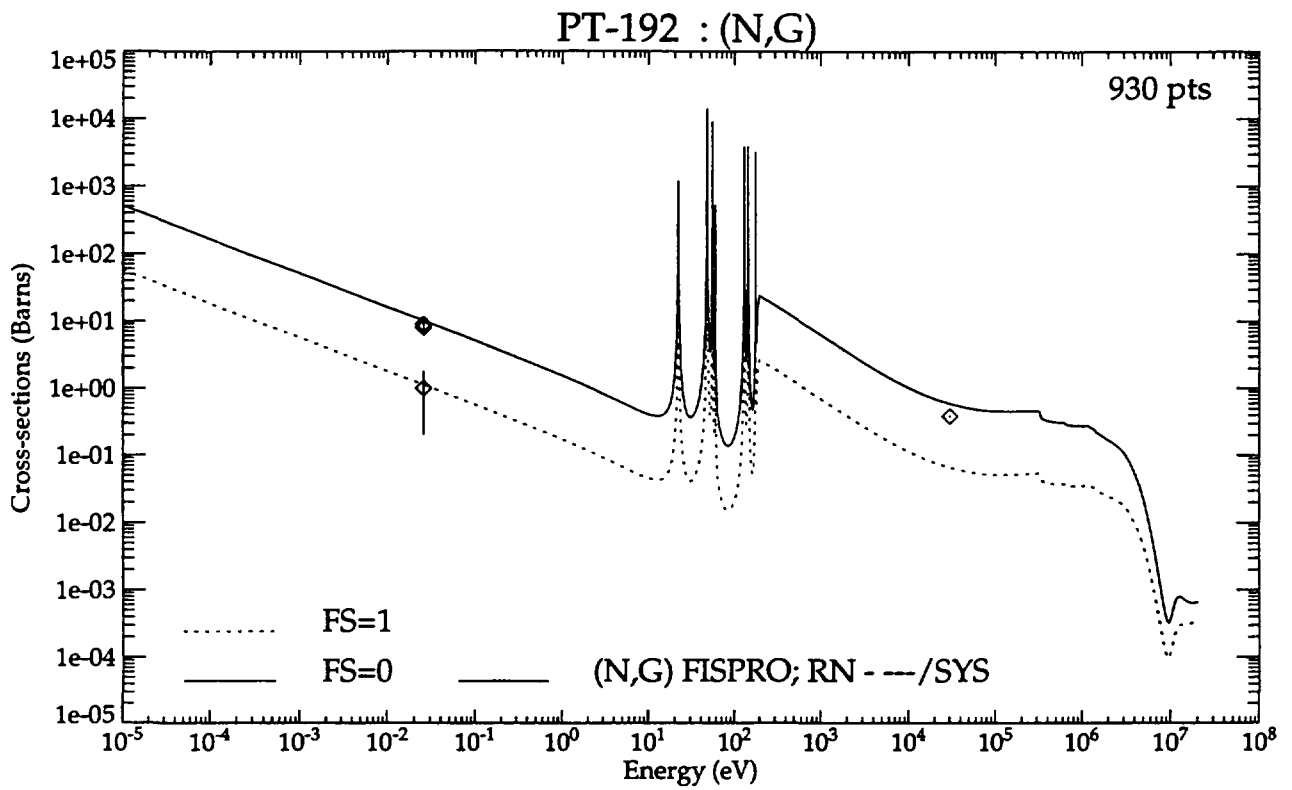


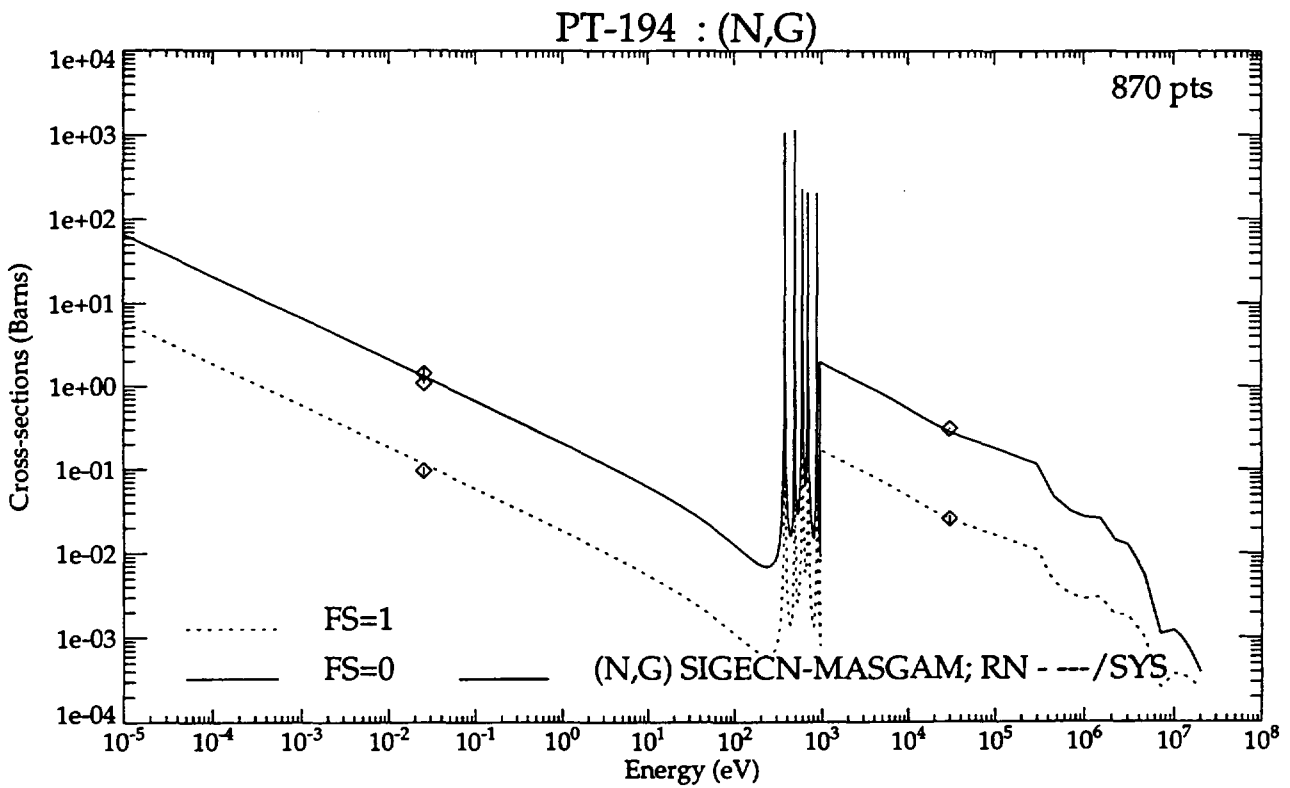
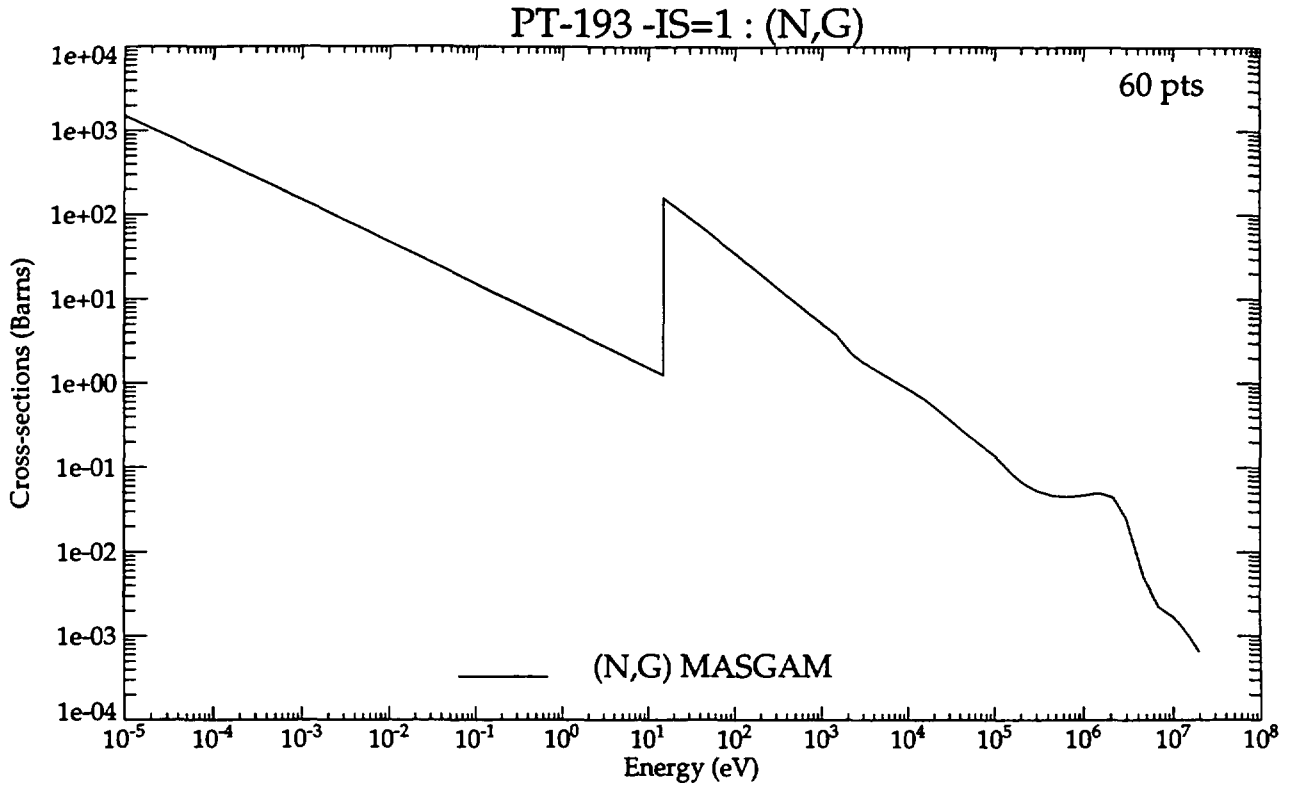
IR-196 -IS=1 : (N,G)

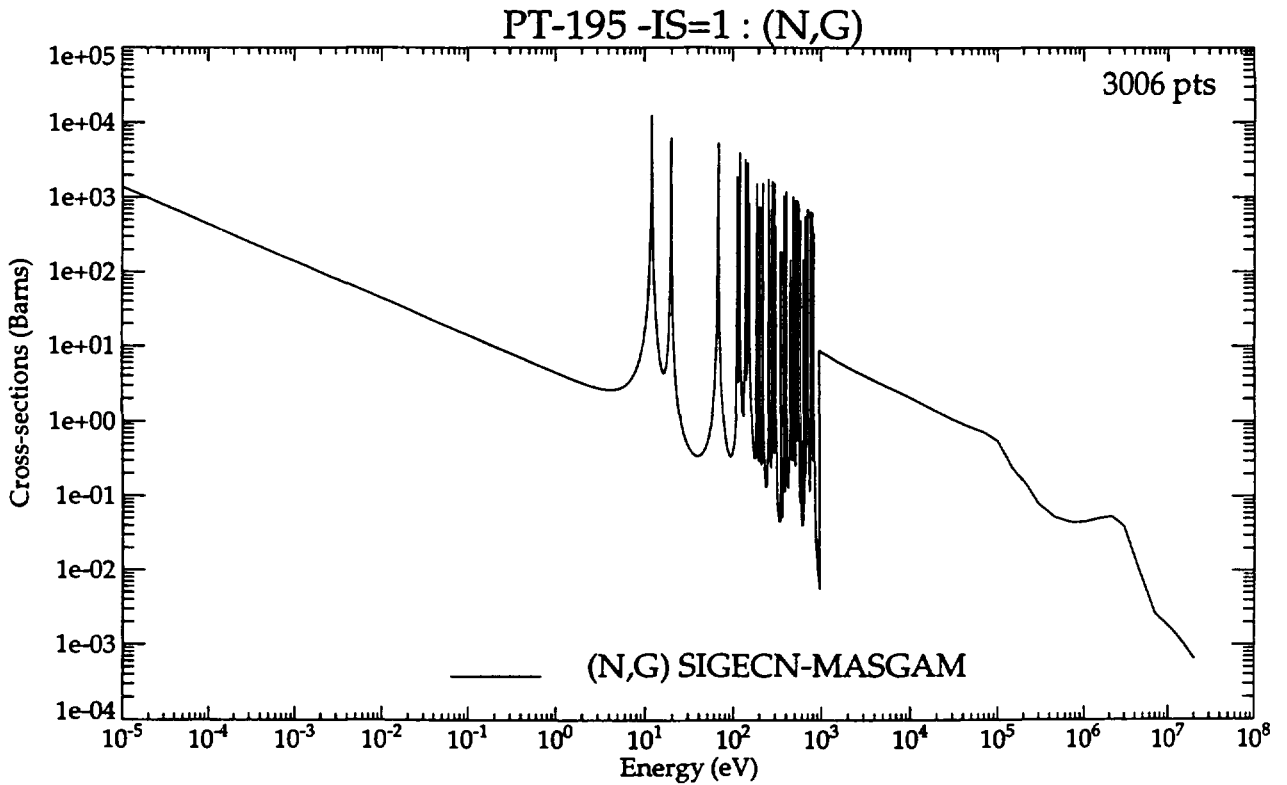
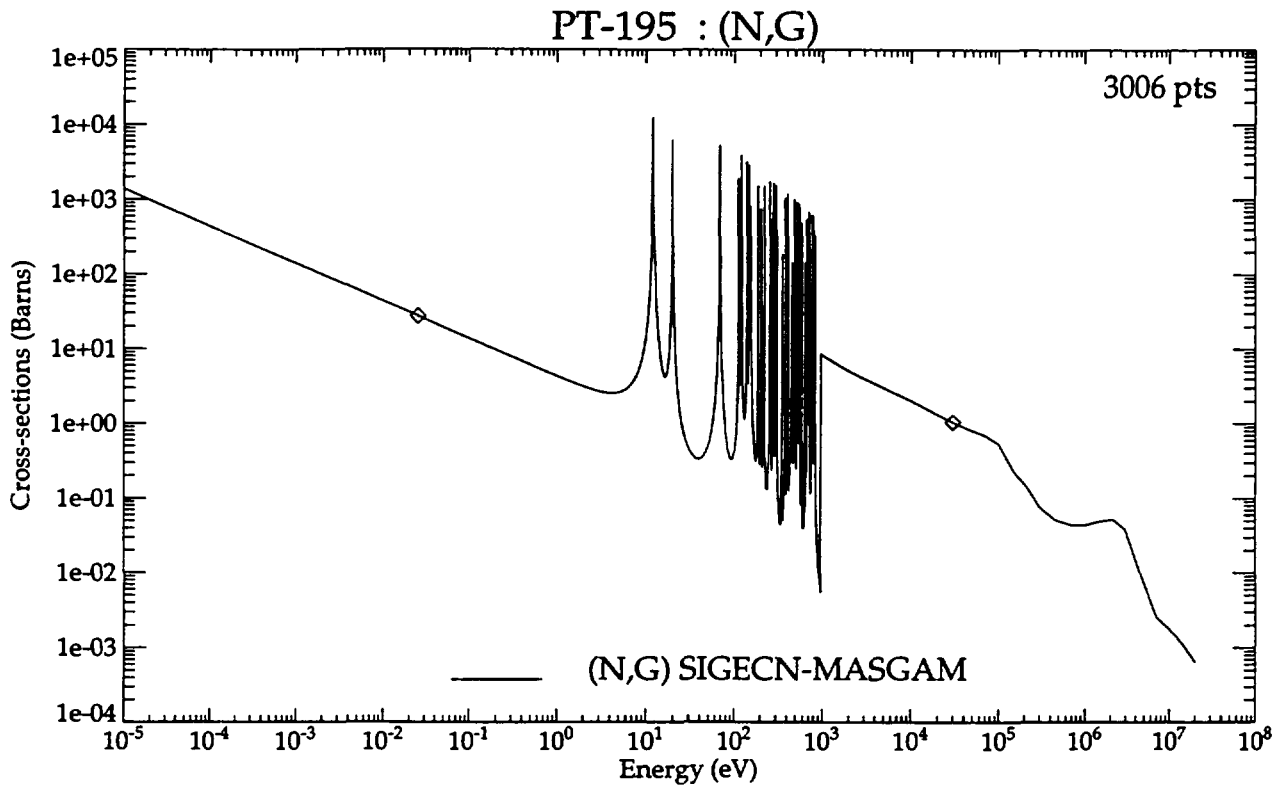




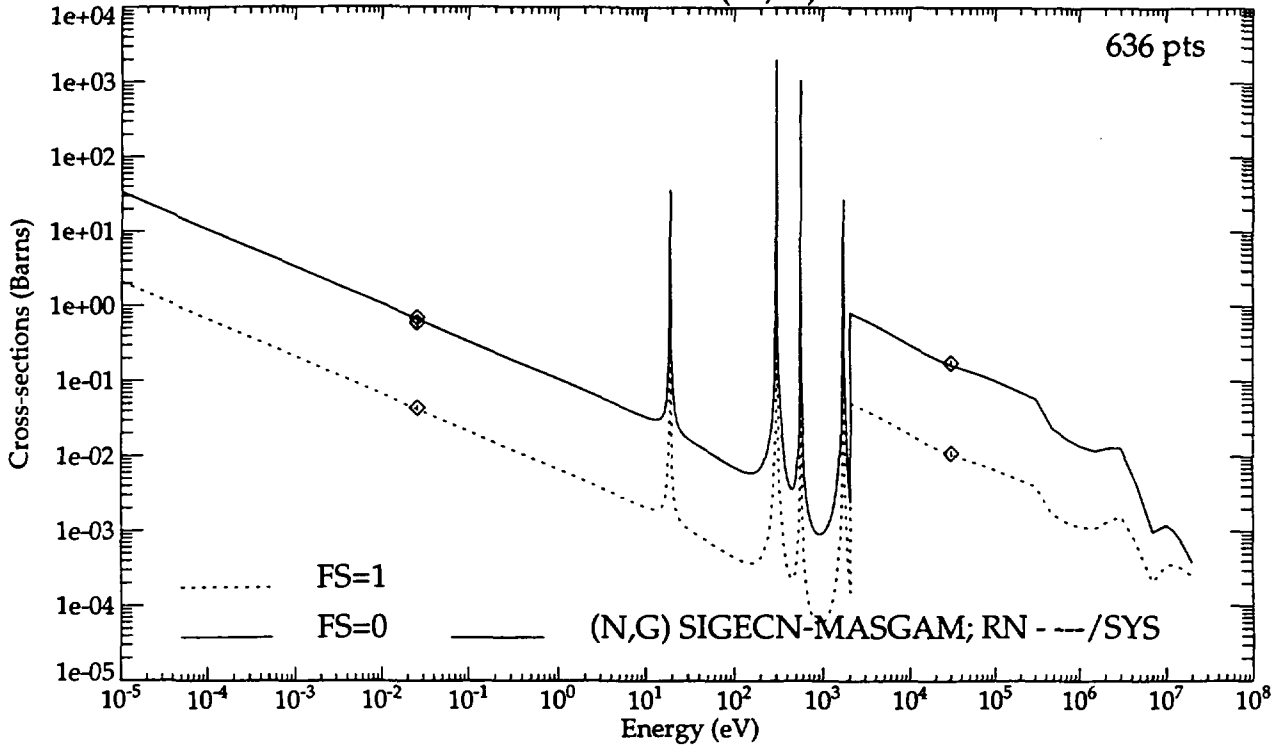




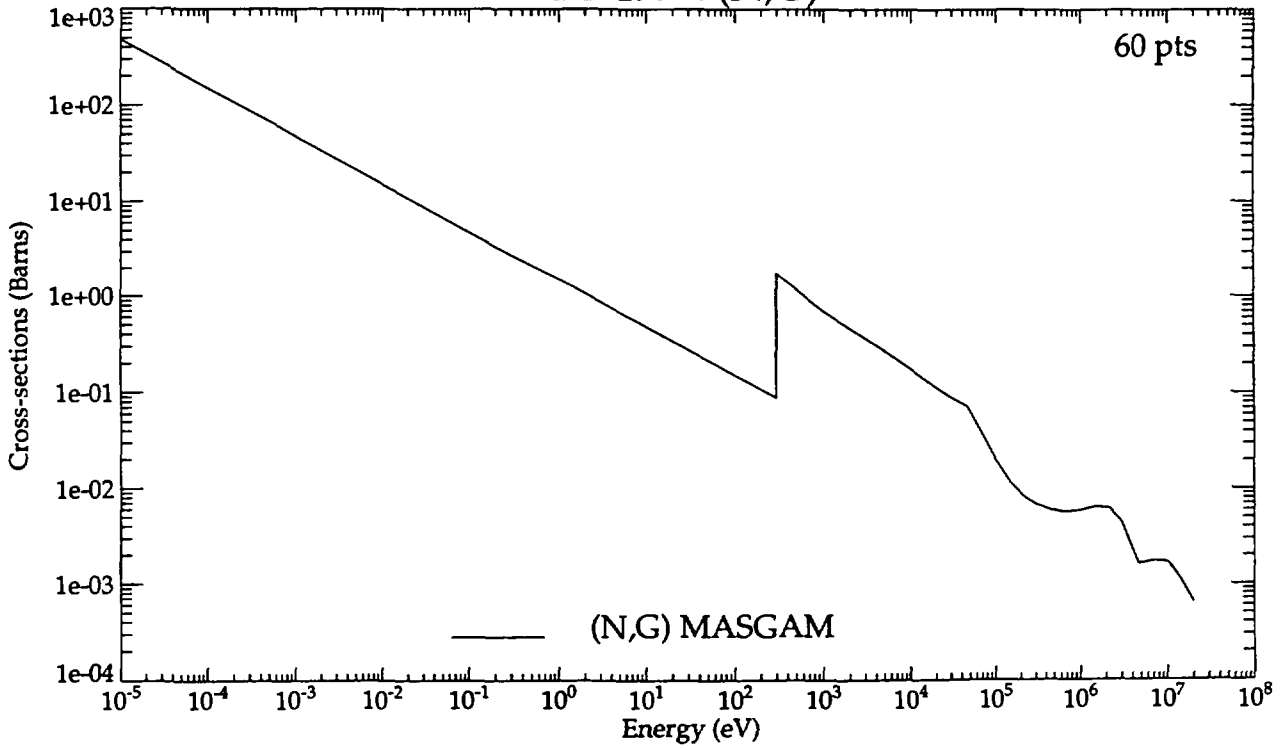


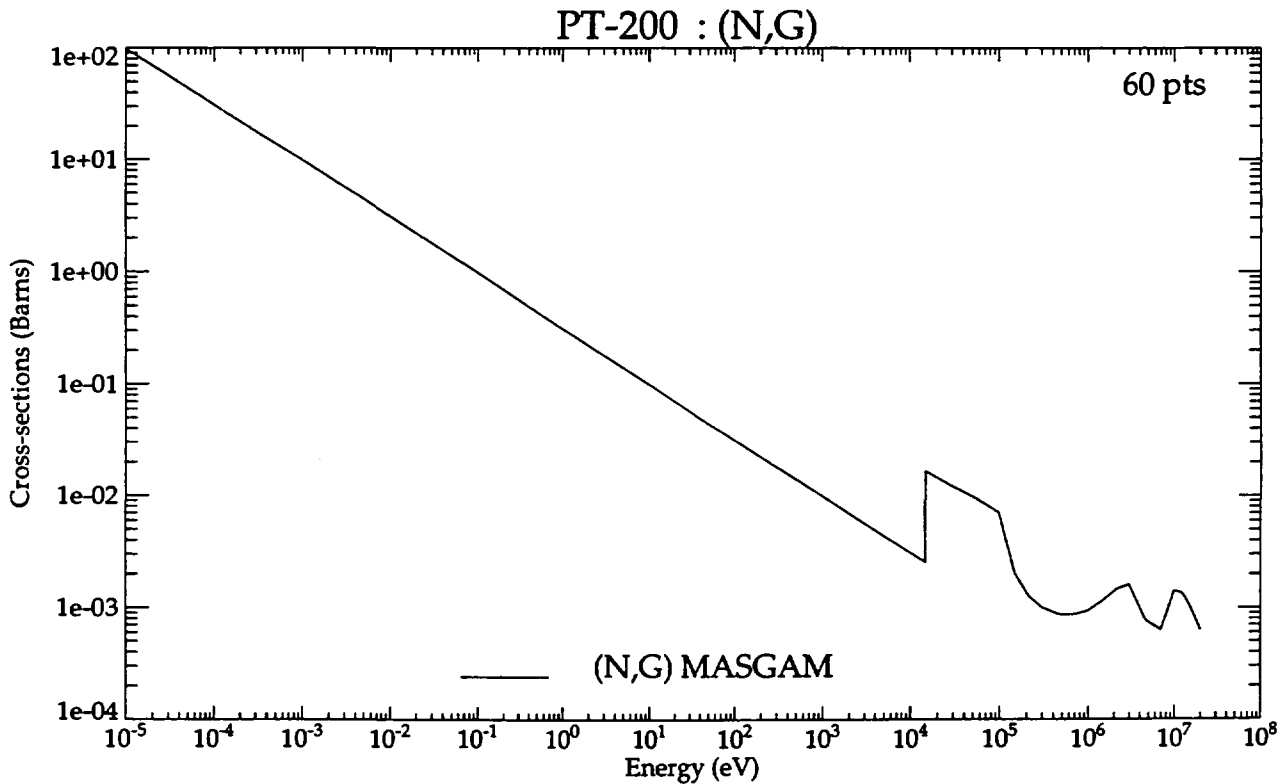
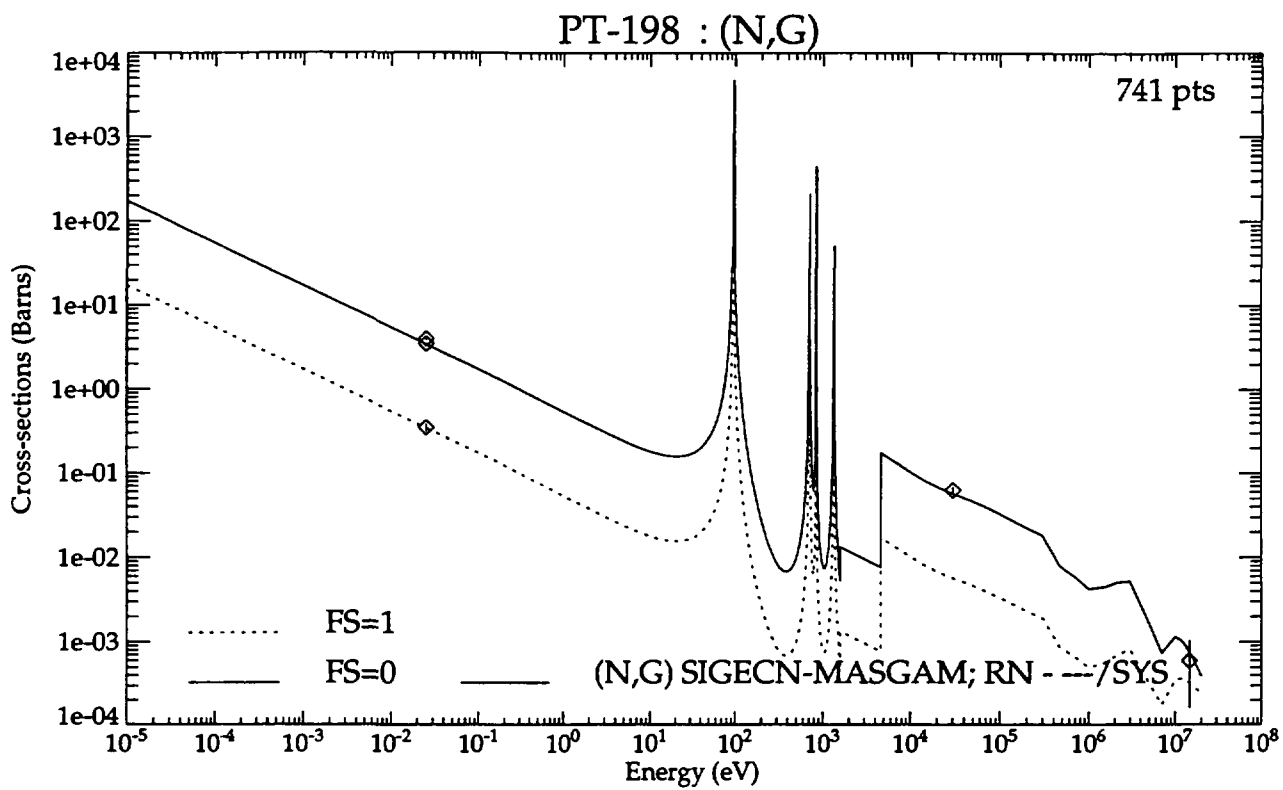


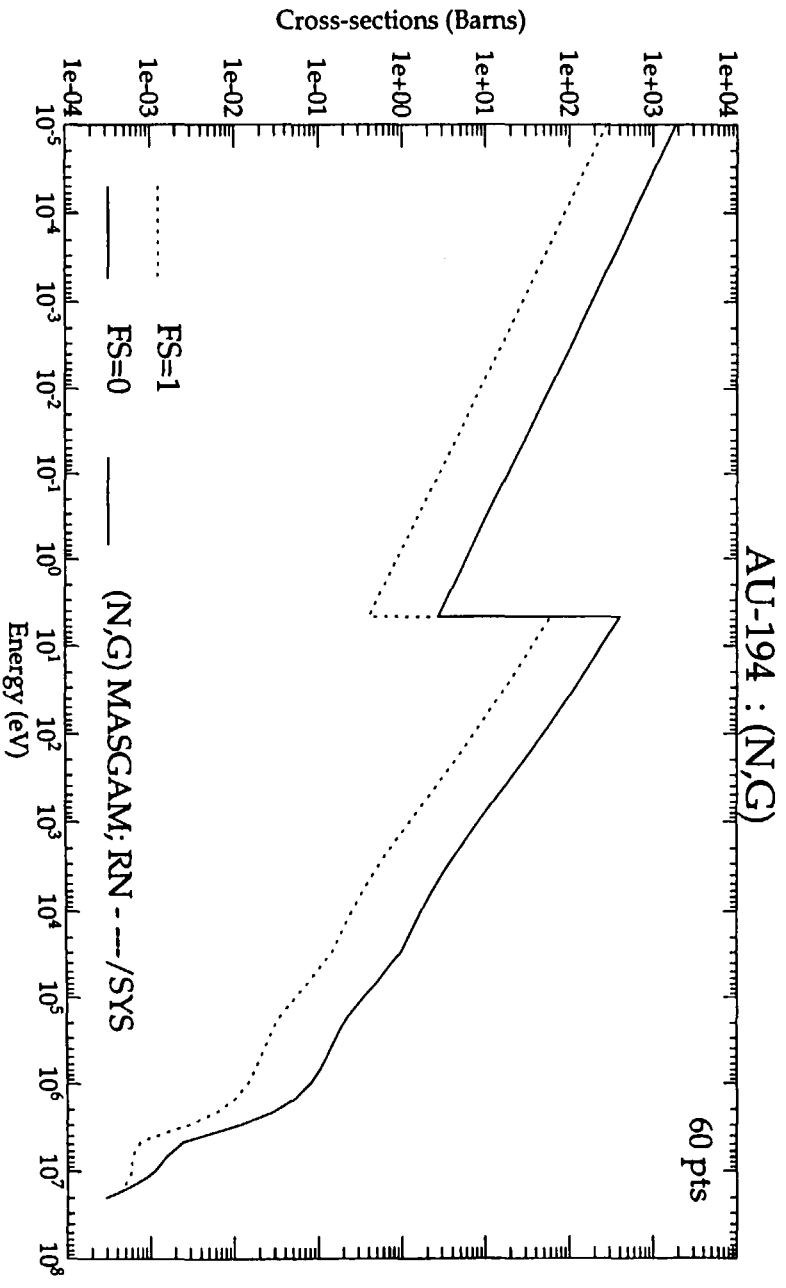
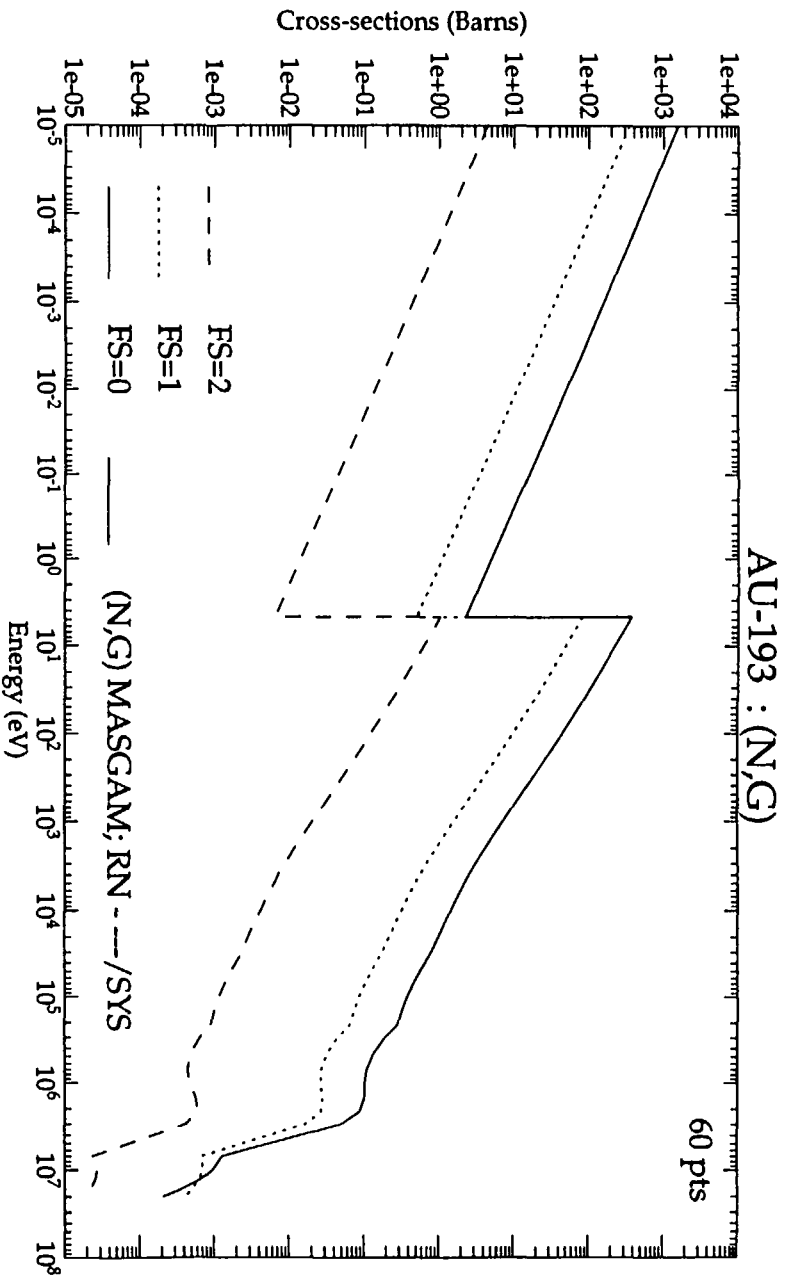
PT-196 : (N,G)

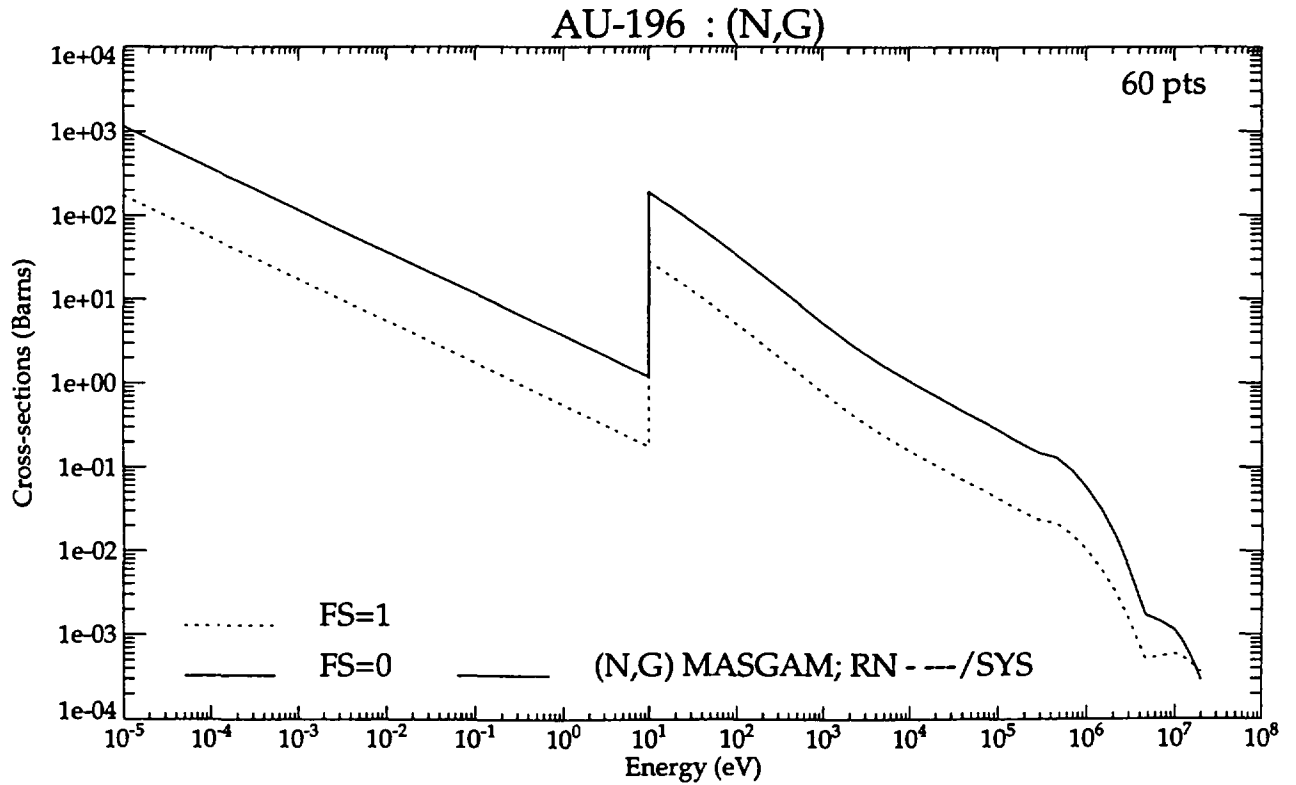
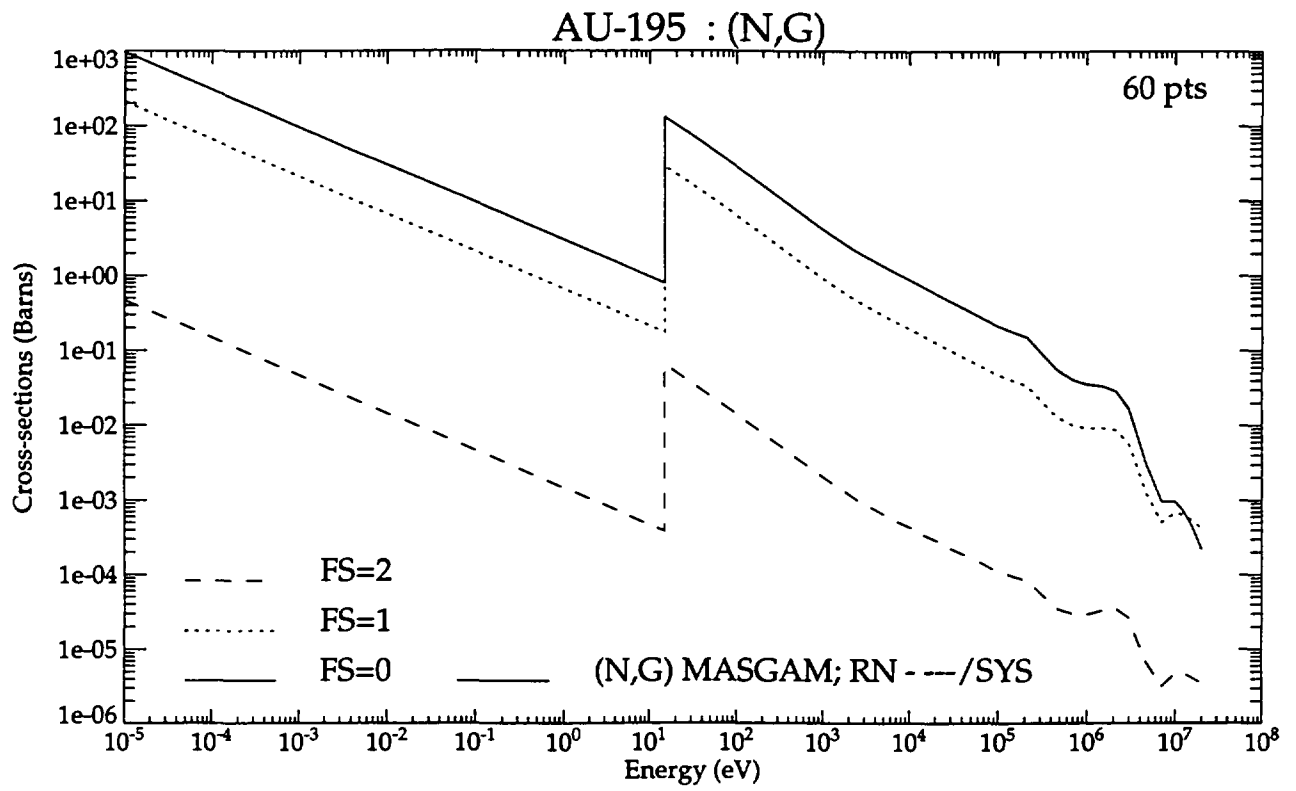


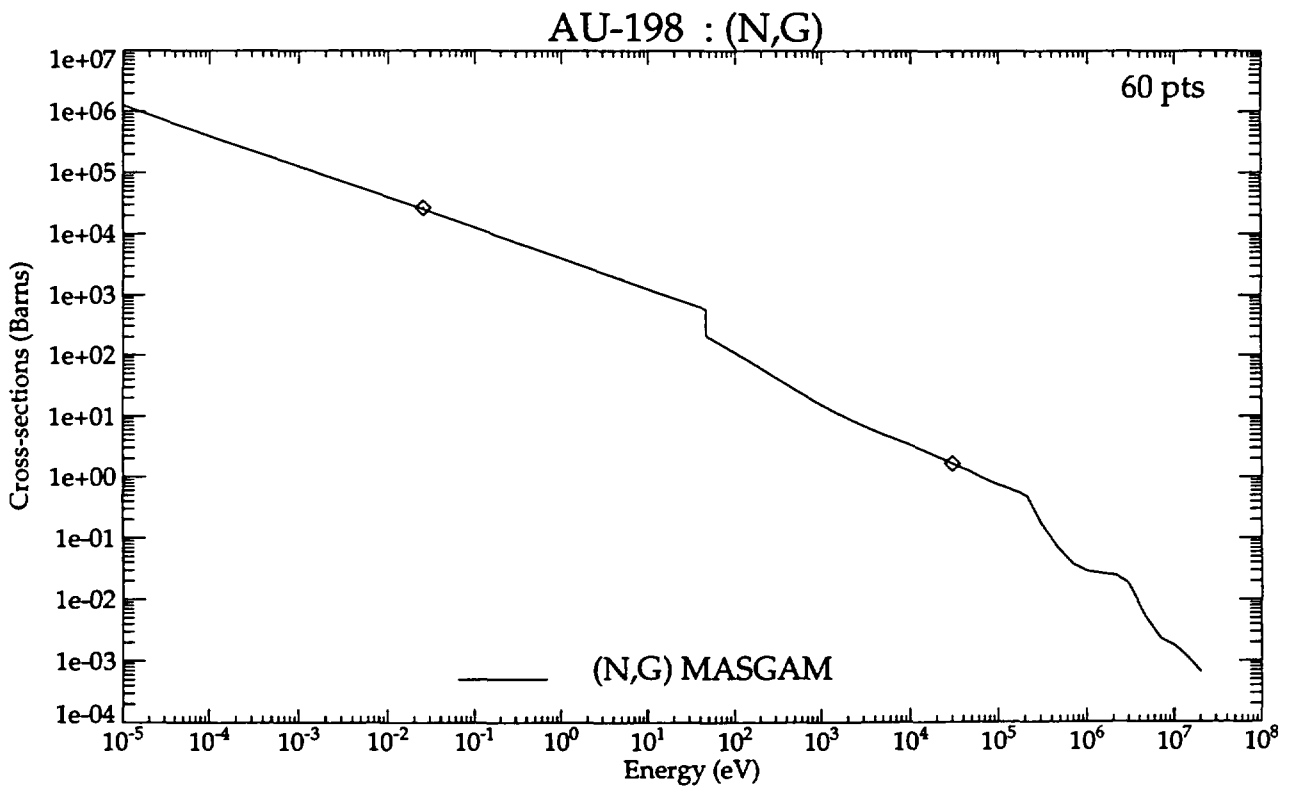
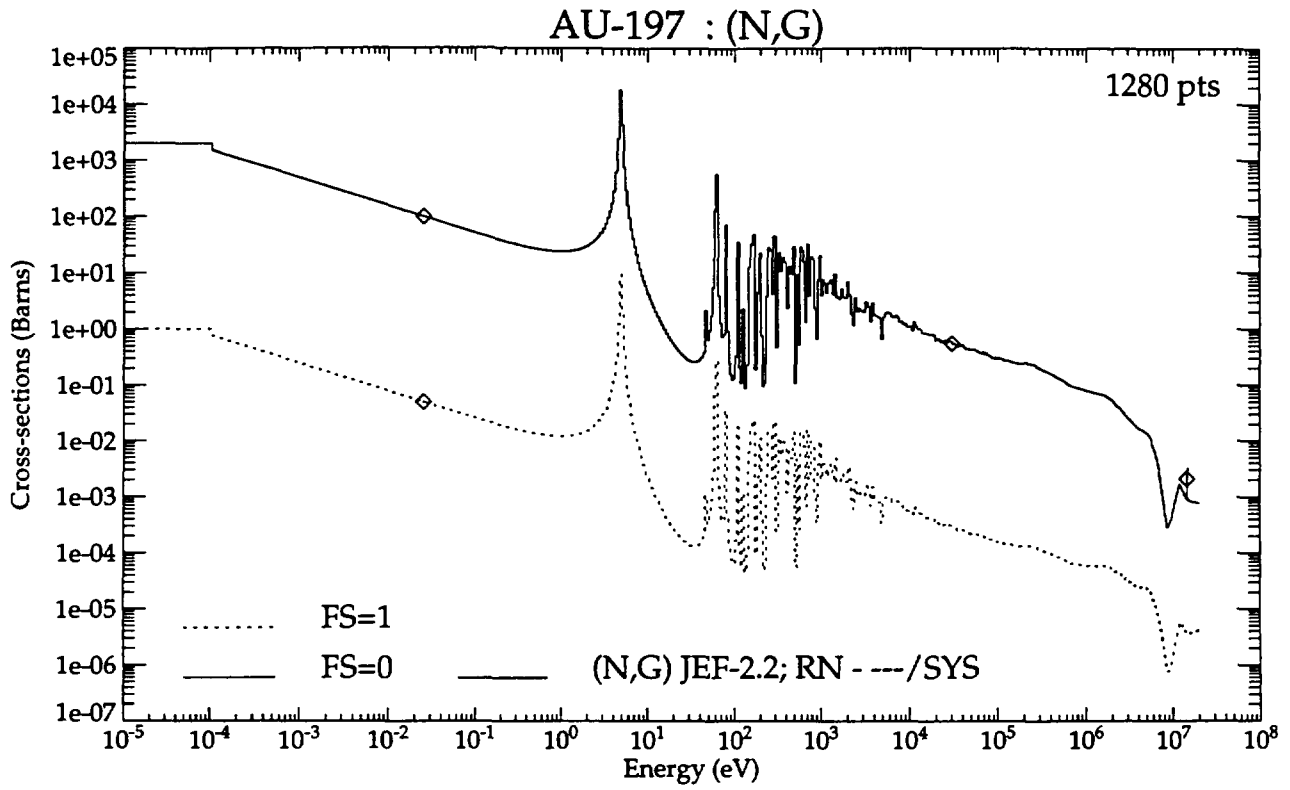
PT-197 : (N,G)

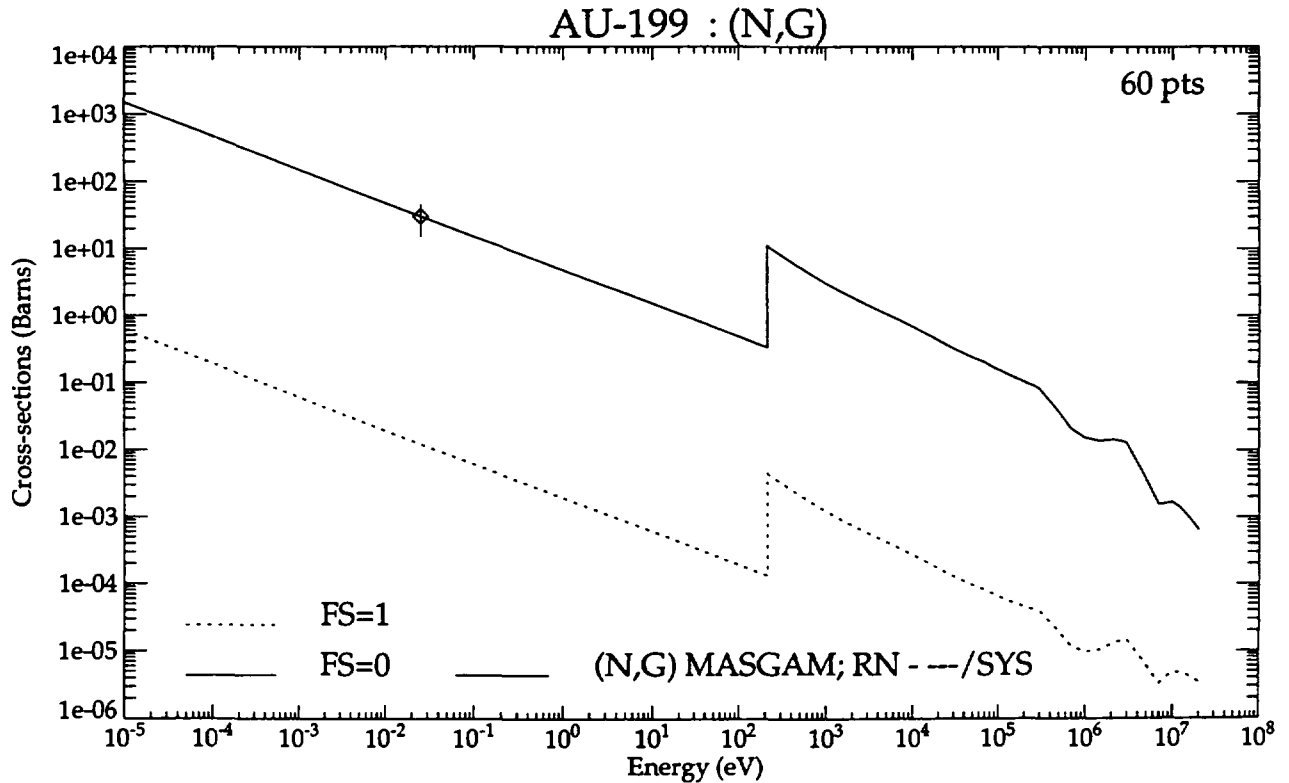
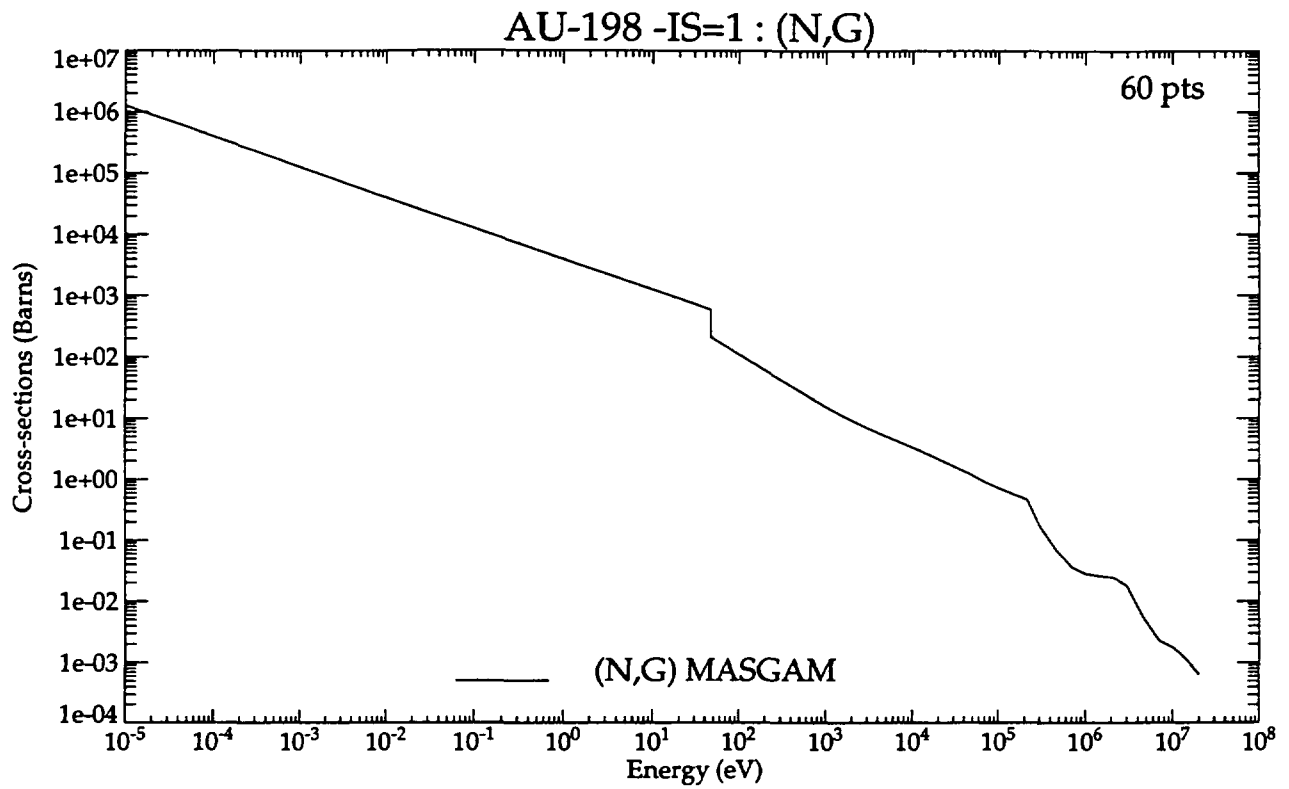


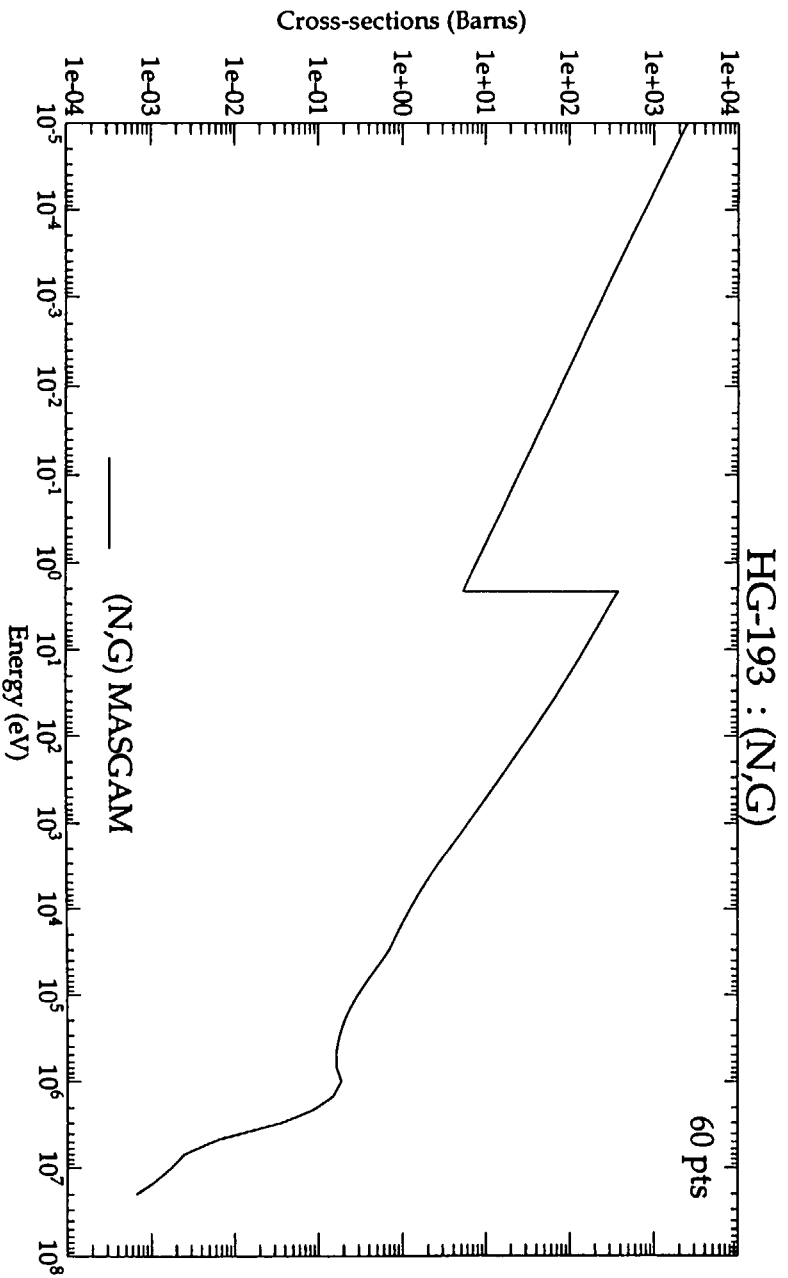
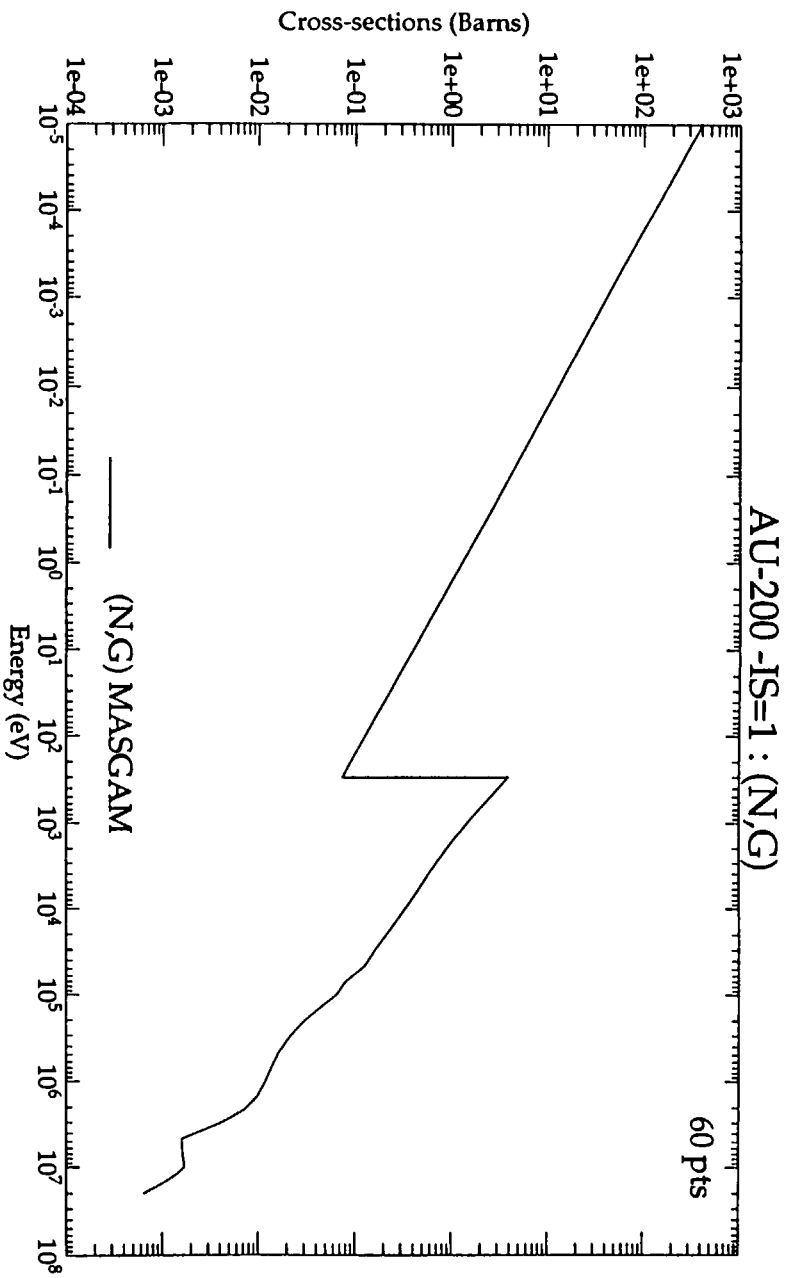


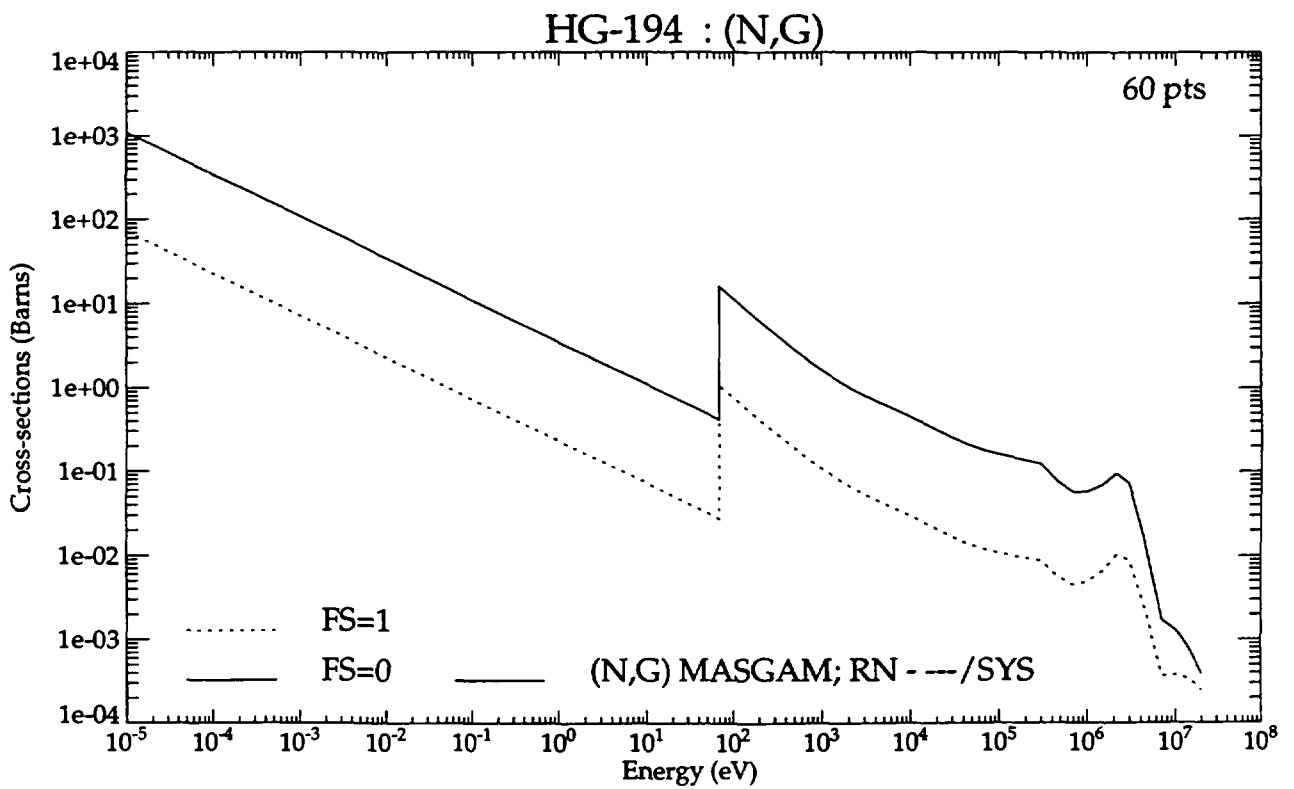
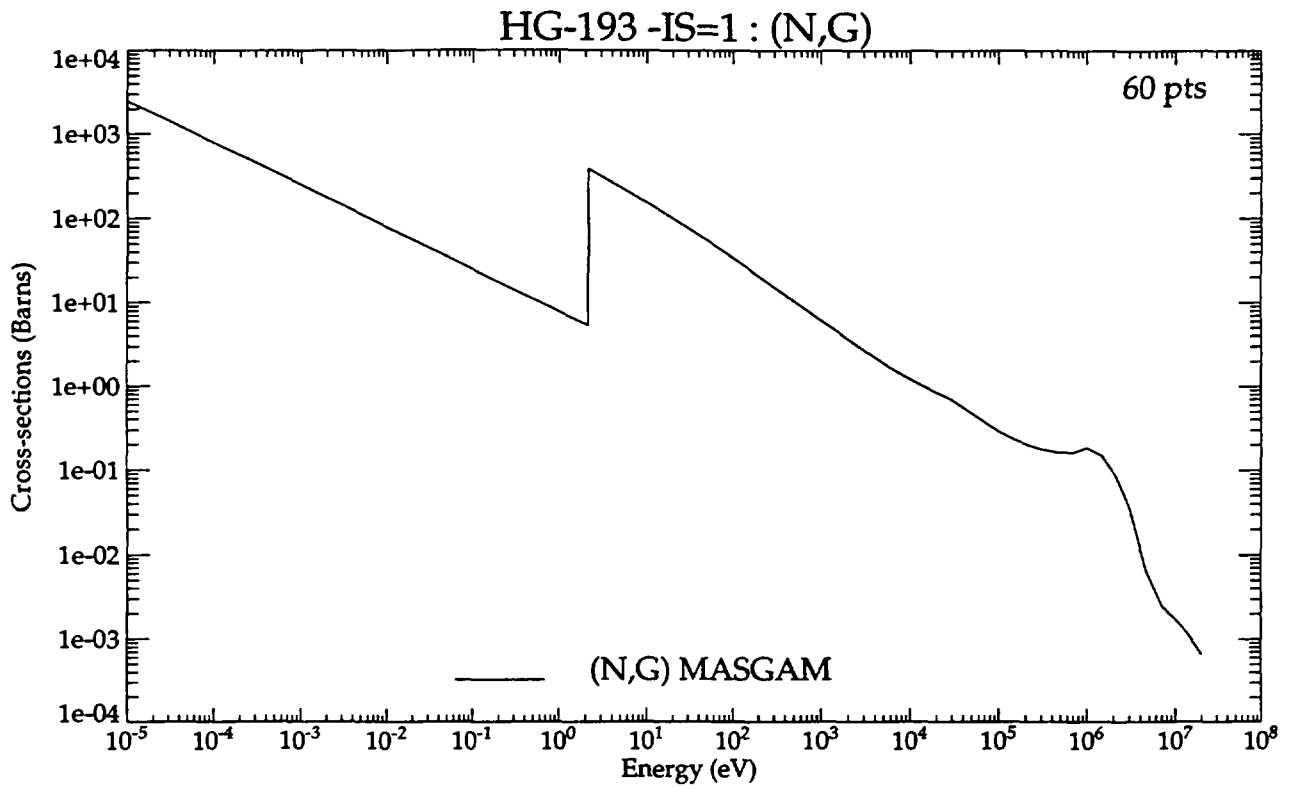


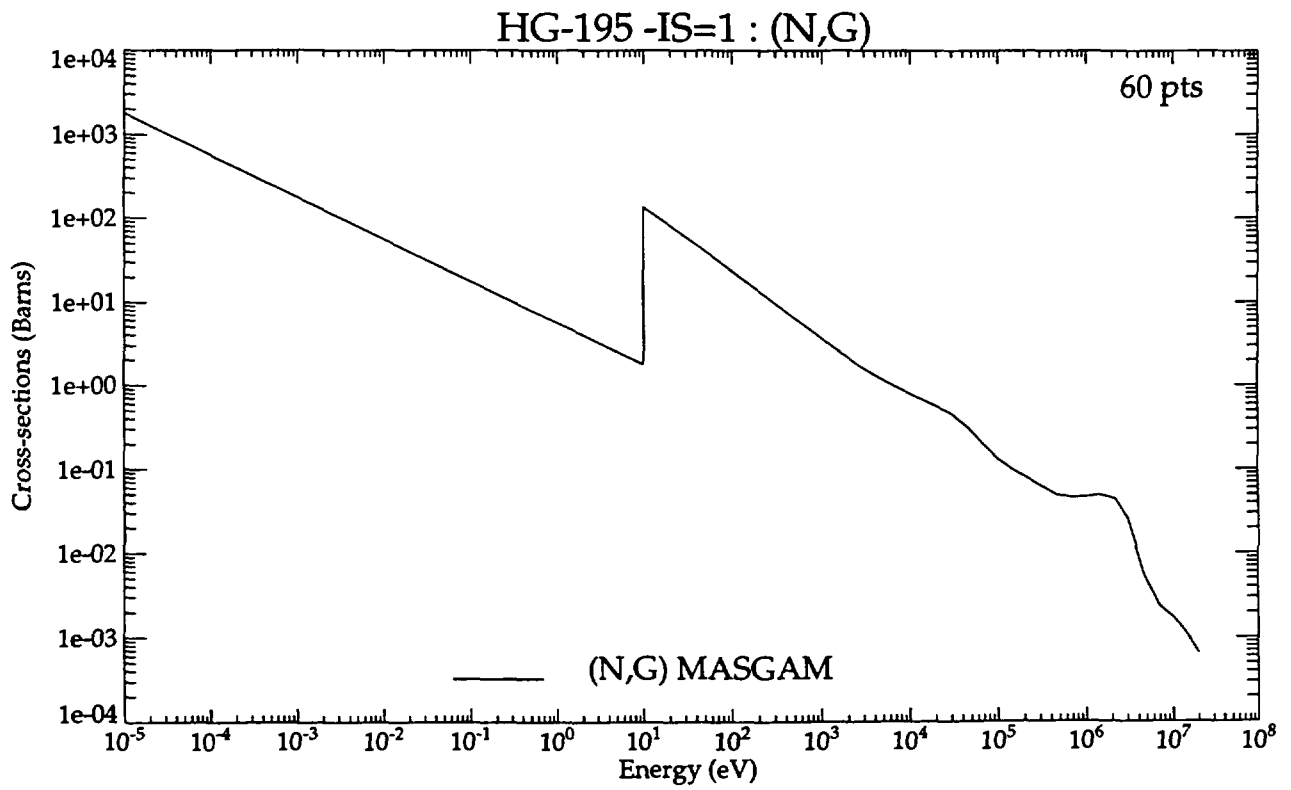
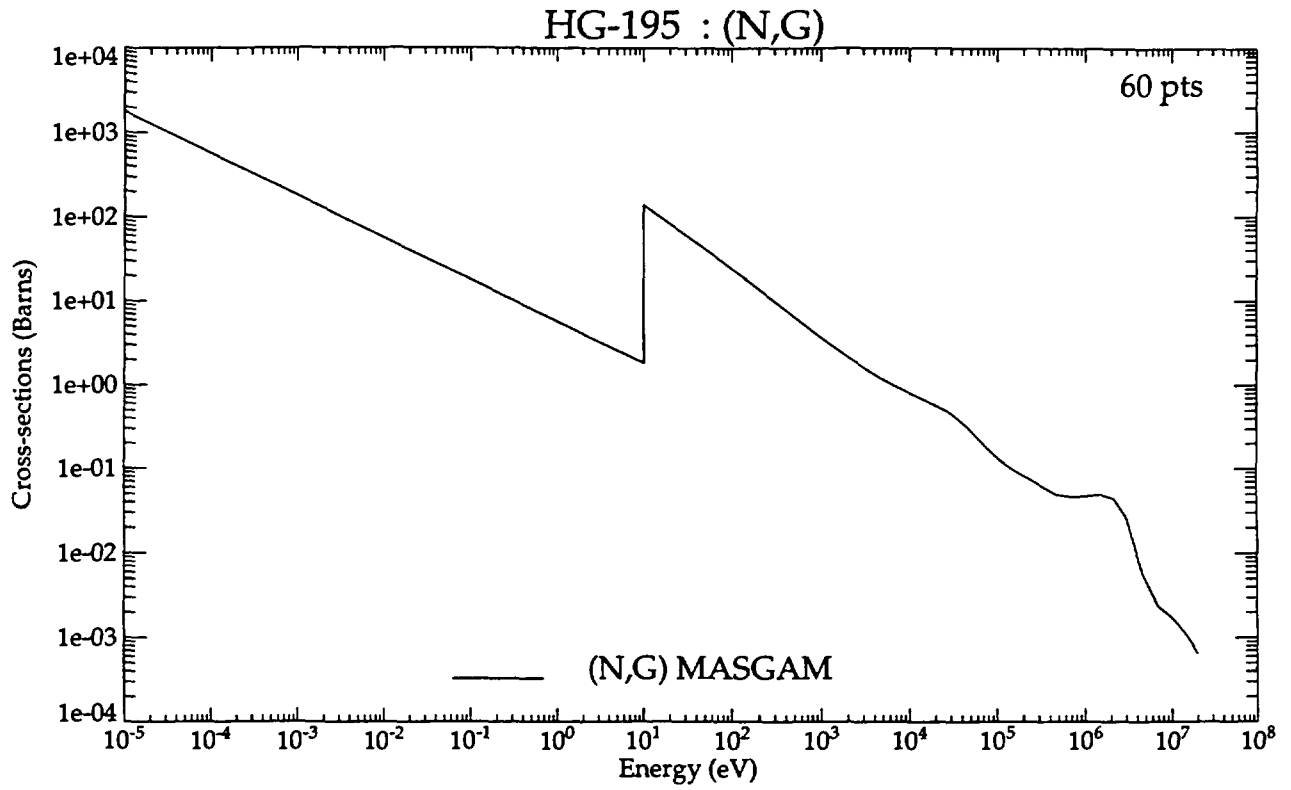




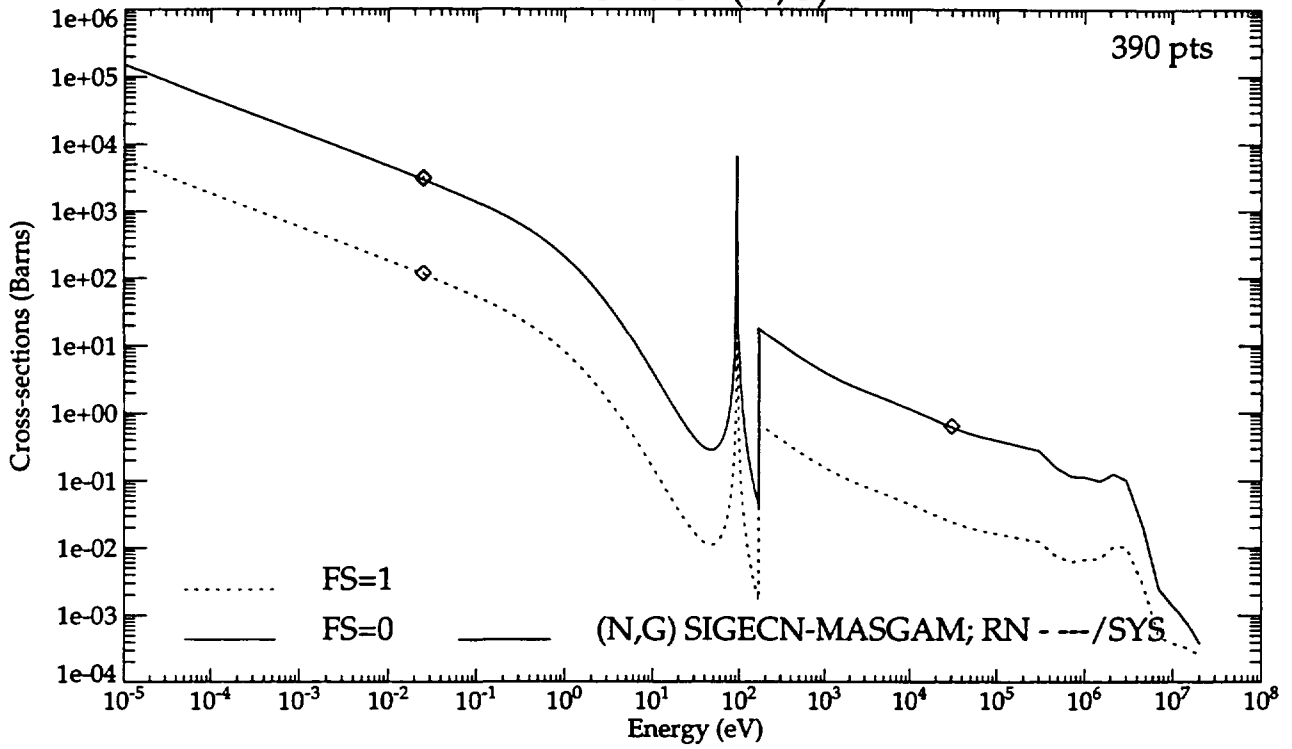




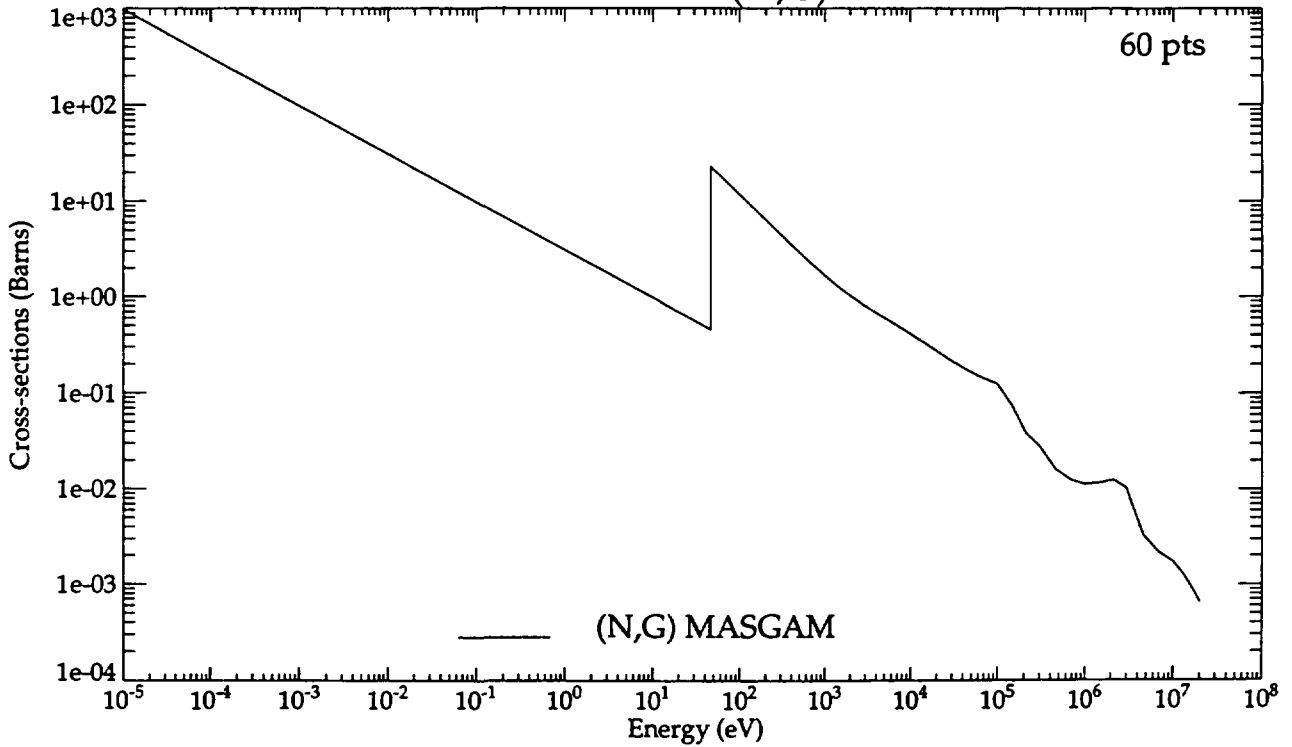


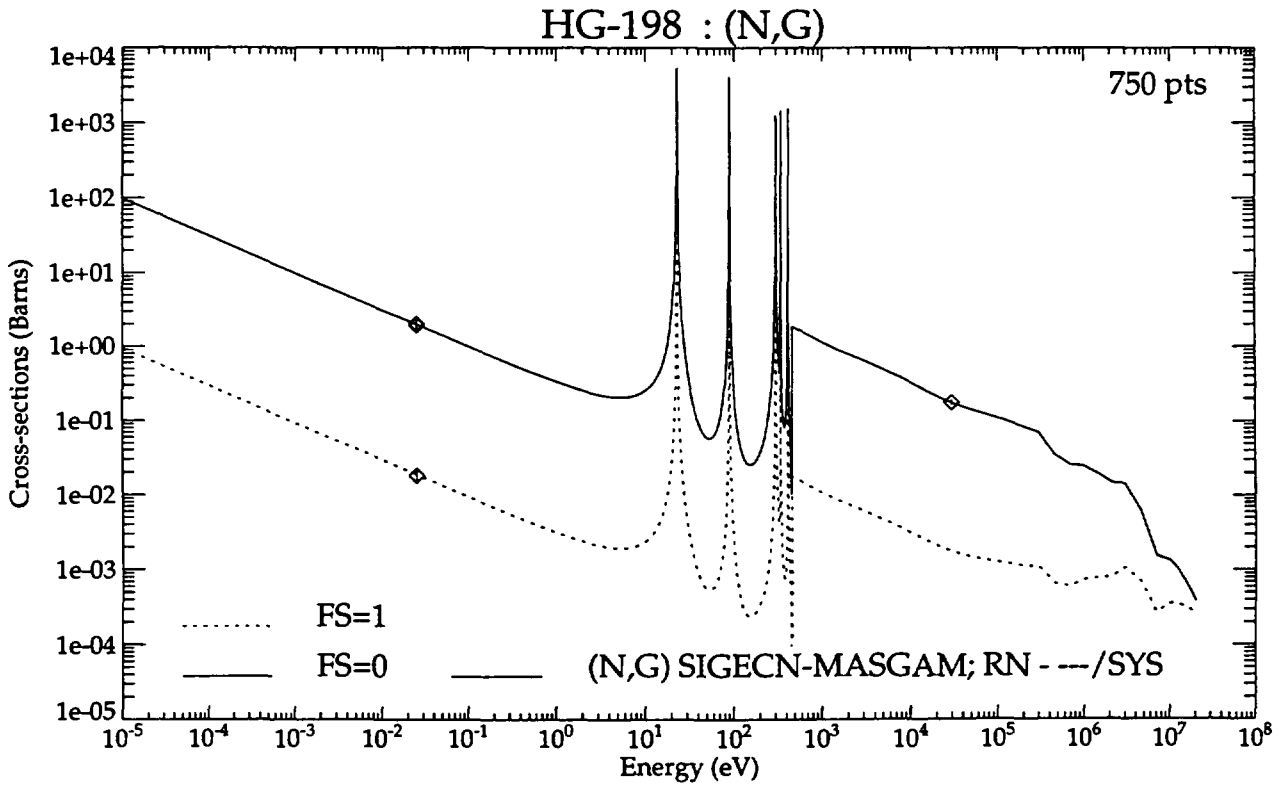
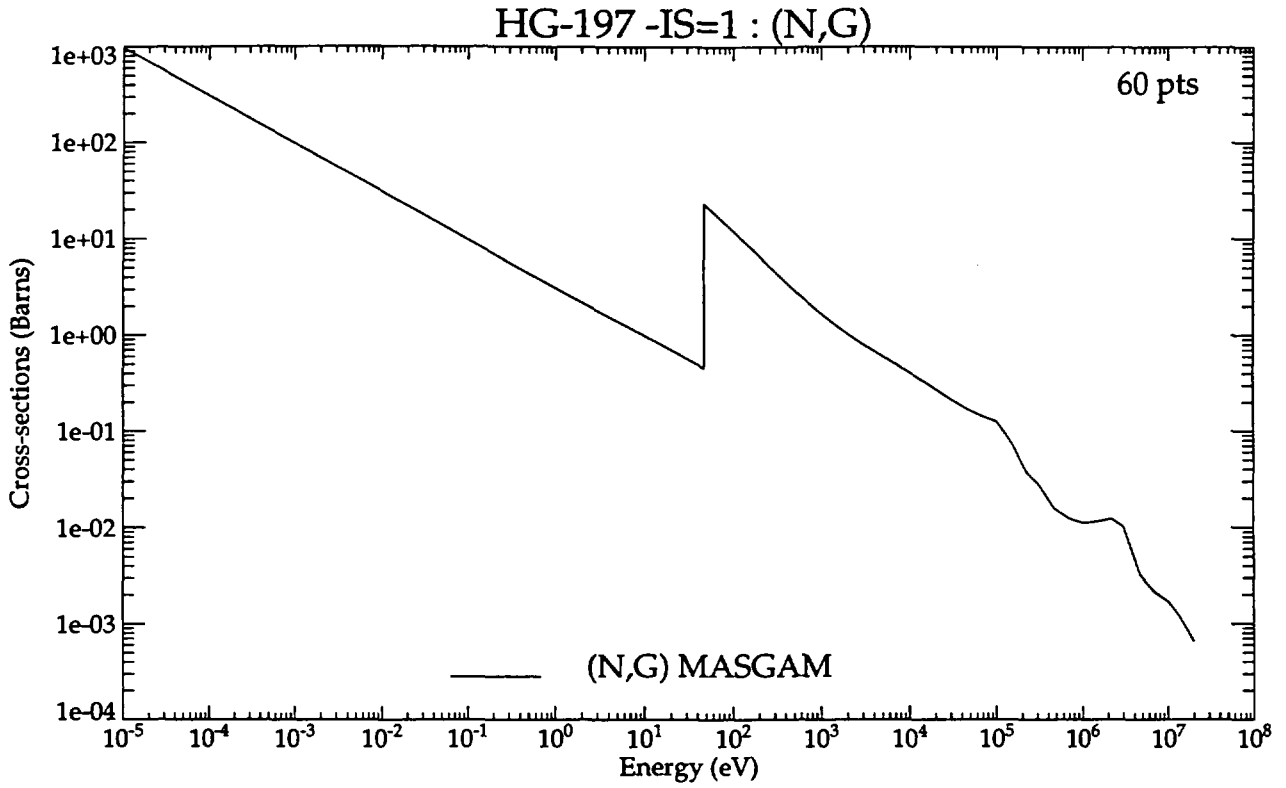


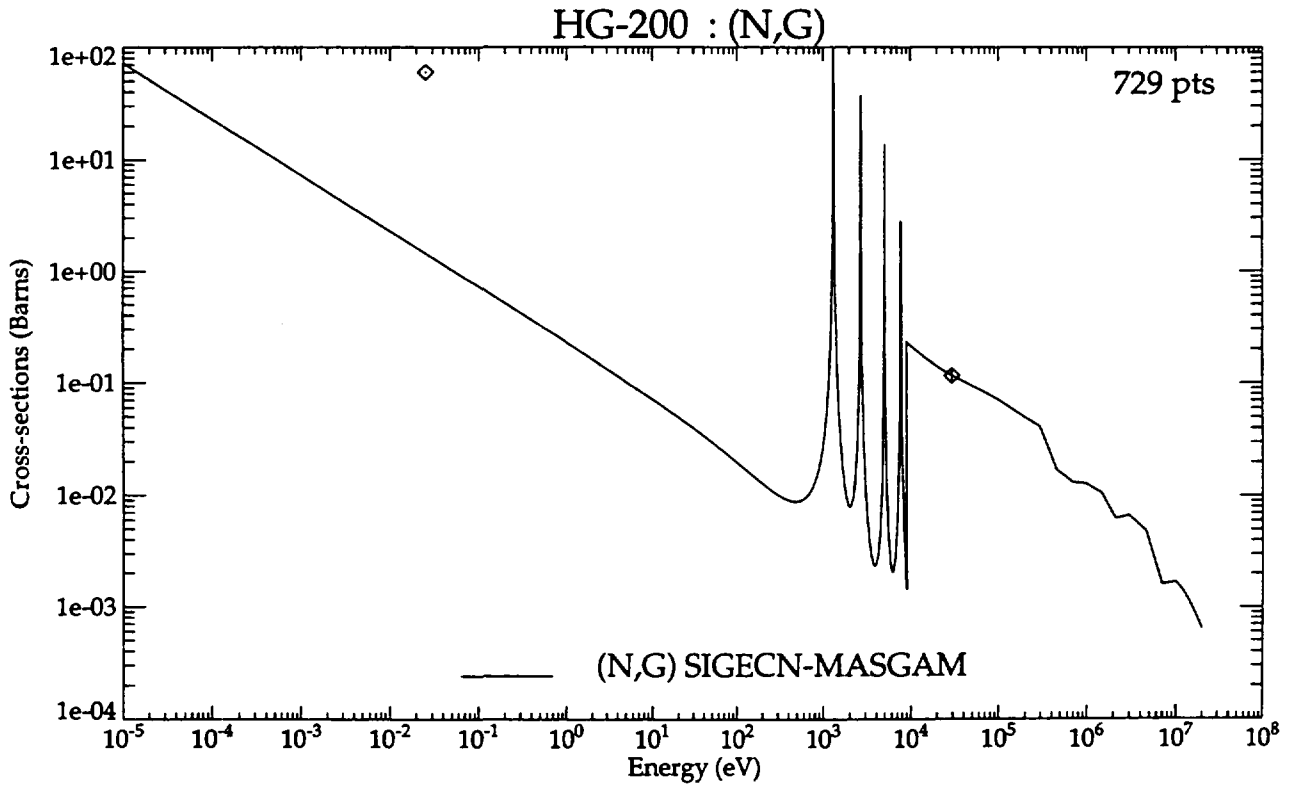
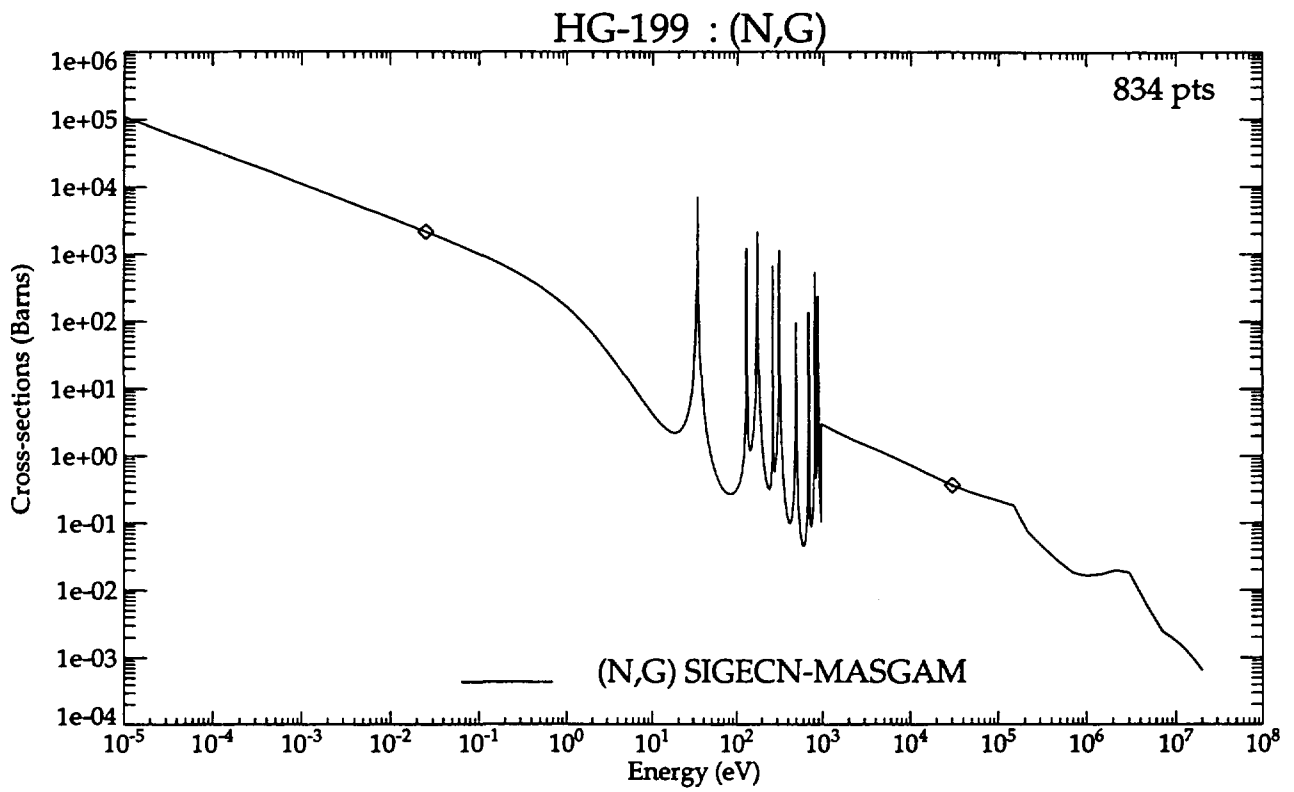
HG-196 : (N,G)

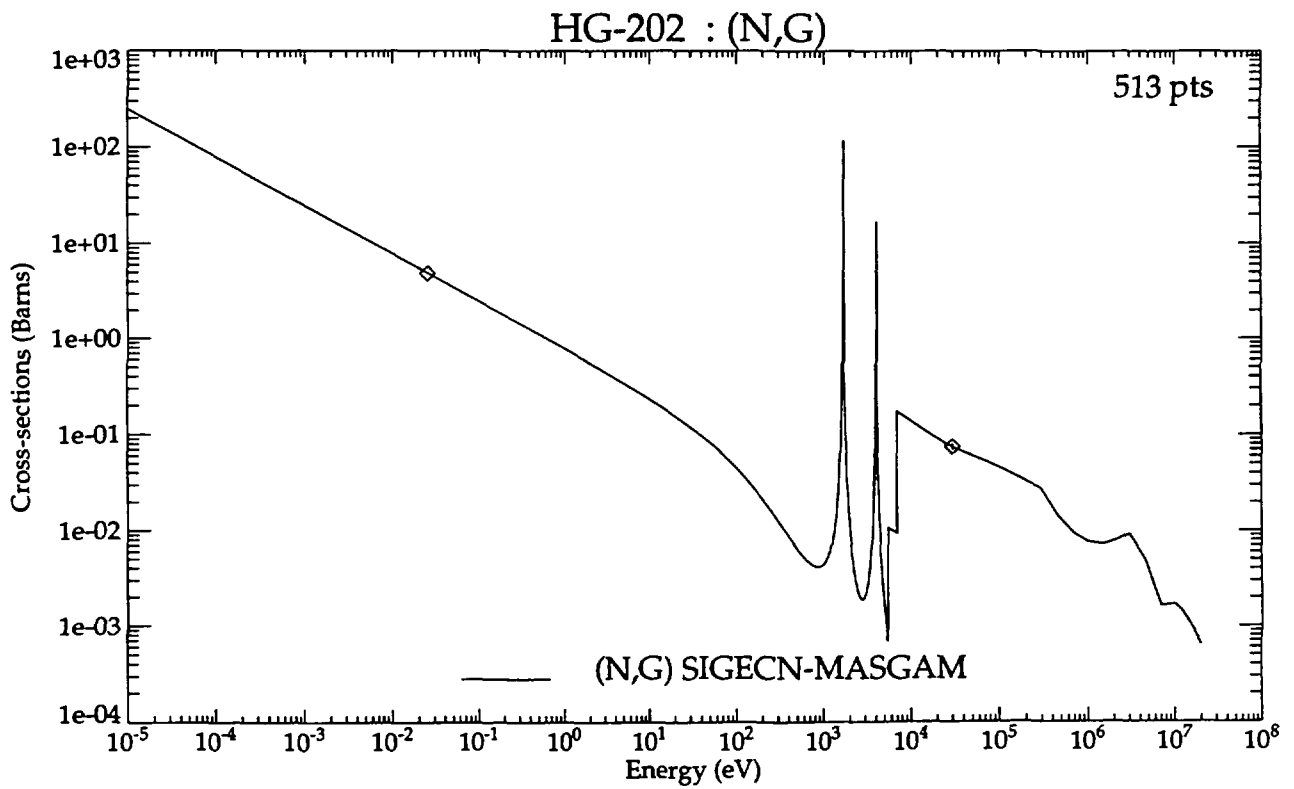
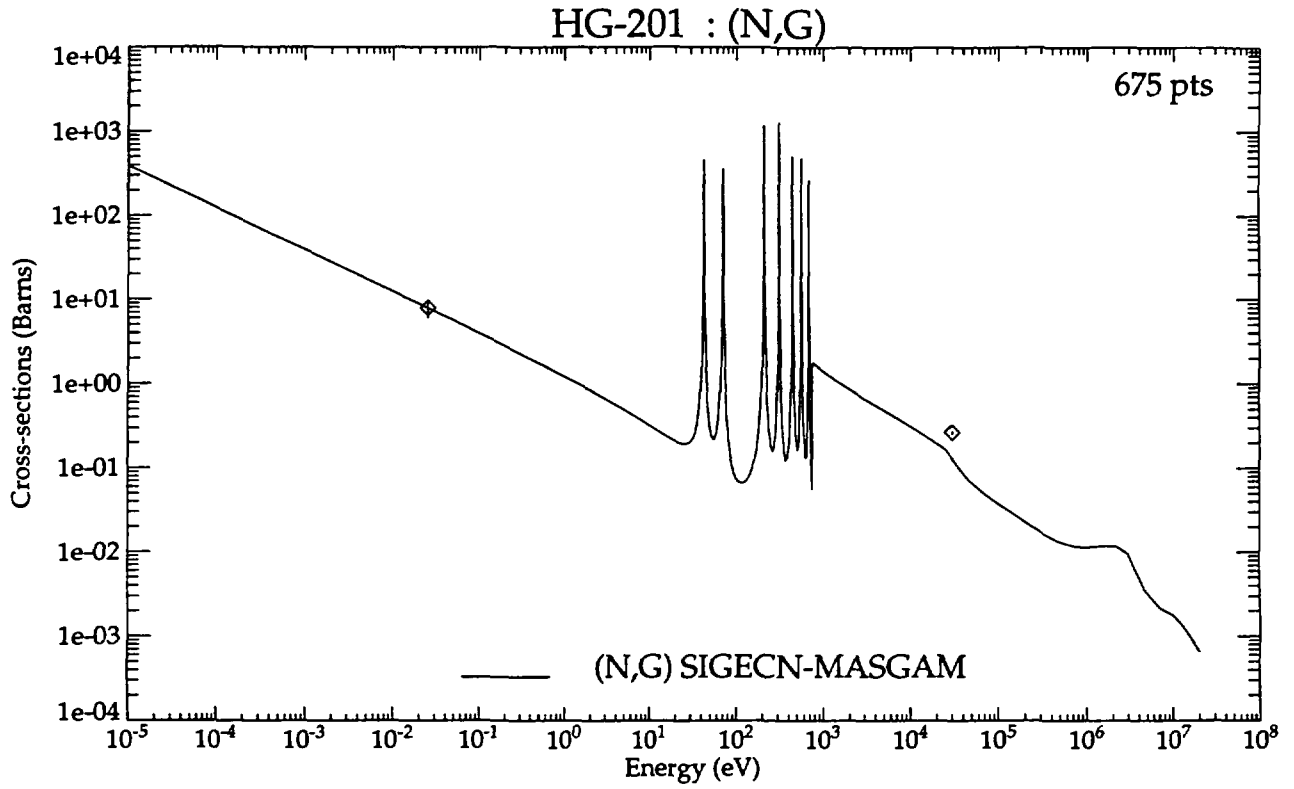


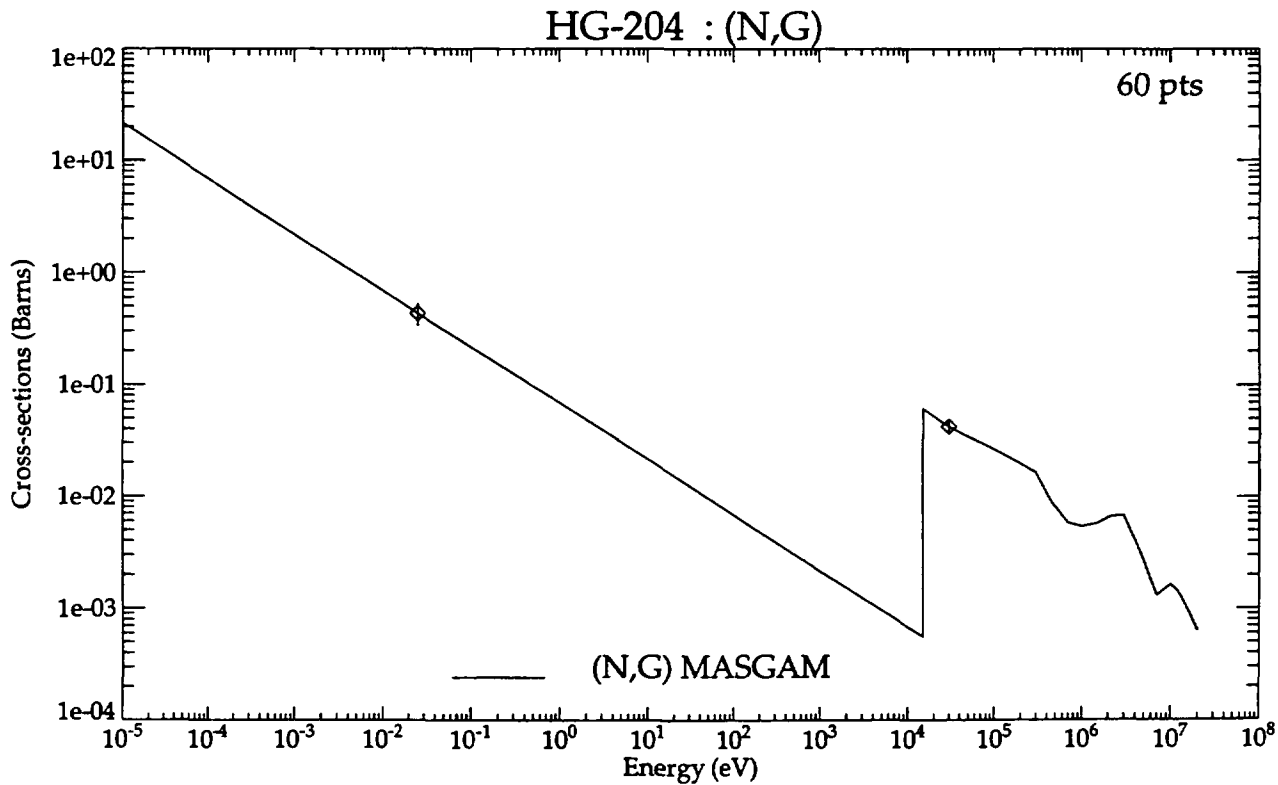
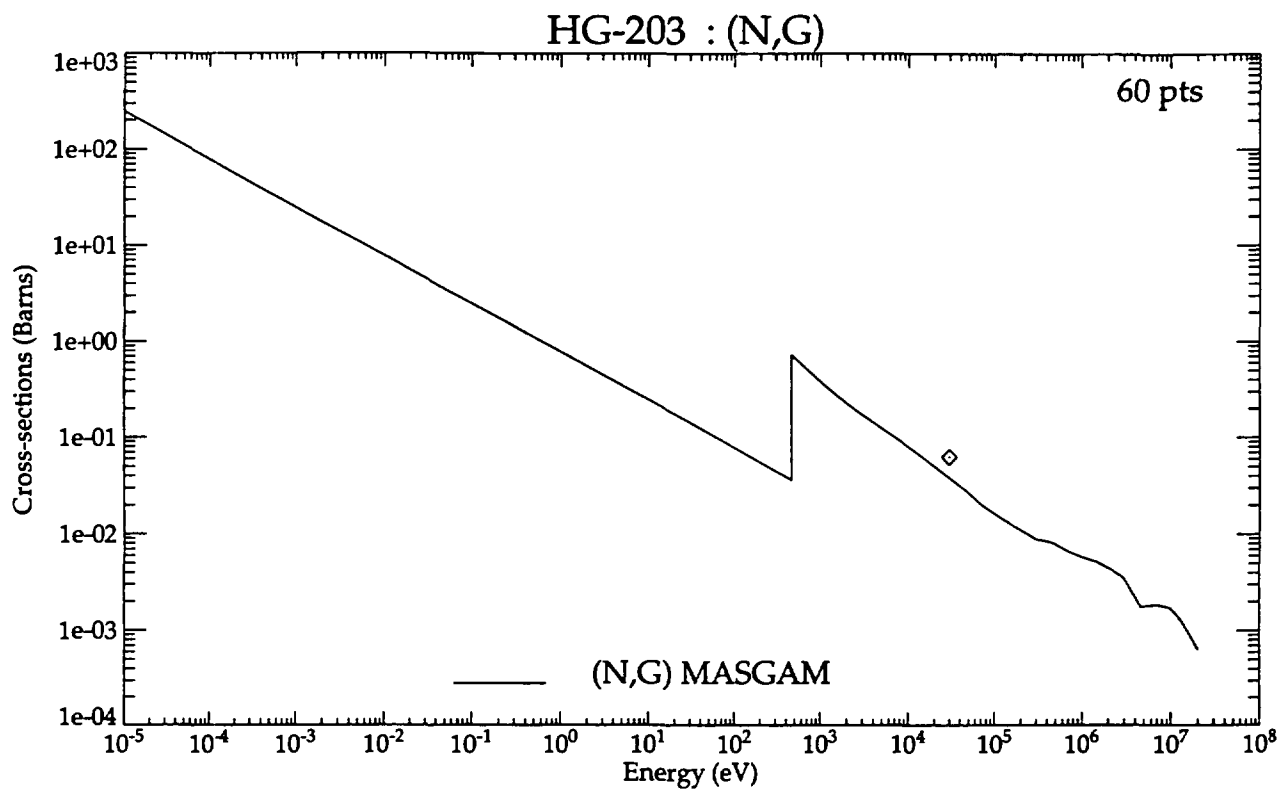
HG-197 : (N,G)

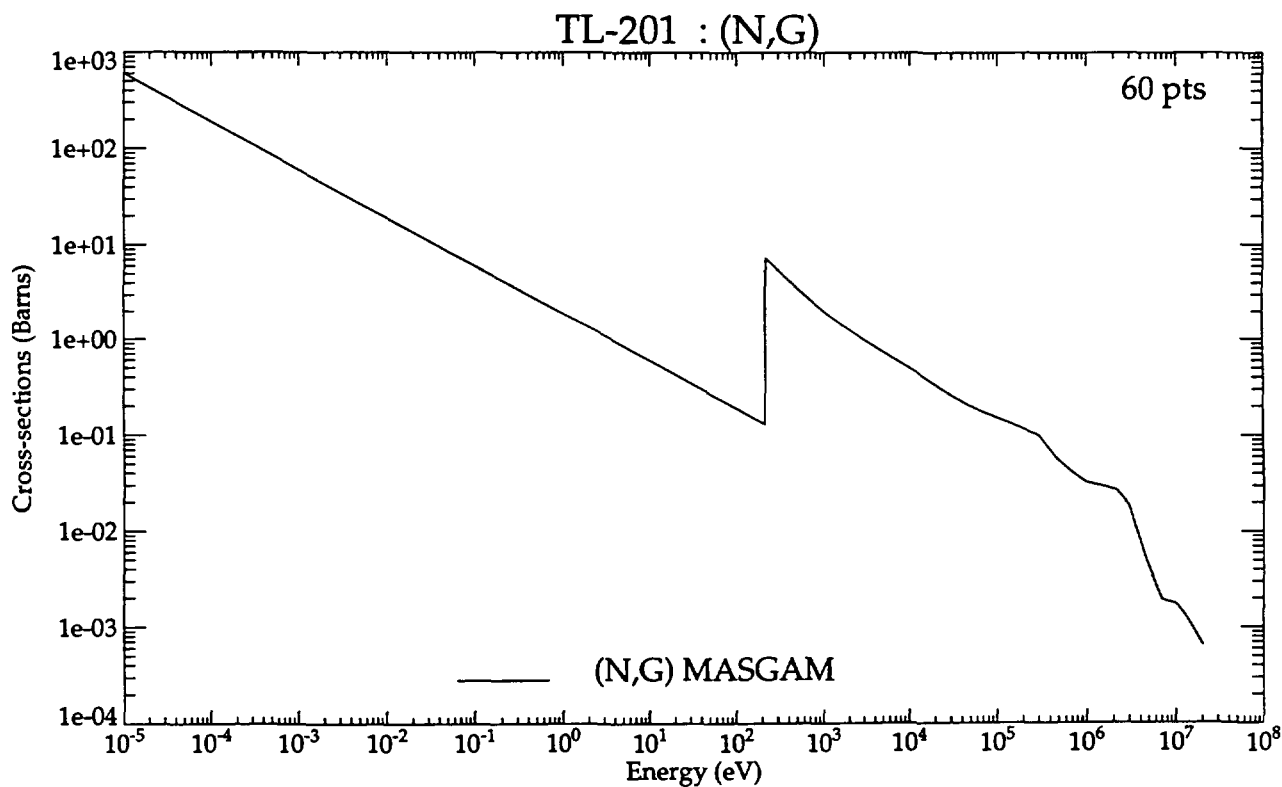
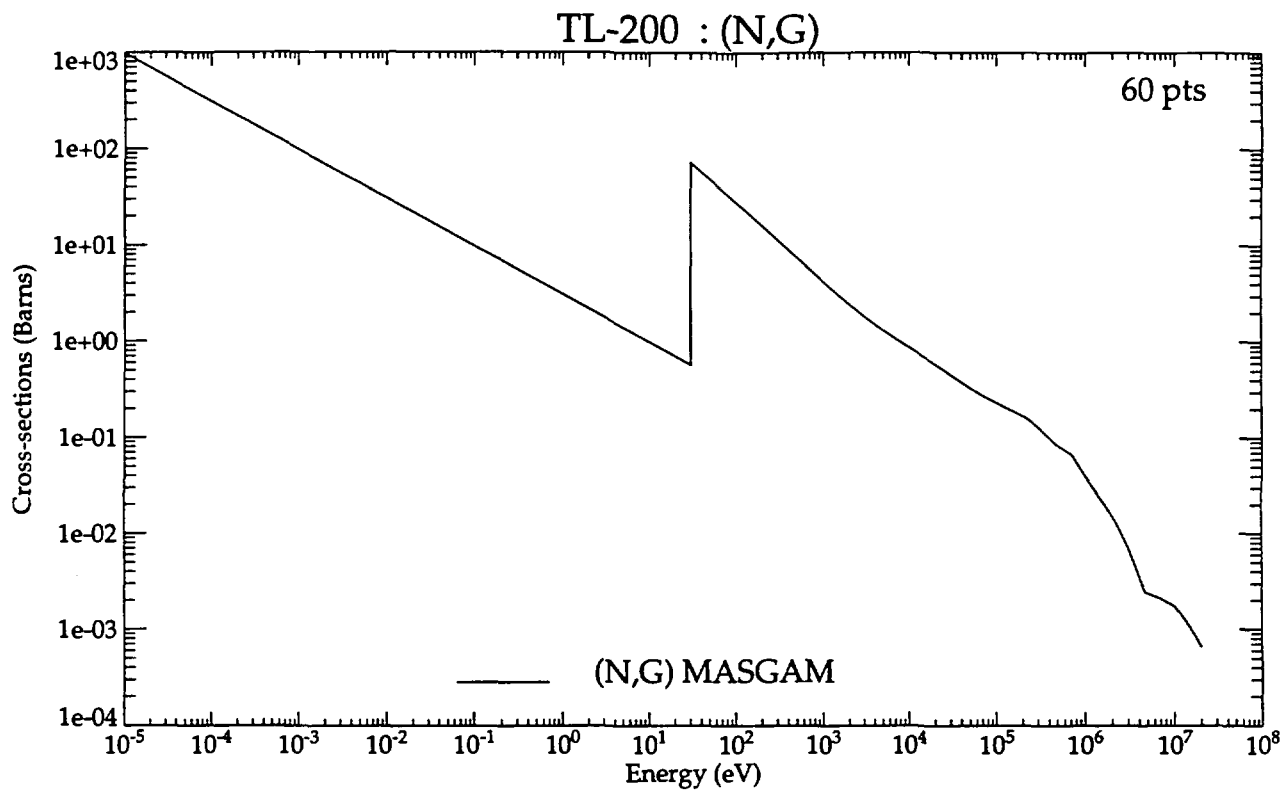


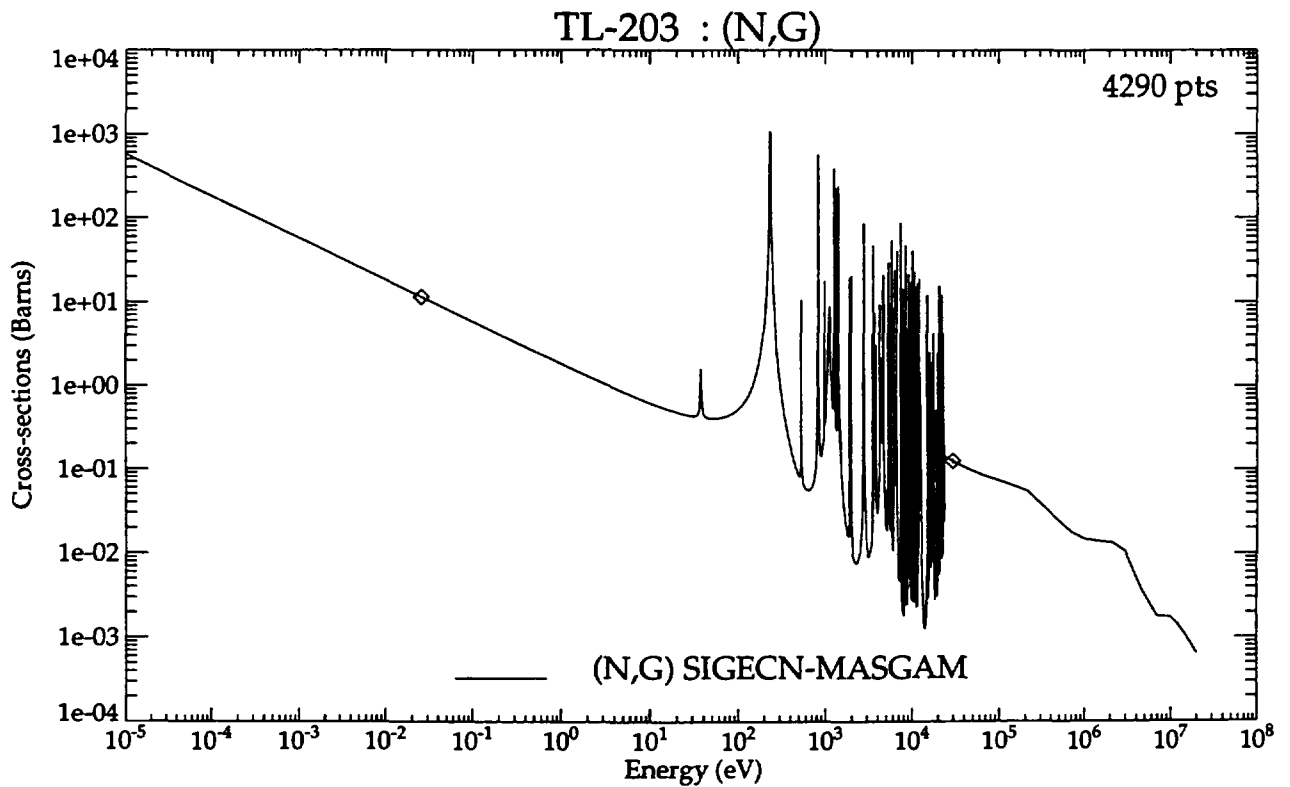
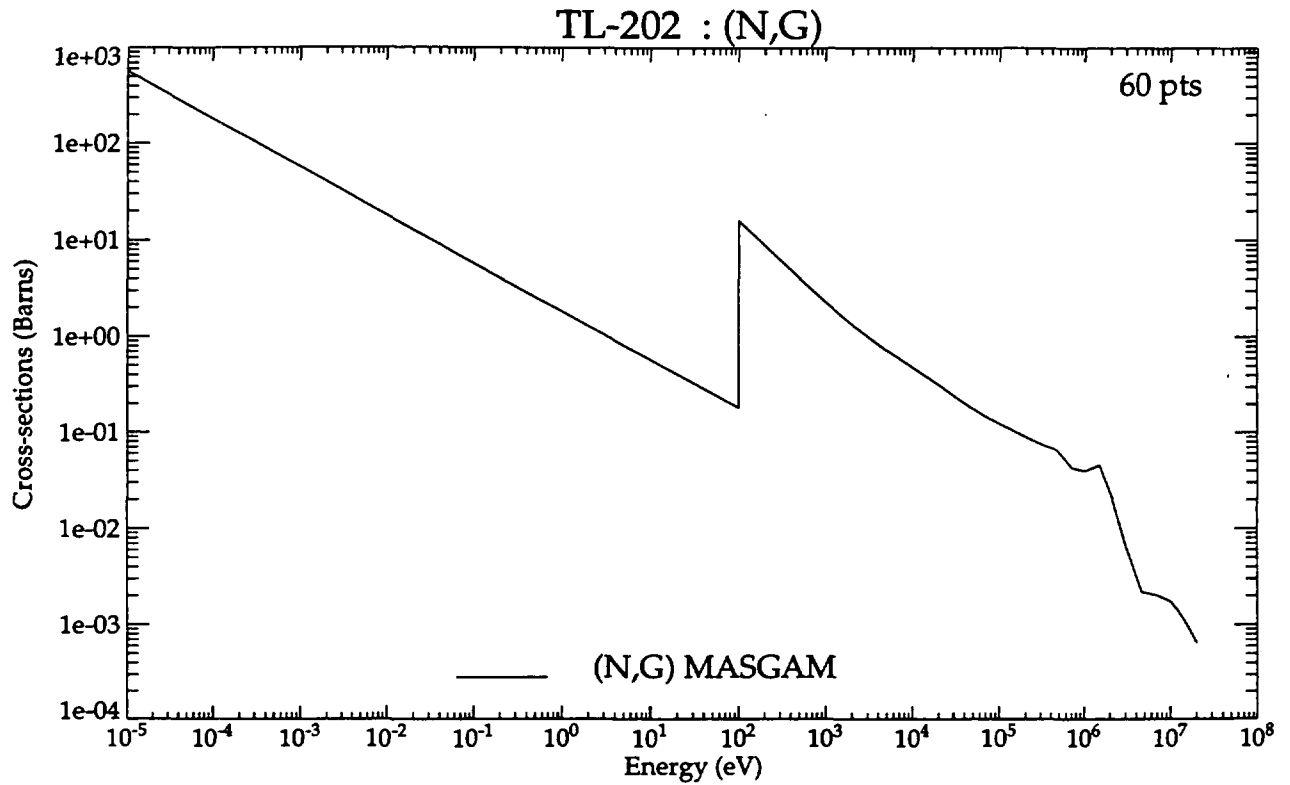


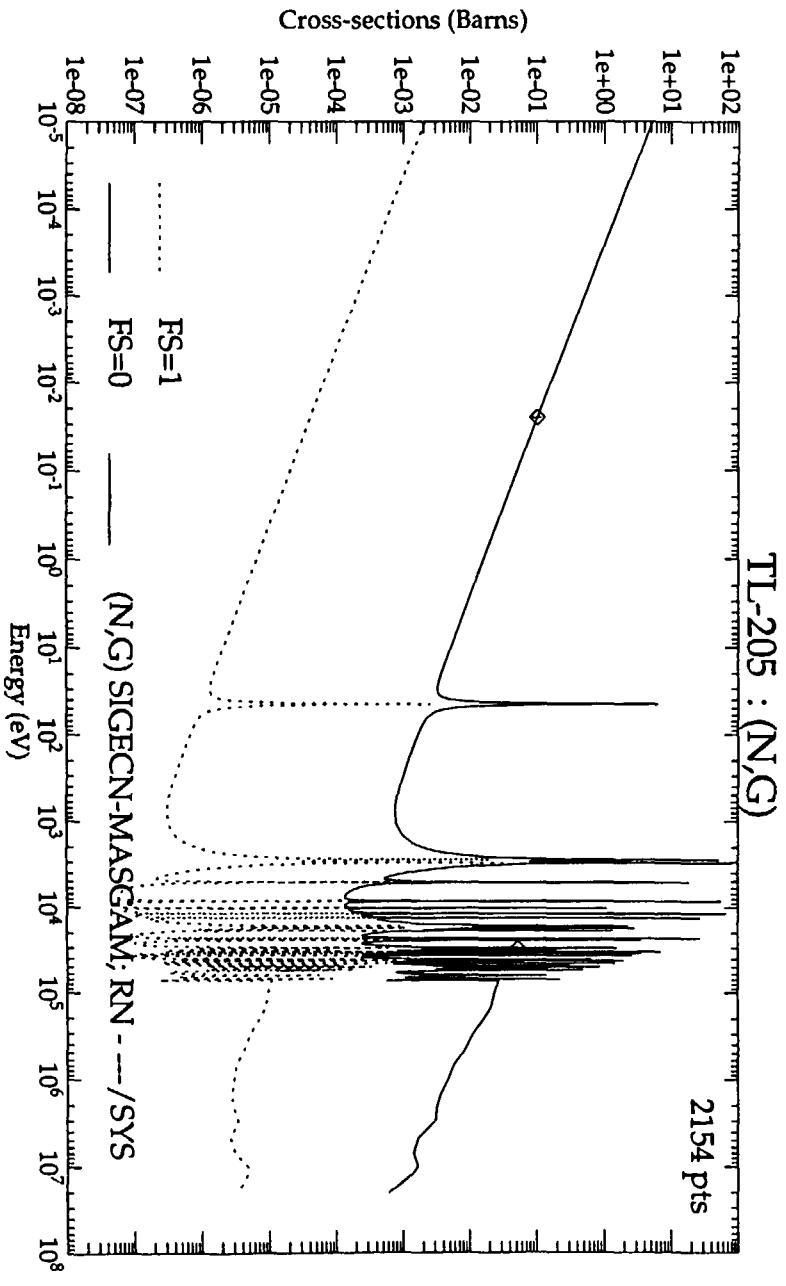
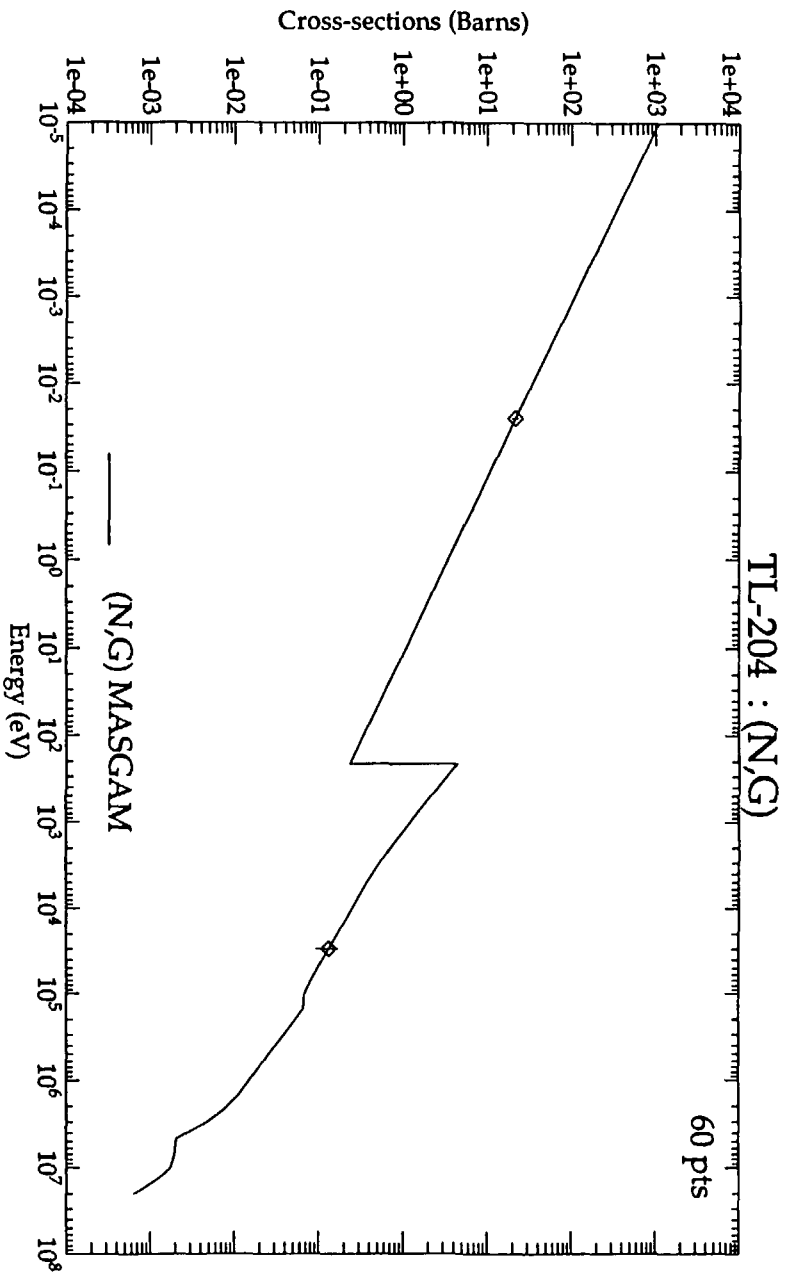


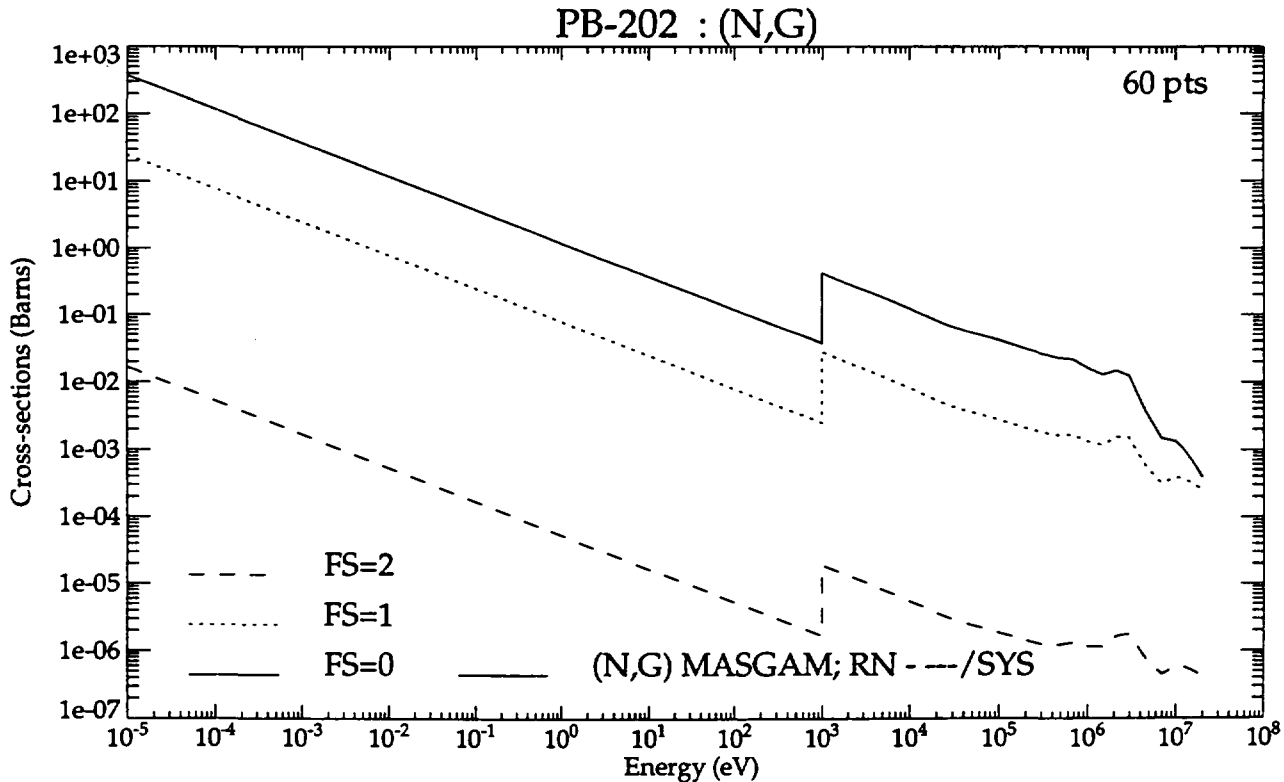
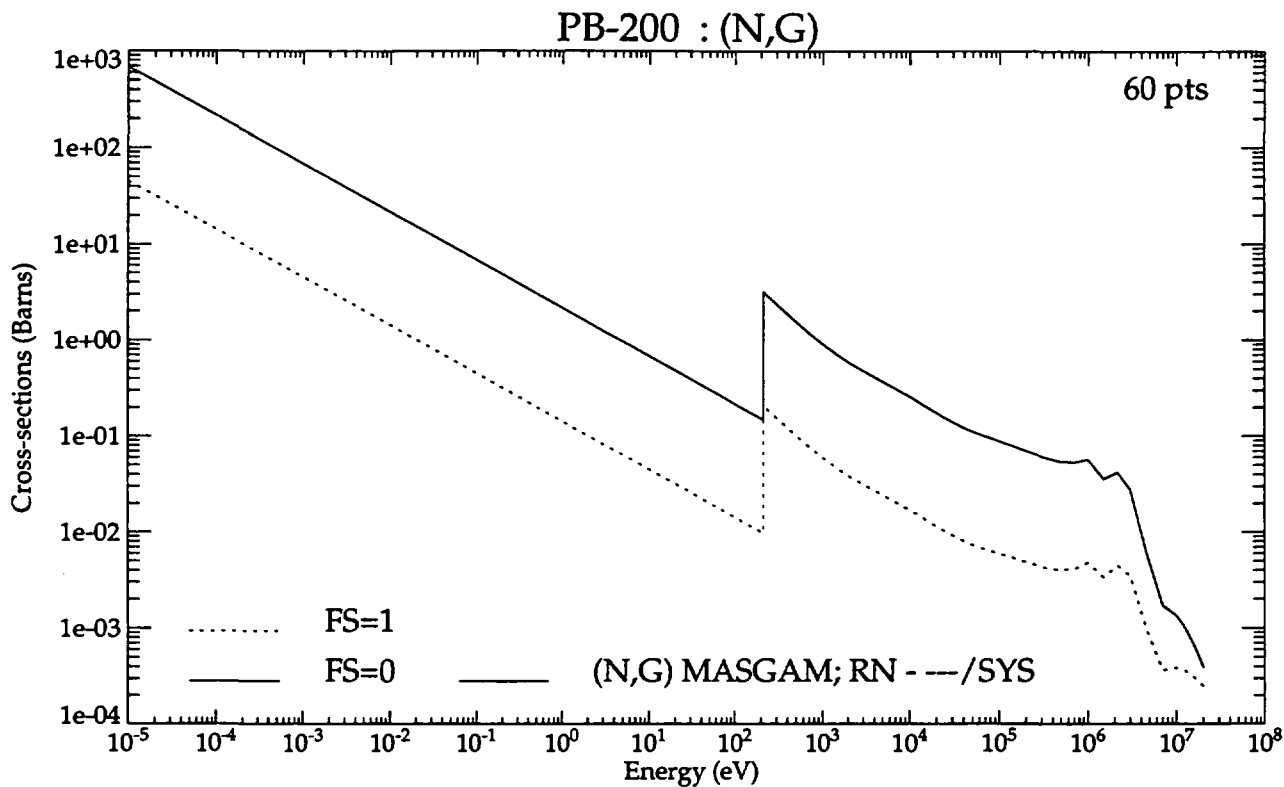


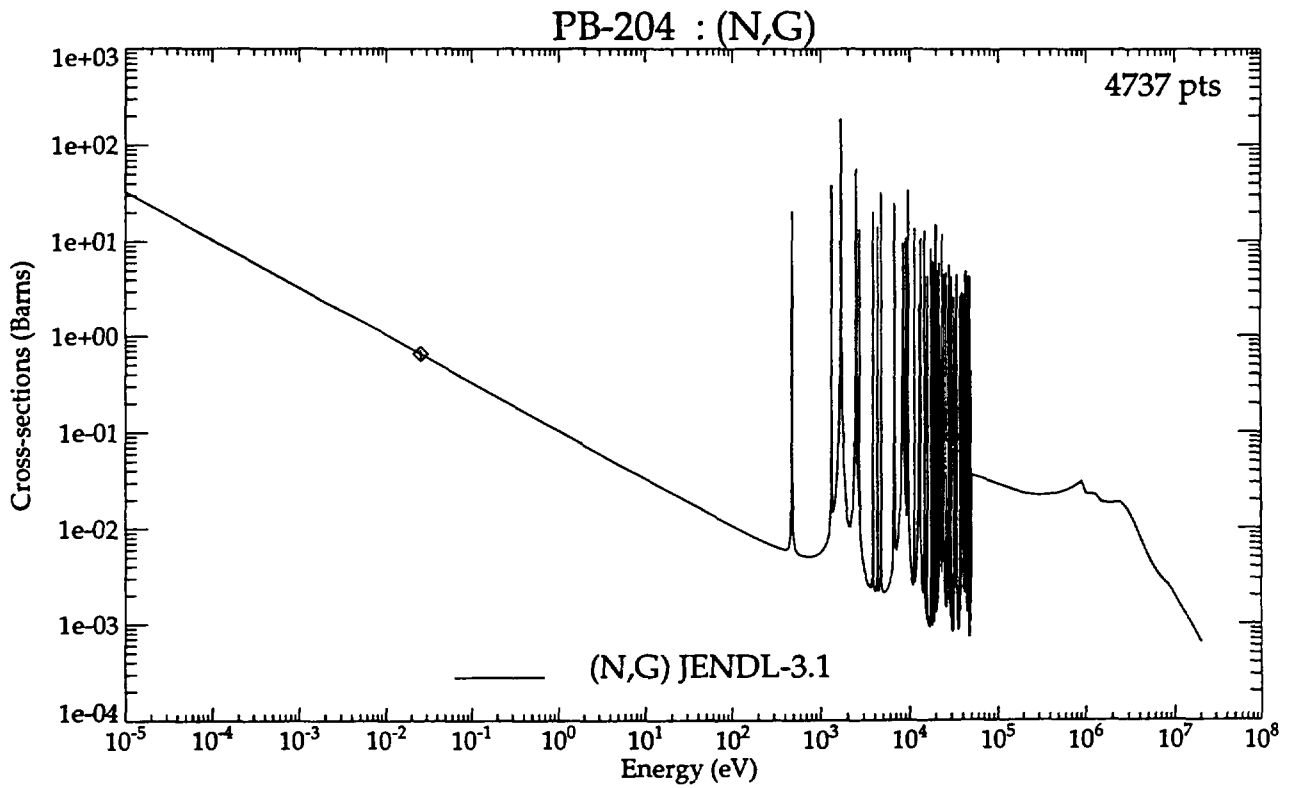
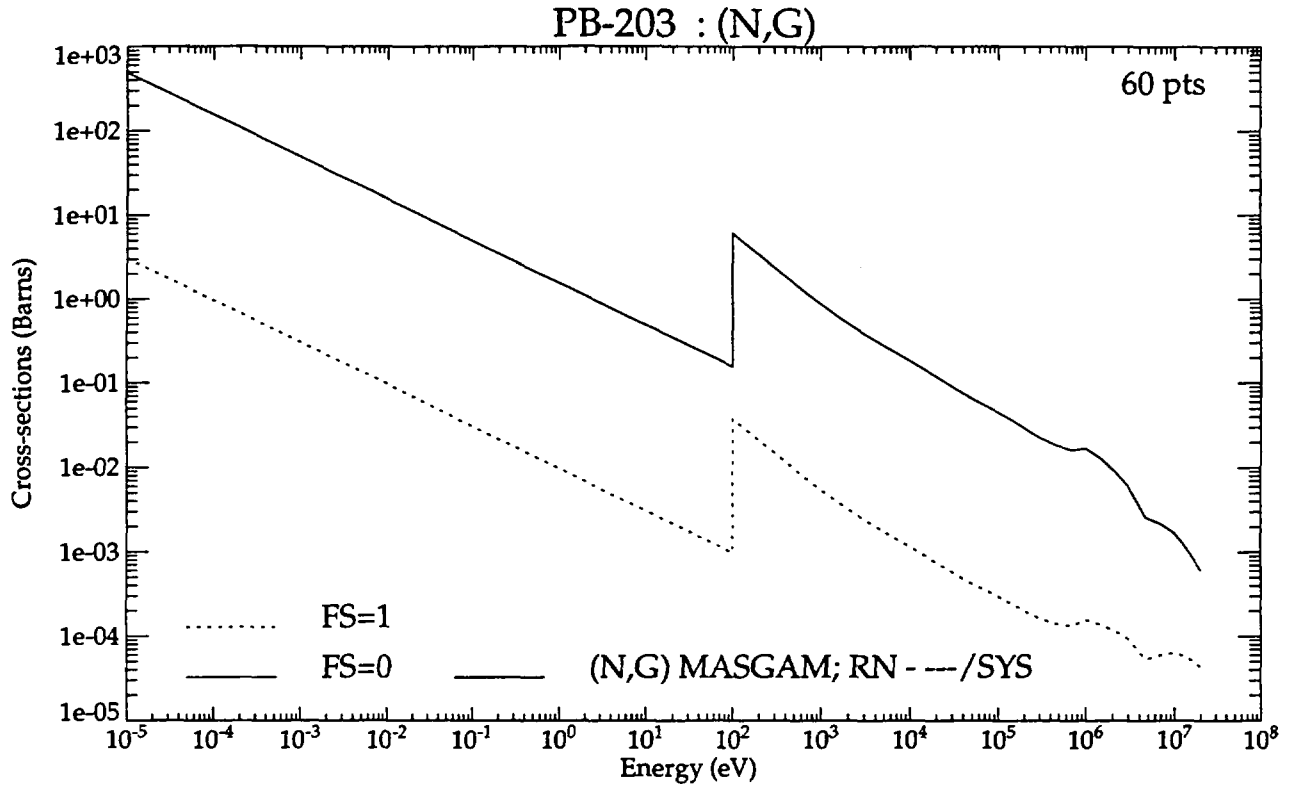


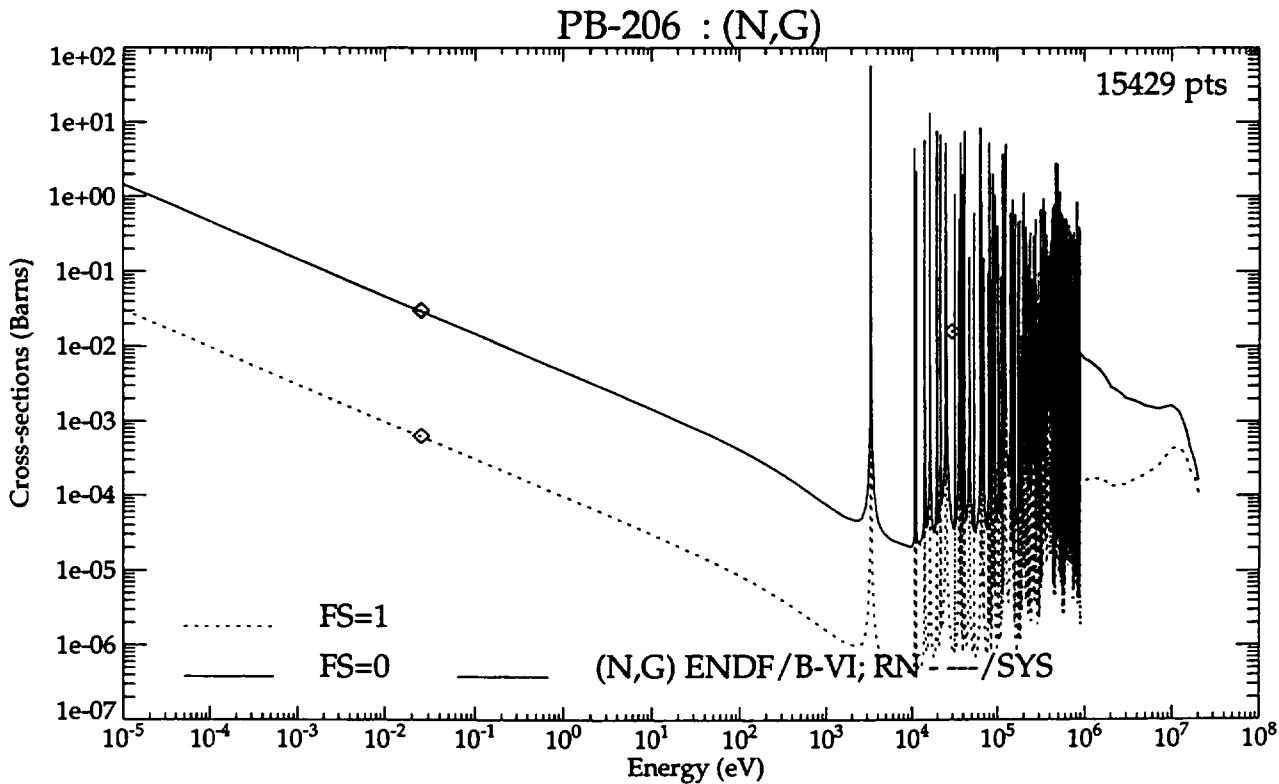
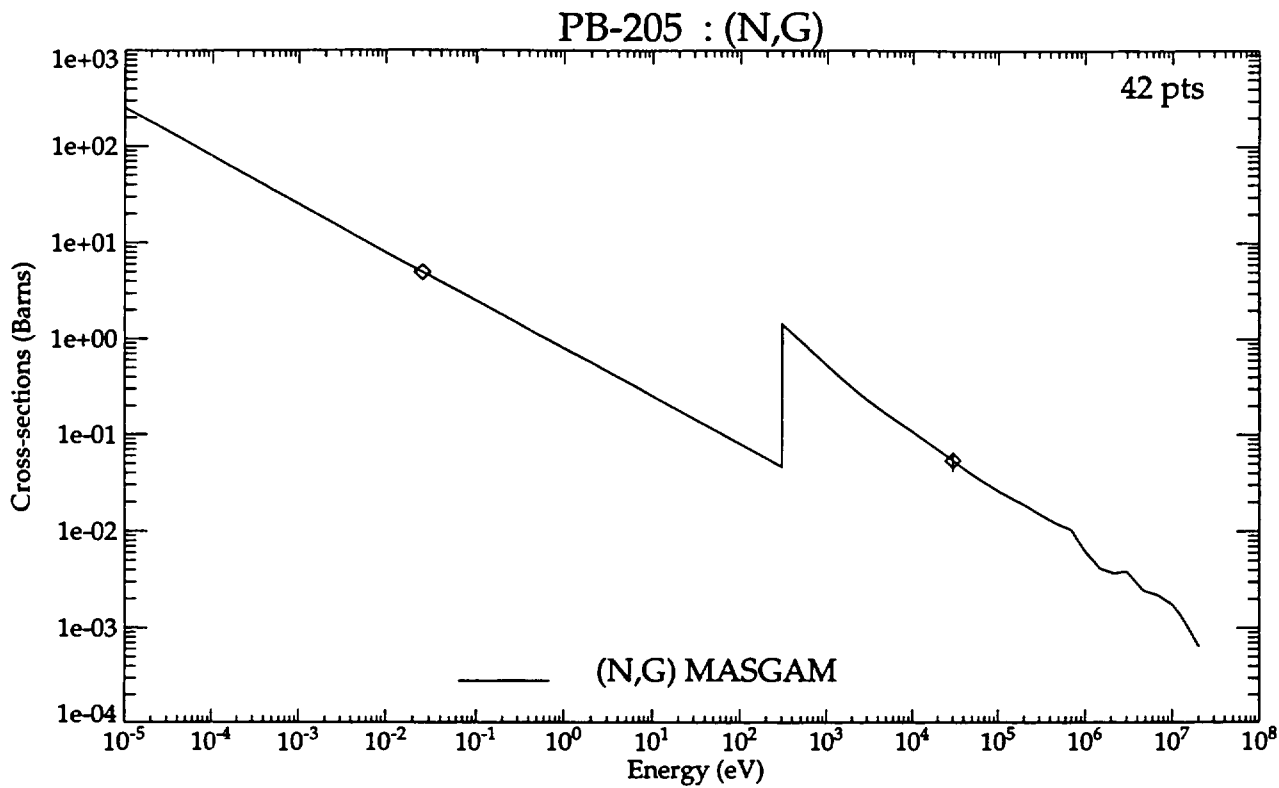


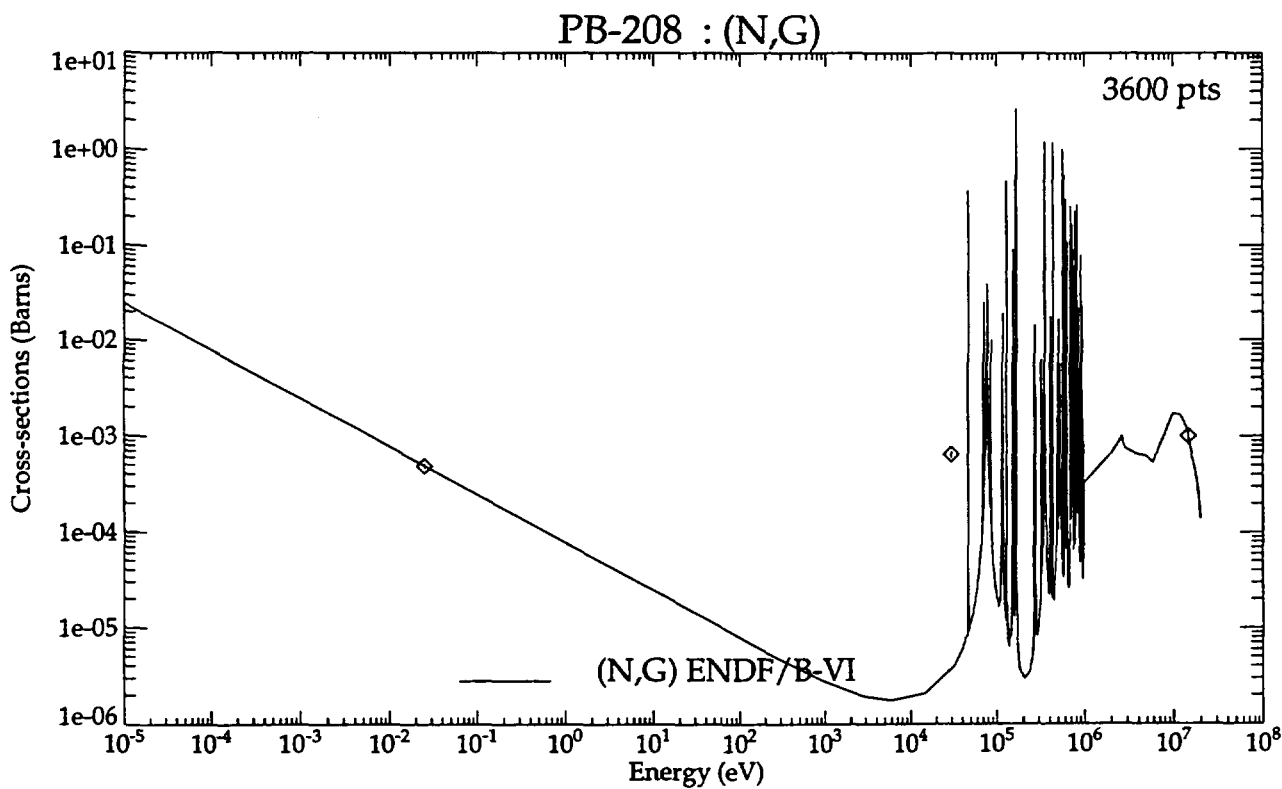
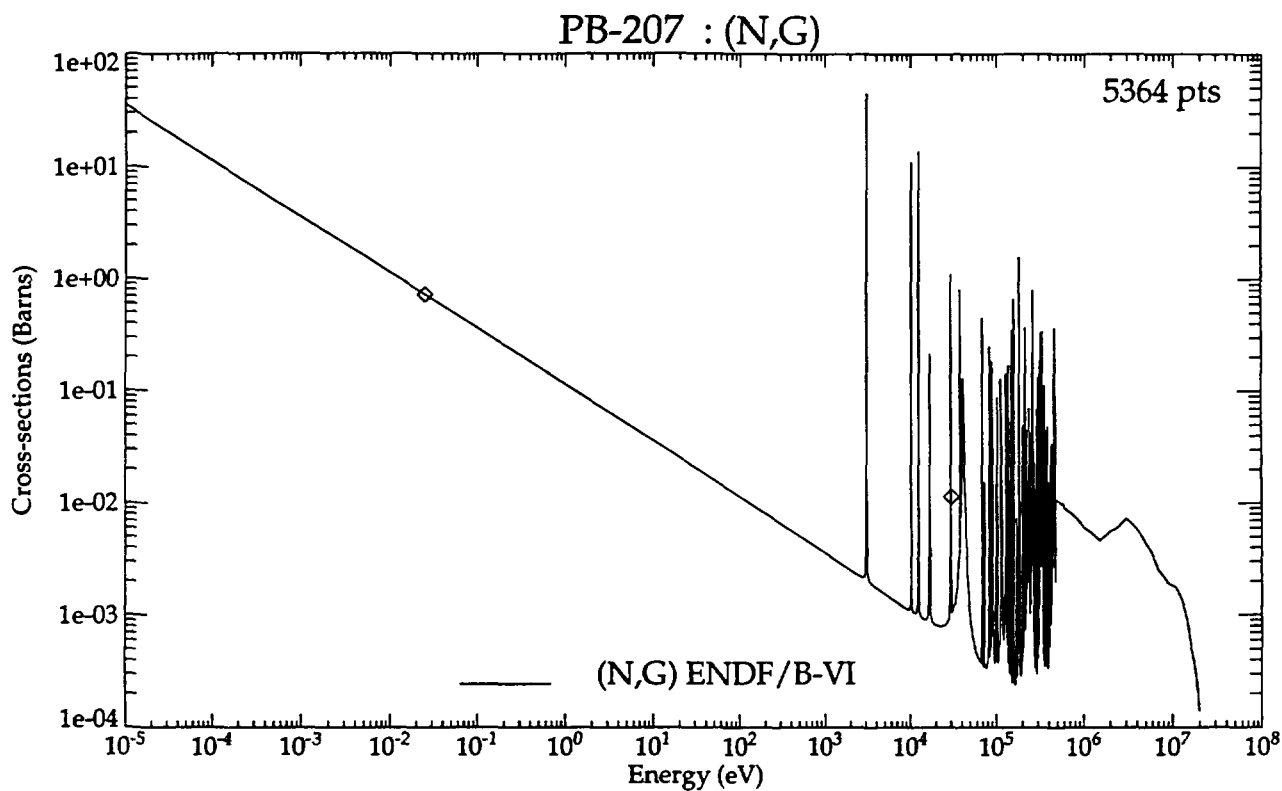


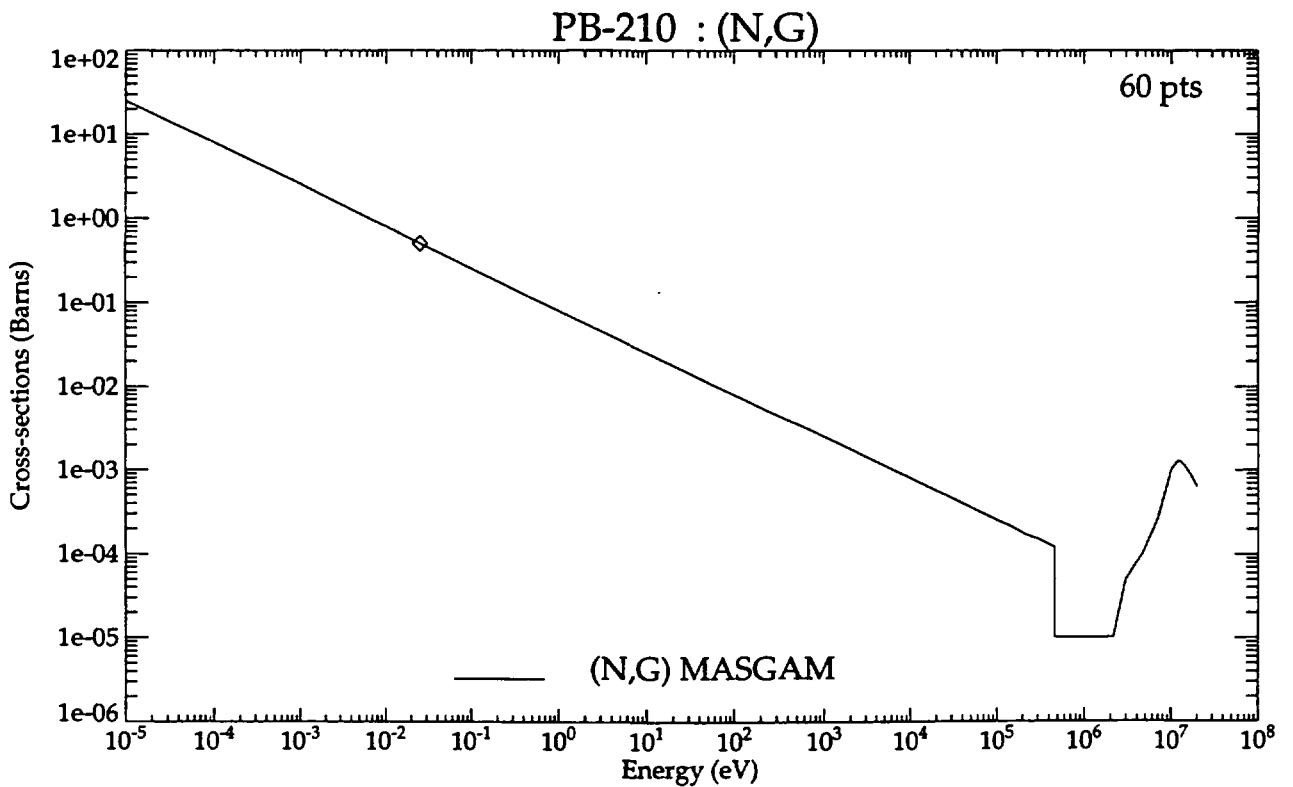
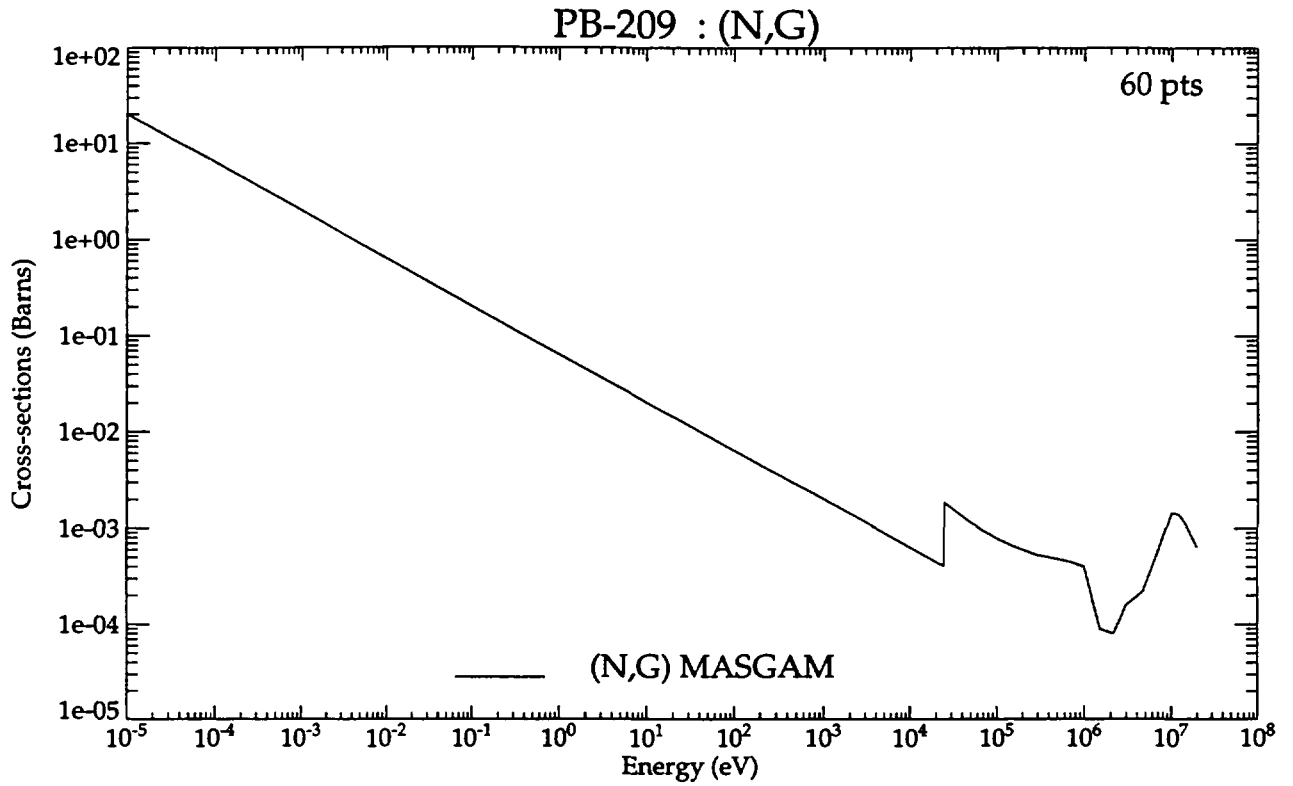


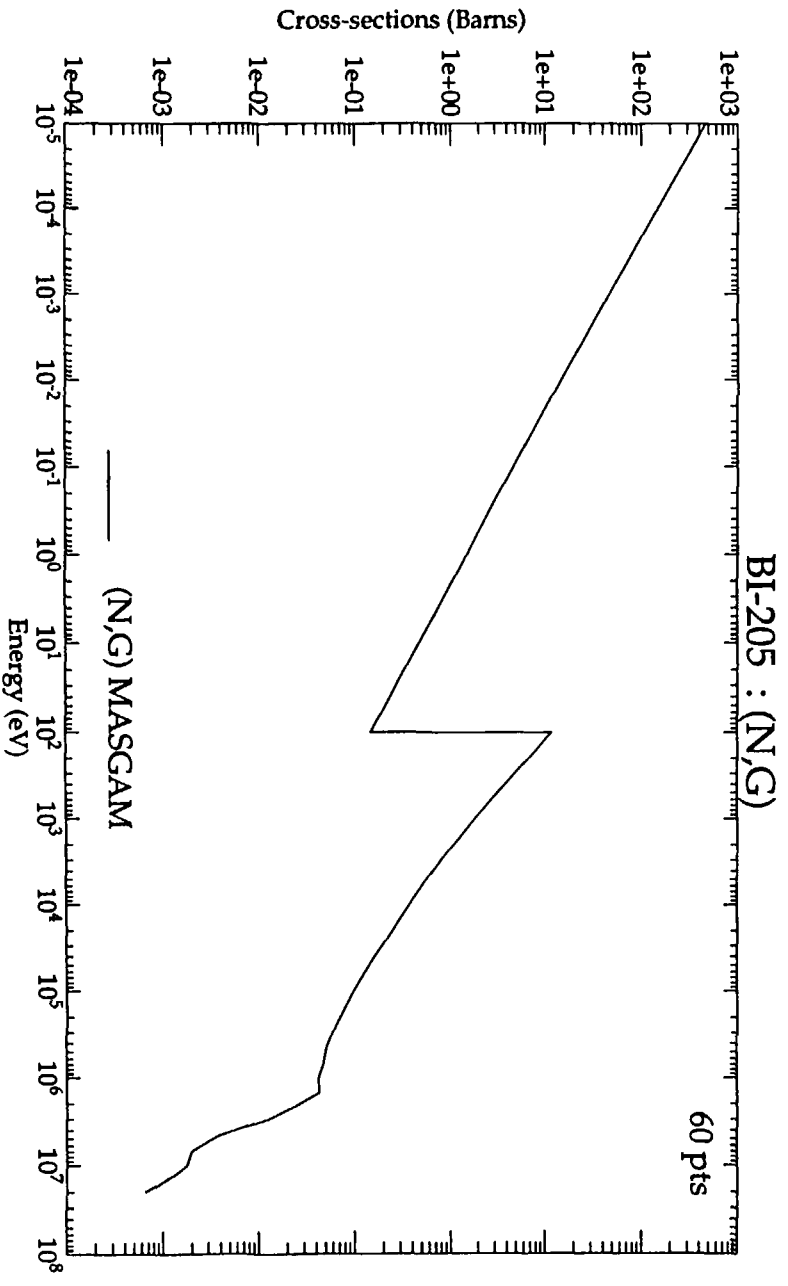
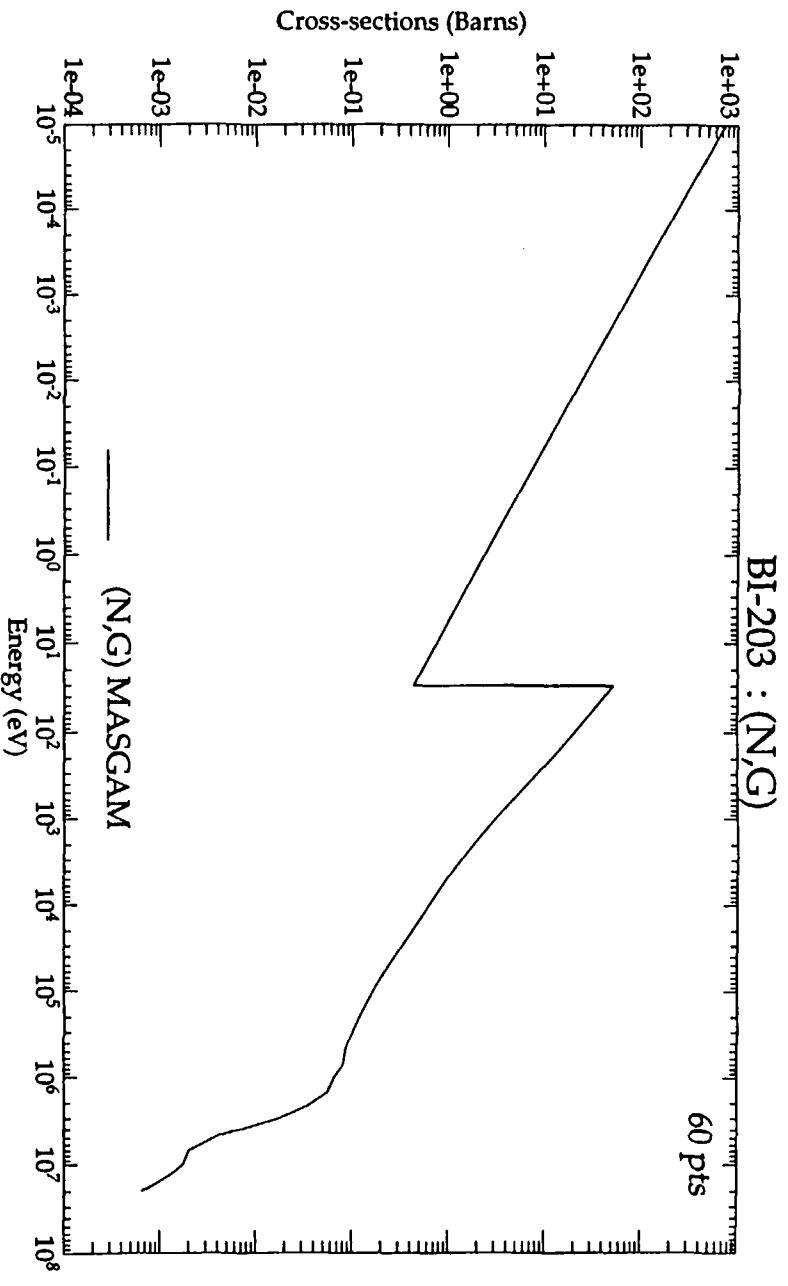


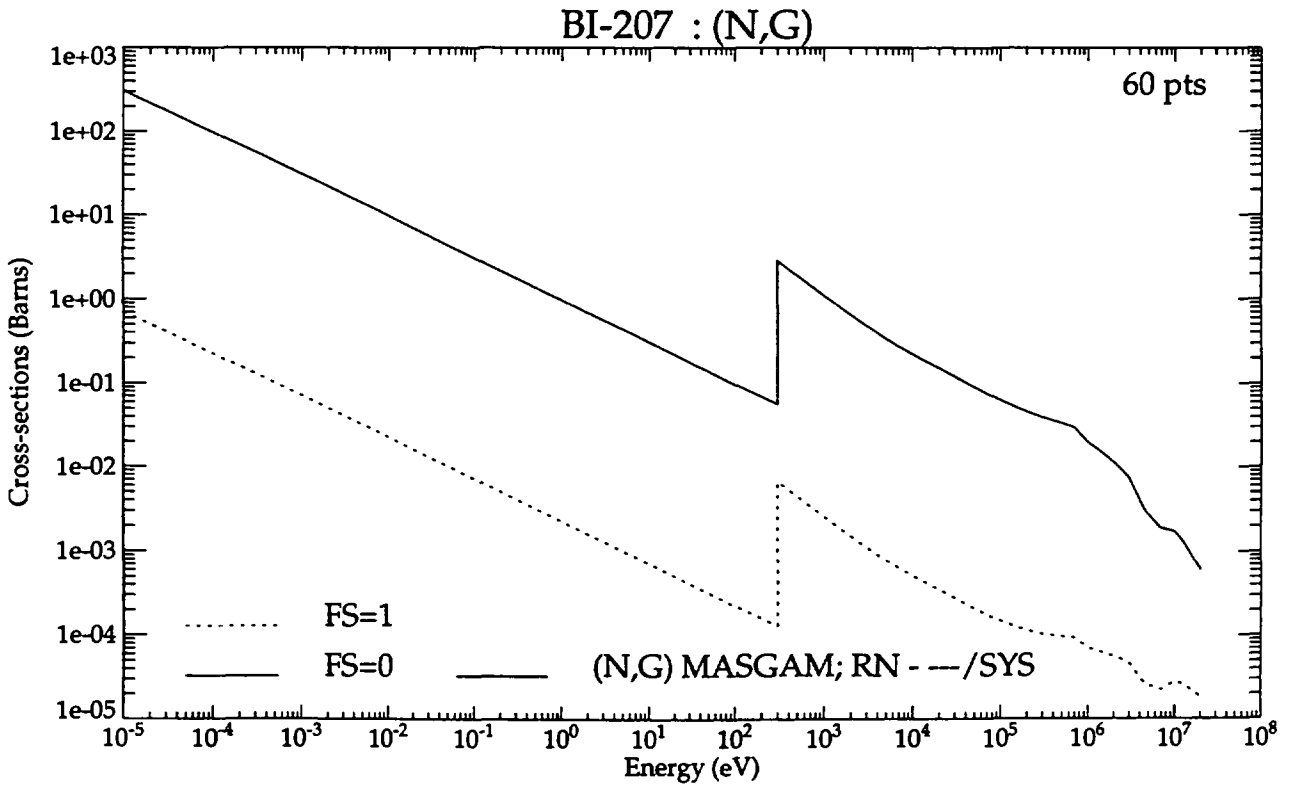
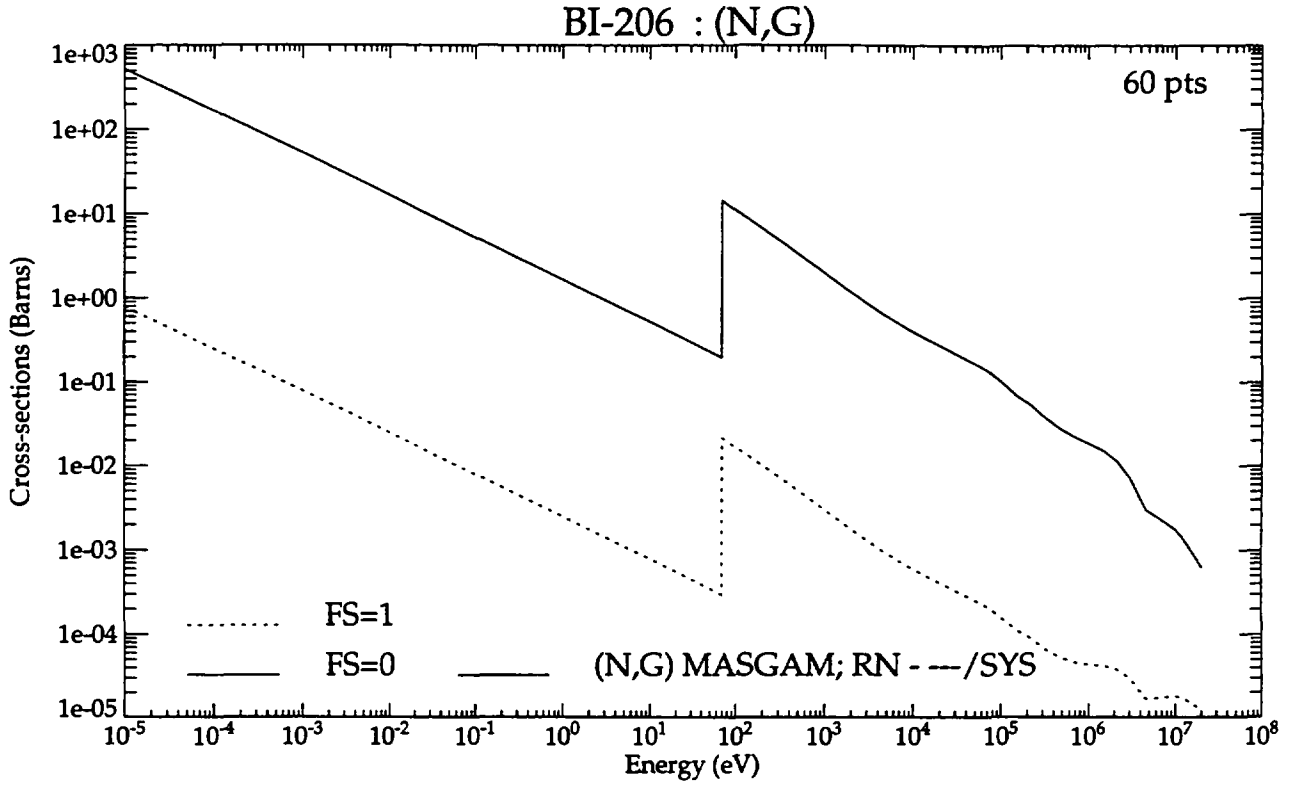


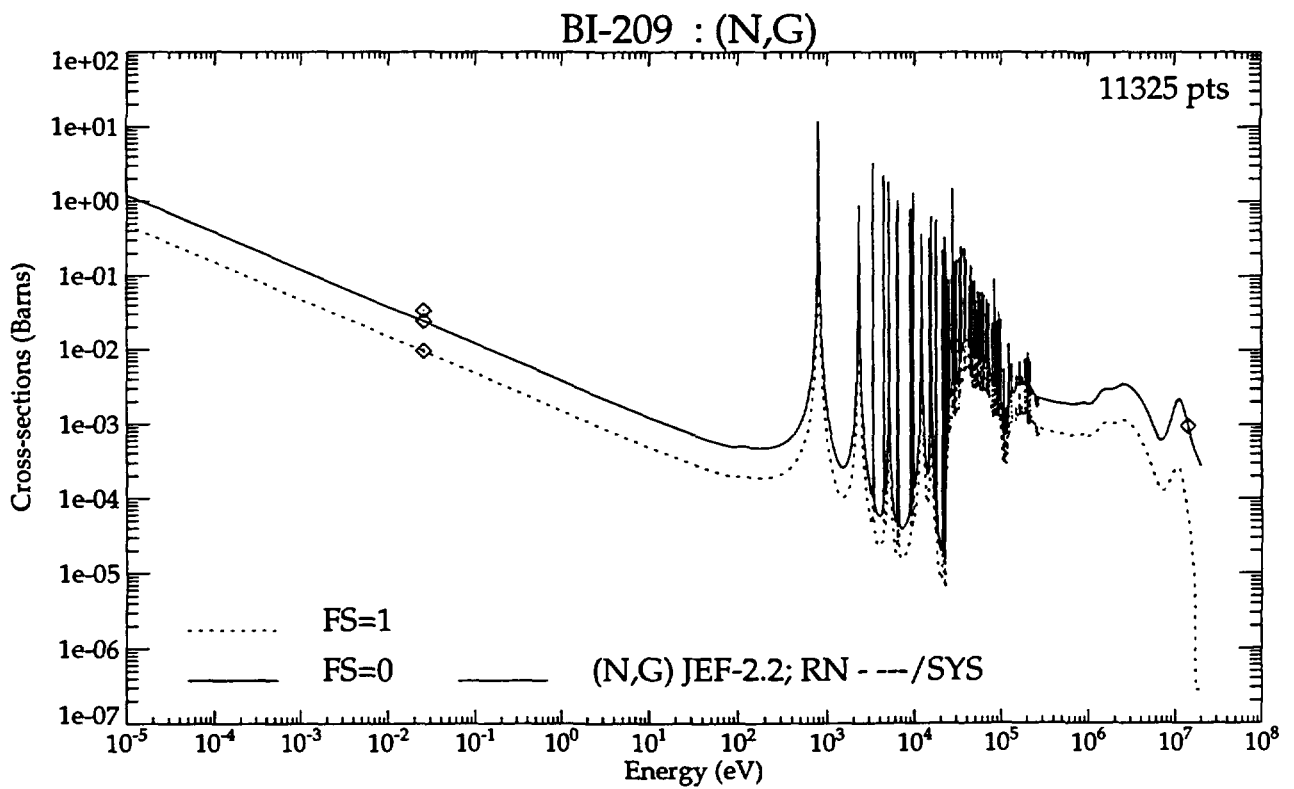
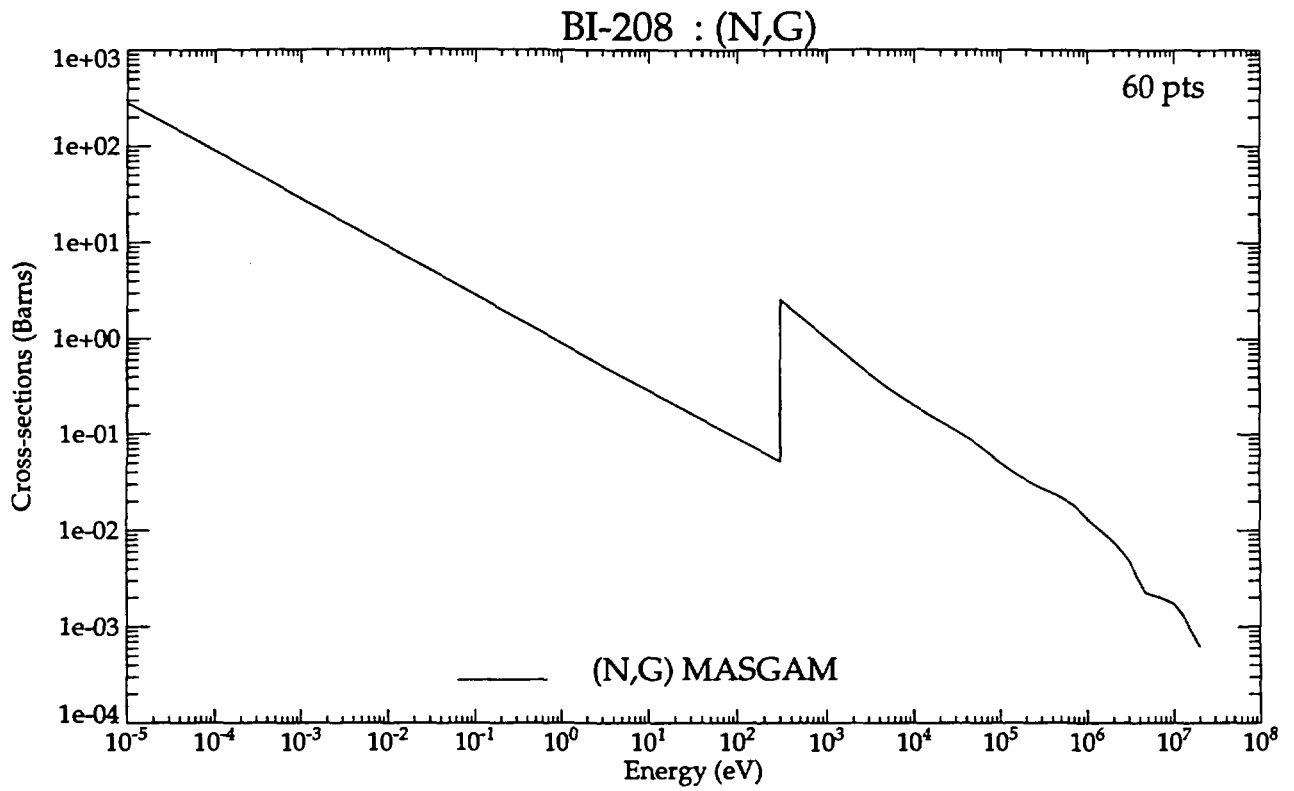


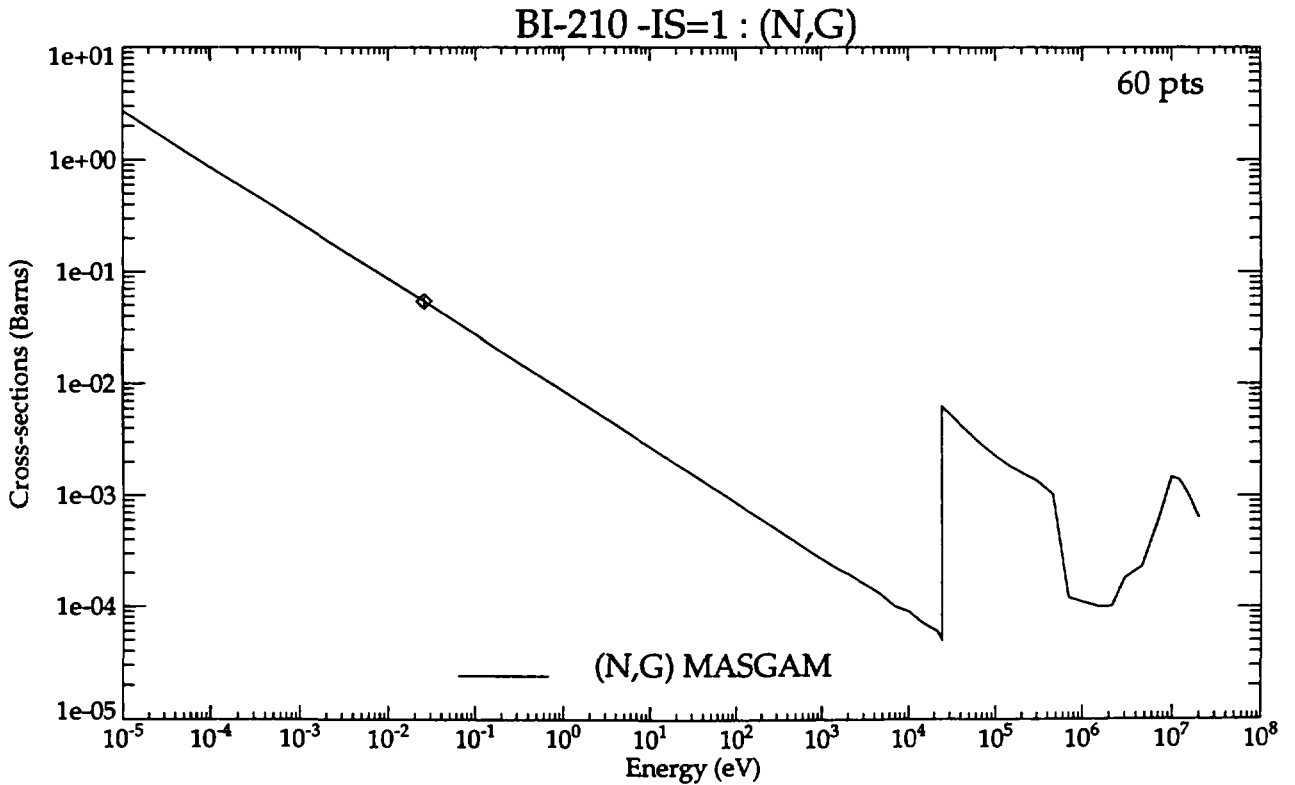
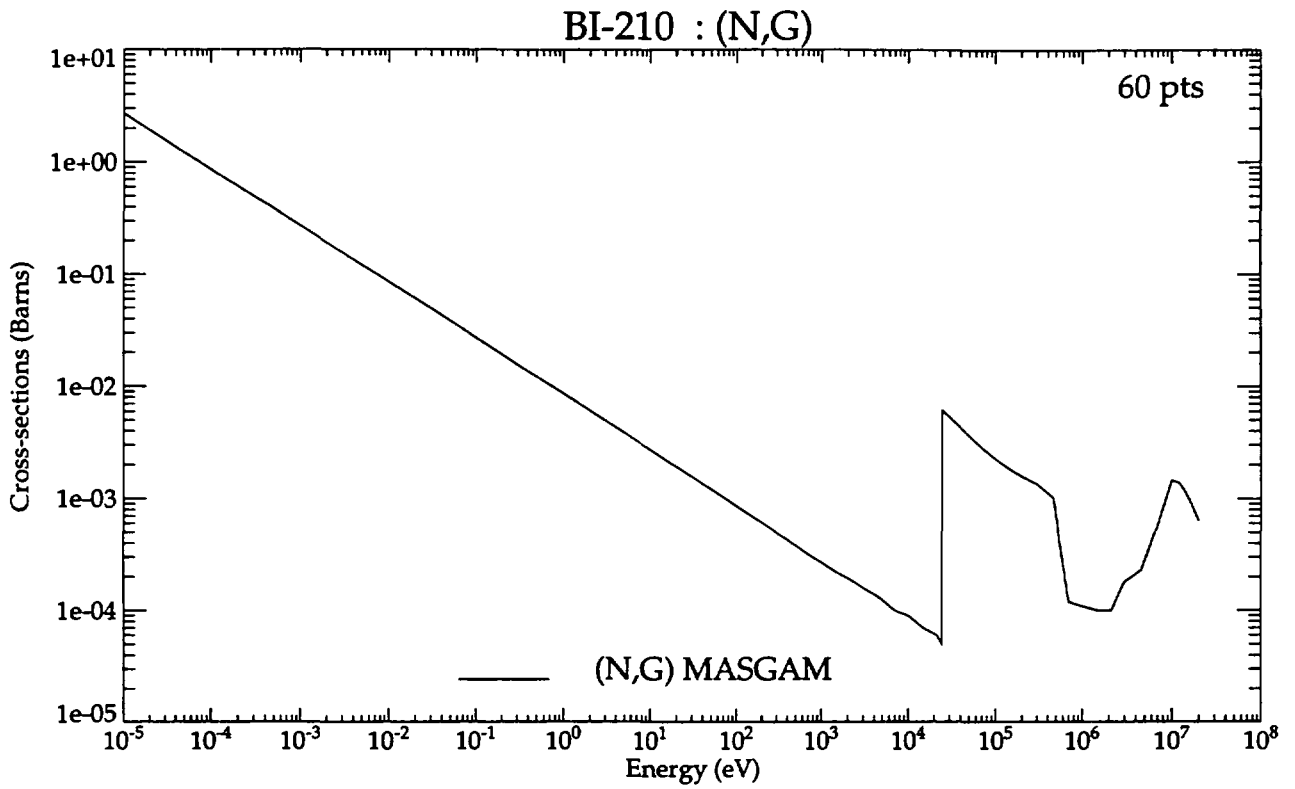


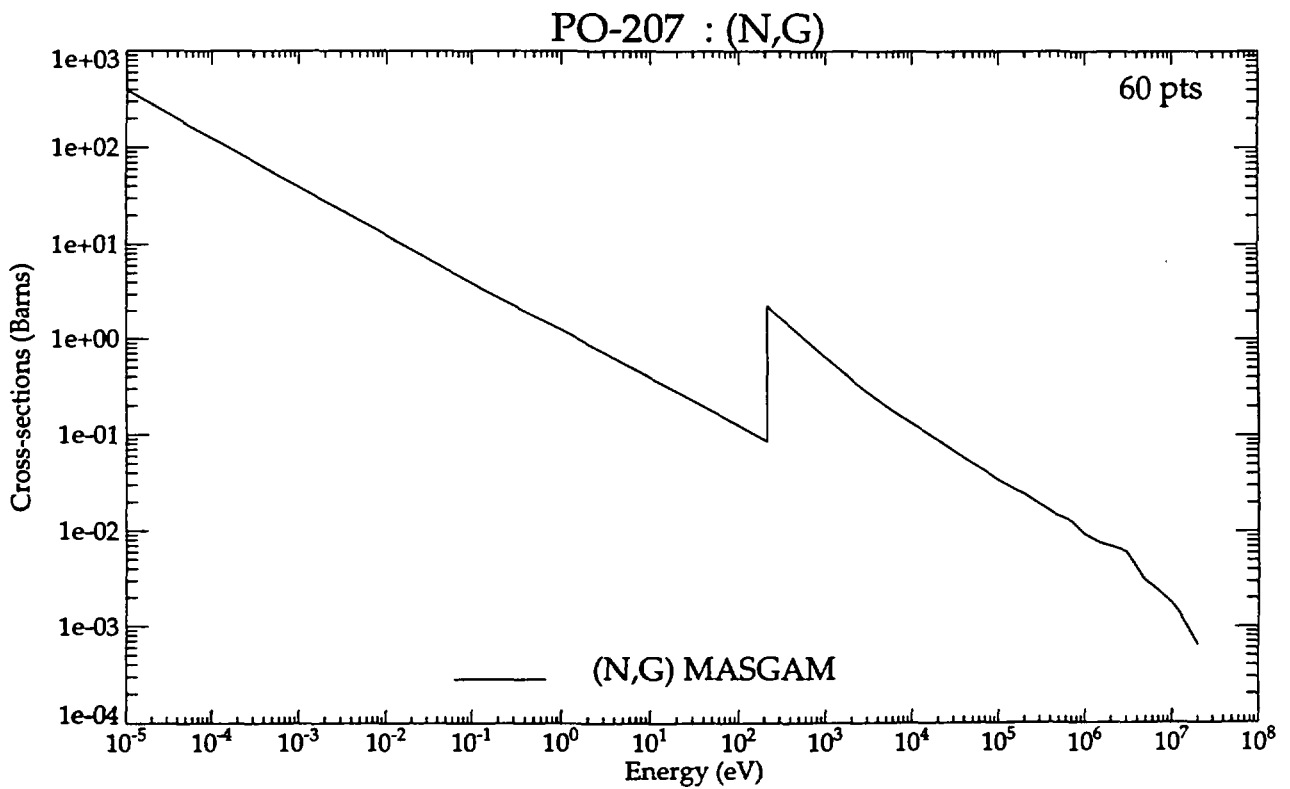
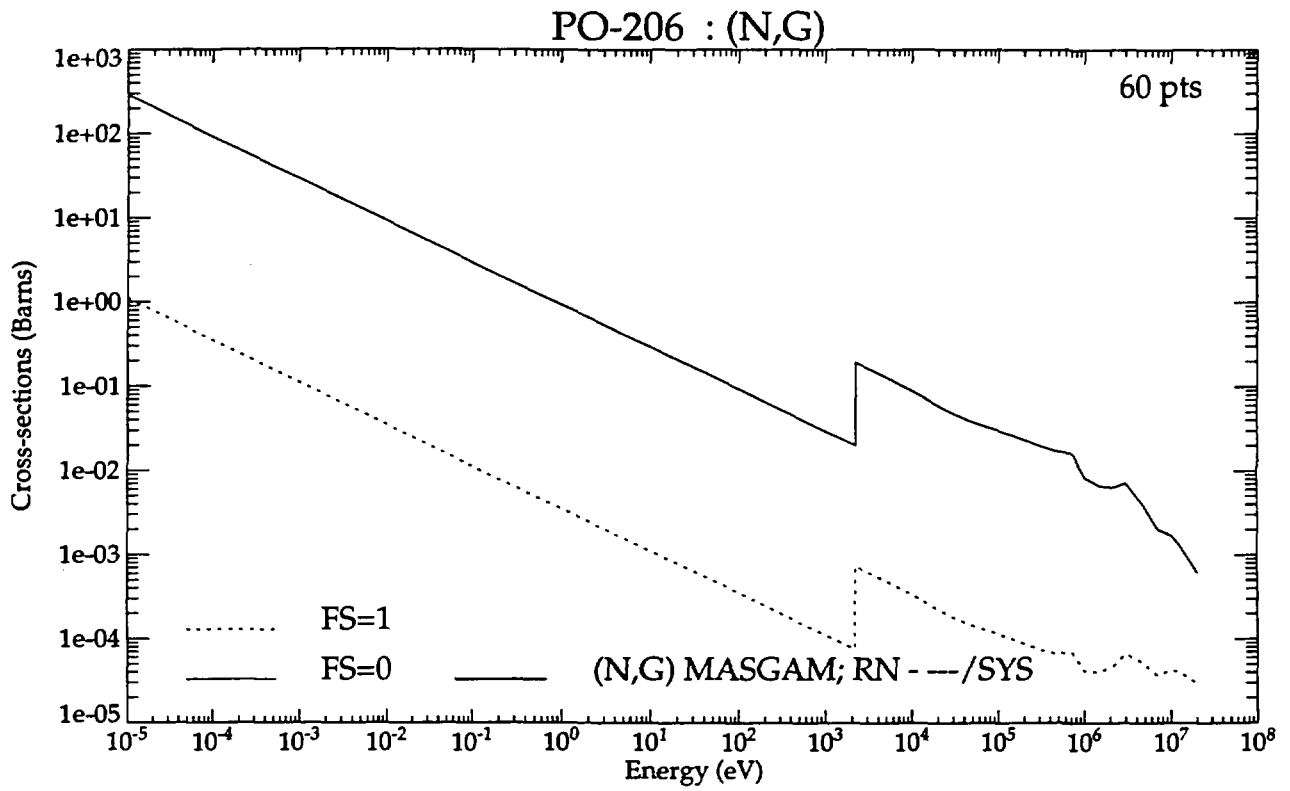


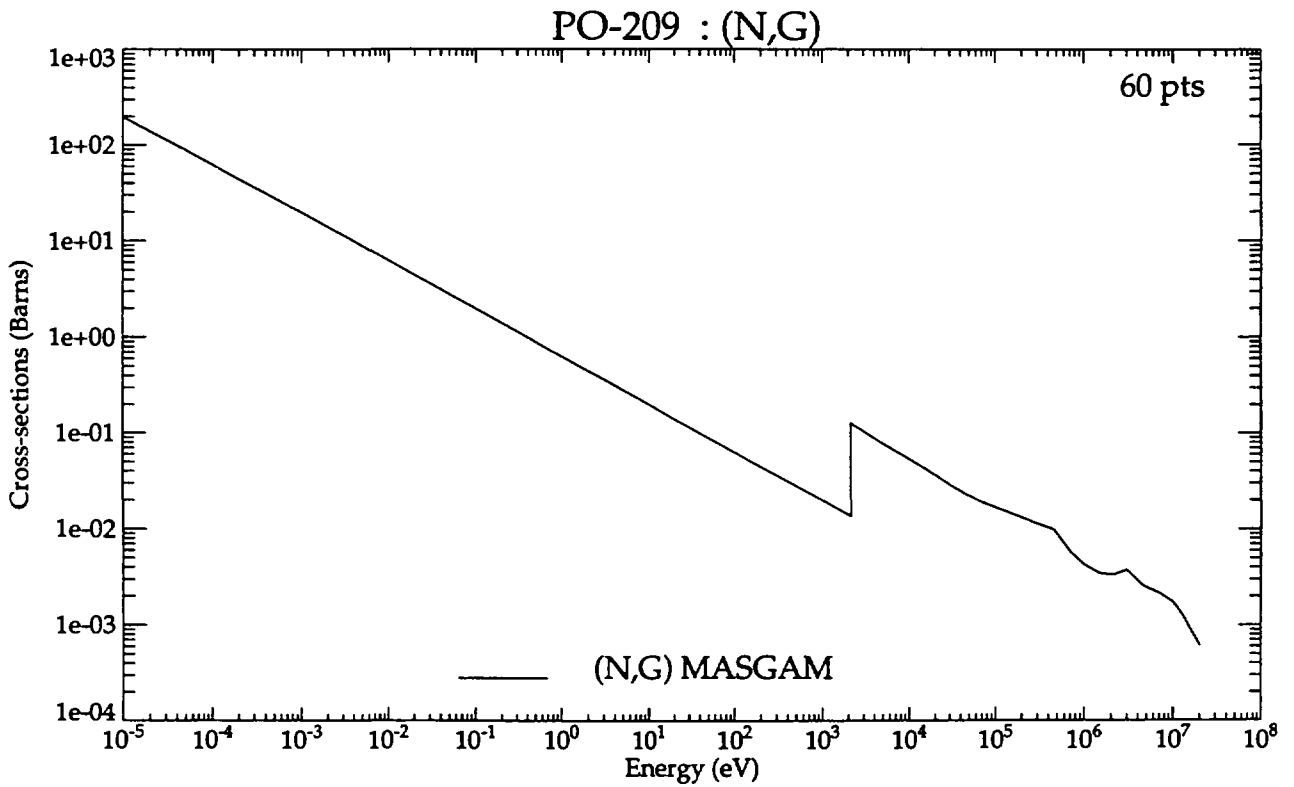
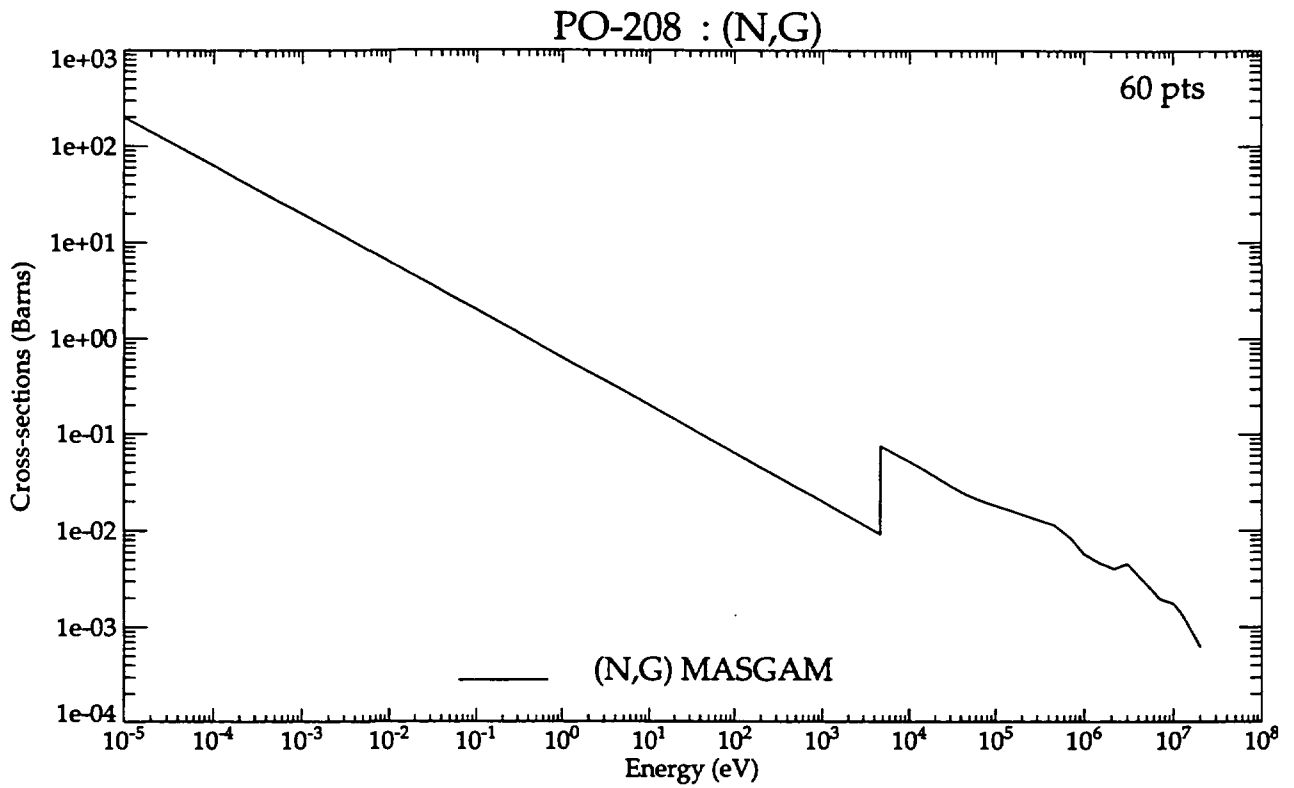


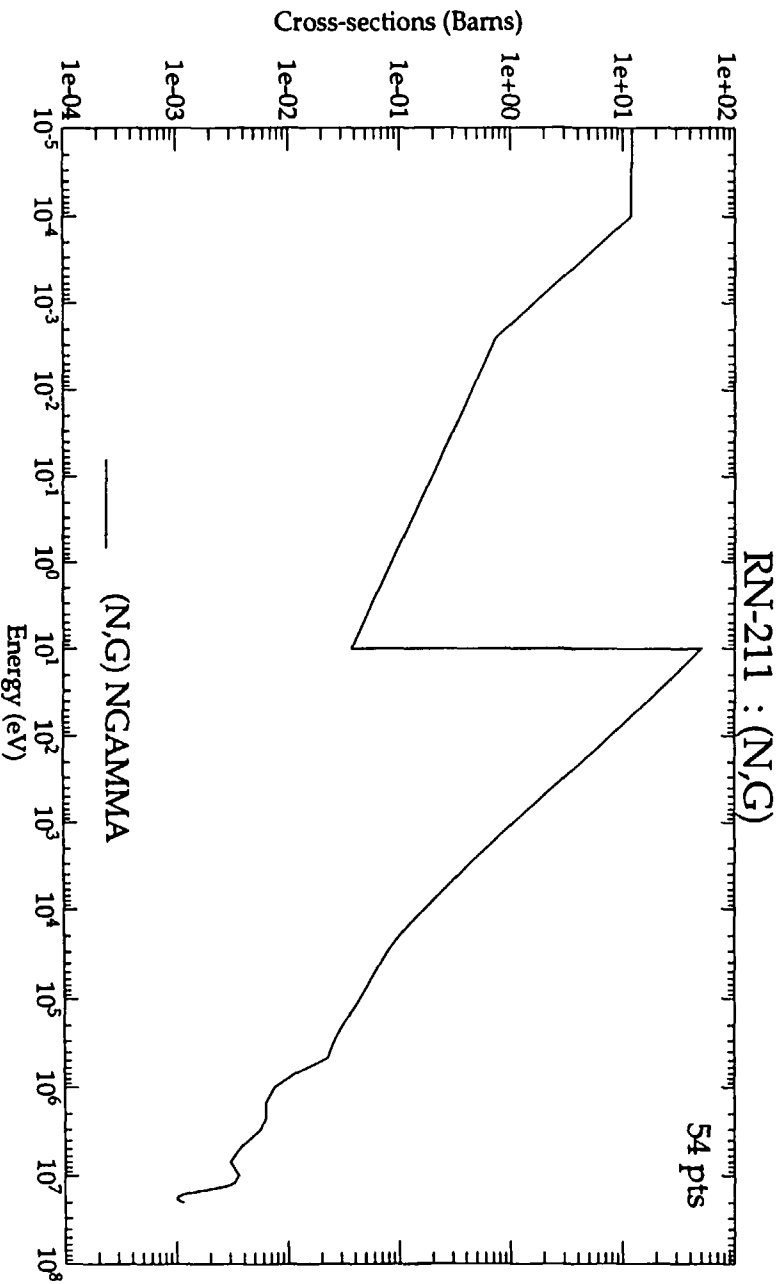
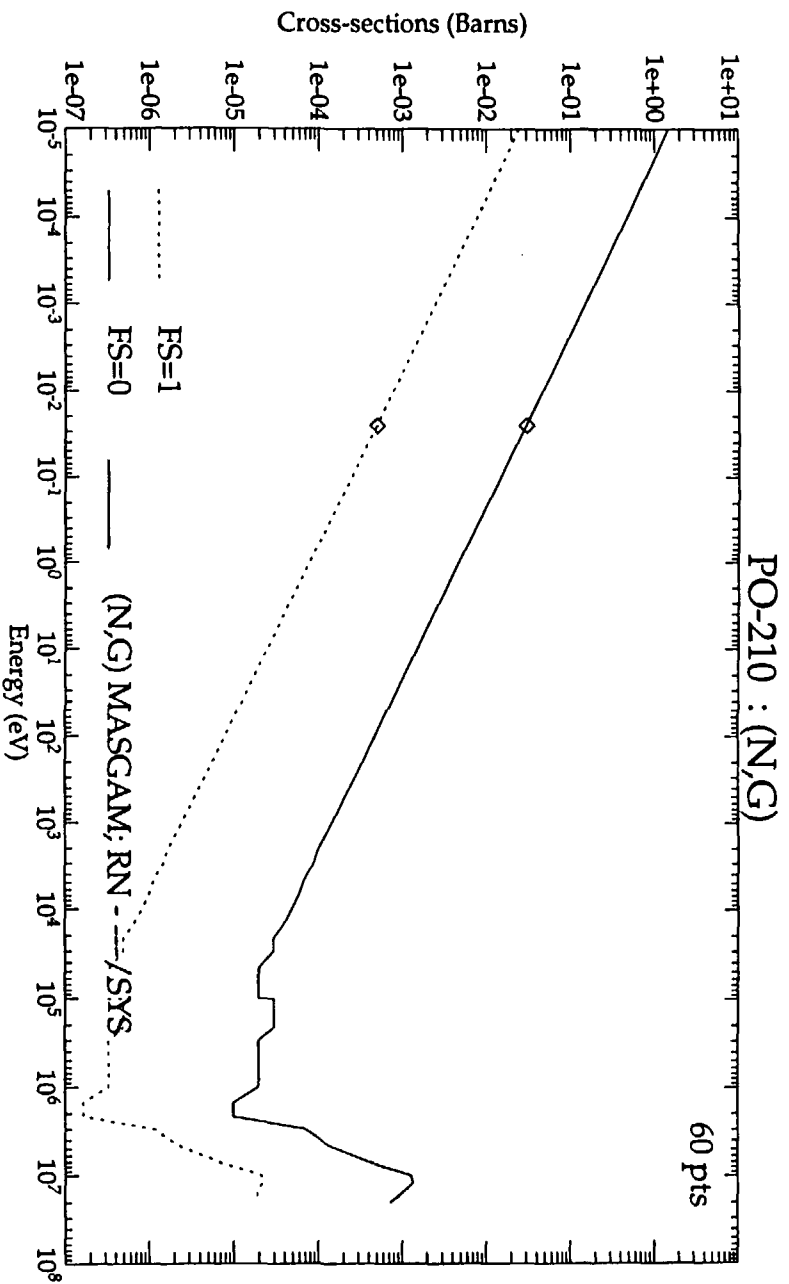


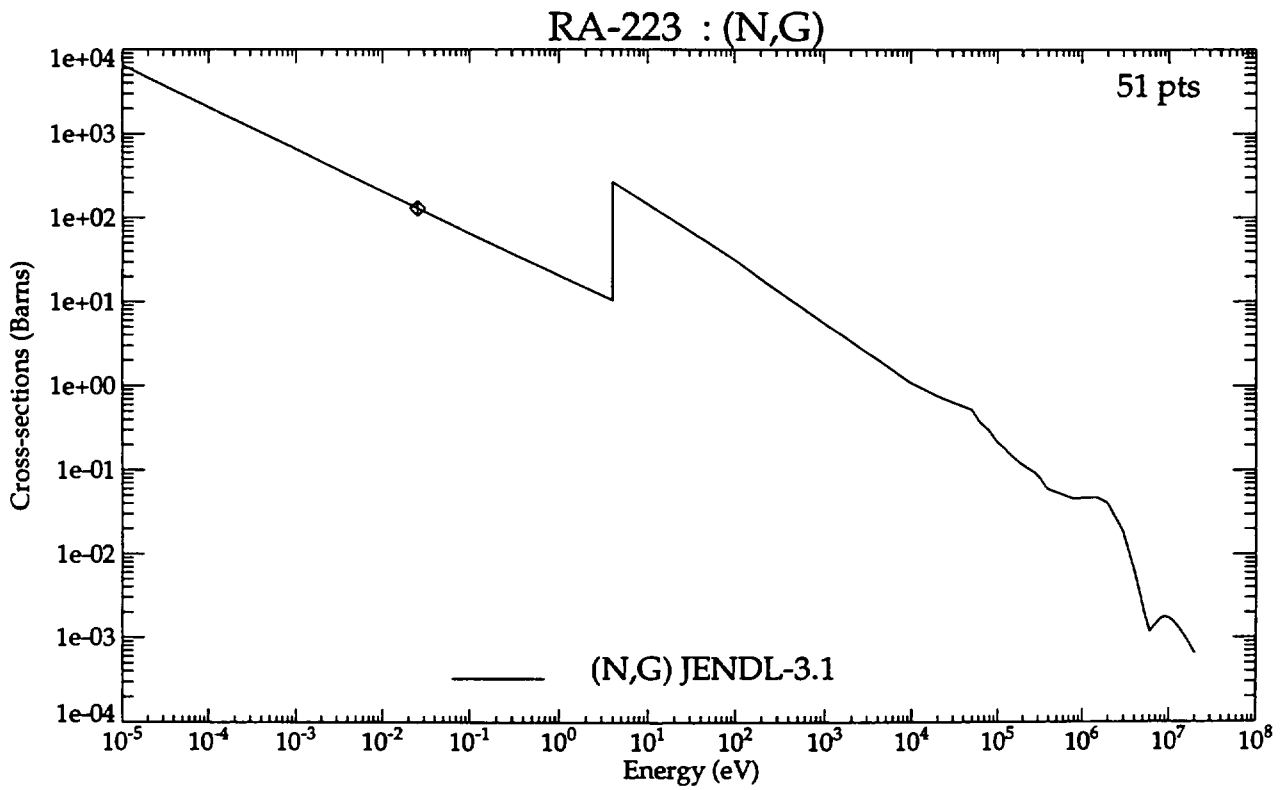
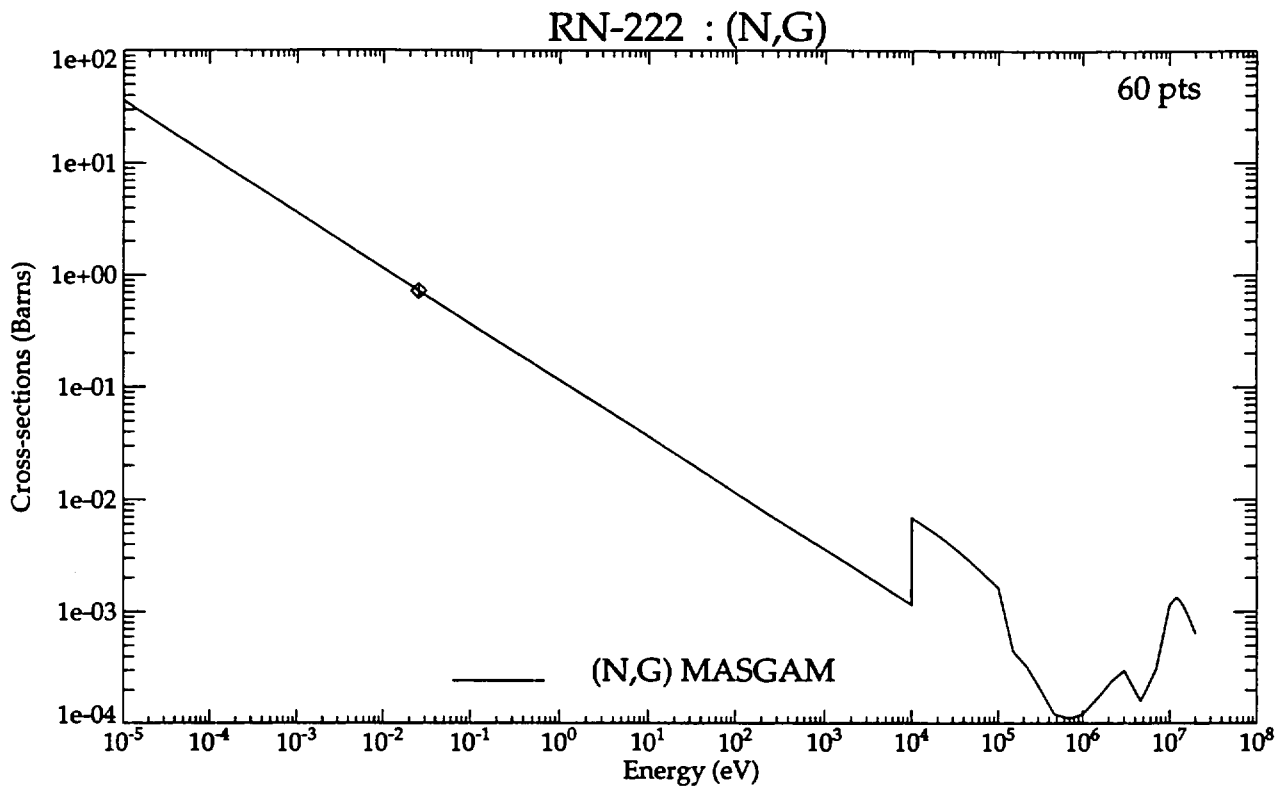




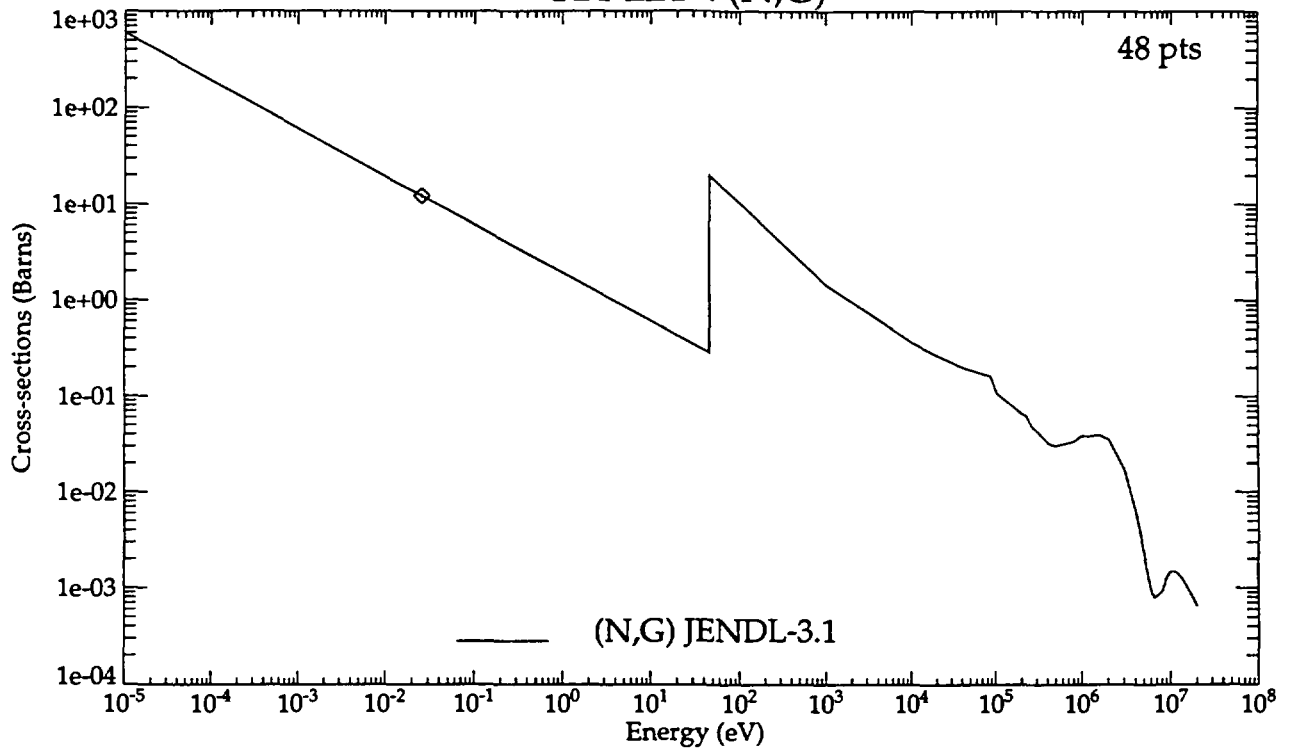




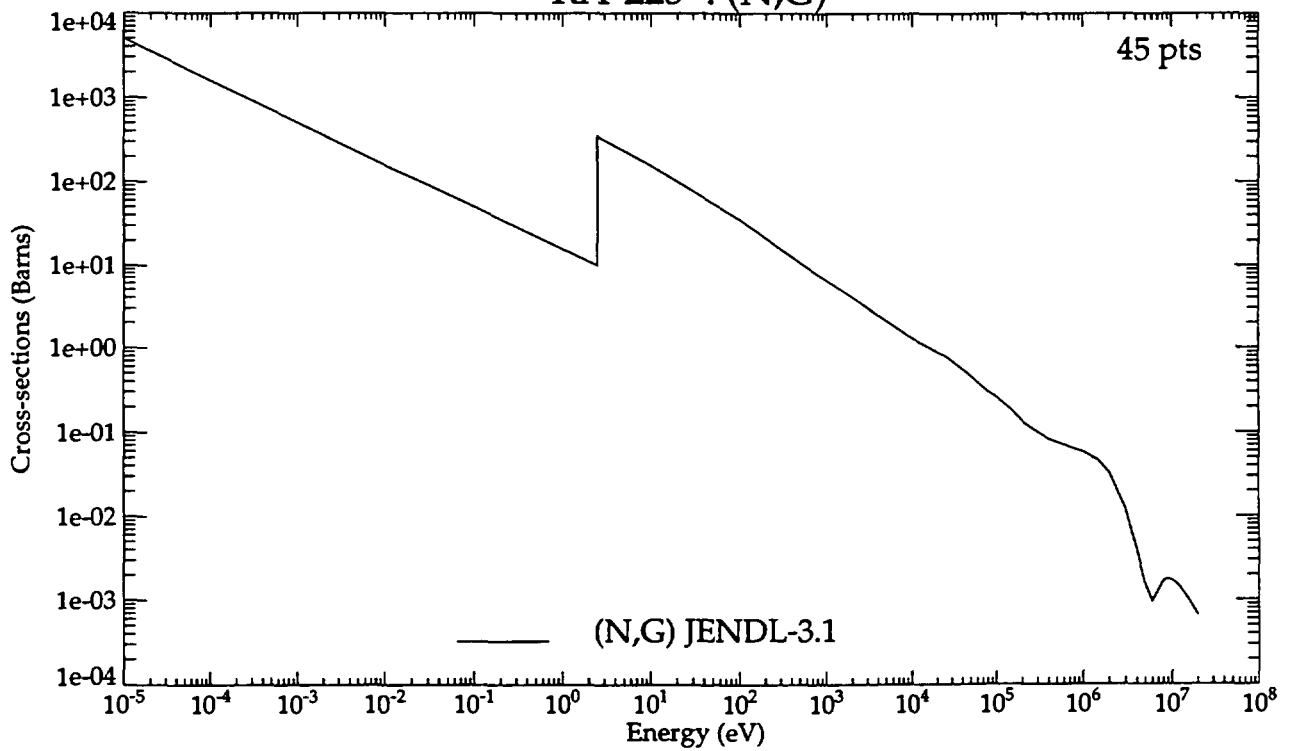


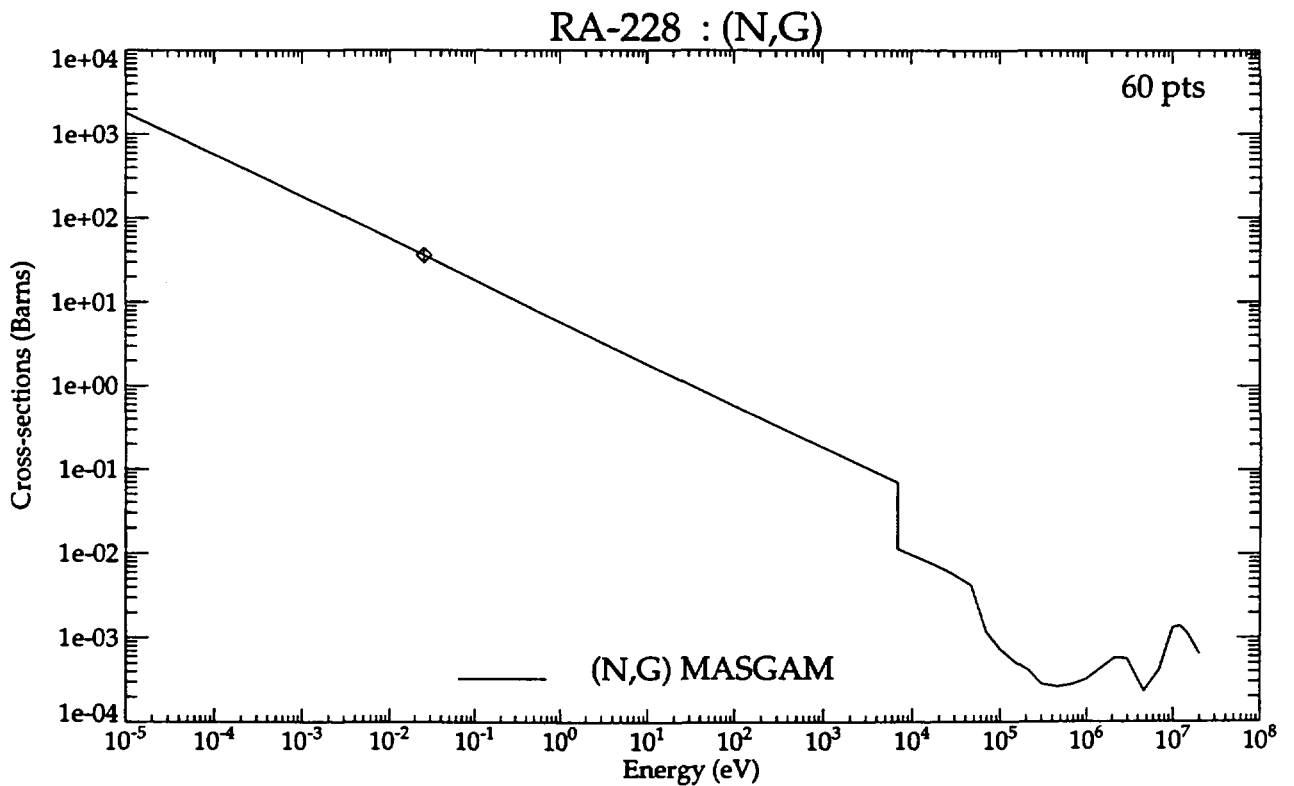
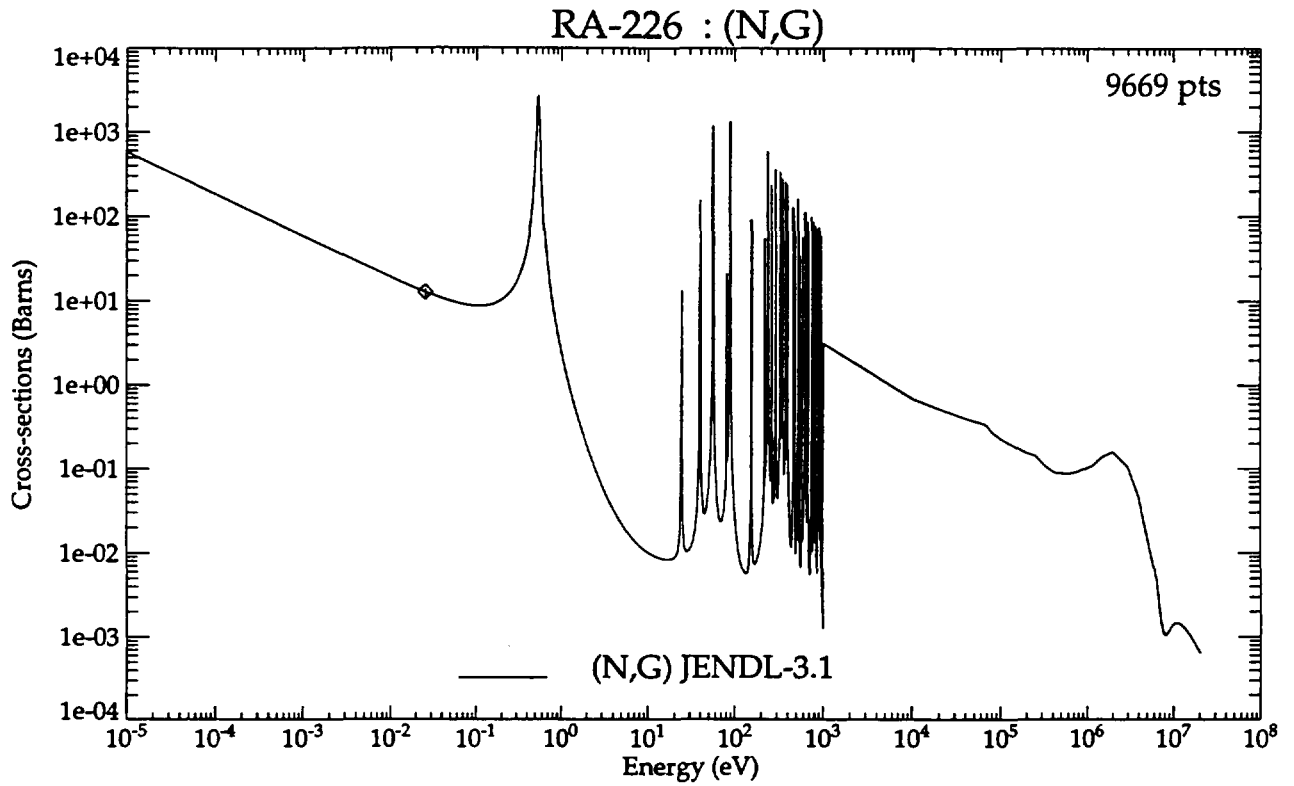


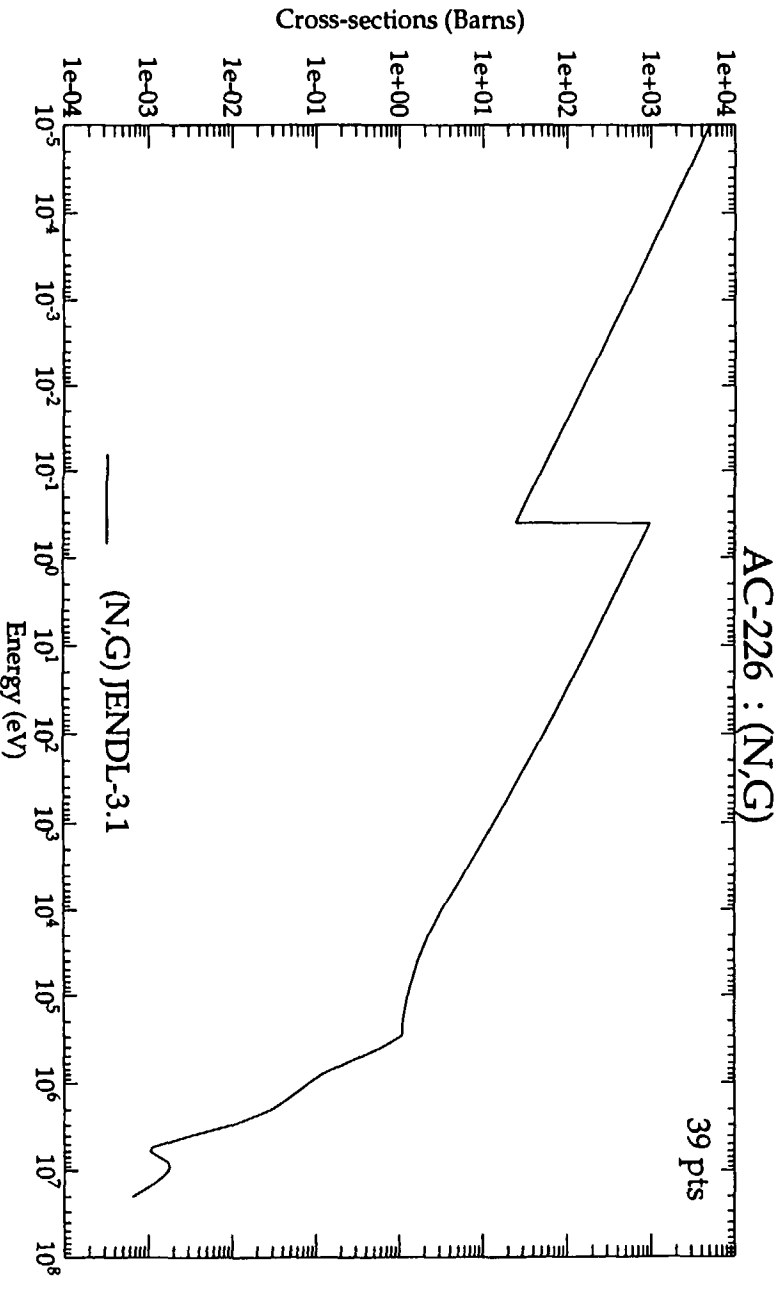
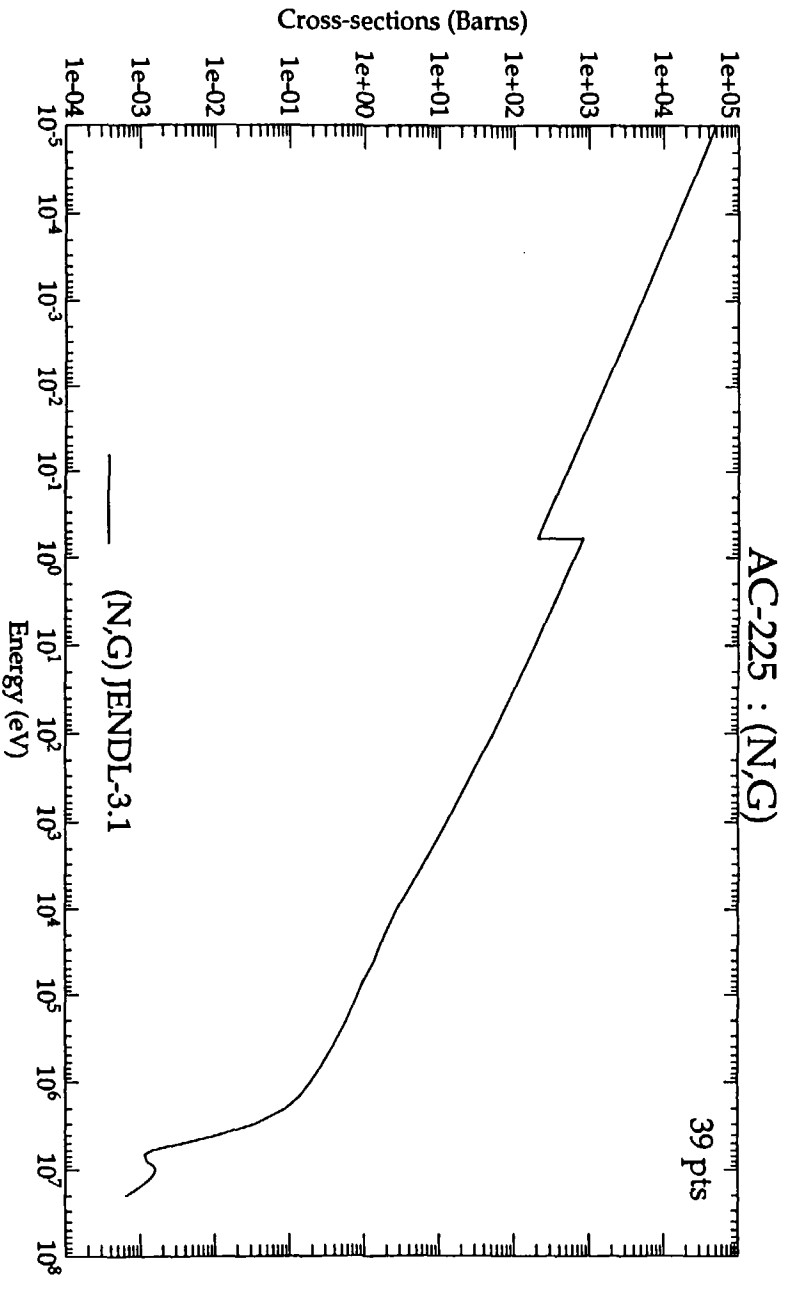
RA-224 : (N,G)

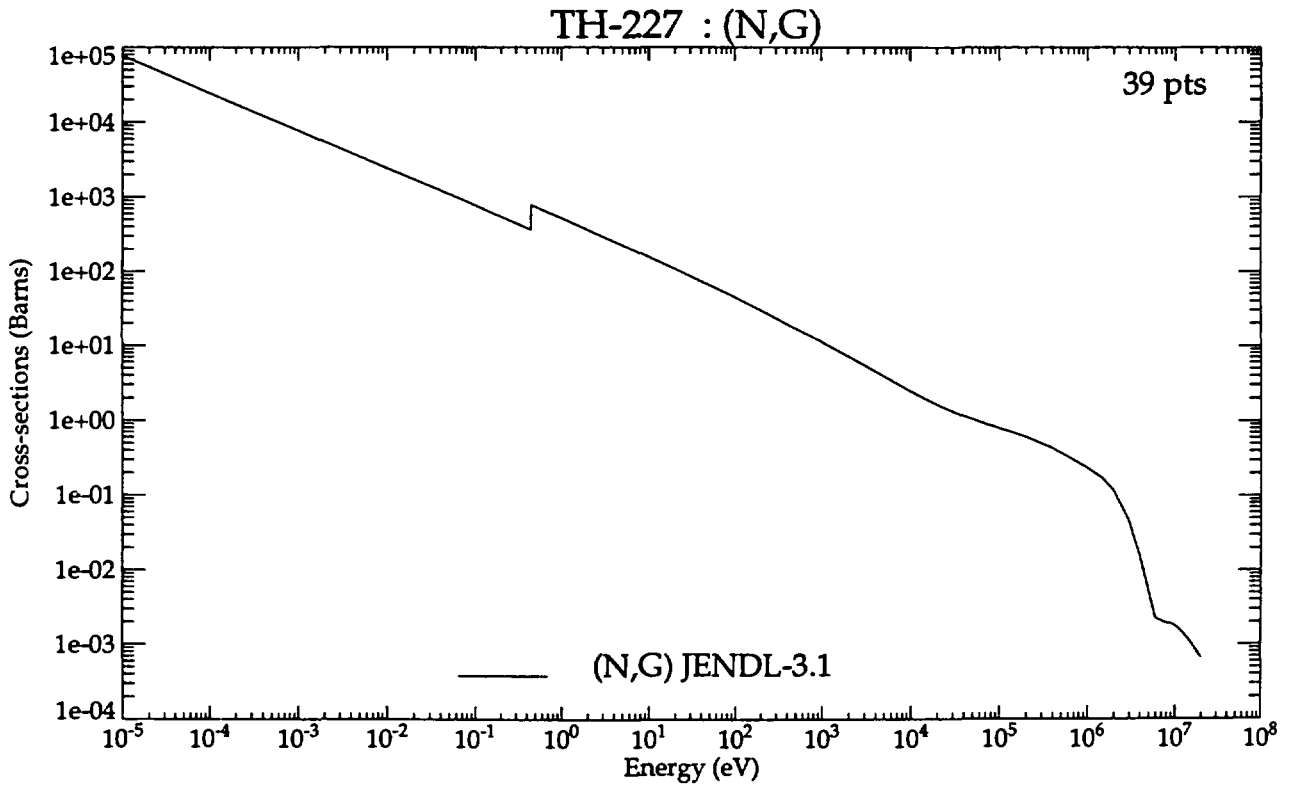
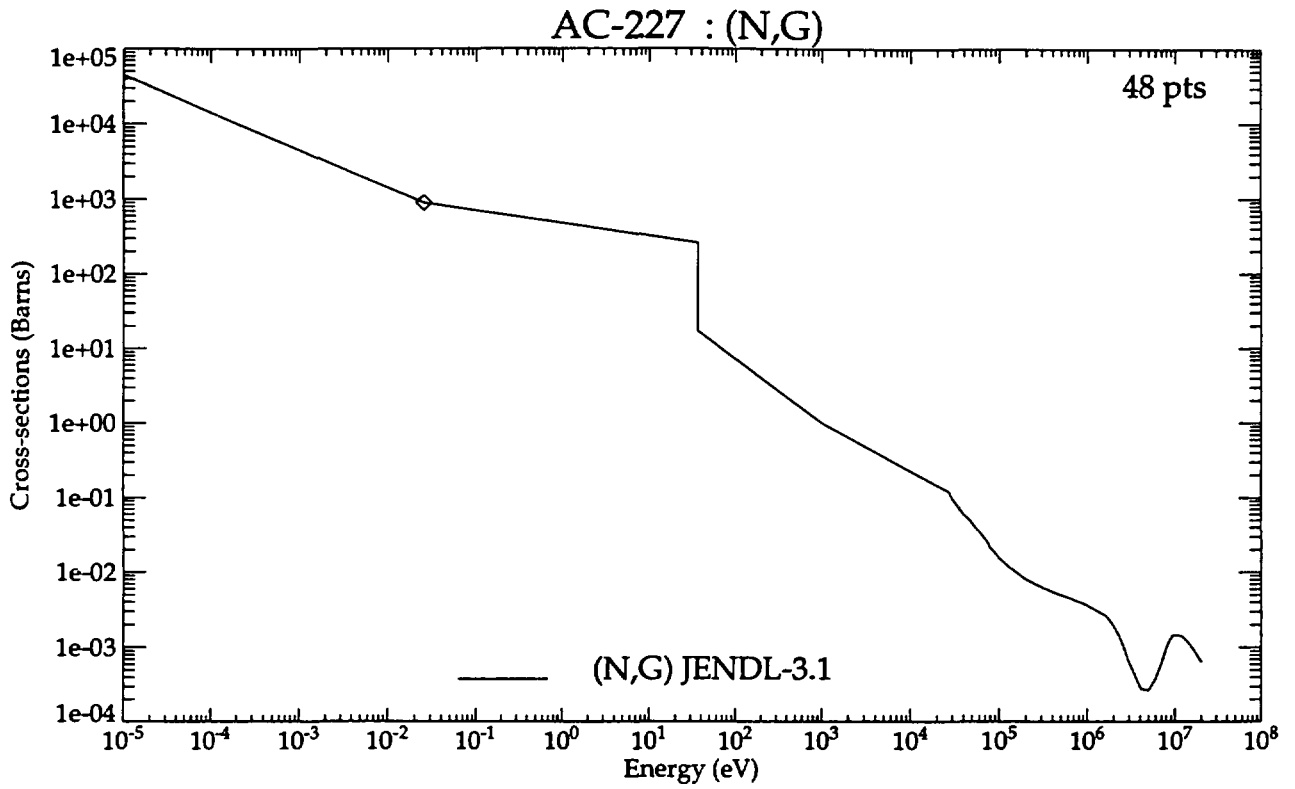


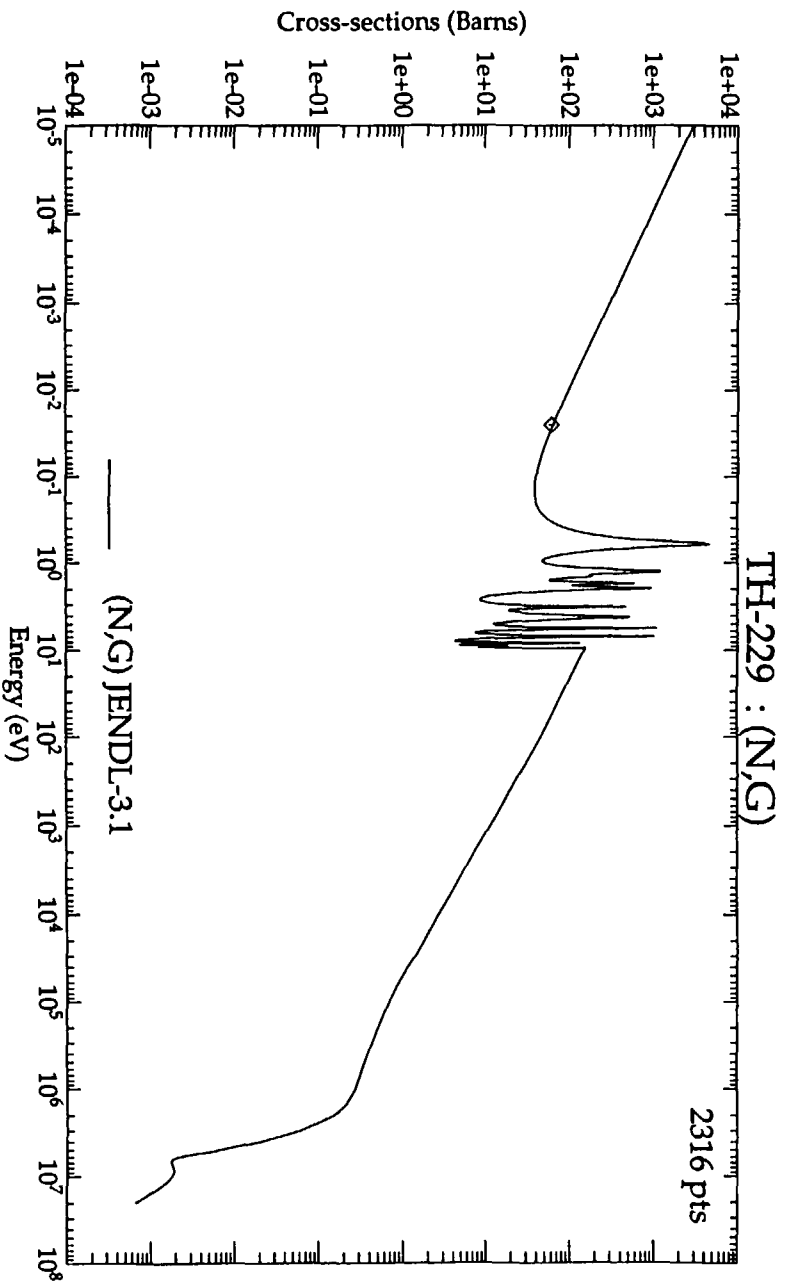
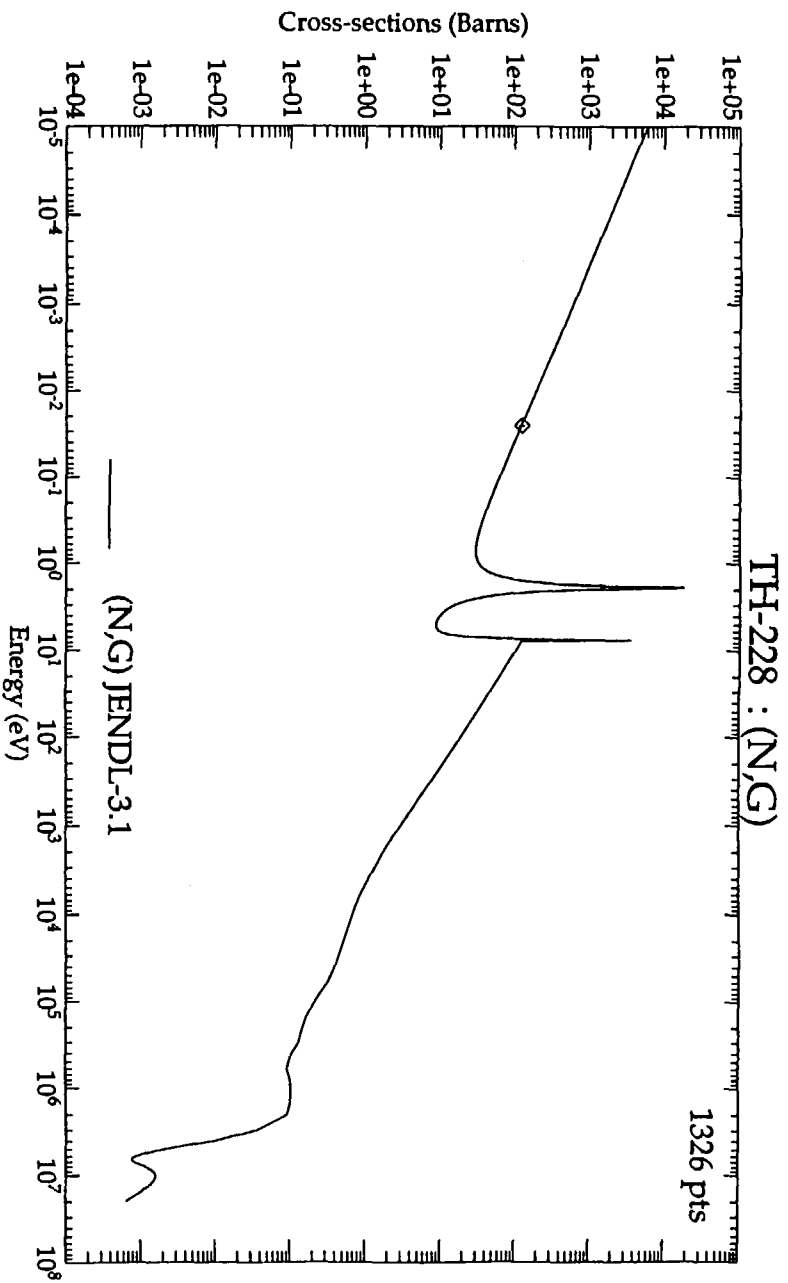
RA-225 : (N,G)

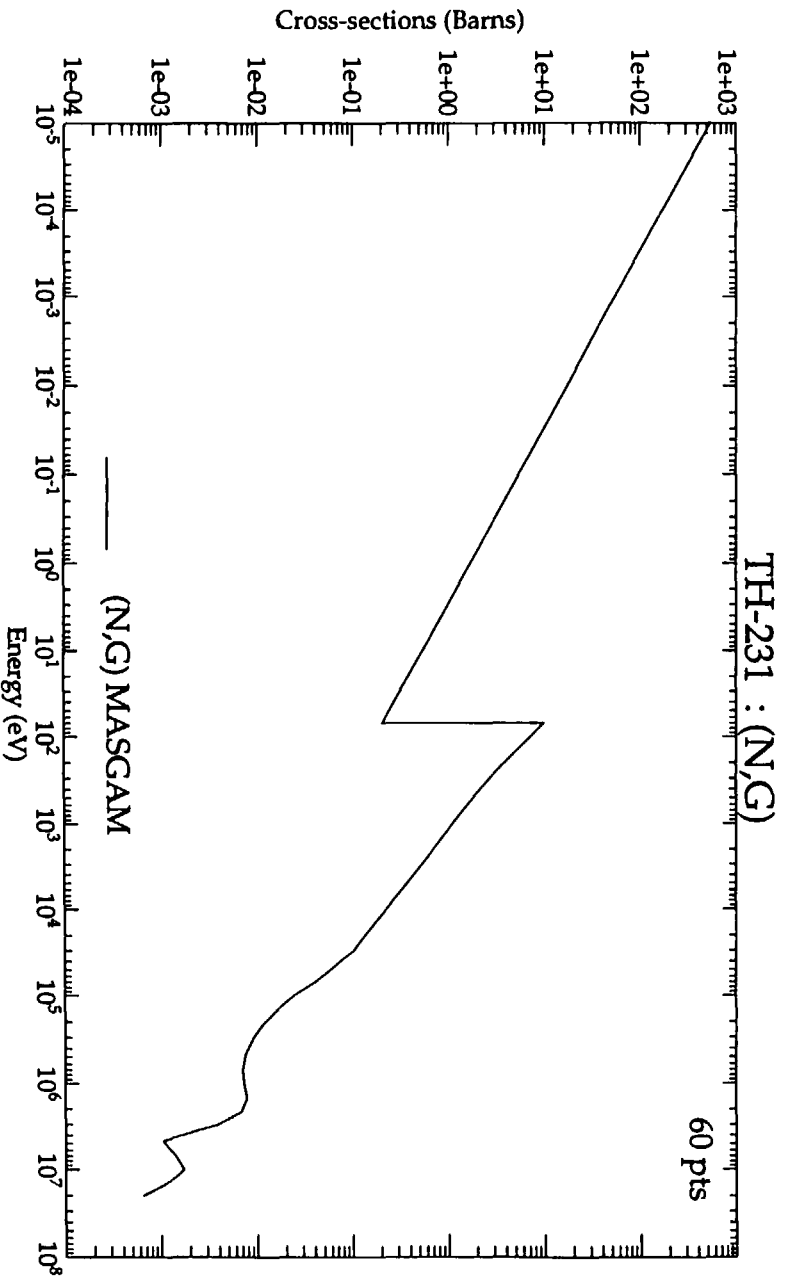
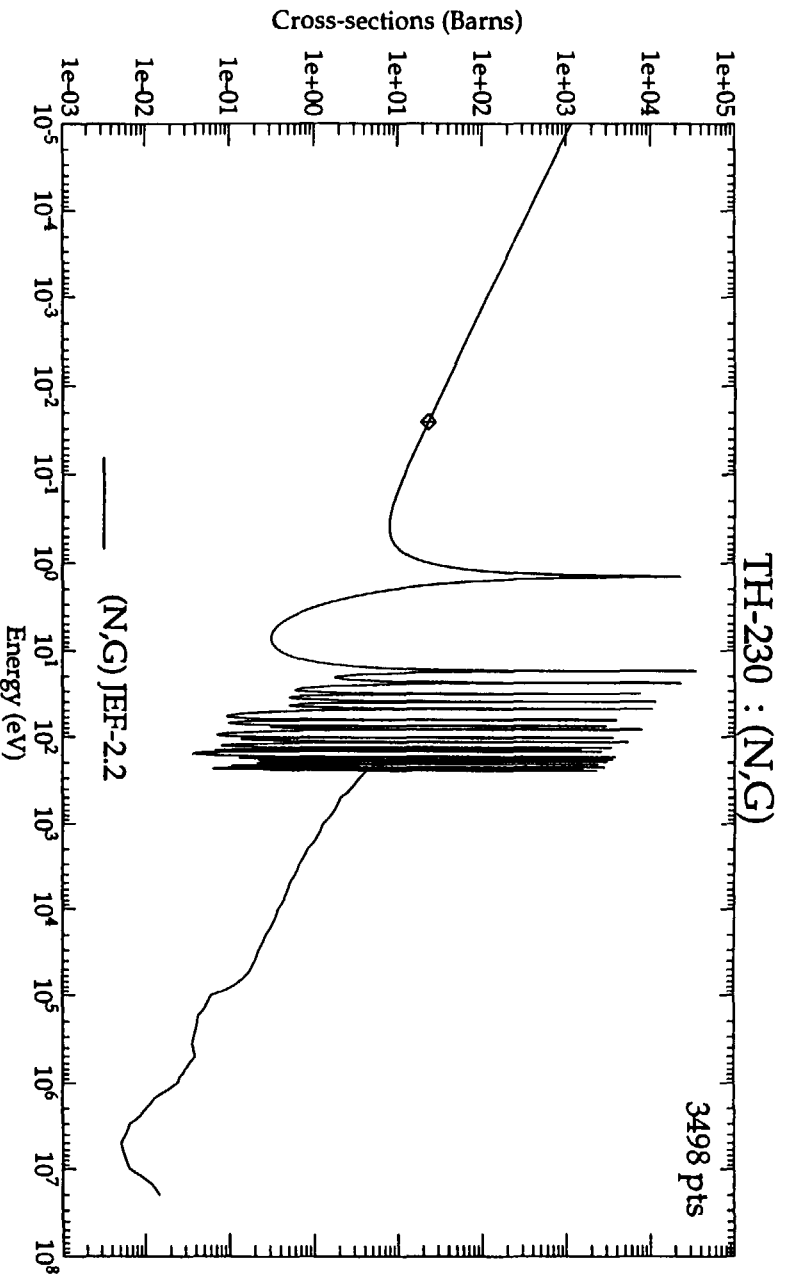


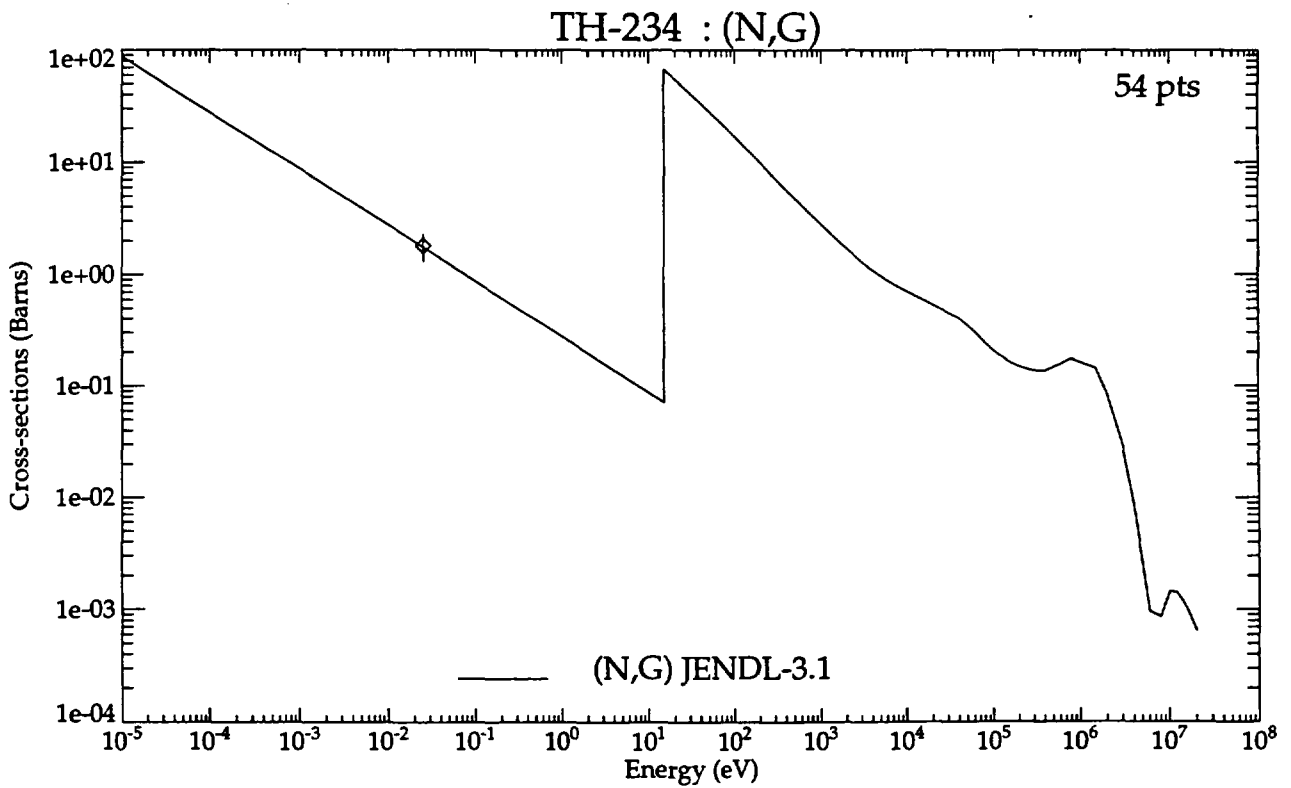
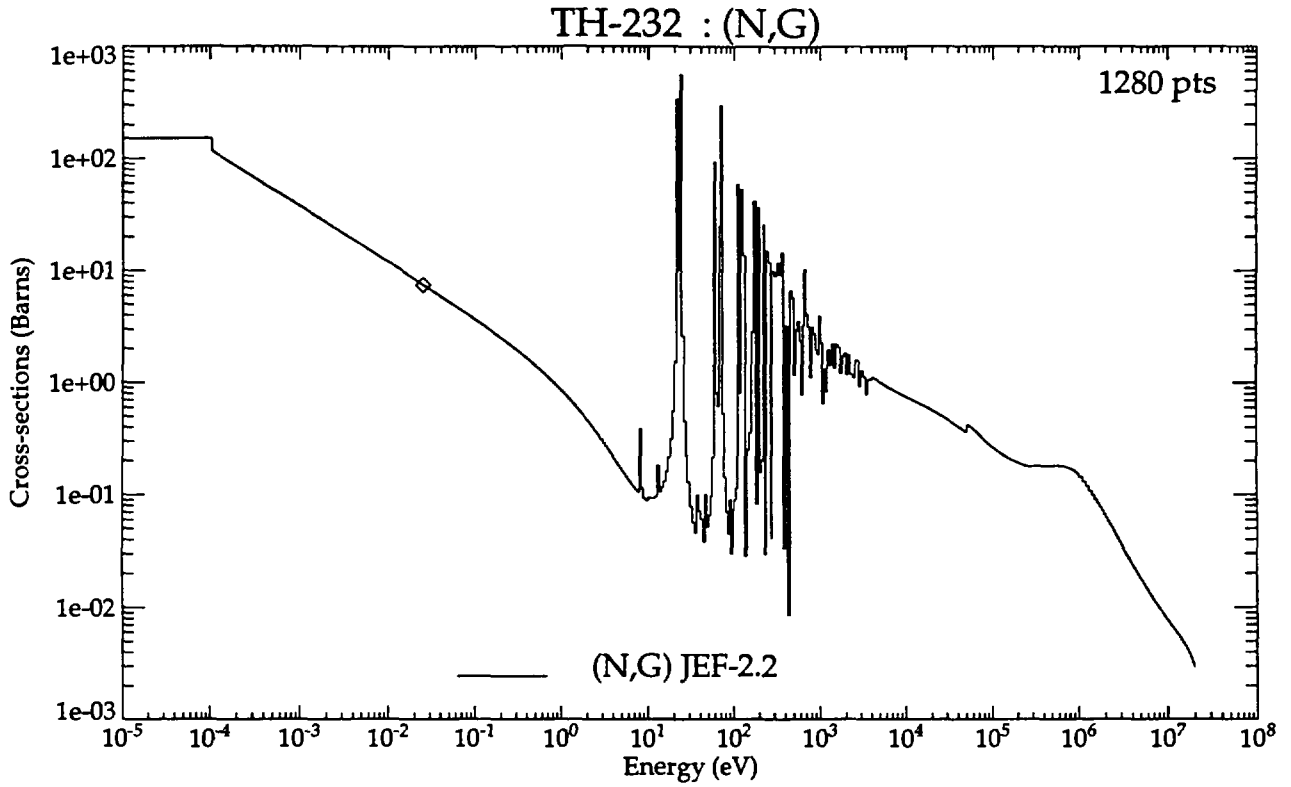


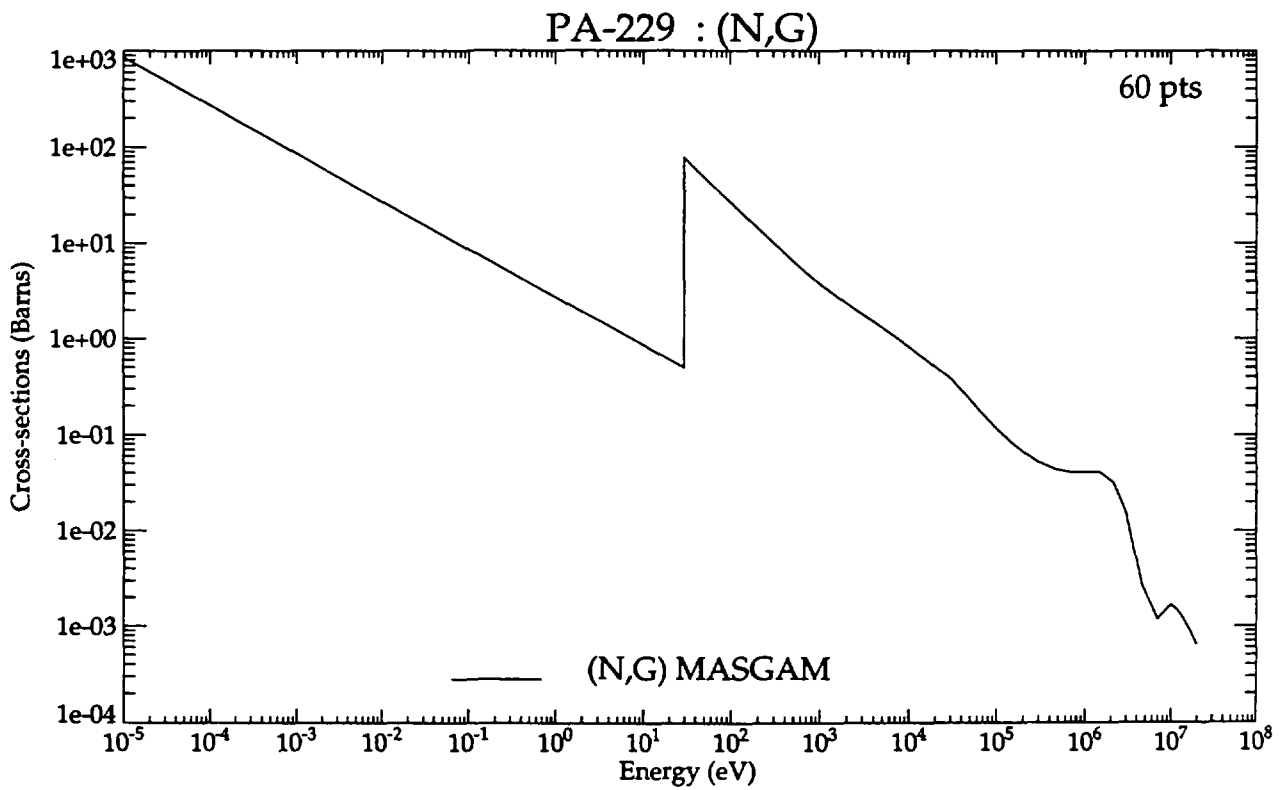
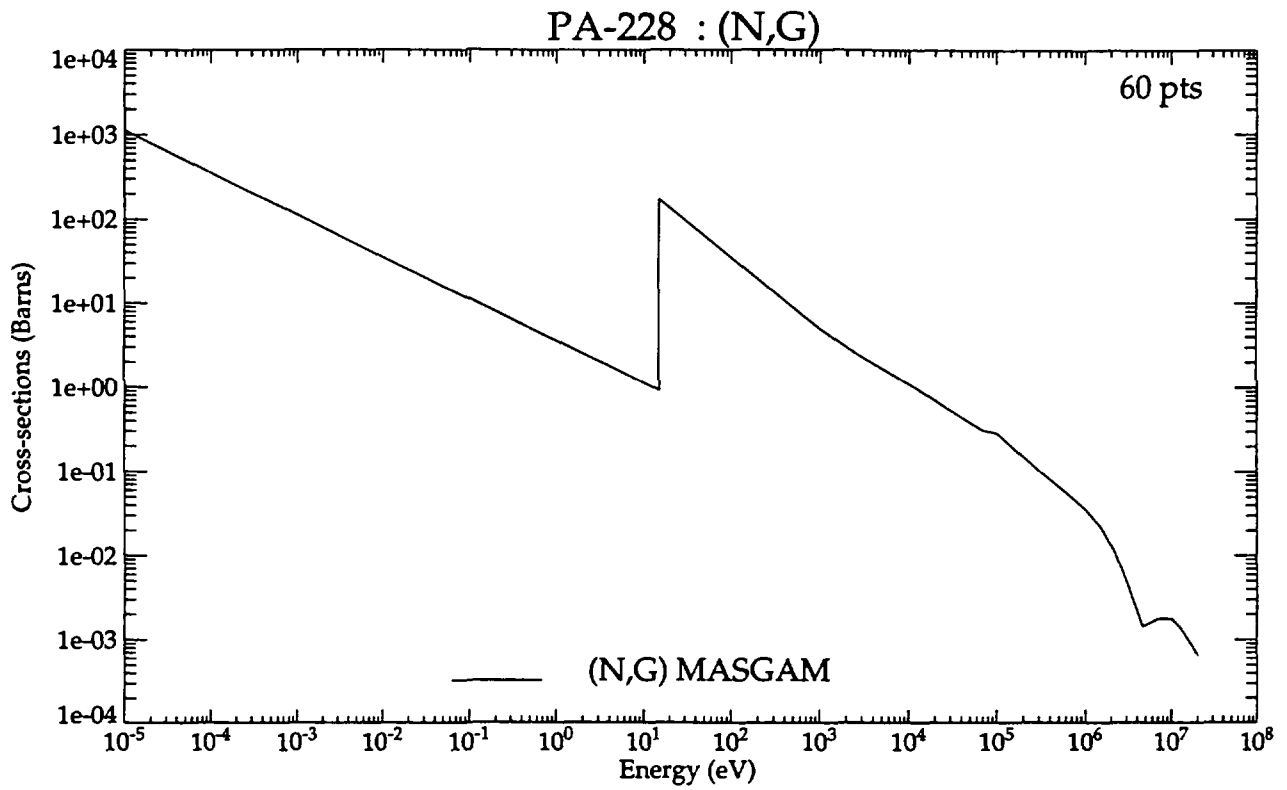


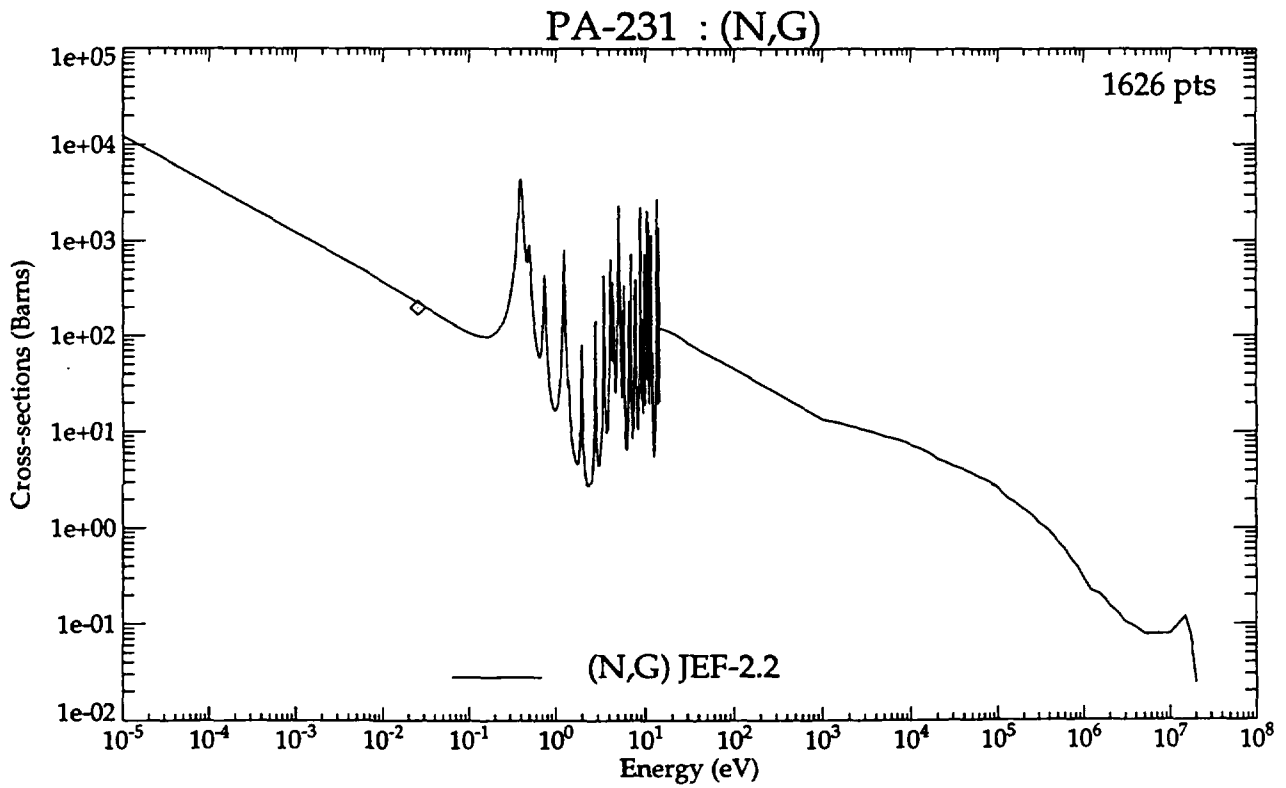
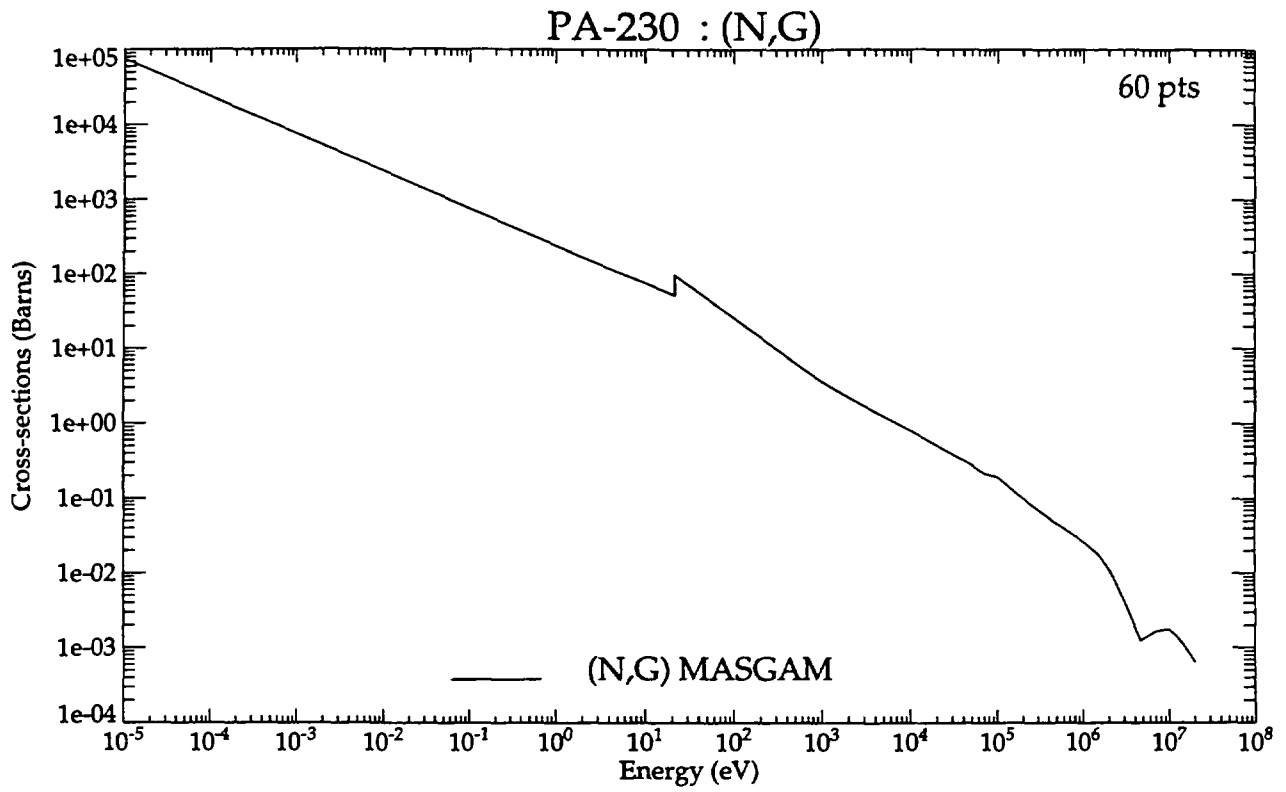


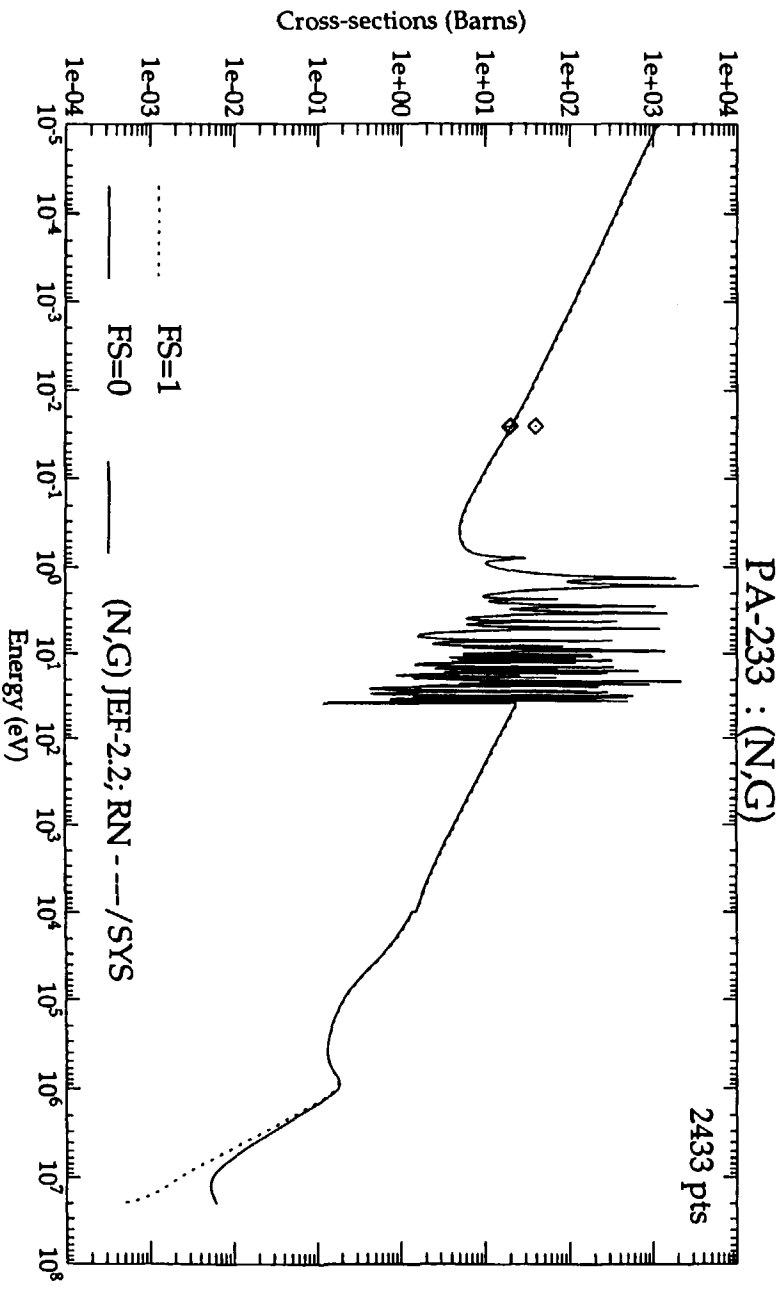
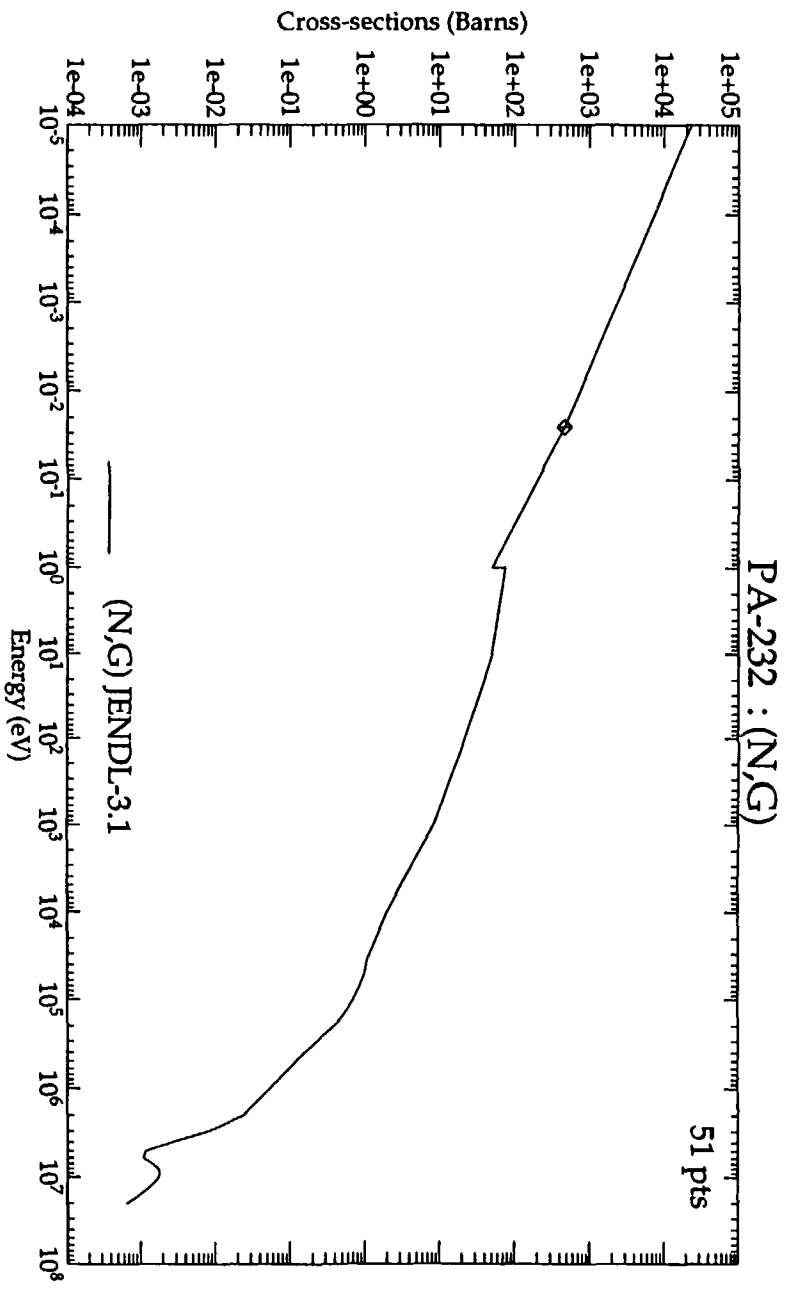




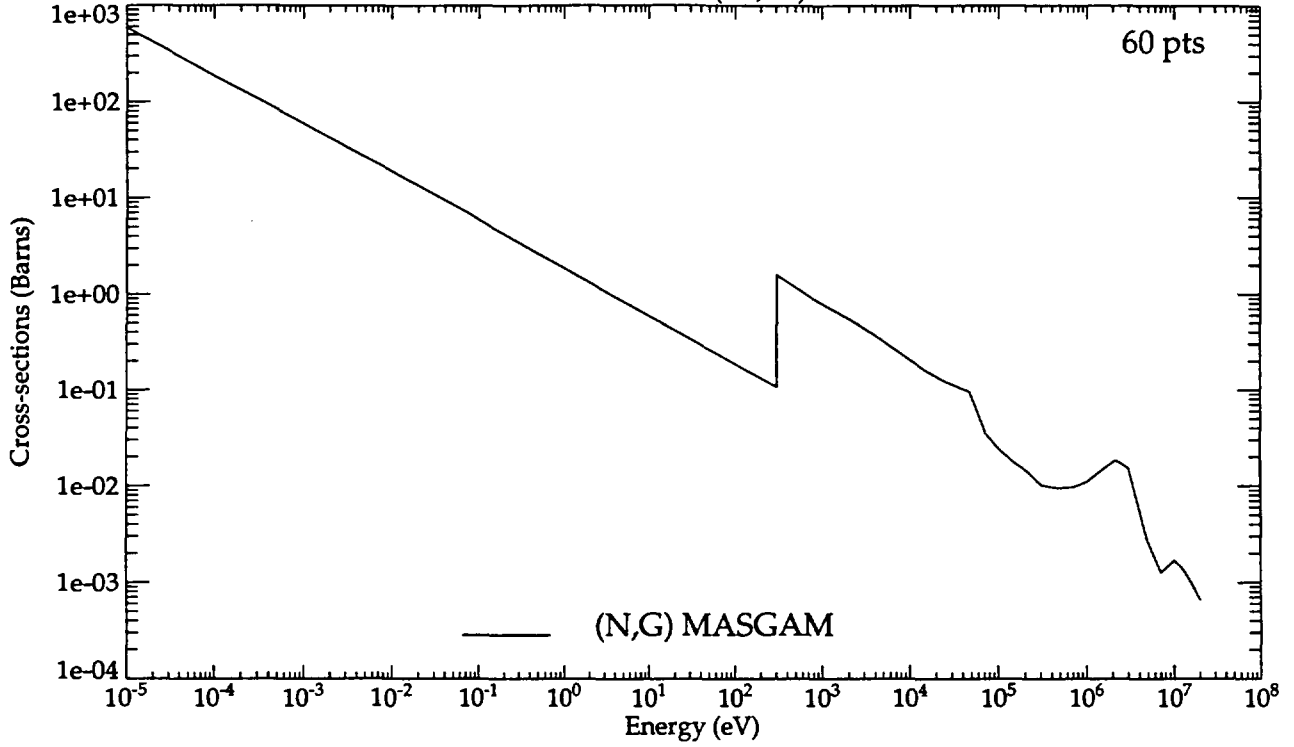




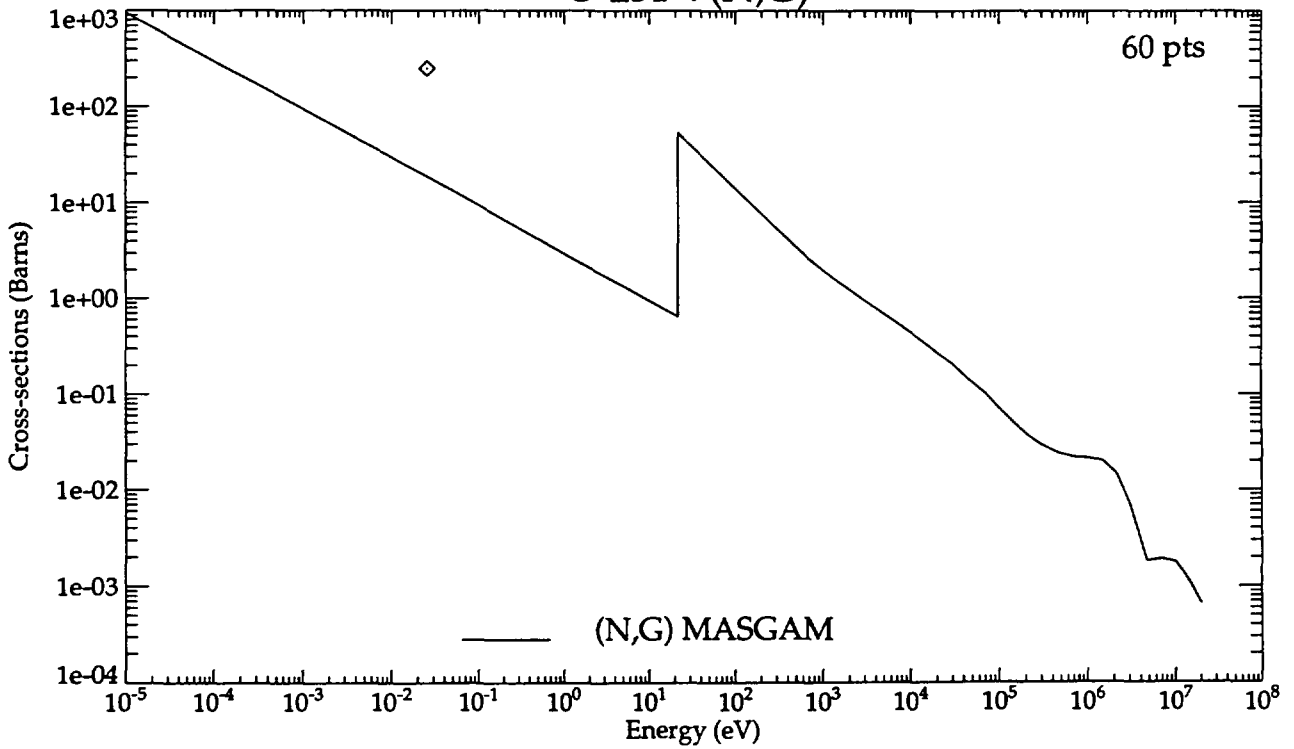


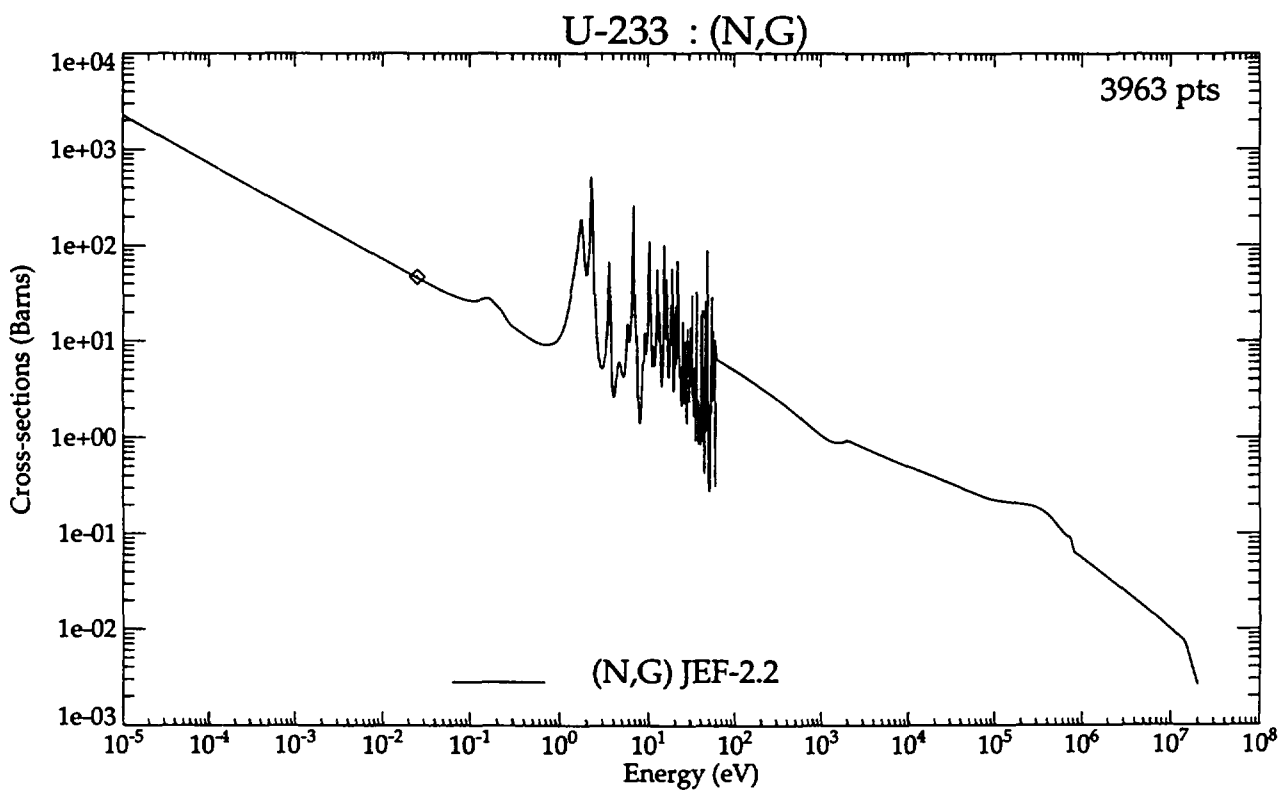
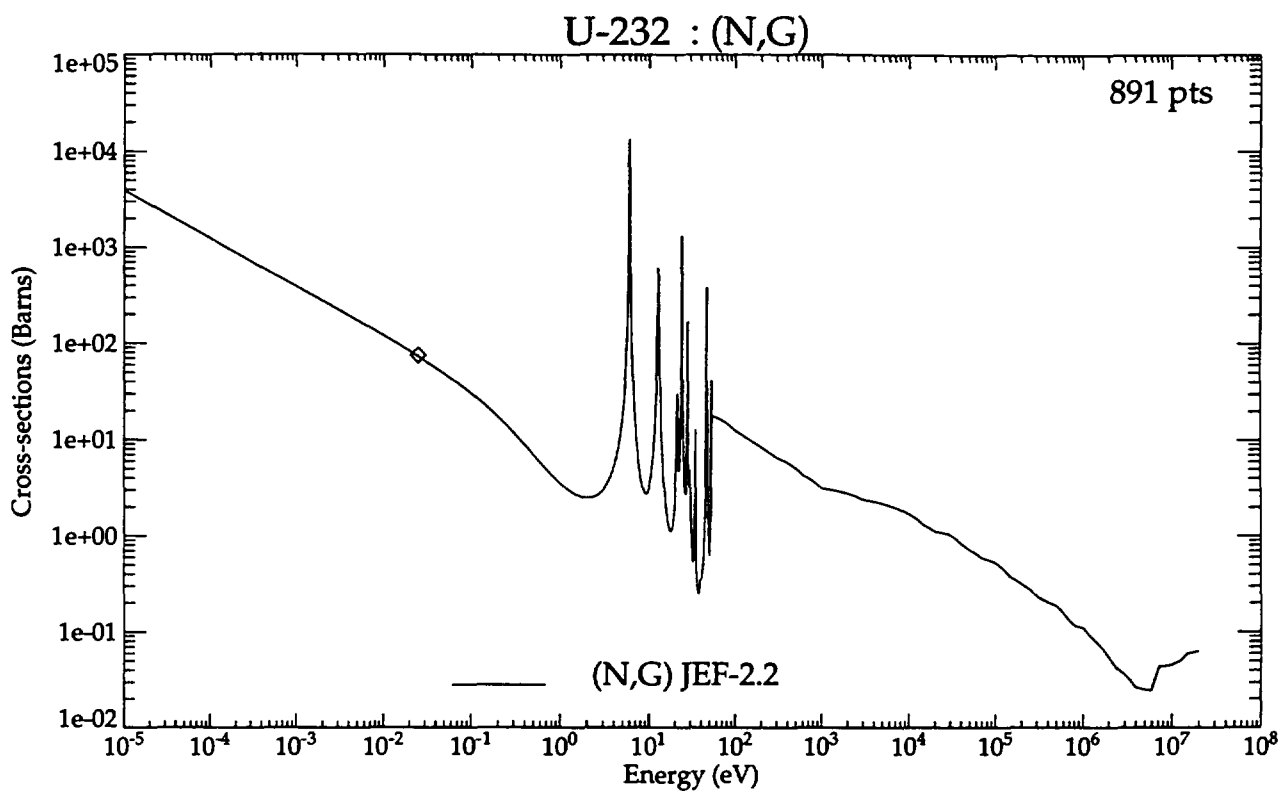


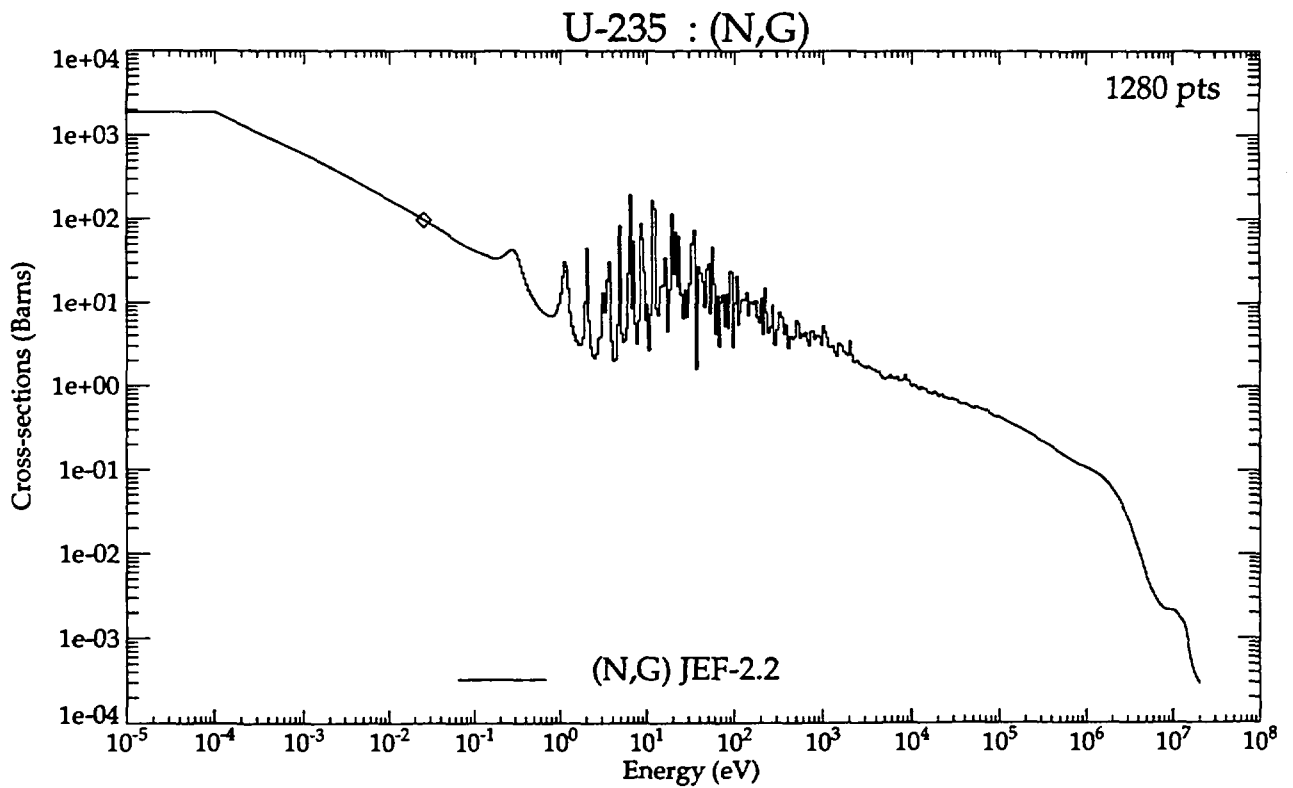
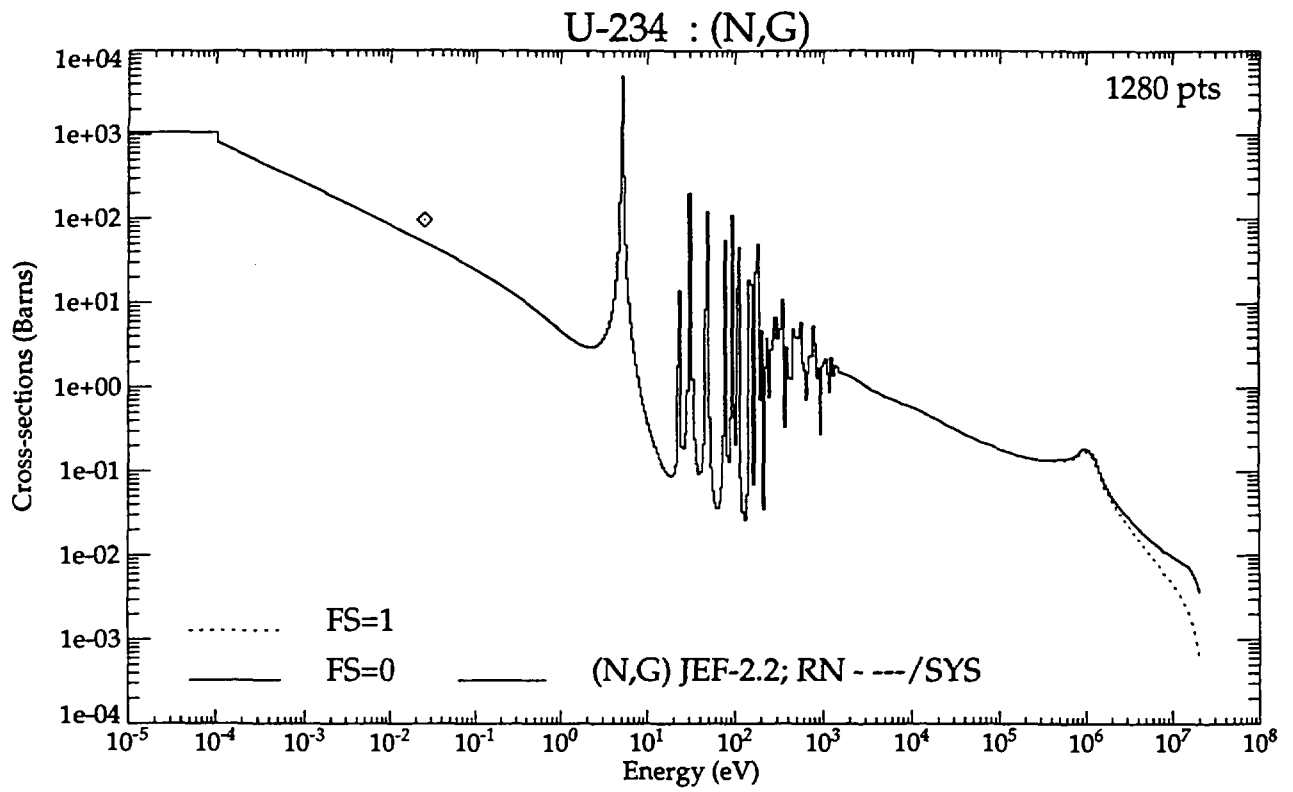
U-230 : (N,G)

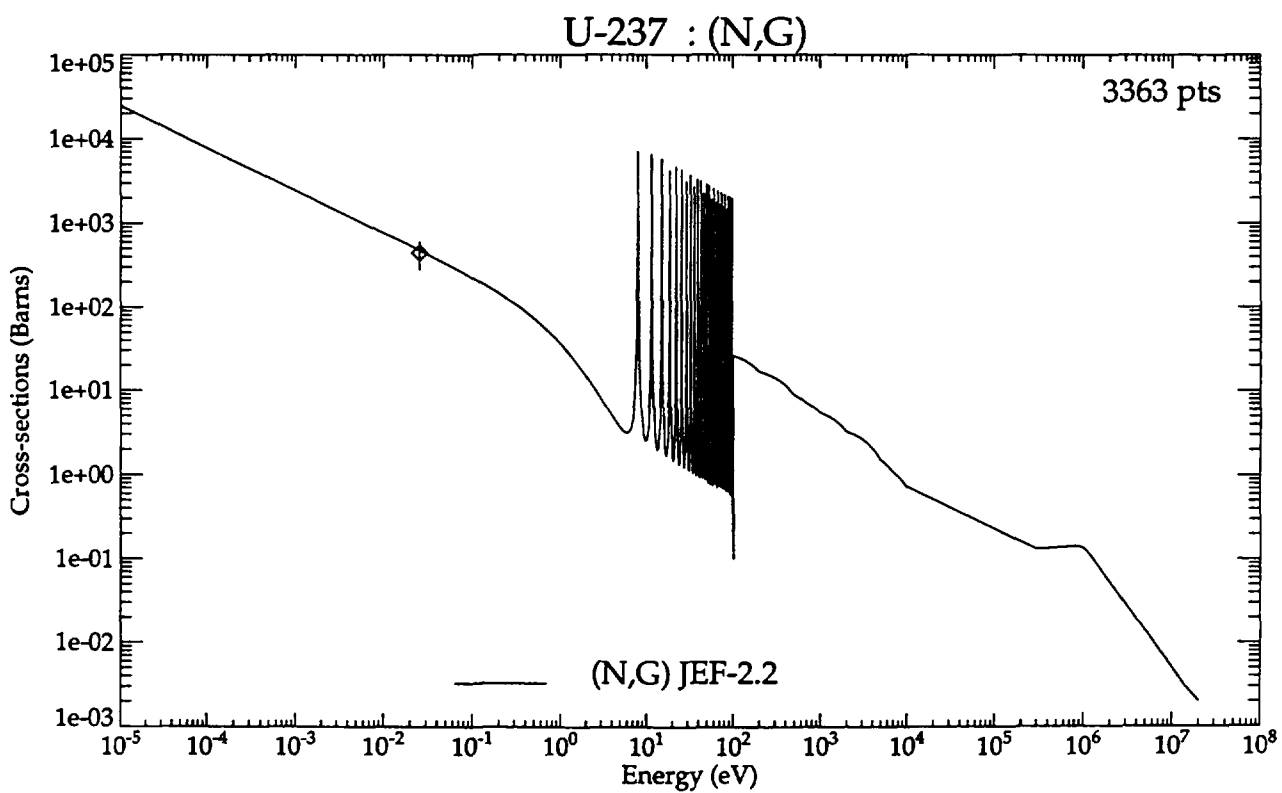
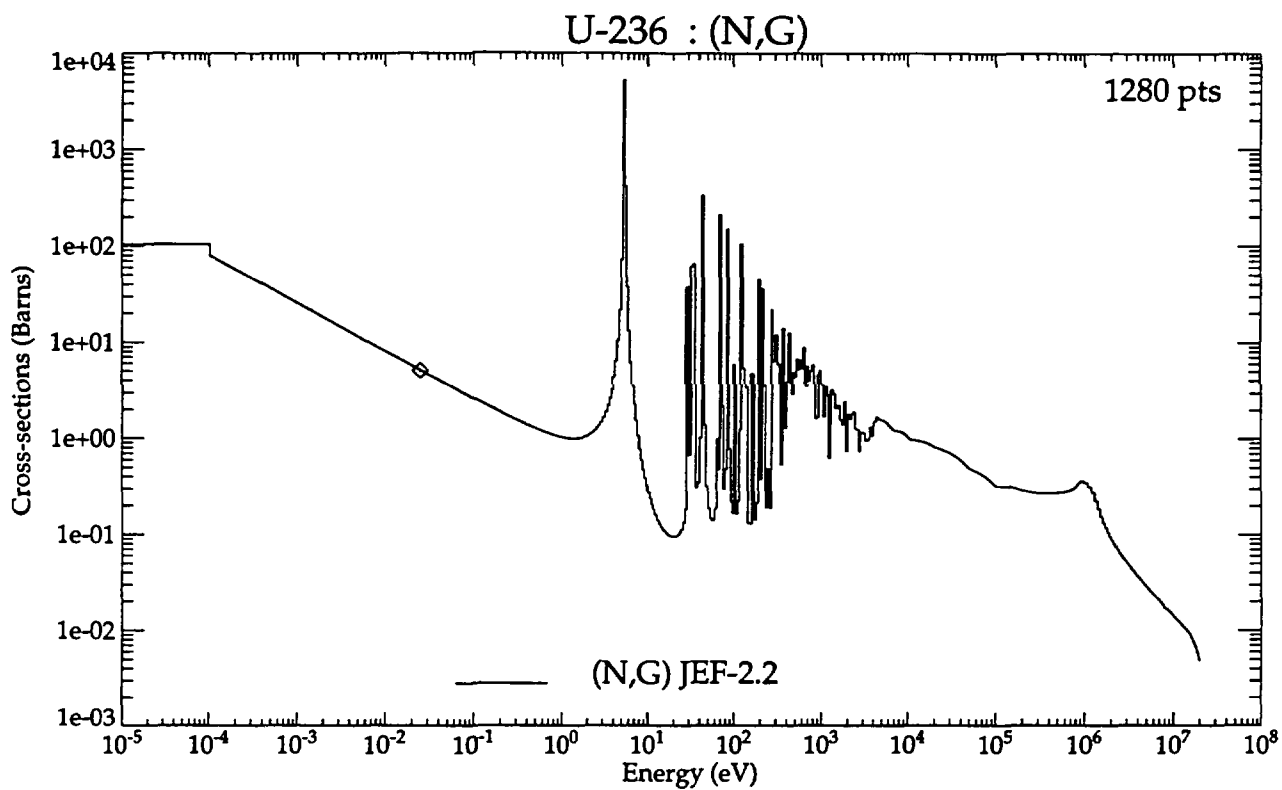


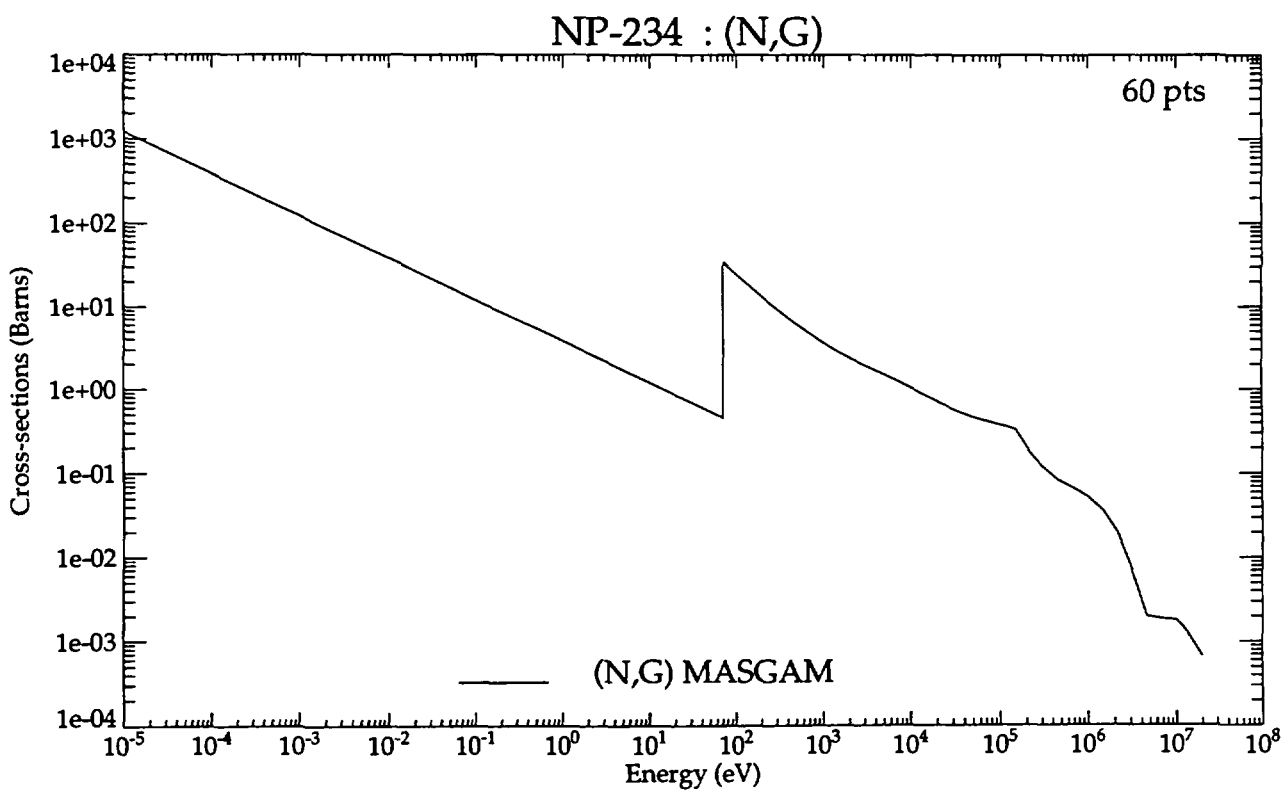
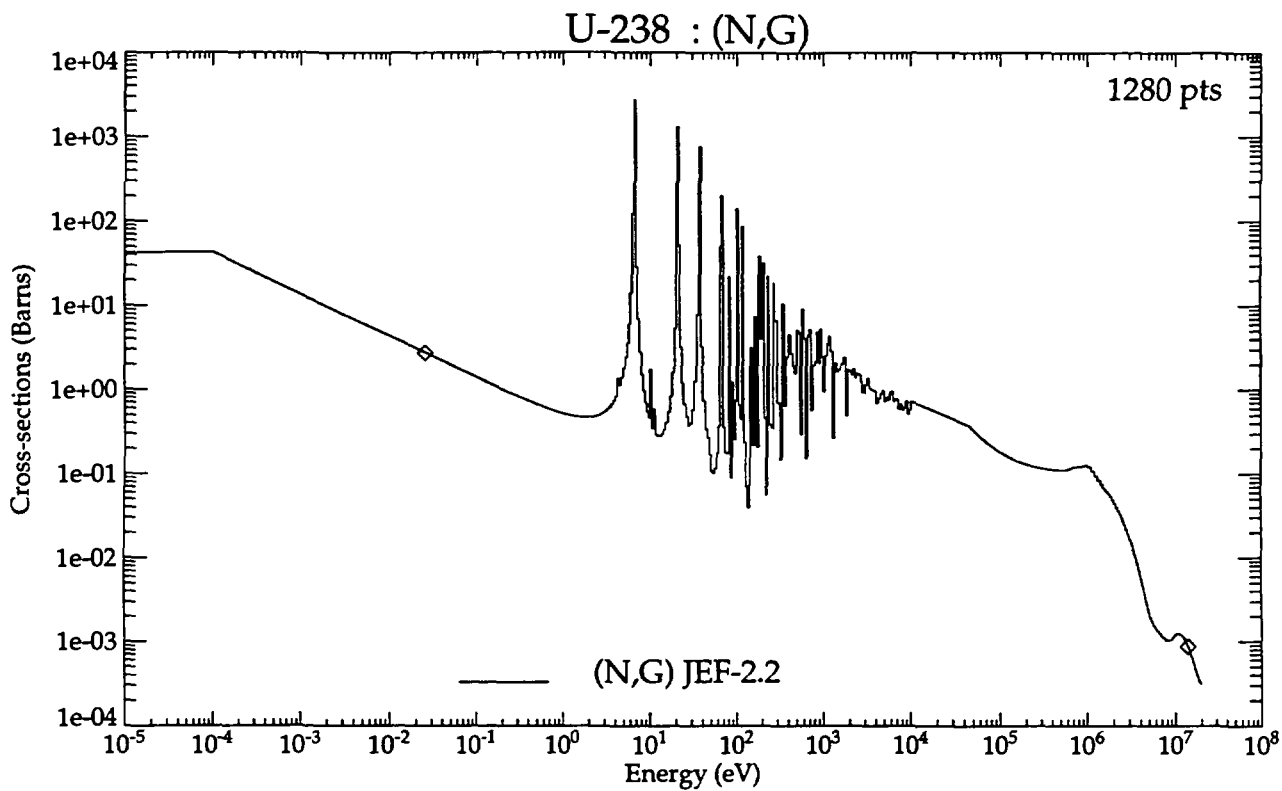
U-231 : (N,G)

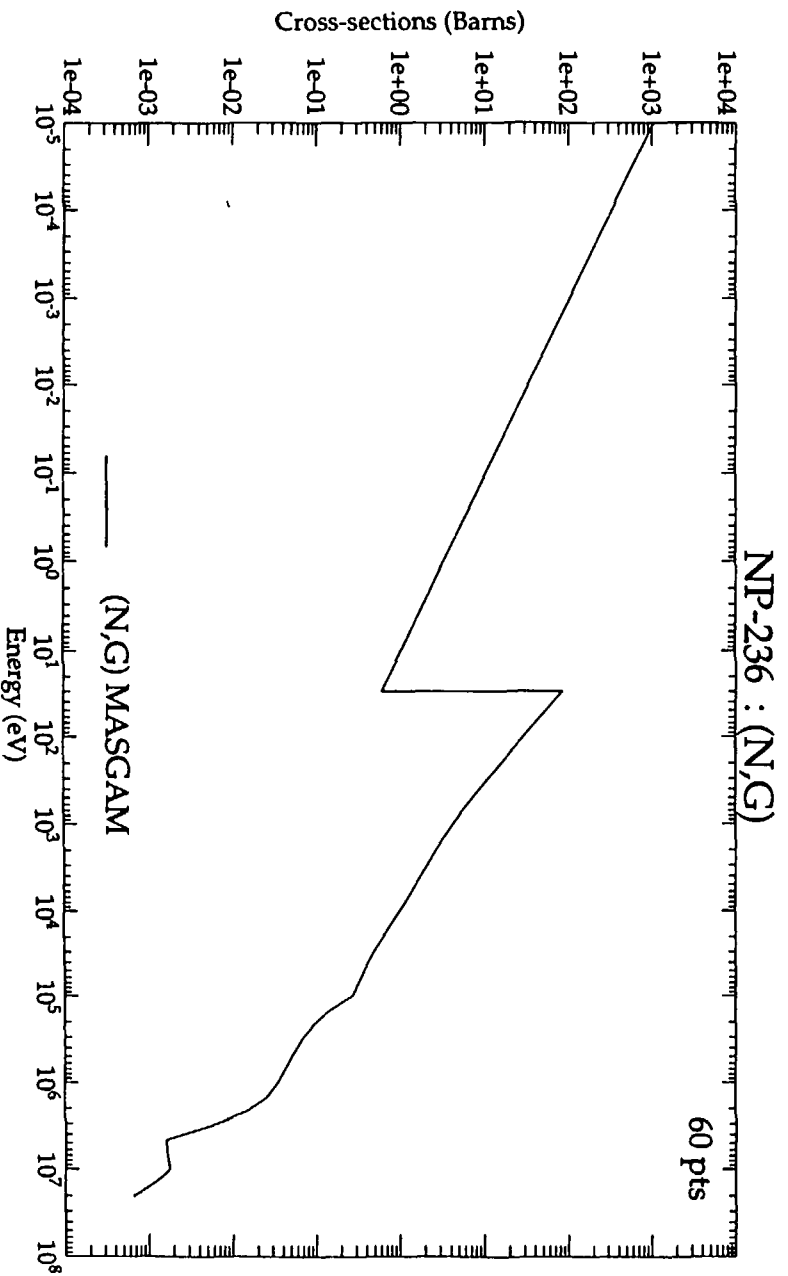
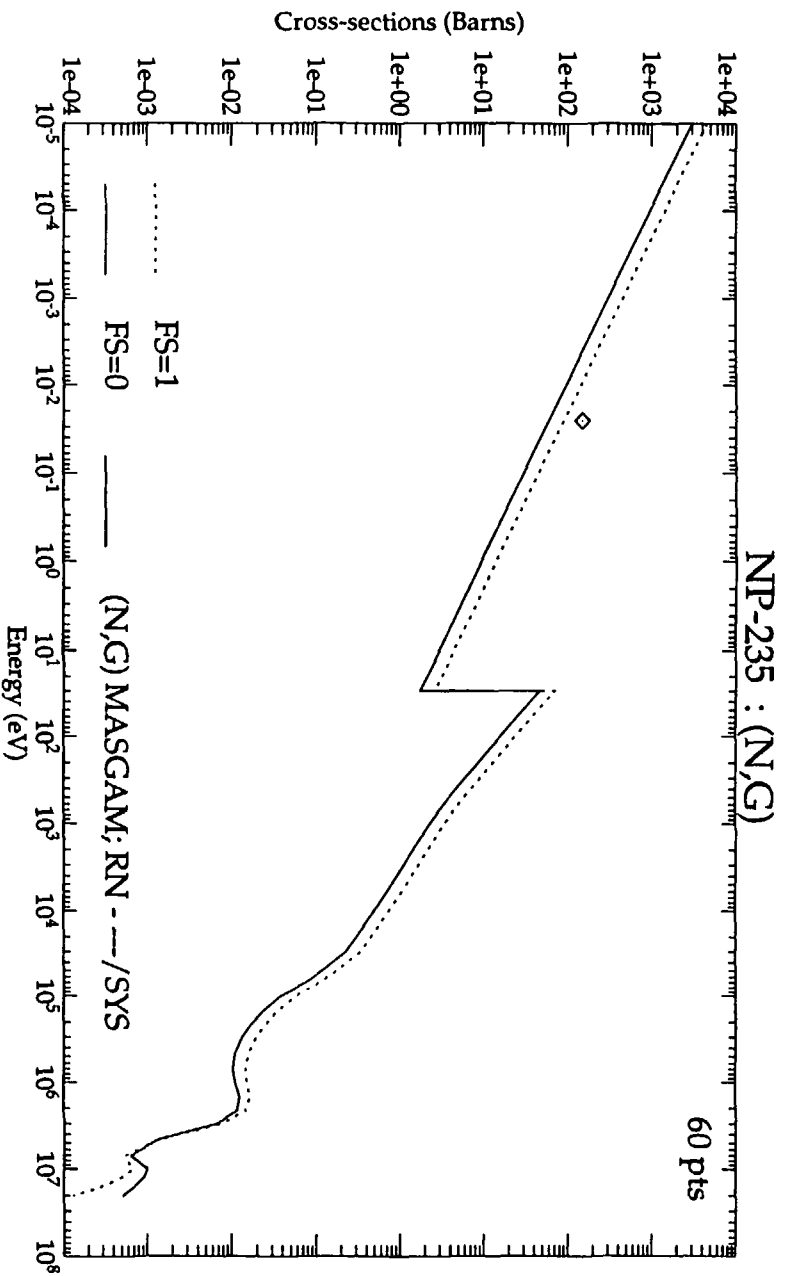


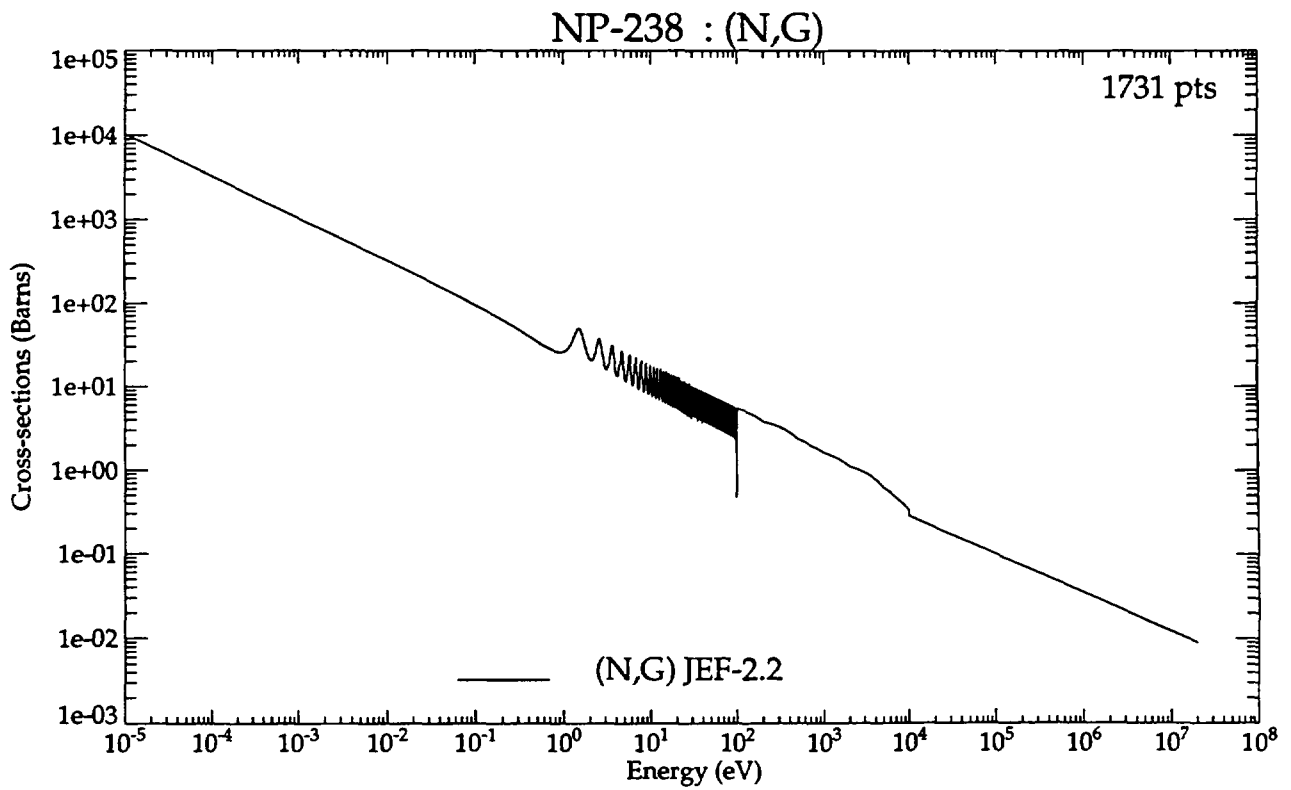
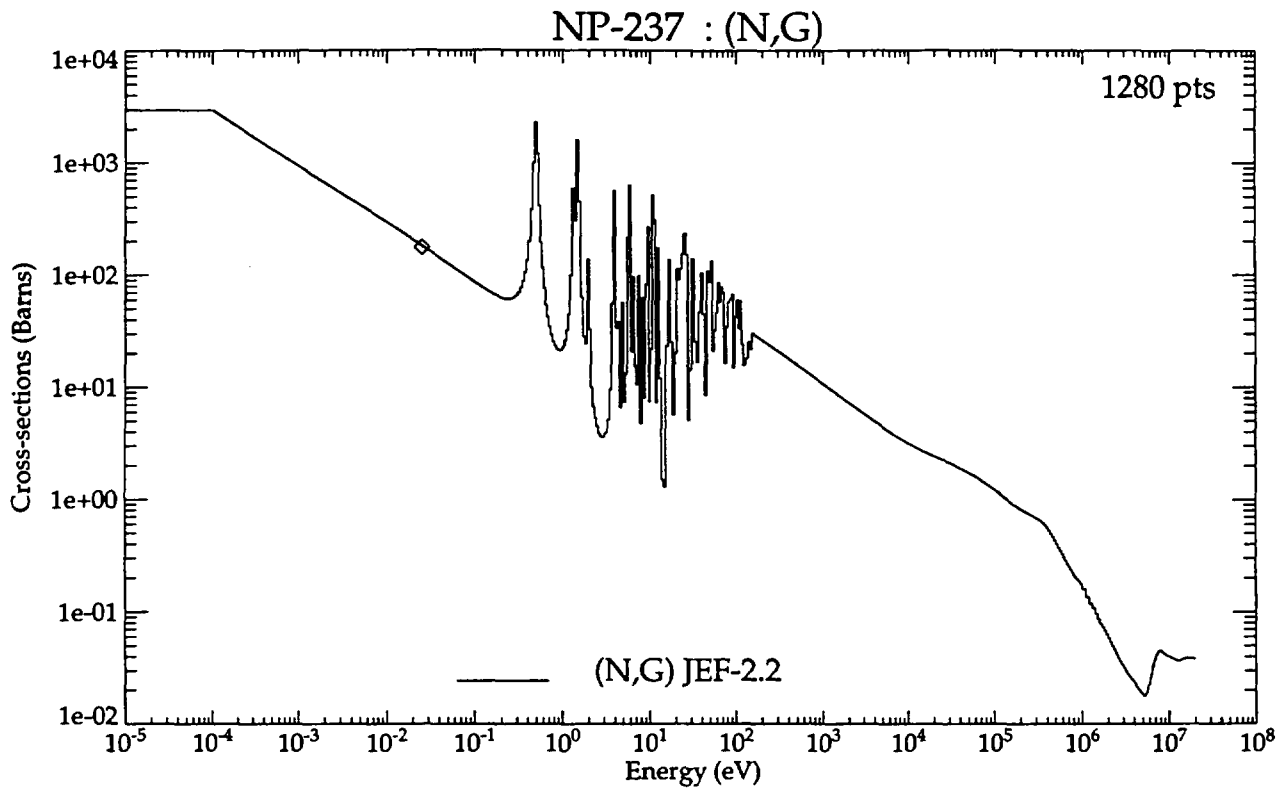


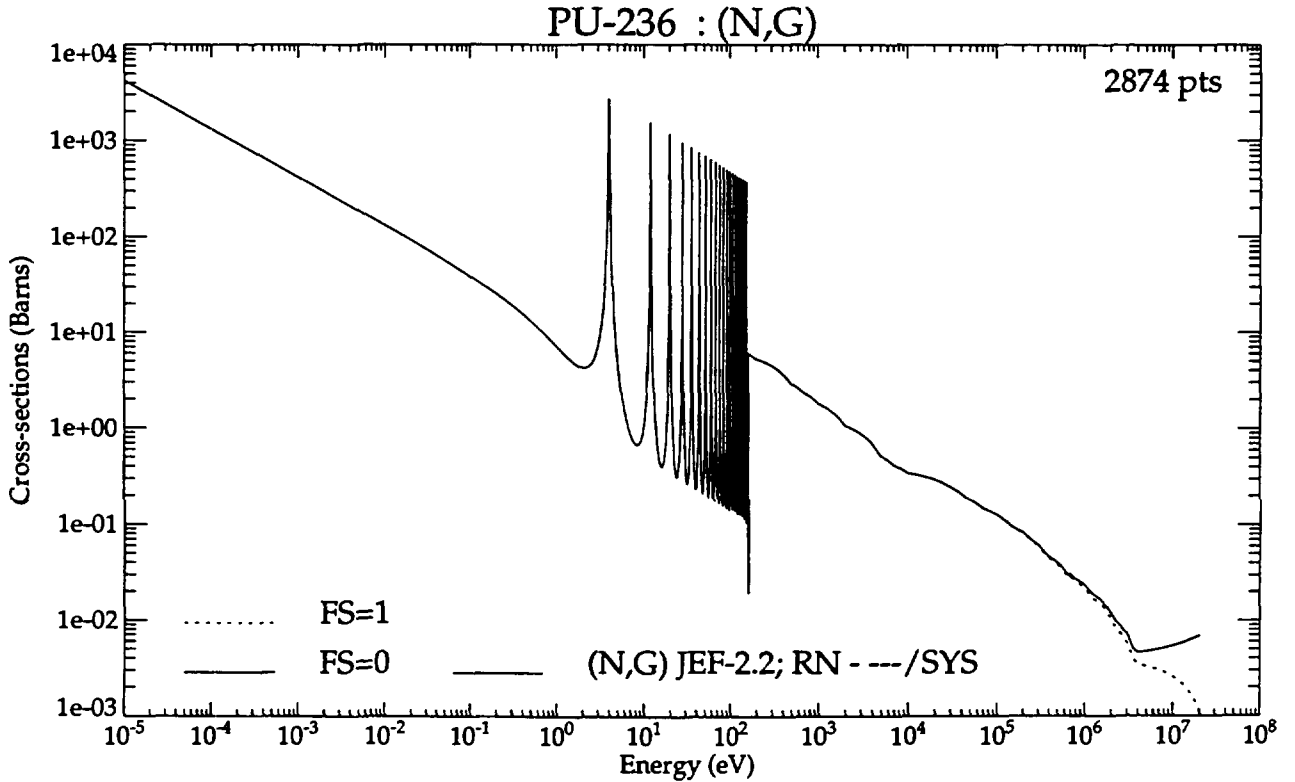
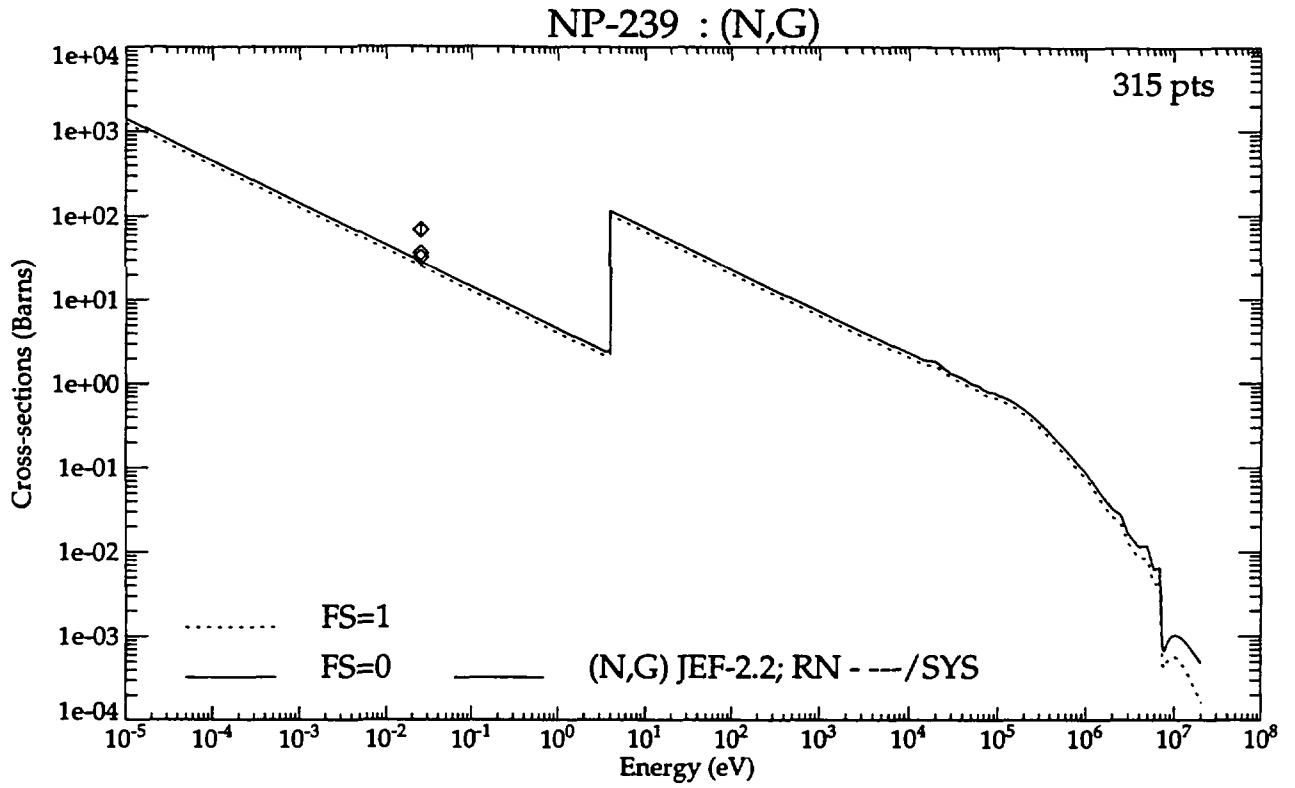


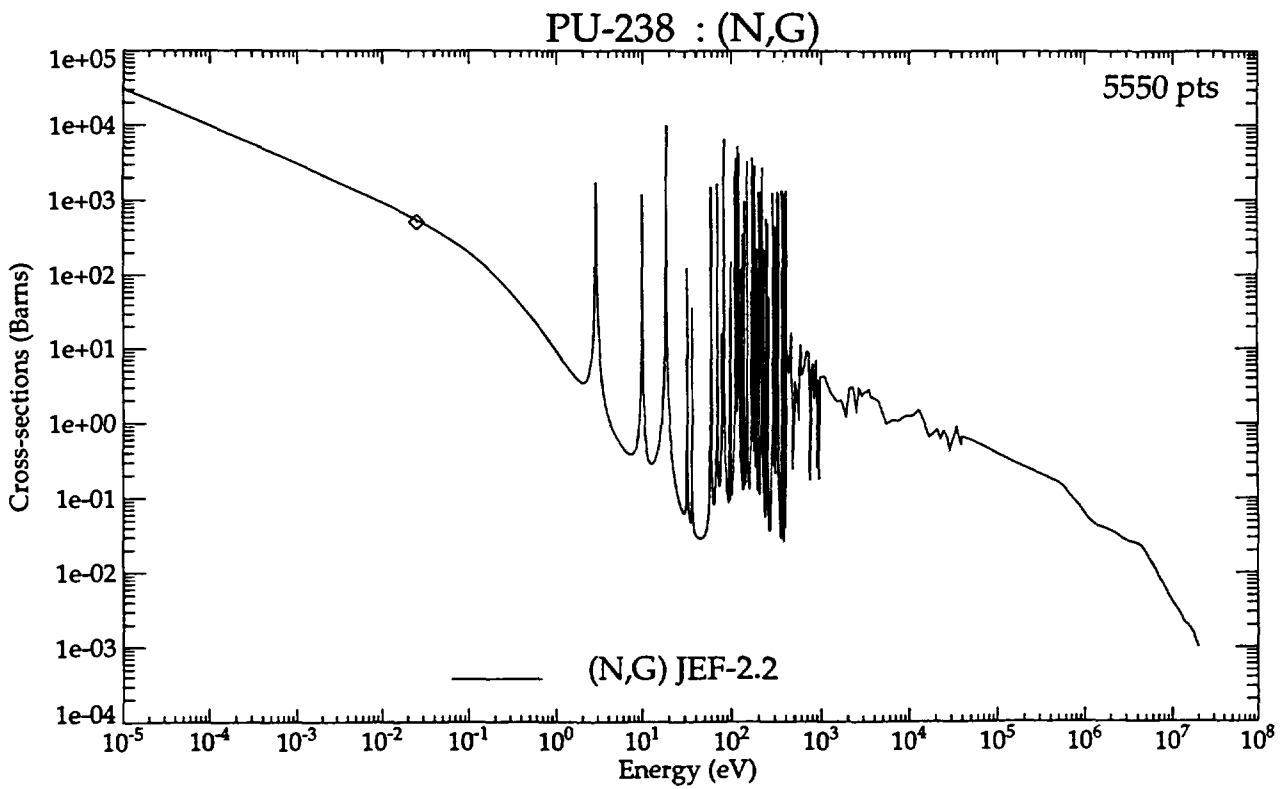
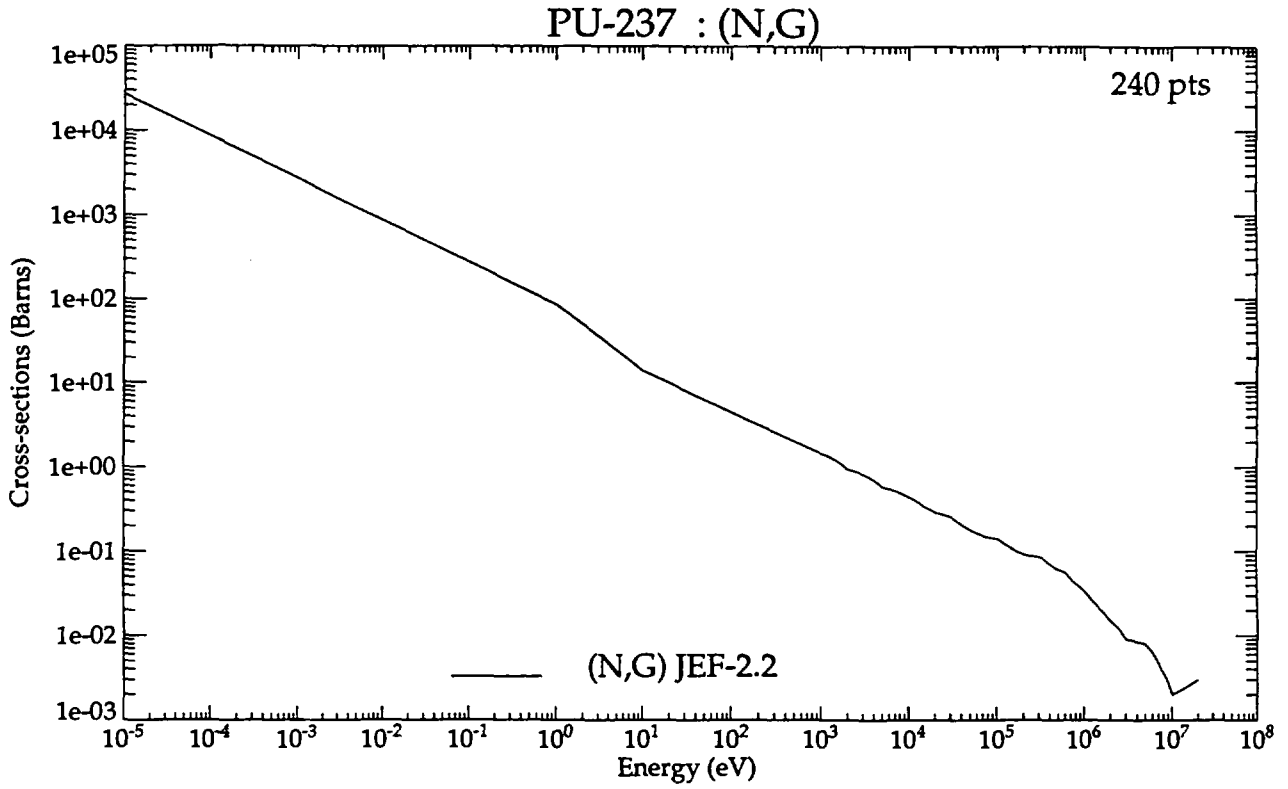


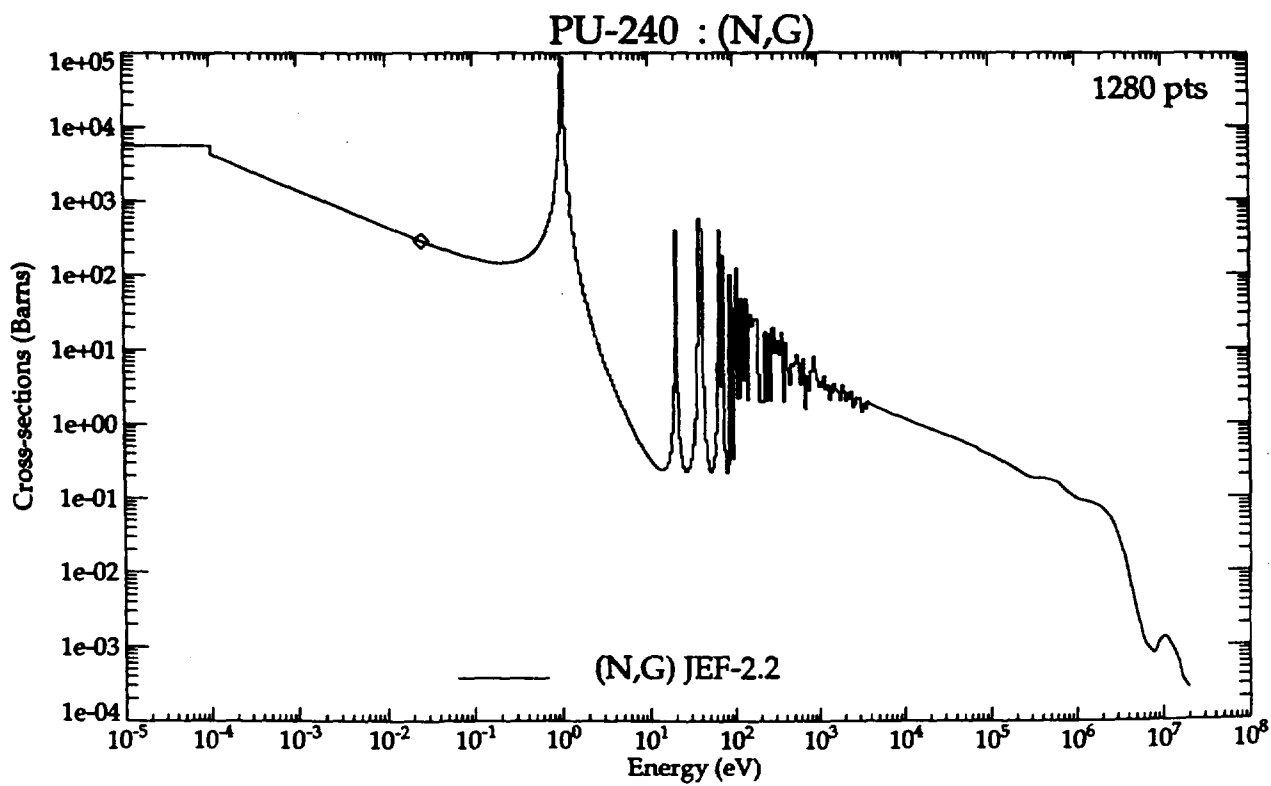
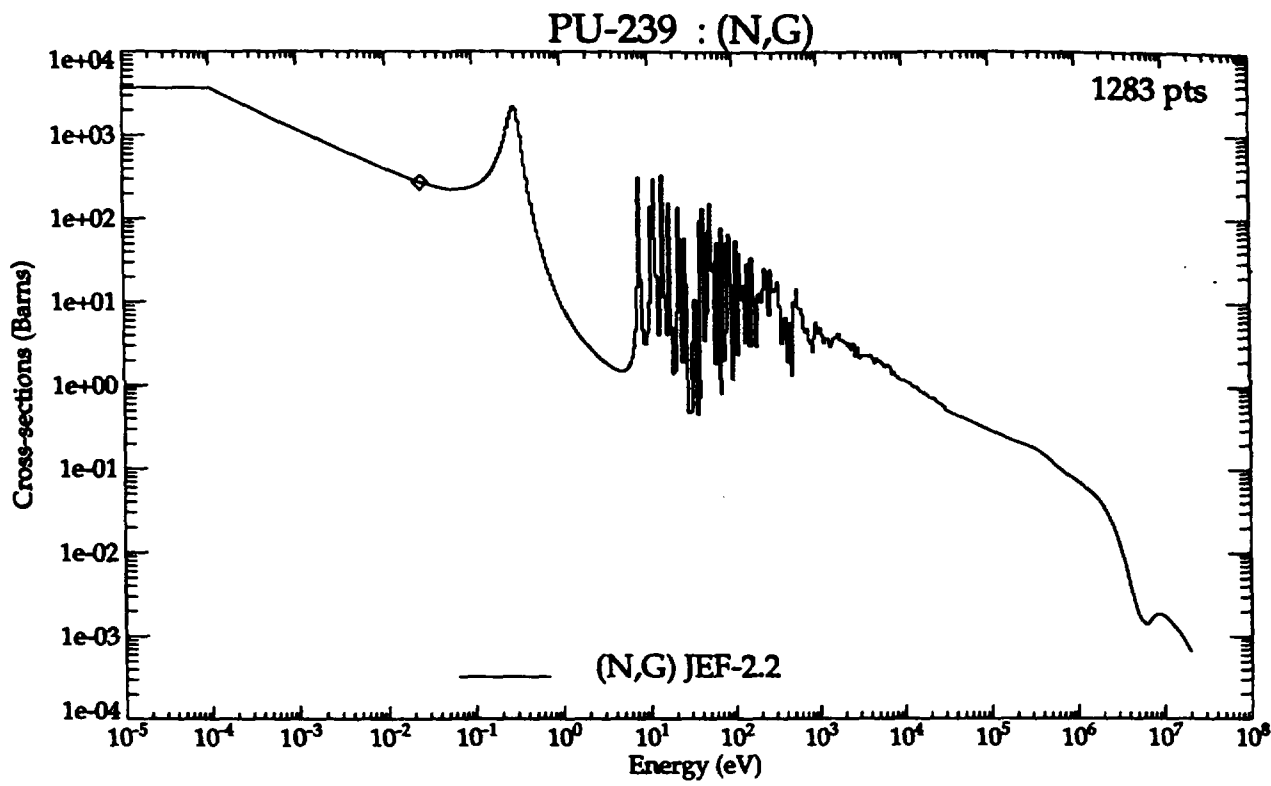


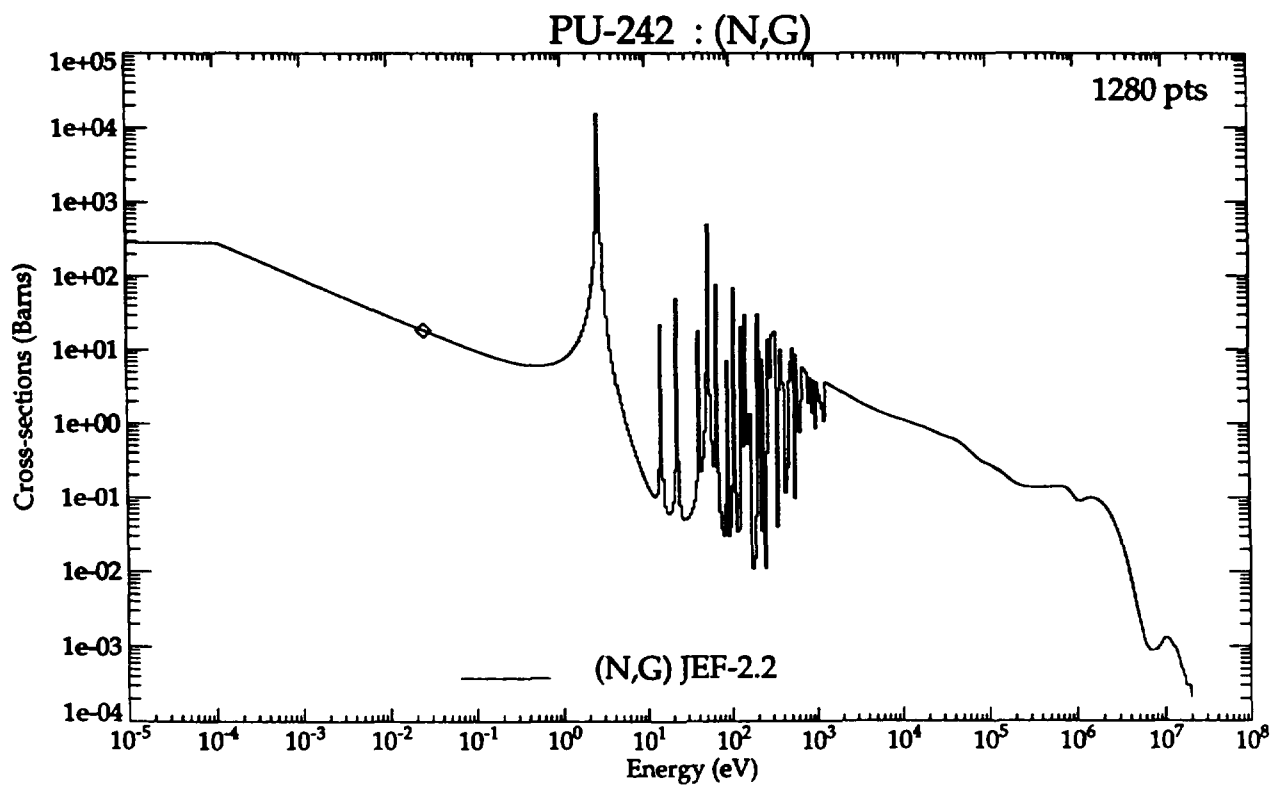
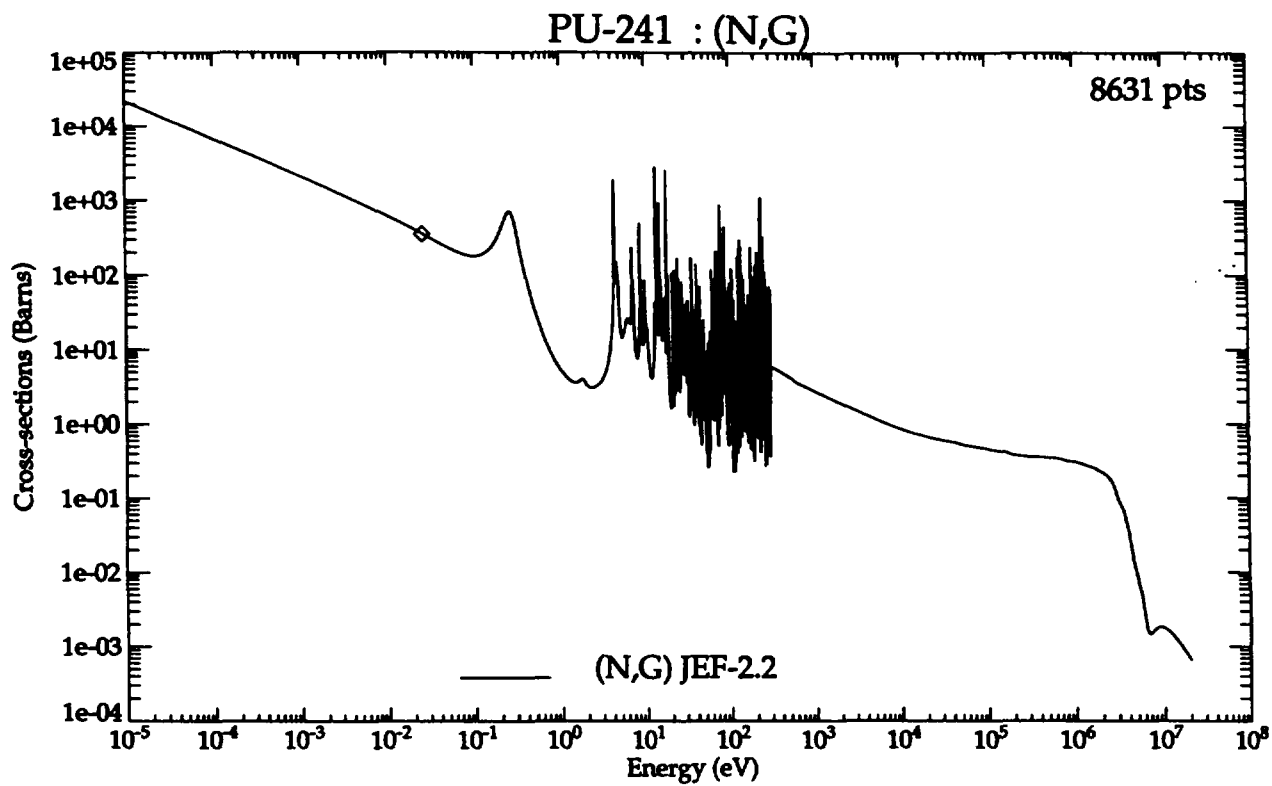


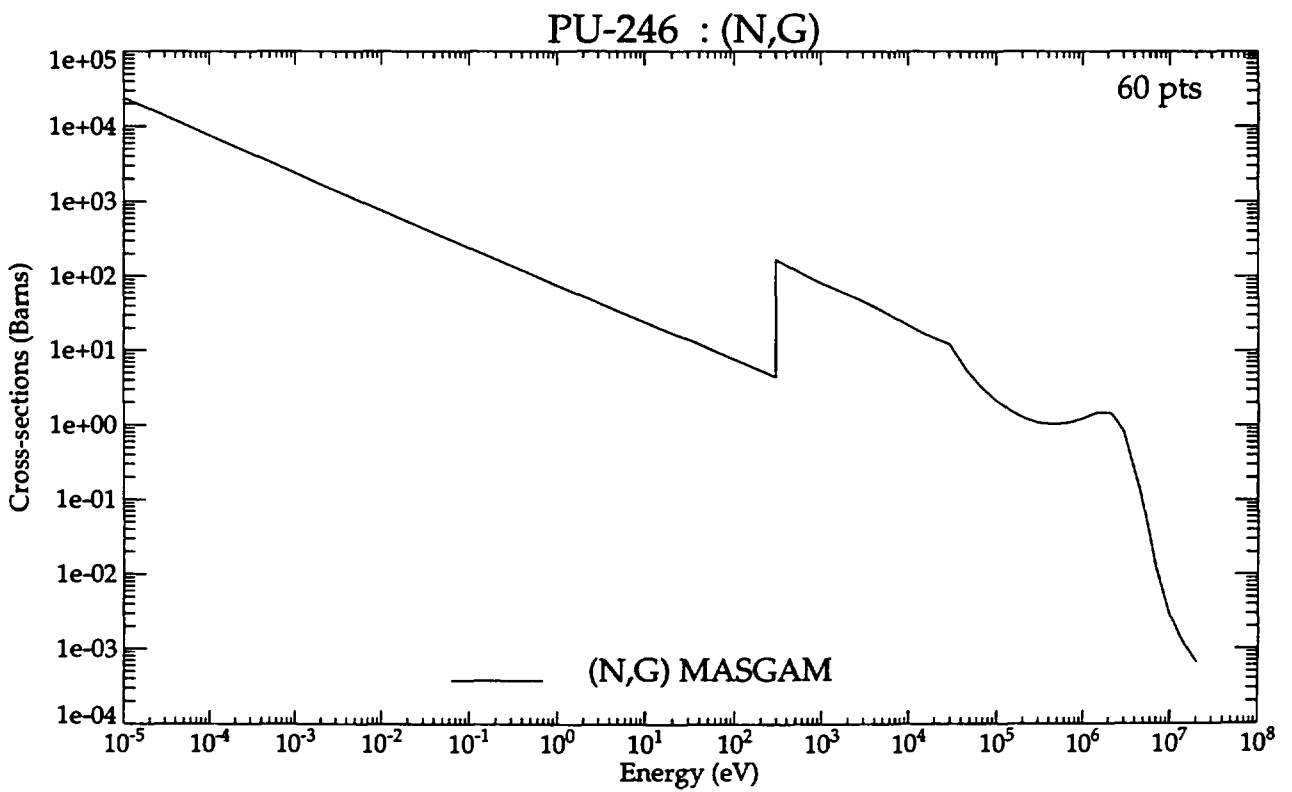
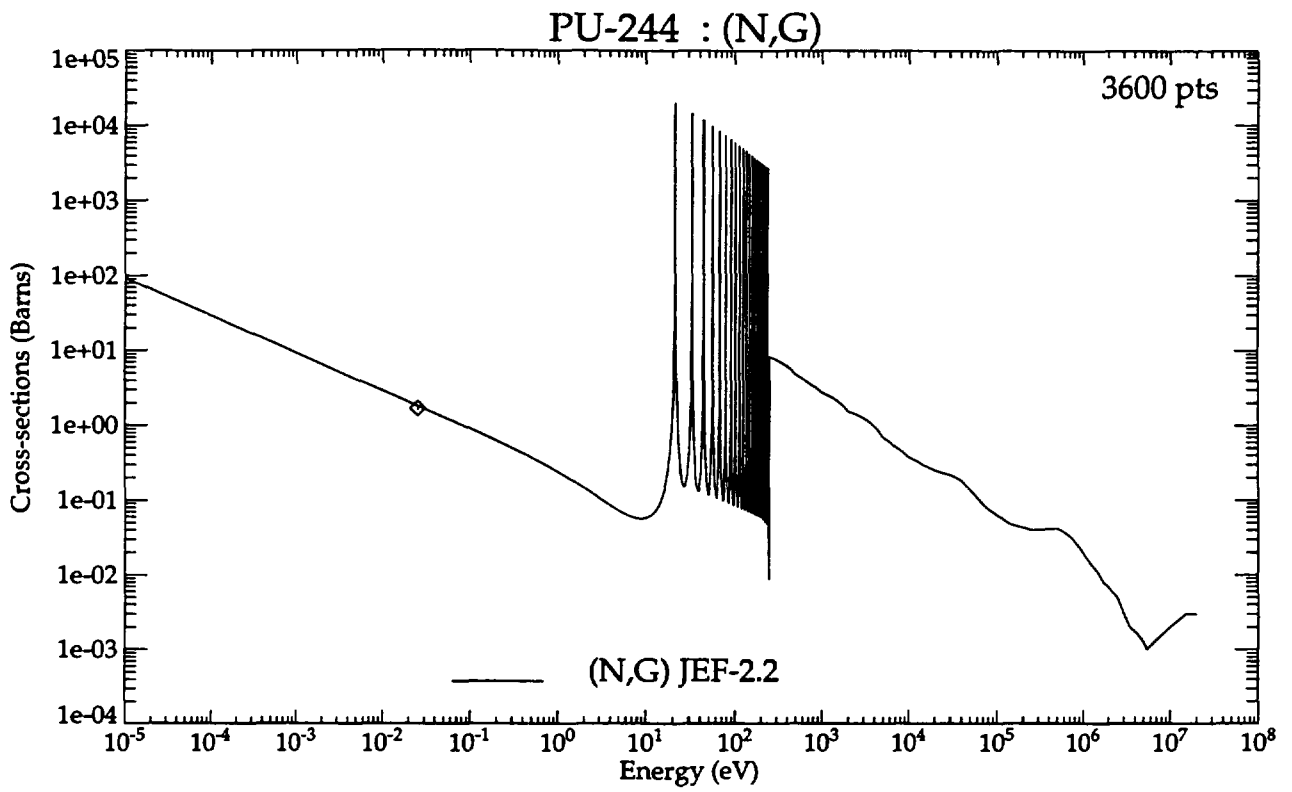


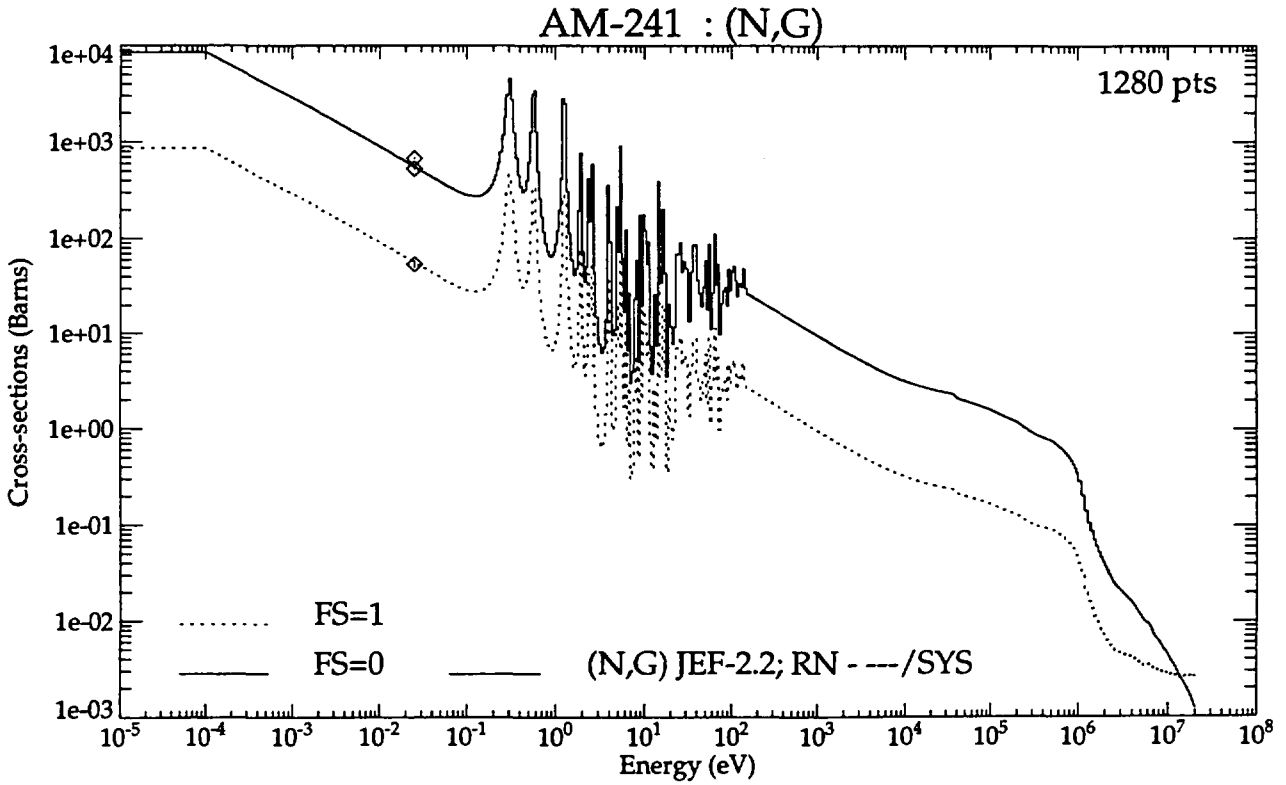
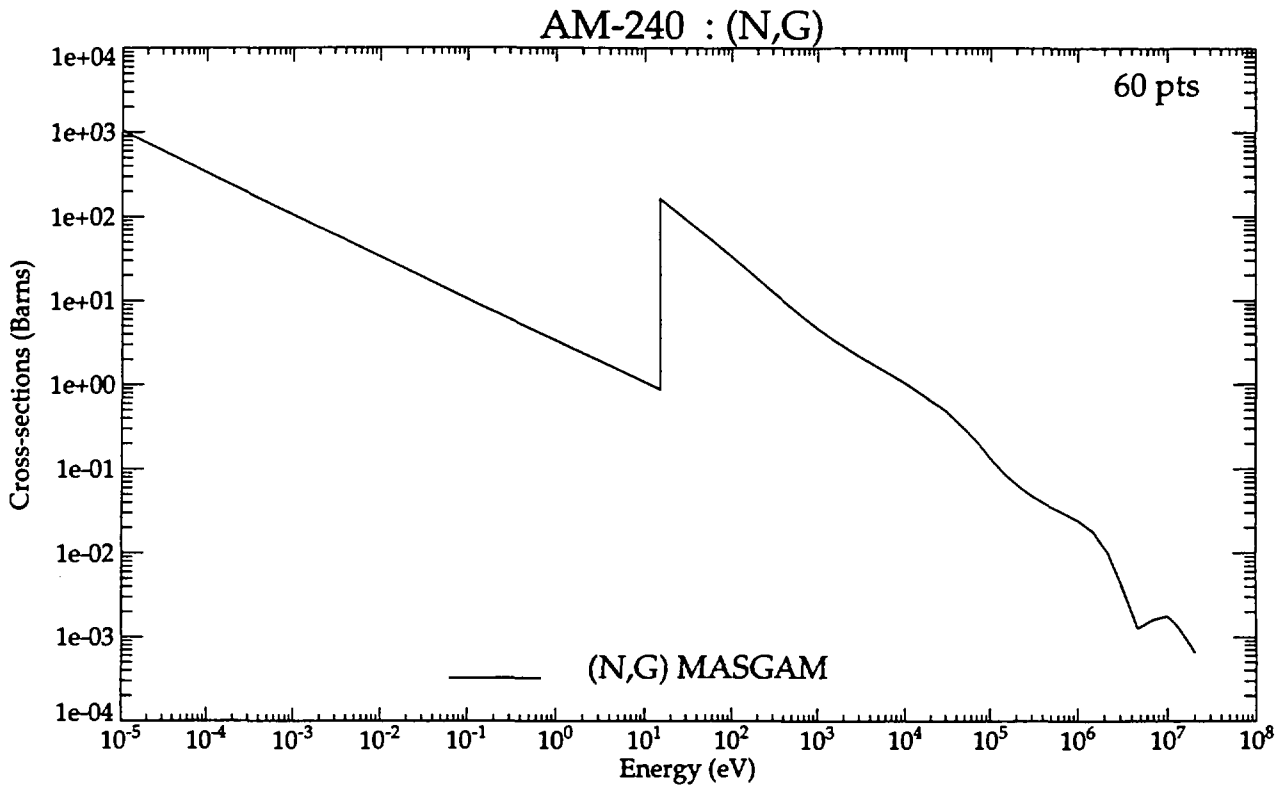


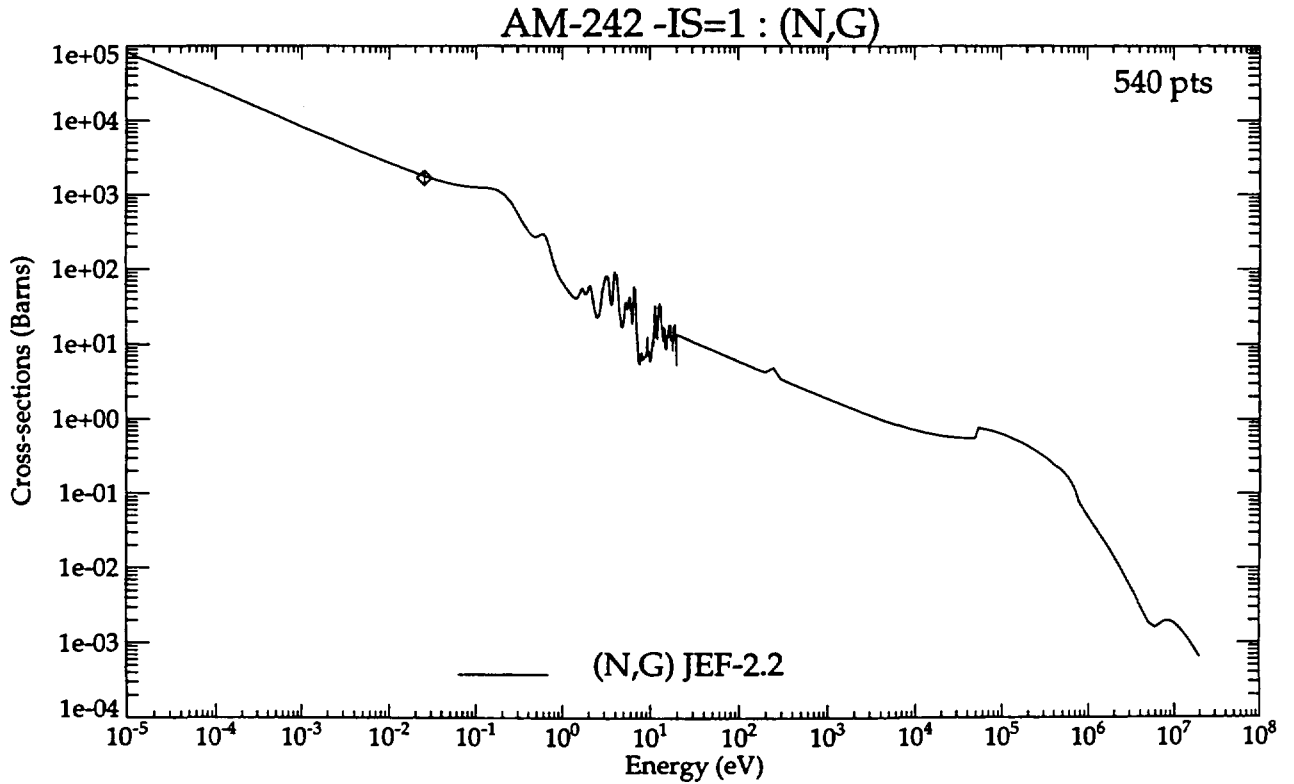
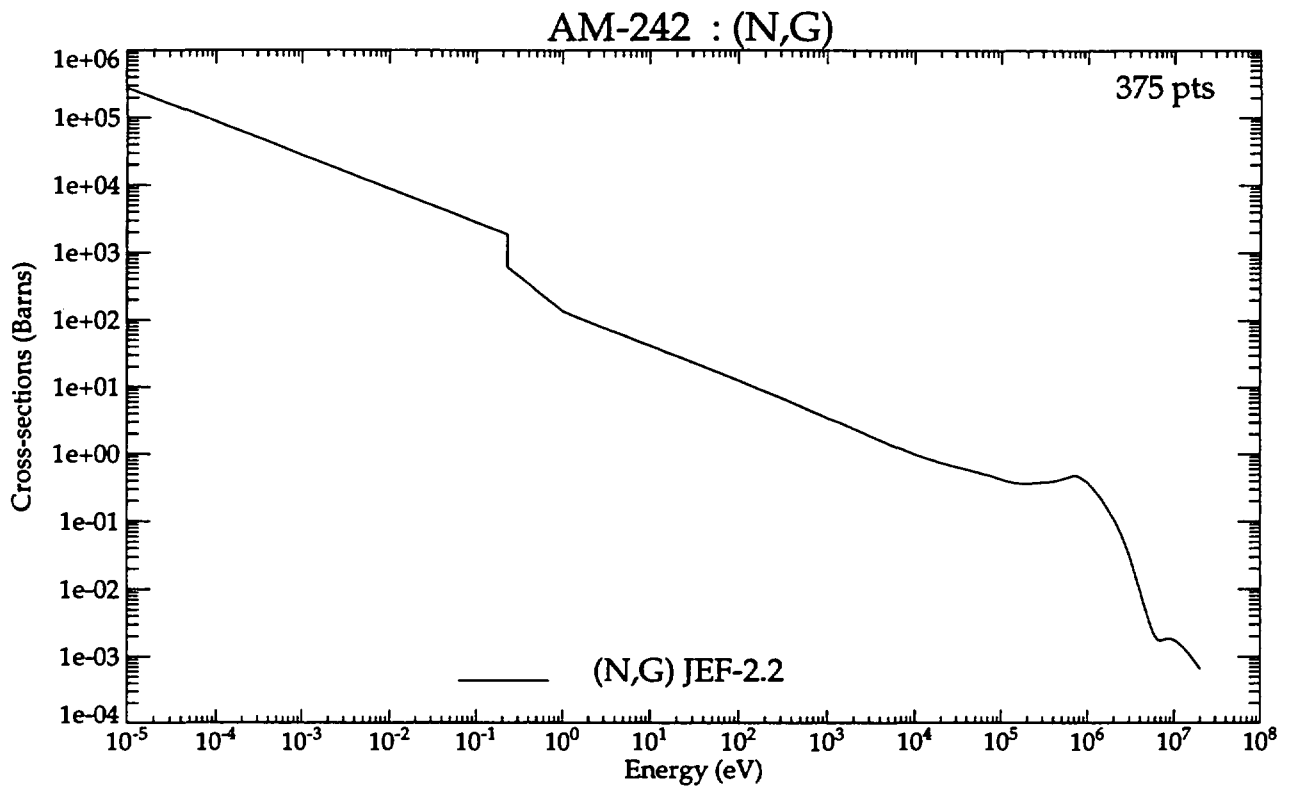


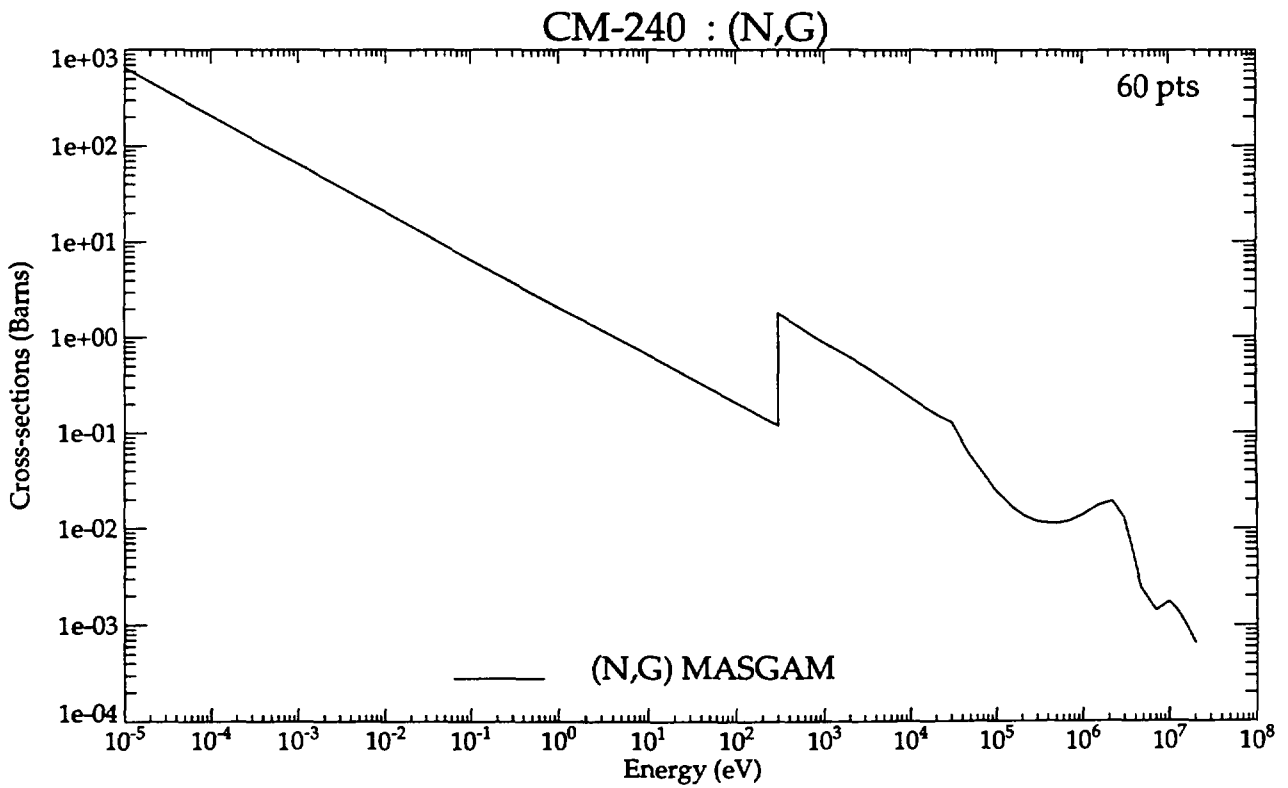
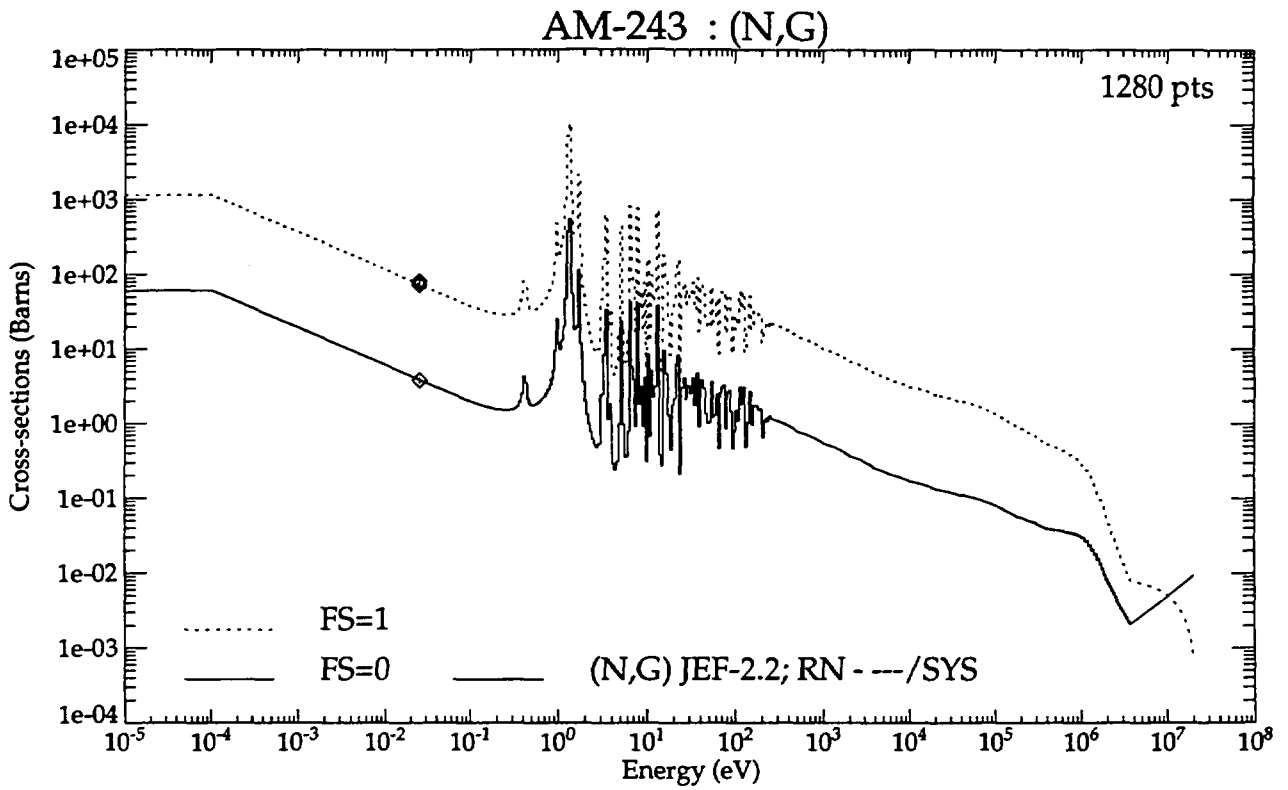


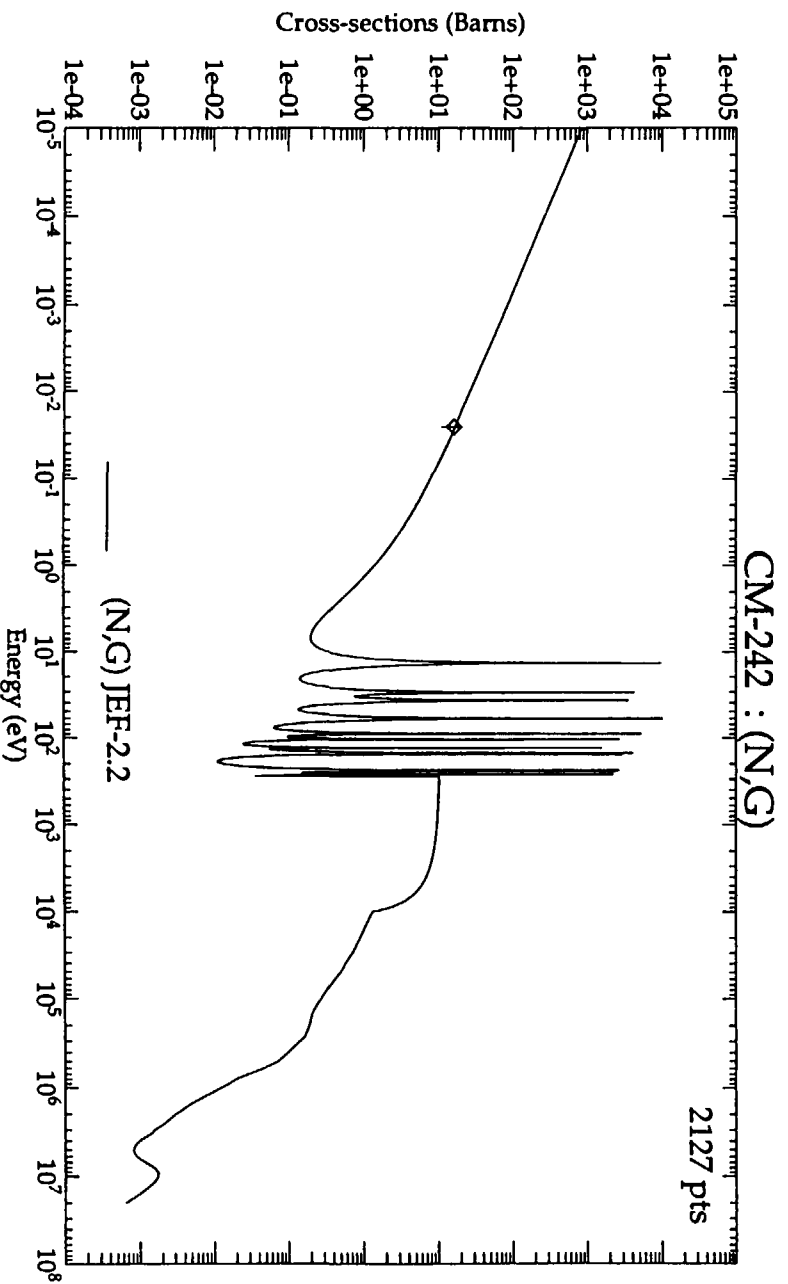
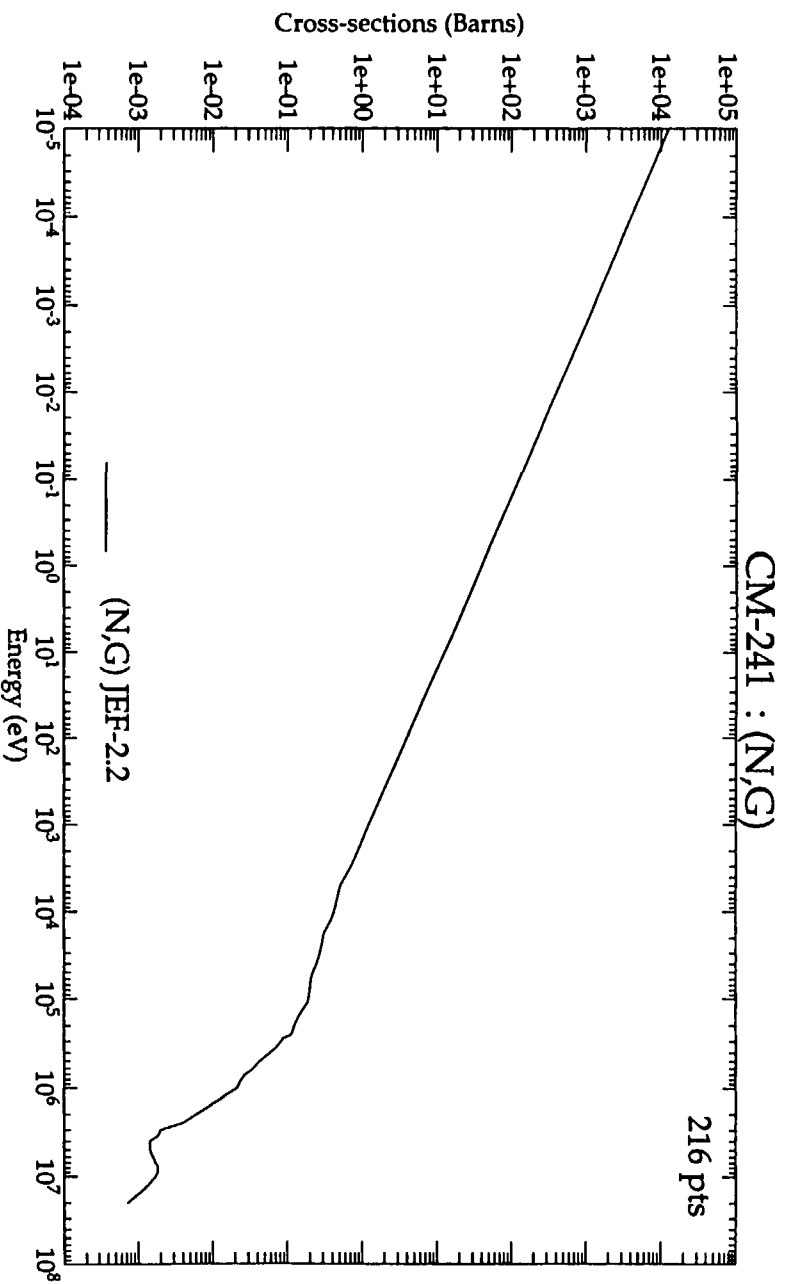


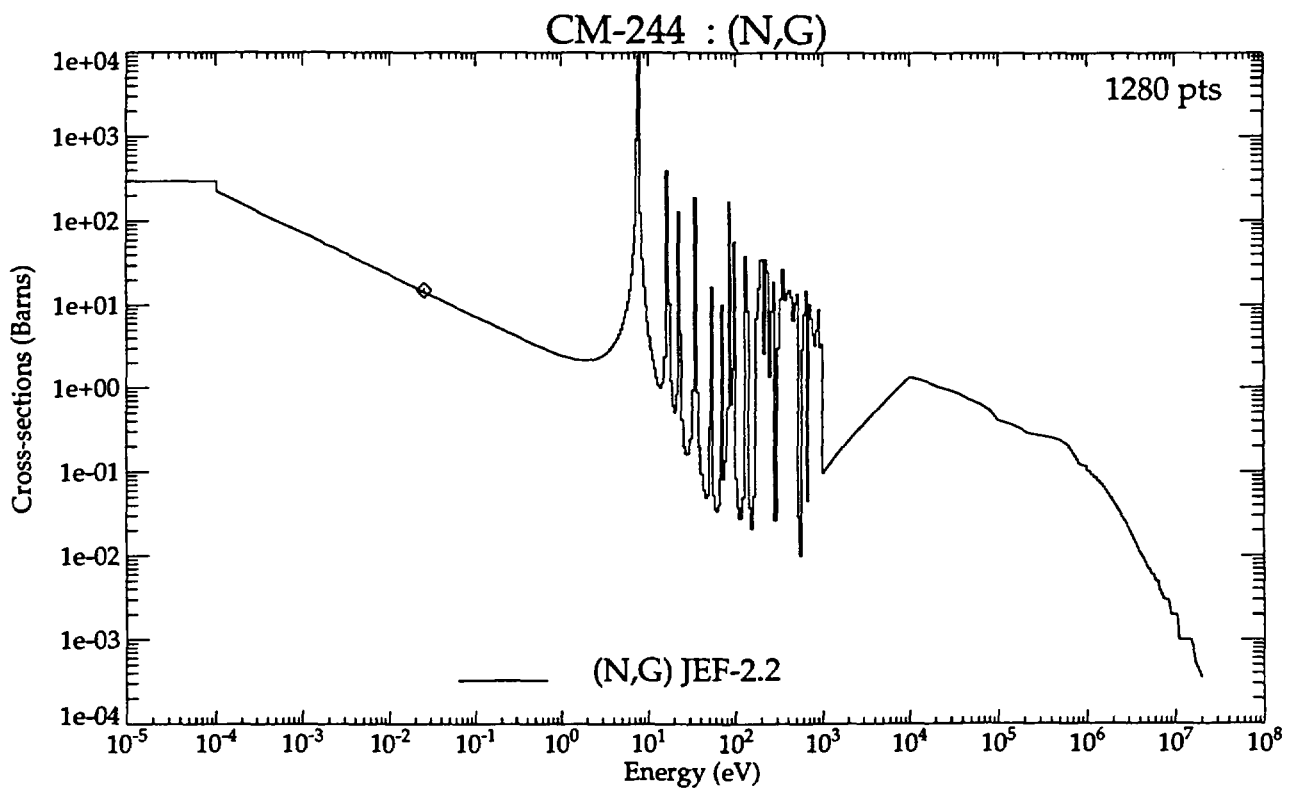
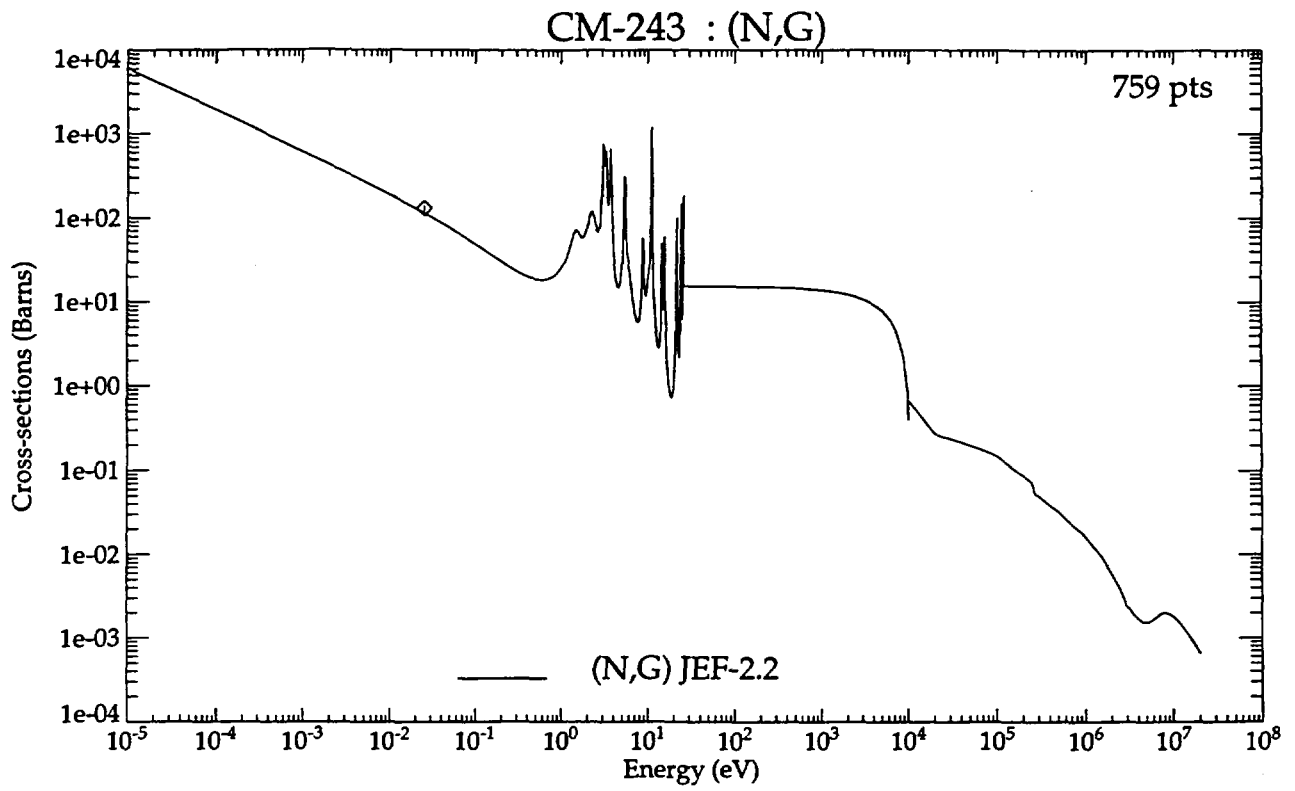


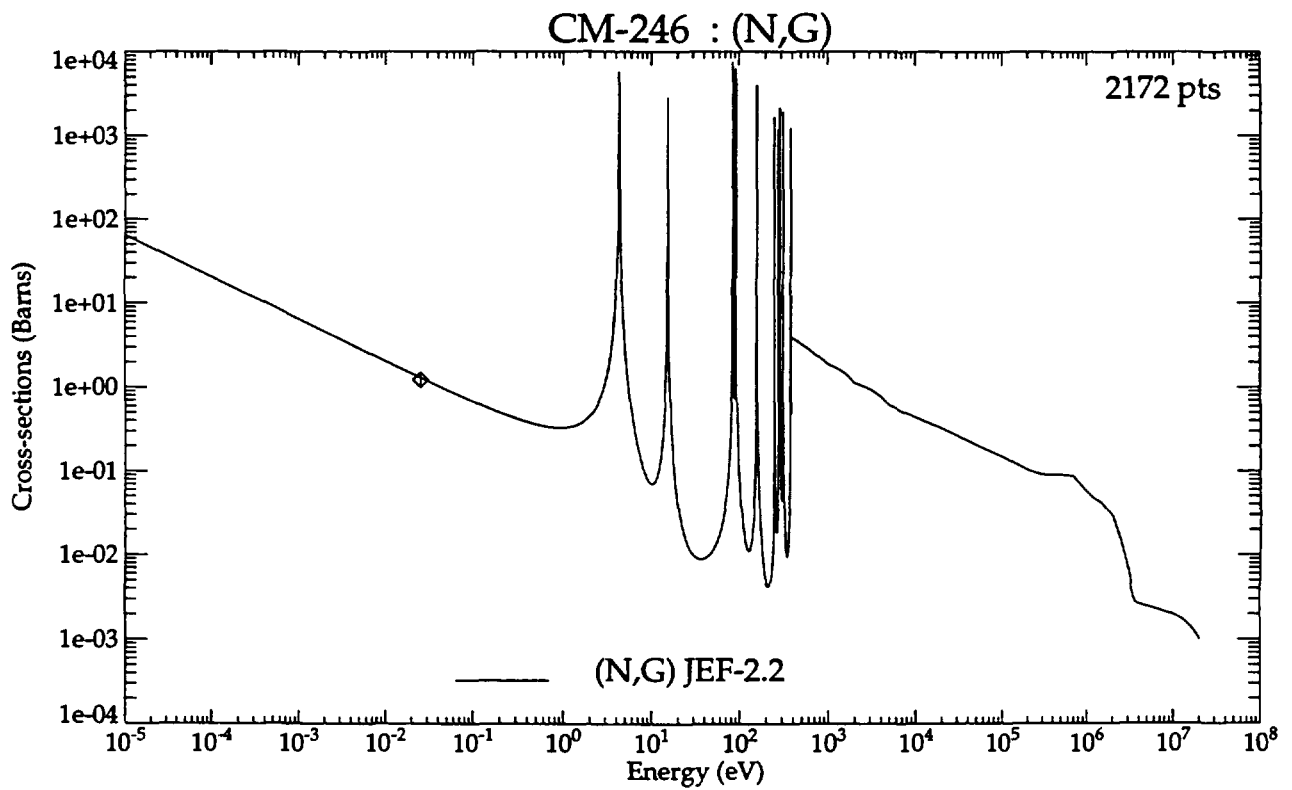
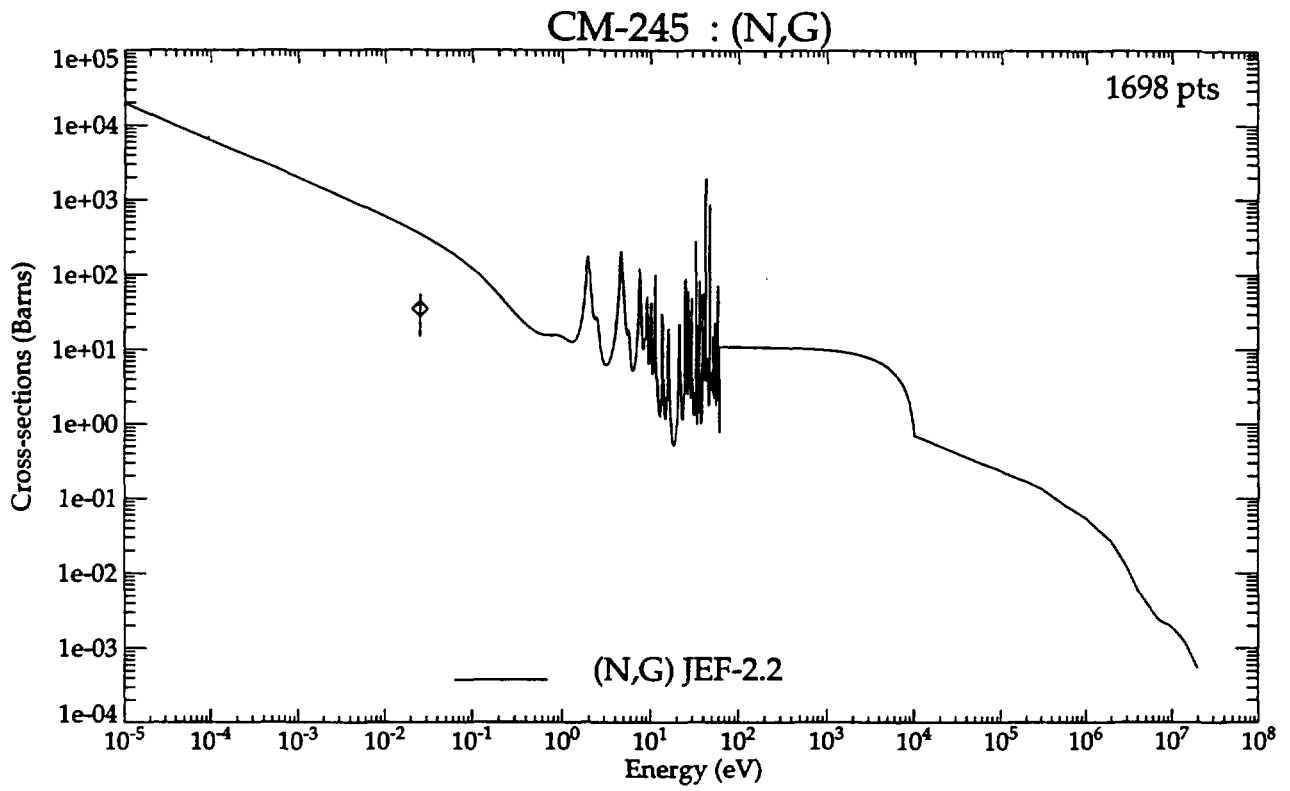


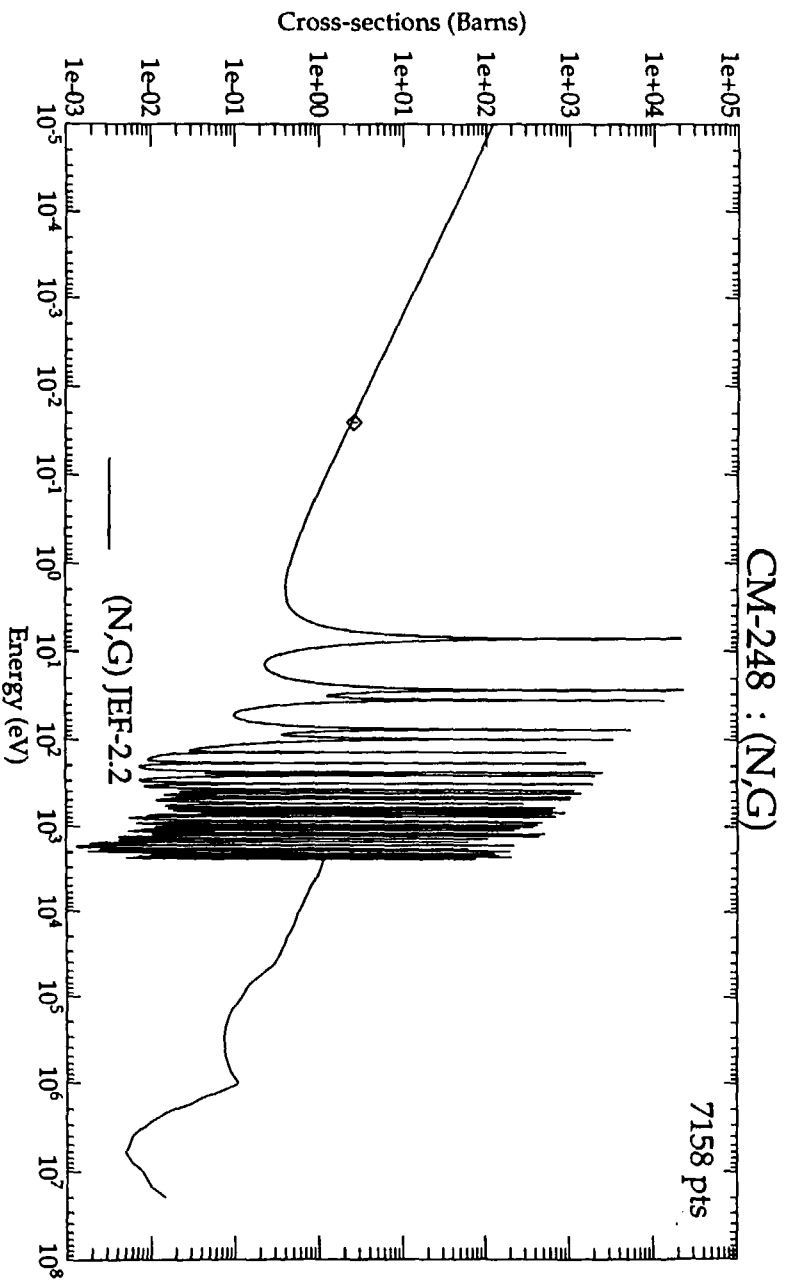
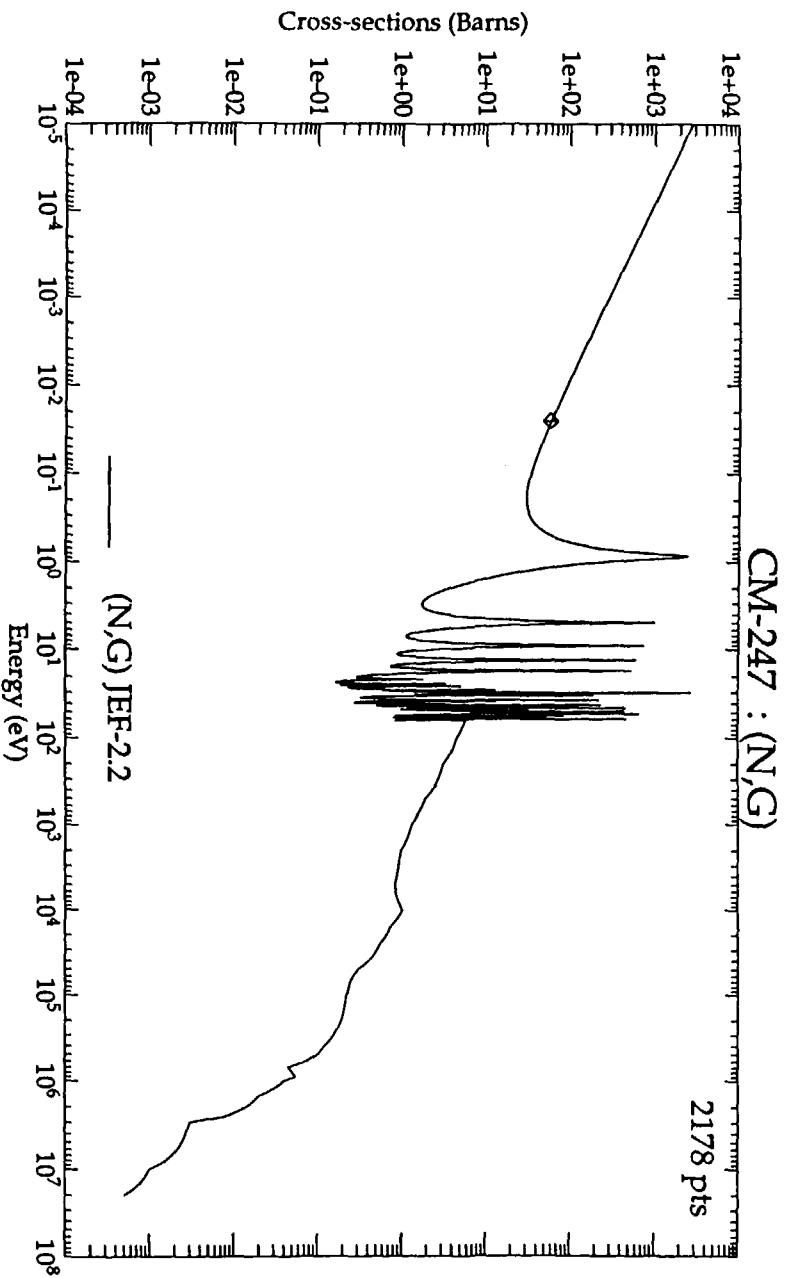












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