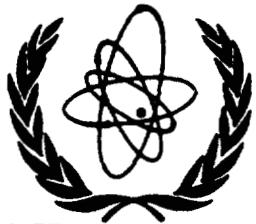




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# **Atlas of Neutron Capture Cross Sections**

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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  $(n,\gamma)$  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  $(n,\gamma)$  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  $(n,\gamma)$  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].

## 2 NGATLAS FILE OF (n, $\gamma$ ) REACTIONS

### 2.1 Reaction nomenclature

A notation is adopted for describing reactions in this report, the format of which is best illustrated by taking an example. Consider the (n, $\gamma$ ) reaction from a target of Ag (A = 108) which is initially in the first metastable state and leads to a final first metastable state. The MASGAM code has been used to evaluate the cross section. The title line contains all this information, and is written as;

AG\*108N, G\*      MASGAM; RN - ---/SYS

+--> describes the IS state  
+--> describes the FS state  
+--> data origin  
+--> indicates renormalisation

IS (Initial State) refers to the target nuclide state, and FS (Final State) describes the reaction product. Possible notations of the isomeric states are shown in Table 1.

**Table 1:** Possible notations of isomeric states.

Value (IS or FS)	NGATLAS notation	State
0	-	Ground state
1	*	First isomer
2	#	Second isomer

Next the data source is given, which in the above example is MASGAM. A complete list of the data origins used to build the NGATLAS file is given in Appendix B, which explains the nature of each source library or processing code that was used to calculate the cross section.

Finally, the flag RN displays information for experimental or systematic renormalisation at 14.5 MeV. These are shown as ; RN - XXX/YYY appended to the data source. The first item is used for the total cross-section, while the second applies to the isomeric branching. Values of EXP or SYS represent Experimental and Systematic renormalisation respectively.

### 2.2 Summary of (n, $\gamma$ ) reaction types and data sources

It is useful to show how the (n, $\gamma$ ) reactions can be divided into different categories, and a number of statistics are given in this section. Firstly, the final states of the (n, $\gamma$ ) reactions can be split as shown in Table 2,

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

Reaction	FS=0	FS=1	FS=2	Total
(n, $\gamma$ )	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, $\gamma$ ) reaction for H (A=3). Hence a total of 738 target isotopes in the library undergo (n, $\gamma$ ) reactions.

The (n, $\gamma$ ) 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, $\gamma$ ) 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
<b>Total</b>	<b>972</b>

All renormalisations made by SYMPAL [4] for (n, $\gamma$ ) 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
<b>Total</b>	<b>441</b>

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
<b>Total</b>	<b>441</b>

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]
<b>Total</b>	<b>1025</b>	

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
<b>Total</b>	<b>512</b>	<b>335</b>	<b>47</b>	<b>894</b>

A histogram may be formed from the distribution of C/E values, and plots at each energy for the  $(n,\gamma)$  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  $(n,\gamma)$  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**

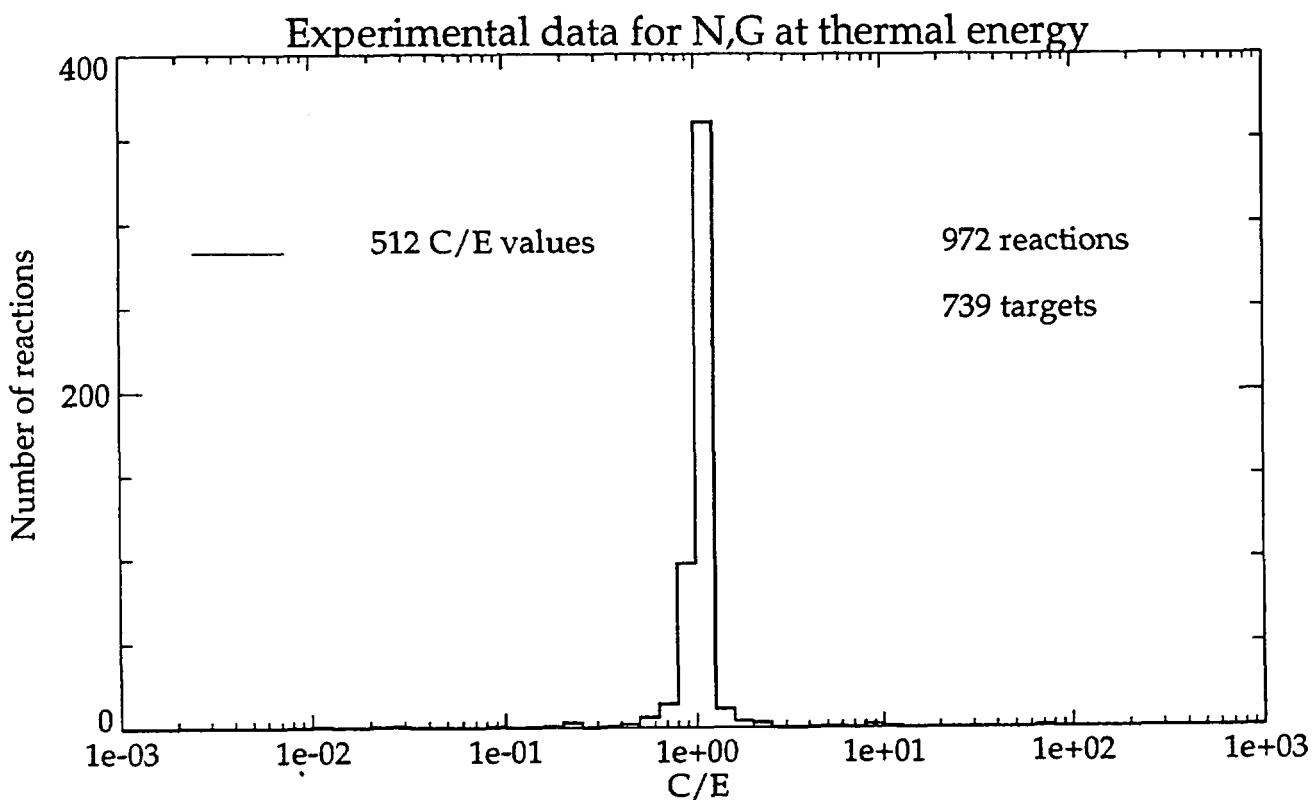
- [1] J. Kopecky and D. Nierop, *The European Activation File EAF-4 Summary Documentation*, ECN-C-95-075, (ECN Report, Petten, The Netherlands, December 1995).
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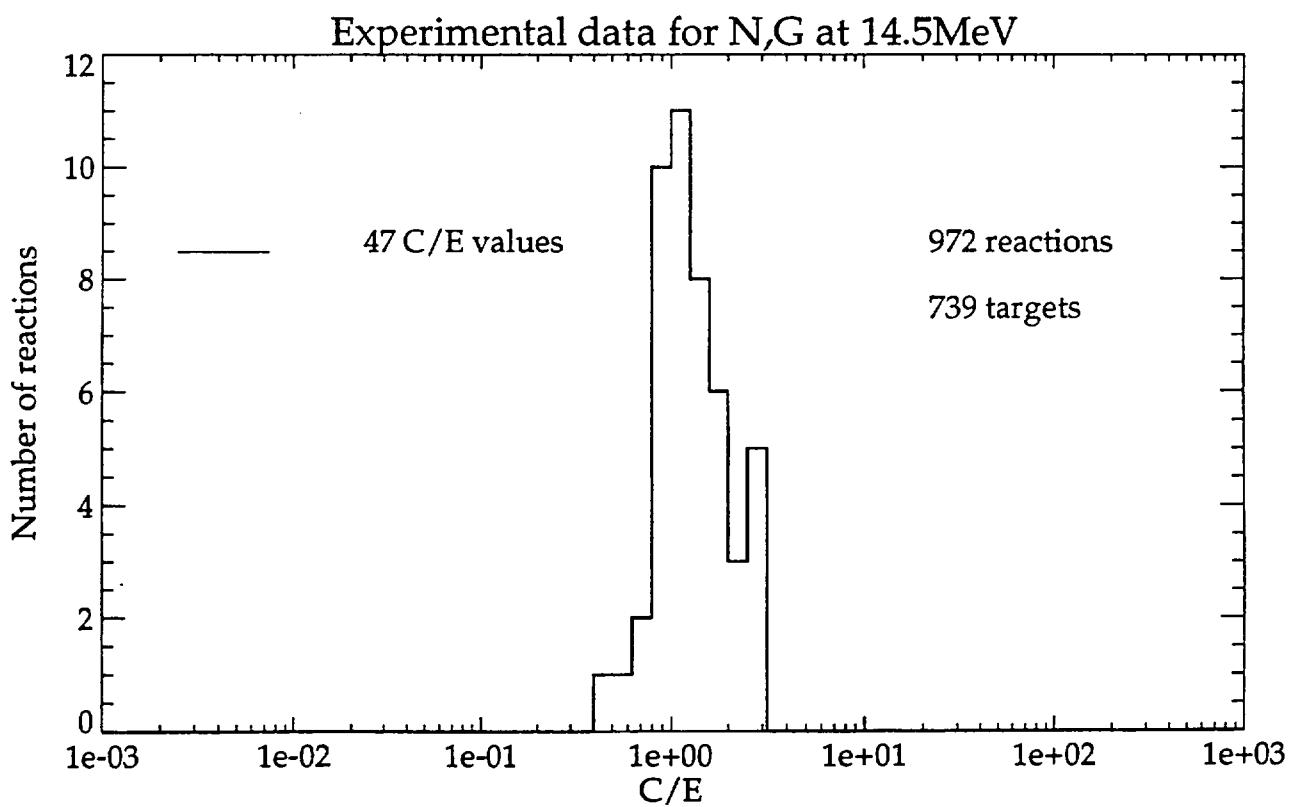
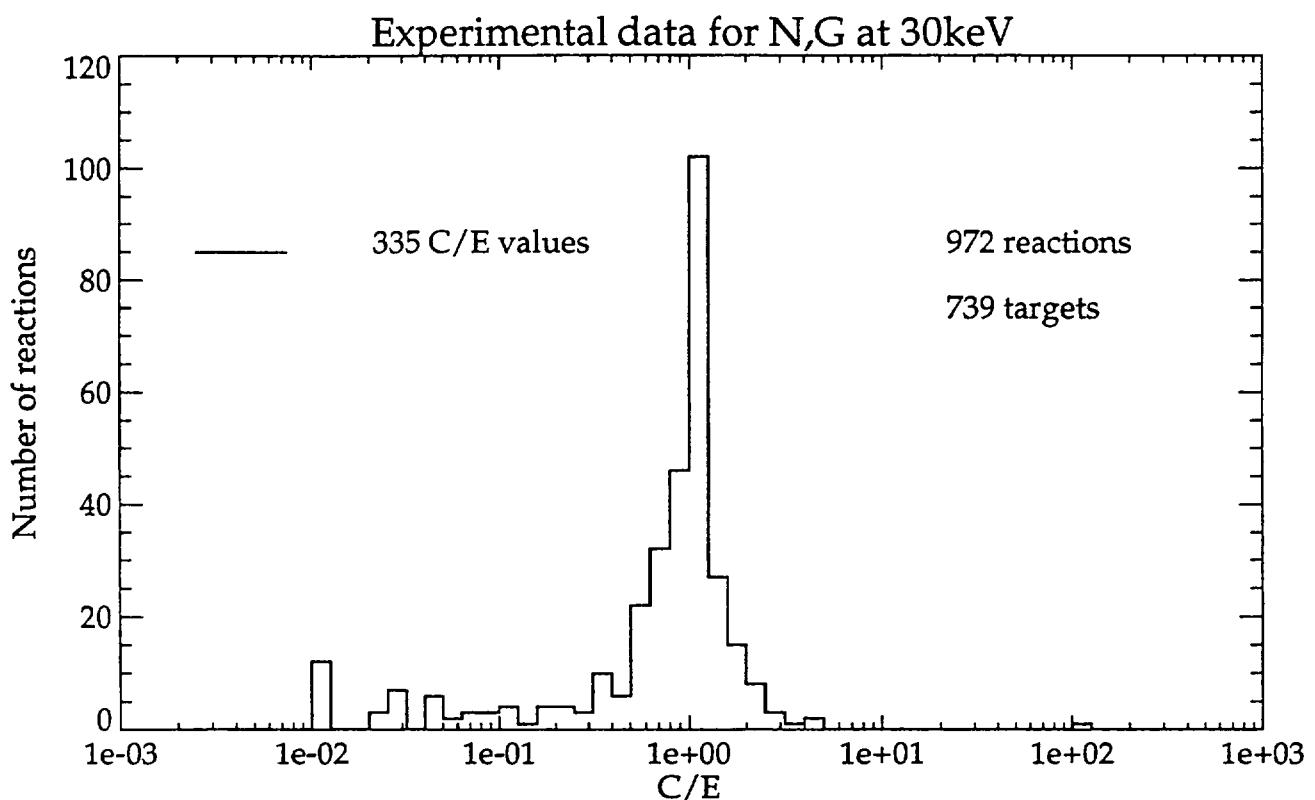
## Appendix A Validation plots

This appendix shows the distribution of evaluation to experiment (C/E) ratios for the ( $n,\gamma$ ) 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.





## 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  $(n,\gamma)$  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	Page
1	H-1	N, G	JEF-2.2	1
2	H-2	N, G	JEF-2.2	2
3	HE-3	N, G	JENDL-3.2	3
4	LI-6	N, G	JEF-2.2	4
5	LI-7	N, G	EFF-2.4	5
6	BE-7	N, G	JEF-2.2	6
7	BE-9	N, G	EFF-2.4	7
8	BE-10	N, G	ESTIMATE, BE9 REVISED	8
9	B-10	N, G	JEF-2.2	9
10	B-11	N, G	JEF-2.2	10
11	C-12	N, G	ENDF/B-VI	11
12	C-13	N, G	SIG-ECN	12
13	C-14	N, G	ESTIMATE, C12 REVISED	13
14	N-14	N, G	JEF-2.2	14
15	N-15	N, G	JENDL-3.2	15
16	O-16	N, G	JENDL-3.2	16
17	O-17	N, G	ENDF/B-VI	17
18	O-18	N, G	ESTIMATE, O16	18
19	F-19	N, G	JEF-2.2	19
20	NE-20	N, G	SIGECN-MASGAM	20
21	NE-21	N, G	SIGECN-MASGAM	21
22	NE-22	N, G	SIGECN-MASGAM	22
23	NA-22	N, G	JEF-2.2	23
24	NA-23	N, G	JEF-2.2; RN - ---/SYS	24
25	NA-24	N, G	MASGAM	25
26	MG-24	N, G	JENDL-3.1	26
27	MG-25	N, G	JENDL-3.1	27
28	MG-26	N, G	JENDL-3.1	28
29	MG-28	N, G	MASGAM	29
30	AL-26	N, G	MASGAM	30
31	AL-27	N, G	JEF-2.2	31
32	SI-28	N, G	JENDL-3.1	32
33	SI-29	N, G	JENDL-3.1	33
34	SI-30	N, G	JENDL-3.1	34
35	SI-31	N, G	MASGAM	35
36	SI-32	N, G	MASGAM	36
37	P-31	N, G	JEF-2.2	37
38	P-32	N, G	MASGAM	38
39	P-33	N, G	MASGAM	39
40	S-32	N, G	JEF-2.2	40
41	S-33	N, G	JEF-2.2	41
42	S-34	N, G	JEF-2.2	42
43	S-35	N, G	MASGAM	43
44	S-36	N, G	JEF-2.2	44
45	CL-35	N, G	SIGECN-MASGAM	45
46	CL-36	N, G	MASGAM	46
47	CL-37	N, G	SIGECN-MASGAM; RN - ---/SYS	47
48	AR-36	N, G	JEF-2.2	48
49	AR-37	N, G	MASGAM	49
50	AR-38	N, G	JEF-2.2	50
51	AR-39	N, G	MASGAM	51
52	AR-40	N, G	JEF-2.2	52
53	AR-41	N, G	MASGAM	53
54	AR-42	N, G	MASGAM	54
55	K-39	N, G	JENDL-3.1	55
56	K-40	N, G	MASGAM	56
57	K-41	N, G	JENDL-3.1	57
58	K-42	N, G	MASGAM	58
59	K-43	N, G	MASGAM	59
60	CA-40	N, G	JENDL-3.1	60
61	CA-41	N, G	MASGAM	61
62	CA-42	N, G	JENDL-3.1	62
63	CA-43	N, G	JENDL-3.1	63
64	CA-44	N, G	JENDL-3.1	64
65	CA-45	N, G	MASGAM	65
66	CA-46	N, G	JENDL-3.1	66
67	CA-47	N, G	MASGAM	67
68	CA-48	N, G	JENDL-3.1	68
69	SC-44-IS=1	N, G	MASGAM; RN - ---/SYS	69
70	SC-45	N, G	ENDF/B-VI; RN - ---/SYS	70
71	SC-46	N, G	MASGAM	71
72	SC-47	N, G	MASGAM	72
73	SC-48	N, G	MASGAM	73
74	TI-44	N, G	MASGAM	74
75	TI-45	N, G	MASGAM	75
76	TI-46	N, G	JENDL-3.1	76
77	TI-47	N, G	JENDL-3.1	77
78	TI-48	N, G	JENDL-3.1	78
79	TI-49	N, G	JENDL-3.1	79
80	TI-50	N, G	JENDL-3.1	80
81	V-48	N, G	MASGAM	81
82	V-49	N, G	MASGAM	82
83	V-50	N, G	SIGECN-MASGAM	83
84	V-51	N, G	JENDL-3.1	84
85	CR-48	N, G	ADL-3	85

86	CR-50	N, G	EFF-2.4		
88	CR-51	N, G	MASGAM	Page 44	
89	CR-52	N, G	EFF-2.4	Page 45	
90	CR-53	N, G	EFF-2.4	Page 46	
91	CR-54	N, G	EFF-2.4	Page 47	
92	MN-52	N, G	MASGAM	Page 48	
93	MN-53	N, G	MASGAM	Page 49	
94	MN-54	N, G	MASGAM	Page 50	
95	MN-55	N, G	JEF-2.2	Page 51	
96	FE-55	N, G	ENDF/B-VI	Page 52	
97	FE-56	N, G	MASGAM	Page 53	
98	FE-57	N, G	ENDF/B-VI	Page 54	
99	FE-58	N, G	ENDF/B-VI	Page 55	
100	FE-59	N, G	MASGAM	Page 56	
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103	CO-56	N, G	MASGAM	Page 59	
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108	CO-60	N, G	MASGAM	Page 64	
109	NI-56	N, G	MASGAM	Page 65	
110	NI-57	N, G	MASGAM	Page 66	
111	NI-58	N, G	EFF-2.4	Page 67	
112	NI-59	N, G	JEF-2.2	Page 68	
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114	NI-61	N, G	EFF-2.4	Page 70	
115	NI-62	N, G	EFF-2.4	Page 71	
116	NI-63	N, G	MASGAM	Page 72	
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118	NI-66	N, G	MASGAM	Page 74	
119	CU-63	N, G	ENDF/B-VI	Page 75	
120	CU-64	N, G	MASGAM	Page 76	
121	CU-65	N, G	ENDF/B-VI	Page 77	
122	CU-67	N, G	MASGAM; RN - ---/SYS	Page 78	
123	ZN-64	N, G	JEF-2.2	Page 79	
124	ZN-65	N, G	MASGAM	Page 80	
125	ZN-66	N, G	SIGECN-MASGAM	Page 81	
126	ZN-67	N, G	SIGECN-MASGAM	Page 82	
127	ZN-68	N, G	SIGECN-MASGAM; RN - ---/SYS	Page 83	
128	ZN-69-IS=1	N, G	MASGAM	Page 84	
129	ZN-70	N, G	SIGECN-MASGAM; RN - ---/SYS	Page 85	
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131	GA-67	N, G	MASGAM	Page 87	
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133	GA-71	N, G	SIGECN-MASGAM	Page 89	
134	GA-72	N, G	MASGAM	Page 90	
135	GE-68	N, G	MASGAM	Page 91	
136	GE-69	N, G	MASGAM	Page 92	
137	GE-70	N, G	SIGECN-MASGAM	Page 93	
138	GE-71	N, G	MASGAM	Page 94	
139	GE-72	N, G	JEF-2.2; RN - ---/SYS	Page 95	
140	GE-73	N, G	JEF-2.2	Page 96	
141	GE-74	N, G	JEF-2.2; RN - ---/SYS	Page 97	
142	GE-76	N, G	JEF-2.2; RN - ---/SYS	Page 98	
143	GE-77	N, G	MASGAM	Page 99	
144	AS-71	N, G	MASGAM		
145	AS-72	N, G	MASGAM		
146	AS-73	N, G	MASGAM		
147	AS-74	N, G	MASGAM		
148	AS-75	N, G	JEF-2.2		
149	AS-76	N, G	MASGAM		
150	AS-77	N, G	MASGAM		
151	SE-72	N, G	MASGAM; RN - ---/SYS		
152	SE-73	N, G	MASGAM		
153	SE-74	N, G	JEF-2.2		
154	SE-75	N, G	MASGAM		
155	SE-76	N, G	JEF-2.2; RN - ---/SYS		
156	SE-77	N, G	JEF-2.2		
157	SE-78	N, G	JEF-2.2; RN - ---/SYS		
158	SE-79	N, G	MASGAM		
159	SE-80	N, G	JEF-2.2; RN - ---/SYS		
160	SE-82	N, G	JEF-2.2; RN - ---/SYS		
161	BR-76	N, G	MASGAM; RN - ---/SYS		
162	BR-77	N, G	MASGAM		
163	BR-79	N, G	JEF-2.2; RN - ---/SYS		
164	BR-81	N, G	JEF-2.2; RN - ---/SYS		
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170	KR-81	N, G	MASGAM		
171	KR-82	N, G	JEF-2.2; RN - ---/SYS		
172	KR-83	N, G	JEF-2.2		
173	KR-84	N, G	JEF-2.2; RN - ---/SYS		
174	KR-85	N, G	JEF-2.2		
175	KR-86	N, G	JEF-2.2		
176	RB-83	N, G	MASGAM; RN - ---/SYS		
177	RB-84	N, G	MASGAM		
178	RB-85	N, G	JEF-2.2; RN - ---/SYS		
179	RB-86	N, G	JEF-2.2		
180	RB-87	N, G	JEF-2.2		
181	SR-82	N, G	MASGAM; RN - ---/SYS		
182	SR-83	N, G	MASCAM		
183	SR-84	N, G	JEF-2.2; RN - ---/SYS		
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186	SR-87	N, G	JEF-2.2		
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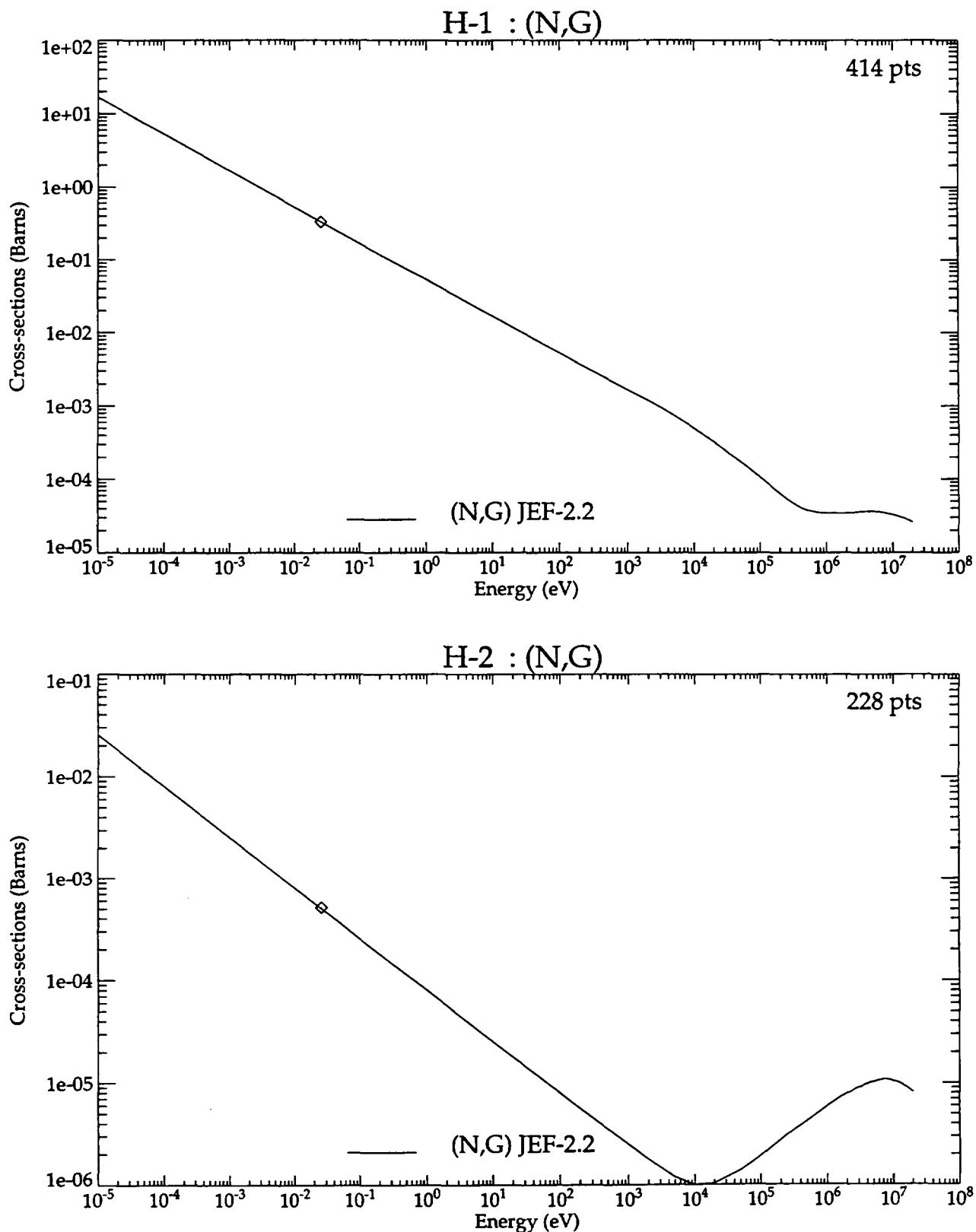
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201	ZR-92	N, G	JEF-2.2	Page 103
202	ZR-93	N, G	JEF-2.2	Page 104
203	ZR-94	N, G	JEF-2.2	Page 105
204	ZR-95	N, G	JEF-2.2	Page 106
205	ZR-96	N, G	JEF-2.2	Page 107
206	ZR-97	N, G	MASGAM	Page 108
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212	NB-93	N, G	JEF-2.2; RN - ---/SYS	Page 114
213	NB-93-IS=1	N, G	JEF-2.2; RN - ---/SYS	Page 115
214	NB-94	N, G	ENDF/B-VI; RN - ---/SYS	Page 116
215	NB-95	N, G	JEF-2.2; RN - ---/SYS	Page 117
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217	NB-96	N, G	MASGAM; RN - ---/SYS	Page 119
218	MO-92	N, G	JEF-2.2; RN - ---/SYS	Page 120
219	MO-93	N, G	MASGAM	Page 121
220	MO-94	N, G	JEF-2.2	Page 122
221	MO-95	N, G	JEF-2.2	Page 123
222	MO-96	N, G	JEF-2.2	Page 124
223	MO-97	N, G	JEF-2.2	Page 125
224	MO-98	N, G	JEF-2.2	Page 126
225	MO-99	N, G	JEF-2.2	Page 127
226	MO-100	N, G	JEF-2.2	Page 128
227	TC-95	N, G	MASGAM; RN - ---/SYS	Page 129
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232	TC-98	N, G	MASGAM; RN - ---/SYS	Page 134
233	TC-99	N, G	JEF-2.2	Page 135
234	RU-96	N, G	JEF-2.2	Page 136
235	RU-97	N, G	MASGAM	Page 137
236	RU-98	N, G	JEF-2.2	Page 138
237	RU-99	N, G	JEF-2.2	Page 139
238	RU-100	N, G	JEF-2.2	Page 140
239	RU-101	N, G	JEF-2.2	Page 141
240	RU-102	N, G	JEF-2.2	Page 142
241	RU-103	N, G	JEF-2.2	Page 143
242	RU-104	N, G	JEF-2.2	Page 144
243	RU-105	N, G	JEF-2.2	Page 145
244	RU-106	N, G	JEF-2.2	Page 146
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247	RH-100	N, G	MASGAM; RN - ---/SYS	Page 149
248	RH-101	N, G	MASGAM; RN - ---/SYS	Page 150
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253	RH-105	N, G	MASGAM	Page 155
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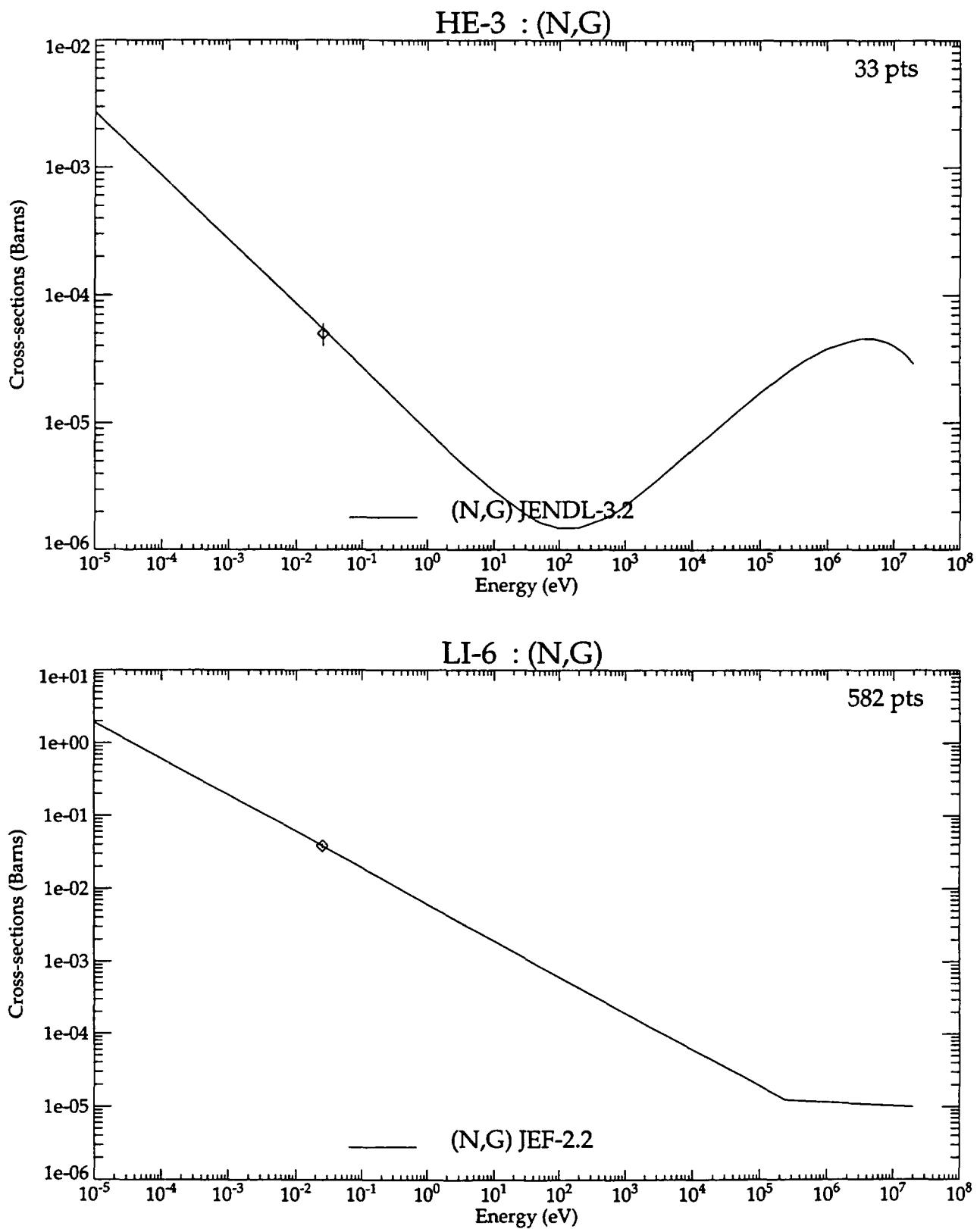
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313	SB-125	N, G	JEF-2.2; RN - ---/SYS	Page 158
314	SB-126	N, G	JEF-2.2;	Page 159
315	SB-127	N, G	MASGAM; RN - ---/SYS	
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342	I-128	N, G	MASGAM	
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344	I-130	N, G	JEF-2.2;	Page 176
345	I-131	N, G	JEF-2.2; RN - ---/SYS	Page 177
346	I-133	N, G	MASGAM; RN - ---/SYS	
347	XE-122	N, G	ADL-3	
348	XE-124	N, G	JEF-2.2; RN - ---/SYS	Page 178
349	XE-125	N, G	MASGAM	
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351	XE-127	N, G	MASGAM	
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359	XE-133	N, G	JEF-2.2; RN - ---/SYS	Page 187
360	XE-133-IS=1	N, G	JEF-2.2; RN - ---/SYS	Page 188
361	XE-134	N, G	JEF-2.2; RN - ---/SYS	Page 189
362	XE-135	N, G	JEF-2.2;	Page 190
363	XE-136	N, G	MASGAM	
364	CS-129	N, G	MASGAM	
365	CS-131	N, G	MASGAM	
366	CS-132	N, G	MASGAM	
367	CS-133	N, G	JEF-2.2; RN - ---/SYS	Page 191
368	CS-134	N, G	JEF-2.2; RN - ---/SYS	Page 192
369	CS-135	N, G	JEF-2.2; RN - ---/SYS	Page 193
370	CS-136	N, G	JEF-2.2;	Page 194
371	CS-137	N, G	JEF-2.2; RN - ---/SYS	Page 195
372	BA-128	N, G	MASGAM; RN - ---/SYS	
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384	BA-138	N, G	JEF-2.2;	Page 201
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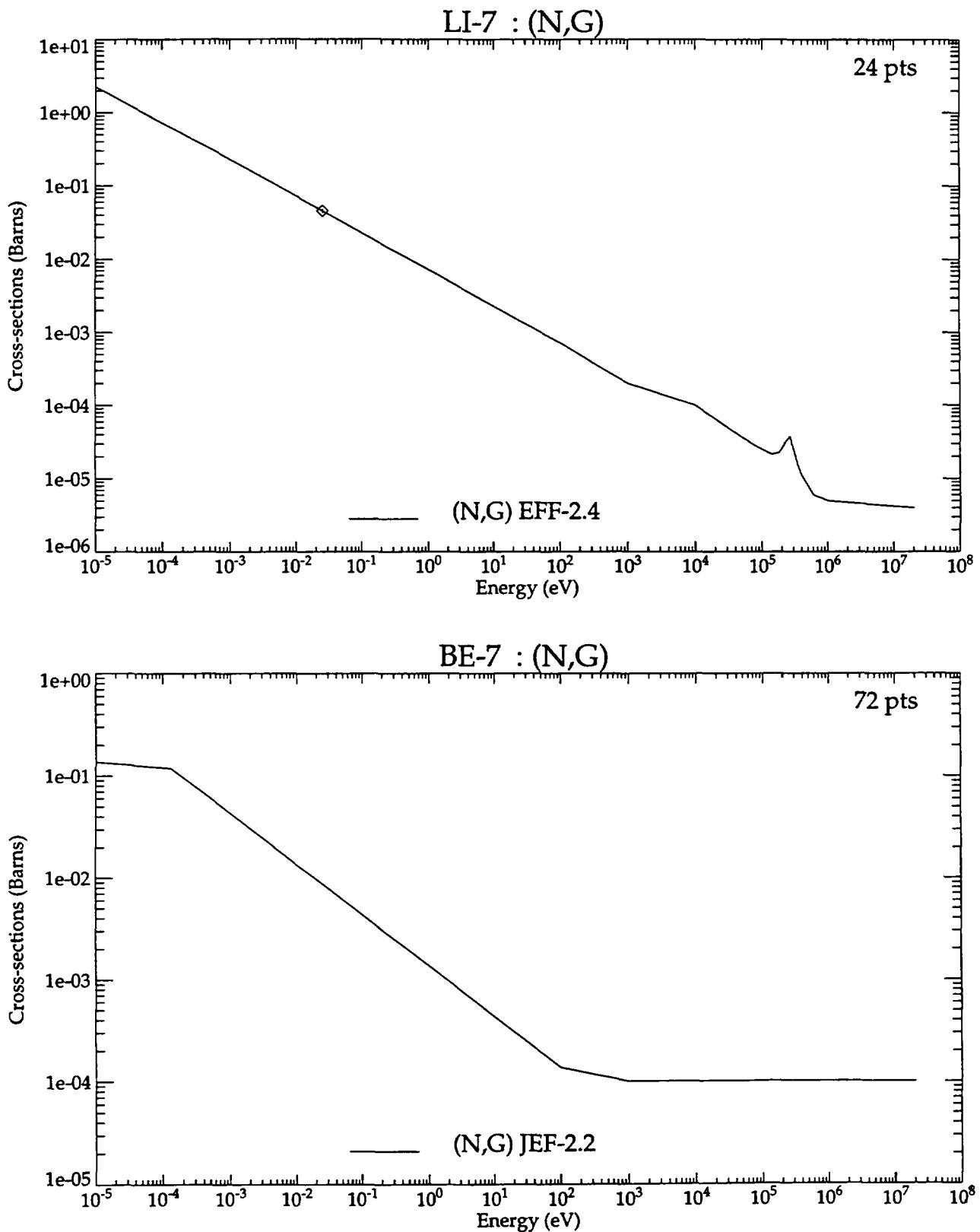
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426	PM-150	N,G	MASGAM	Page 215
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430	SM-146	N,G	MASGAM	Page 219
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433	SM-149	N,G	MASGAM	Page 222
434	SM-150	N,G	MASGAM	Page 223
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439	EU-145	N,G	MASGAM	Page 228
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441	EU-147	N,G	MASGAM	Page 230
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453	EU-157	N,G	JEF-2.2	Page 242
454	GD-146	N,G	MASGAM	Page 243
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456	GD-148	N,G	MASGAM	Page 245
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465	GD-157	N,G	JEF-2.2	Page 254
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472	TB-154	N,G	MASGAM	Page 261
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507	ER-169	N,G	MASGAM	Page 257
508	ER-170	N,G	SIGECN-MASGAM	Page 258
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511	TM-165	N,G	MASGAM	Page 261
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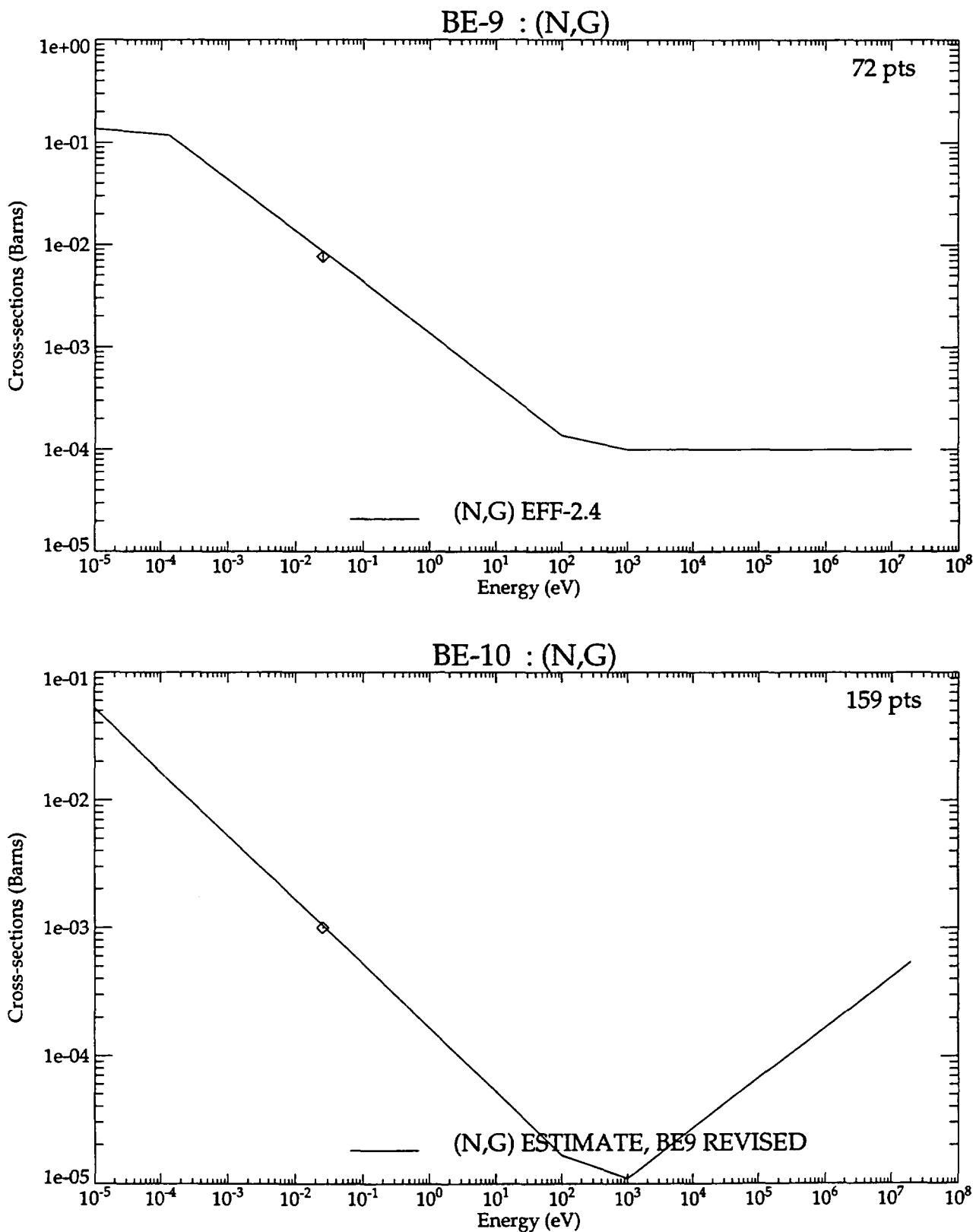
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536	LU-175	N,G	JEF-2.2; RN - ---/SYS		Page 269
537	LU-176	N,G	JEF-2.2; RN - ---/SYS		Page 270
538	LU-177	N,G	MASGAM; RN - ---/SYS		Page 271
539	LU-177-IS=1	N,G	MASGAM; RN - ---/SYS		Page 272
540	HF-170	N,G	MASGAM		
541	HF-171	N,G	MASGAM		
542	HF-172	N,G	MASGAM		
543	HF-173	N,G	MASGAM		
544	HF-174	N,G	JEF-2.2		
545	HF-175	N,G	MASGAM		Page 273
546	HF-176	N,G	JEF-2.2; RN - ---/SYS		Page 274
547	HF-177	N,G	LANL		
548	HF-178	N,G	JEF-2.2; RN - ---/SYS		Page 275
549	HF-178-IS=2	N,G	JEF-2.2; RN - ---/SYS		Page 276
550	HF-179	N,G	JEF-2.2; RN - ---/SYS		Page 277
551	HF-179-IS=2	N,G	JEF-2.2; RN - ---/SYS		Page 278
552	HF-180	N,G	JEF-2.2		
553	HF-180-IS=1	N,G	JEF-2.2		
554	HF-181	N,G	MASGAM; RN - ---/SYS		Page 279
555	HF-182	N,G	MASGAM		
556	TA-177	N,G	MASGAM; RN - ---/SYS		
557	TA-179	N,G	MASGAM; RN - ---/SYS		
558	TA-180	N,G	LANL		
559	TA-180-IS=1	N,G	MASGAM		
560	TA-181	N,G	JEF-2.2; RN - ---/SYS		Page 280
561	TA-182	N,G	JEF-2.2		
562	TA-183	N,G	MASGAM		
563	W-178	N,G	MASGAM; RN - ---/SYS		Page 282
564	W-180	N,G	SIGECN-MASGAM		
565	W-181	N,G	MASGAM		
566	W-182	N,G	JEF-2.2; RN - ---/SYS		Page 283
567	W-183	N,G	JEF-2.2		
568	W-184	N,G	LANL		
569	W-185	N,G	MASGAM		
570	W-186	N,G	JEF-2.2		
571	W-187	N,G	MASGAM		
572	W-188	N,G	MASGAM		
573	RE-181	N,G	MASGAM; RN - ---/SYS		Page 287
574	RE-182	N,G	MASGAM		
575	RE-183	N,G	MASGAM; RN - ---/SYS		Page 288
576	RE-184	N,G	MASGAM		
577	RE-184-IS=1	N,G	MASGAM		
578	RE-185	N,G	LANL		
579	RE-186	N,G	MASGAM		
580	RE-186-IS=1	N,G	MASGAM		
581	RE-187	N,G	JEF-2.2 (LANL for LFS=1)		Page 291
582	RE-188	N,G	MASGAM		
583	RE-189	N,G	MASGAM; RN - ---/SYS		Page 292
584	OS-182	N,G	MASGAM; RN - ---/SYS		Page 293
585	OS-183	N,G	MASGAM		
586	OS-184	N,G	MASGAM		
587	OS-185	N,G	MASGAM		
588	OS-186	N,G	SIGECN-MASGAM		
589	OS-187	N,G	SIGECN-MASGAM		
590	OS-188	N,G	FISPRO; RN - ---/SYS		
591	OS-189	N,G	FISPRO; RN - ---/SYS		
592	OS-190	N,G	FISPRO; RN - ---/SYS		
593	OS-191	N,G	MASGAM; RN - ---/SYS		
594	OS-191-IS=1	N,G	MASGAM; RN - ---/SYS		
595	OS-192	N,G	FISPRO		
596	OS-193	N,G	MASGAM		
597	OS-194	N,G	MASGAM		
598	IR-185	N,G	MASGAM; RN - ---/SYS		
599	IR-186	N,G	MASGAM		
600	IR-188	N,G	MASGAM		
601	IR-189	N,G	MASGAM; RN - ---/SYS		
602	IR-190	N,G	MASGAM; RN - ---/SYS		
603	IR-191	N,G	SIGECN-MASGAM; RN - ---/SYS		
604	IR-192	N,G	SIGECN-MASGAM; RN - ---/SYS		
605	IR-192-IS=2	N,G	SIGECN-MASGAM; RN - ---/SYS		
606	IR-193	N,G	SIGECN-MASGAM; RN - ---/SYS		
607	IR-193-IS=1	N,G	SIGECN-MASGAM; RN - ---/SYS		
608	IR-194	N,G	MASGAM; RN - ---/SYS		
609	IR-194-IS=1	N,G	MASGAM; RN - ---/SYS		
610	IR-196-IS=1	N,G	MASGAM; RN - ---/SYS		
611	PT-188	N,G	MASGAM		
612	PT-189	N,G	MASGAM		
613	PT-190	N,G	SIGECN-MASGAM		
614	PT-191	N,G	MASGAM		
615	PT-192	N,G	FISPRO; RN - ---/SYS		
616	PT-193	N,G	MASGAM		
617	PT-193-IS=1	N,G	MASGAM		
618	PT-194	N,G	SIGECN-MASGAM; RN - ---/SYS		
619	PT-195	N,G	SIGECN-MASGAM		
620	PT-195-IS=1	N,G	SIGECN-MASGAM		
621	PT-196	N,G	SIGECN-MASGAM; RN - ---/SYS		
622	PT-197	N,G	MASGAM		
623	PT-198	N,G	SIGECN-MASGAM; RN - ---/SYS		
624	PT-200	N,G	MASGAM		
625	AU-193	N,G	MASGAM; RN - ---/SYS		
626	AU-194	N,G	MASGAM; RN - ---/SYS		
627	AU-195	N,G	MASGAM; RN - ---/SYS		
628	AU-196	N,G	MASGAM; RN - ---/SYS		
629	AU-197	N,G	JEF-2.2; RN - ---/SYS		
630	AU-198	N,G	MASGAM		
631	AU-198-IS=1	N,G	MASGAM		
632	AU-199	N,G	MASGAM; RN - ---/SYS		
633	AU-200-IS=1	N,G	MASGAM		
634	HG-193	N,G	MASGAM		
635	HG-193-IS=1	N,G	MASGAM		
636	HG-194	N,G	MASGAM; RN - ---/SYS		
637	HG-195	N,G	MASGAM		
638	HG-195-IS=1	N,G	MASGAM		
639	HG-196	N,G	SIGECN-MASGAM; RN - ---/SYS		
640	HG-197	N,G	MASGAM		
641	HG-197-IS=1	N,G	MASGAM		
642	HG-198	N,G	SIGECN-MASGAM; RN - ---/SYS		
643	HG-199	N,G	SIGECN-MASGAM		
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645	HG-201	N,G	SIGECN-MASGAM		

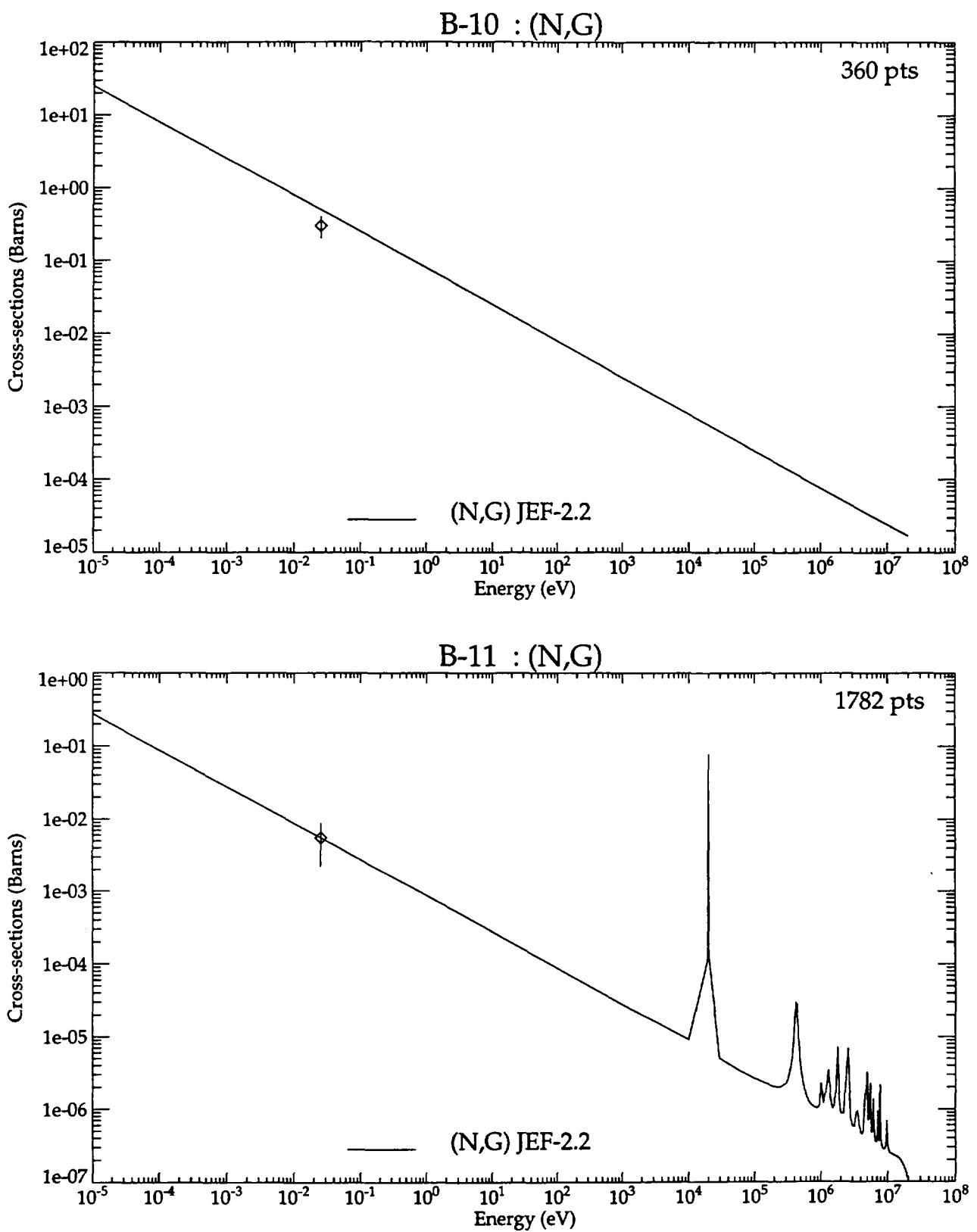
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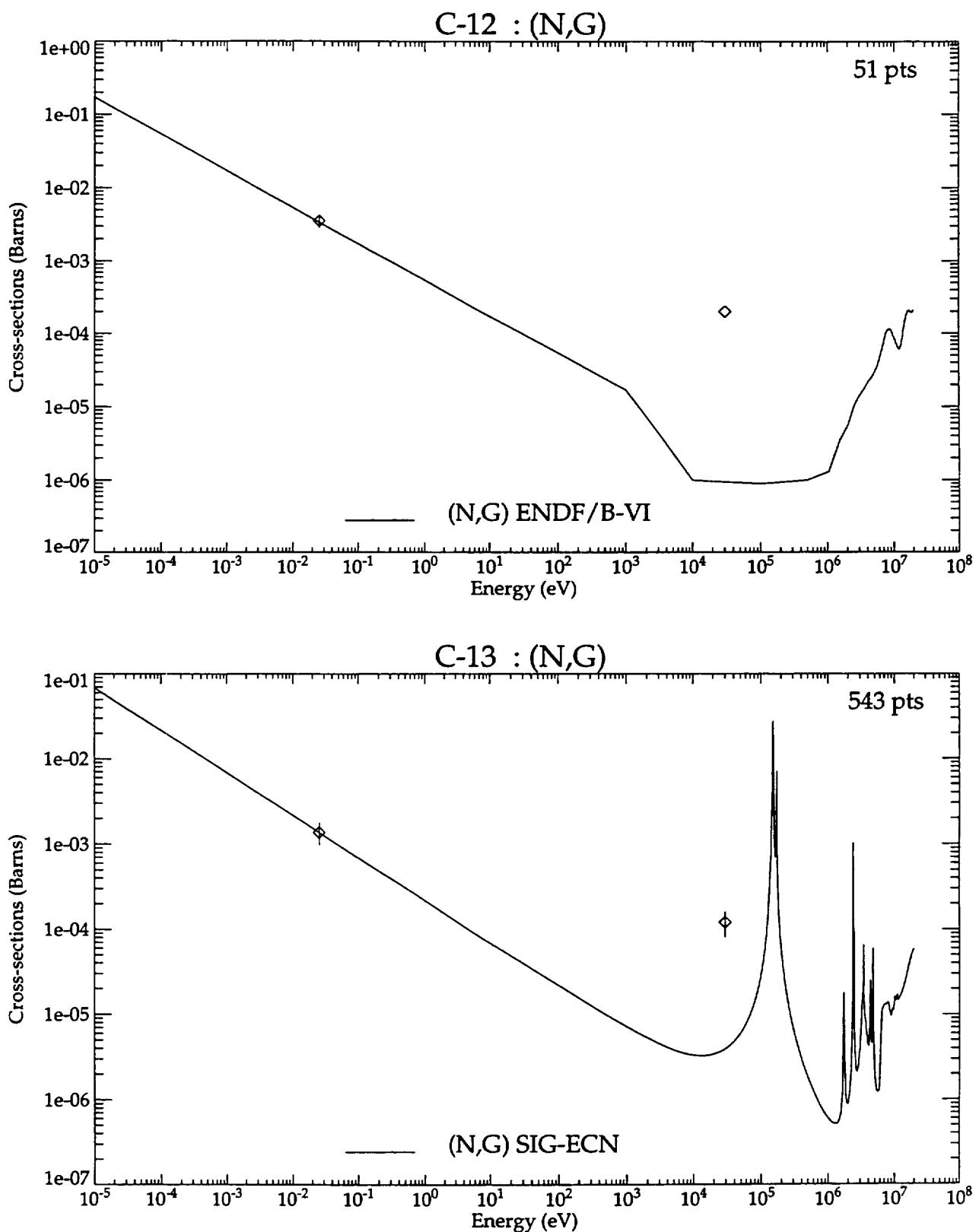


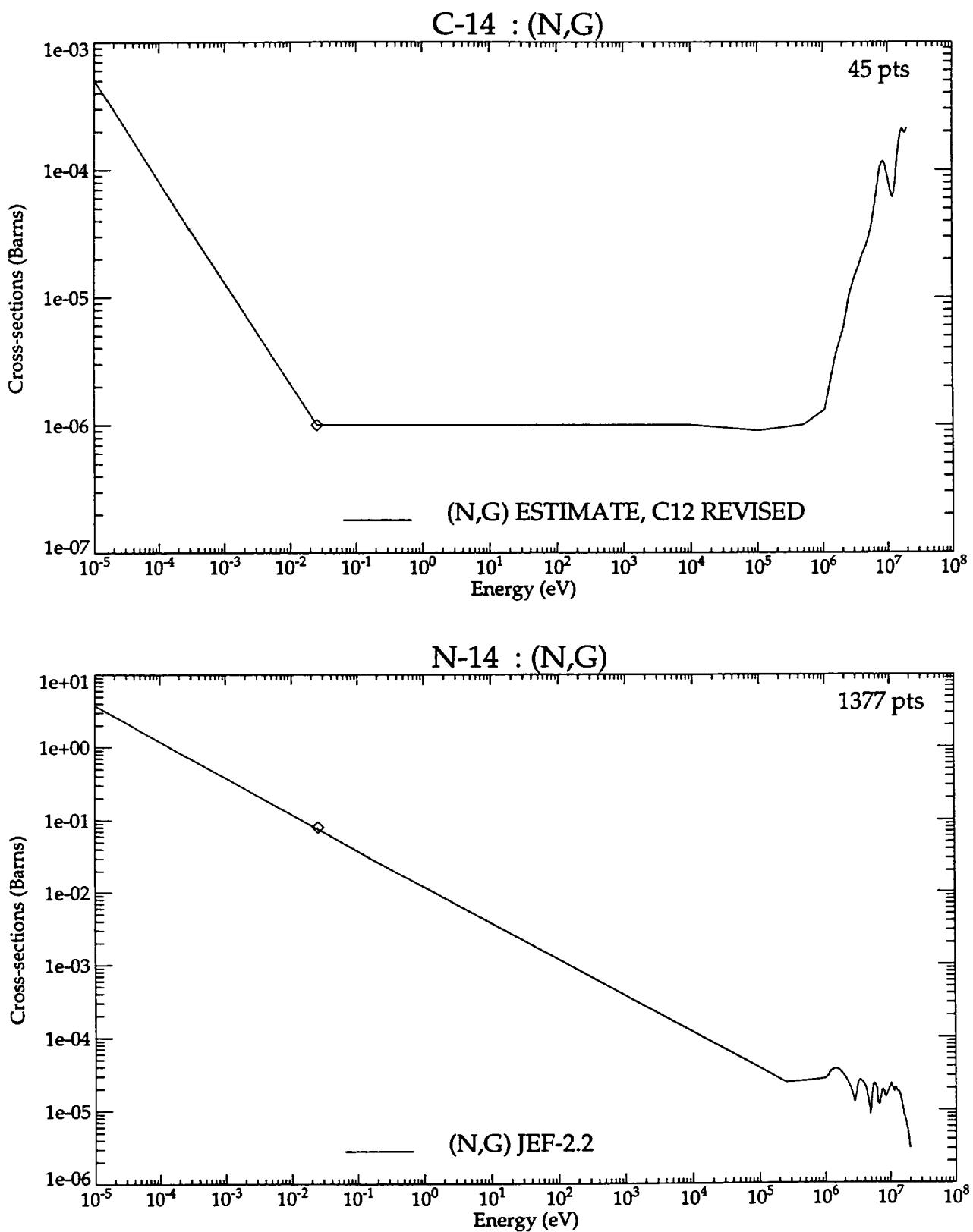


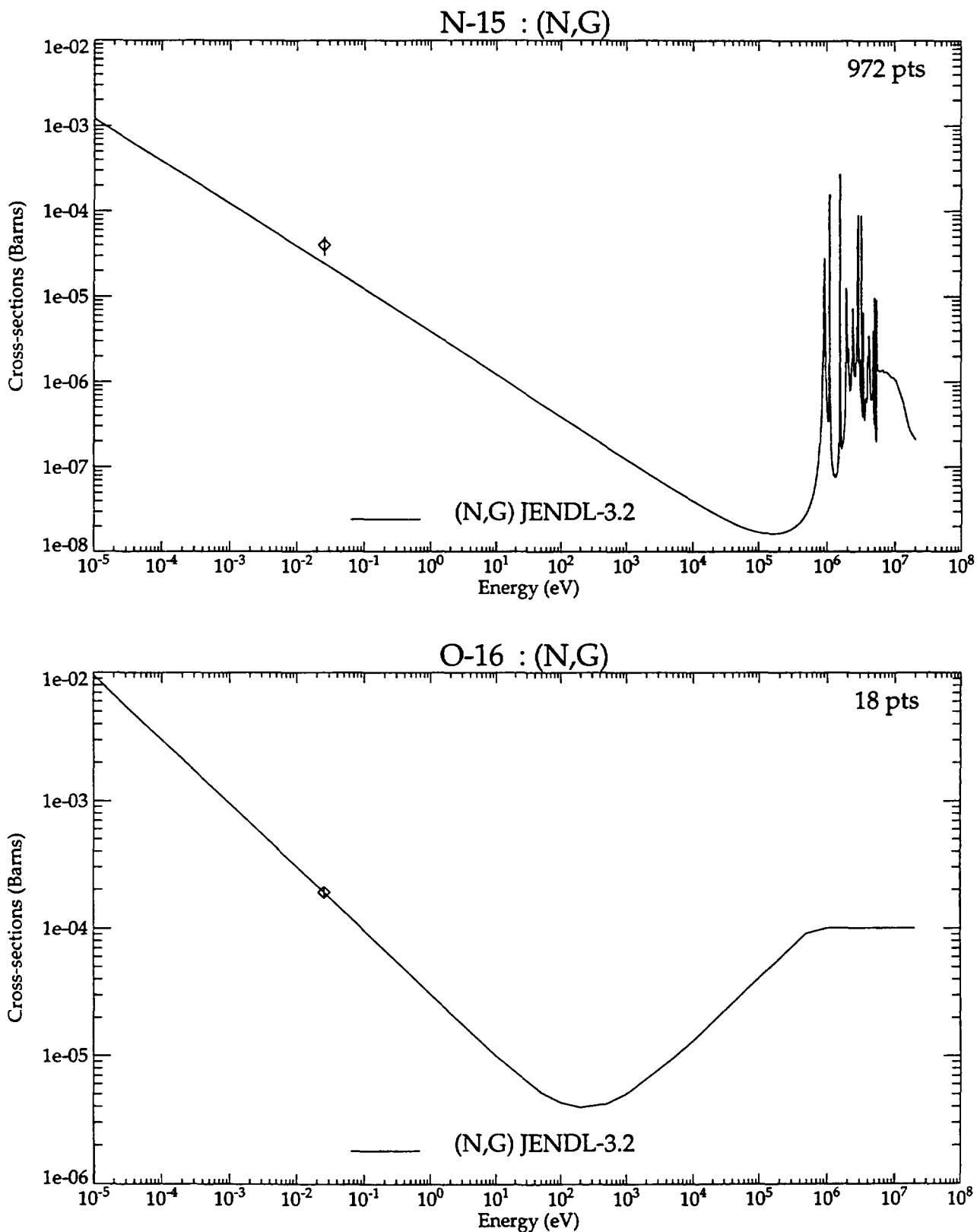


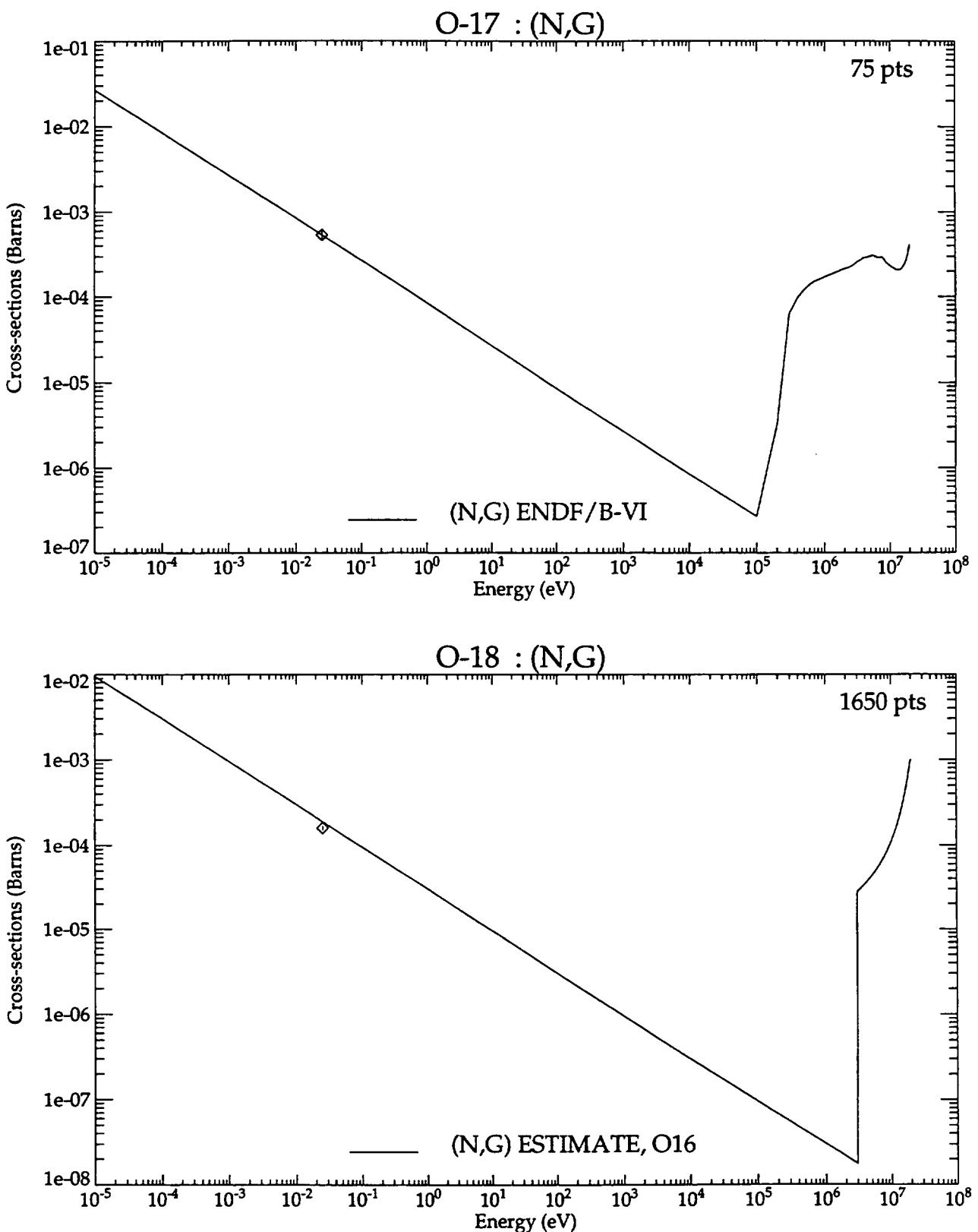


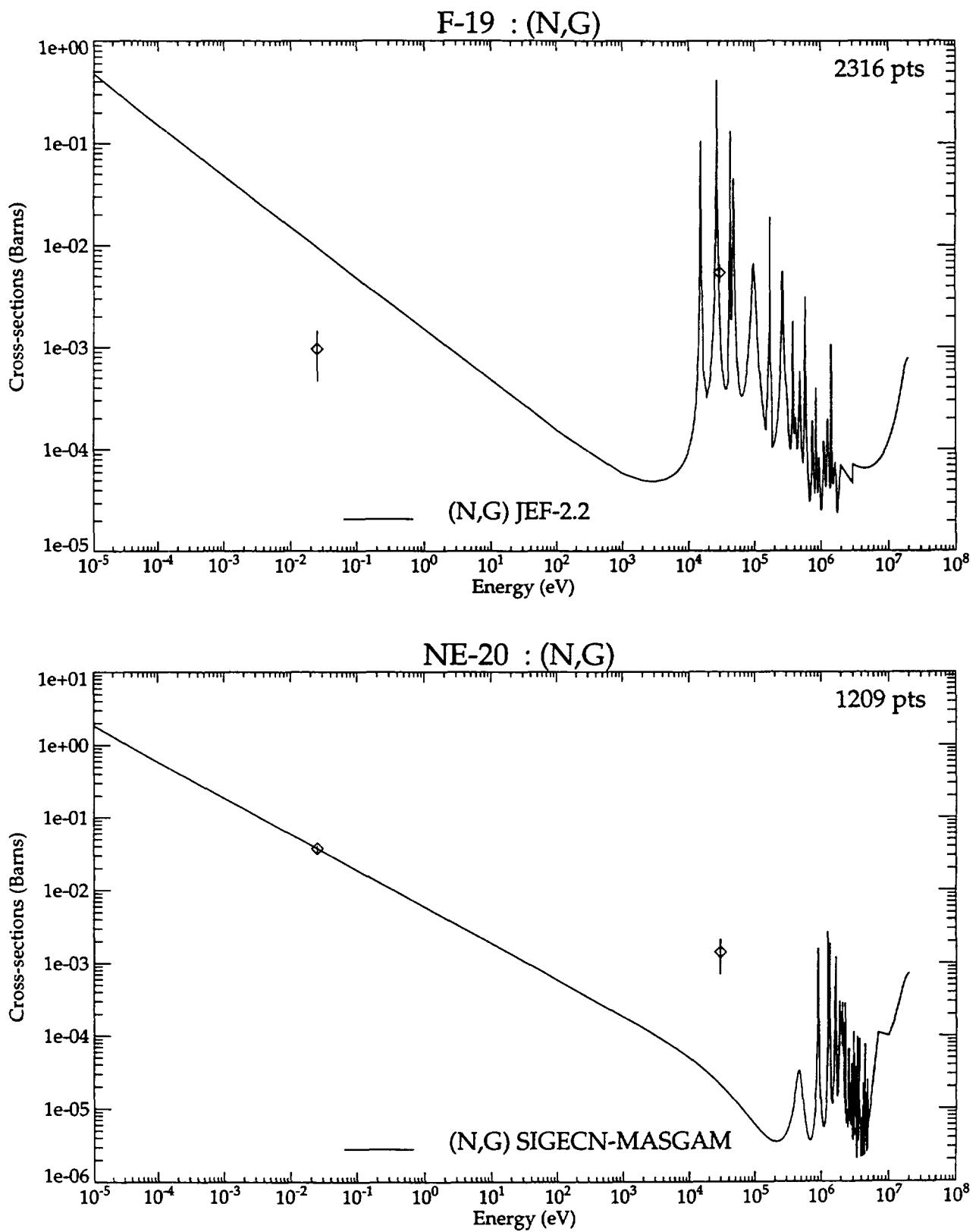


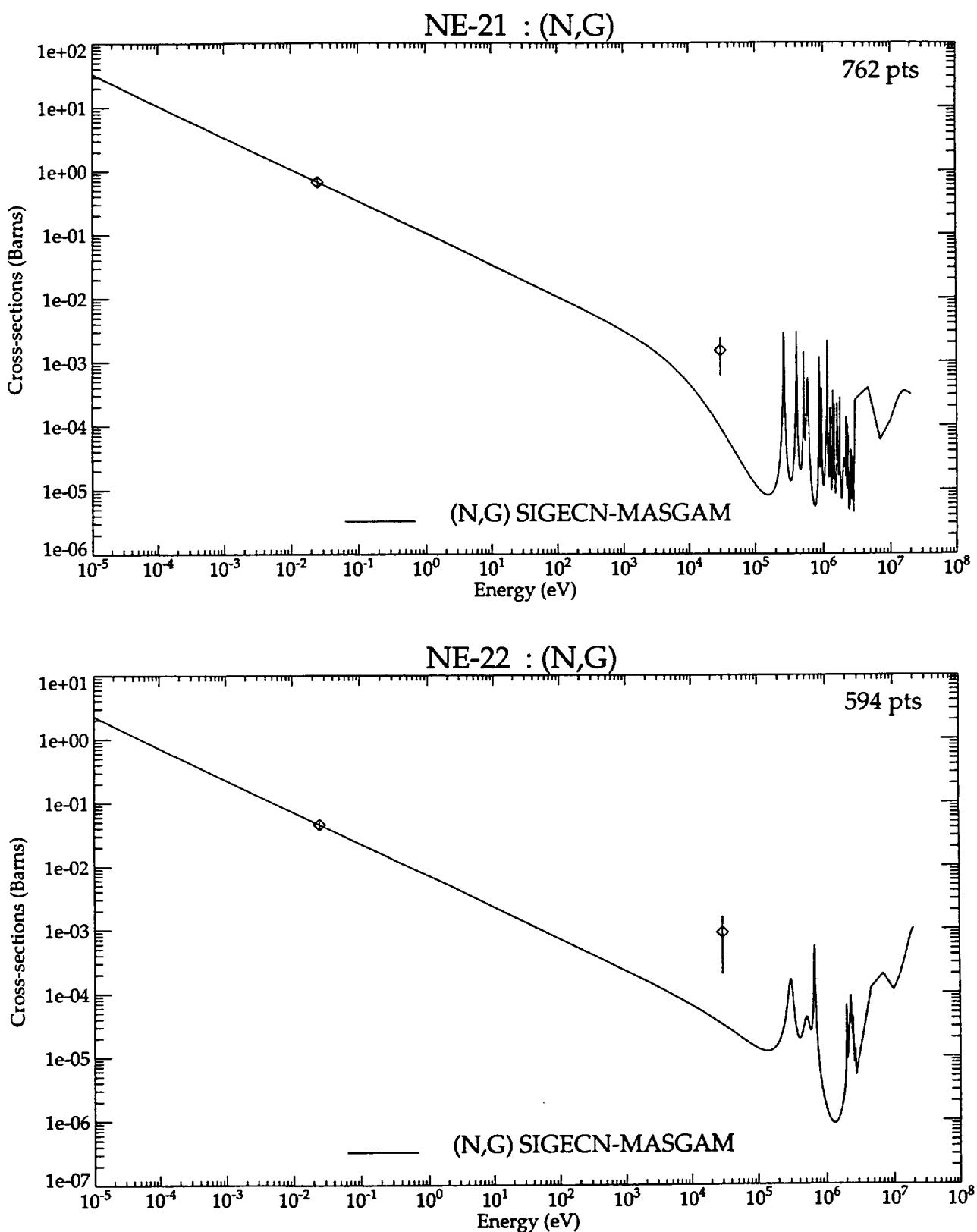


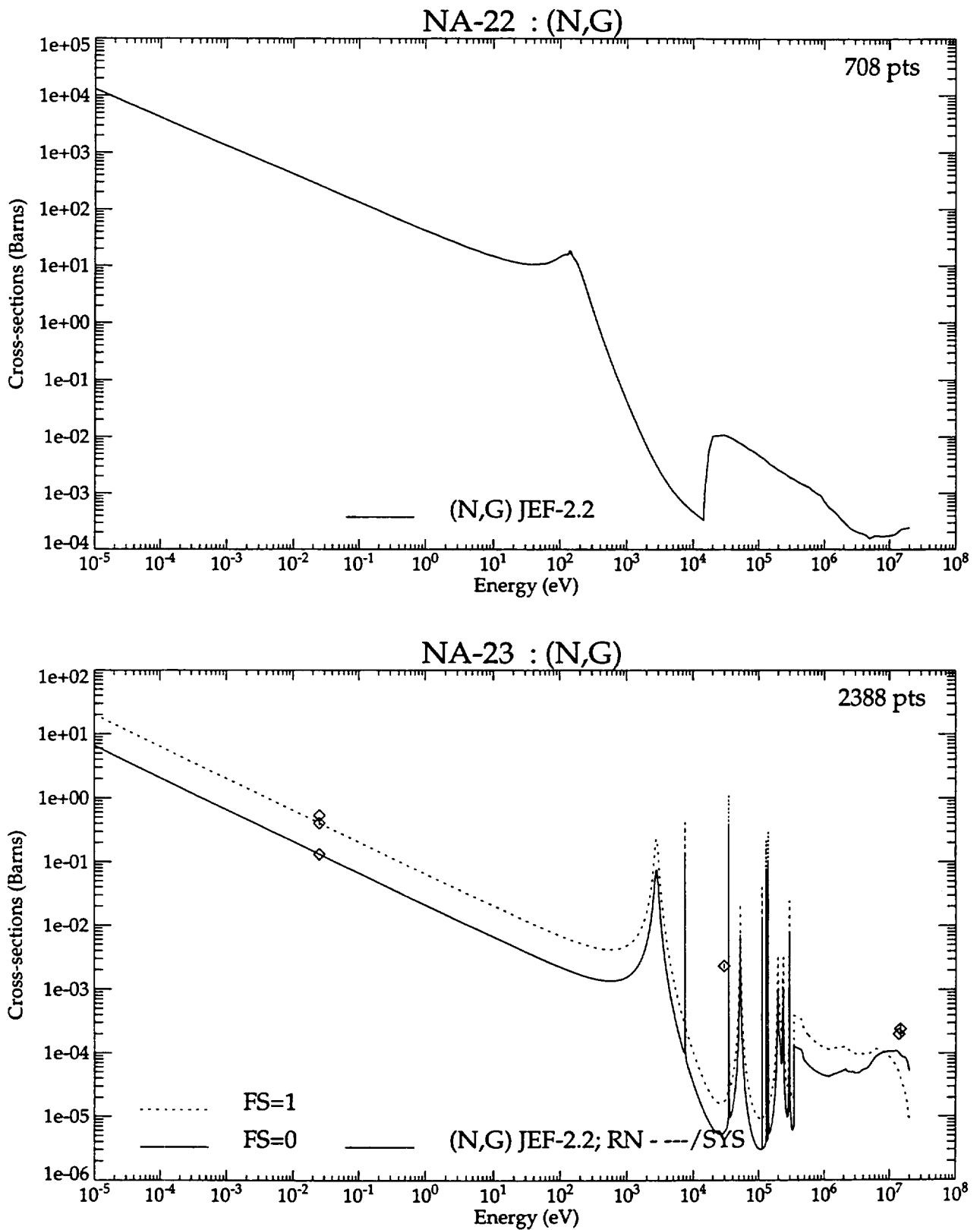


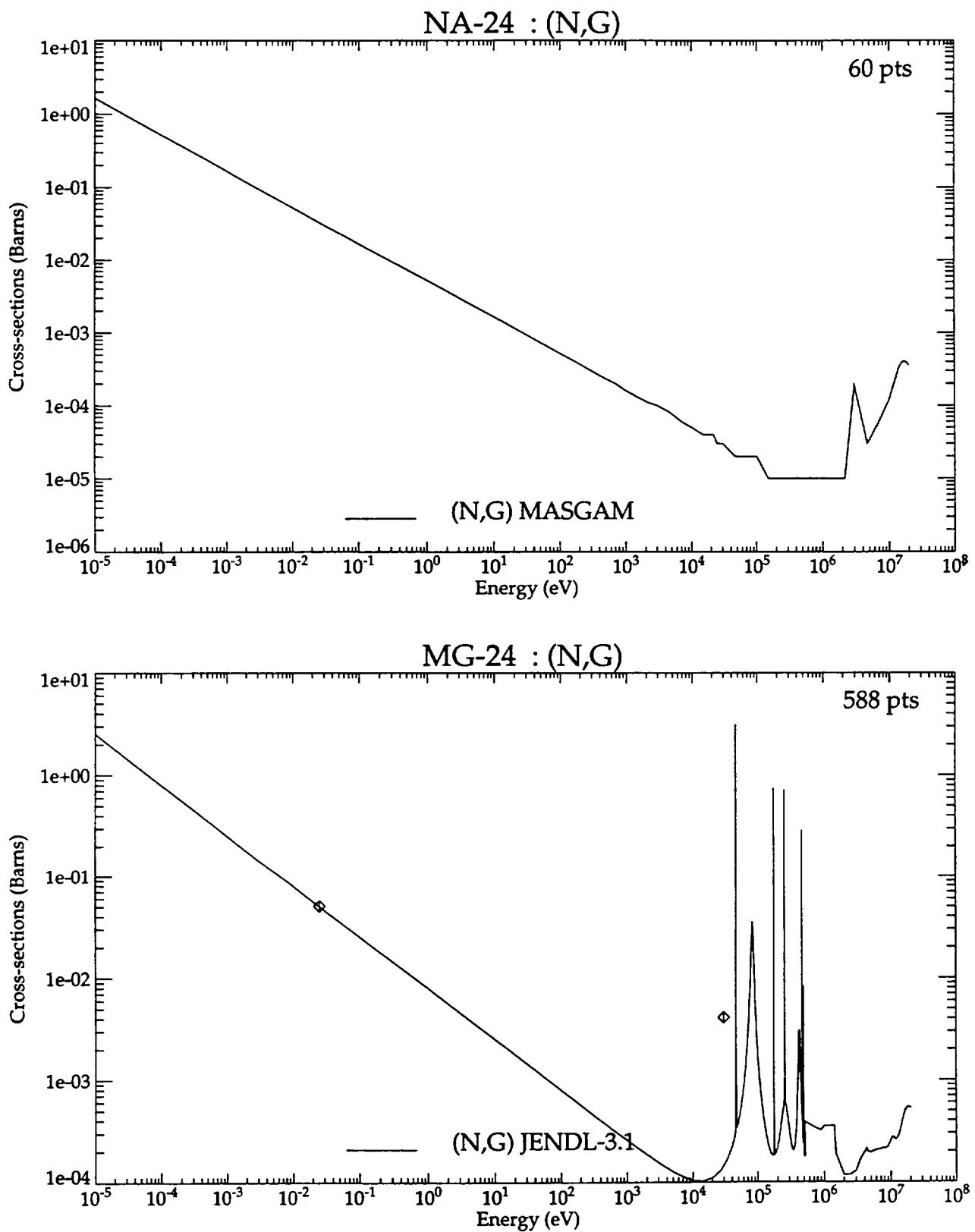


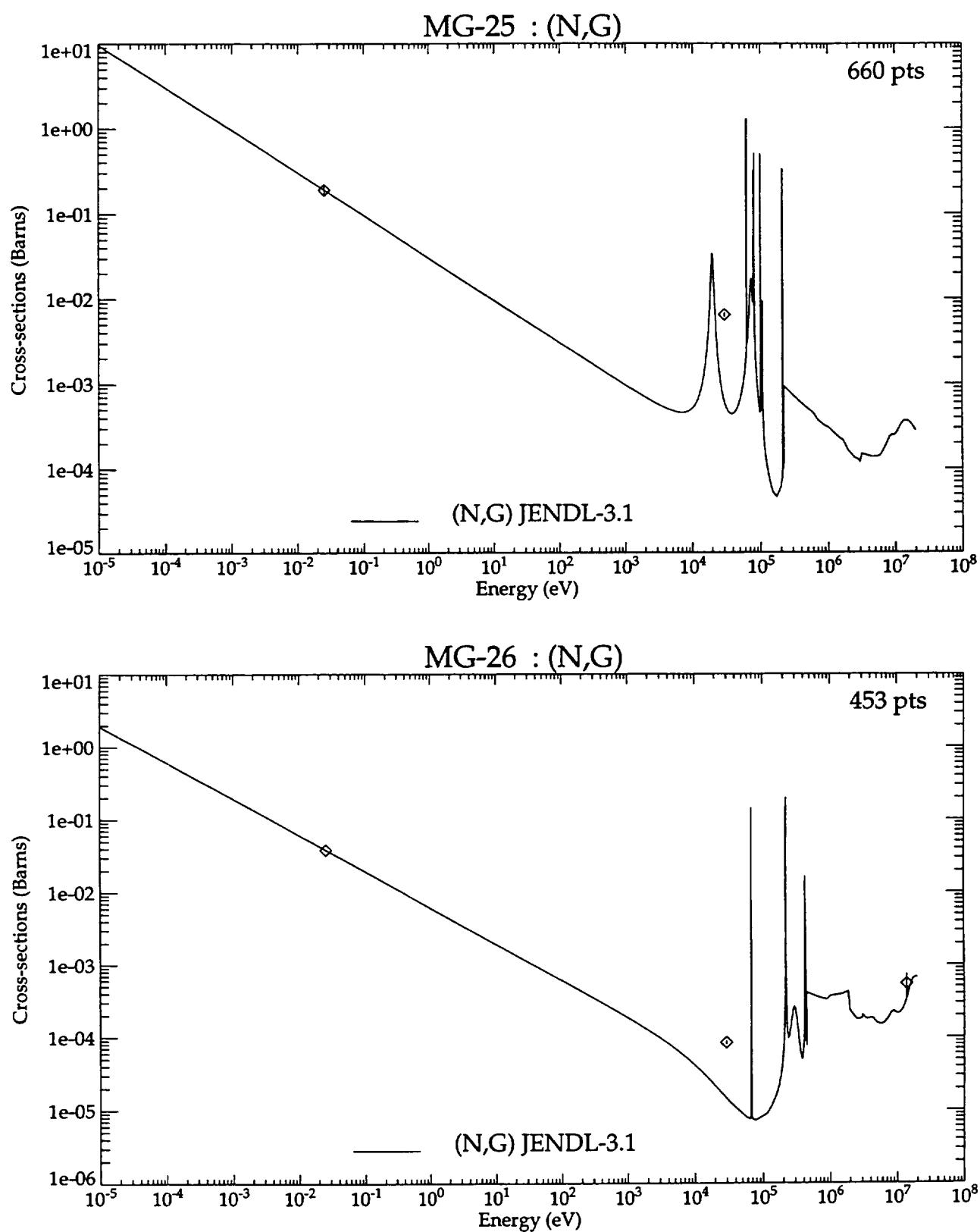


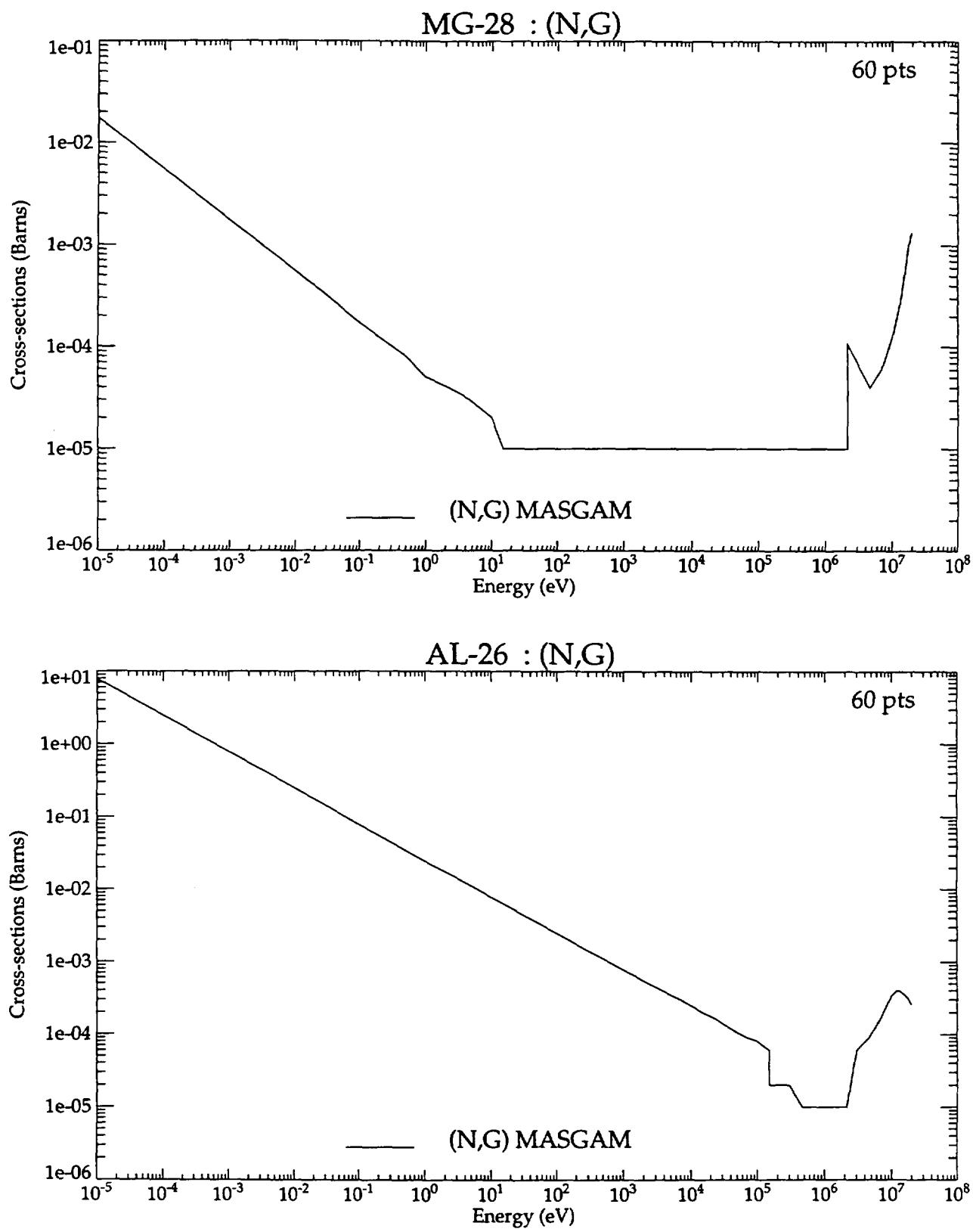




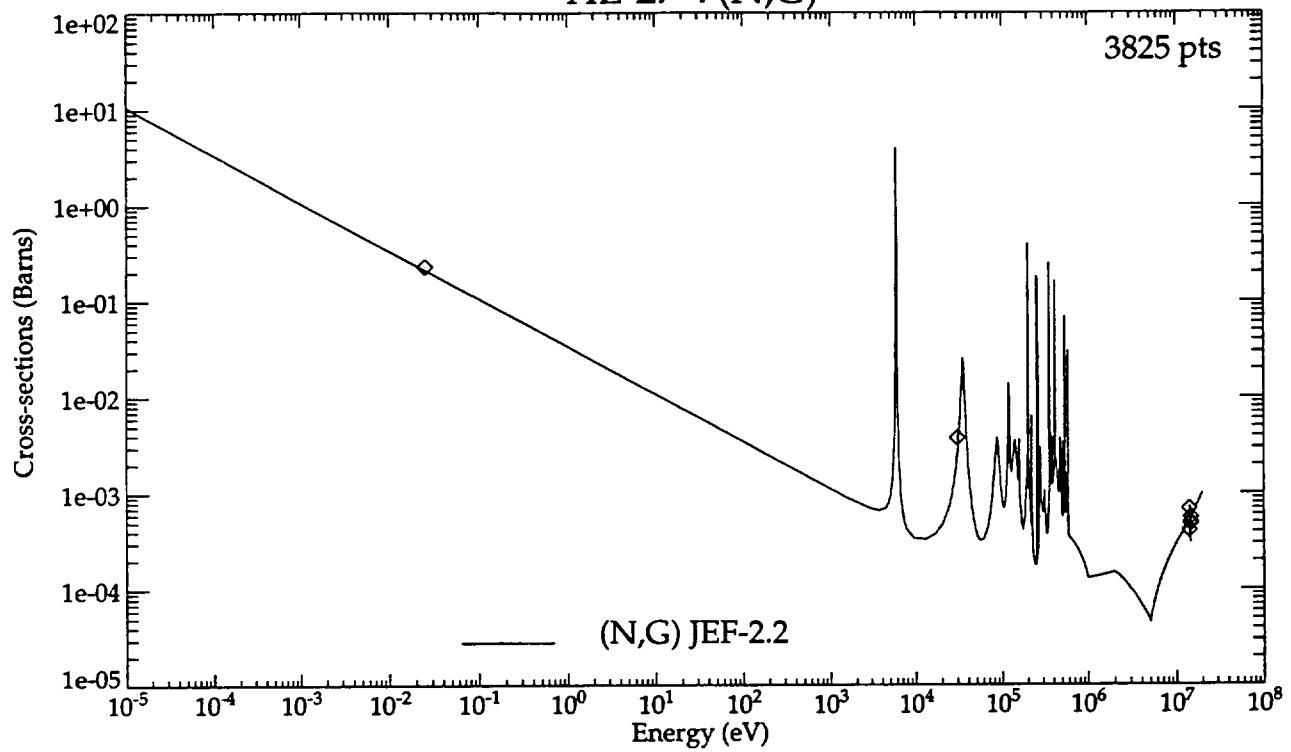




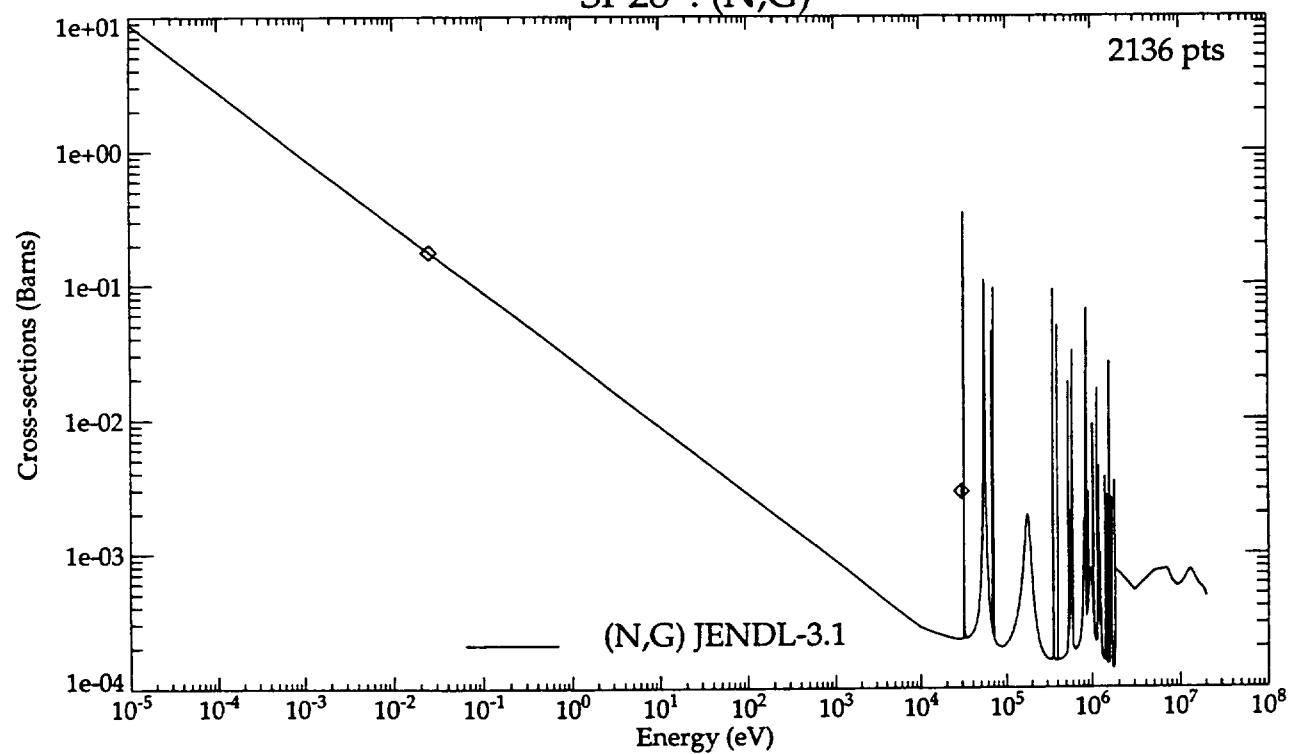


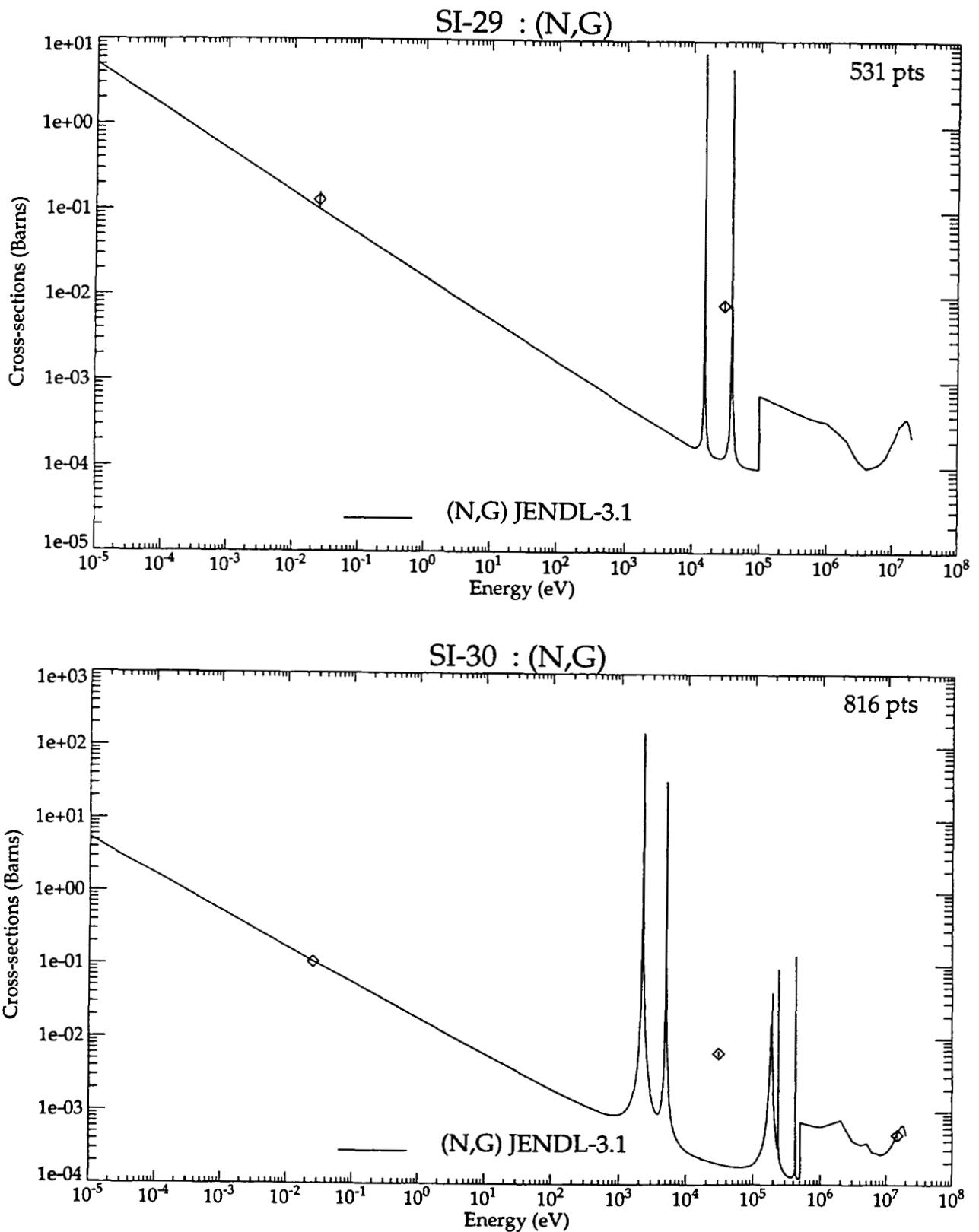


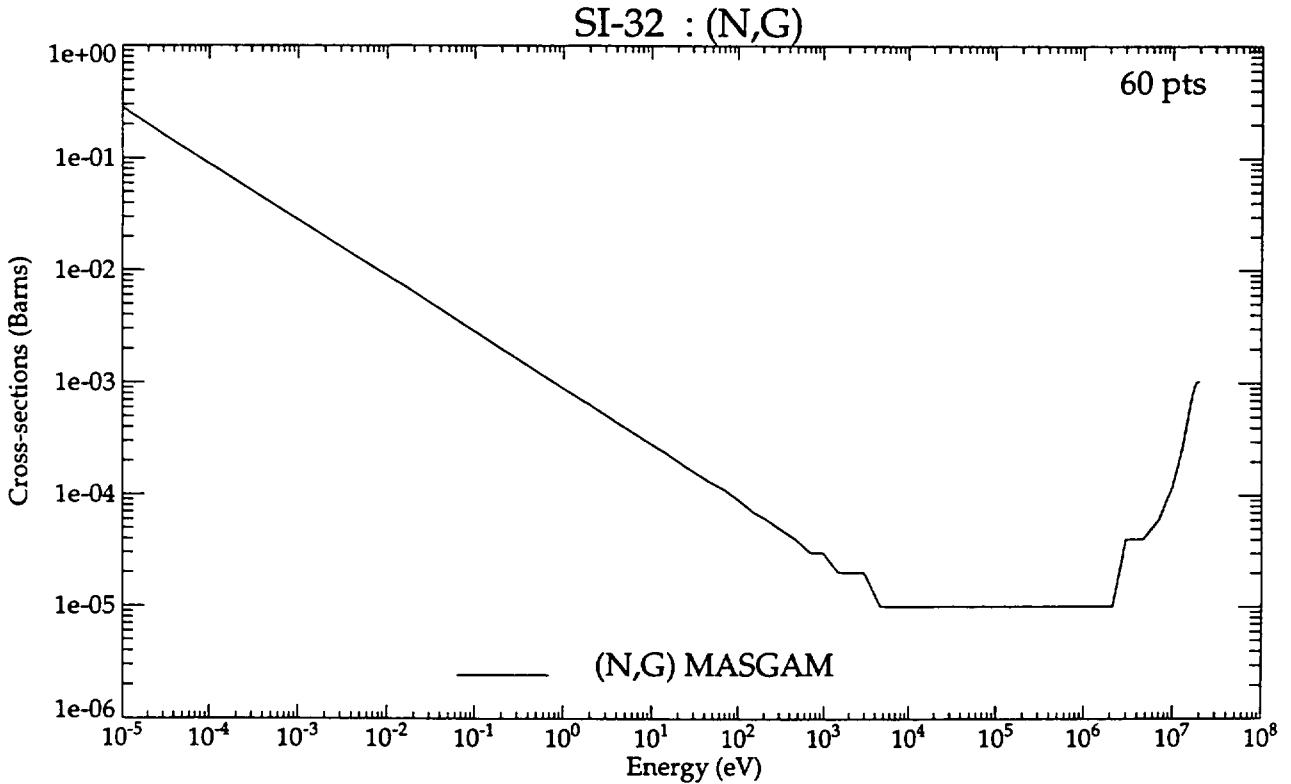
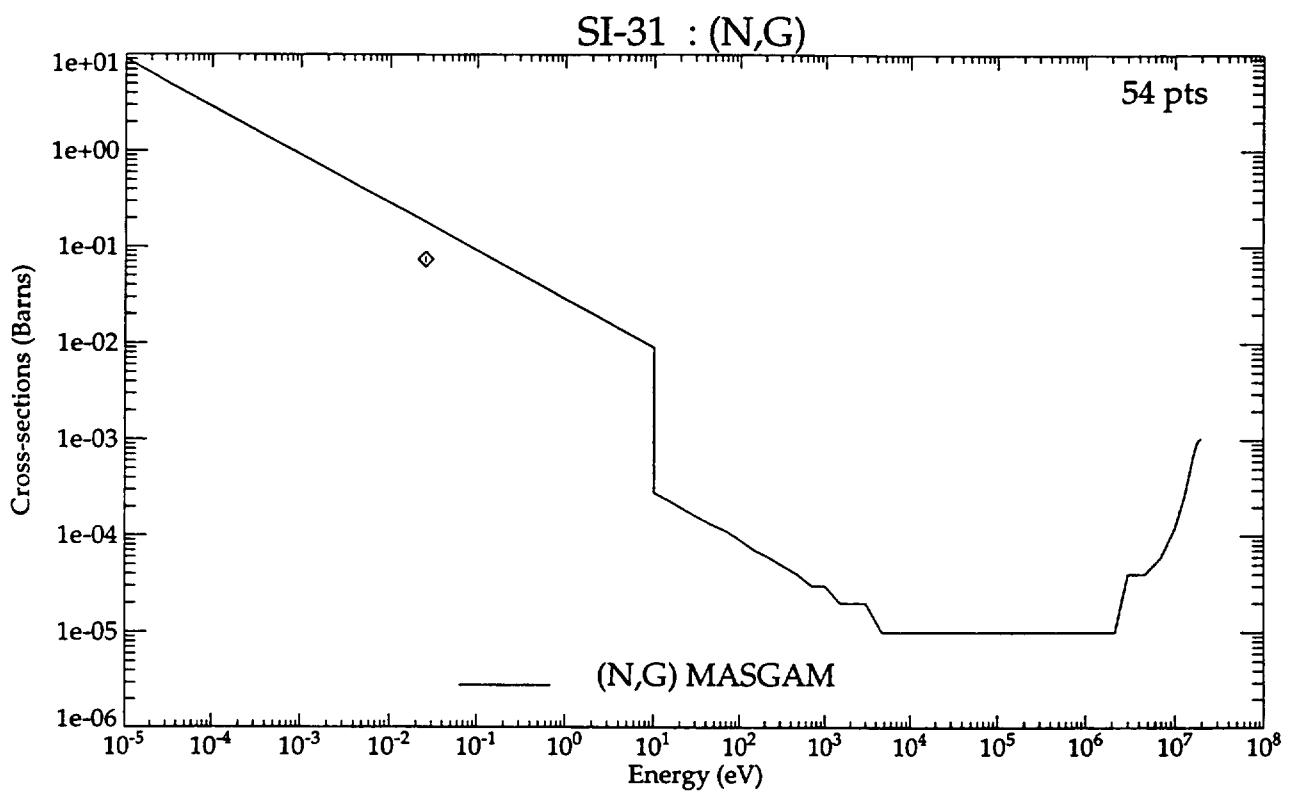
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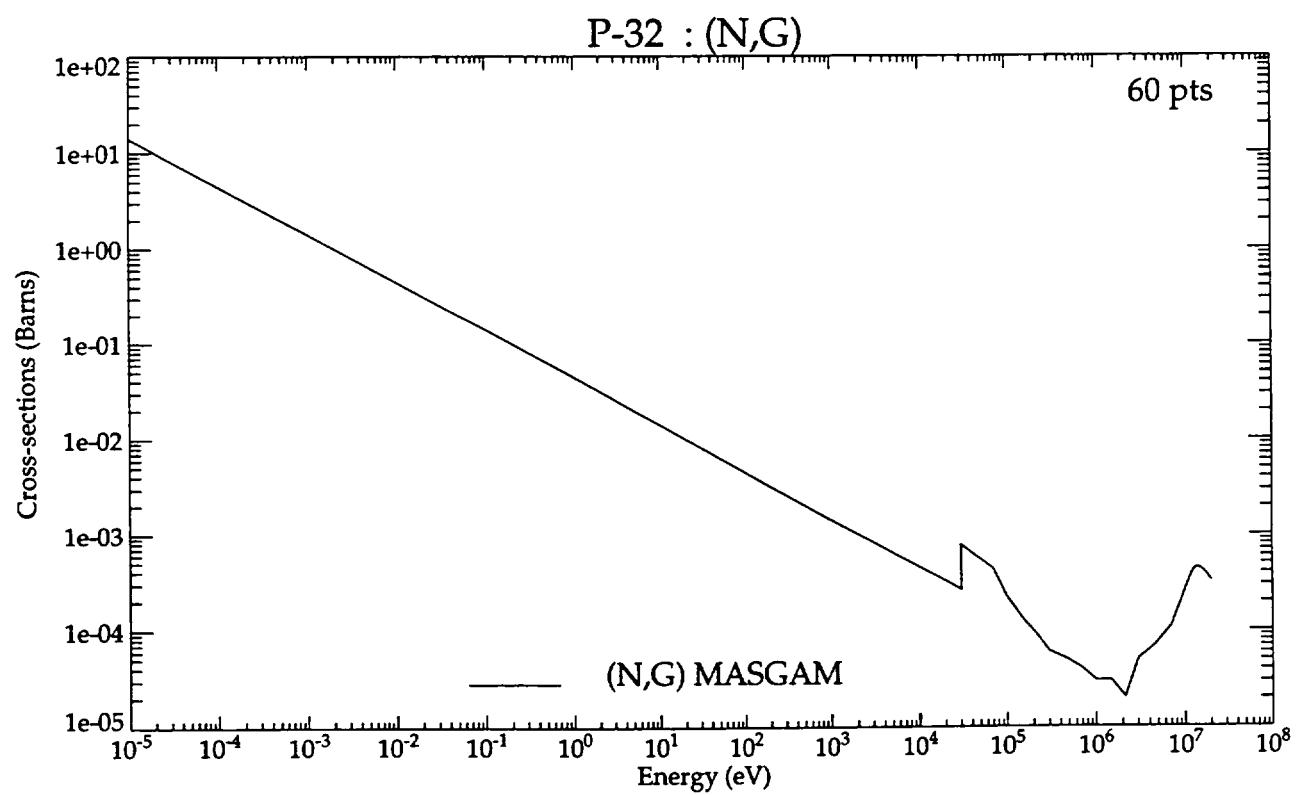
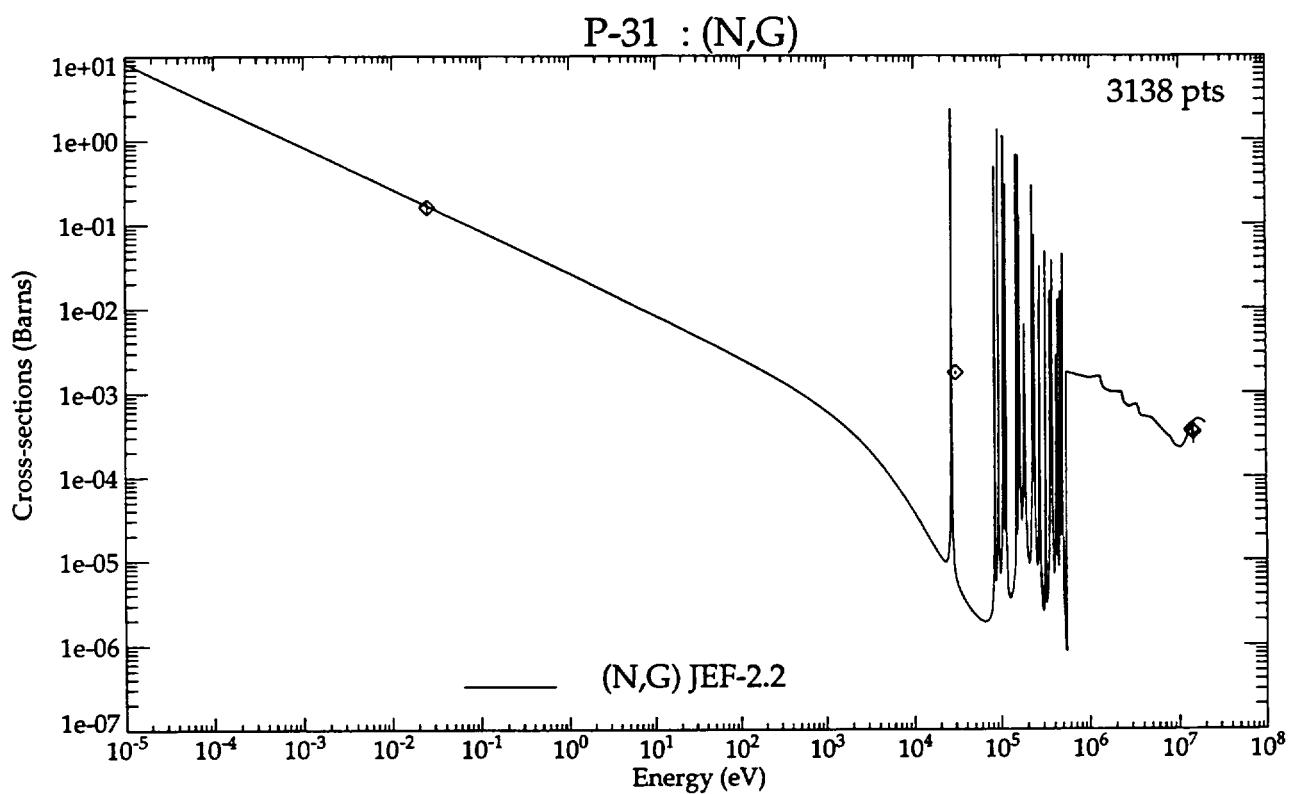


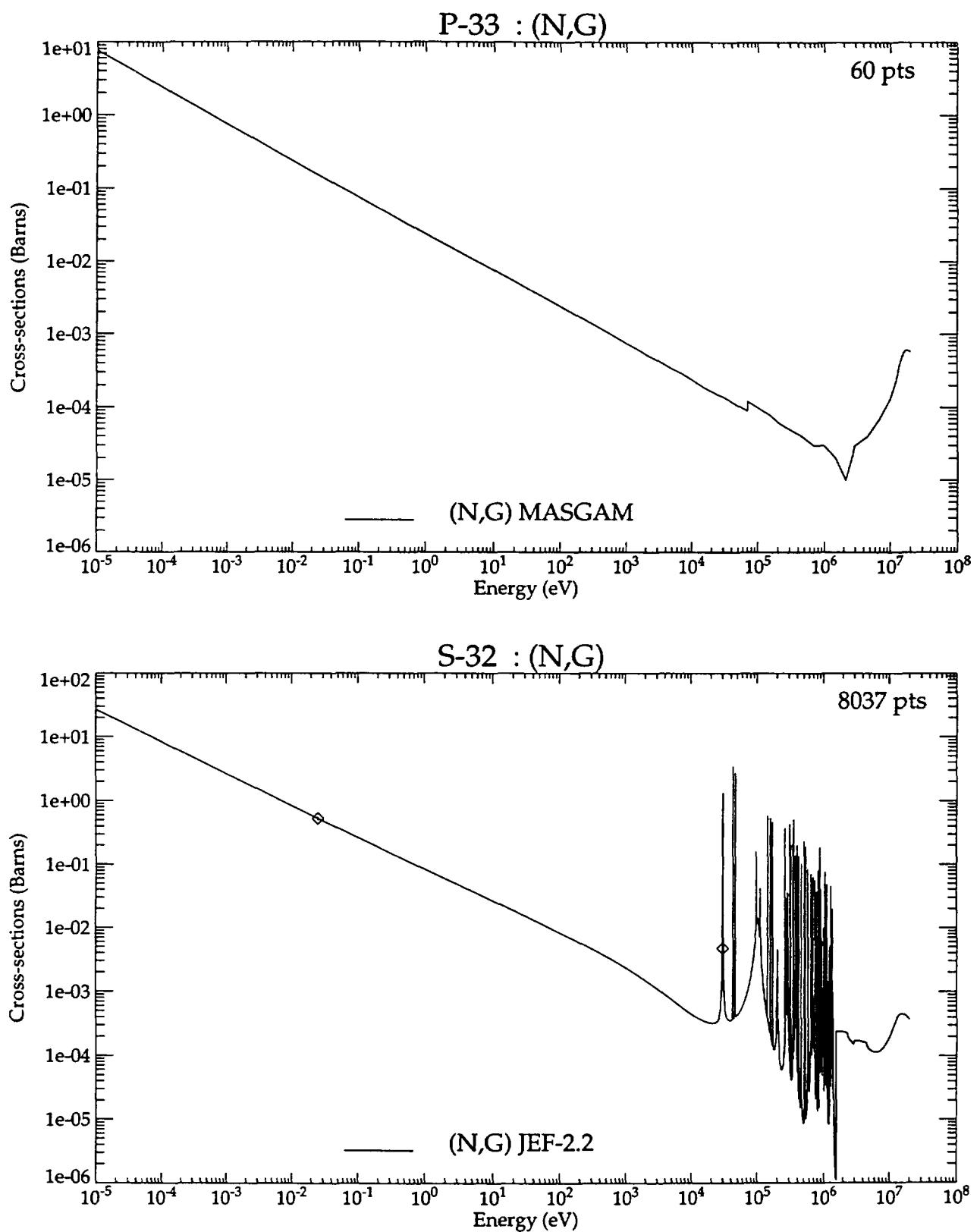
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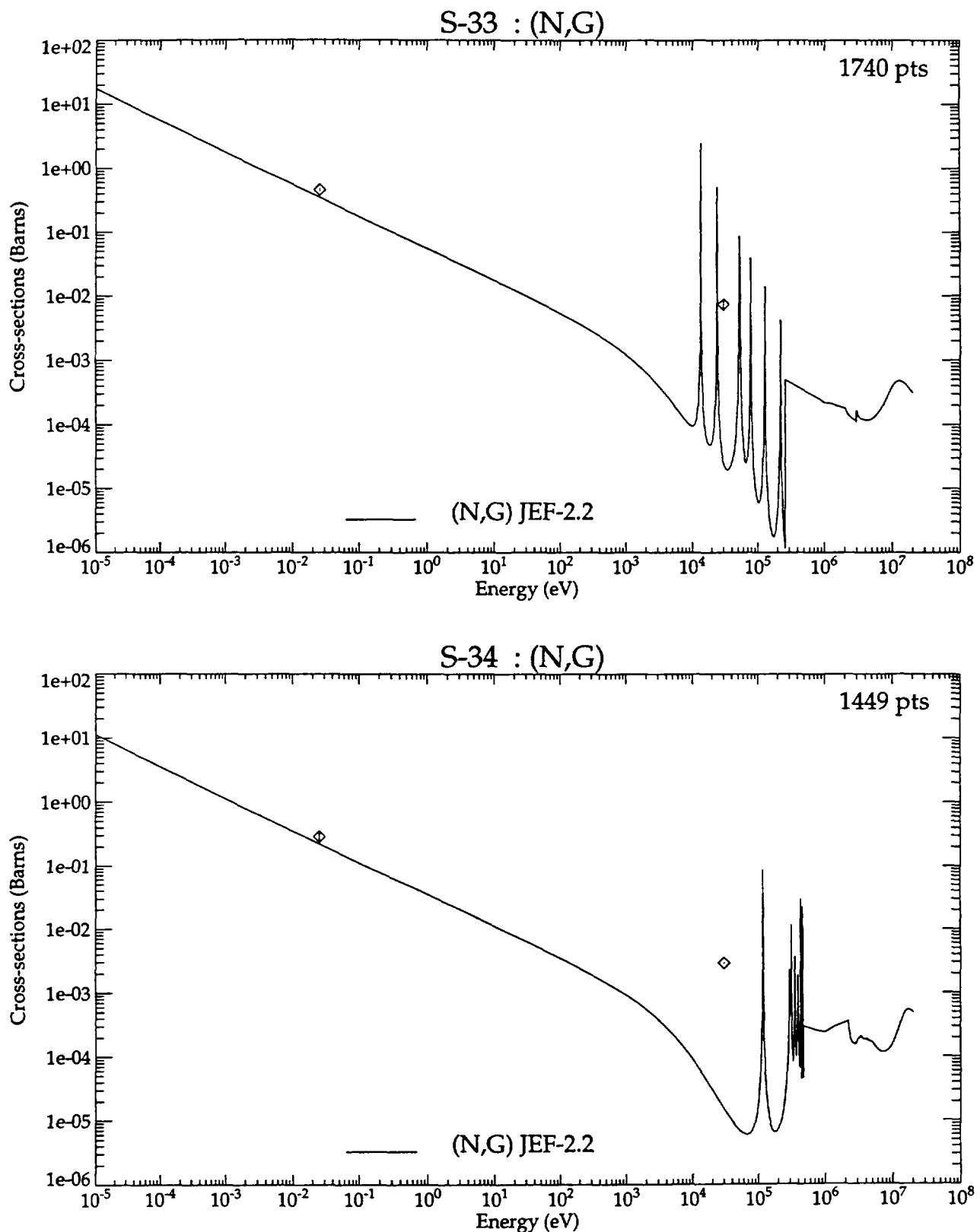


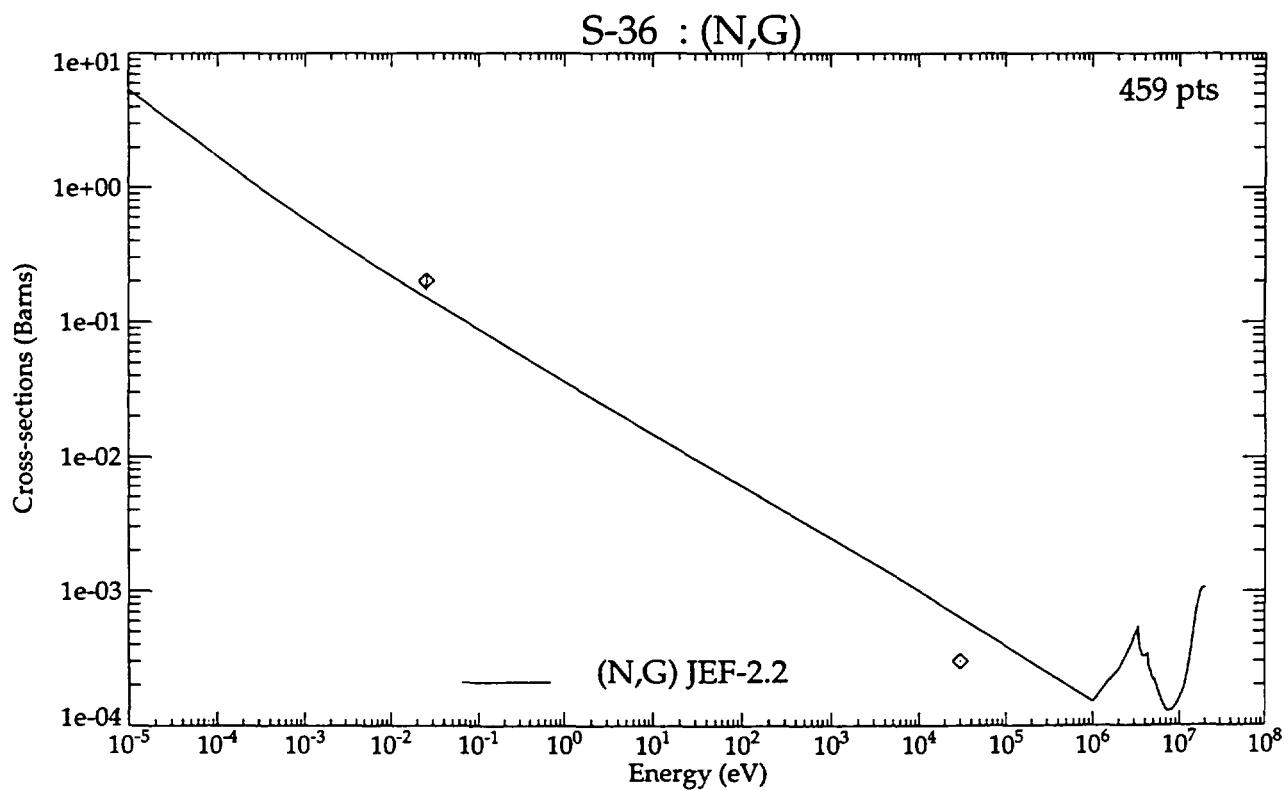
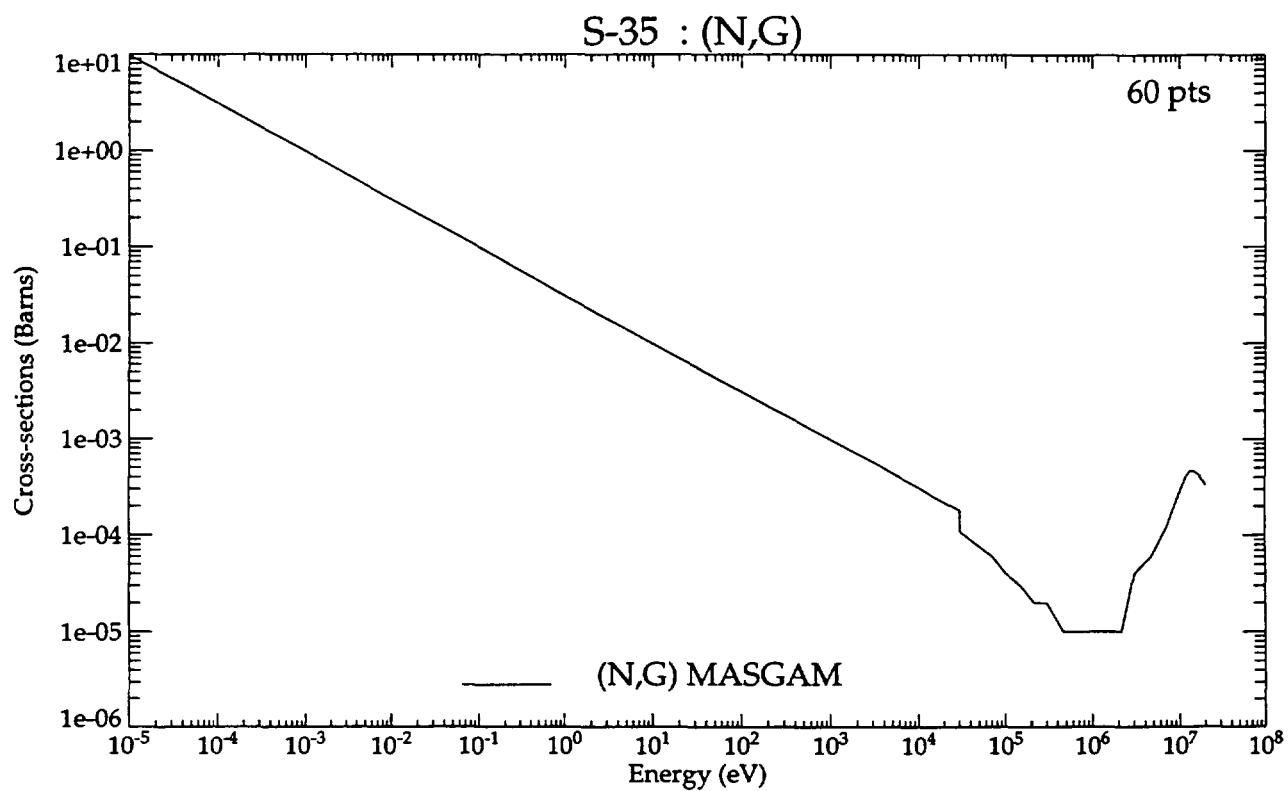


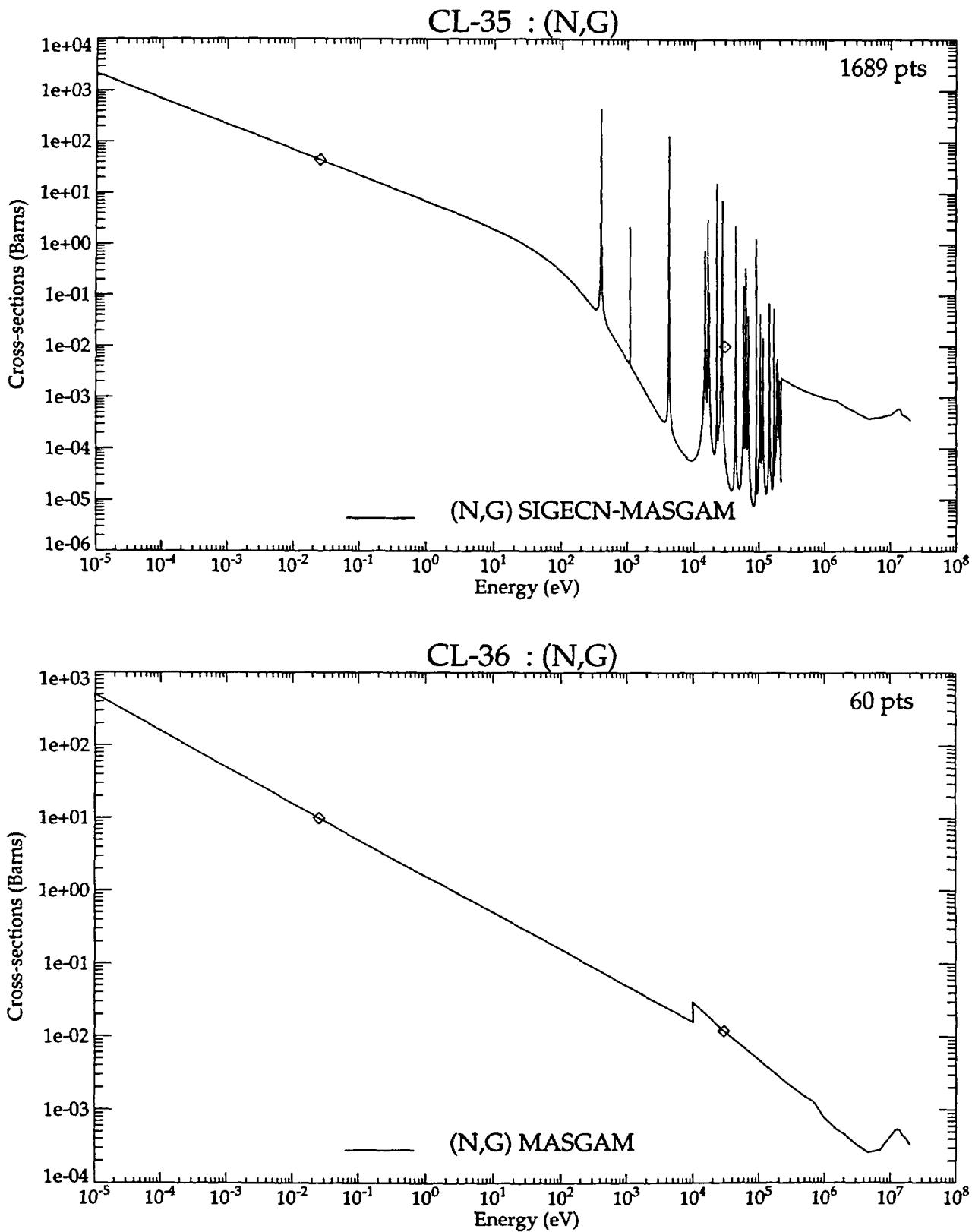


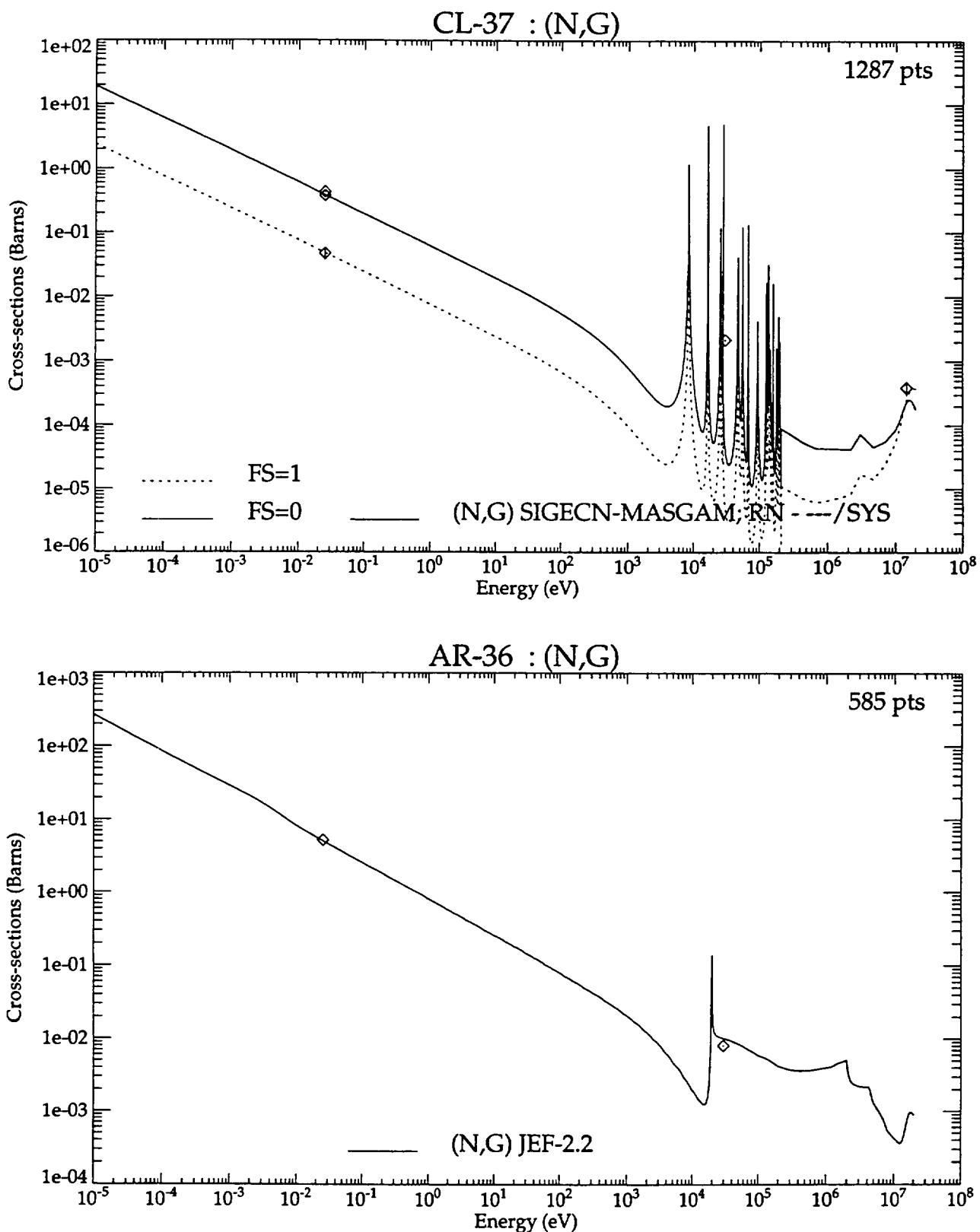


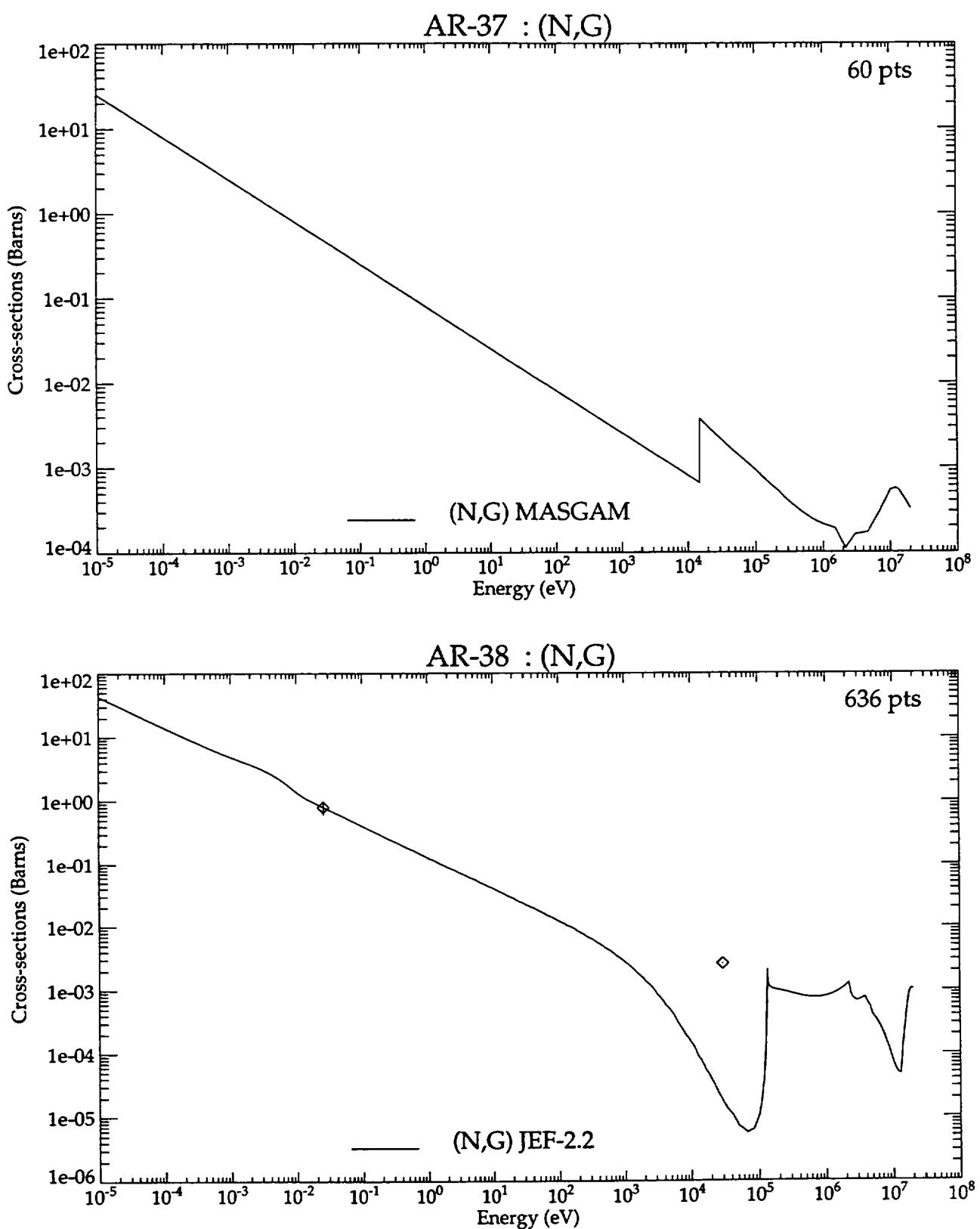


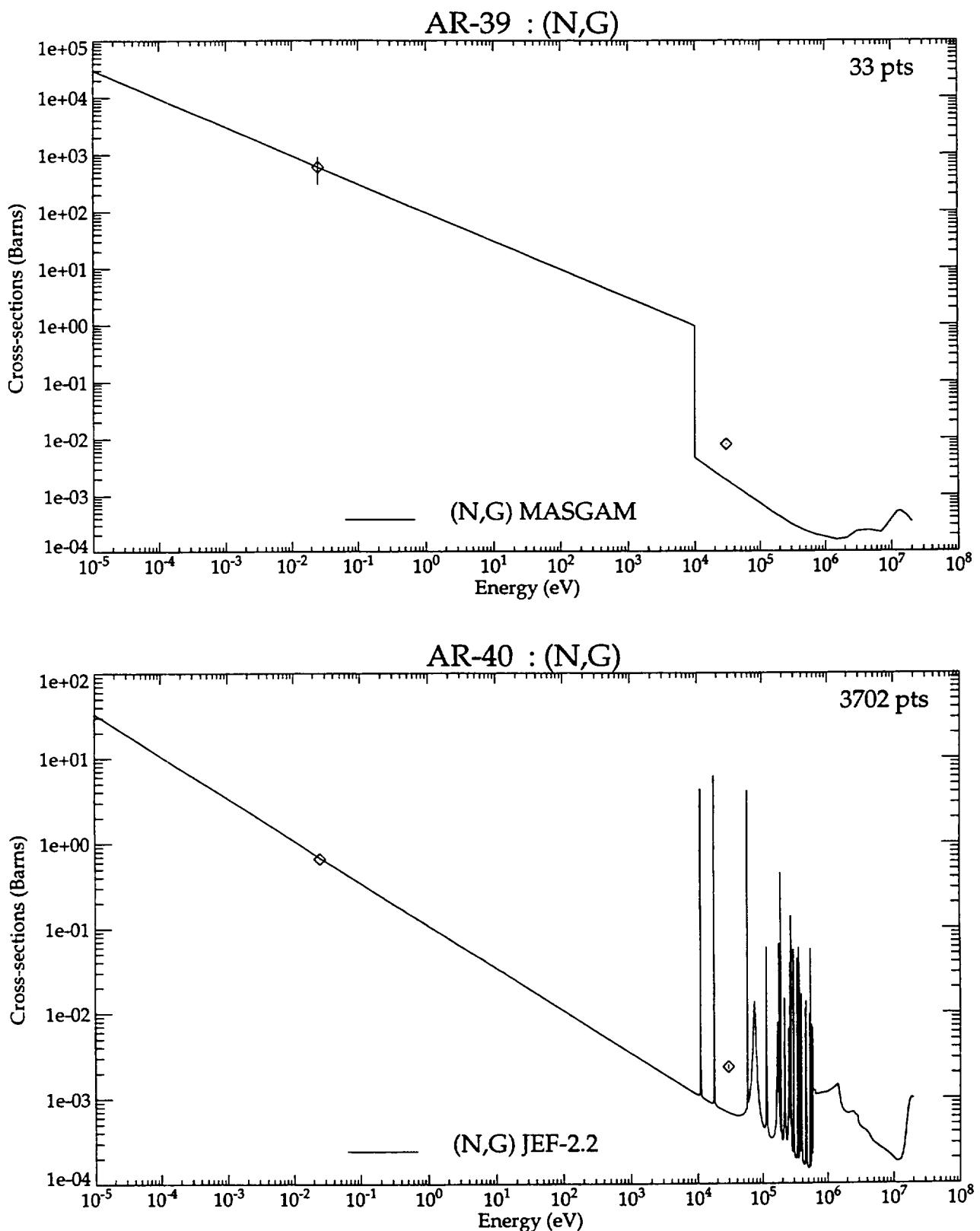


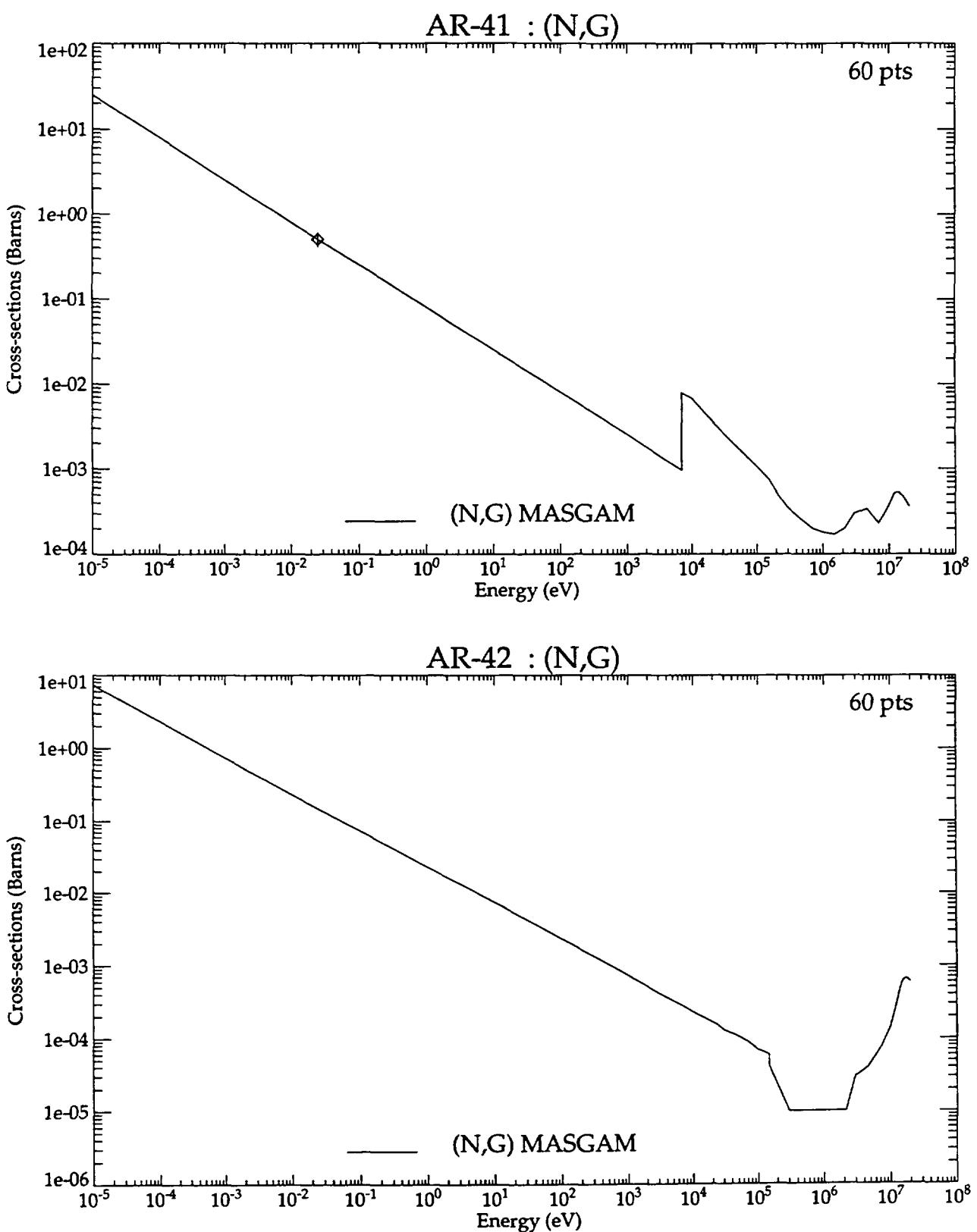


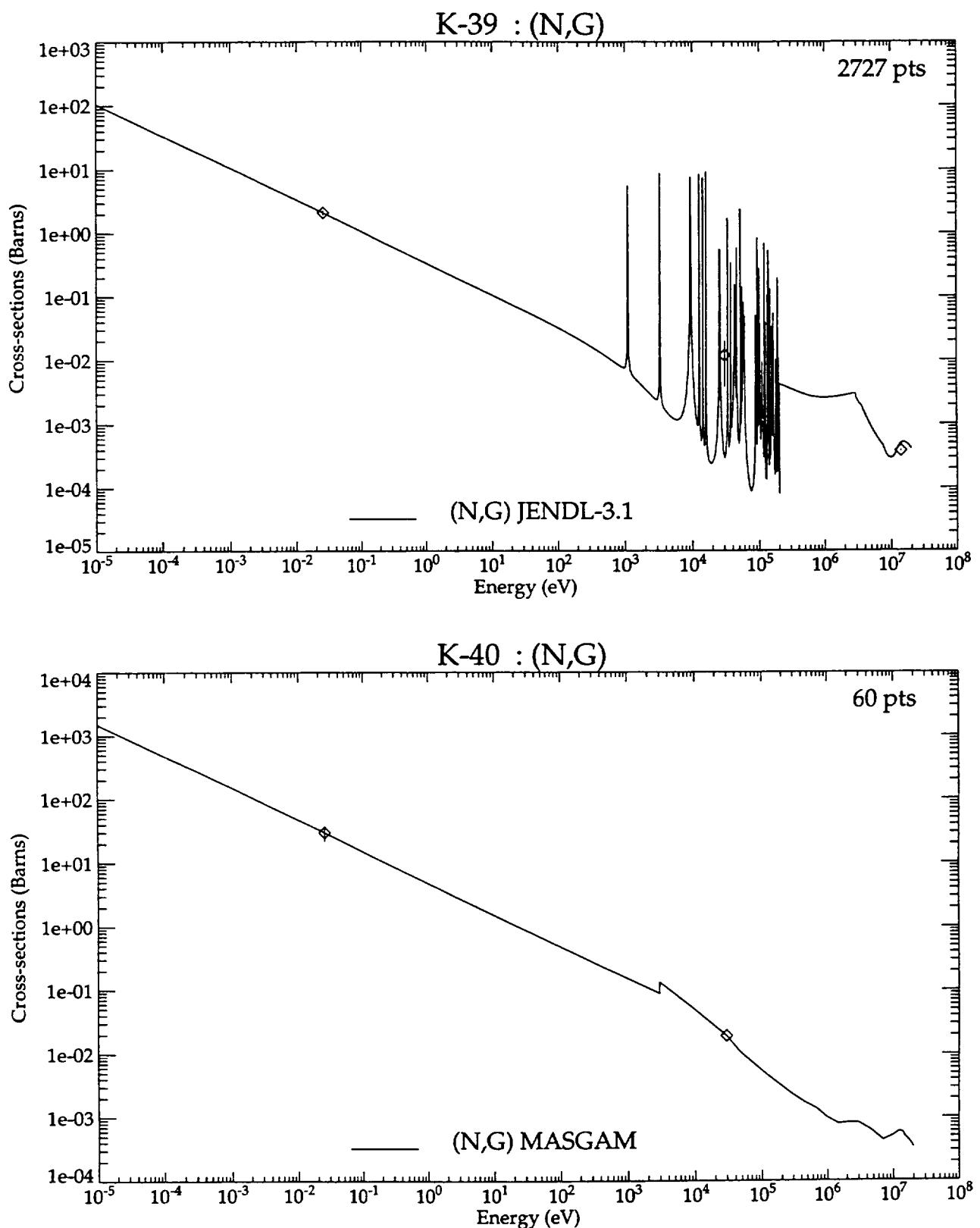


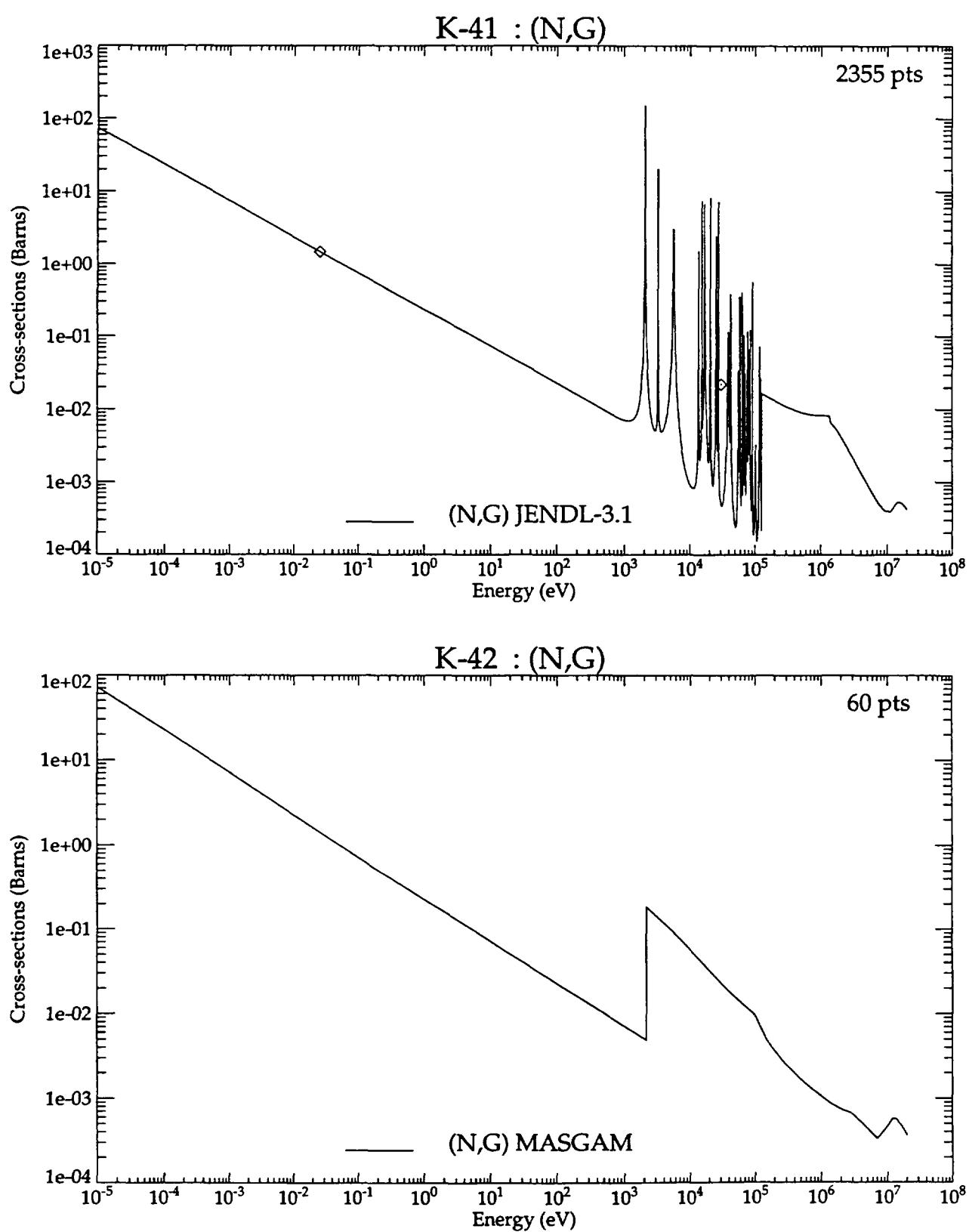


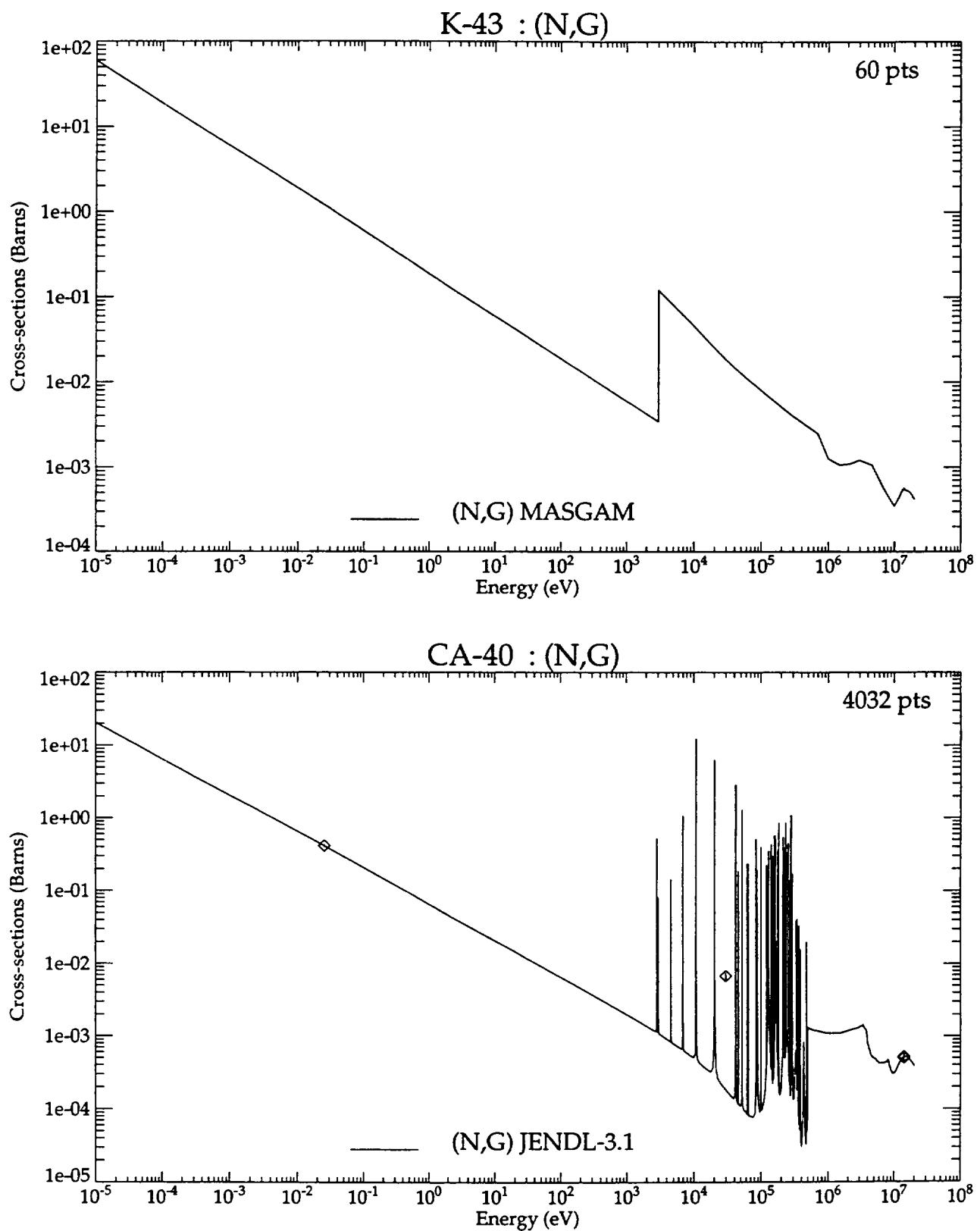


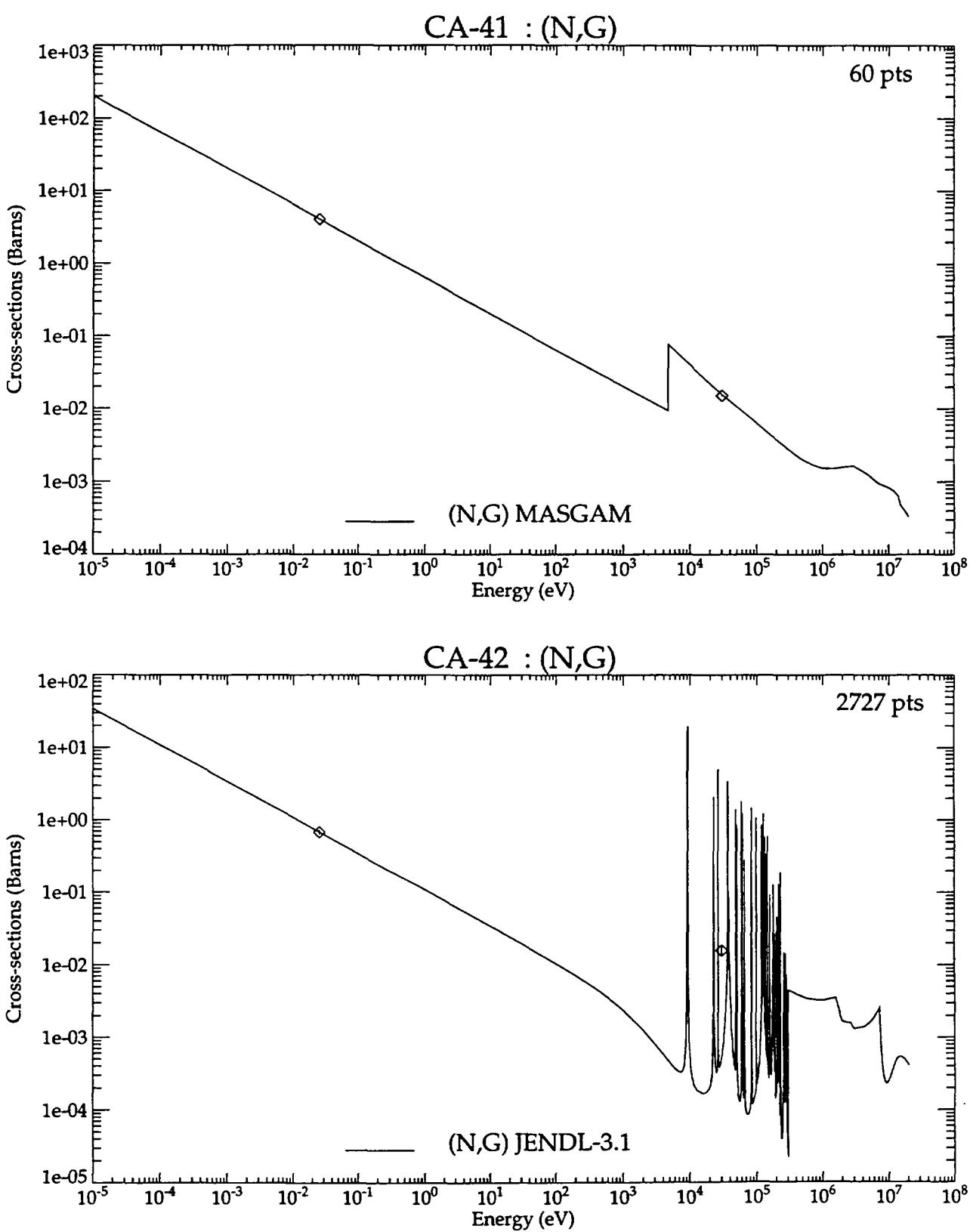


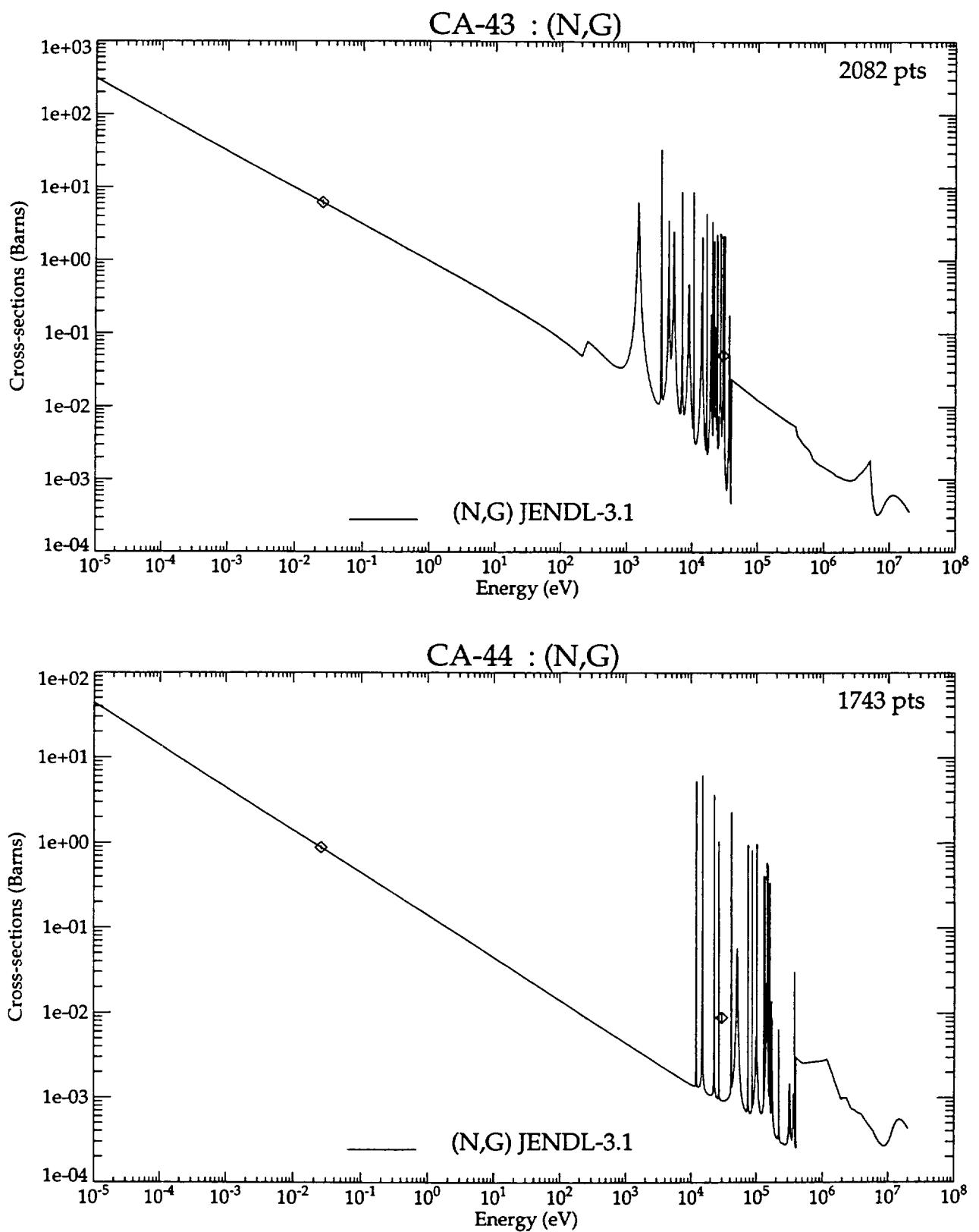


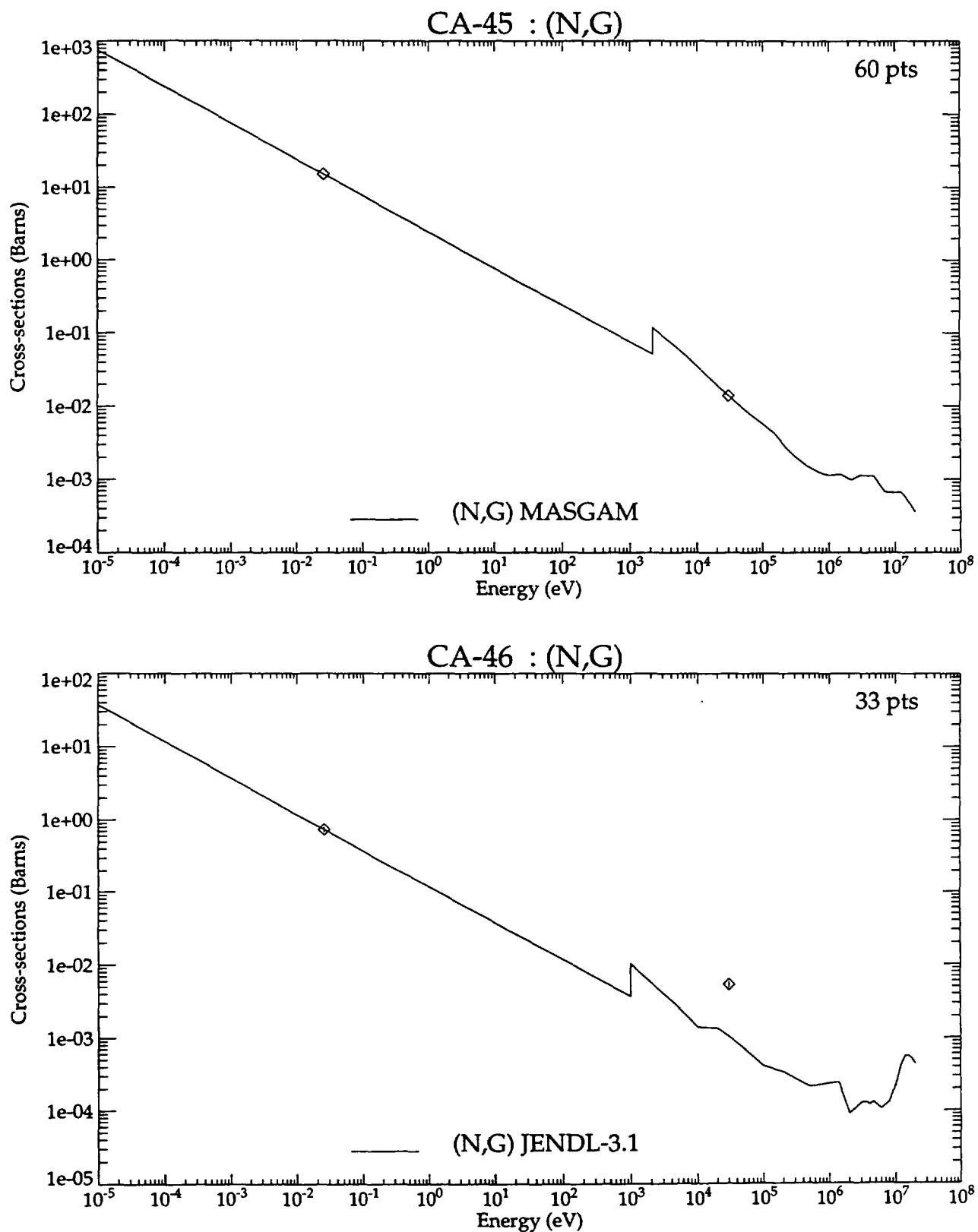


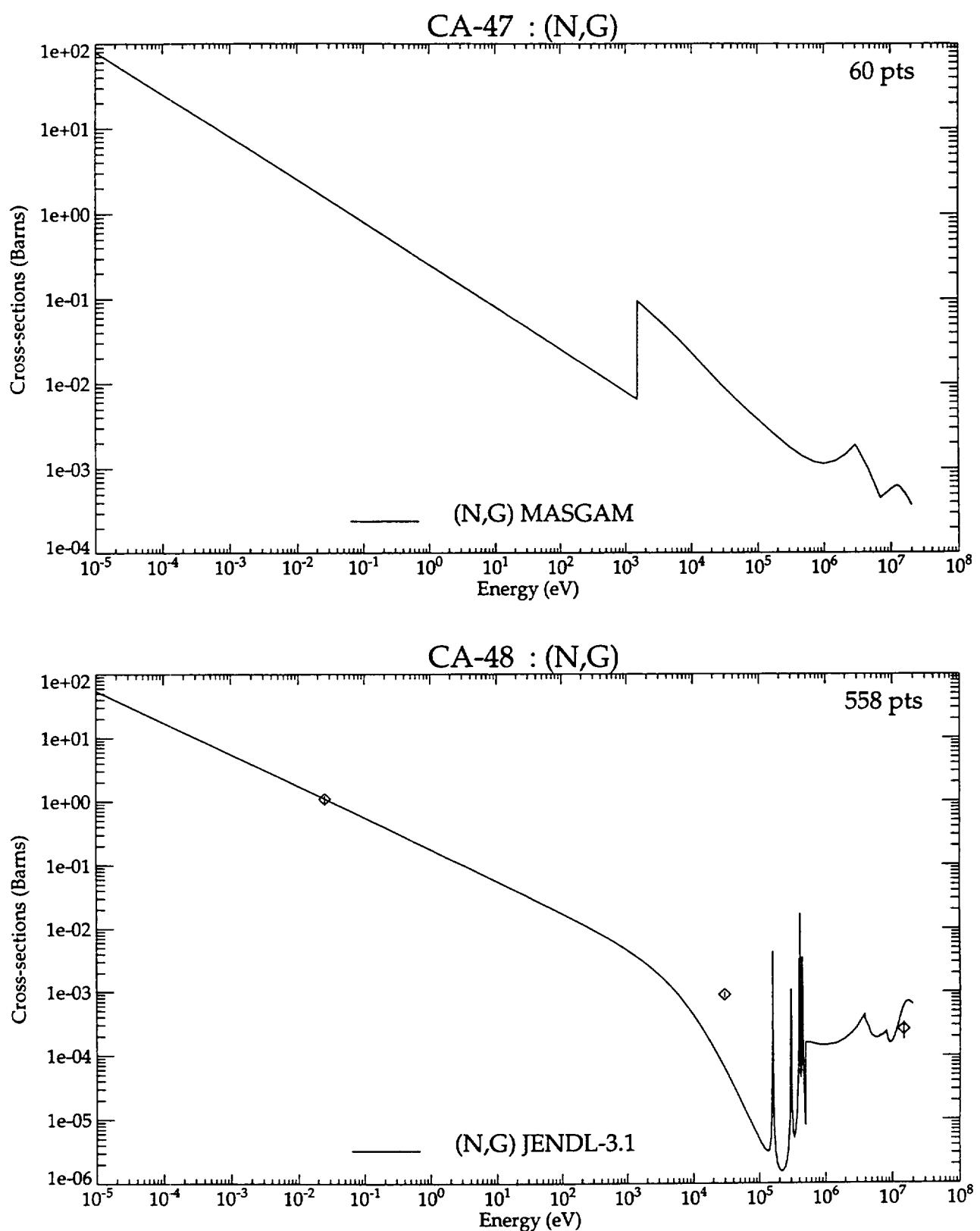


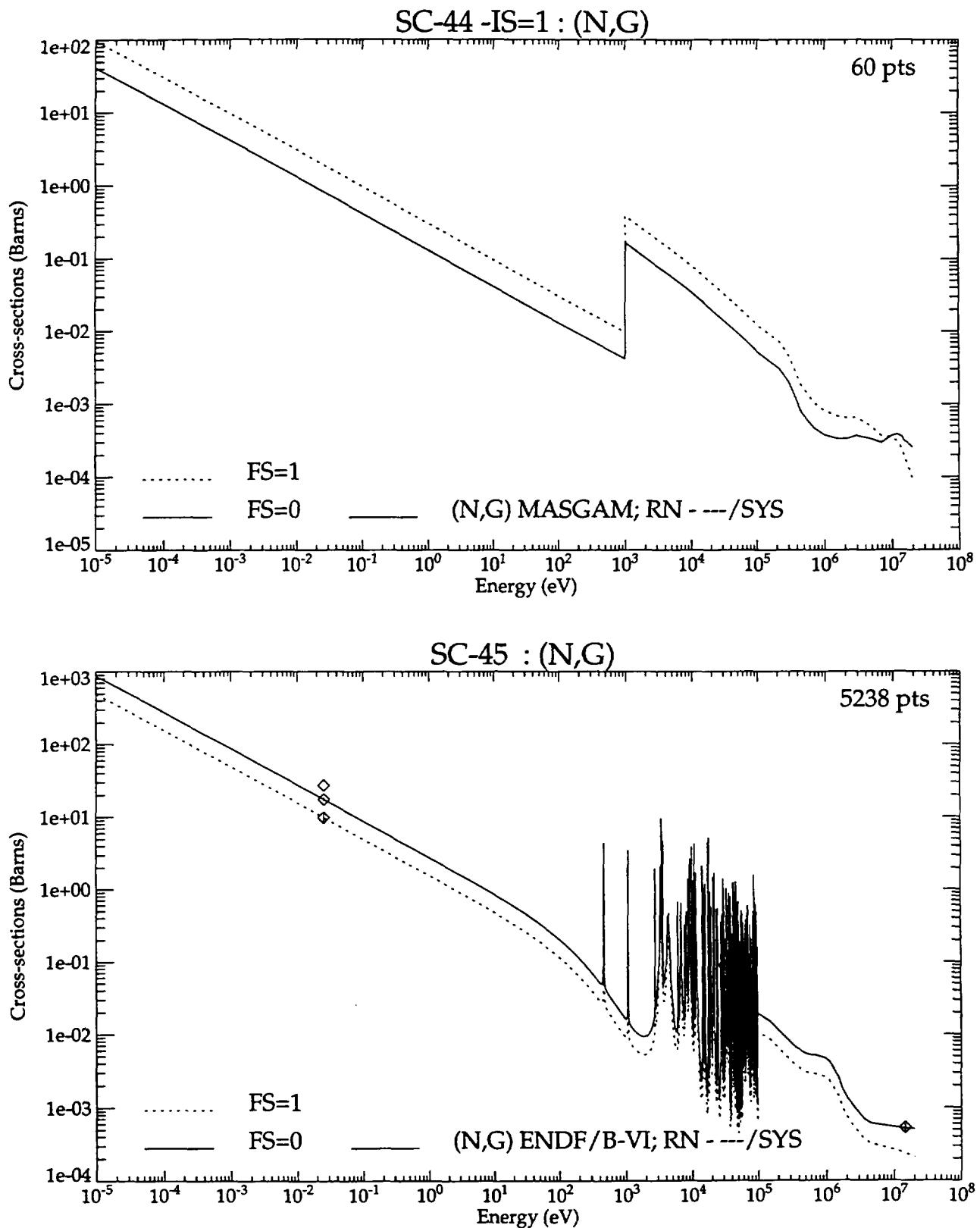


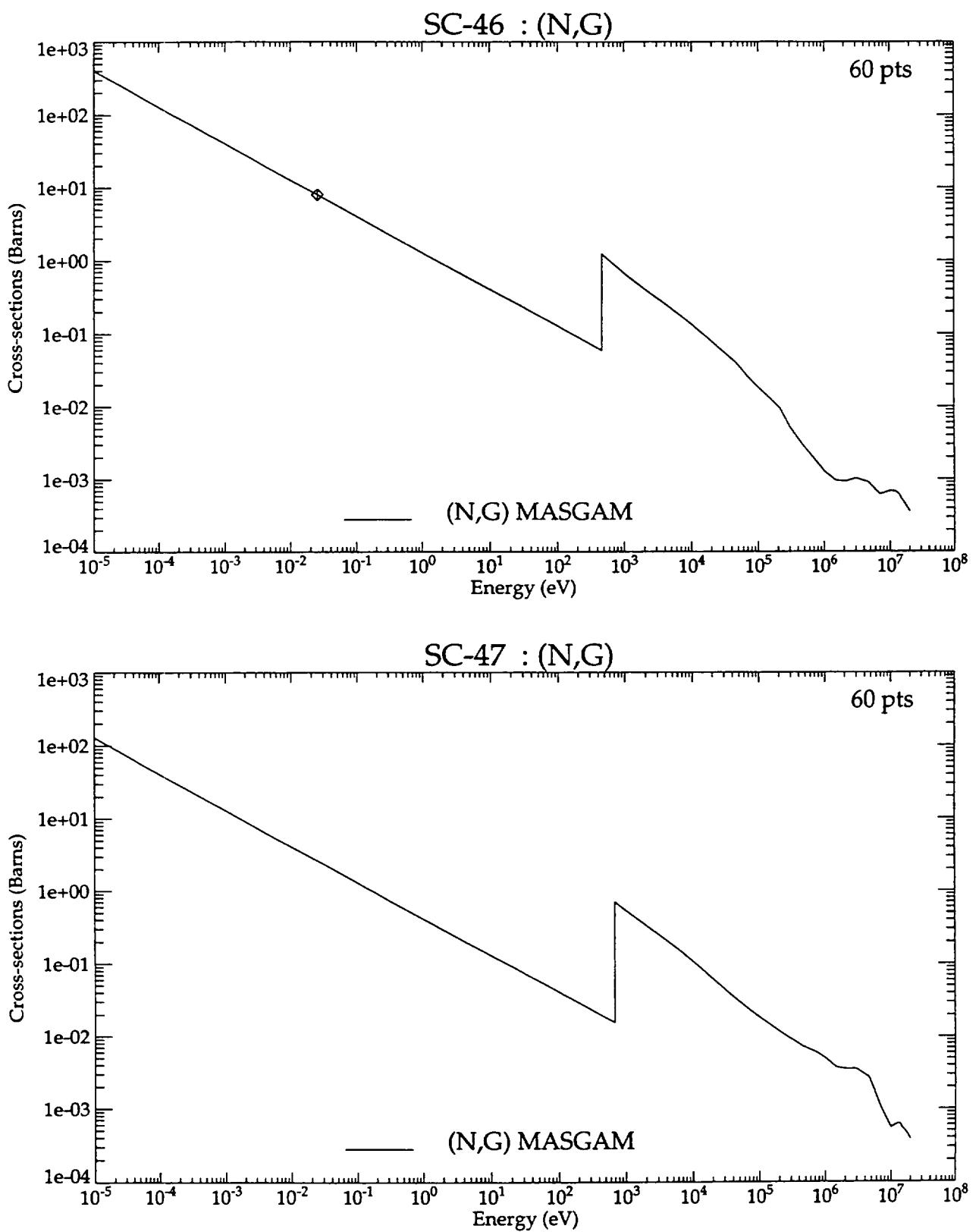


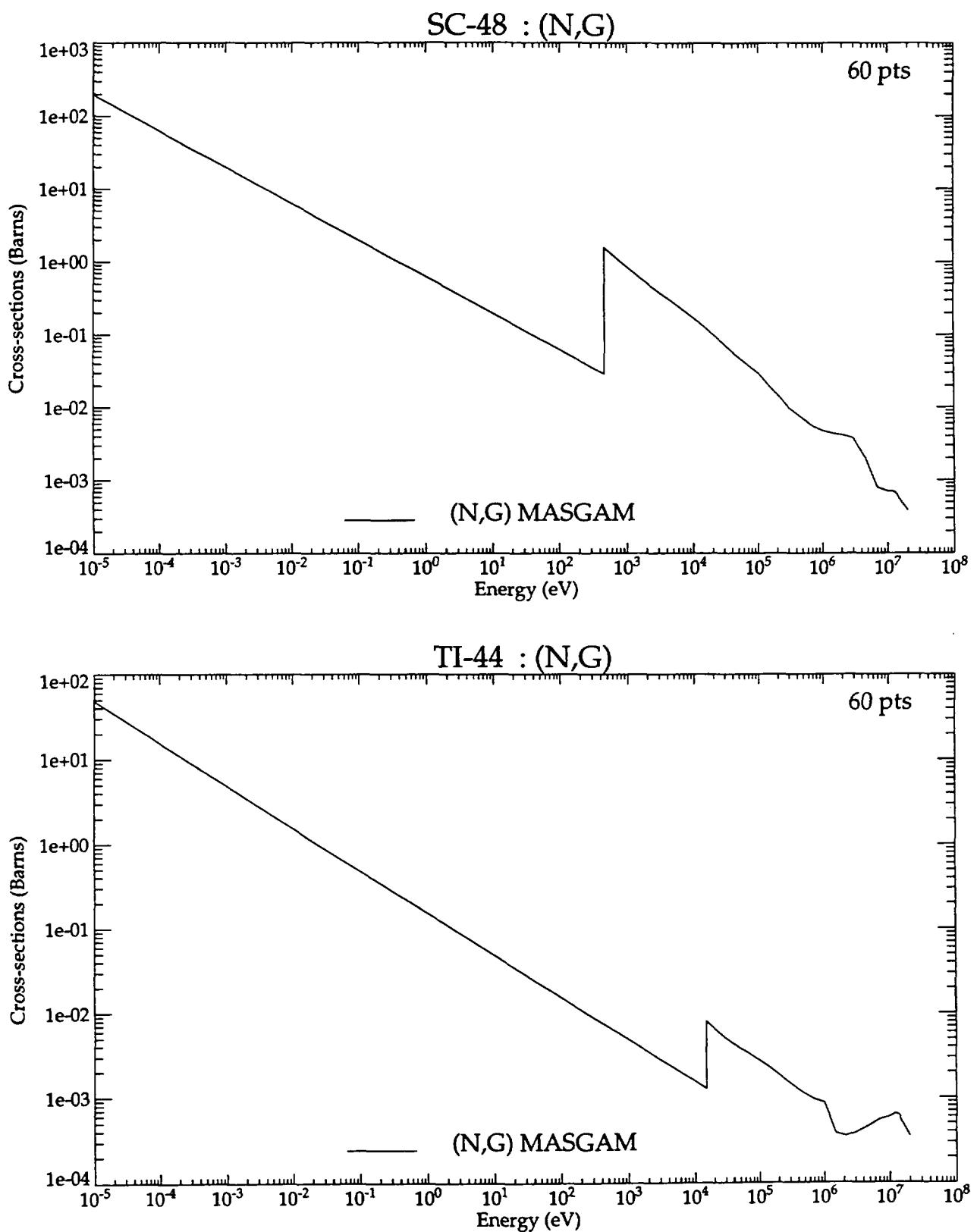


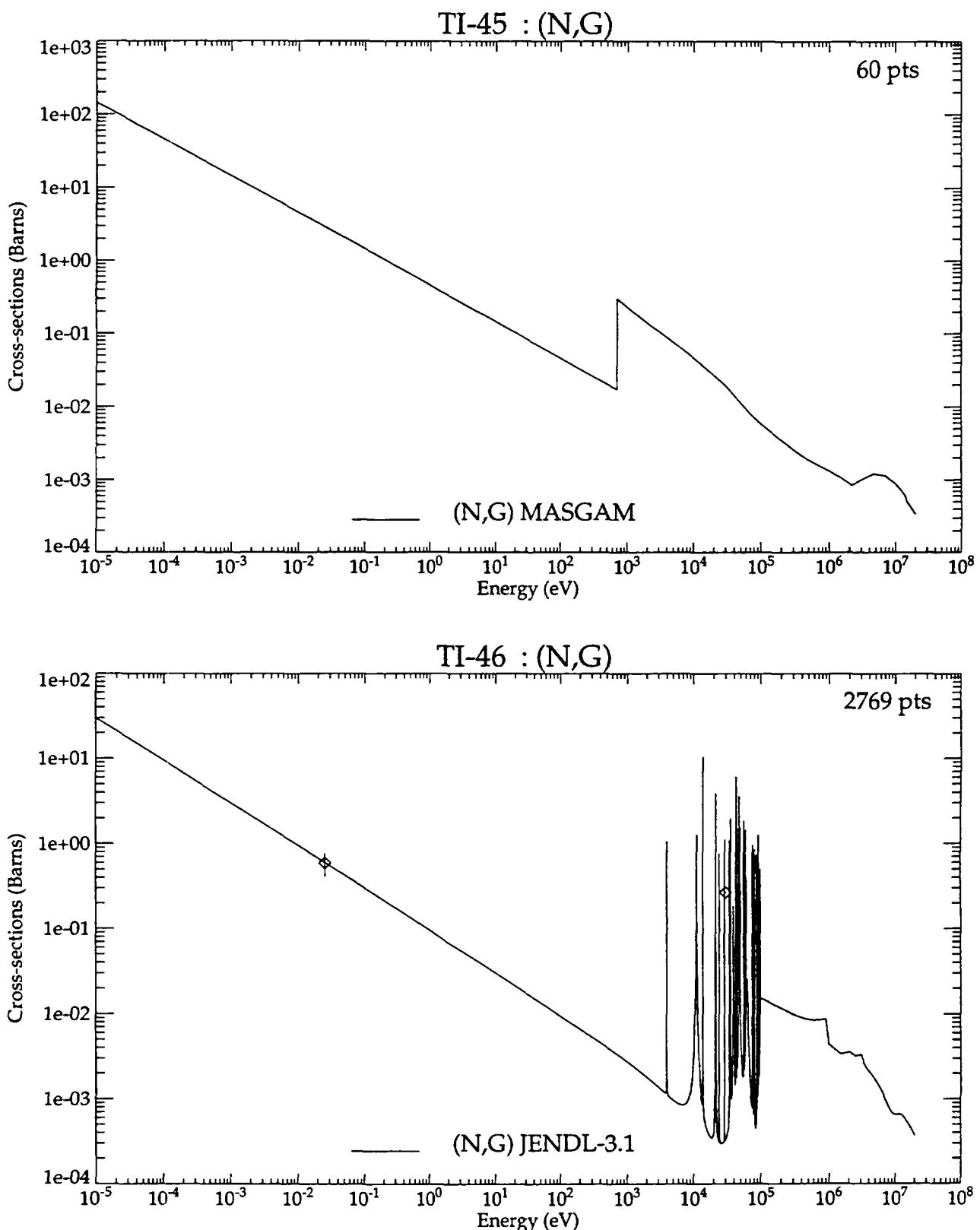


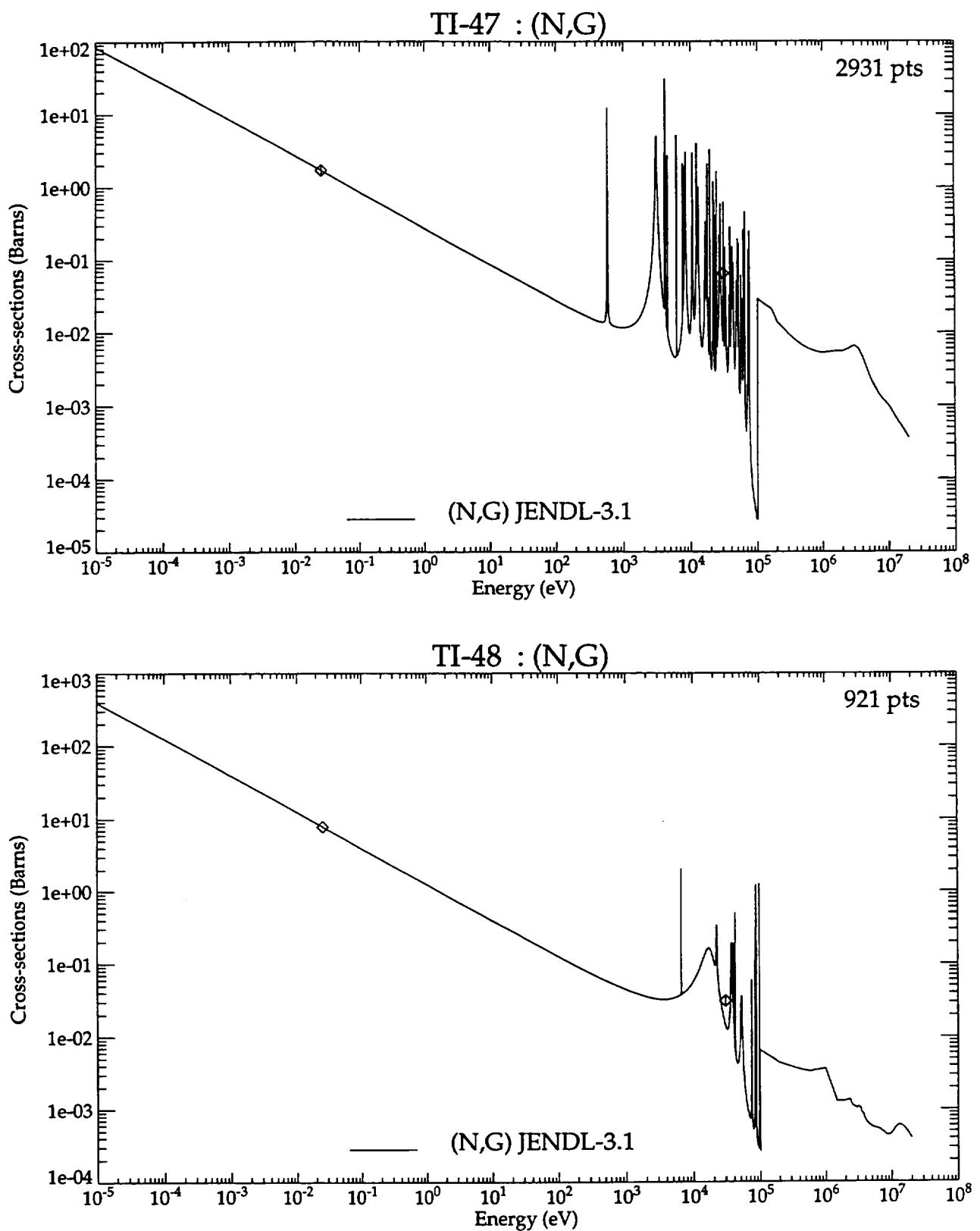


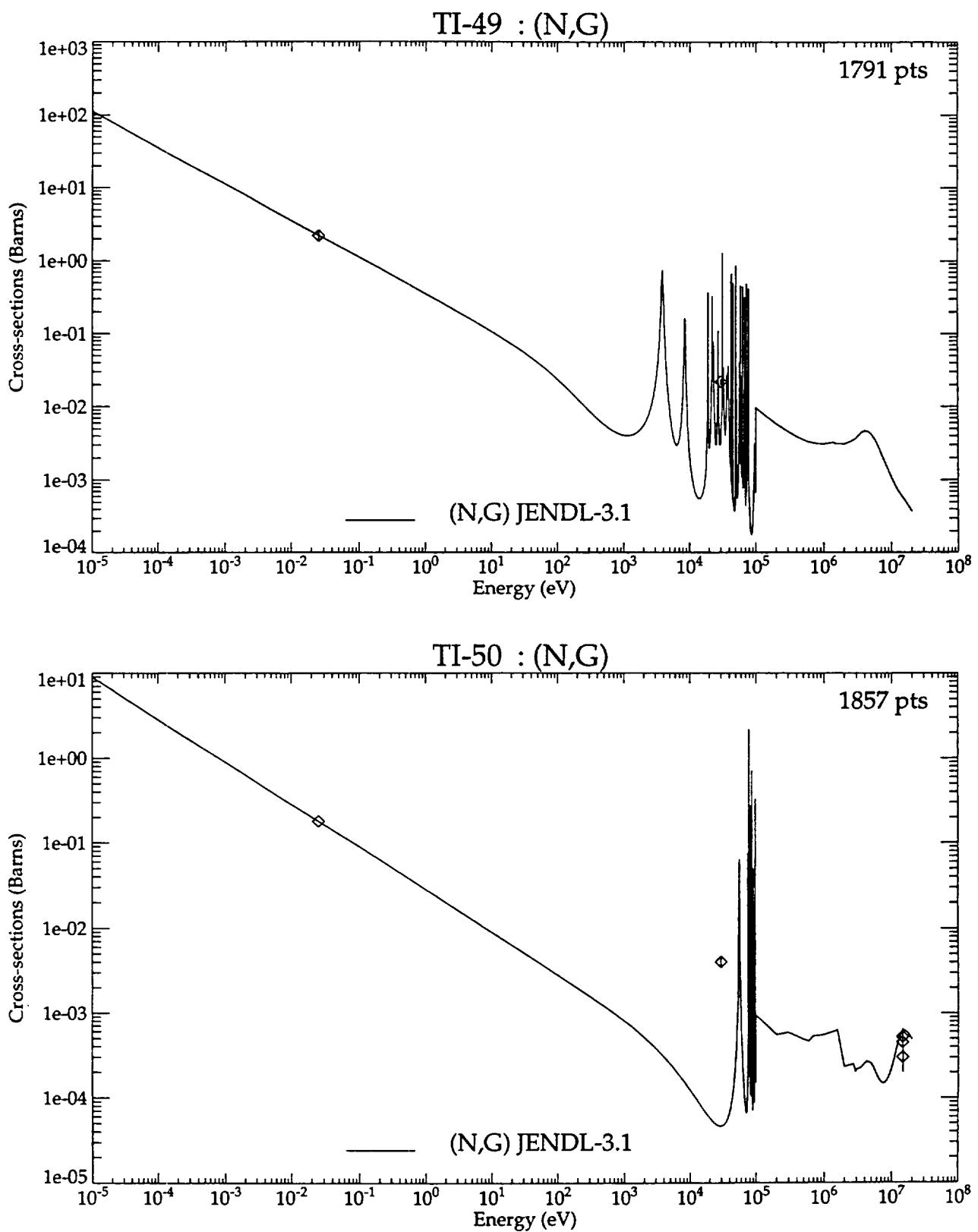


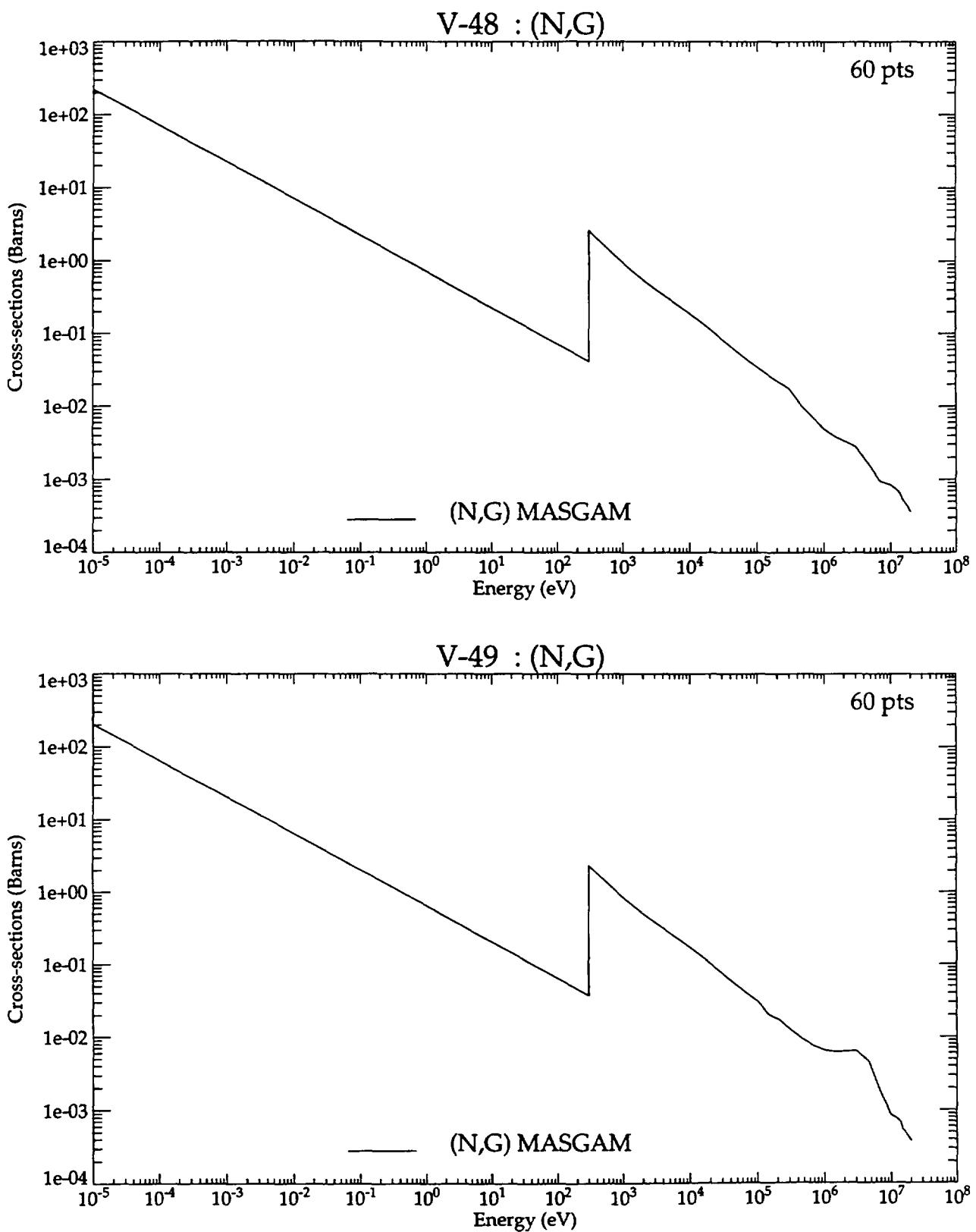


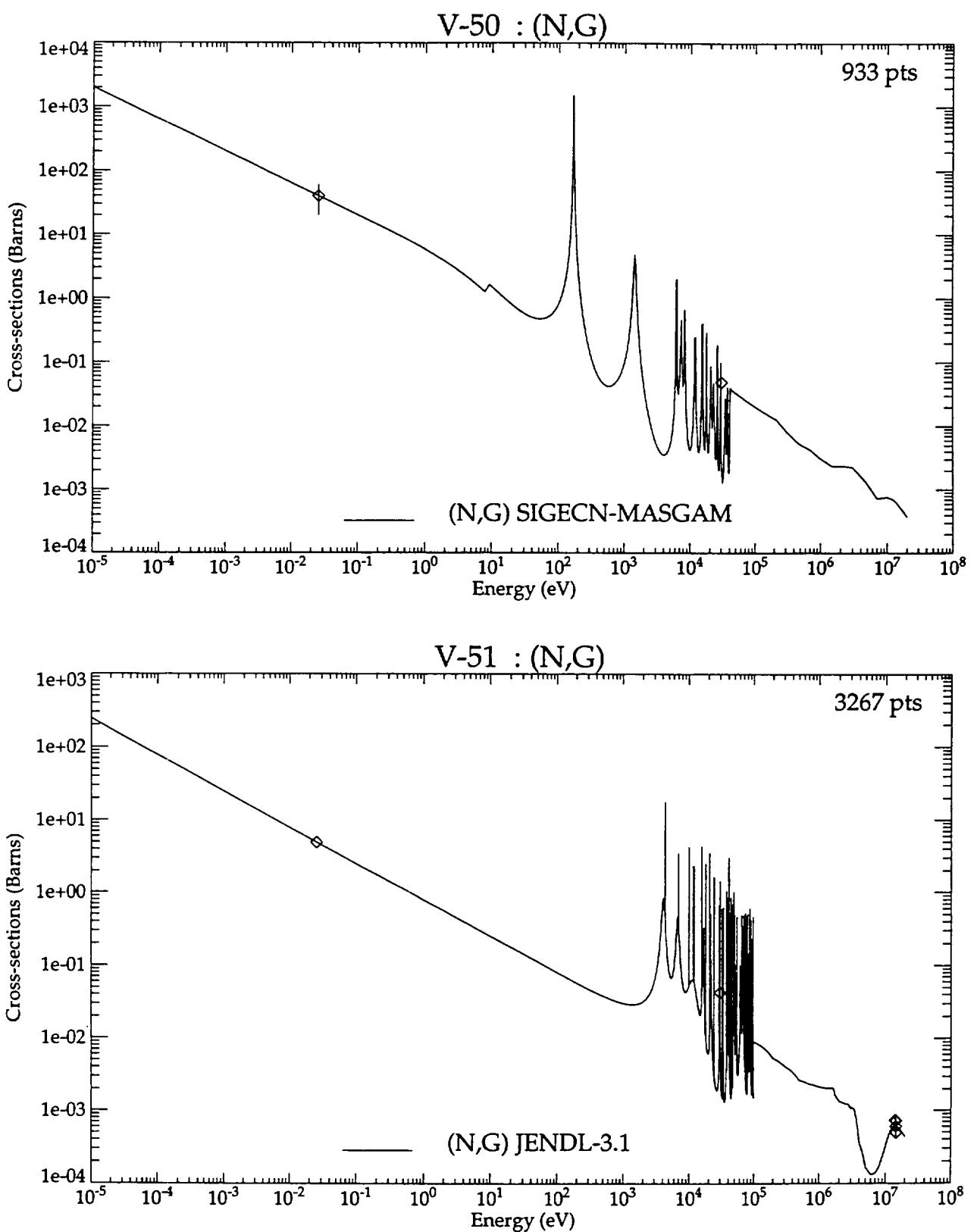


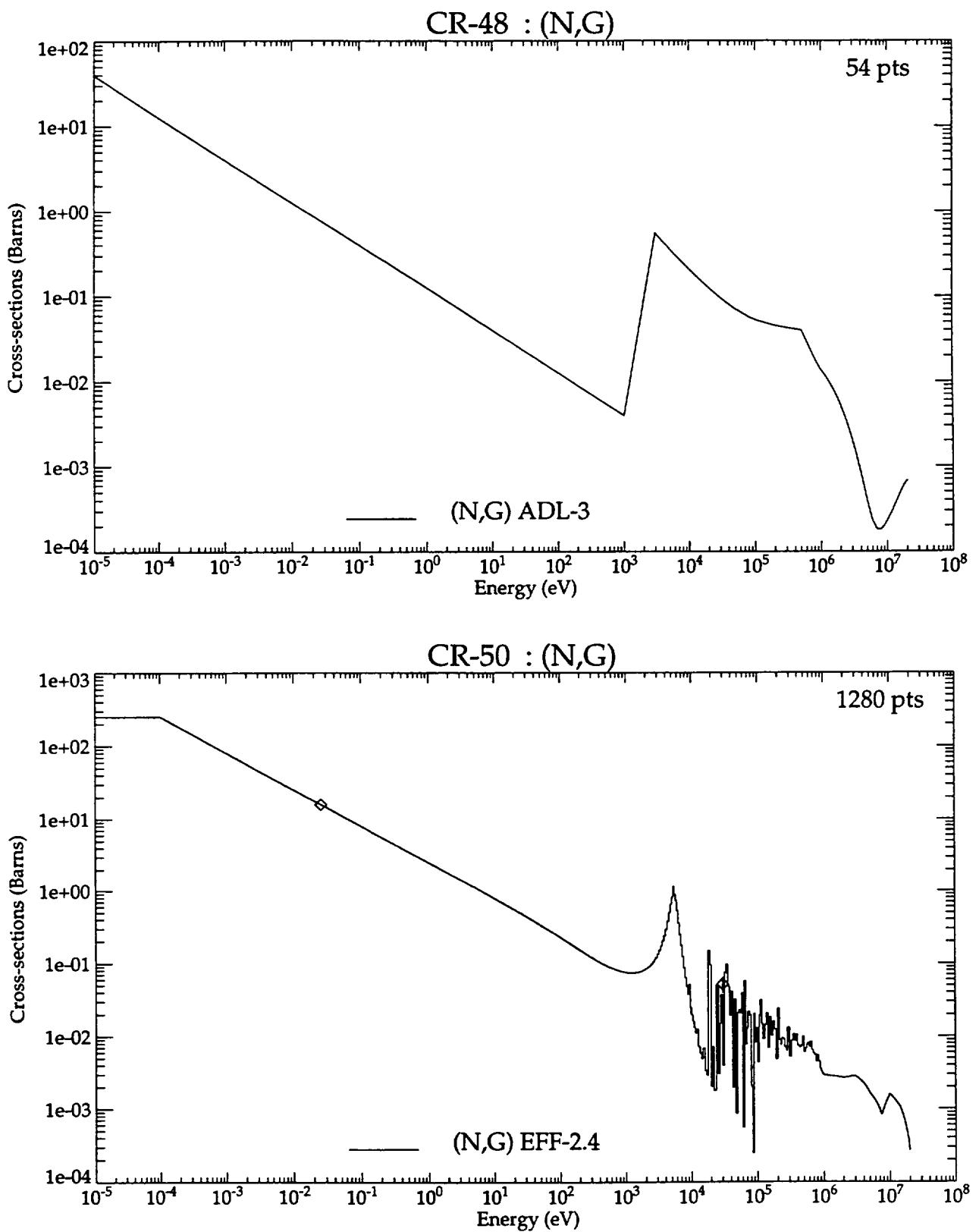


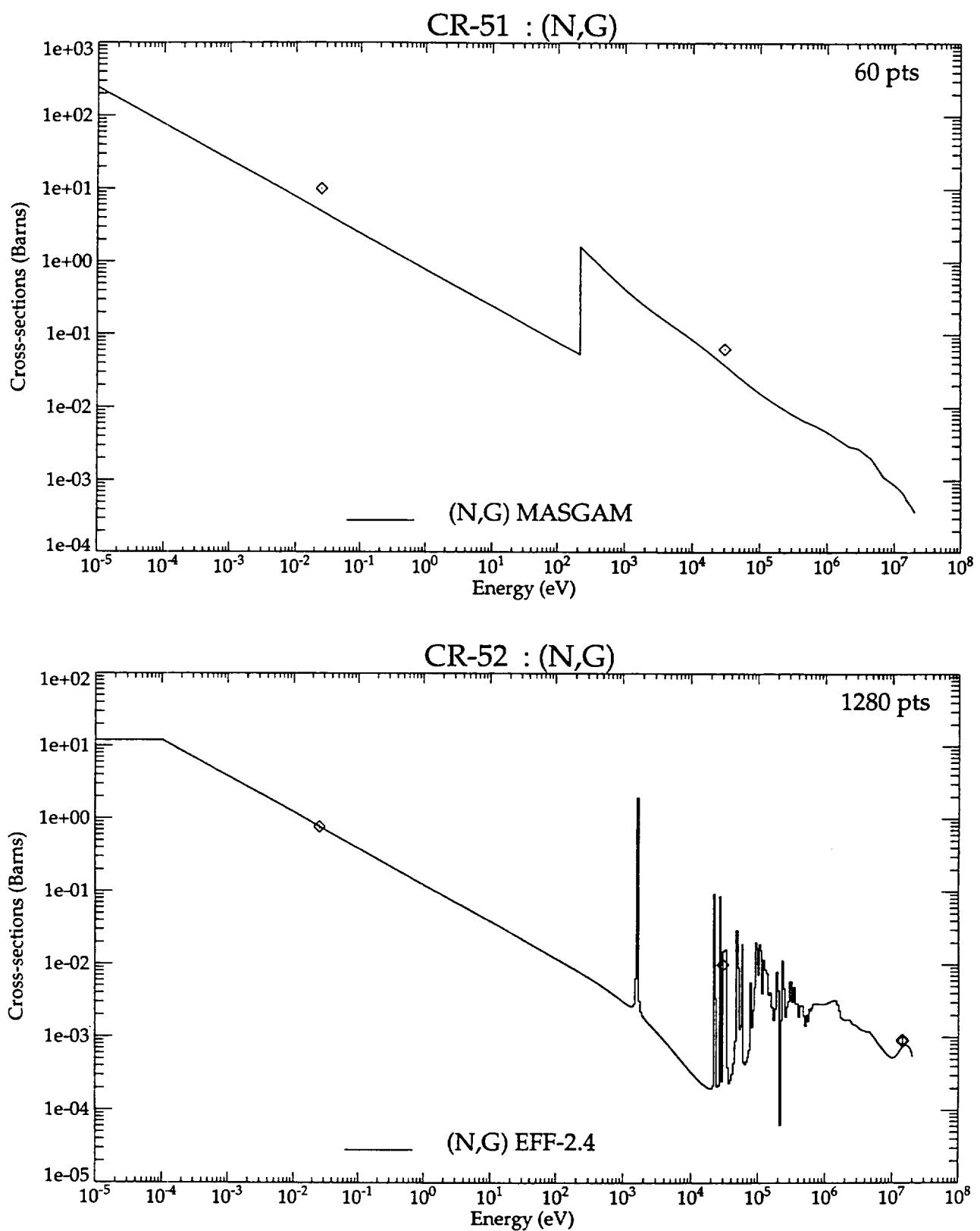


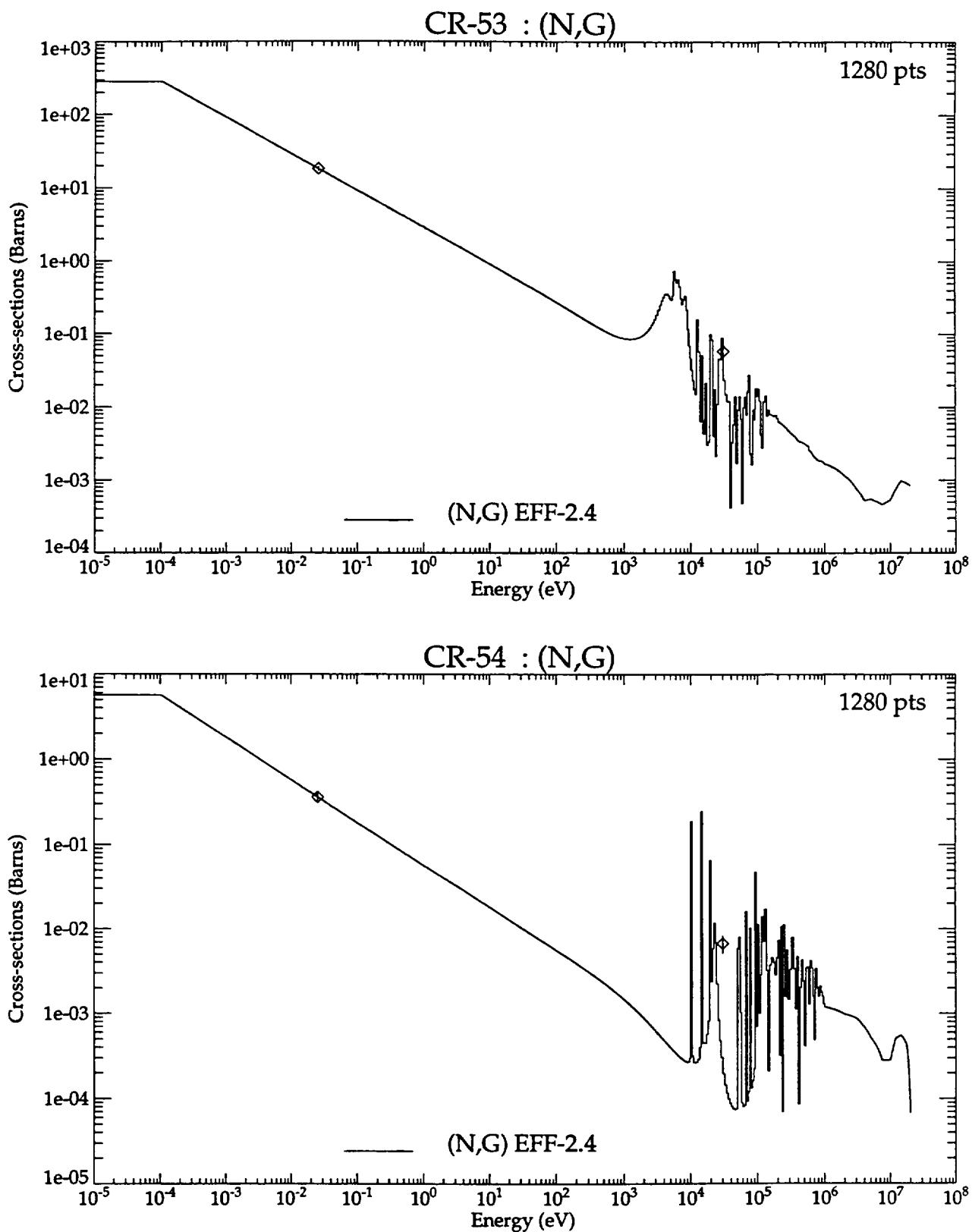


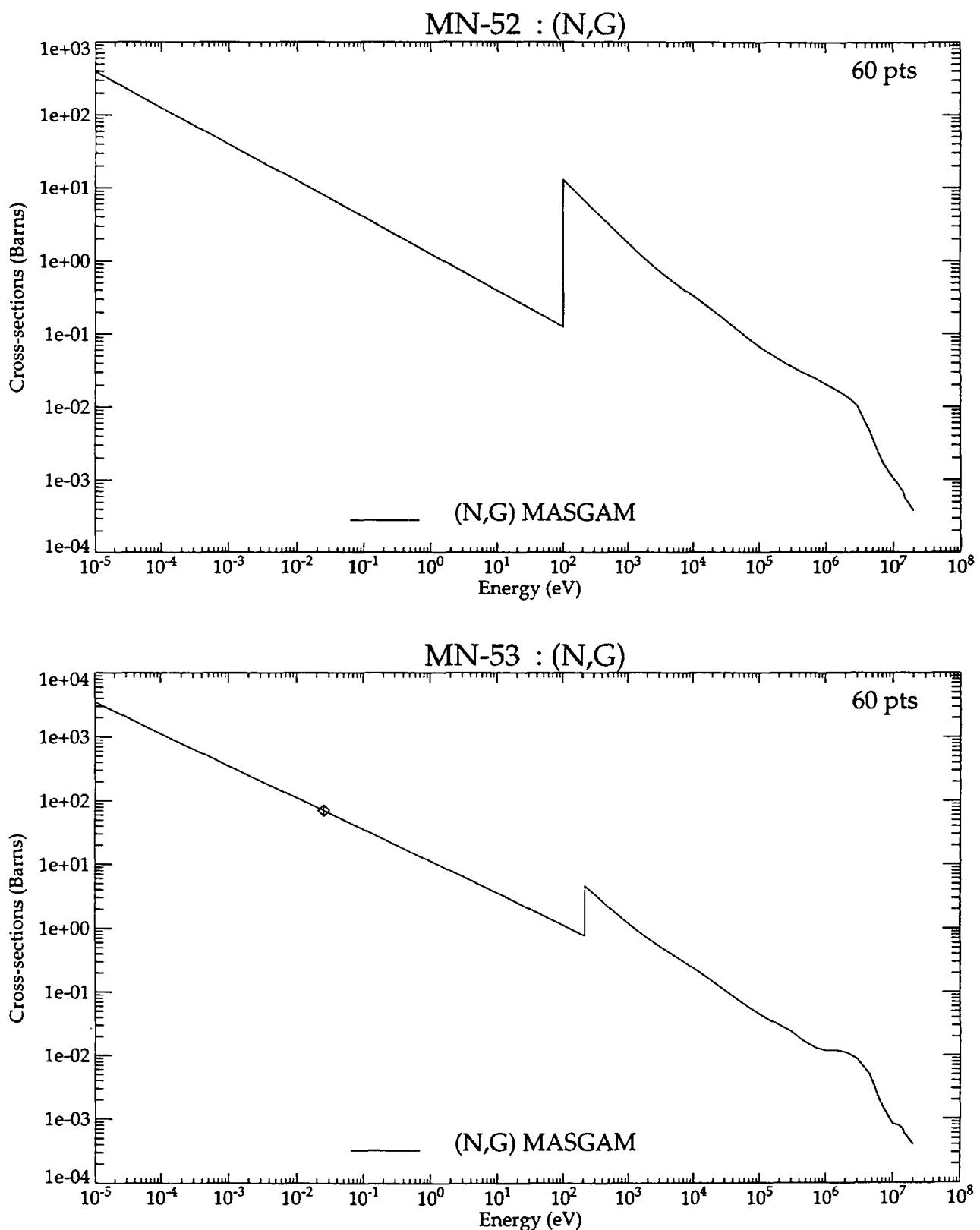


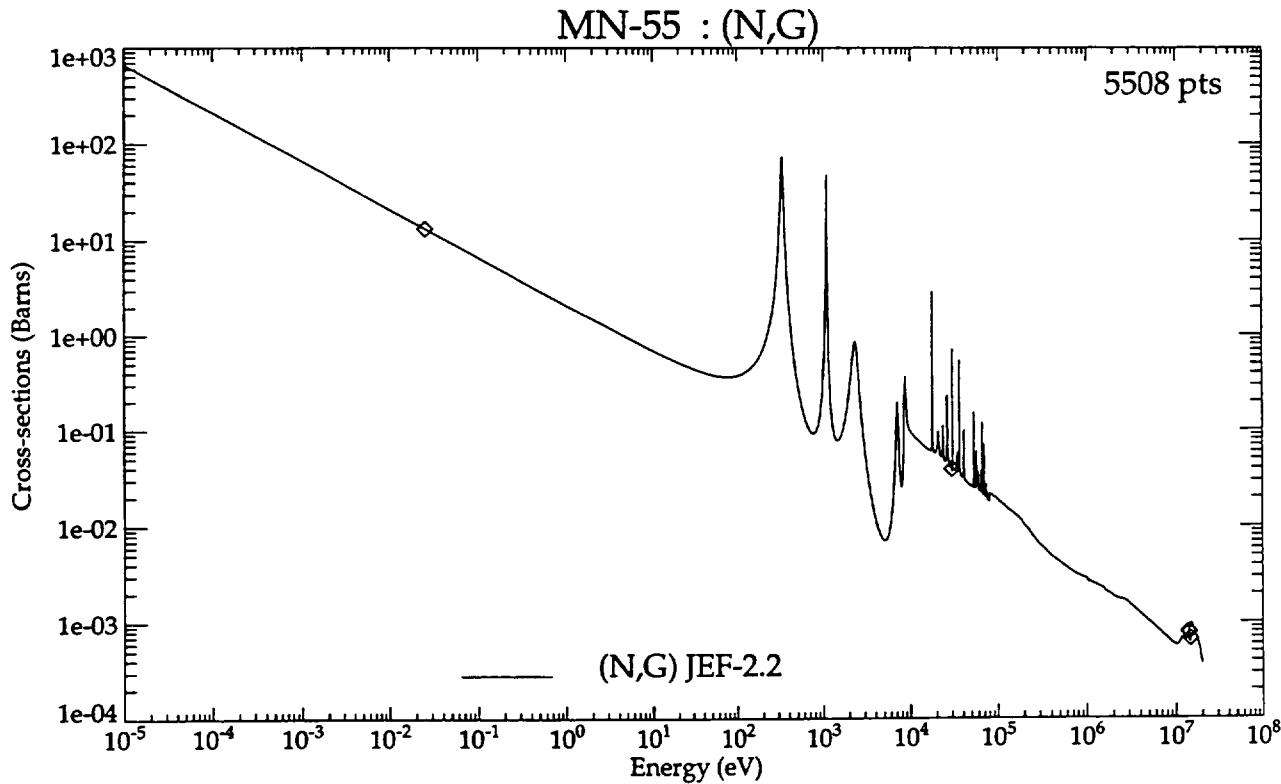
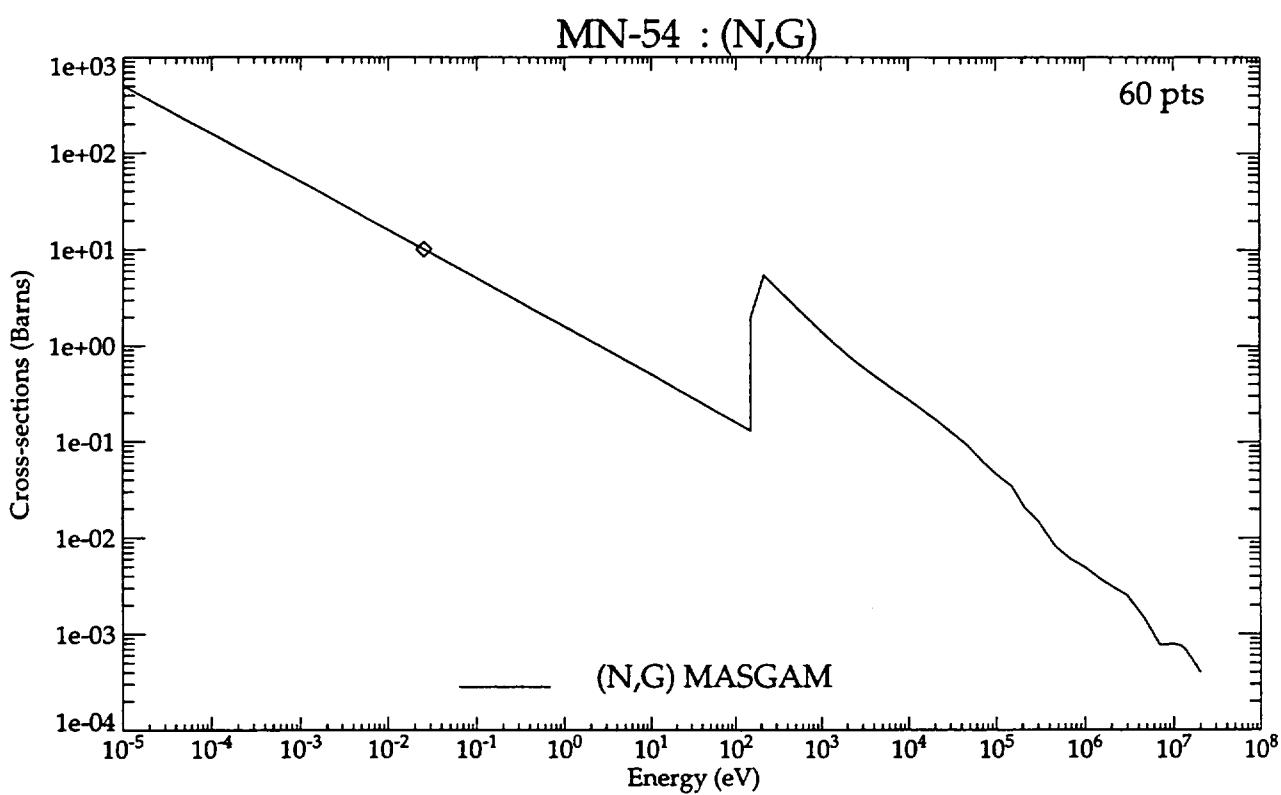


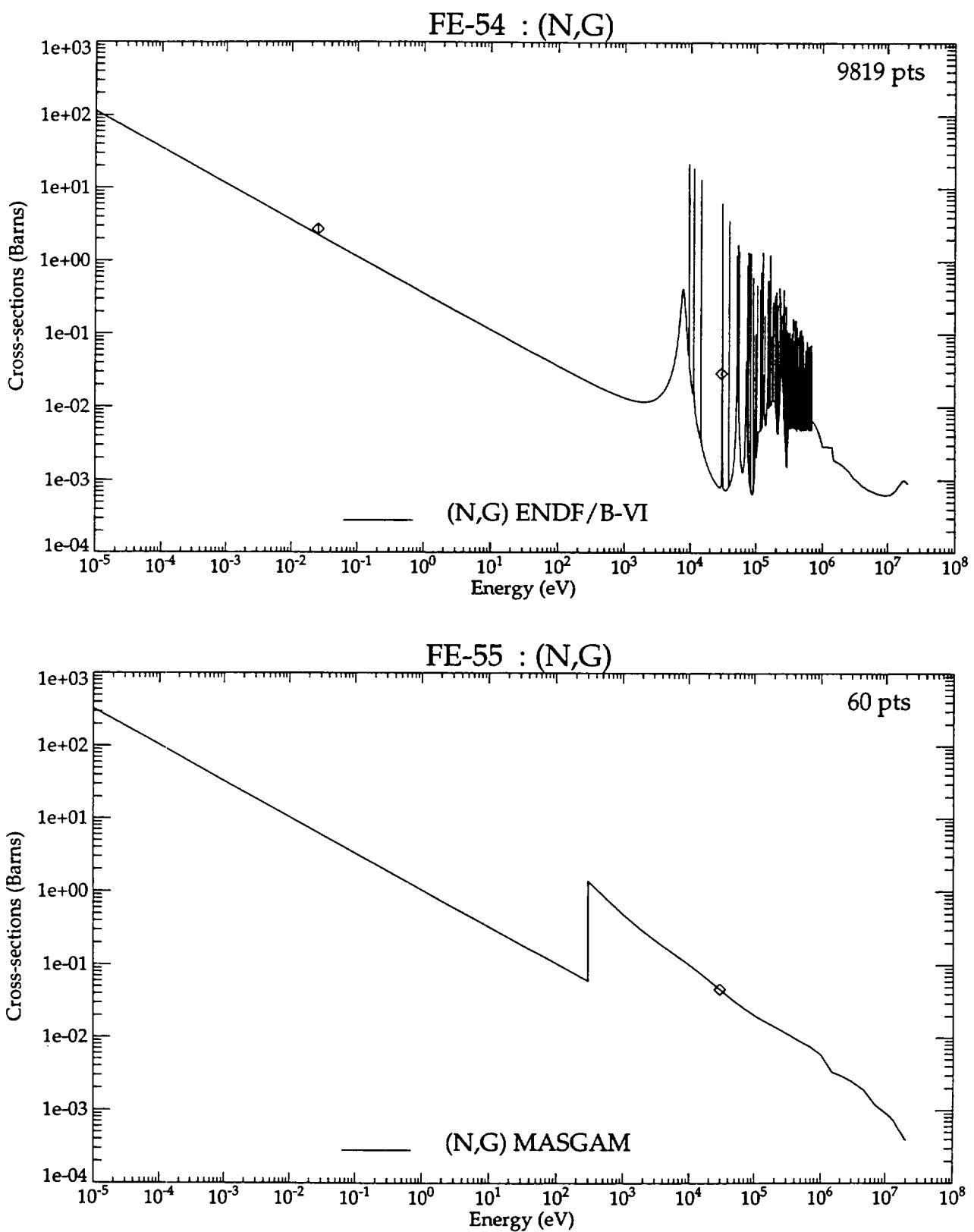


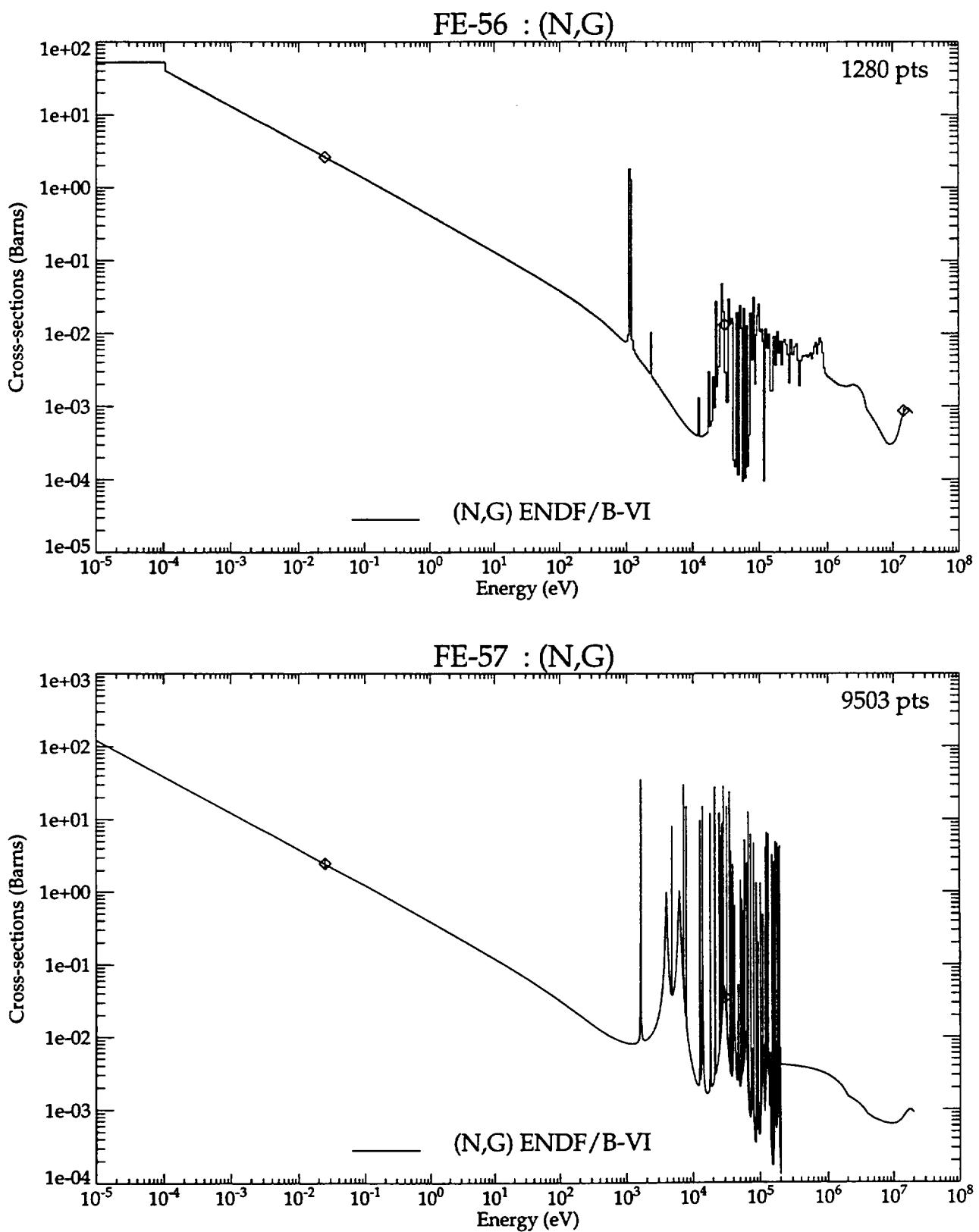


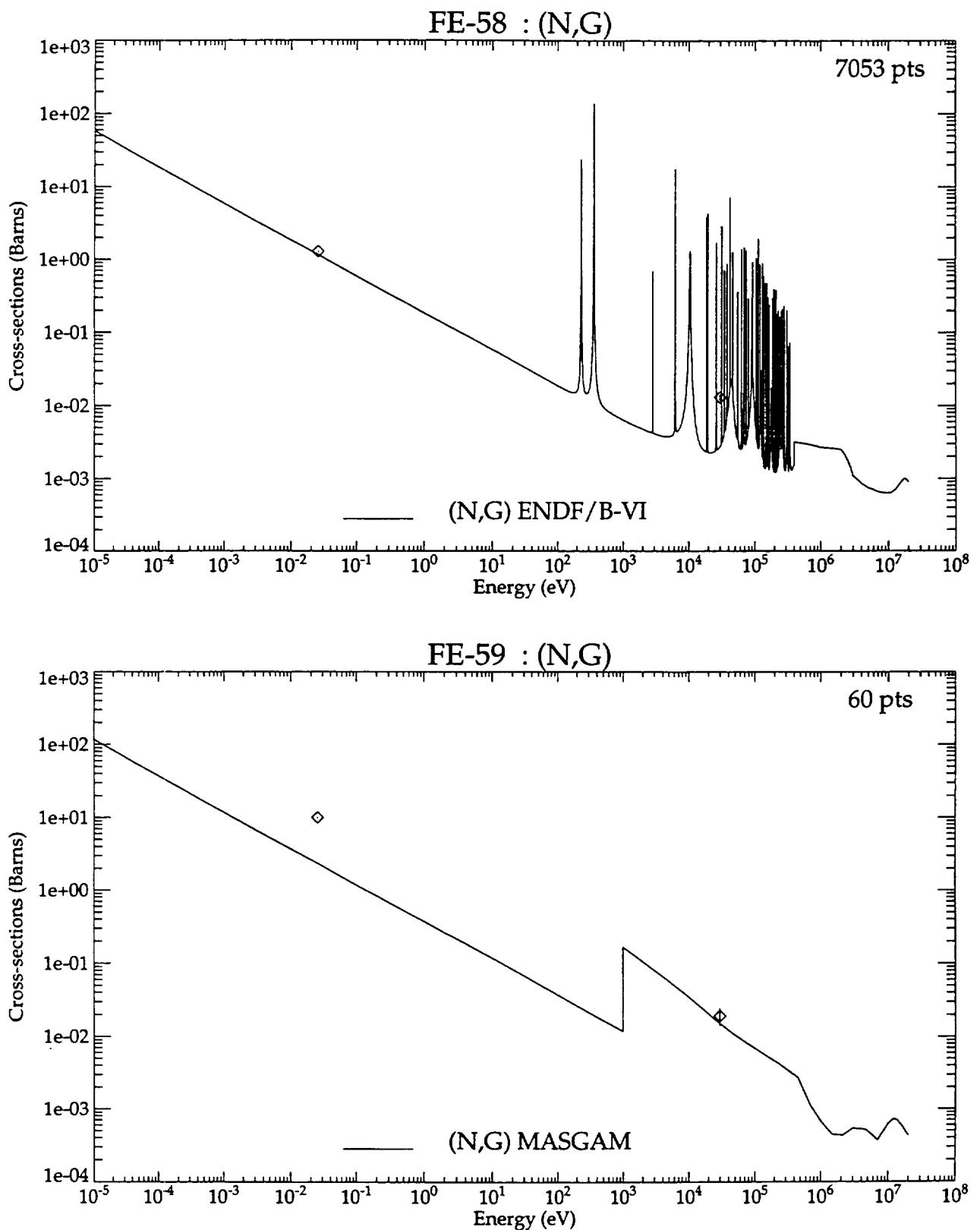


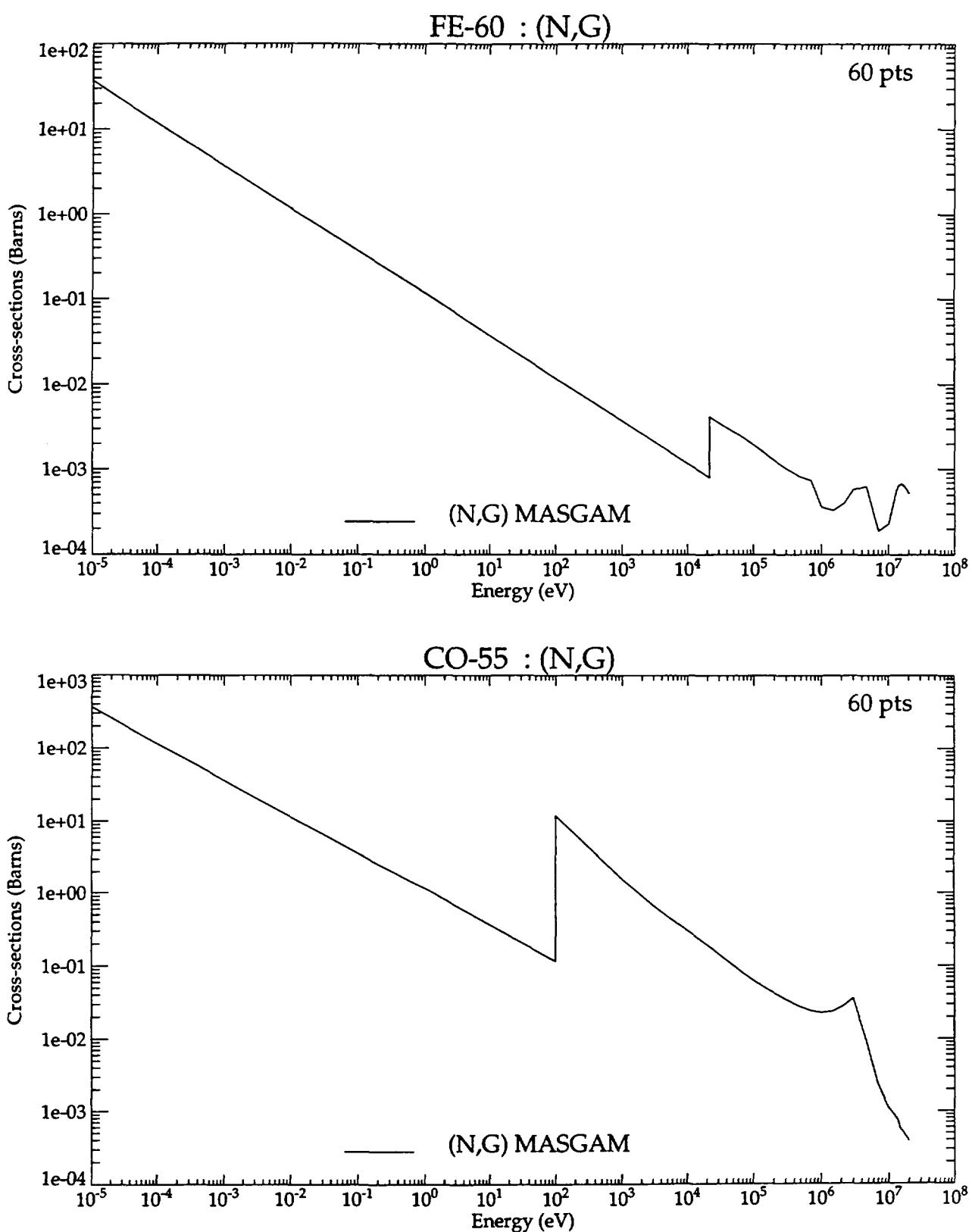


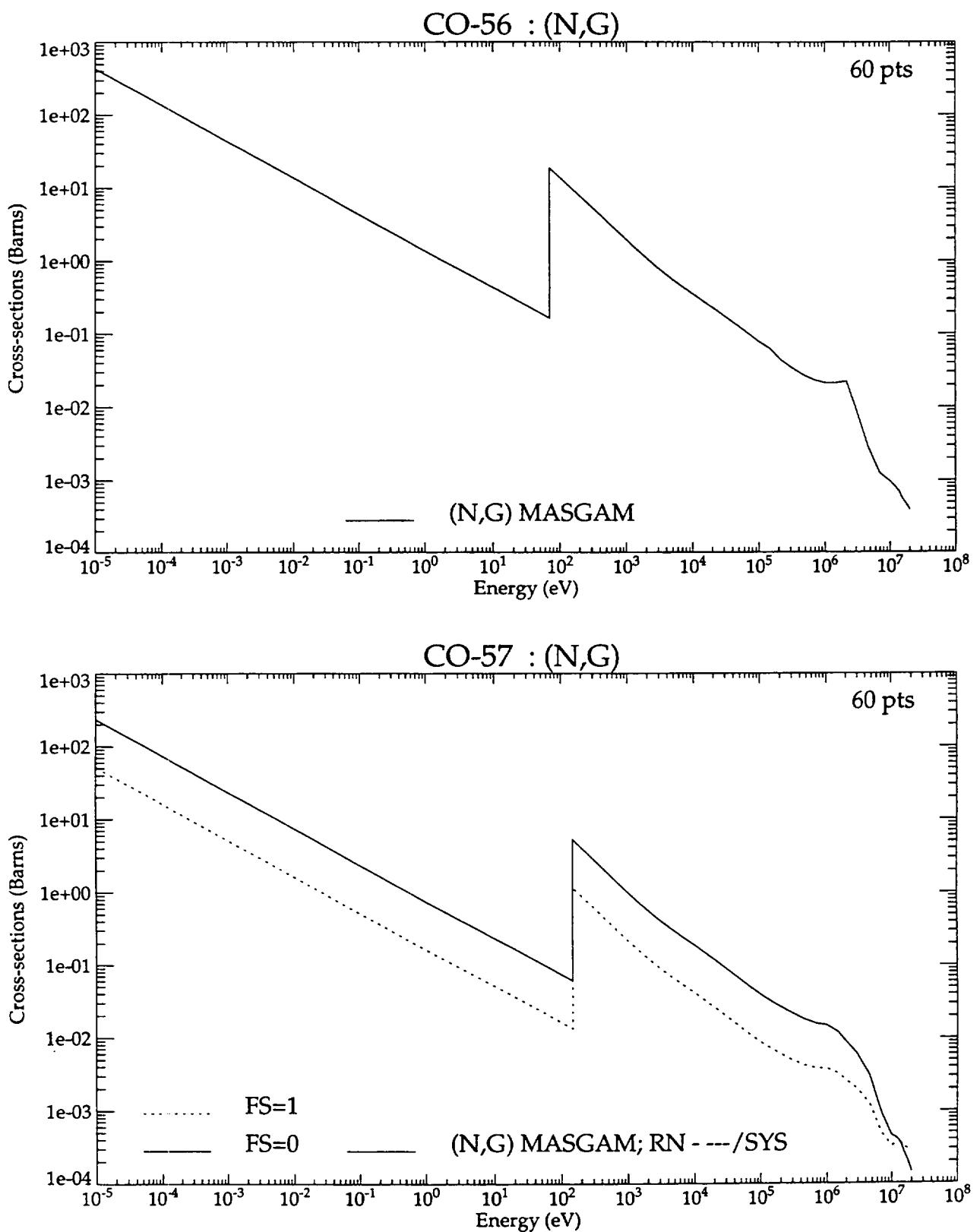


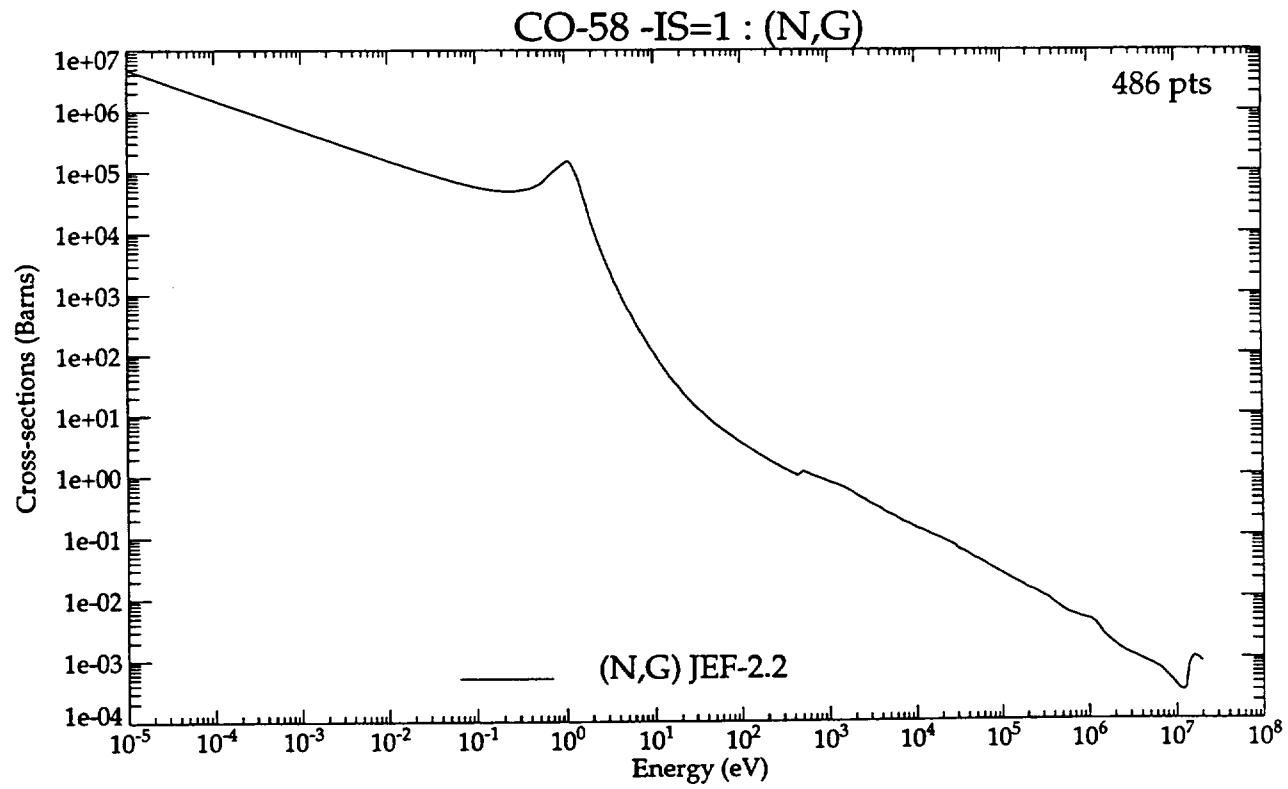
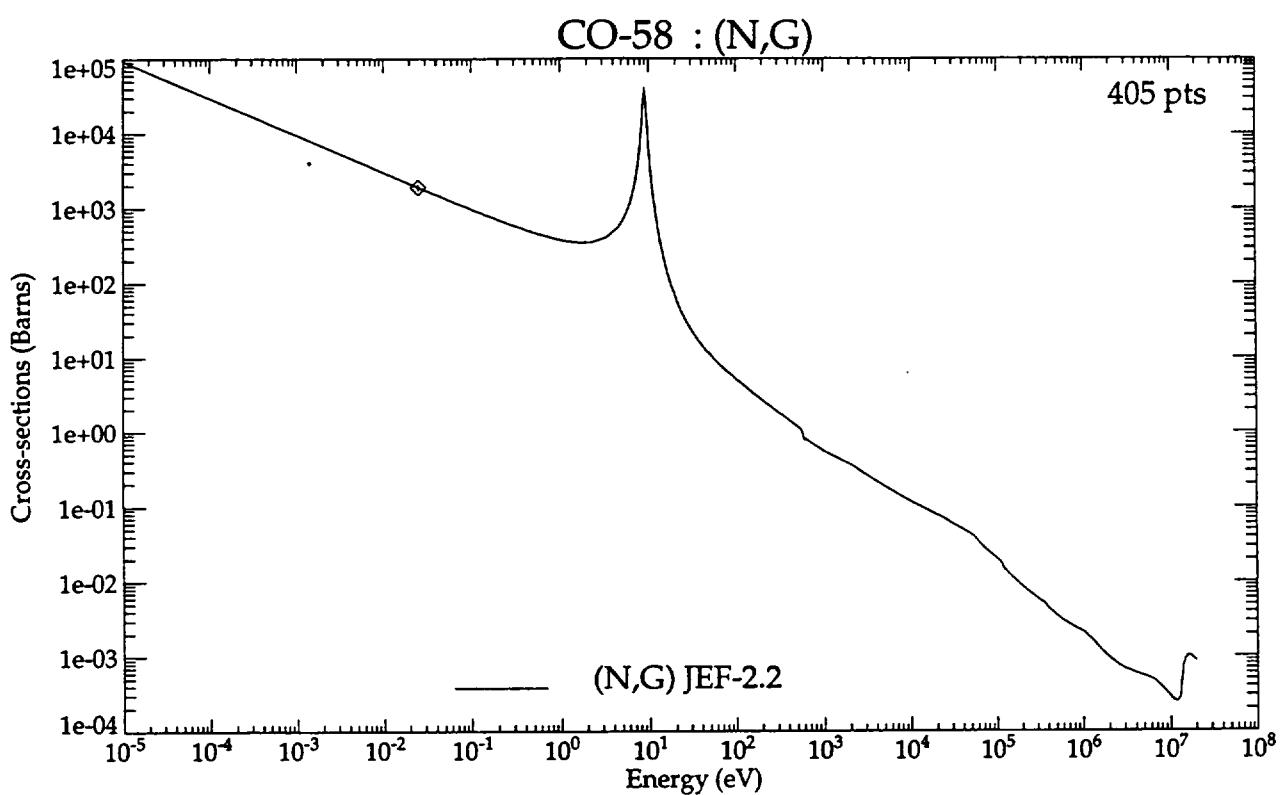


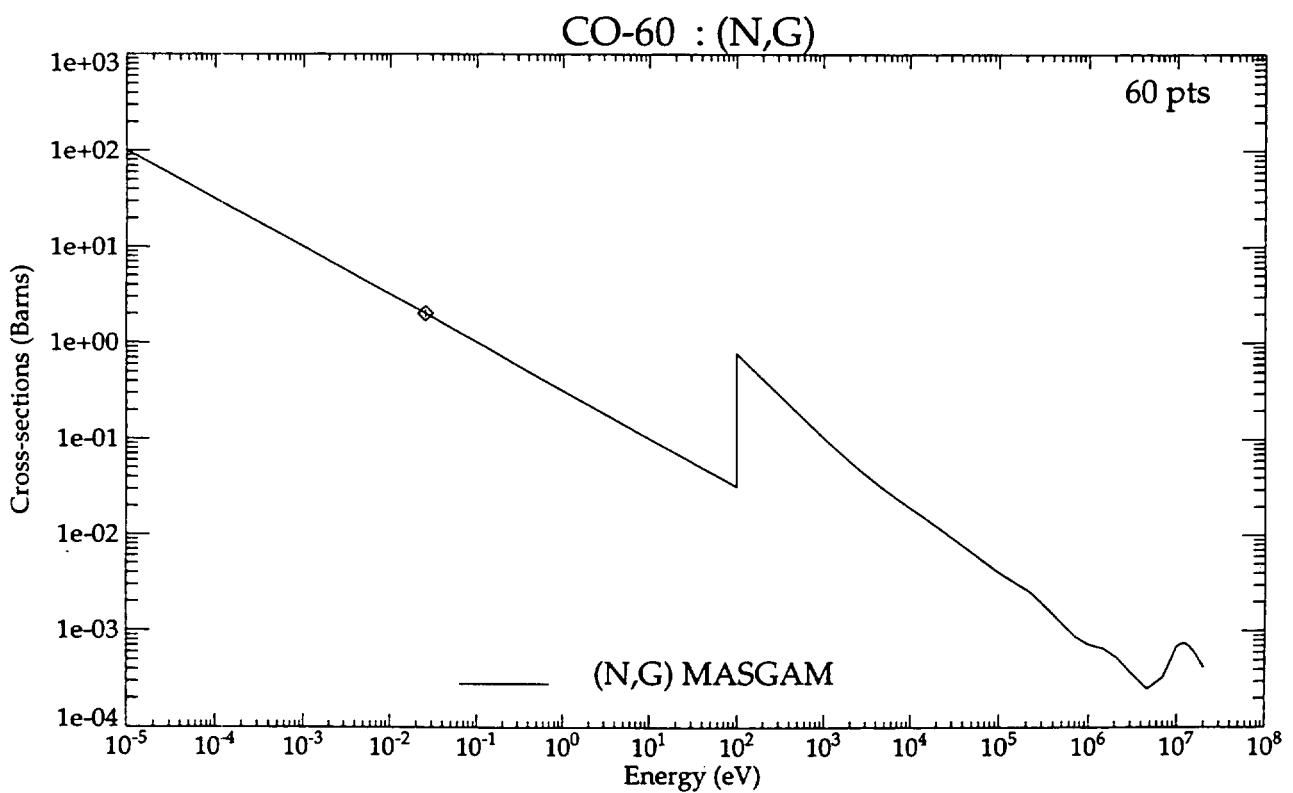
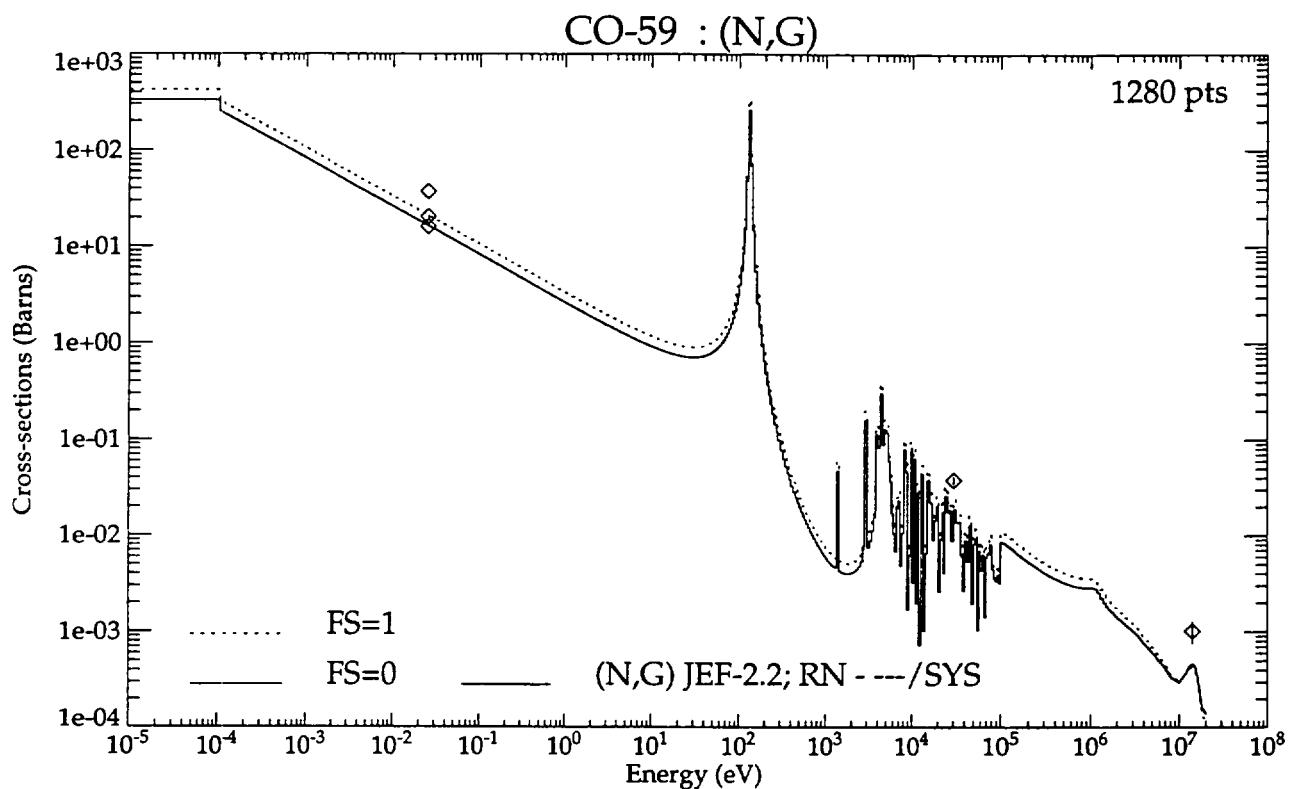


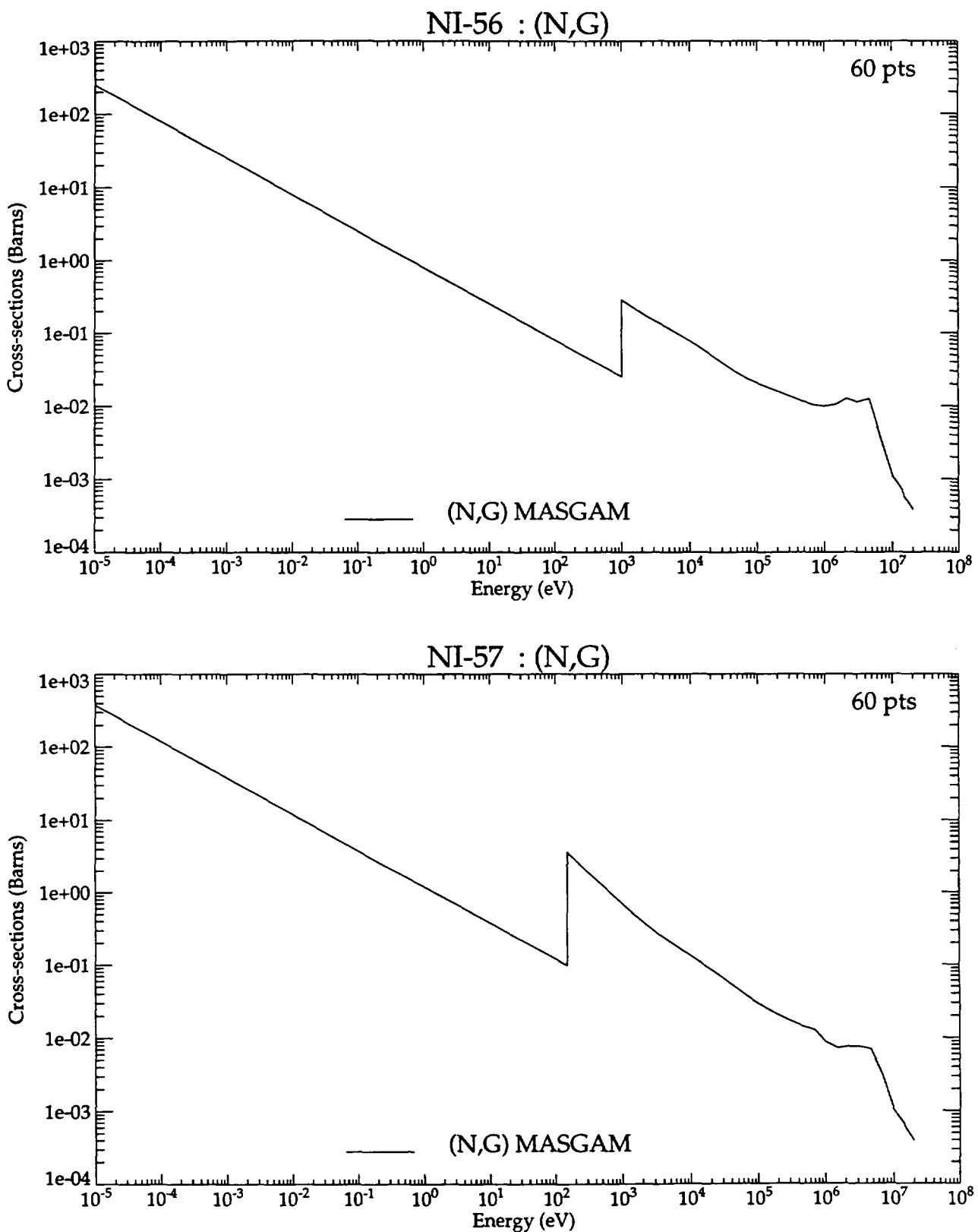


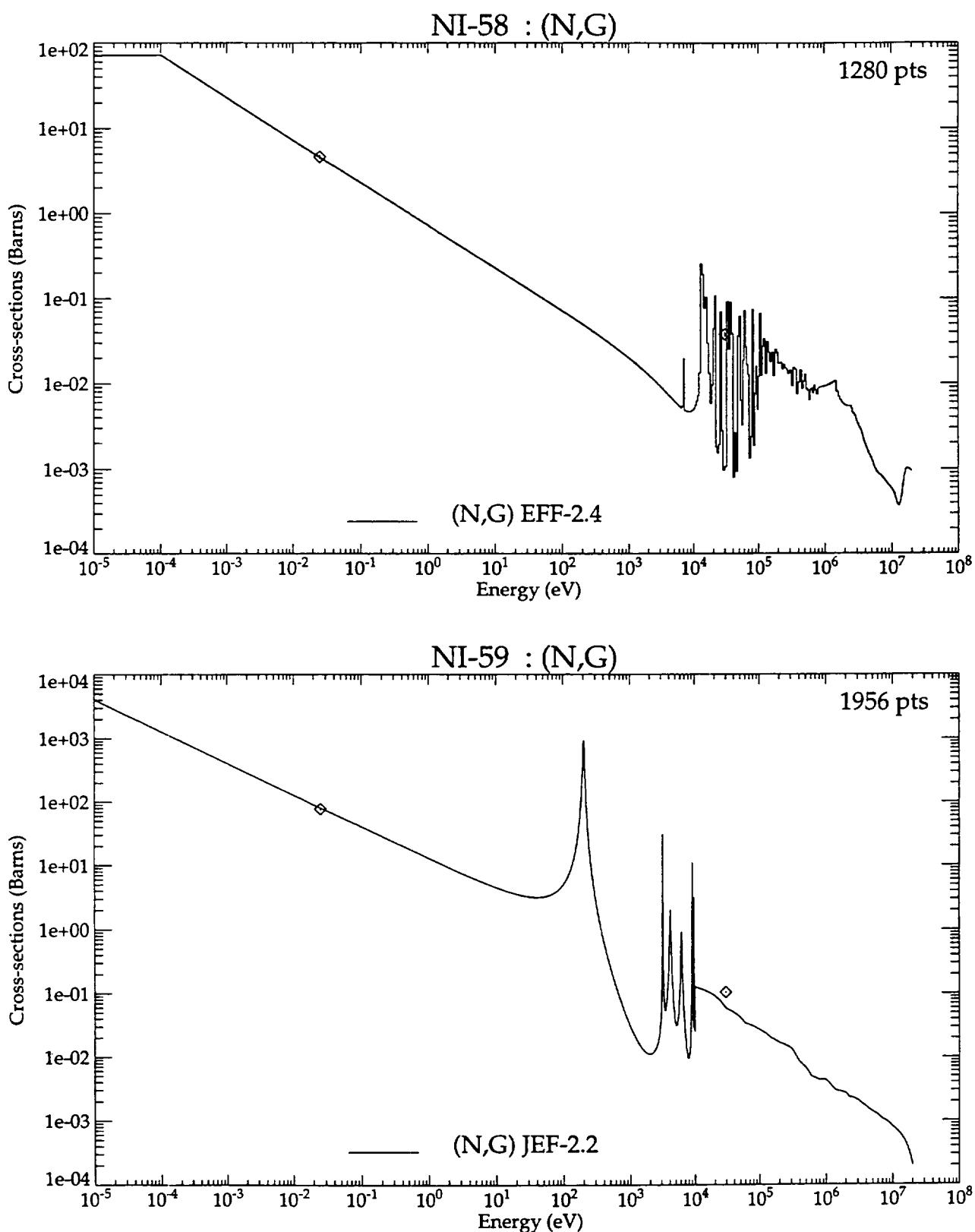


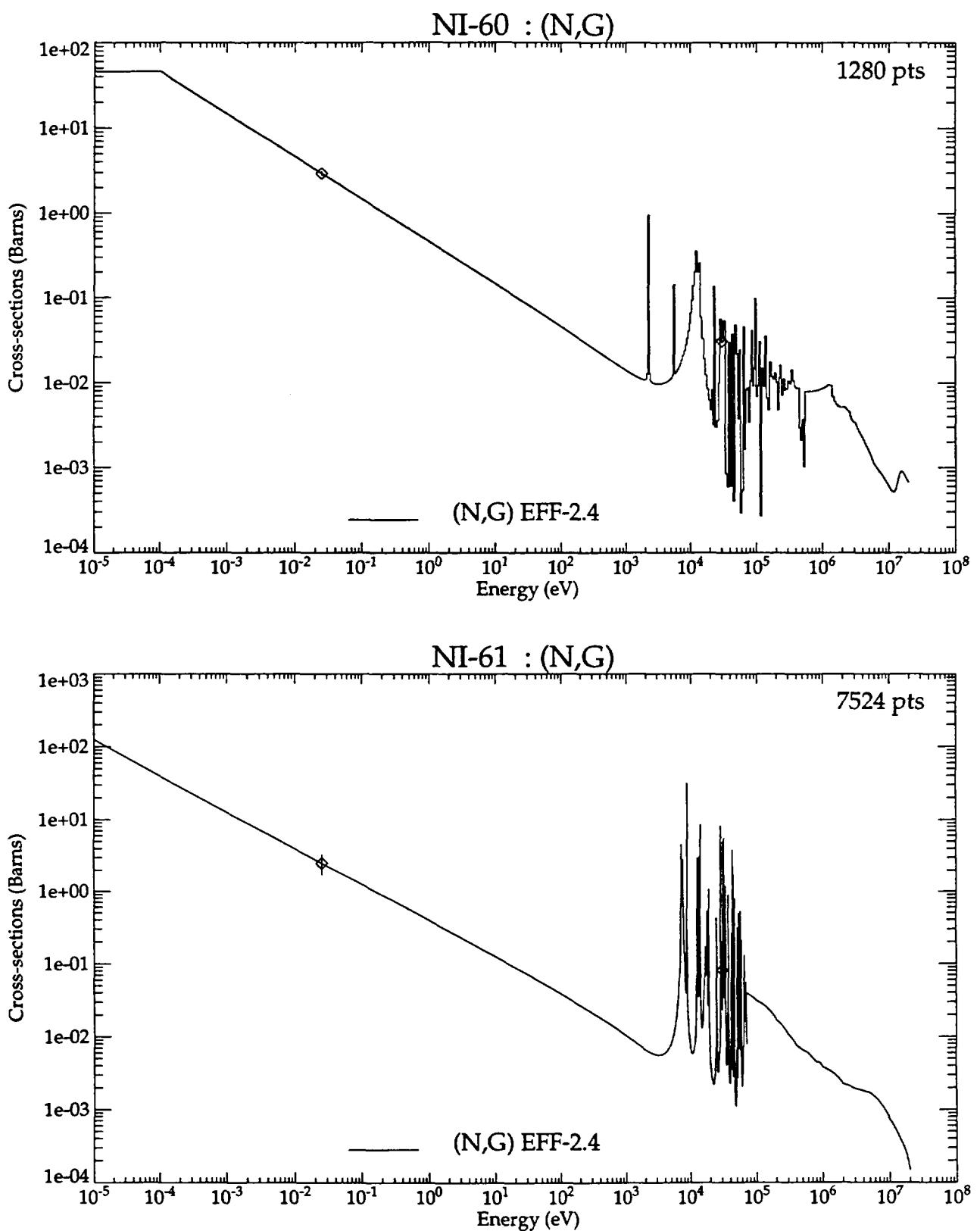


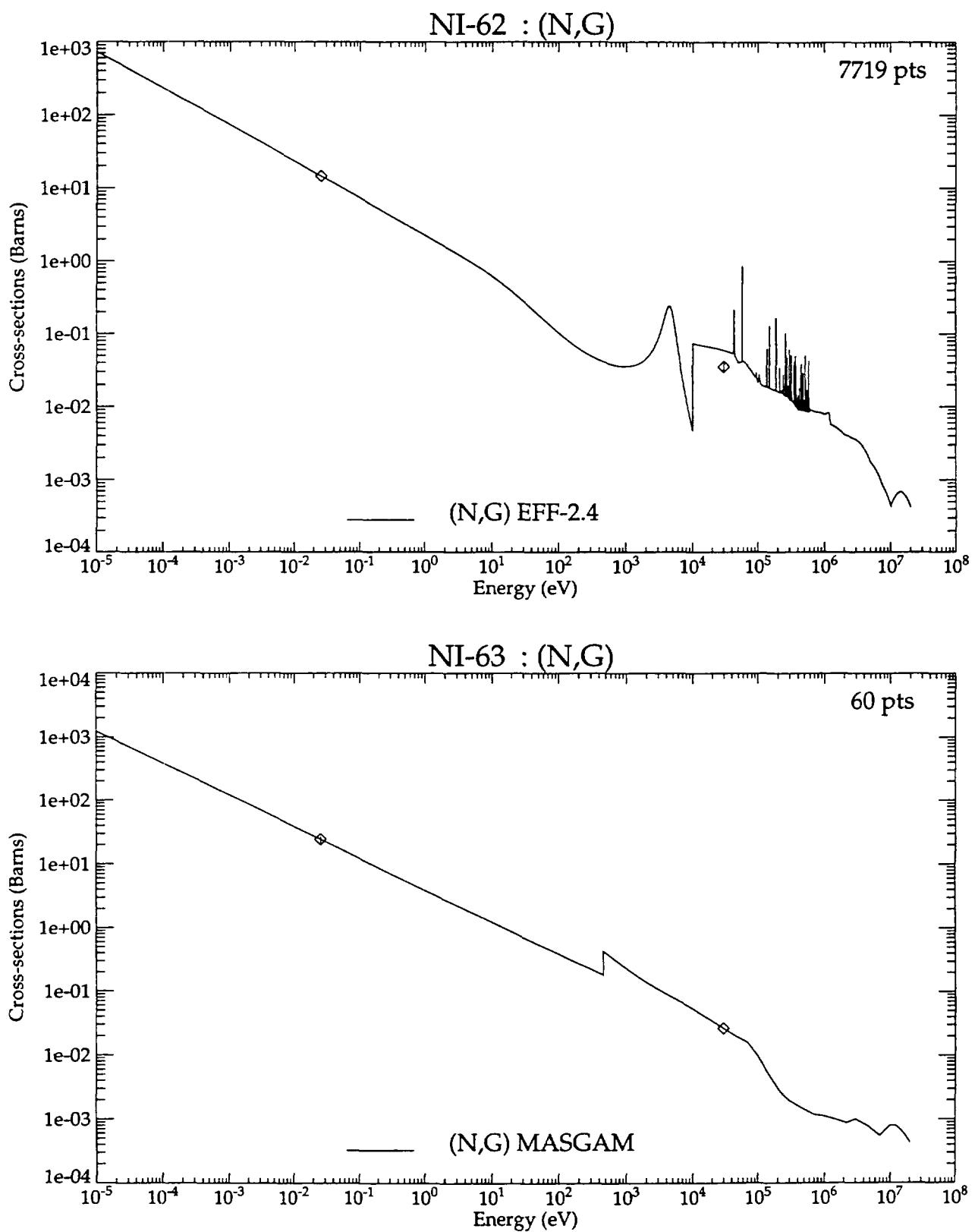


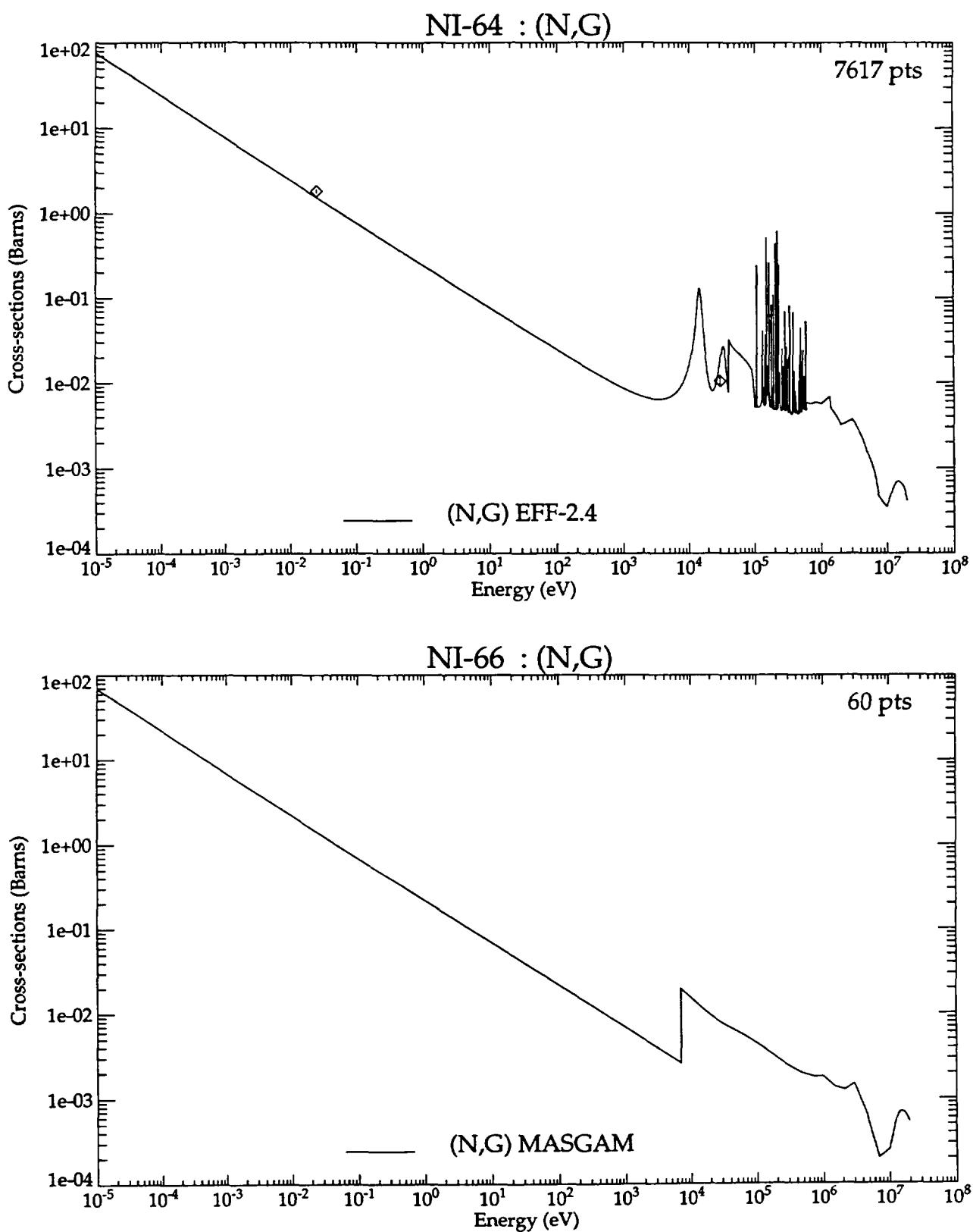


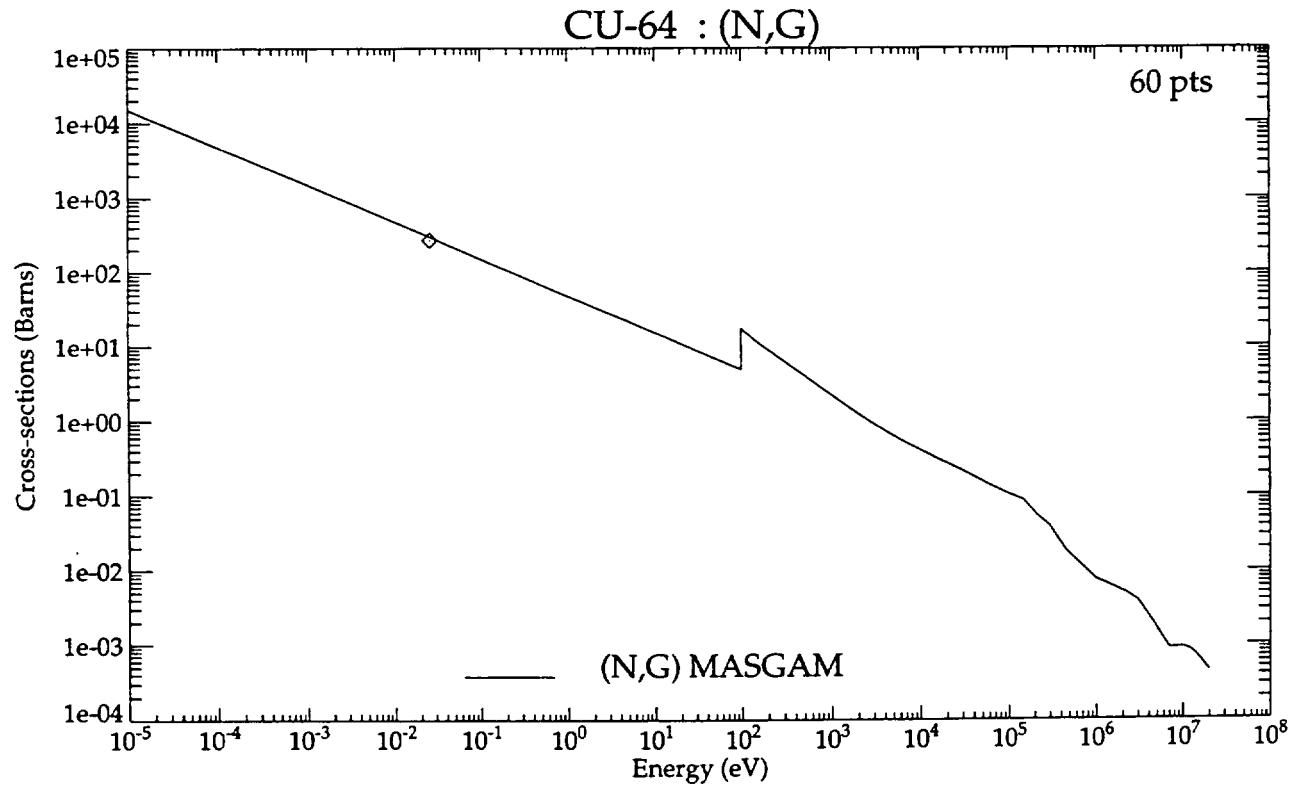
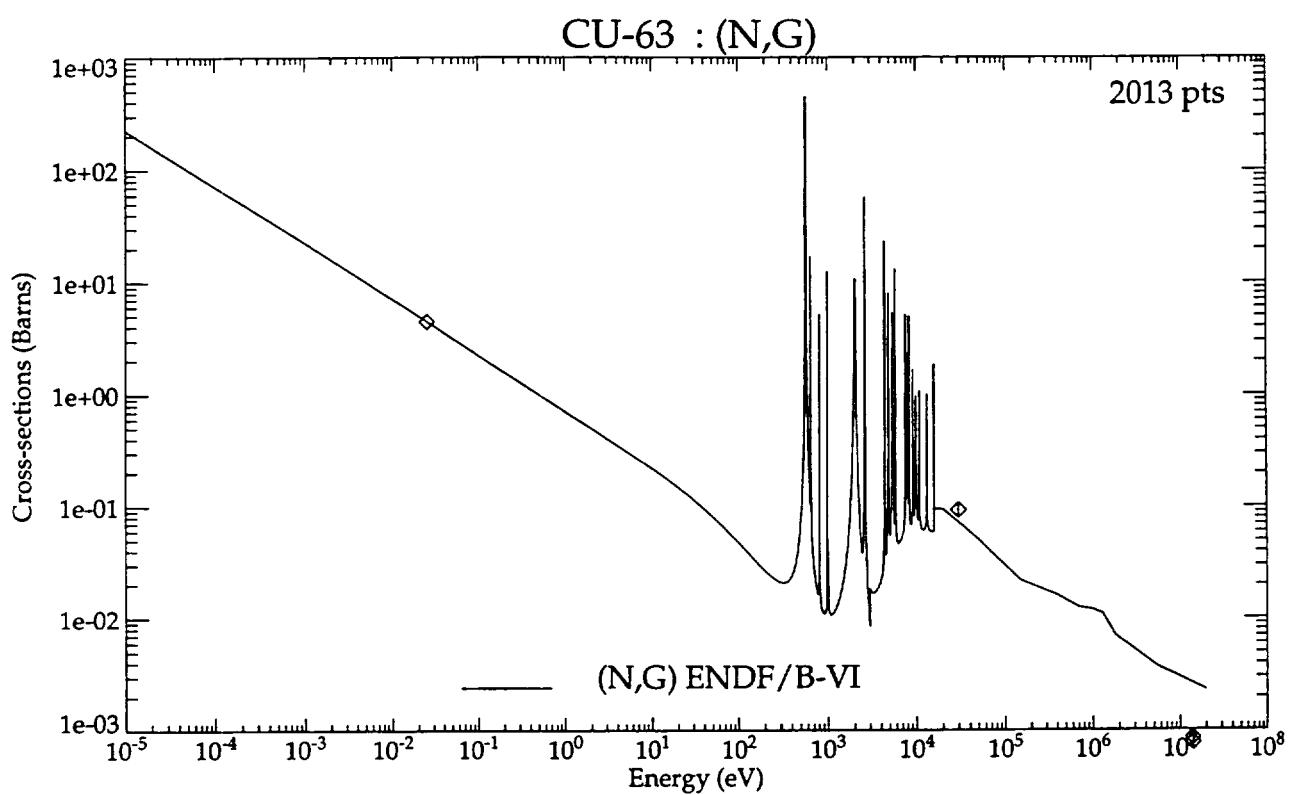


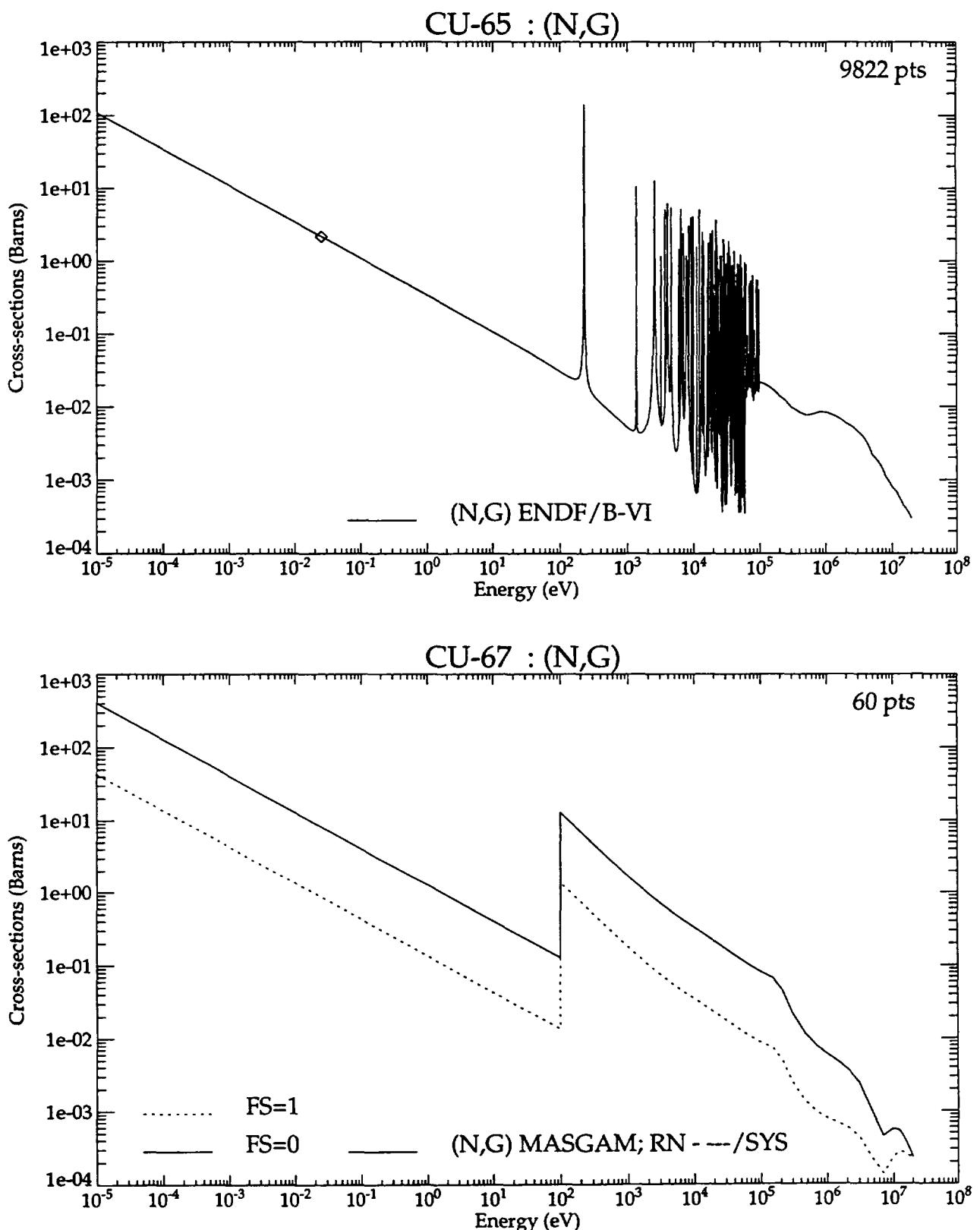


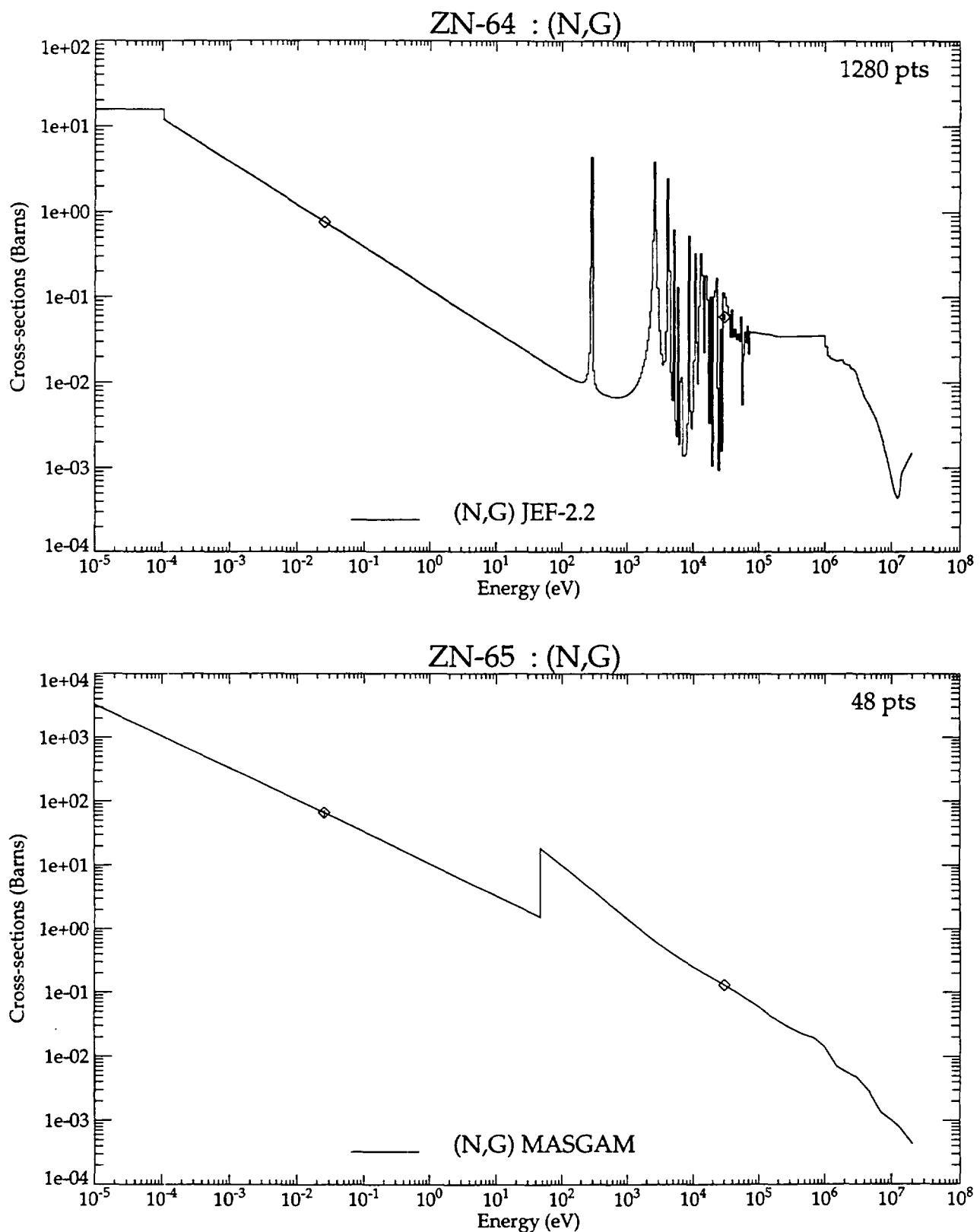


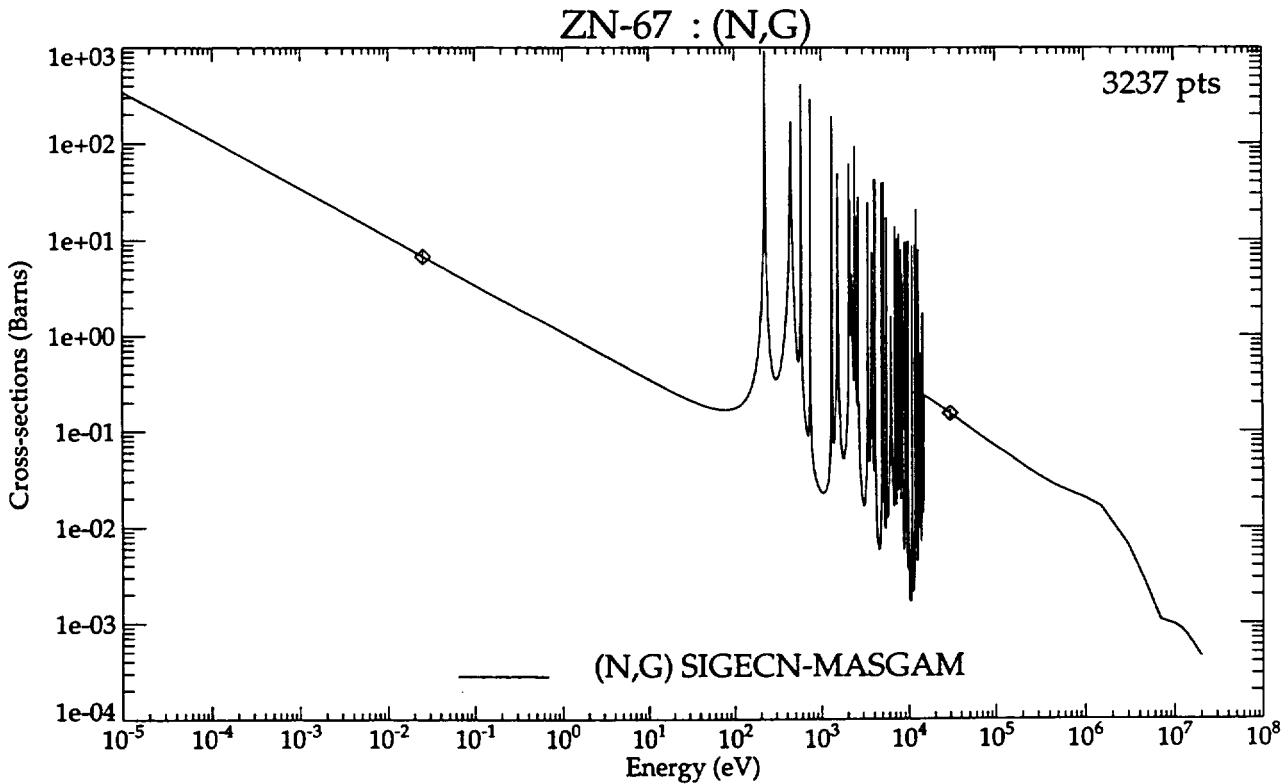
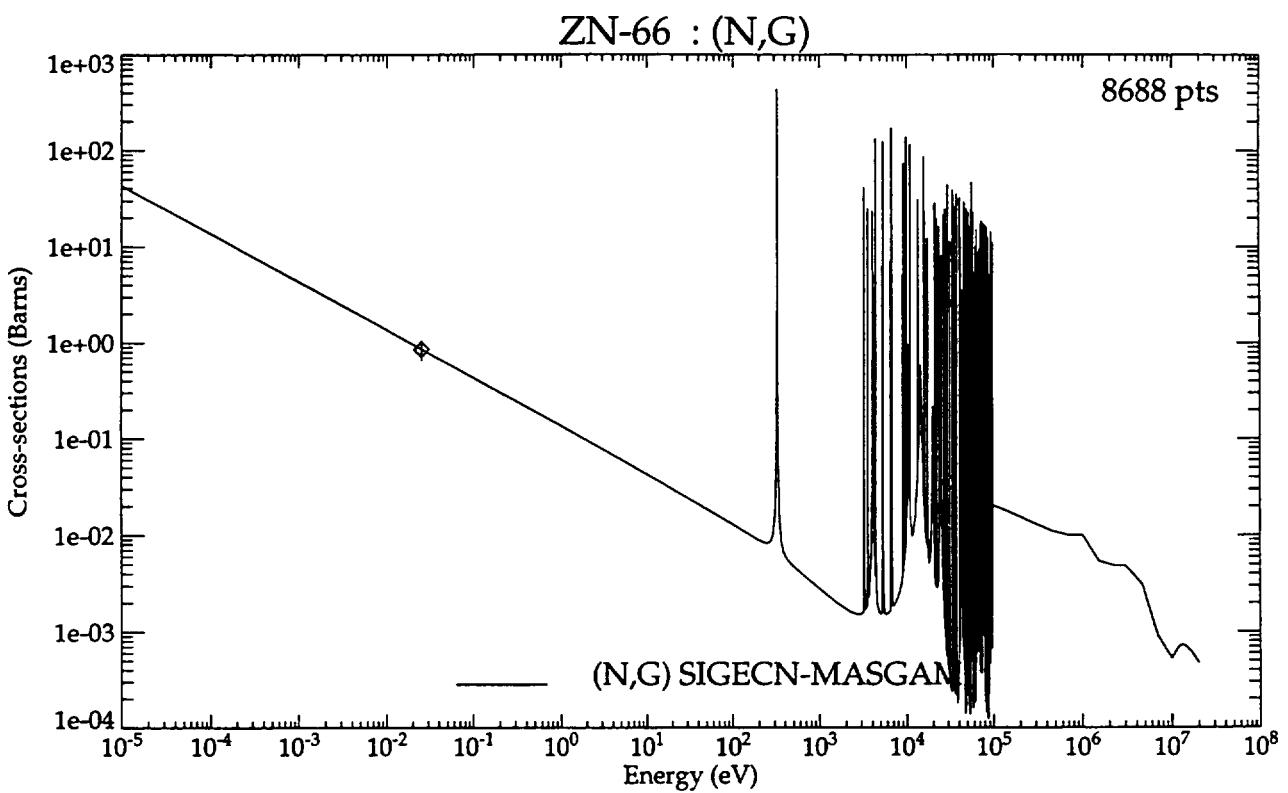


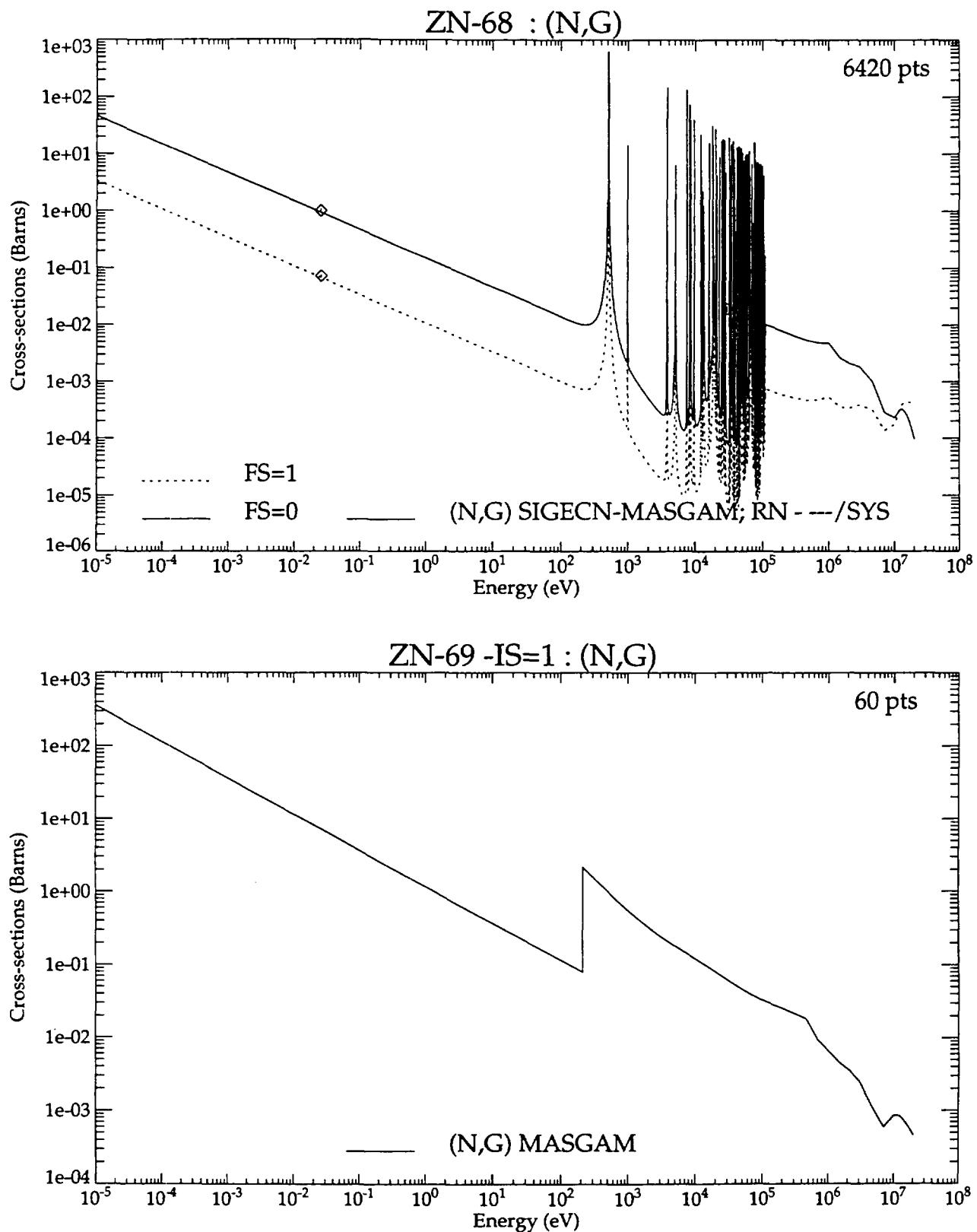


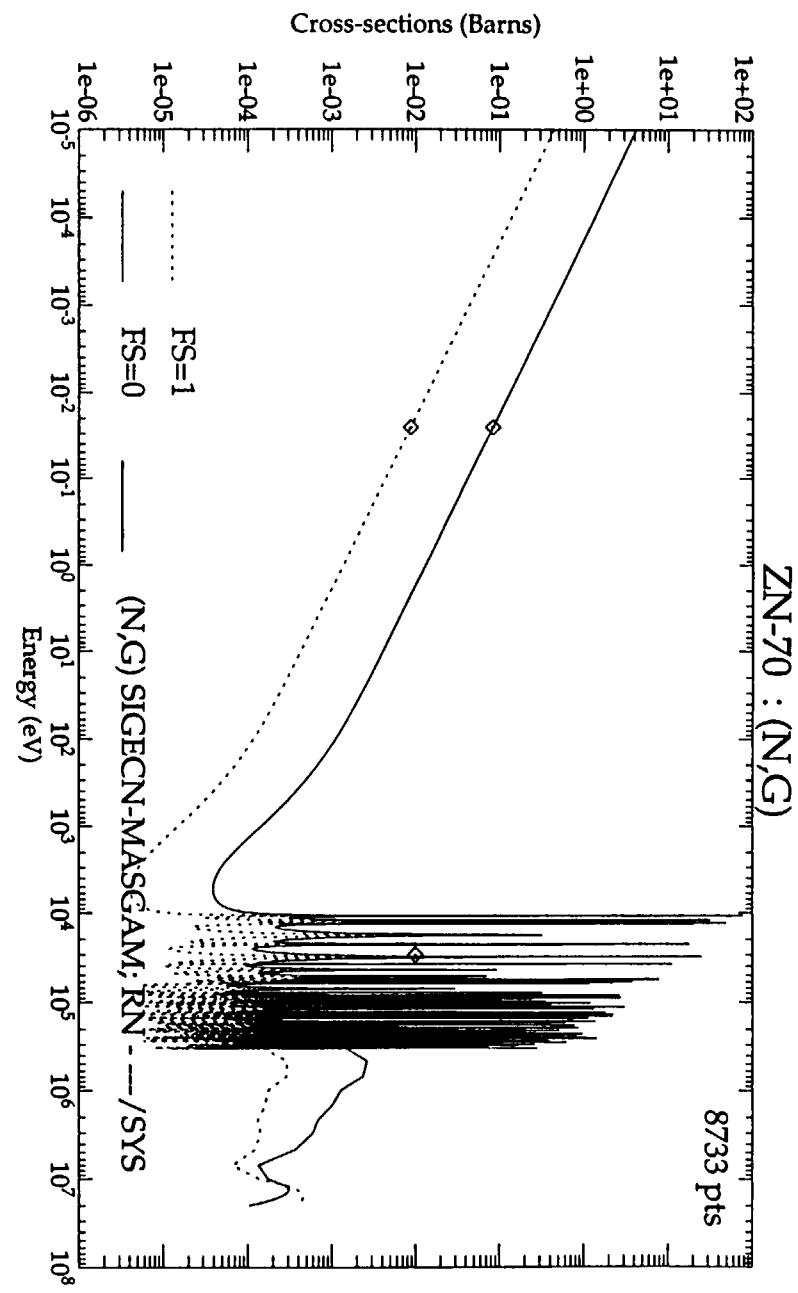
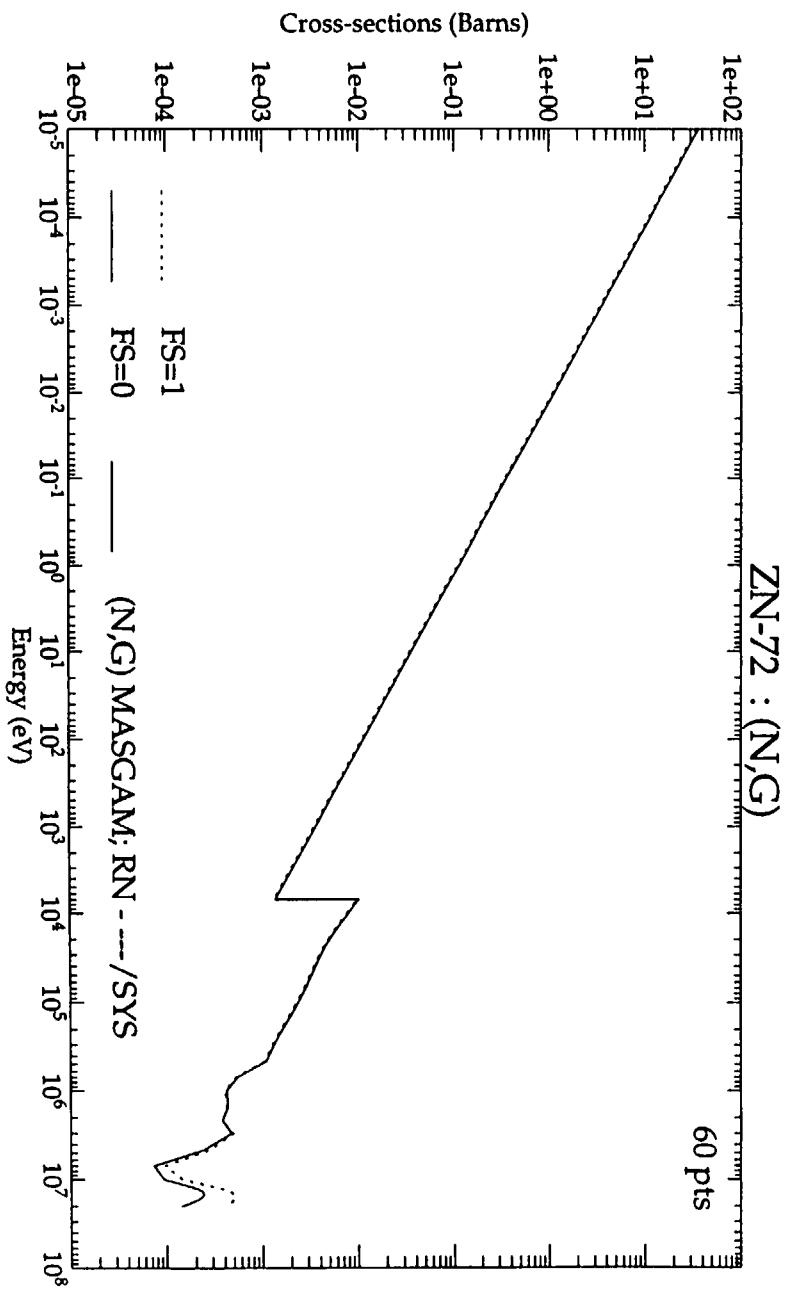


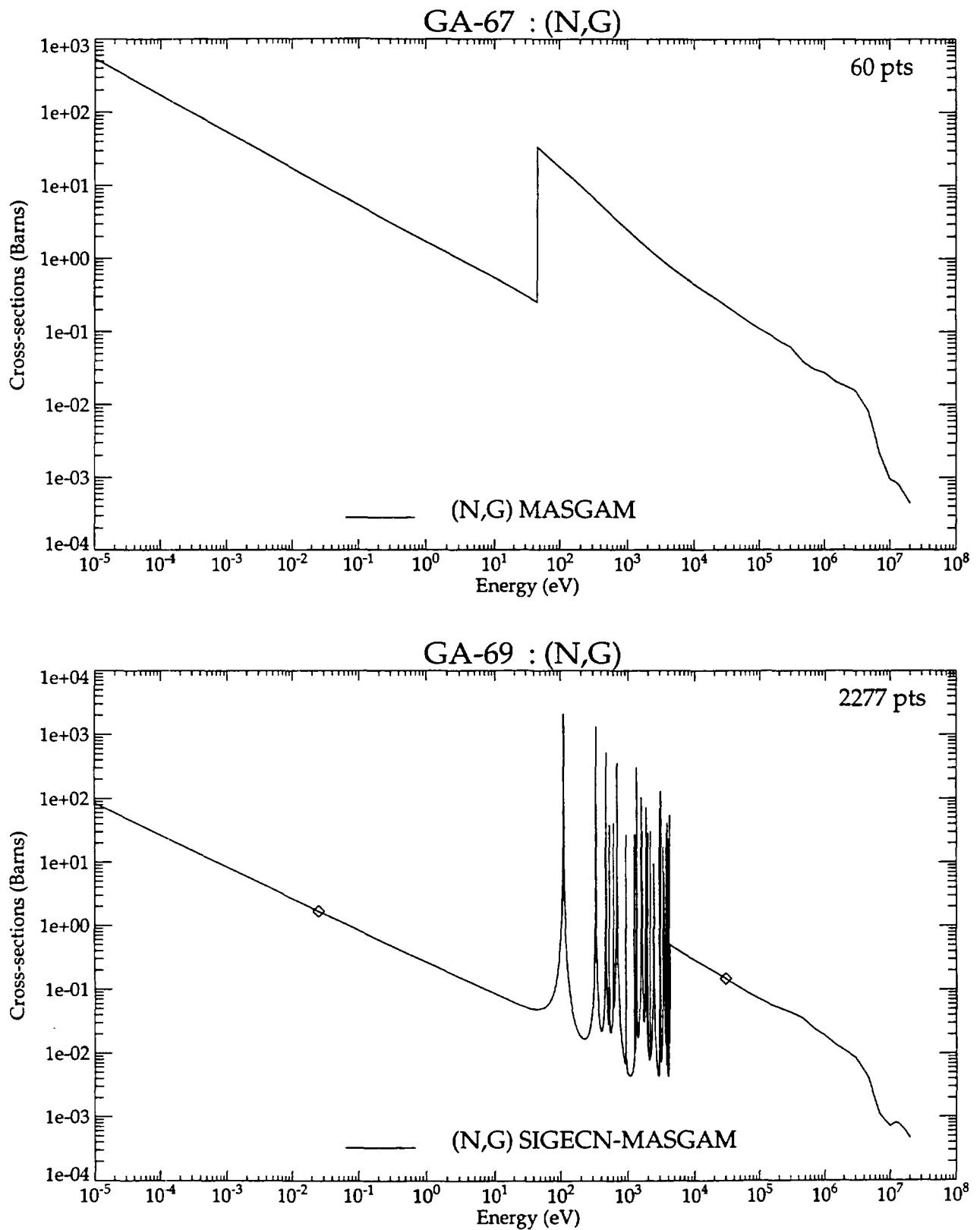


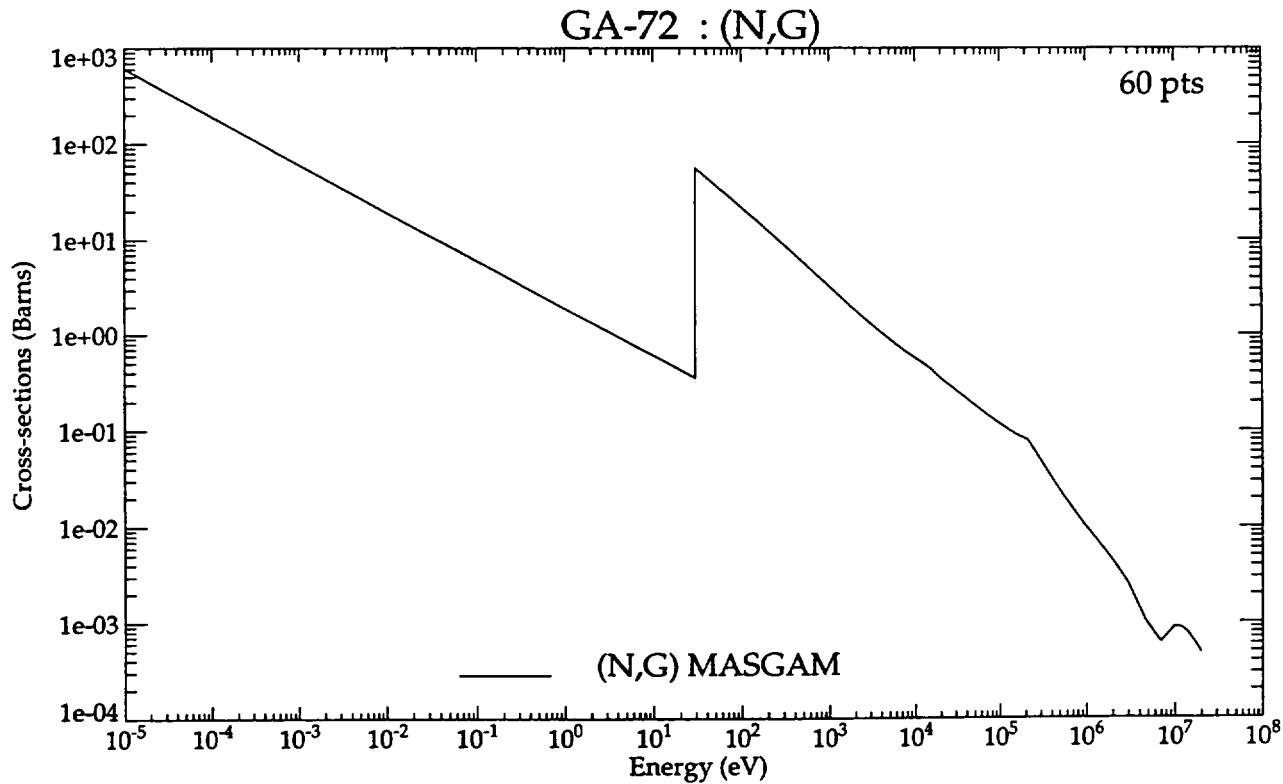
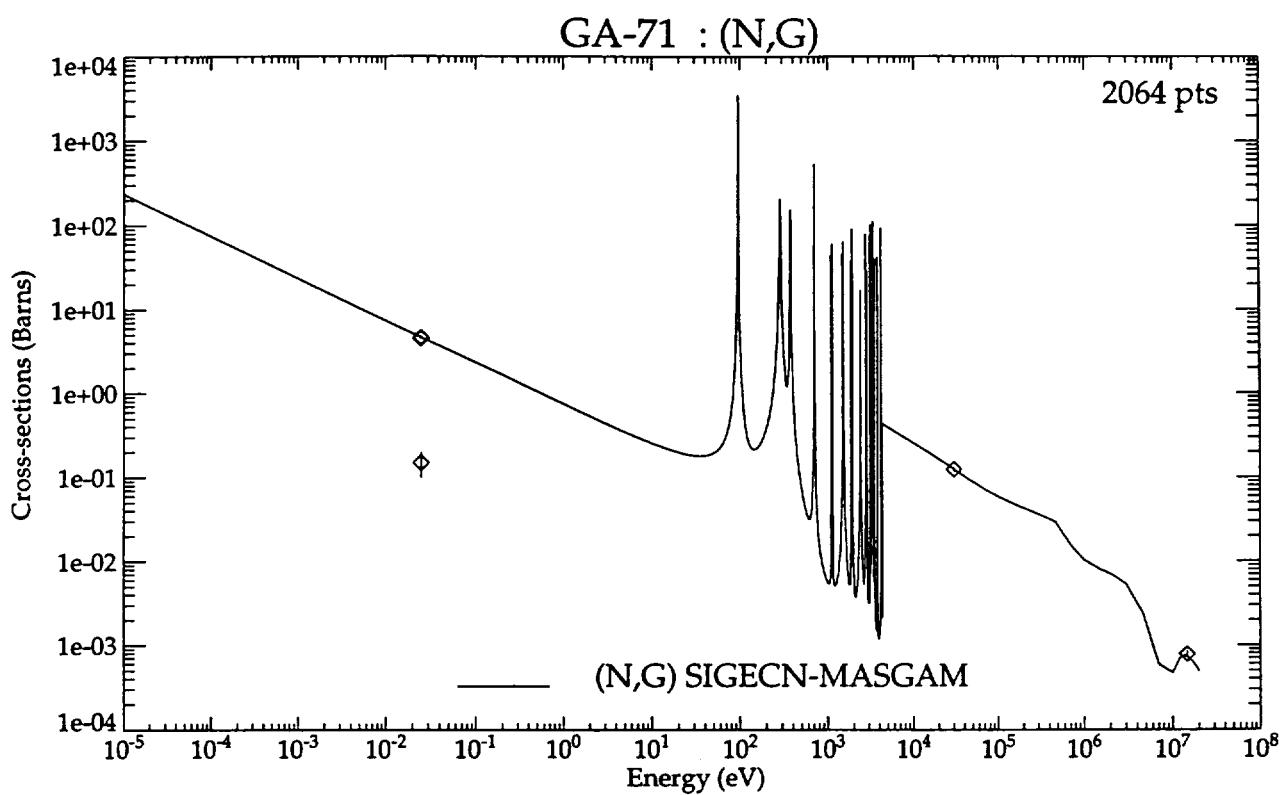


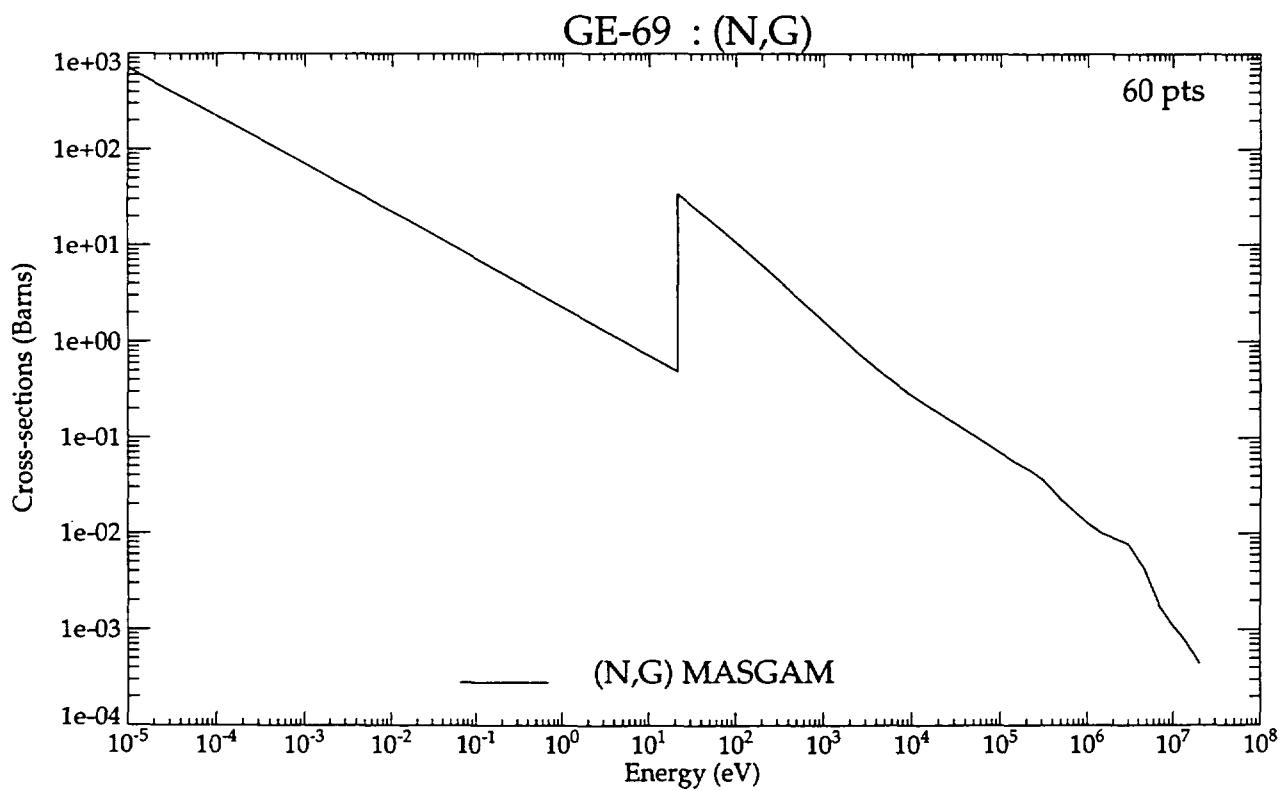
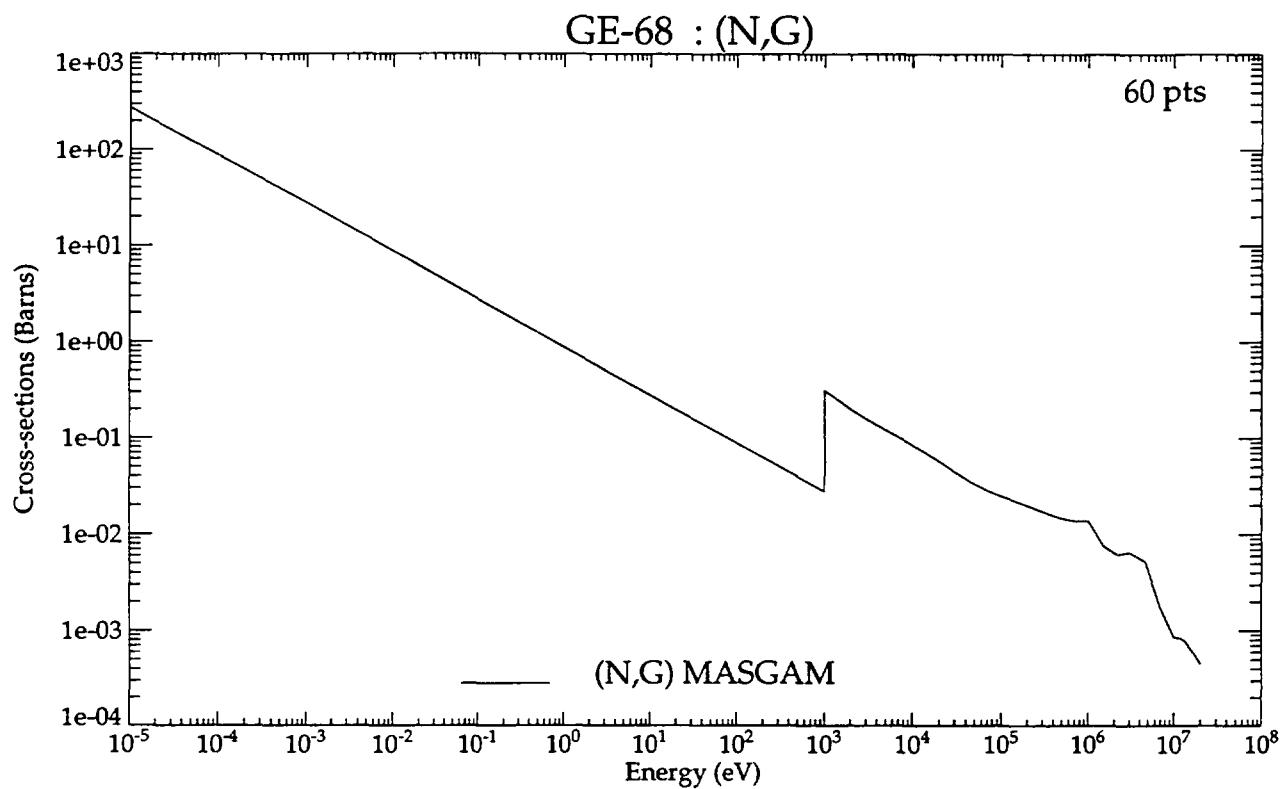


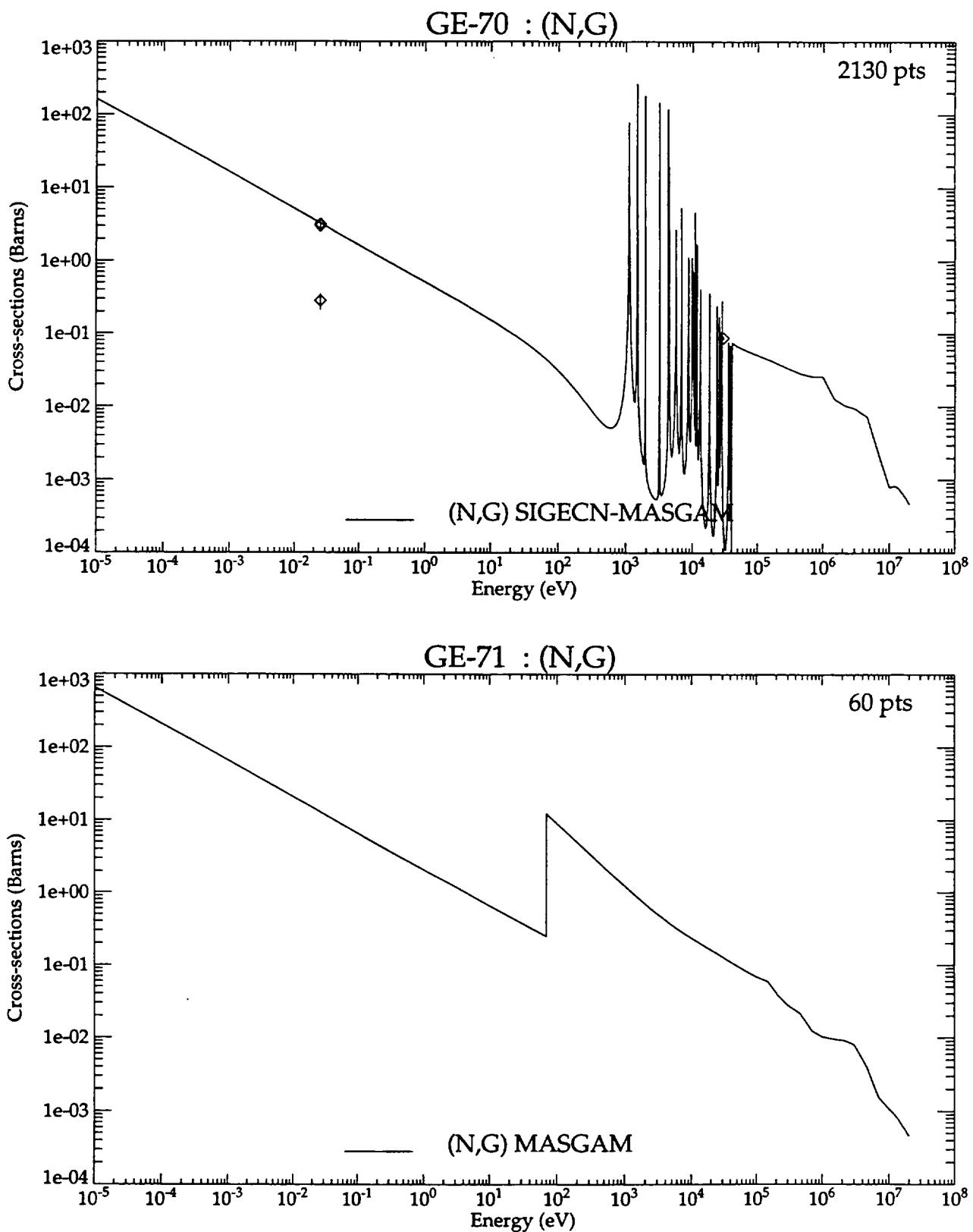


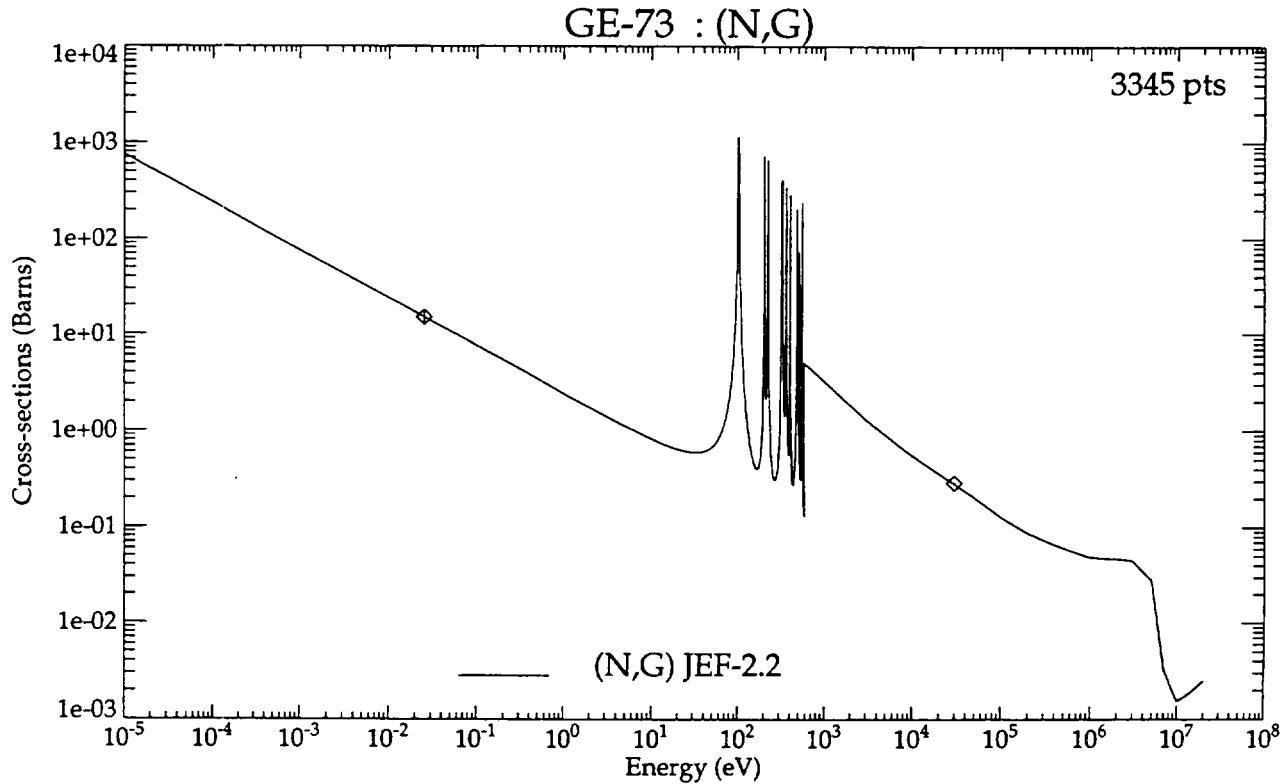
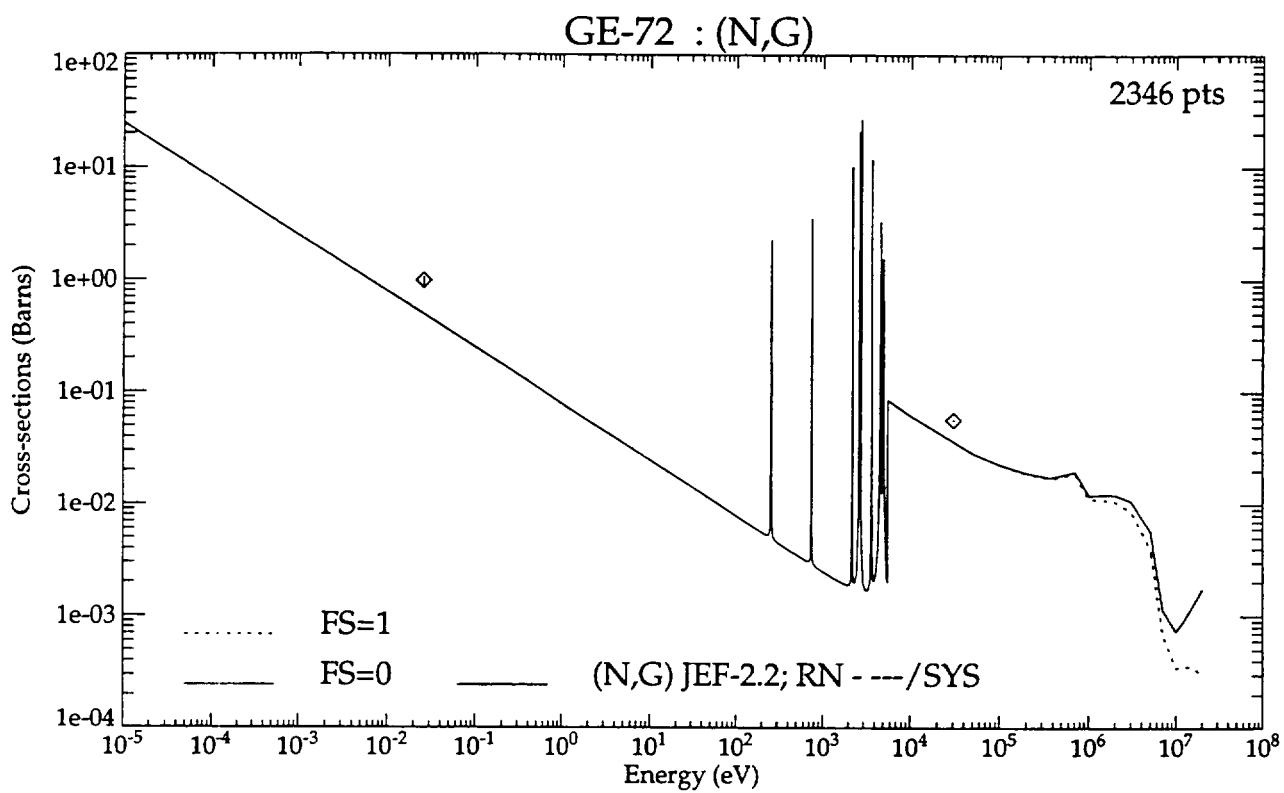




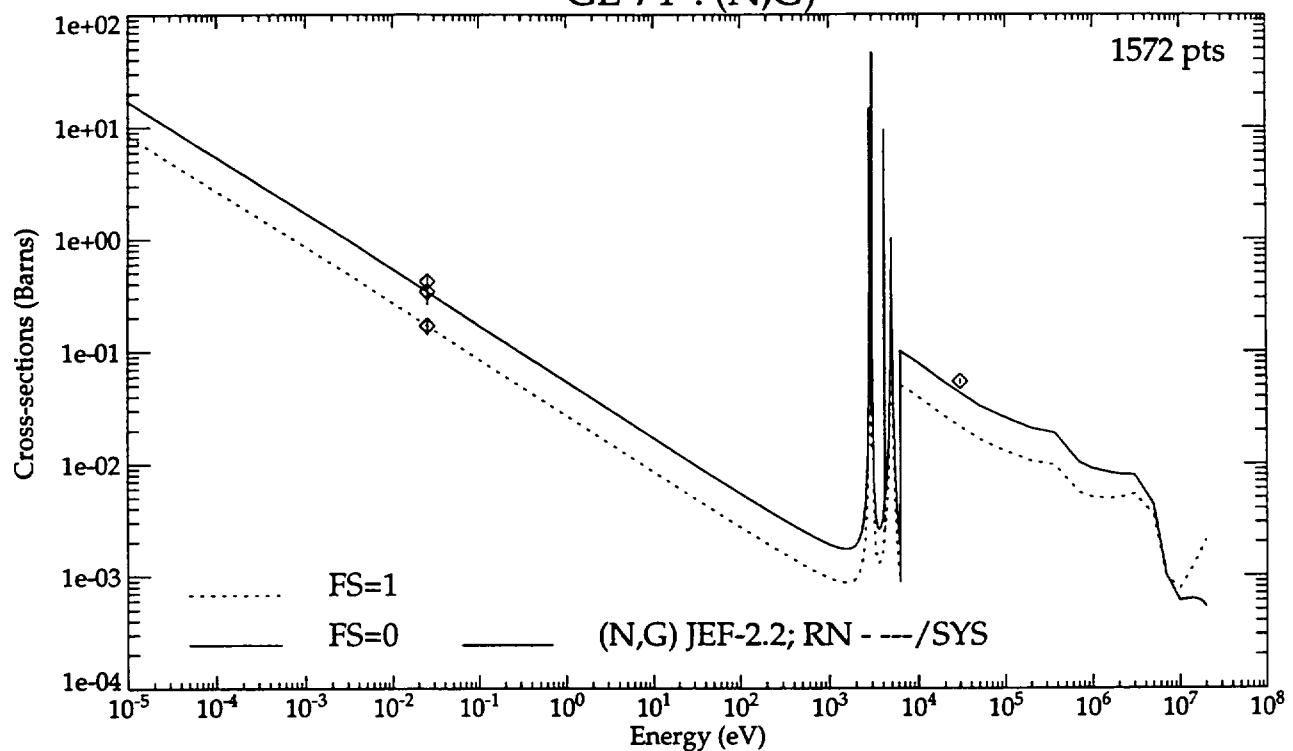




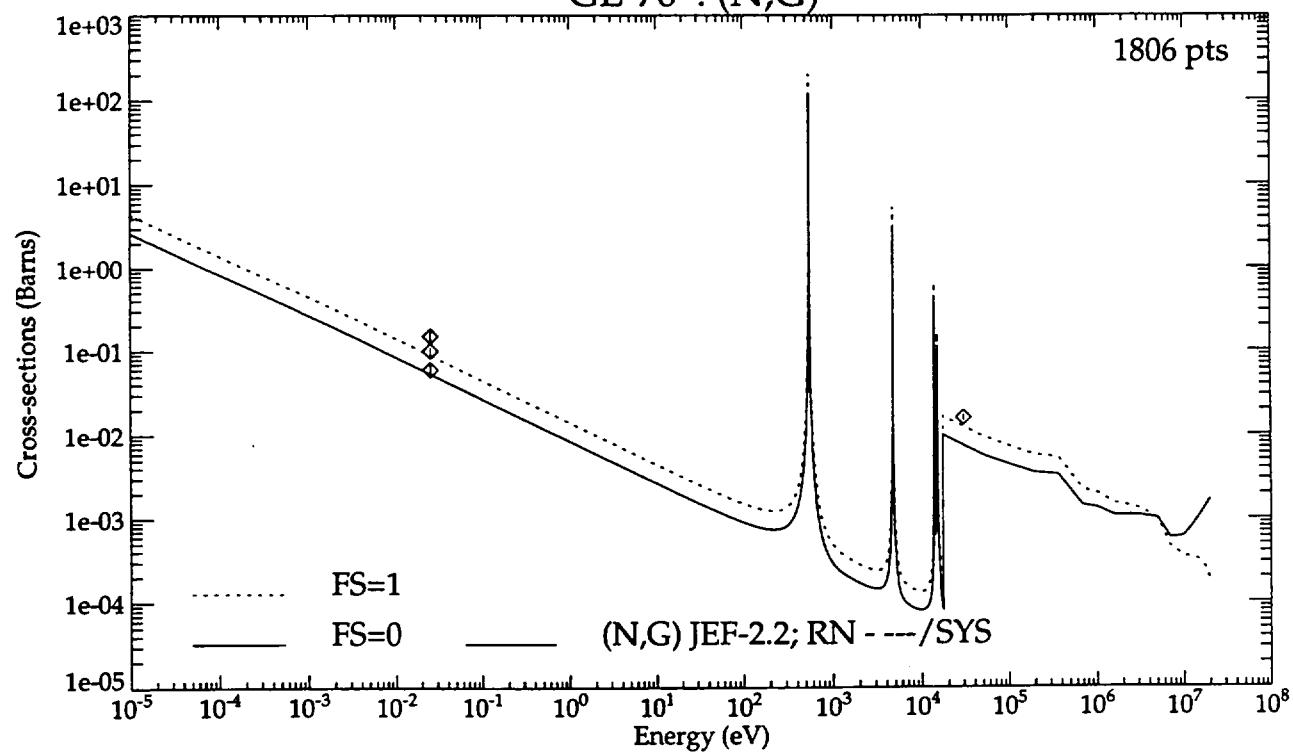


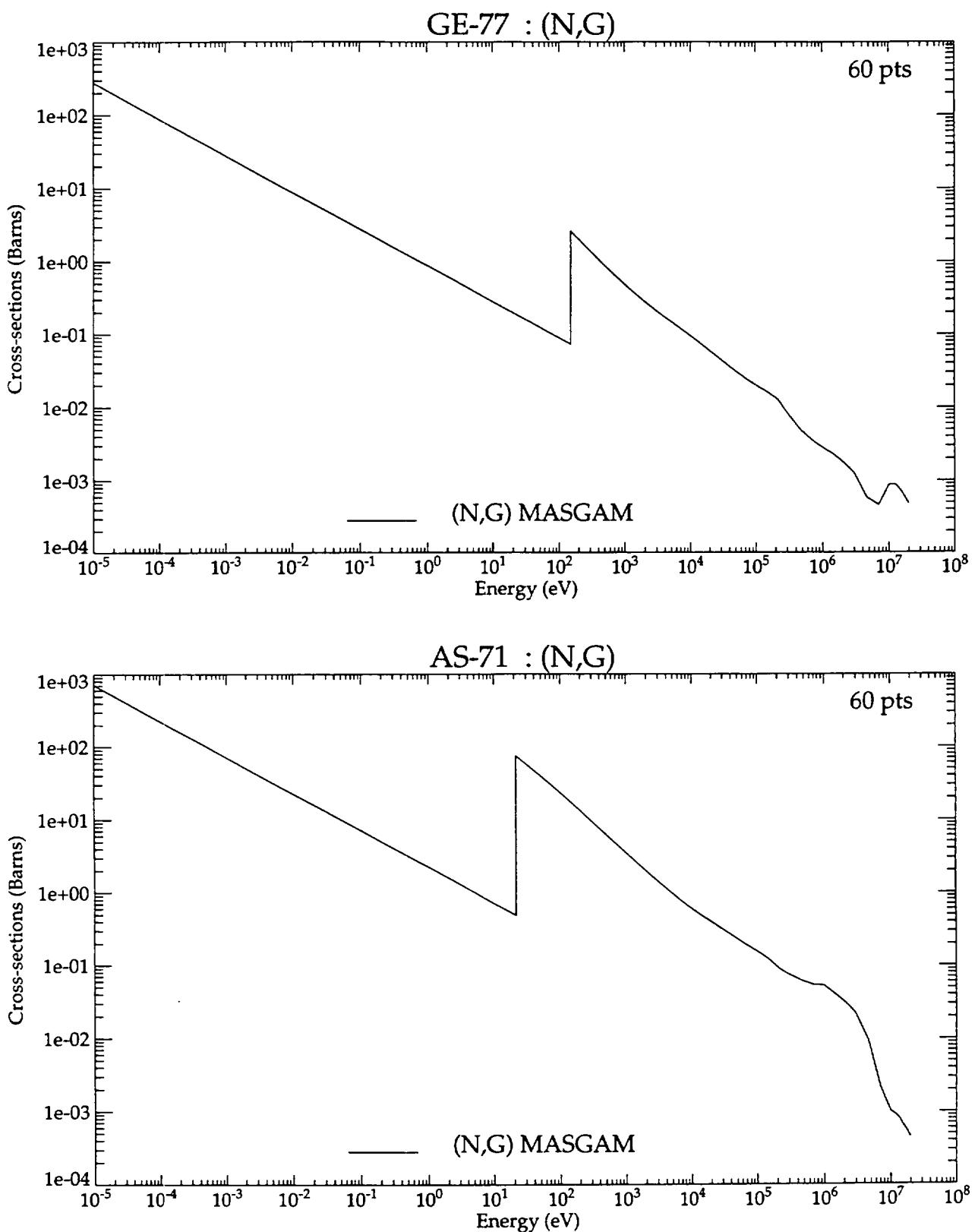


GE-74 : (N,G)

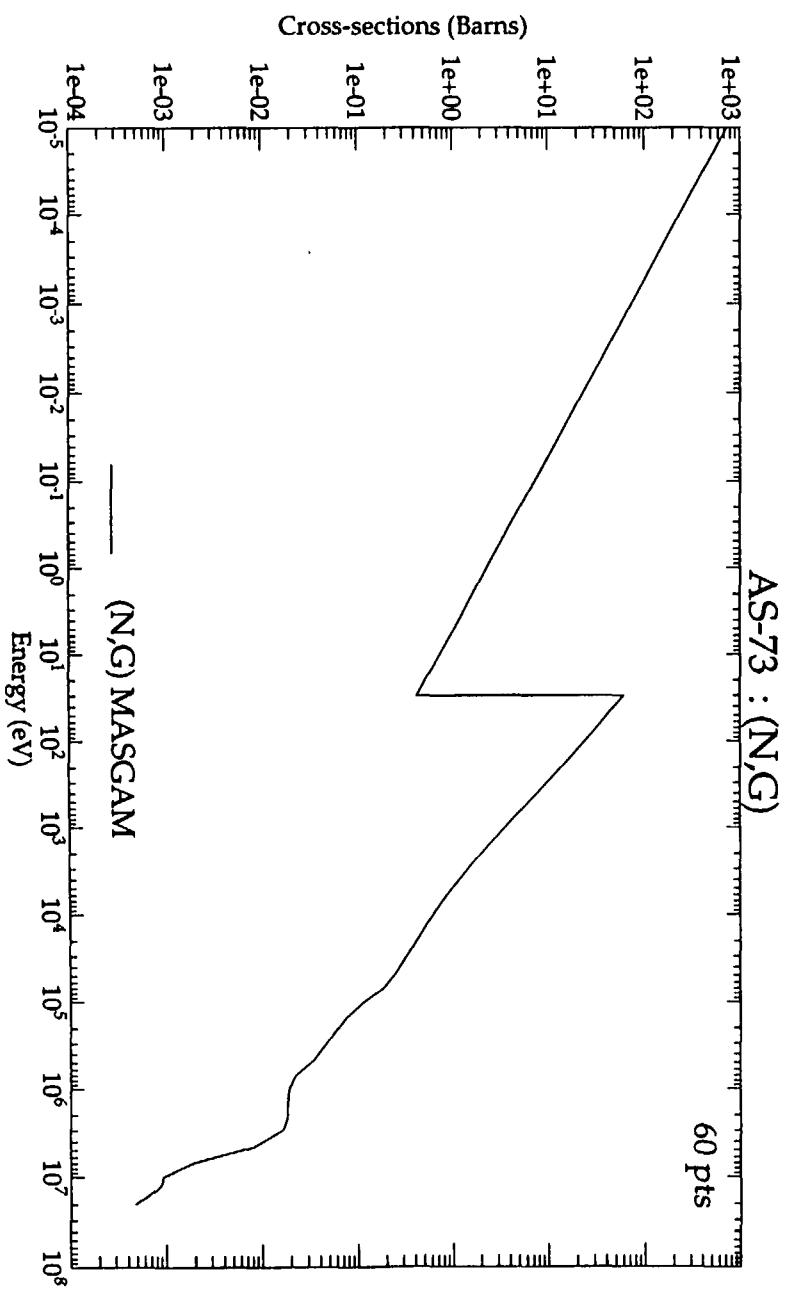
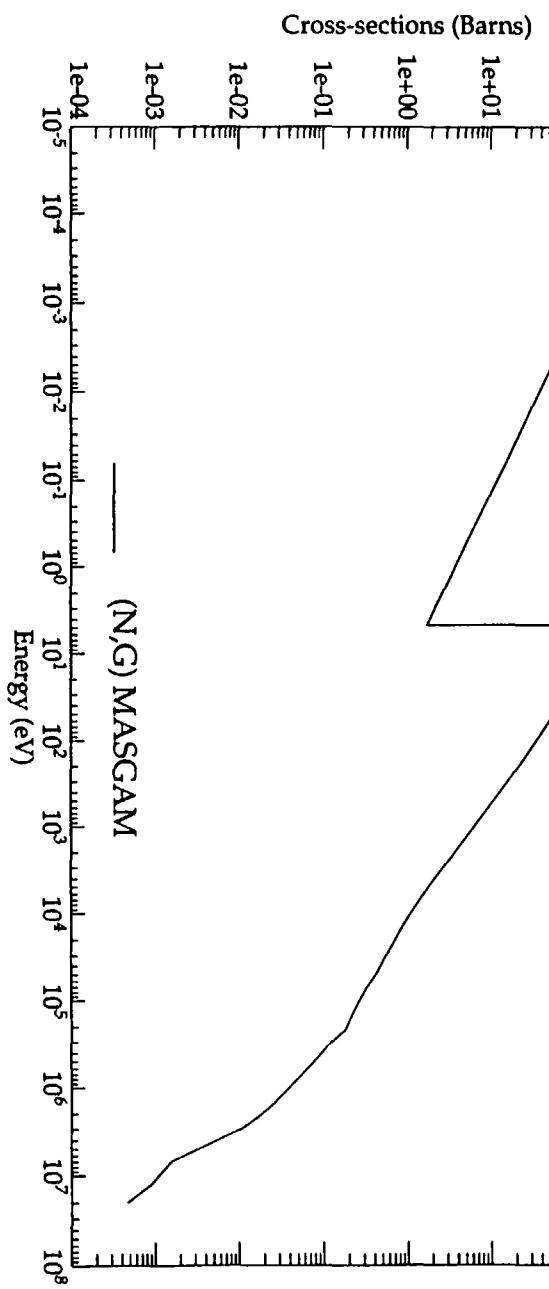
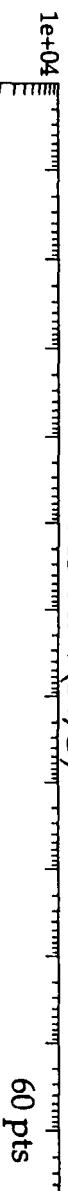


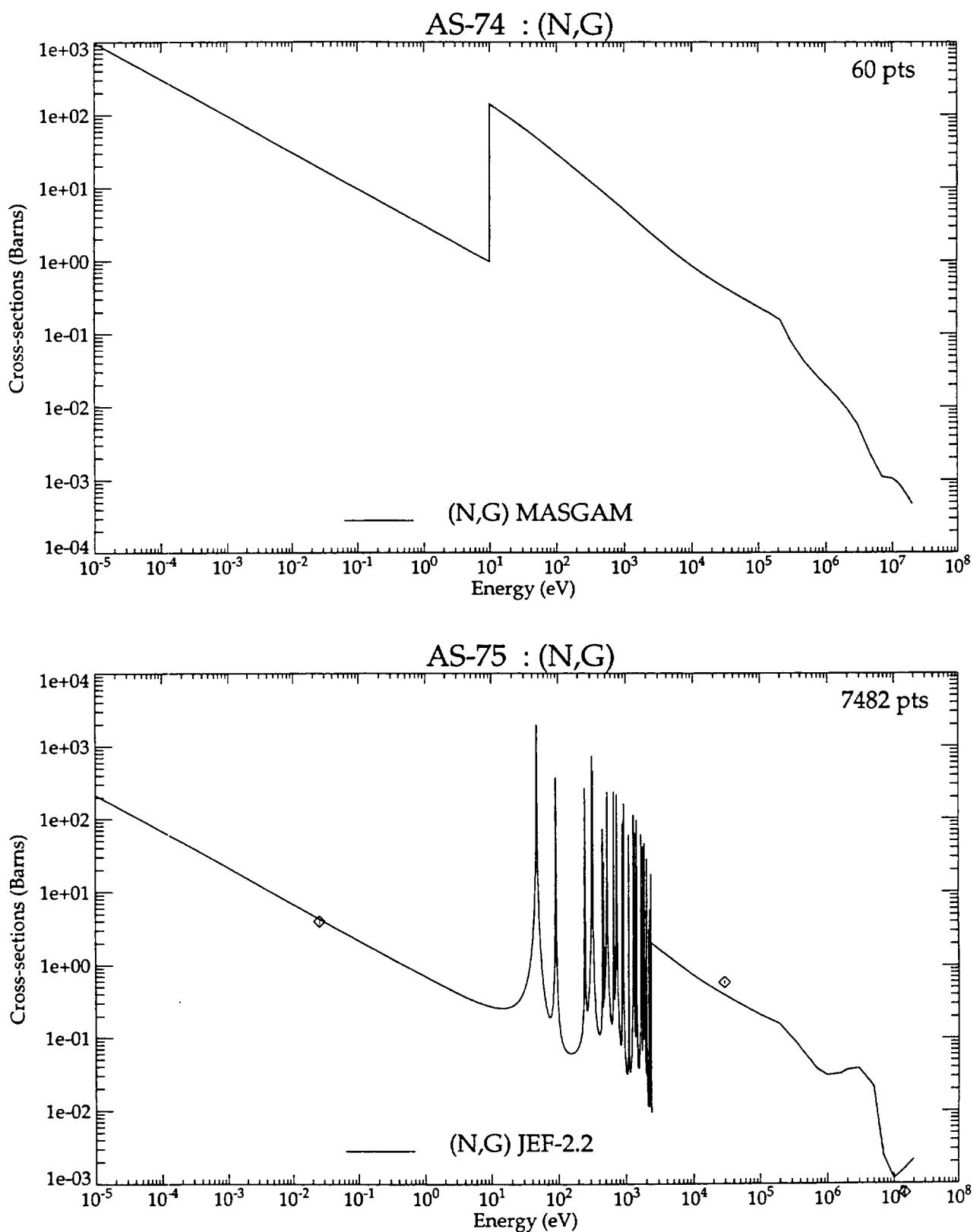
GE-76 : (N,G)

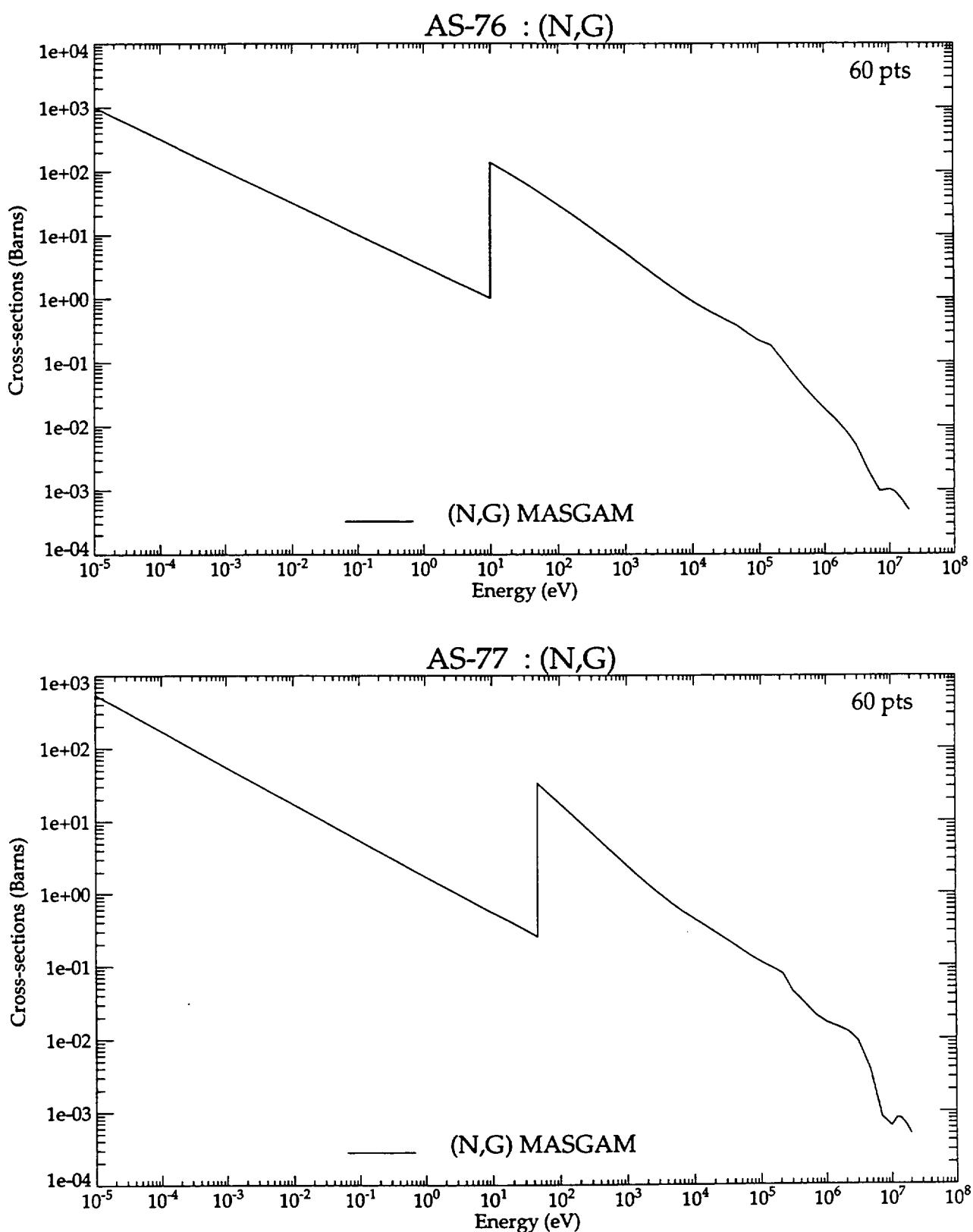




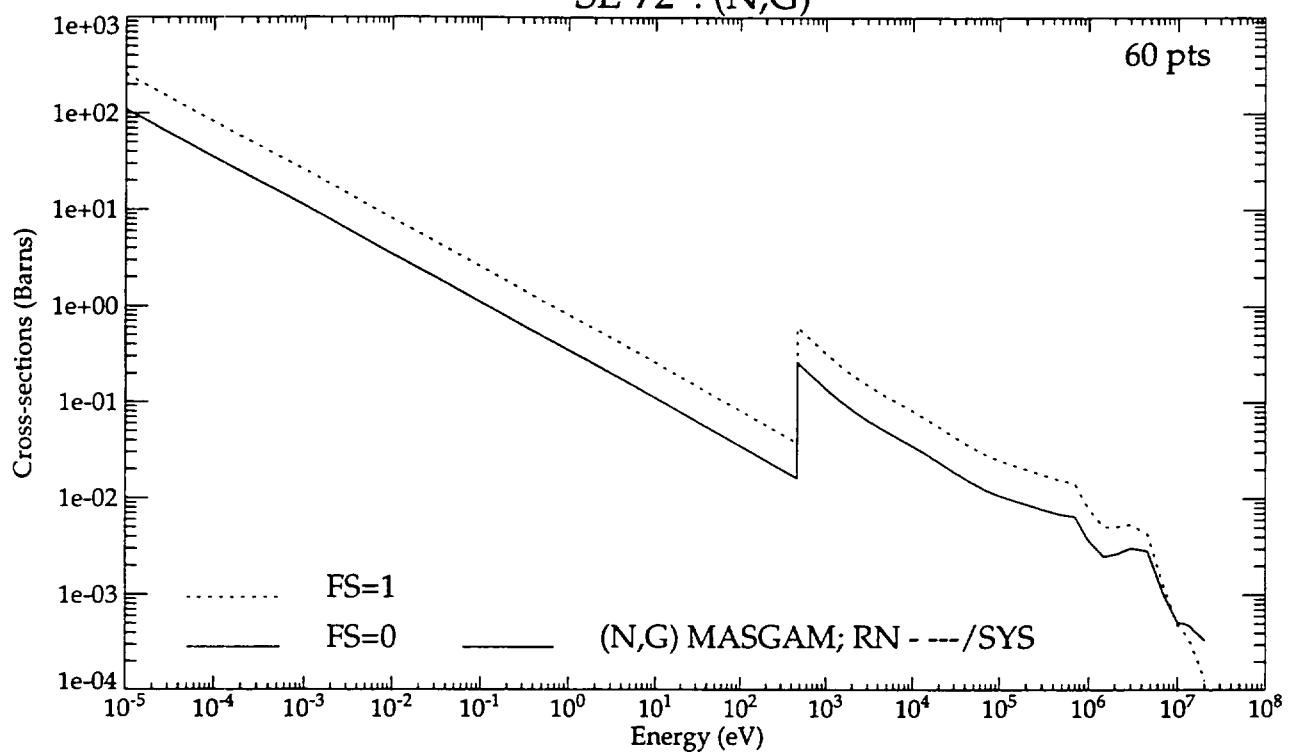
**AS-72 : (N, $G$ )**



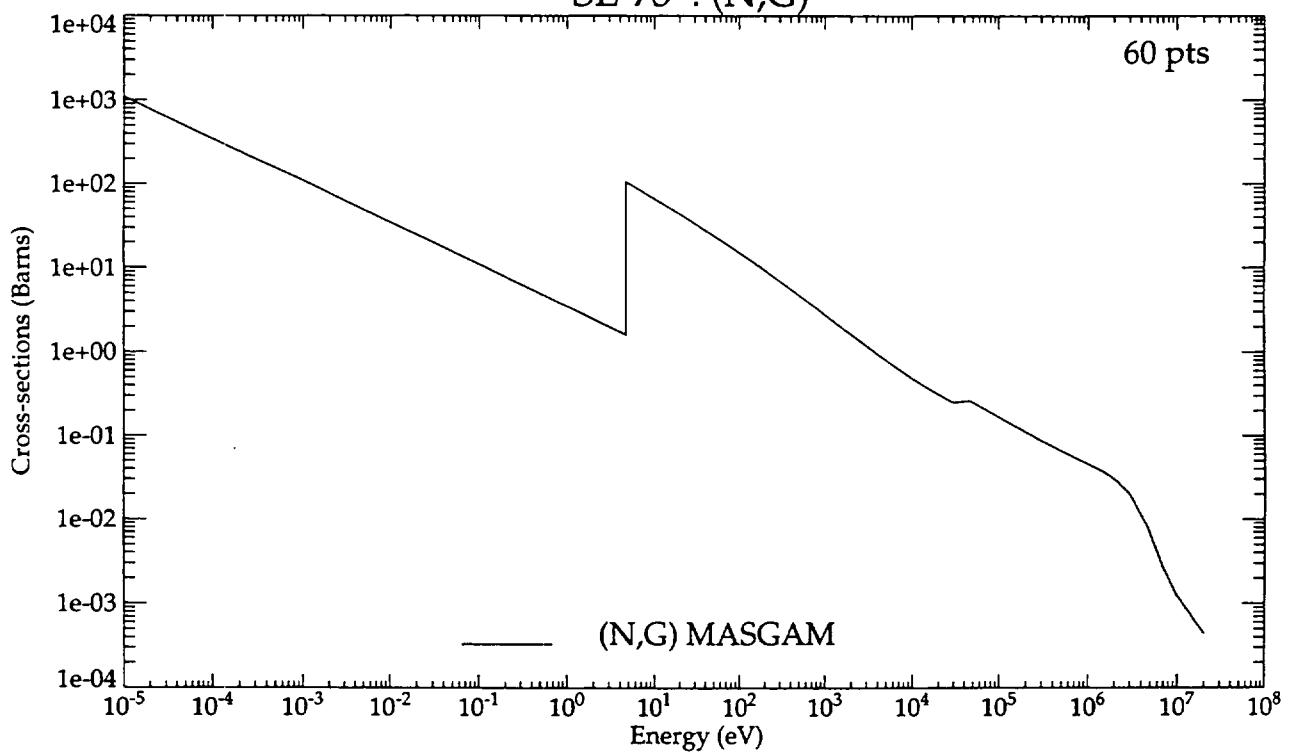


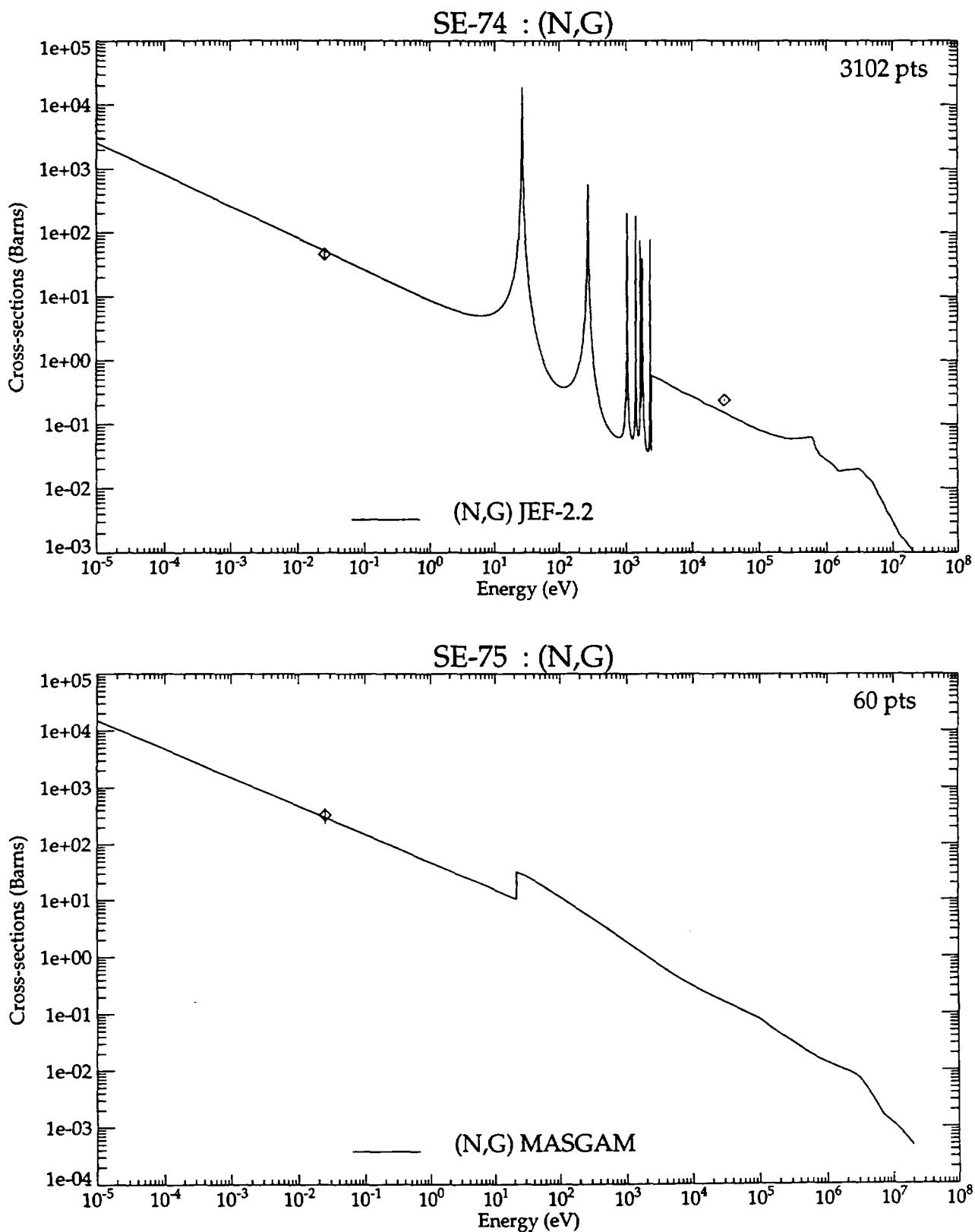


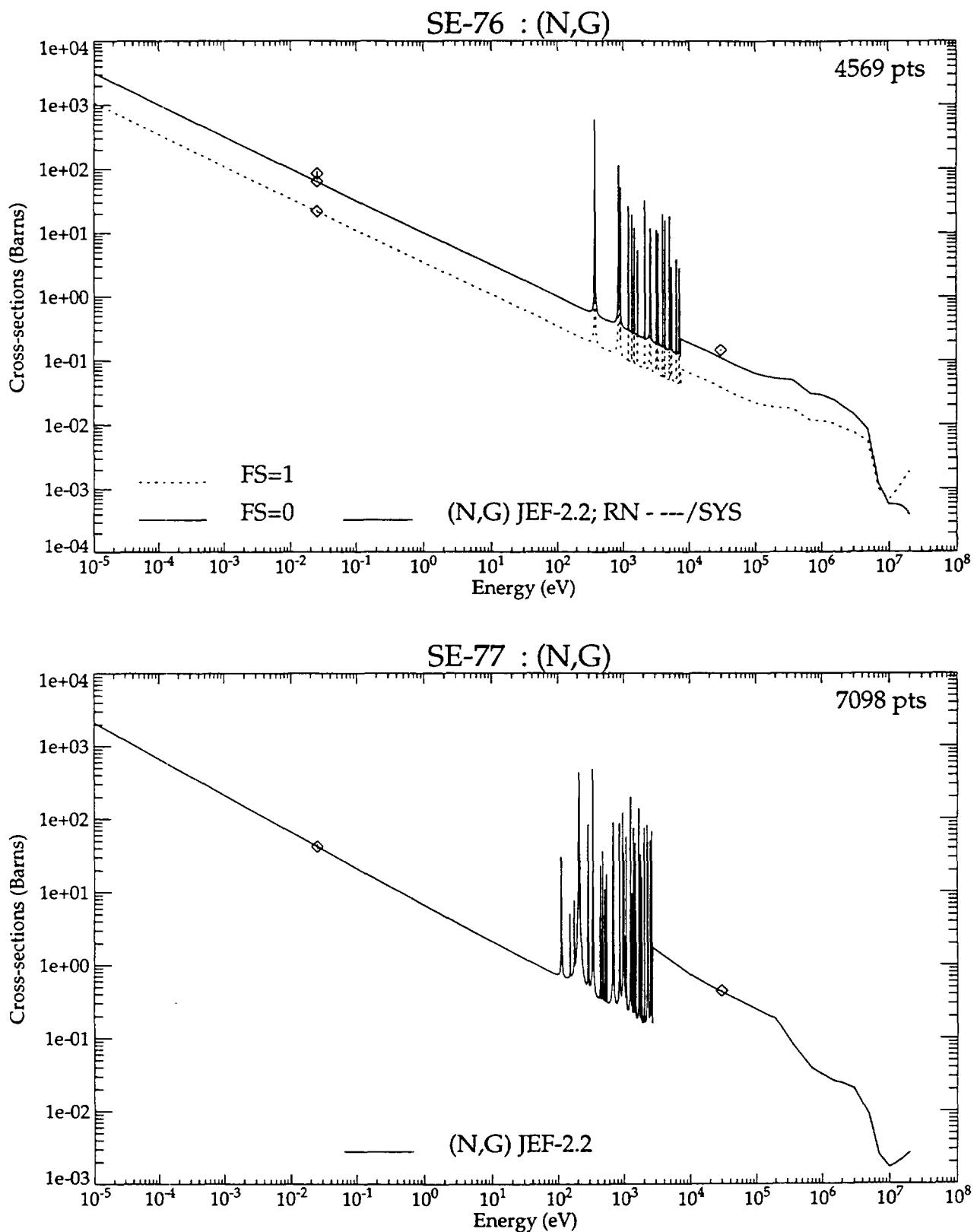
SE-72 : (N,G)

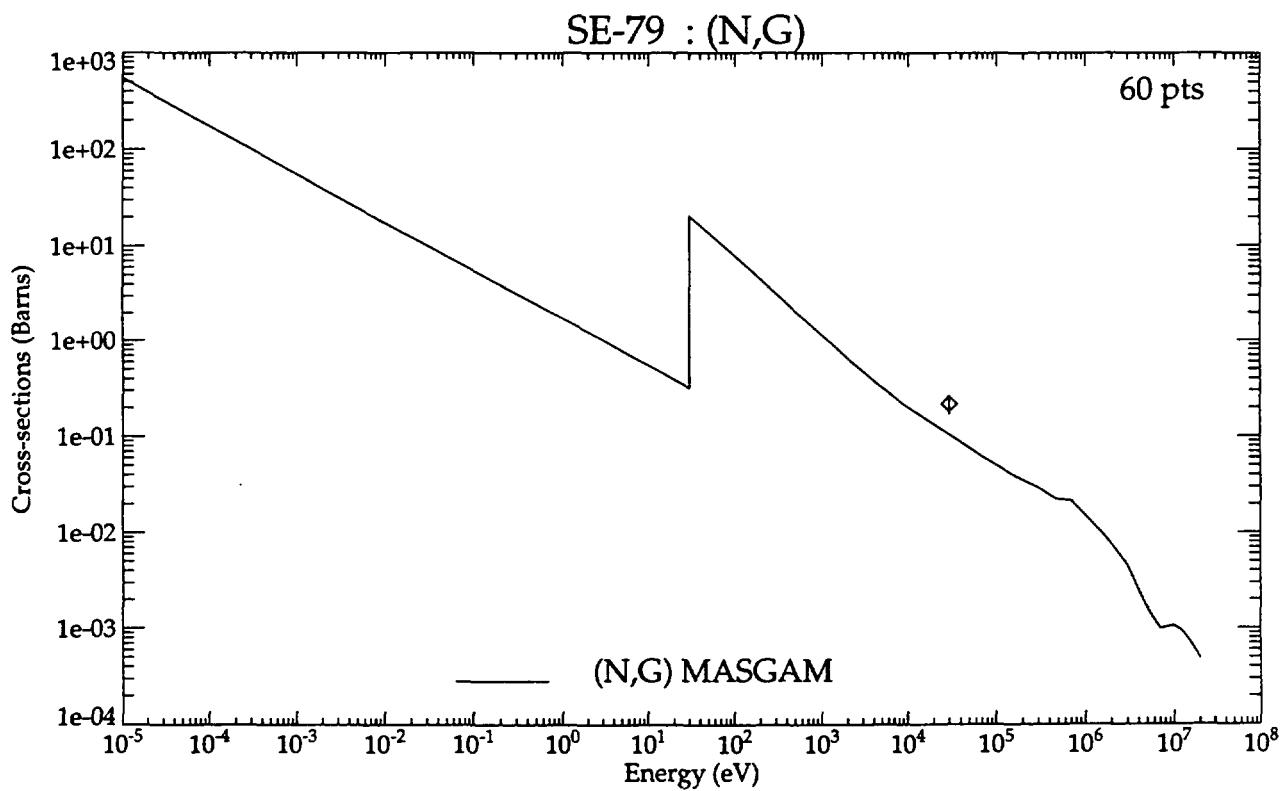
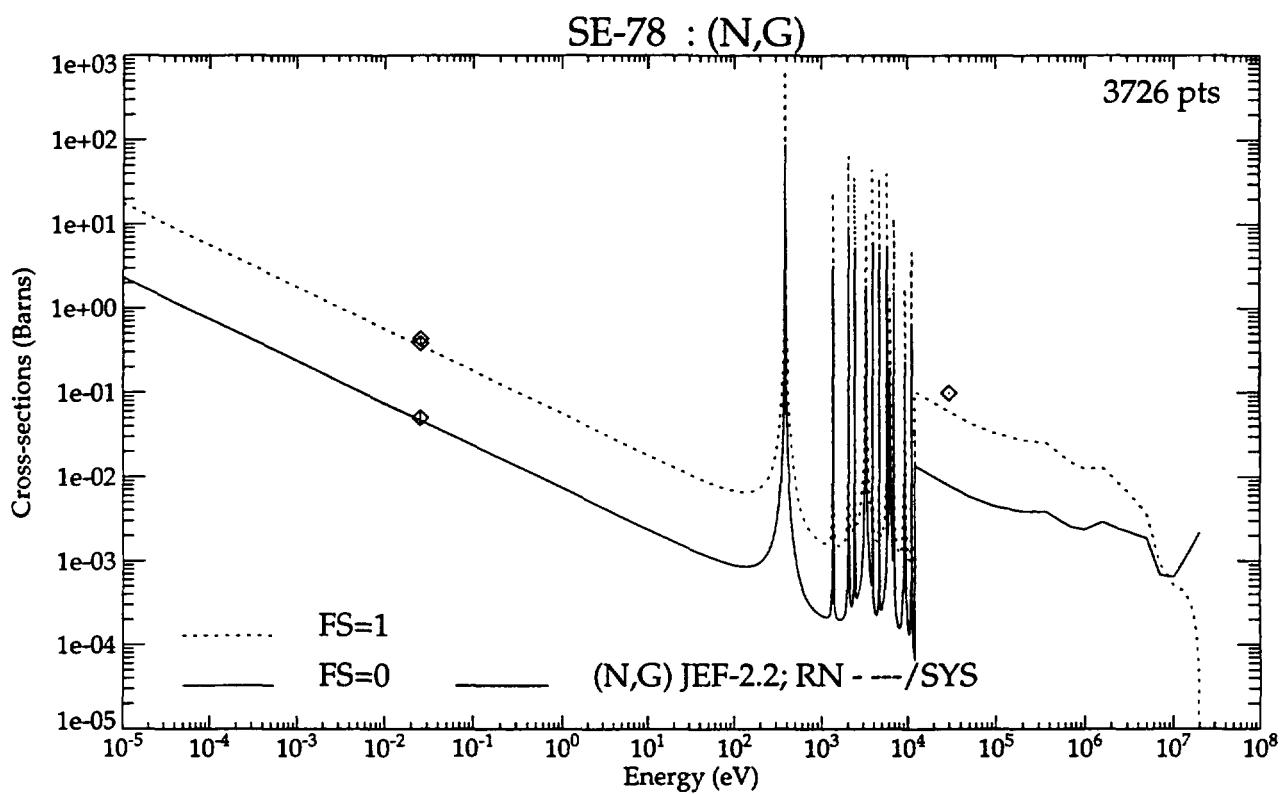


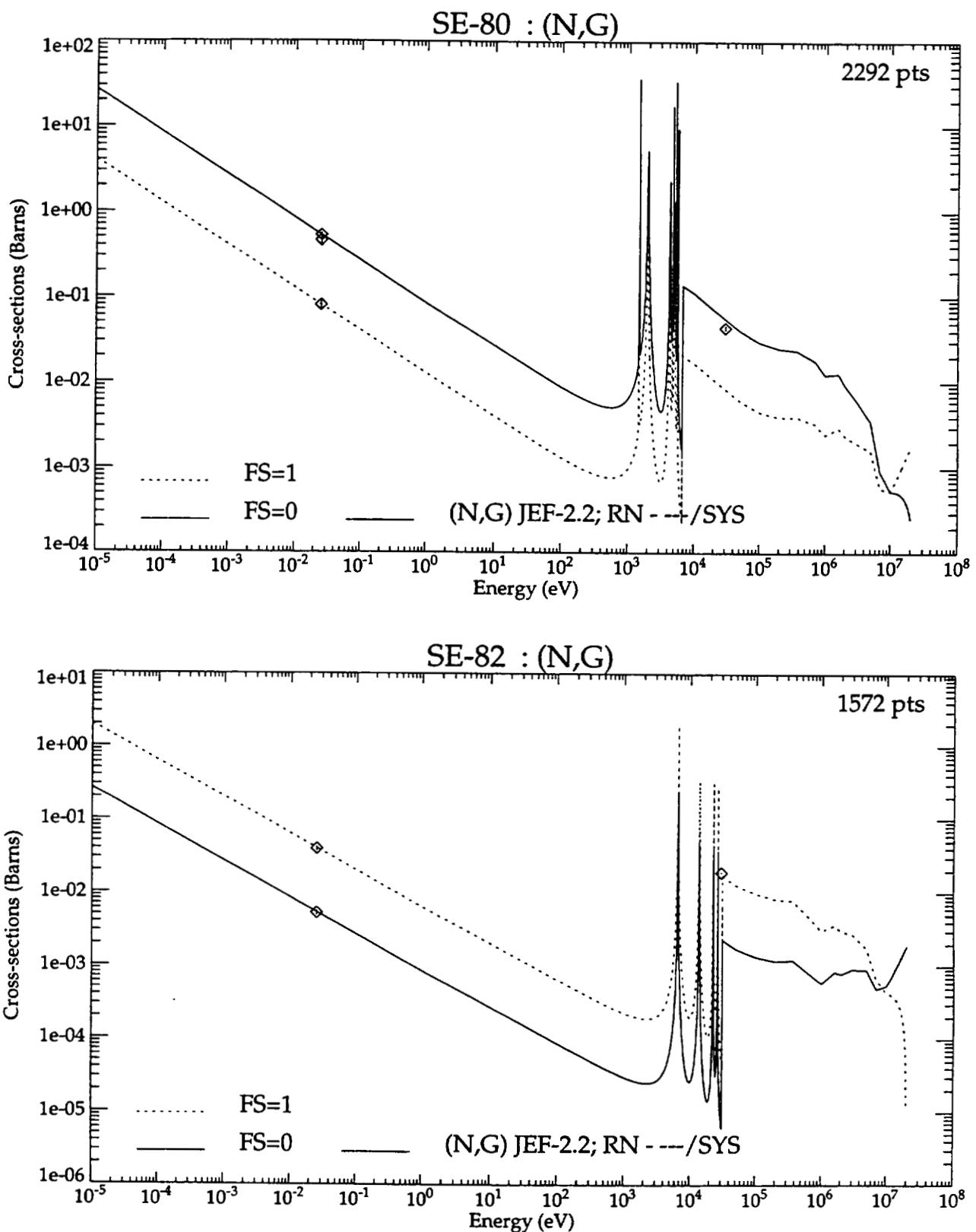
SE-73 : (N,G)

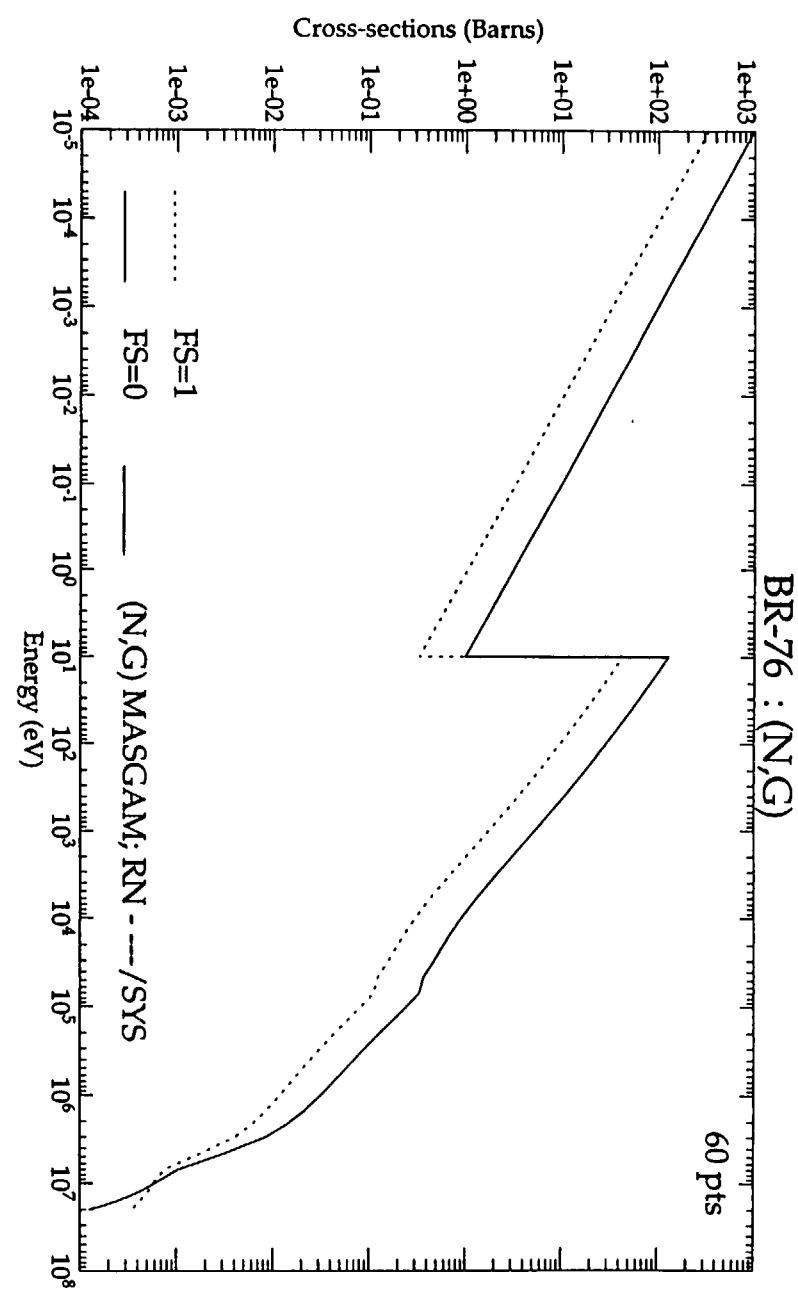
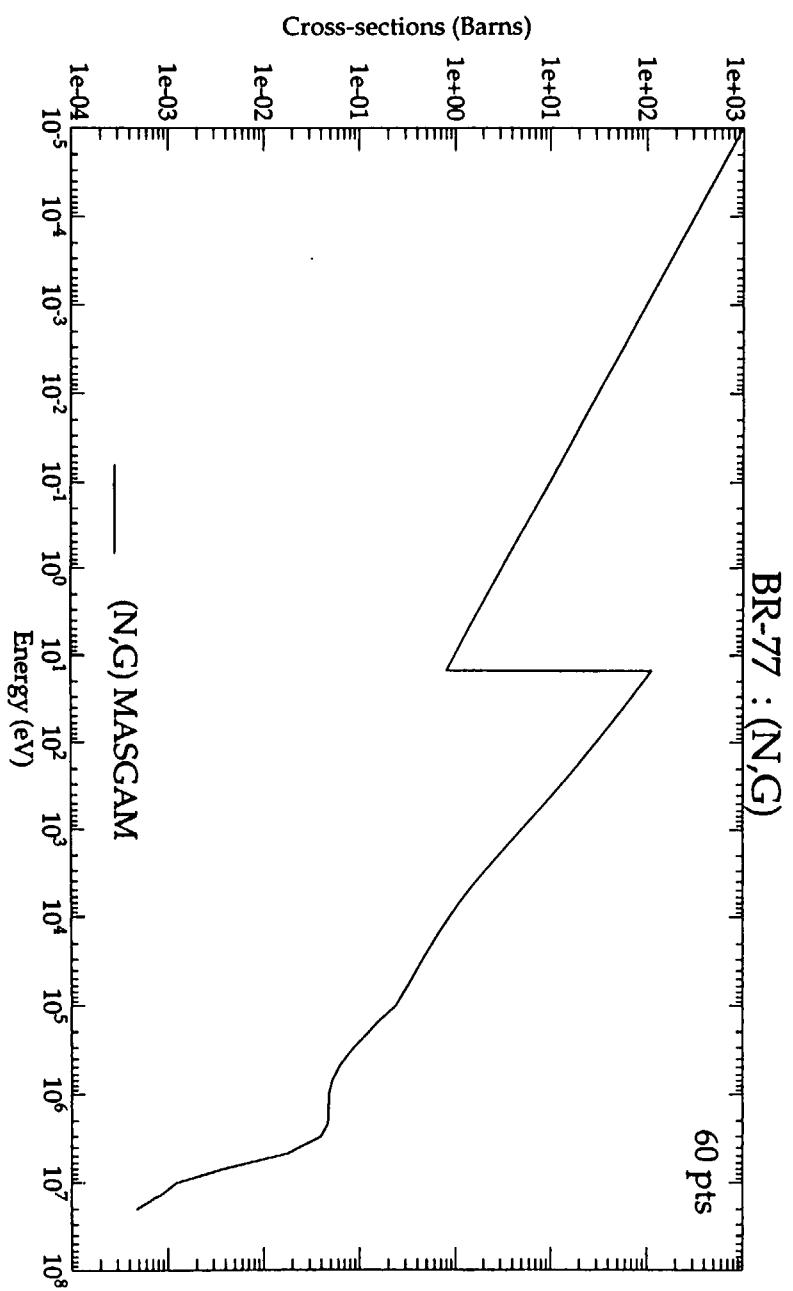


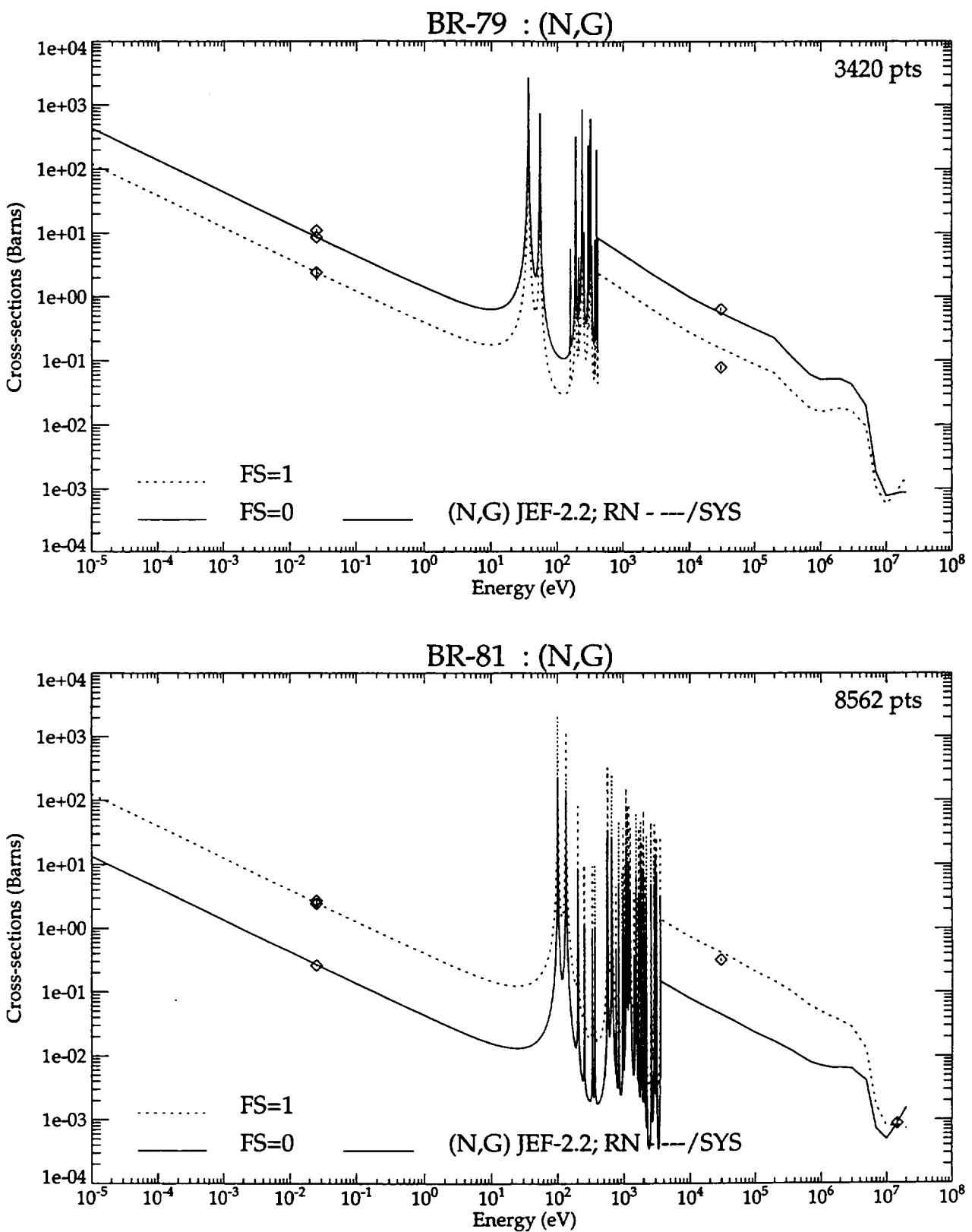


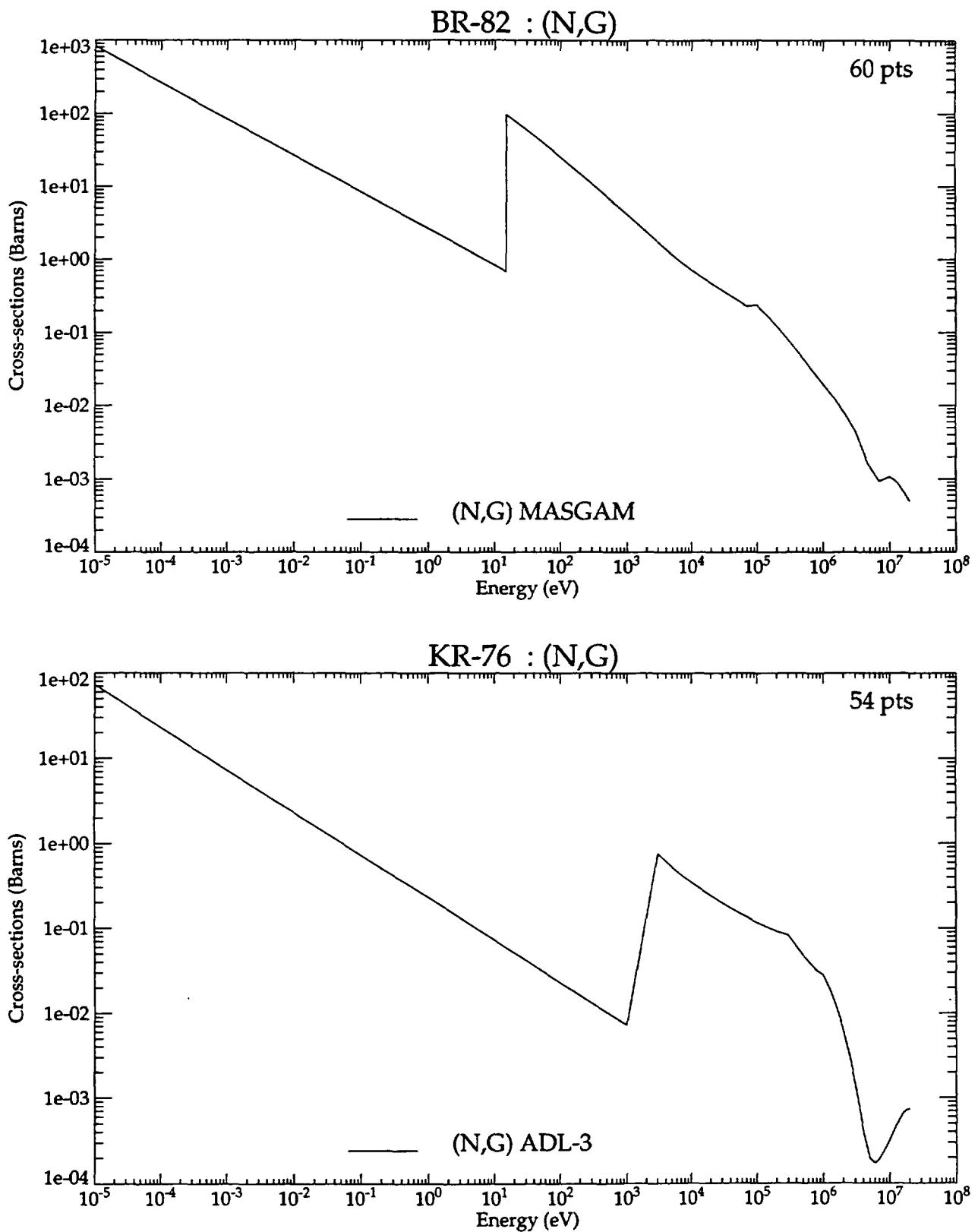


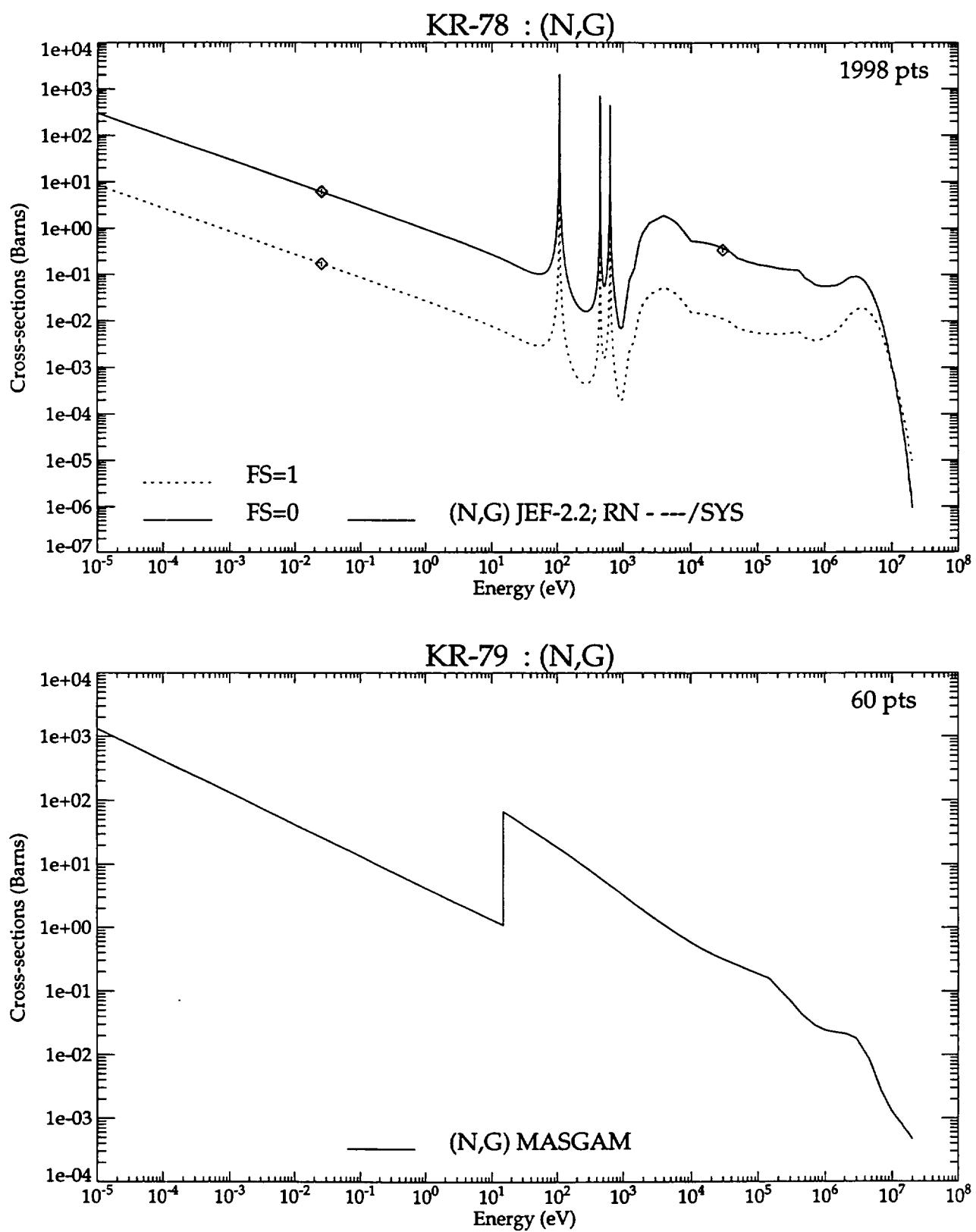


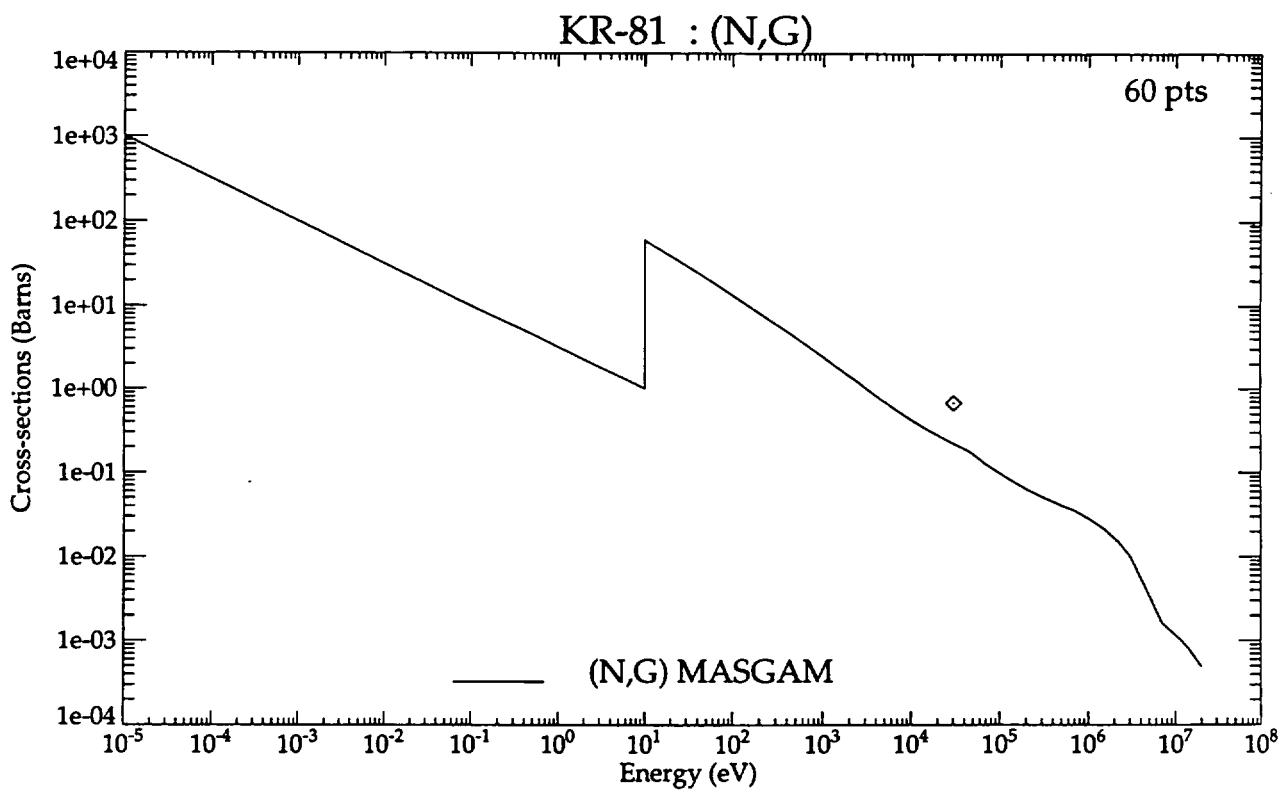
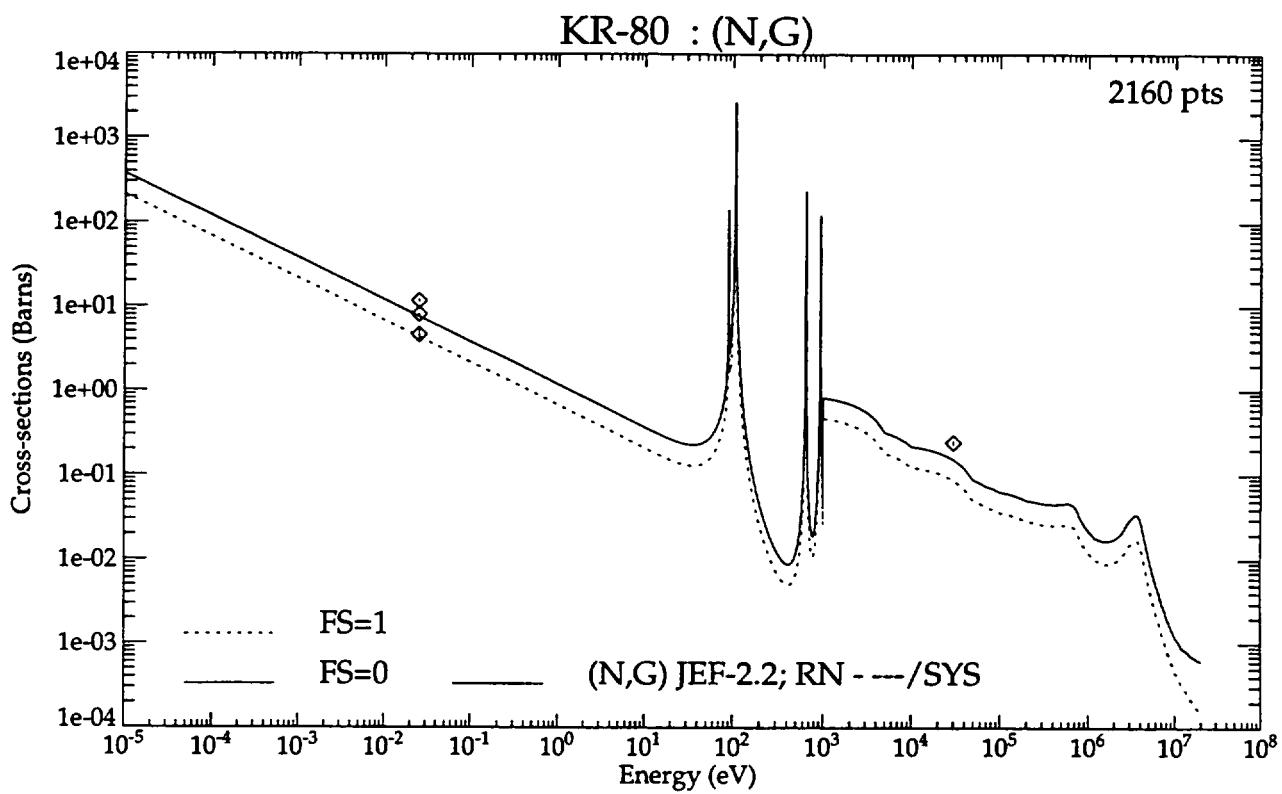


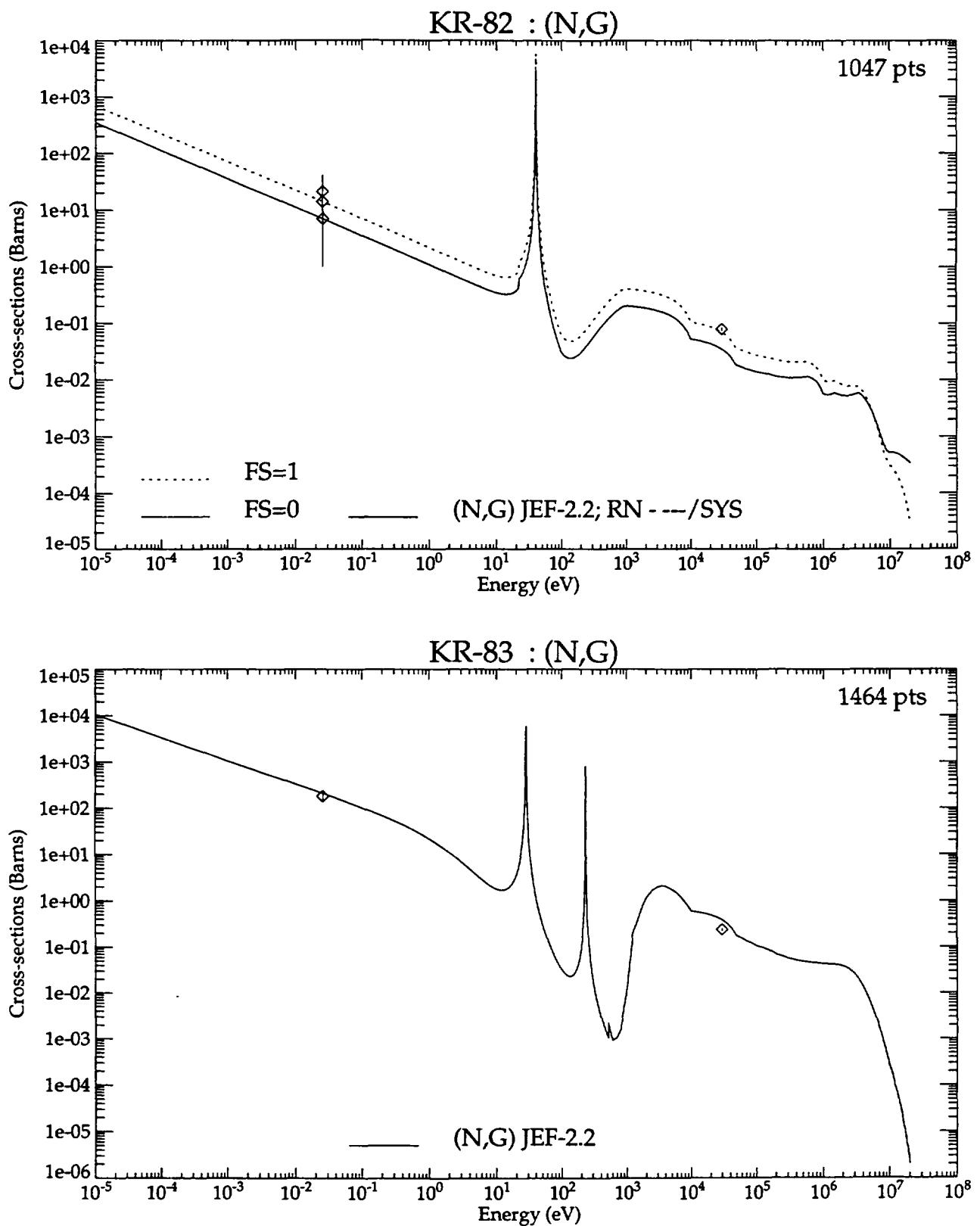


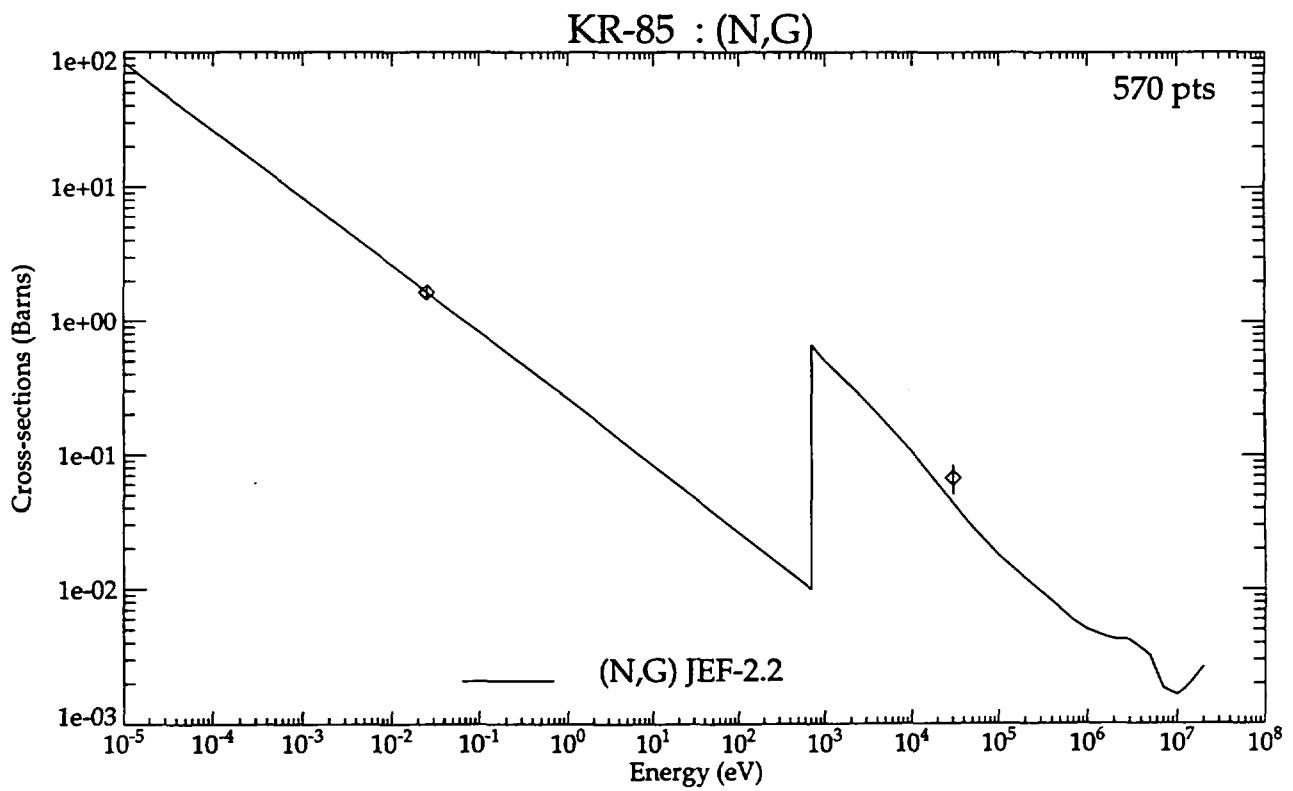
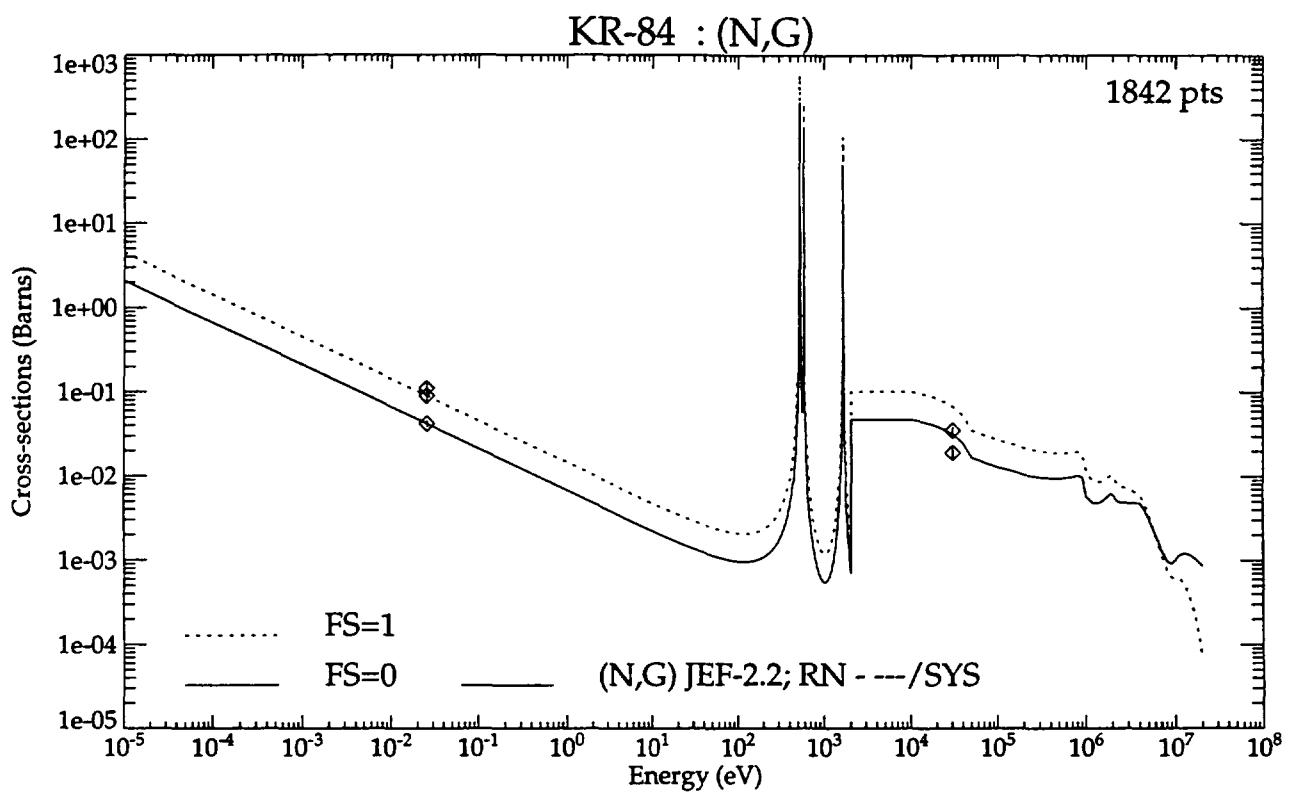


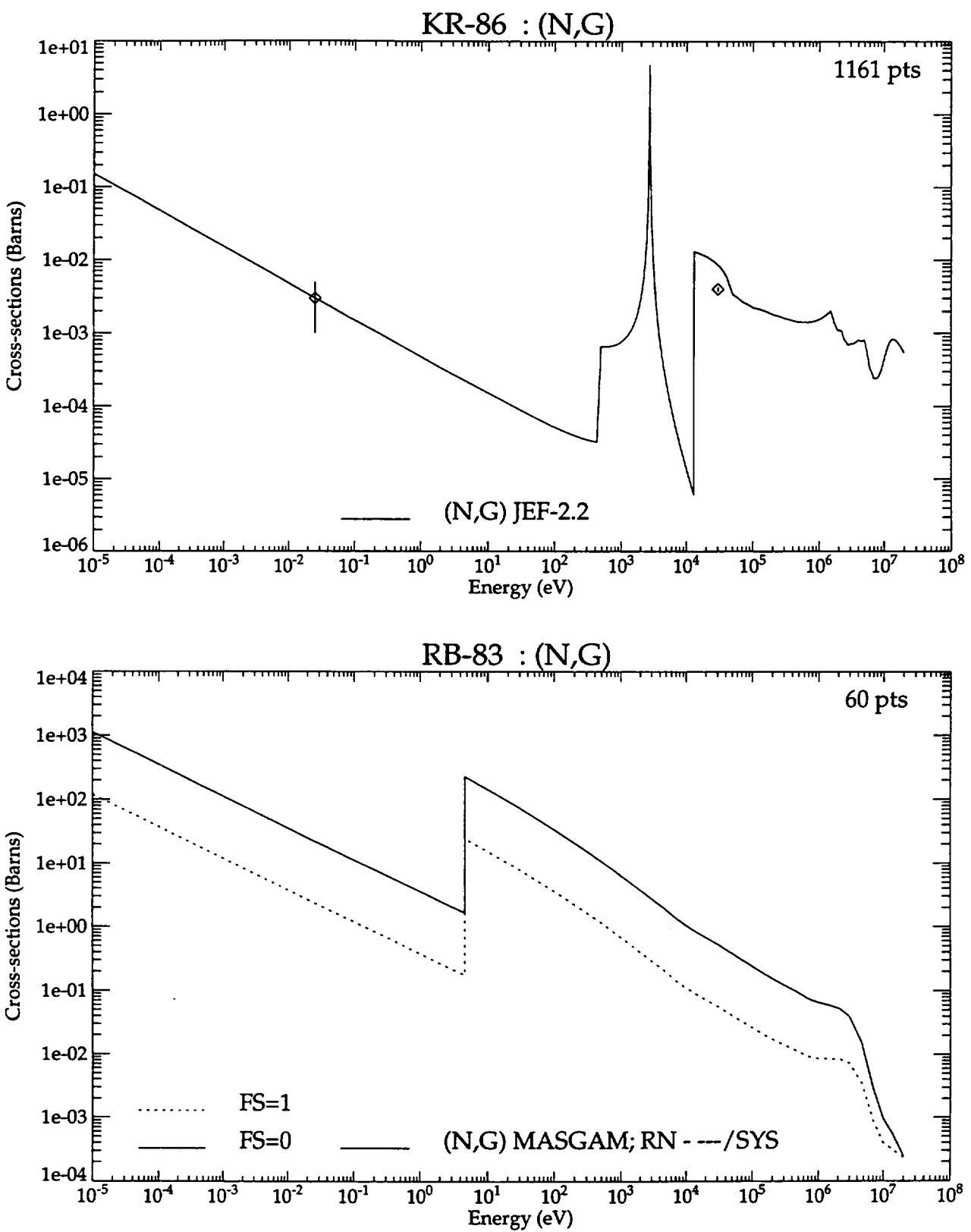


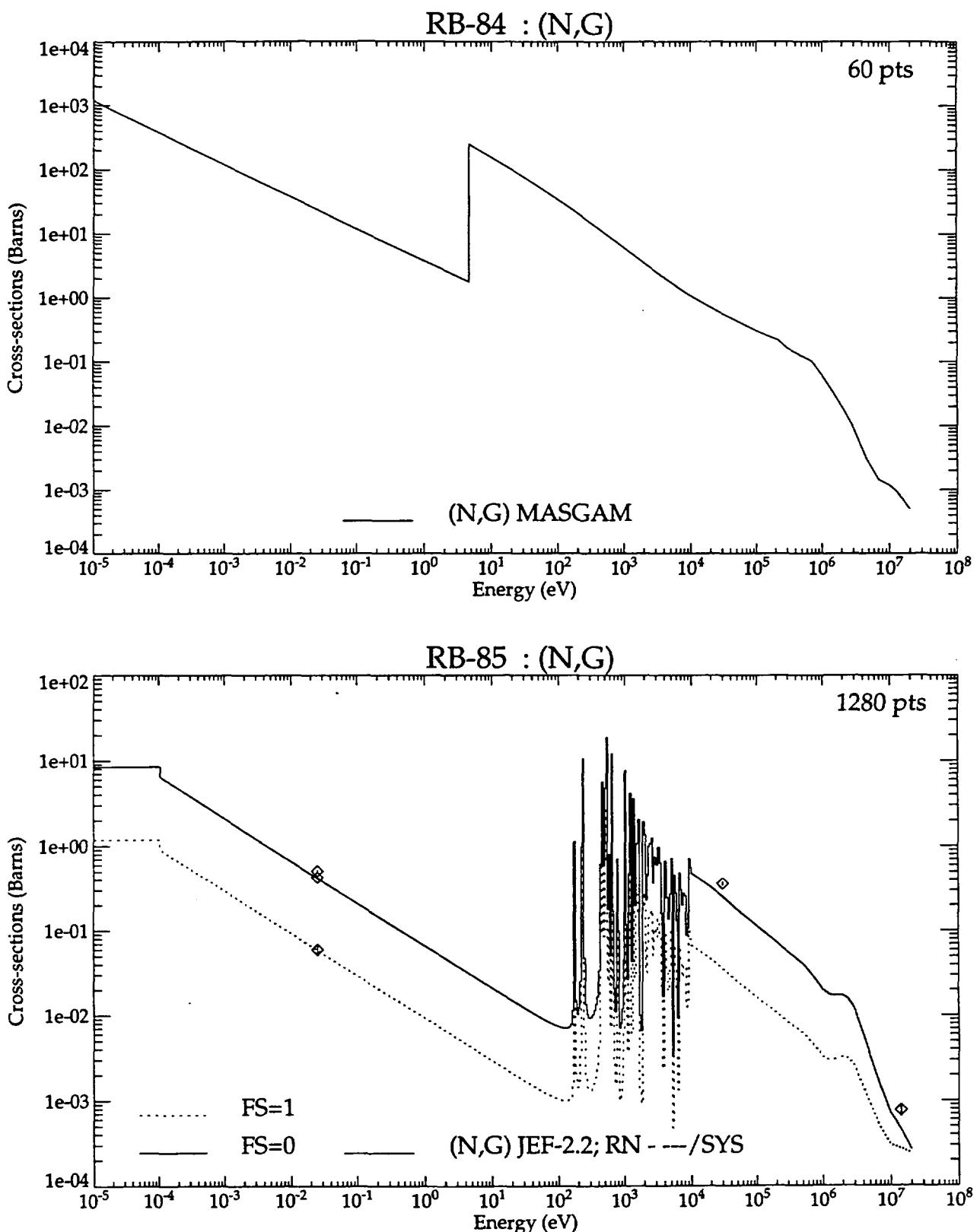


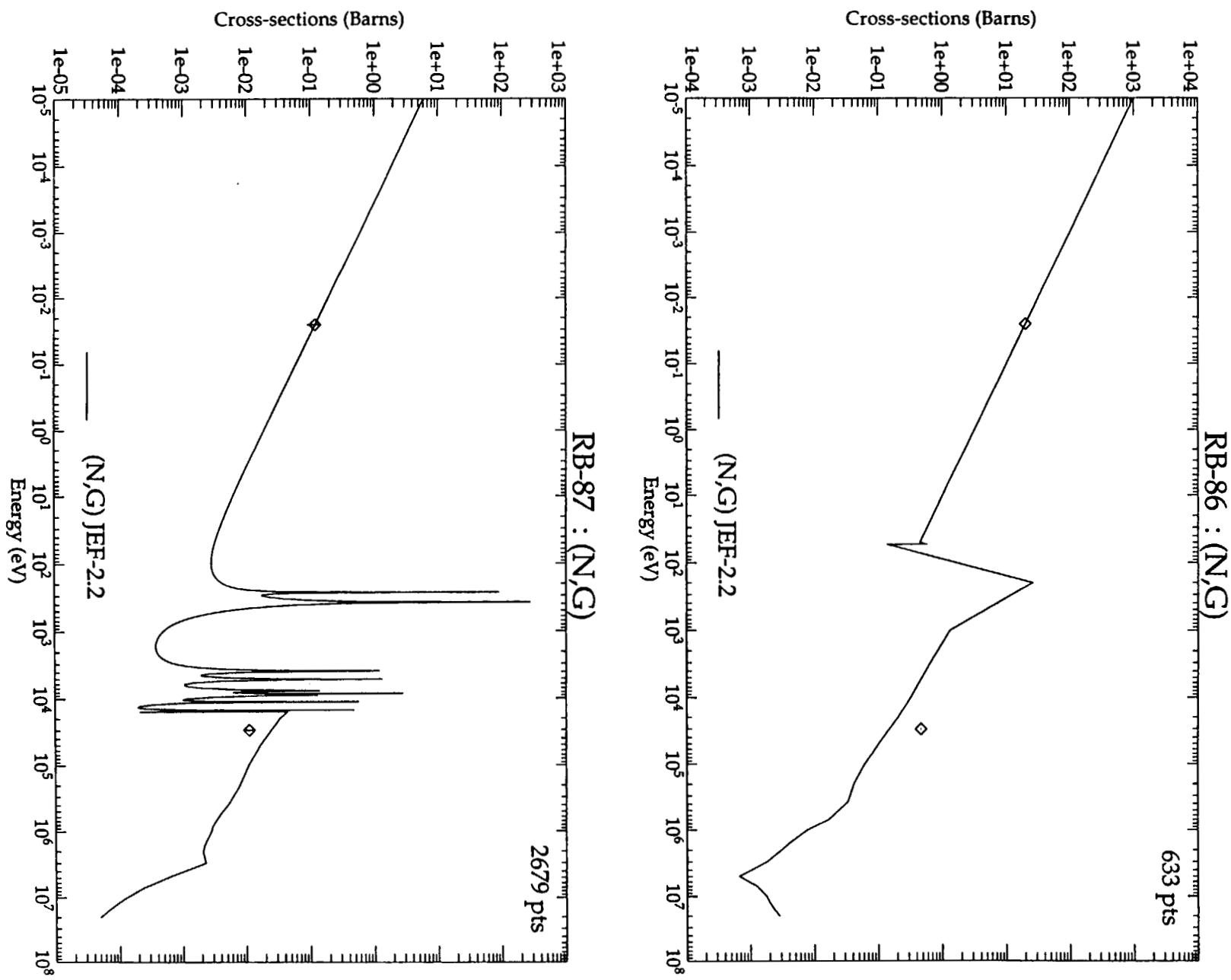


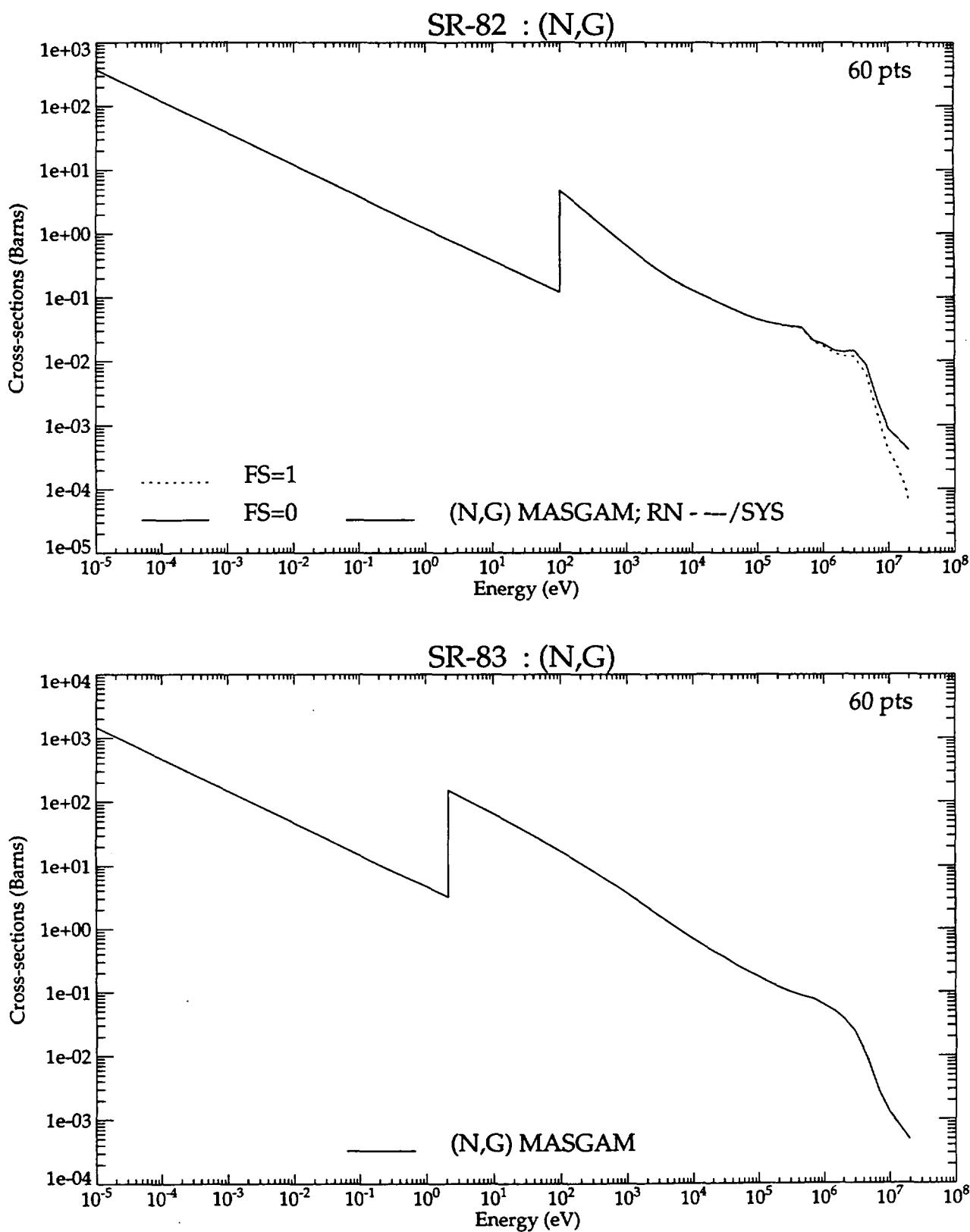


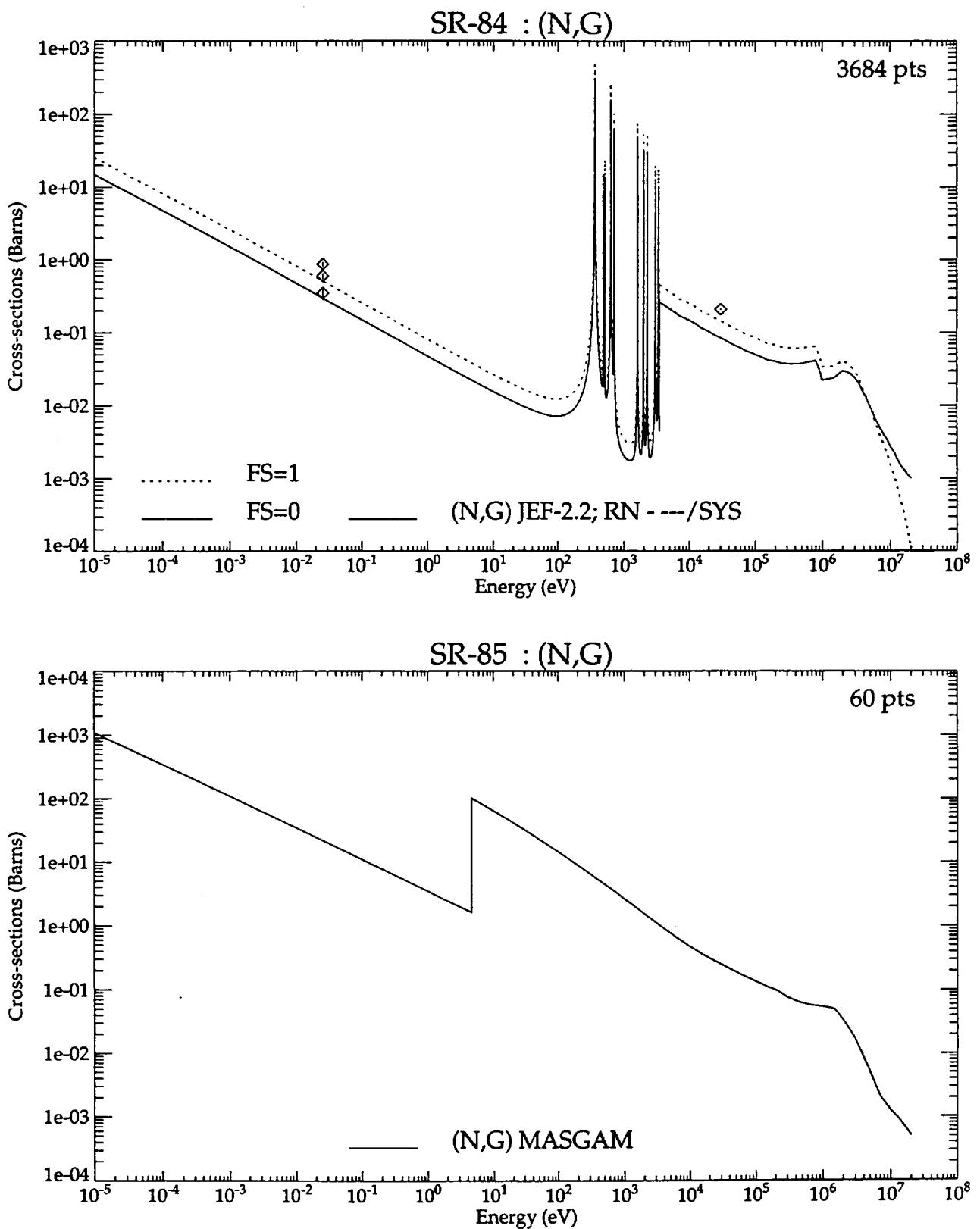


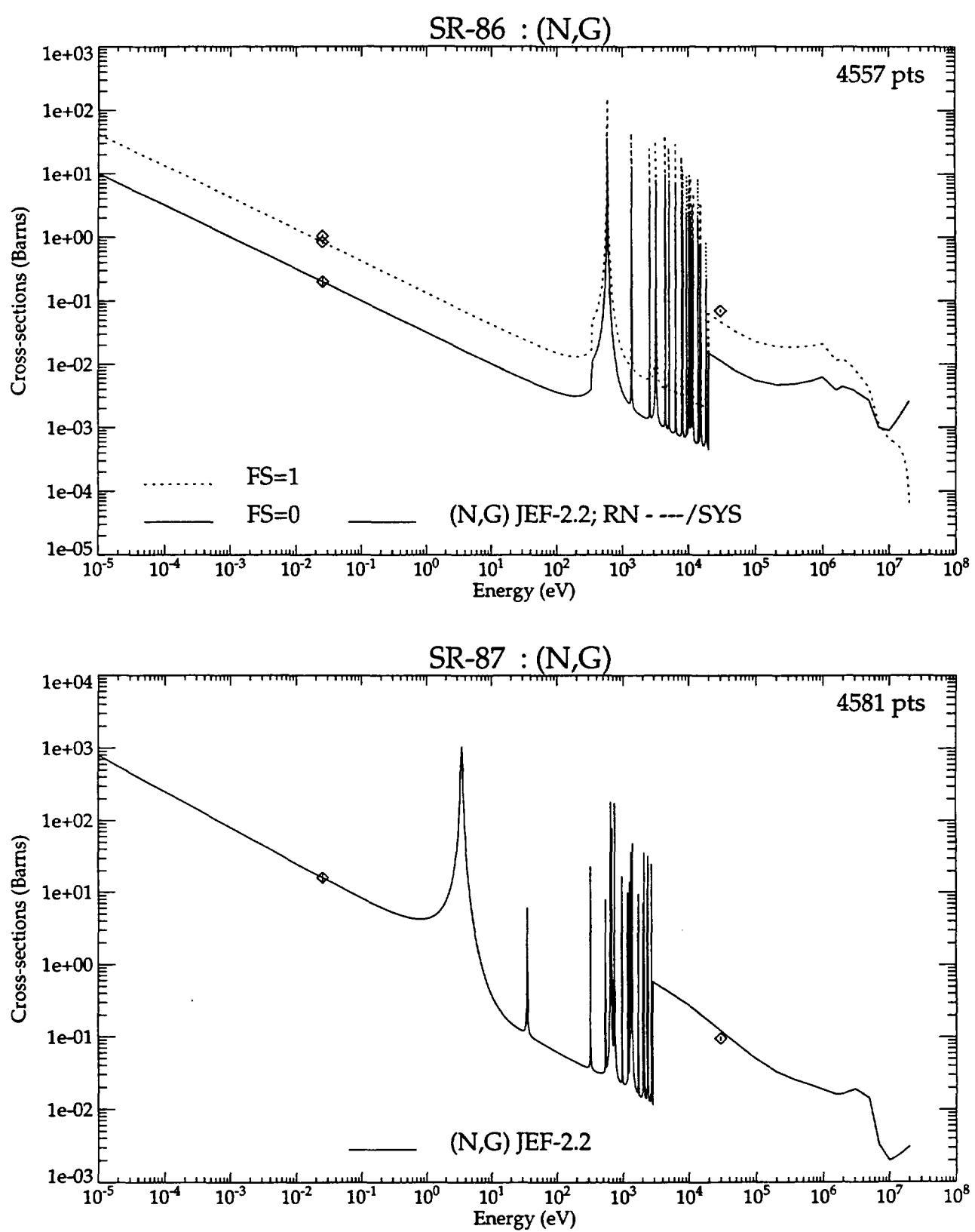


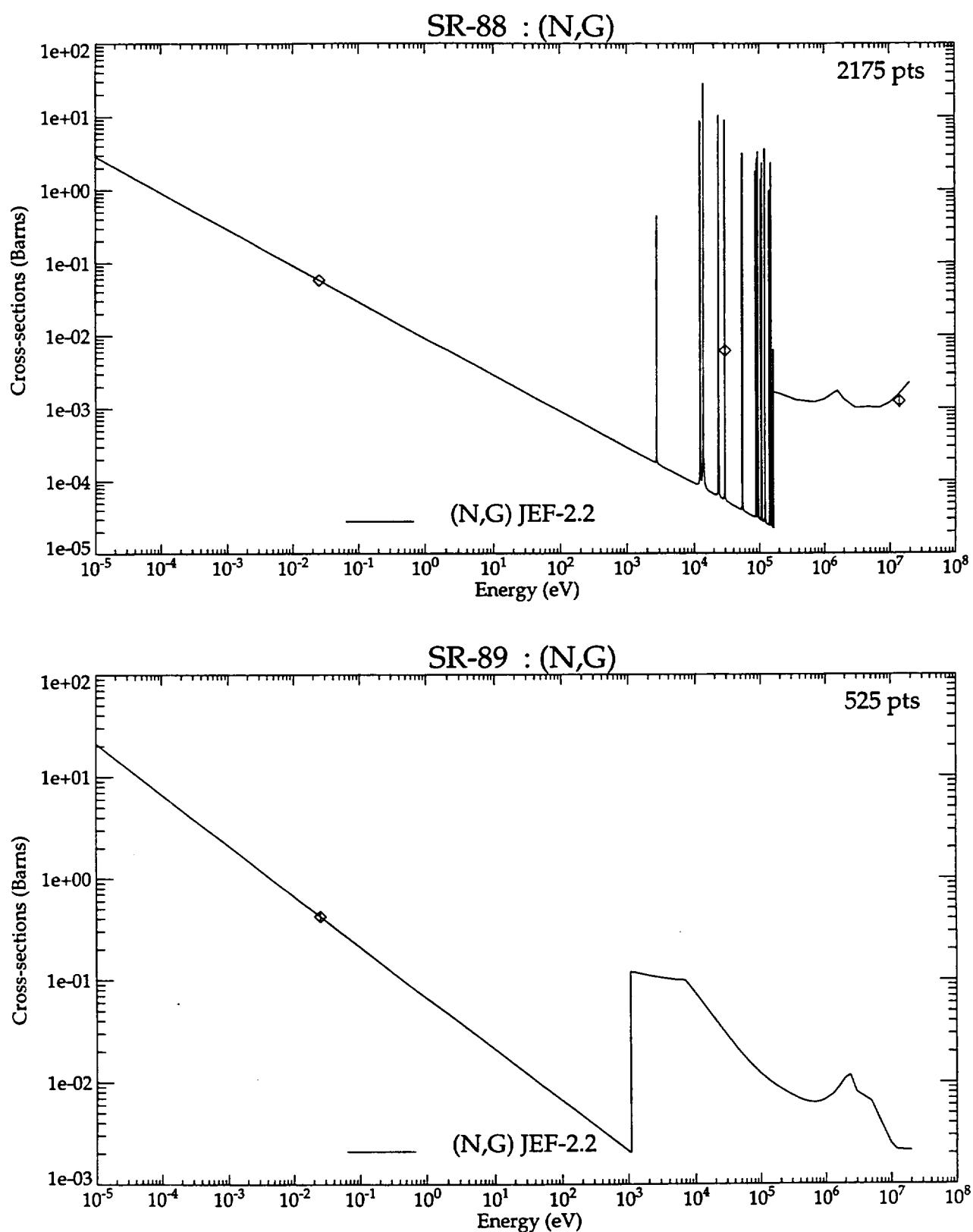


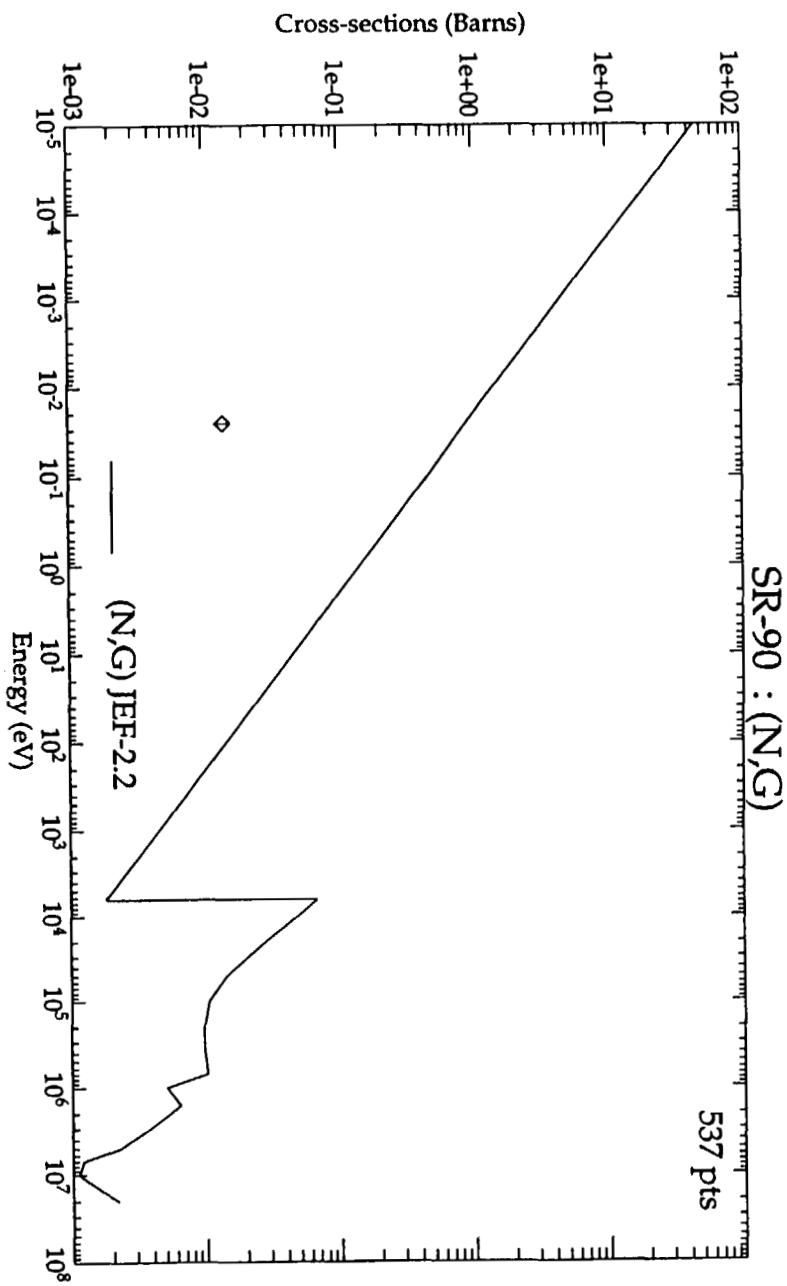
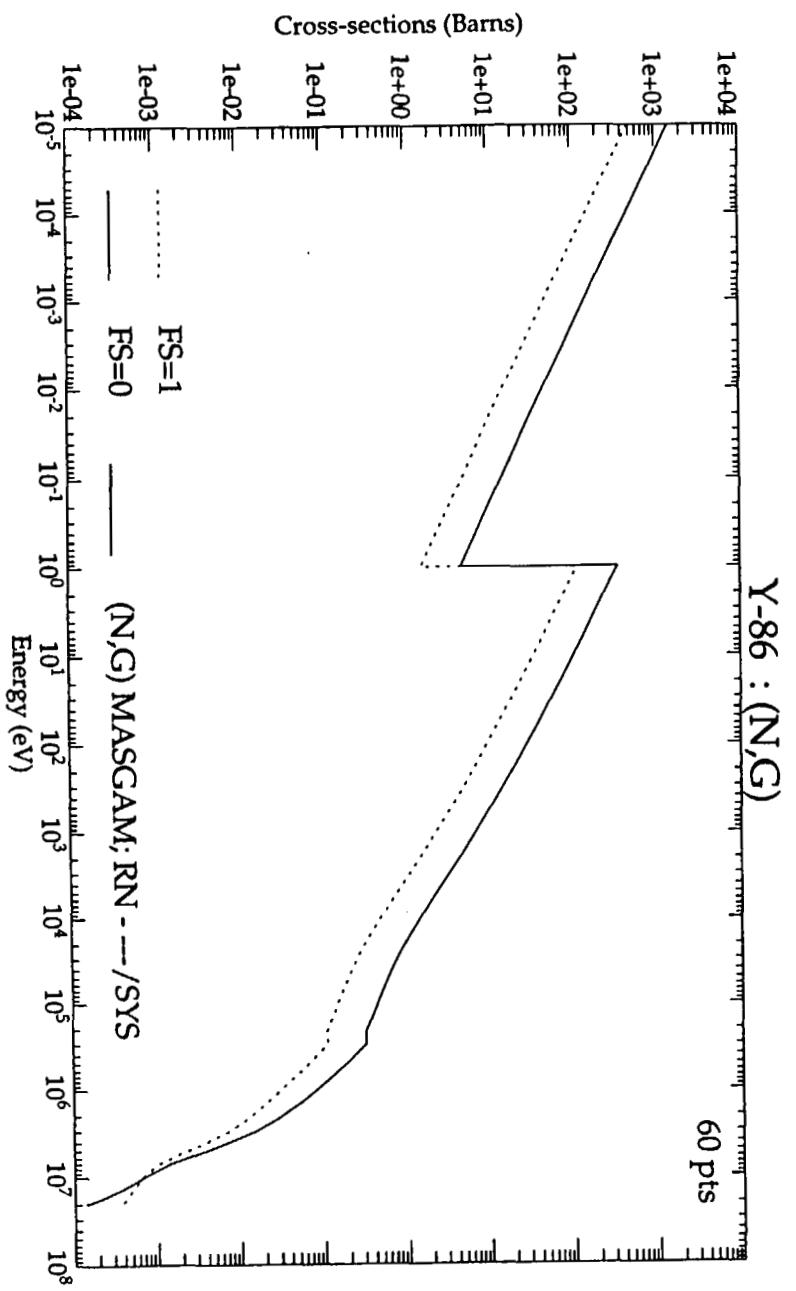


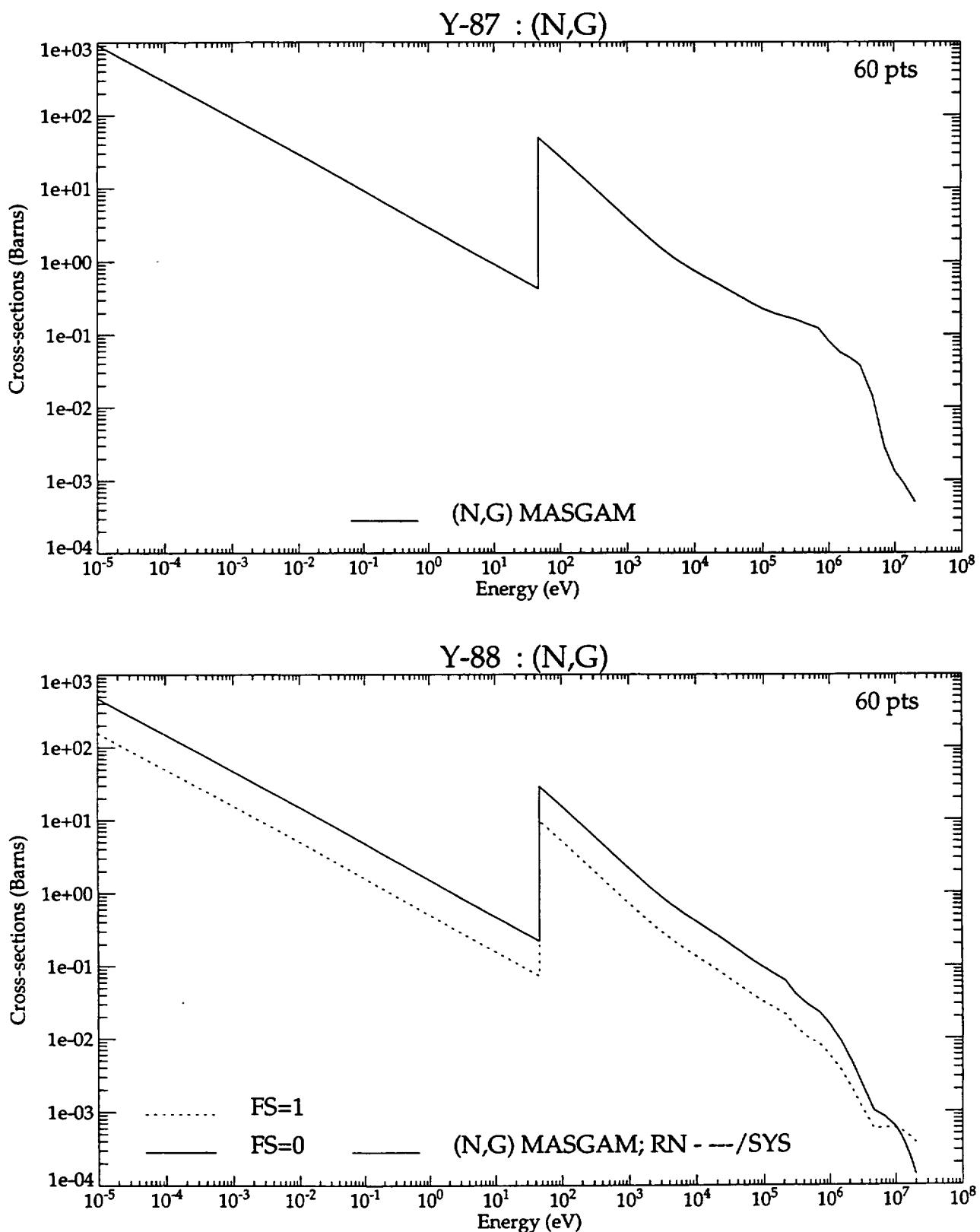


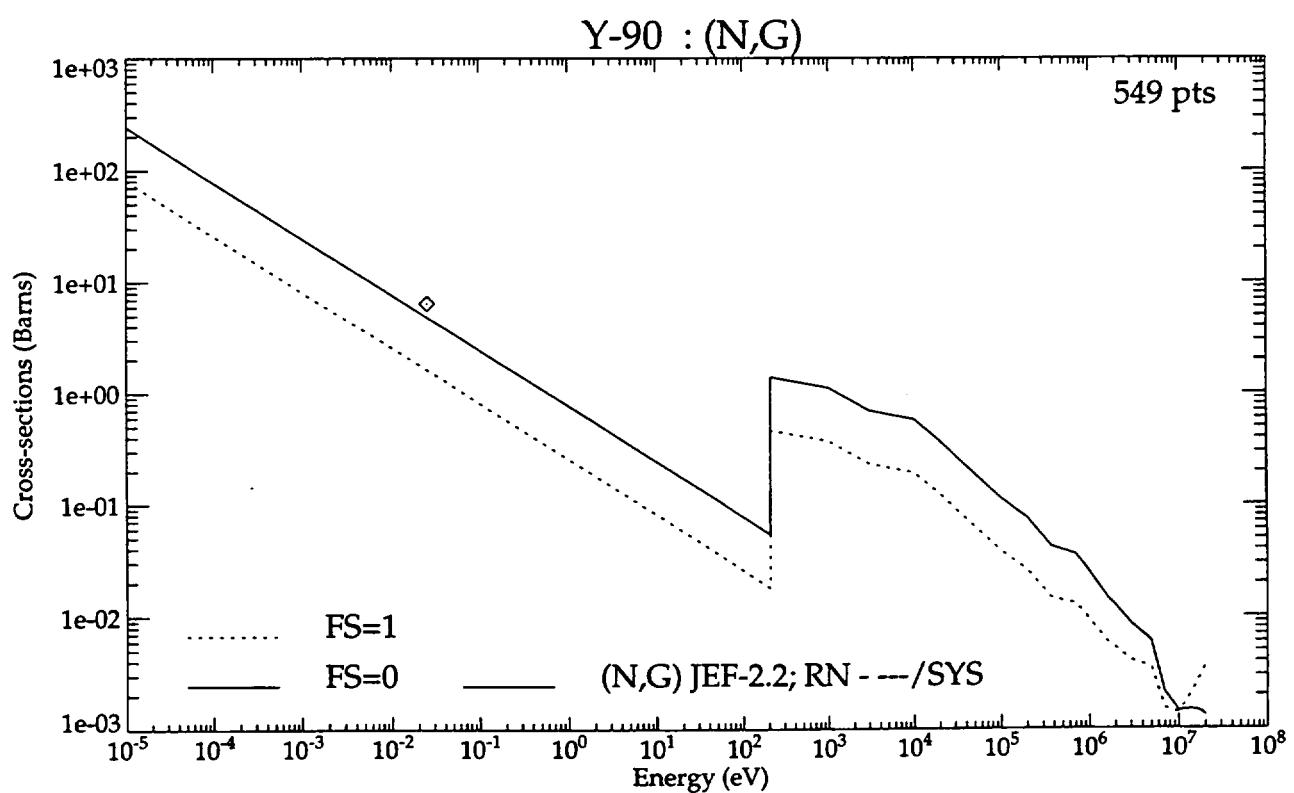
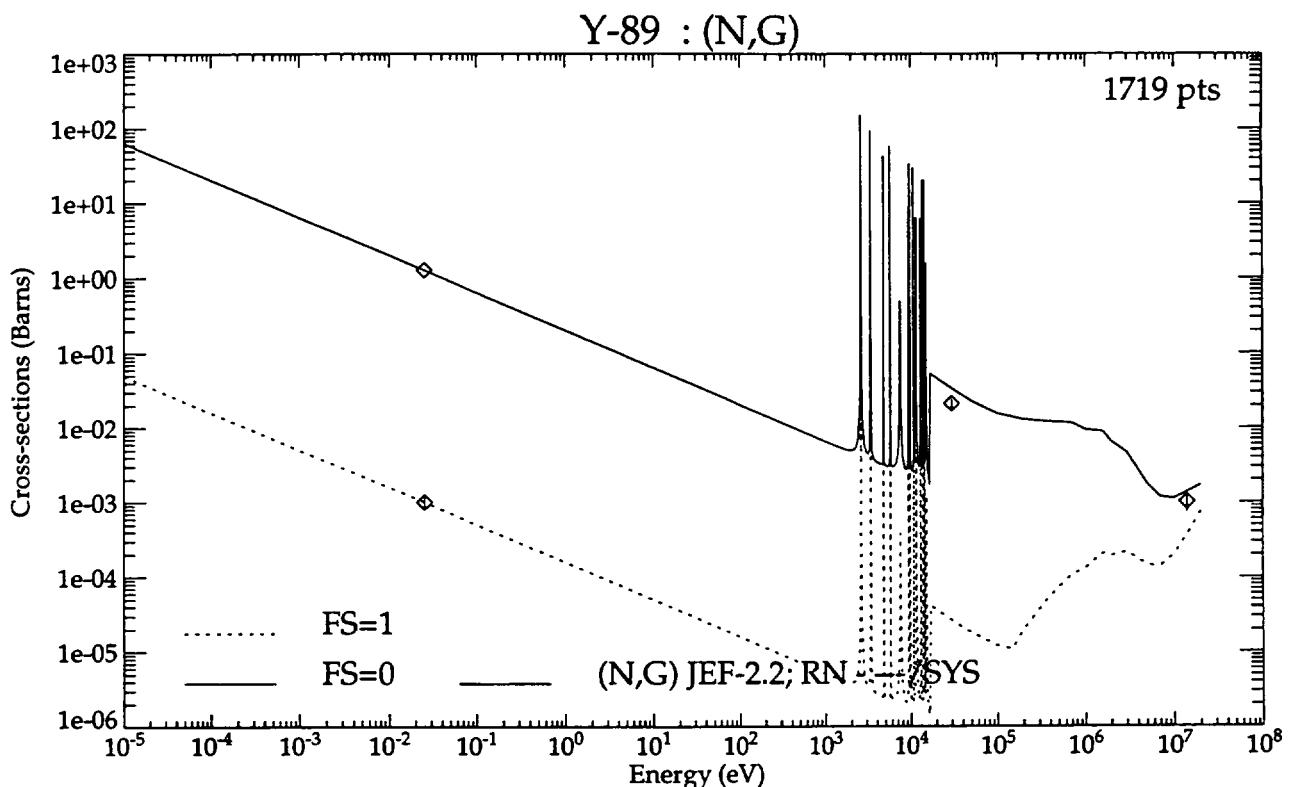


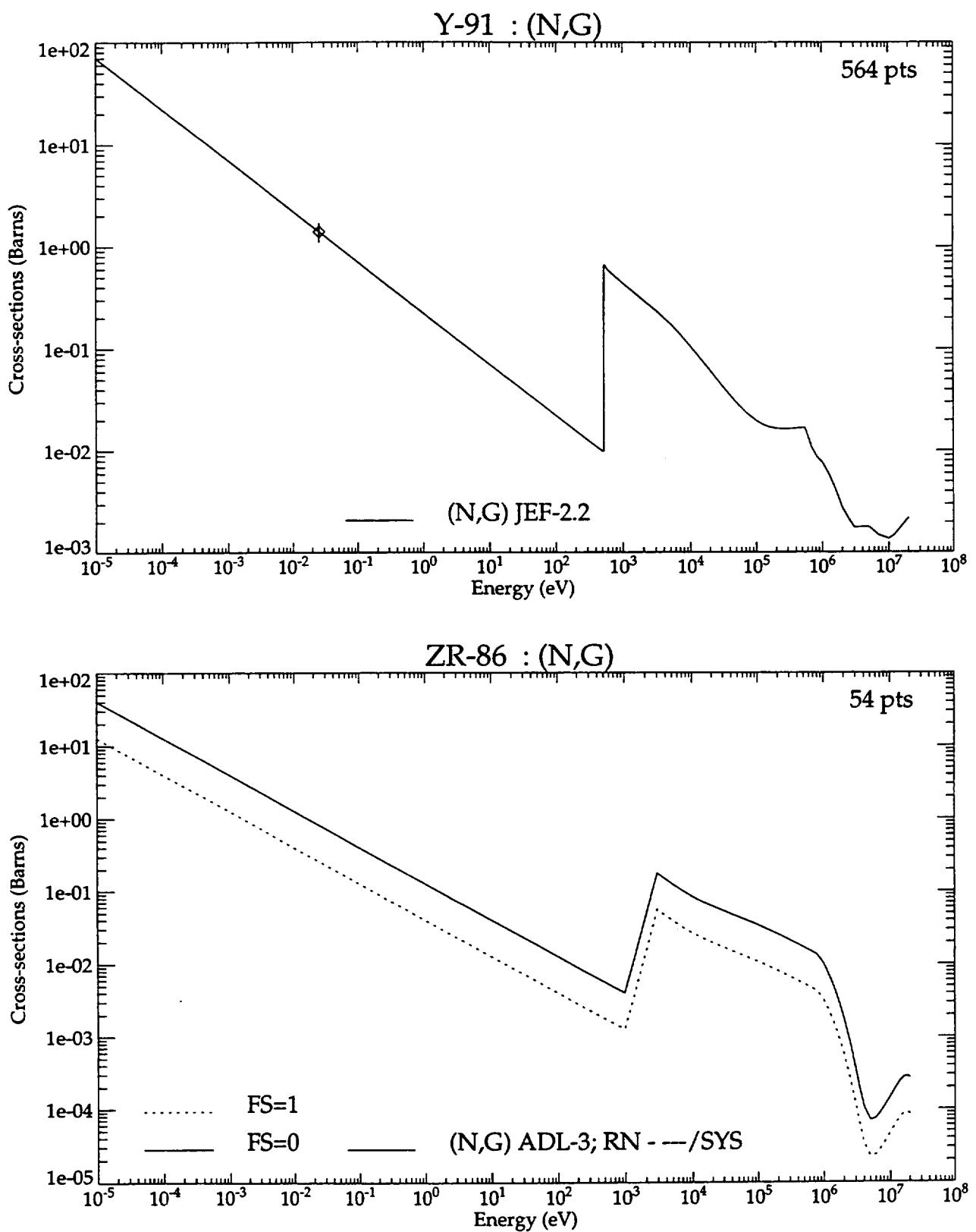


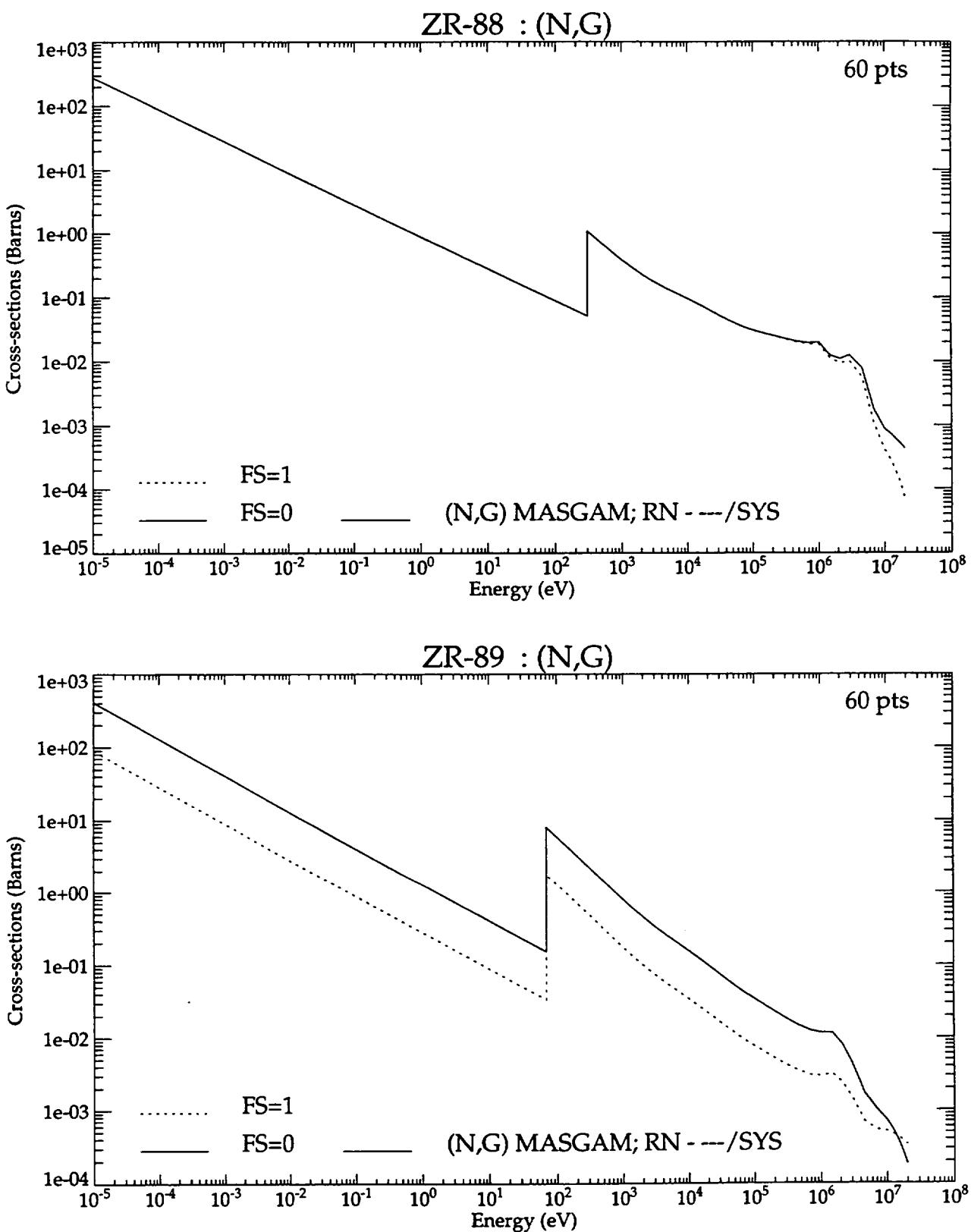


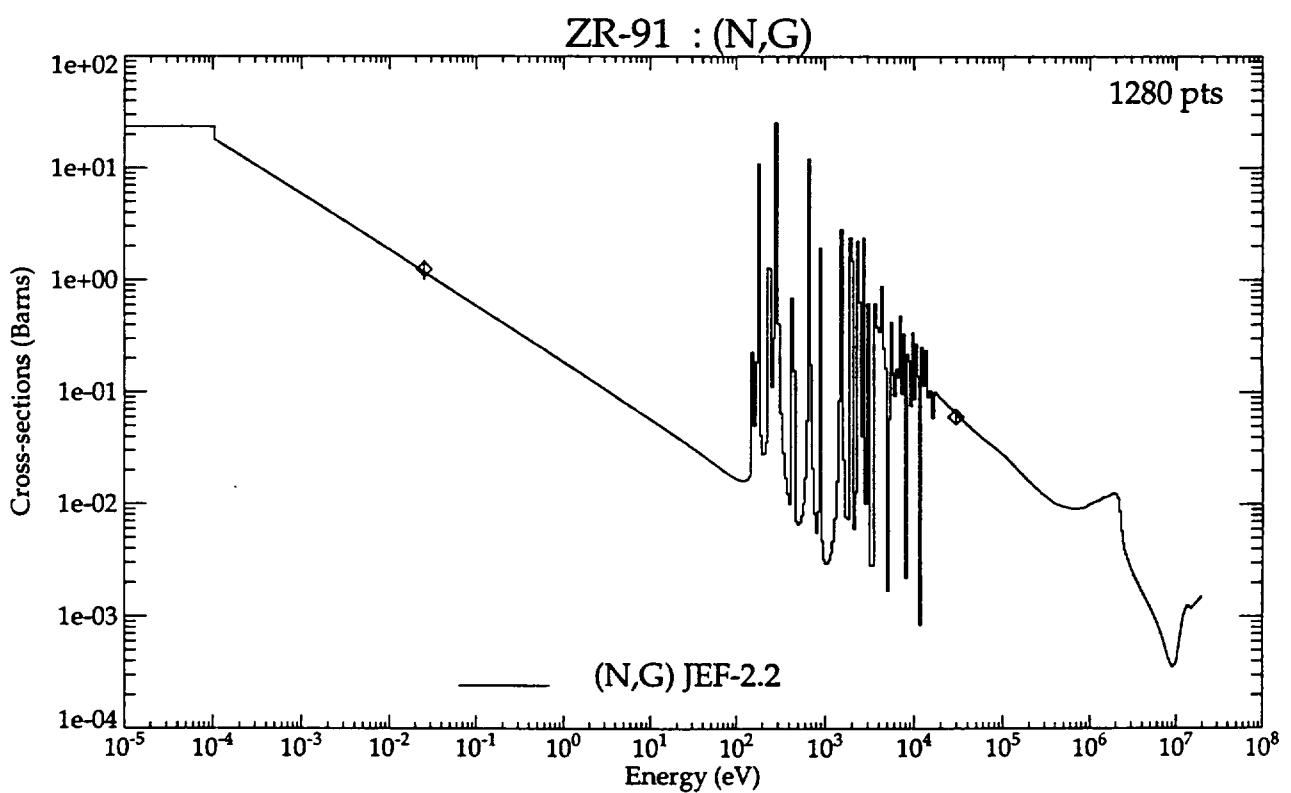
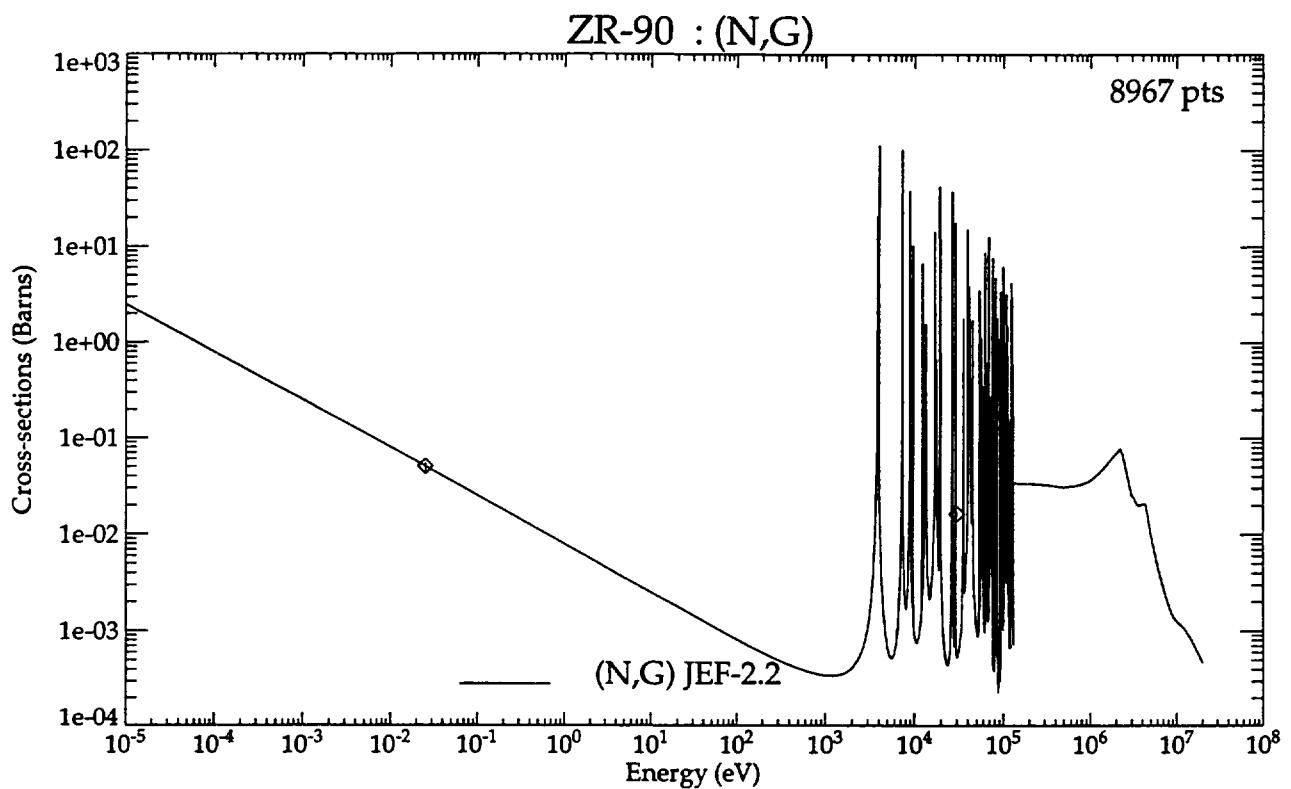






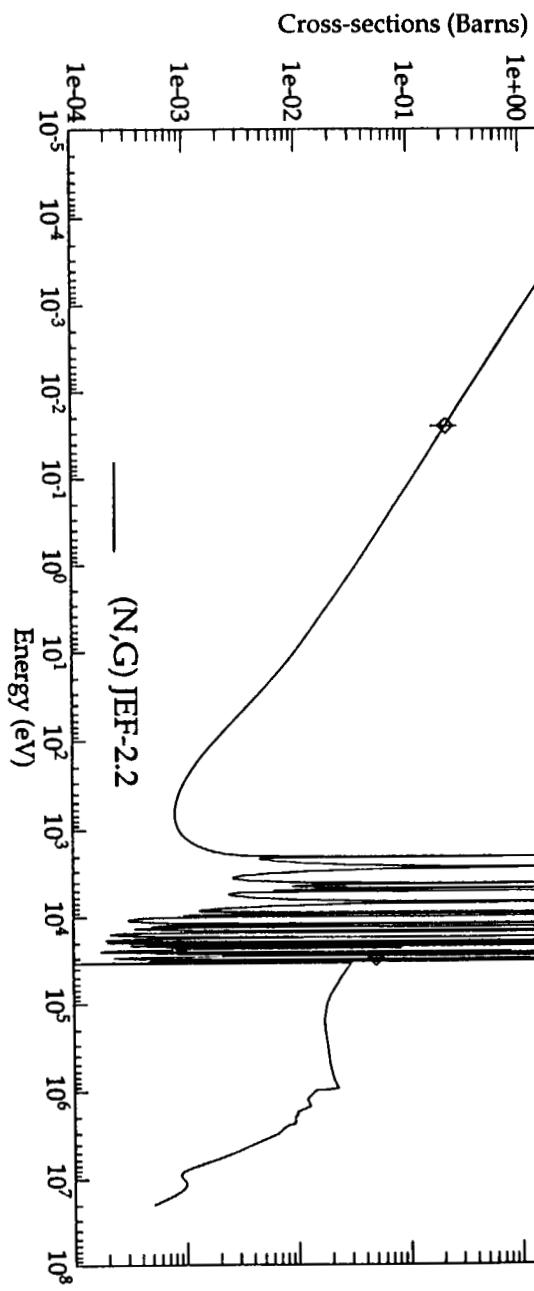






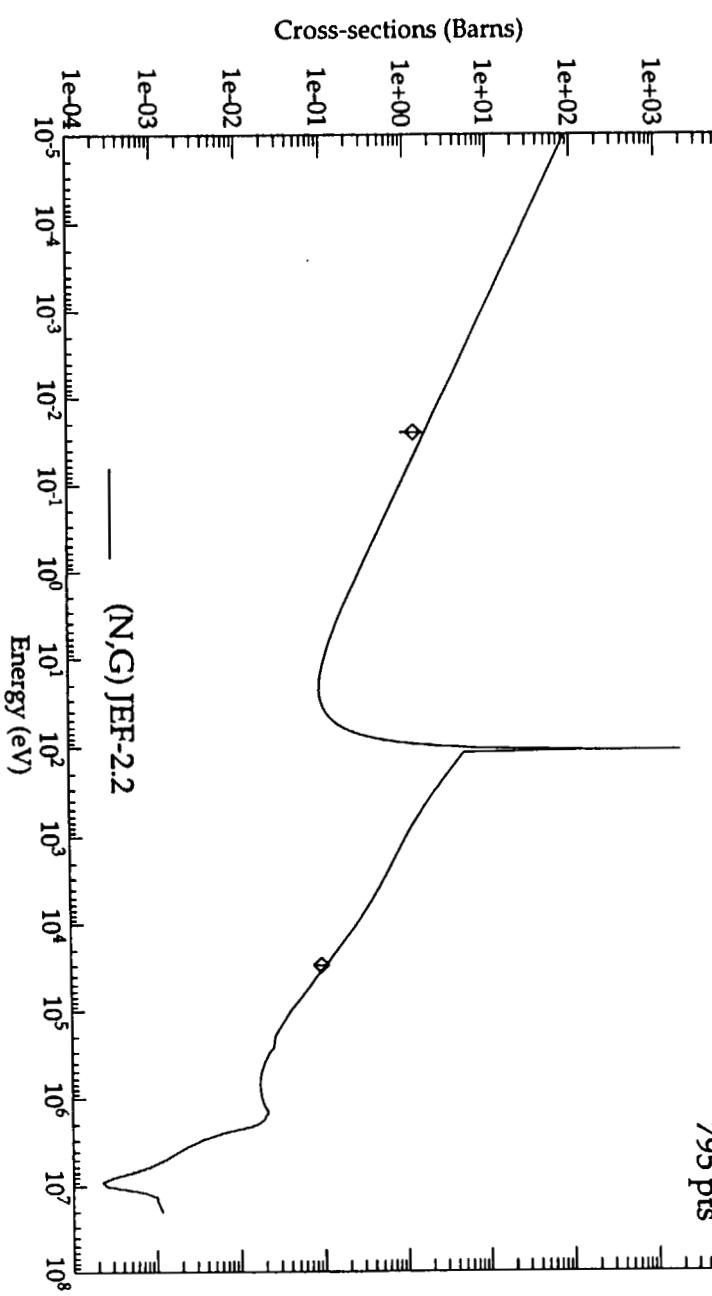
ZR-92 : (N,G)

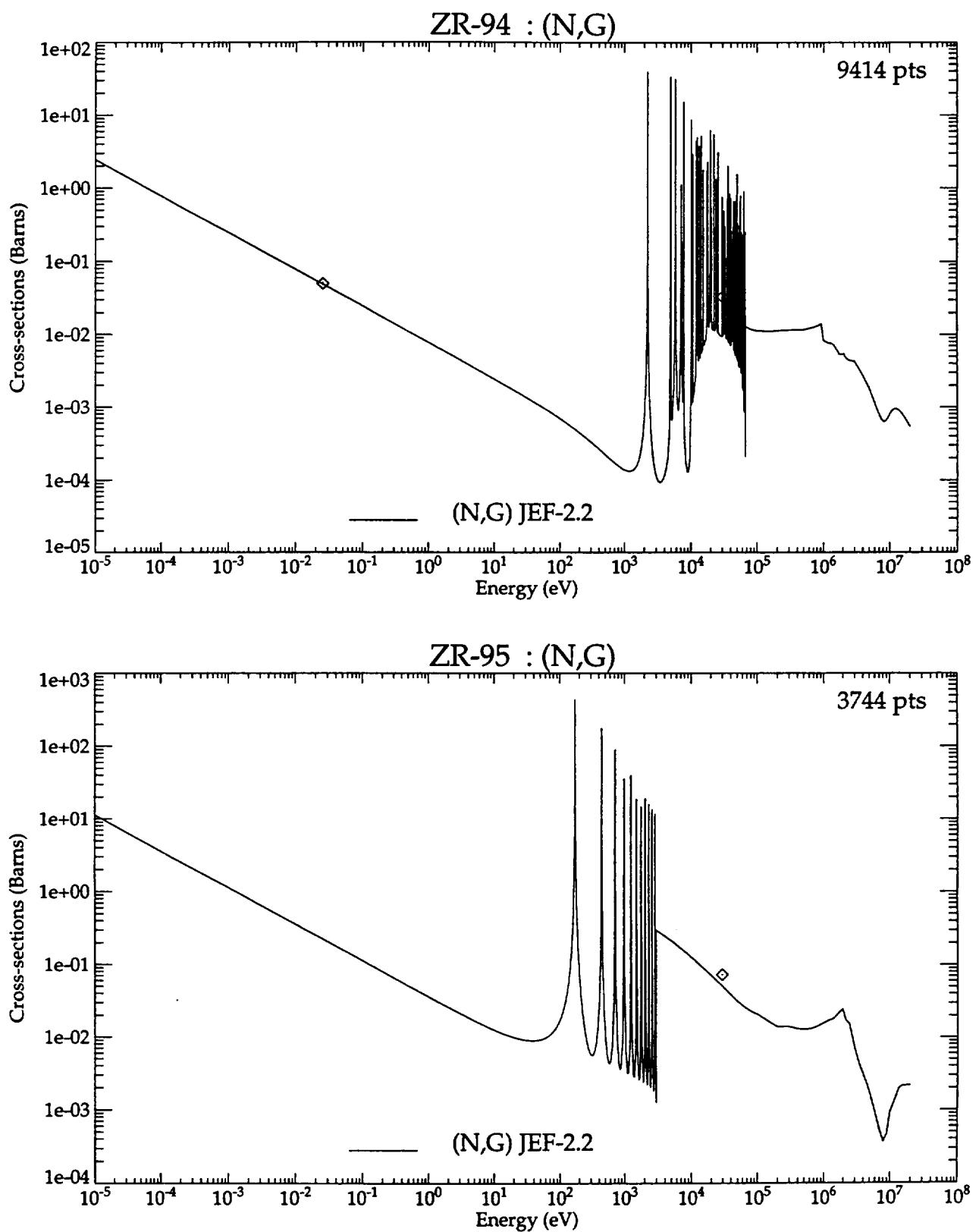
6423 pts

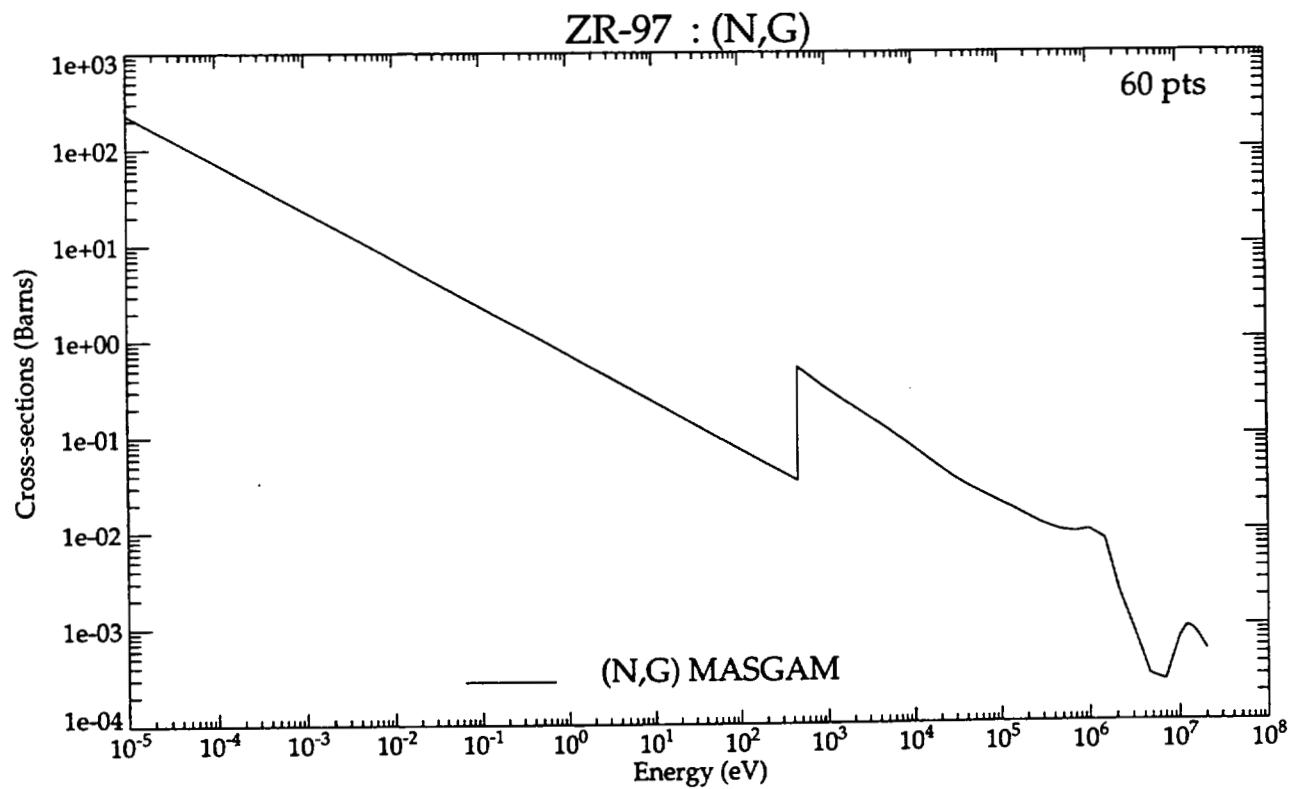
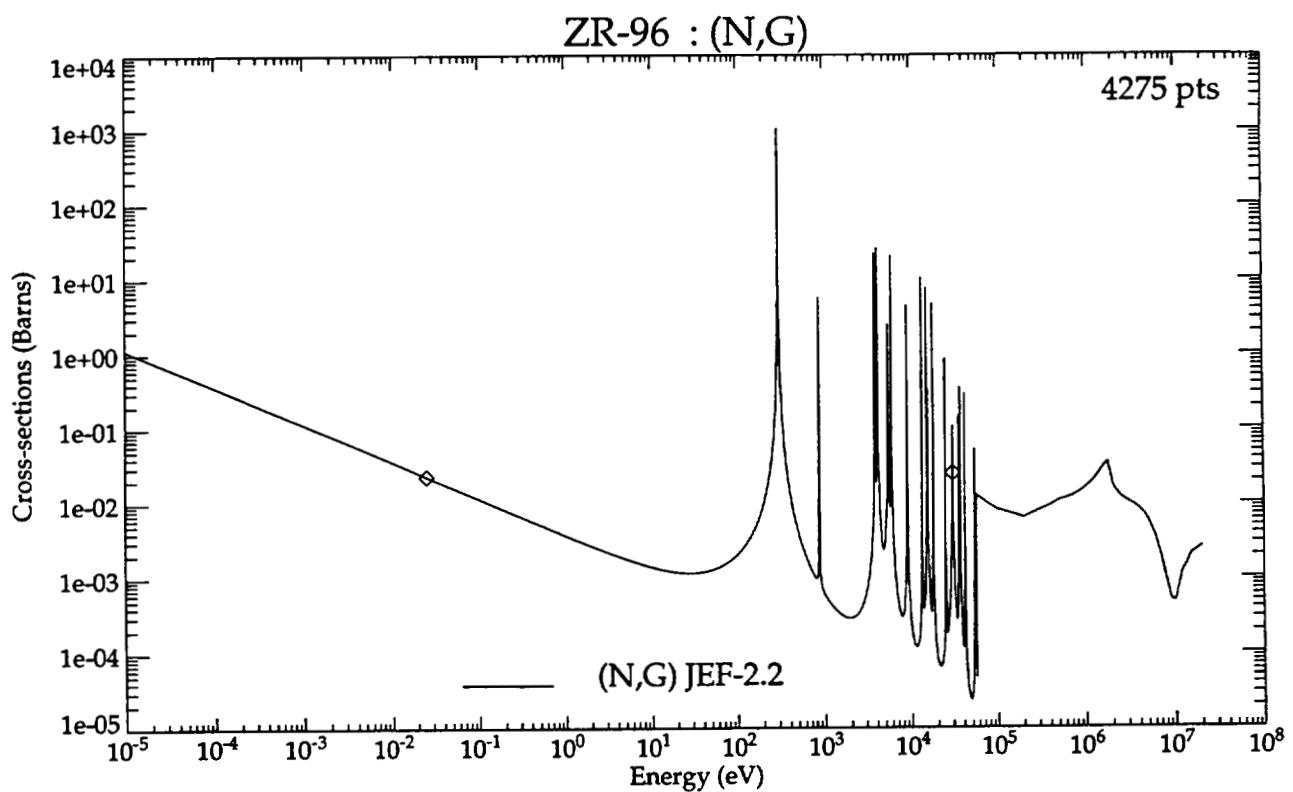


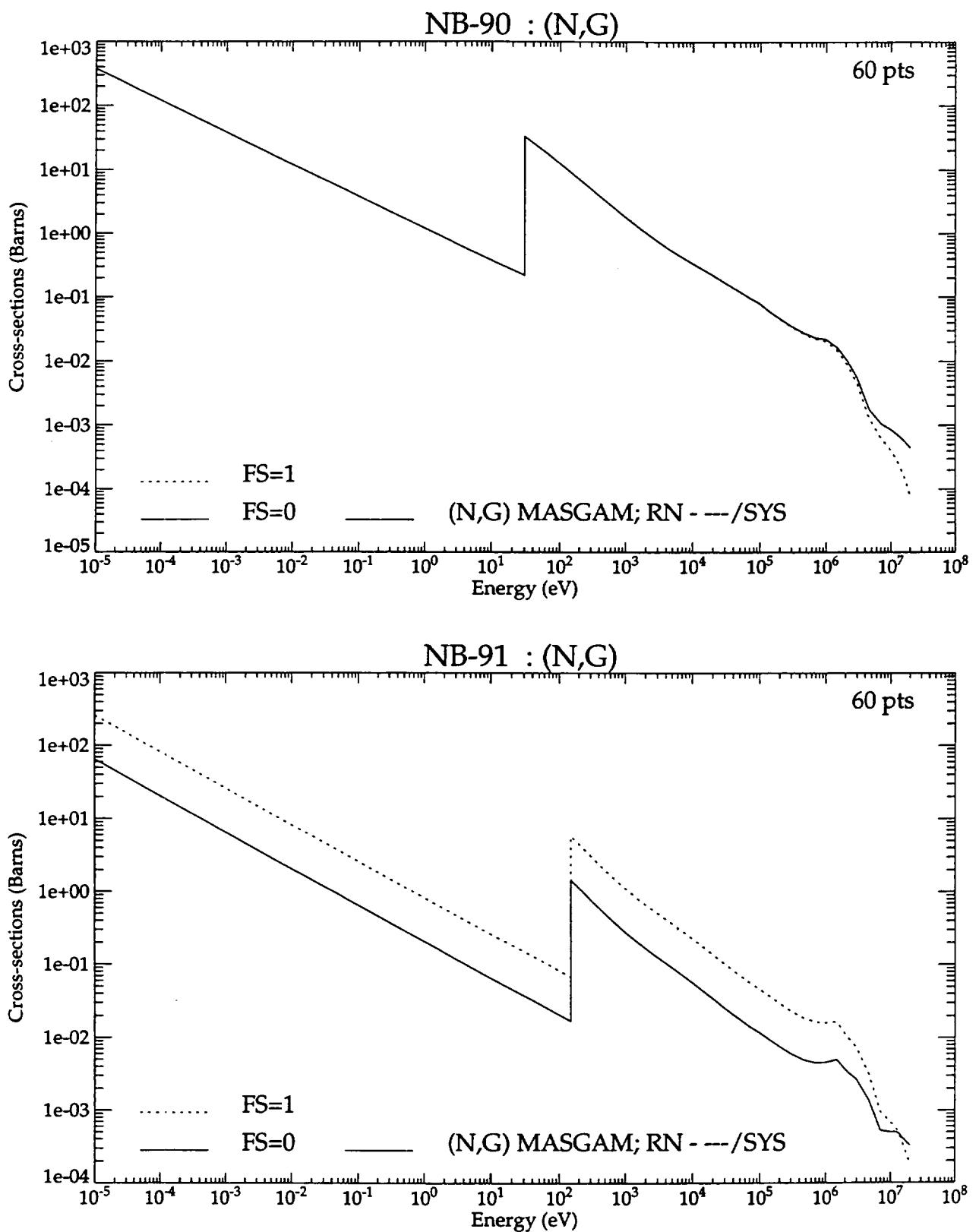
ZR-93 : (N,G)

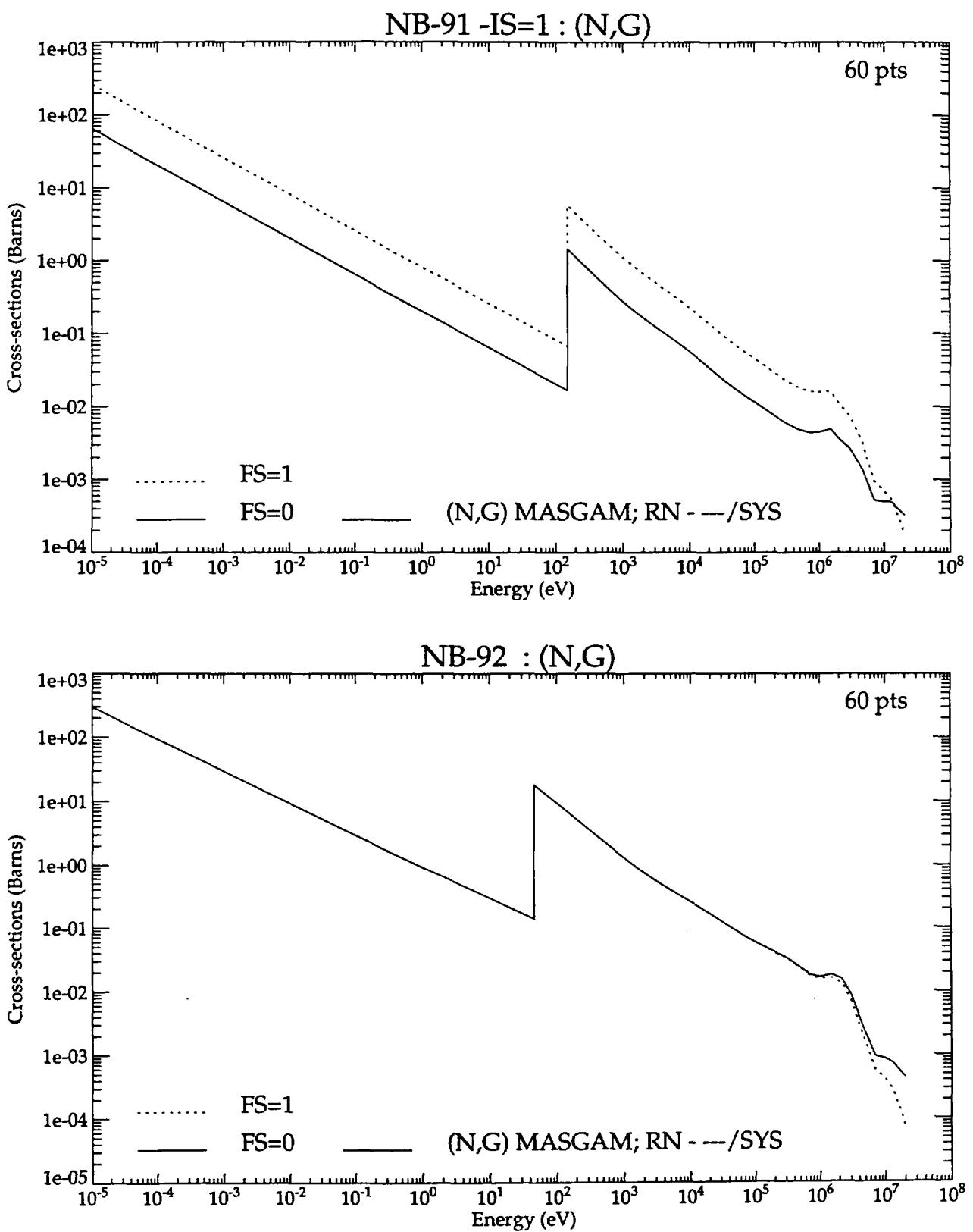
795 pts

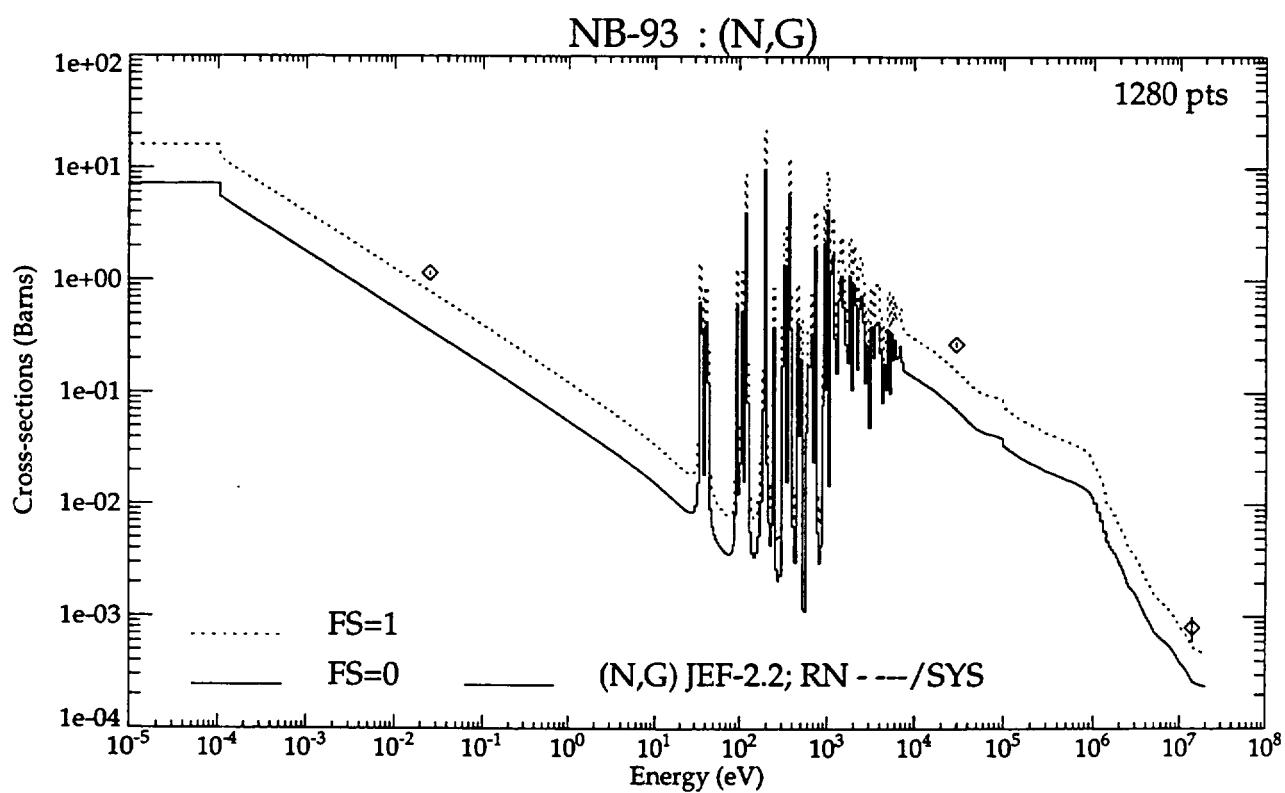
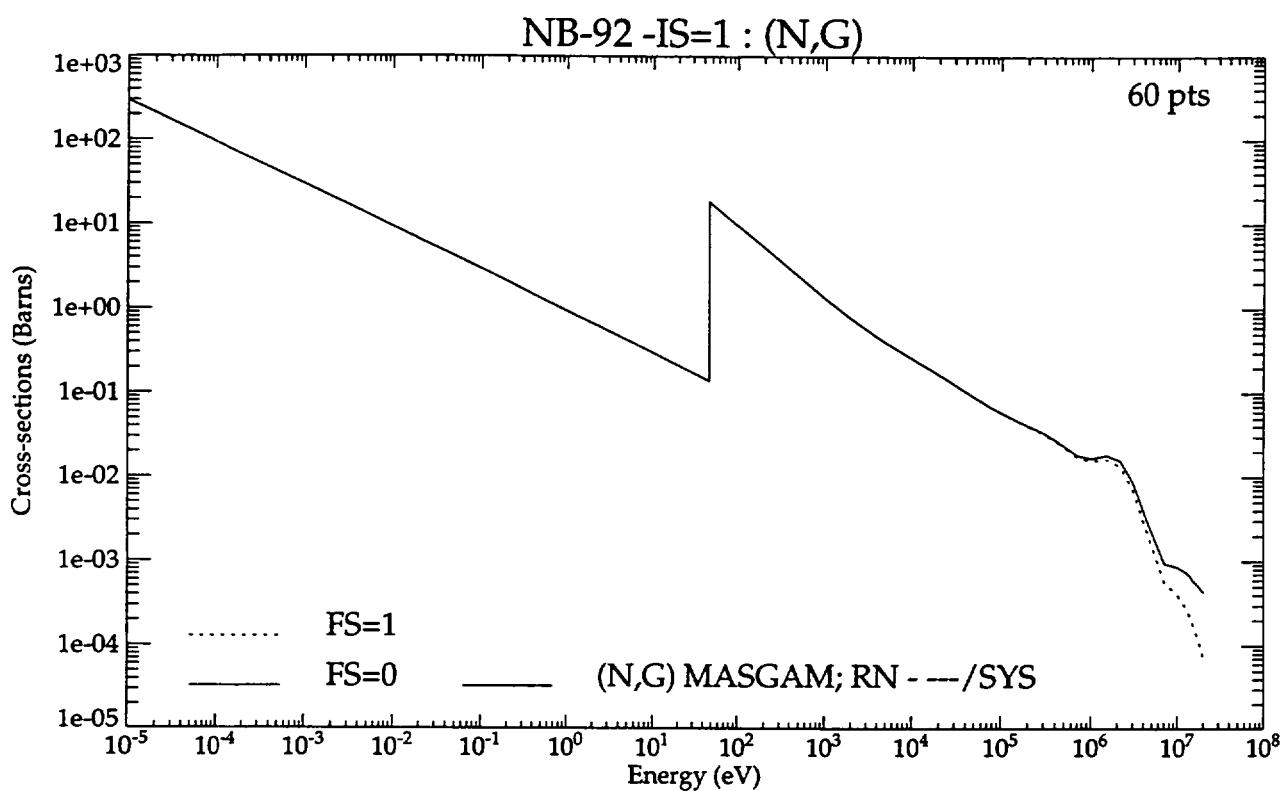


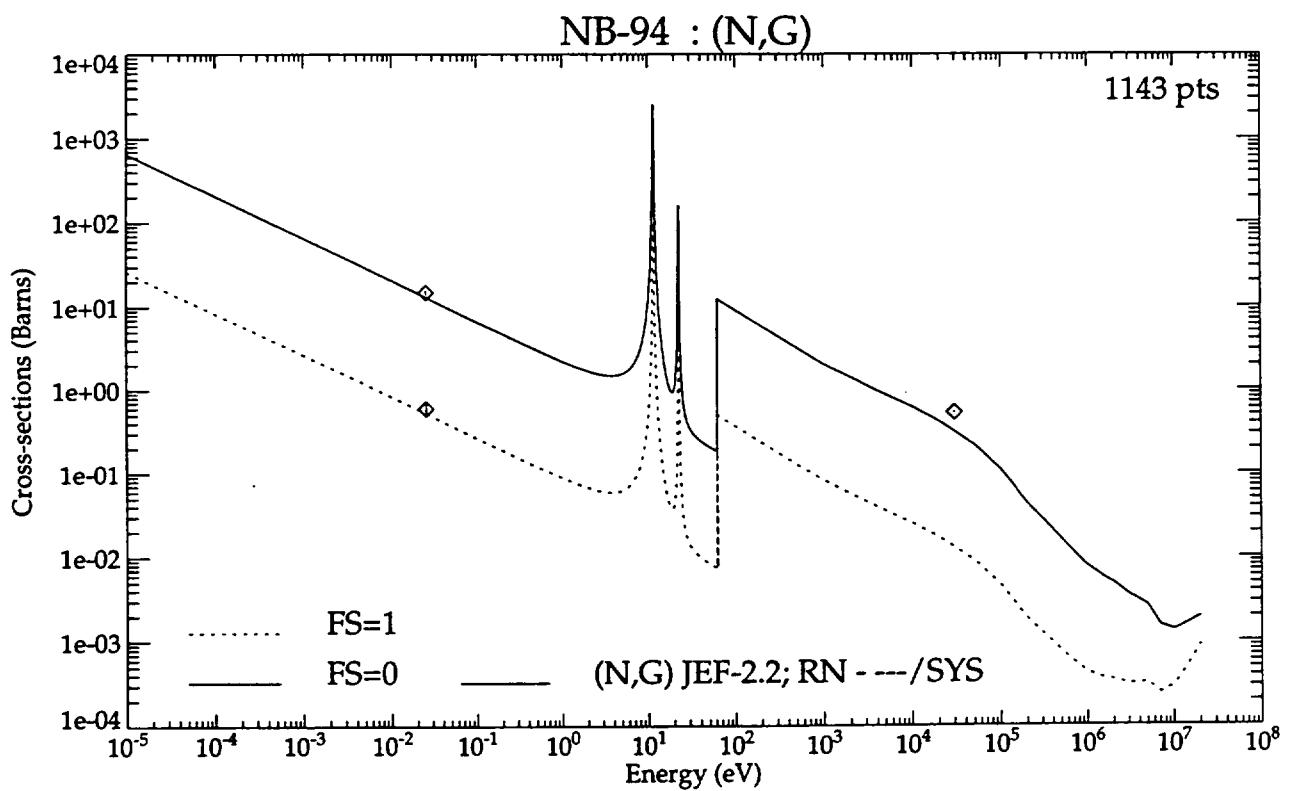
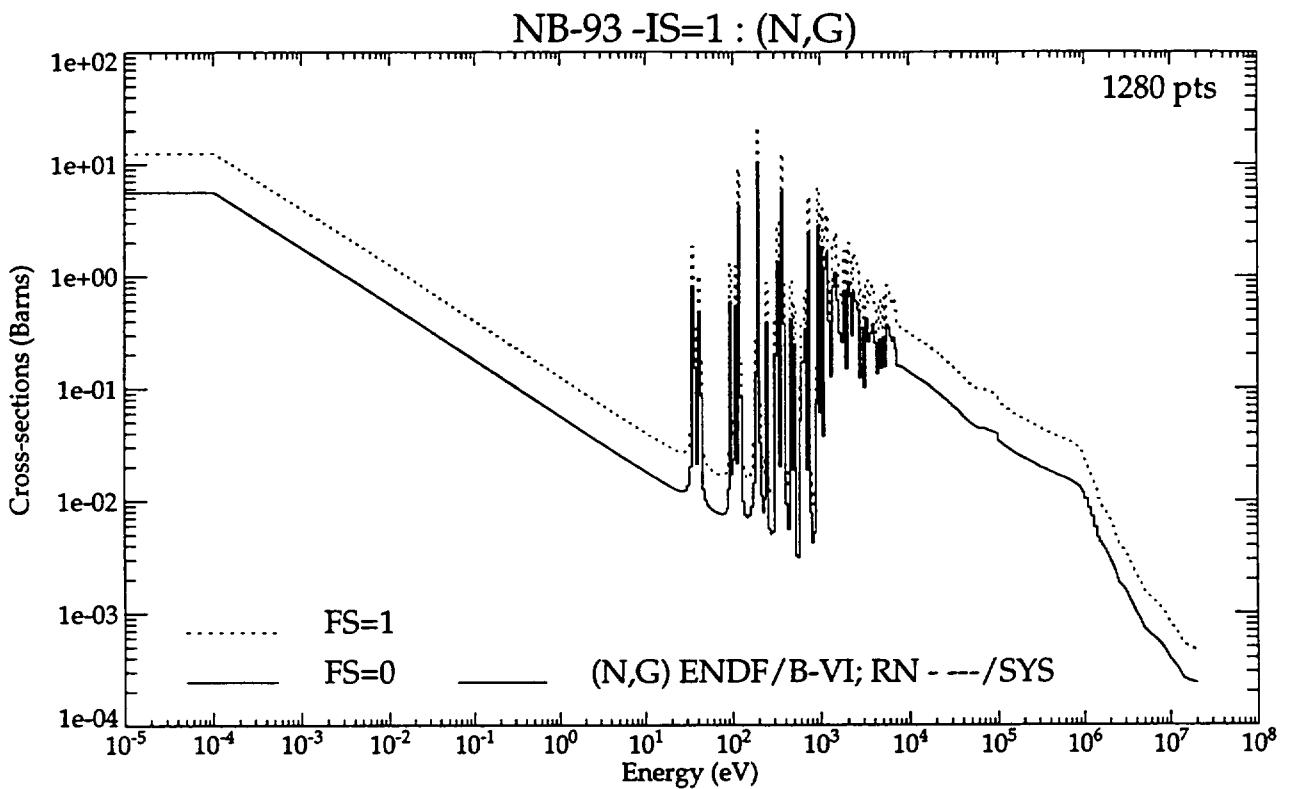


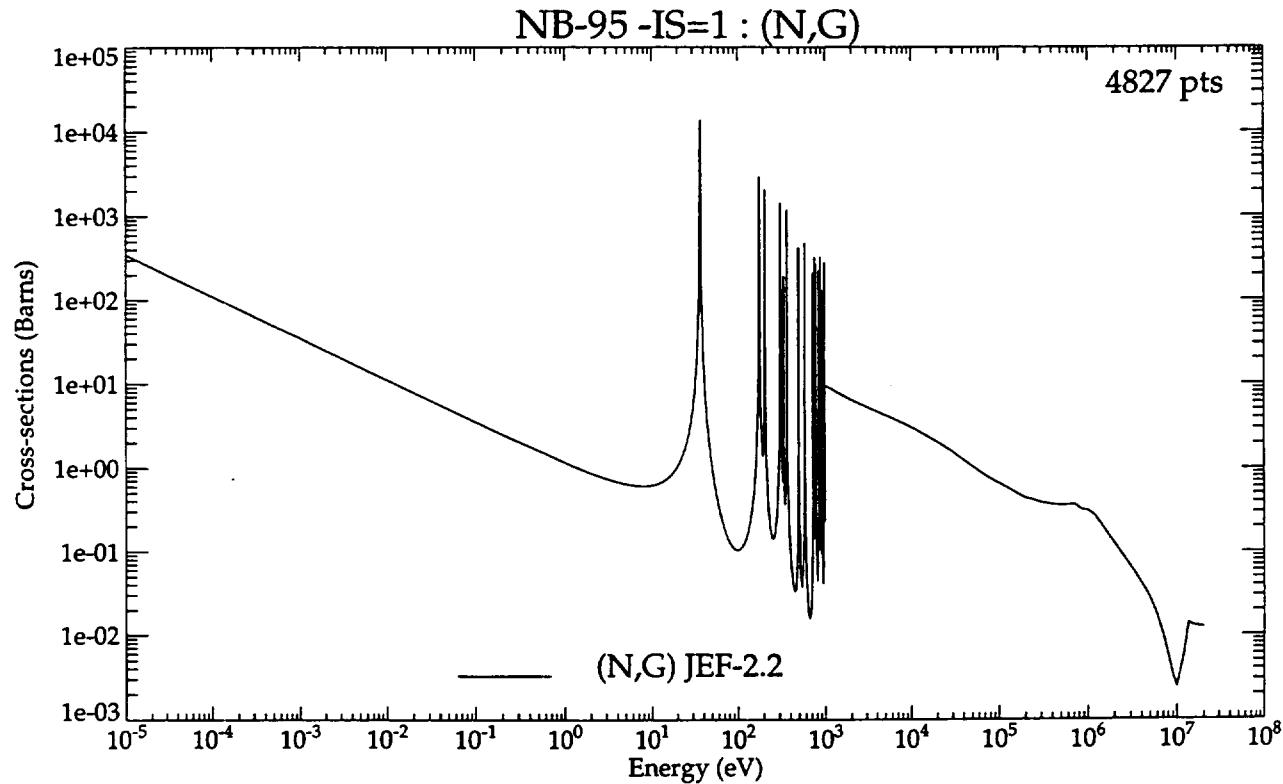
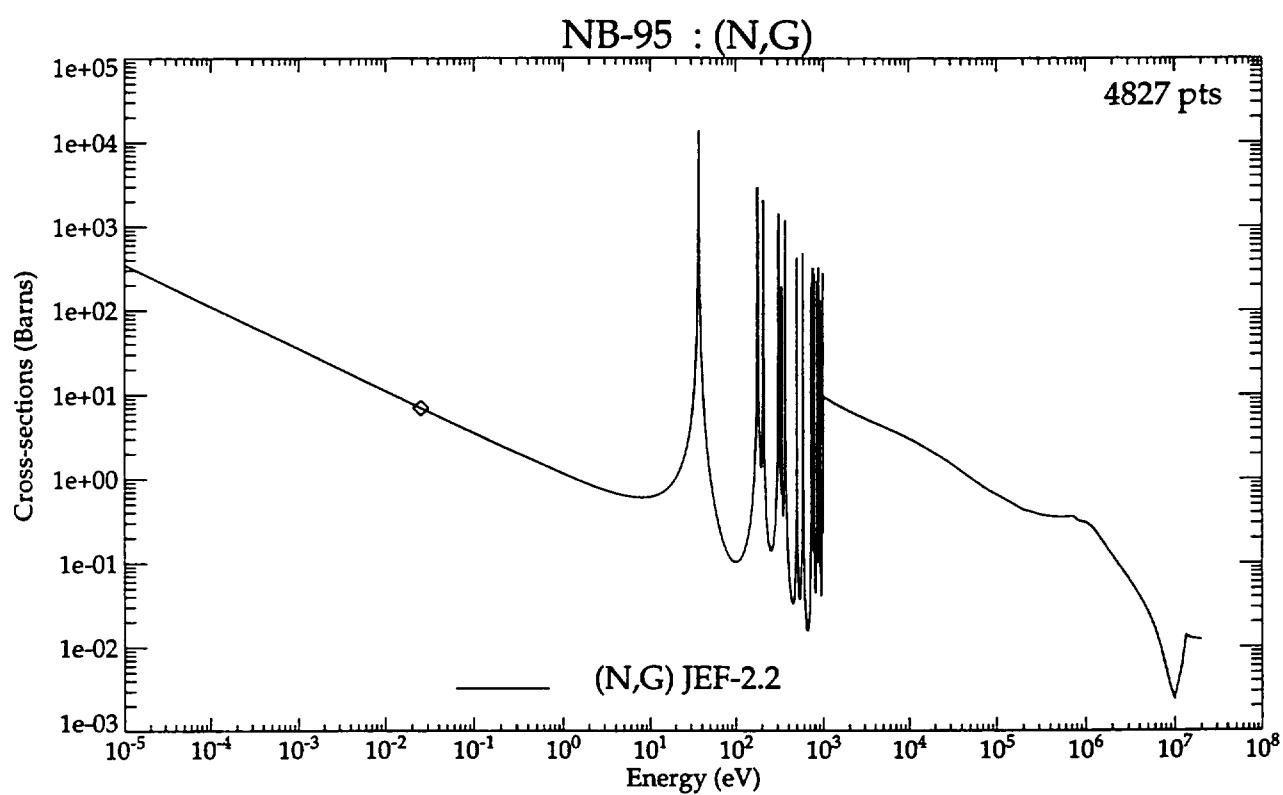


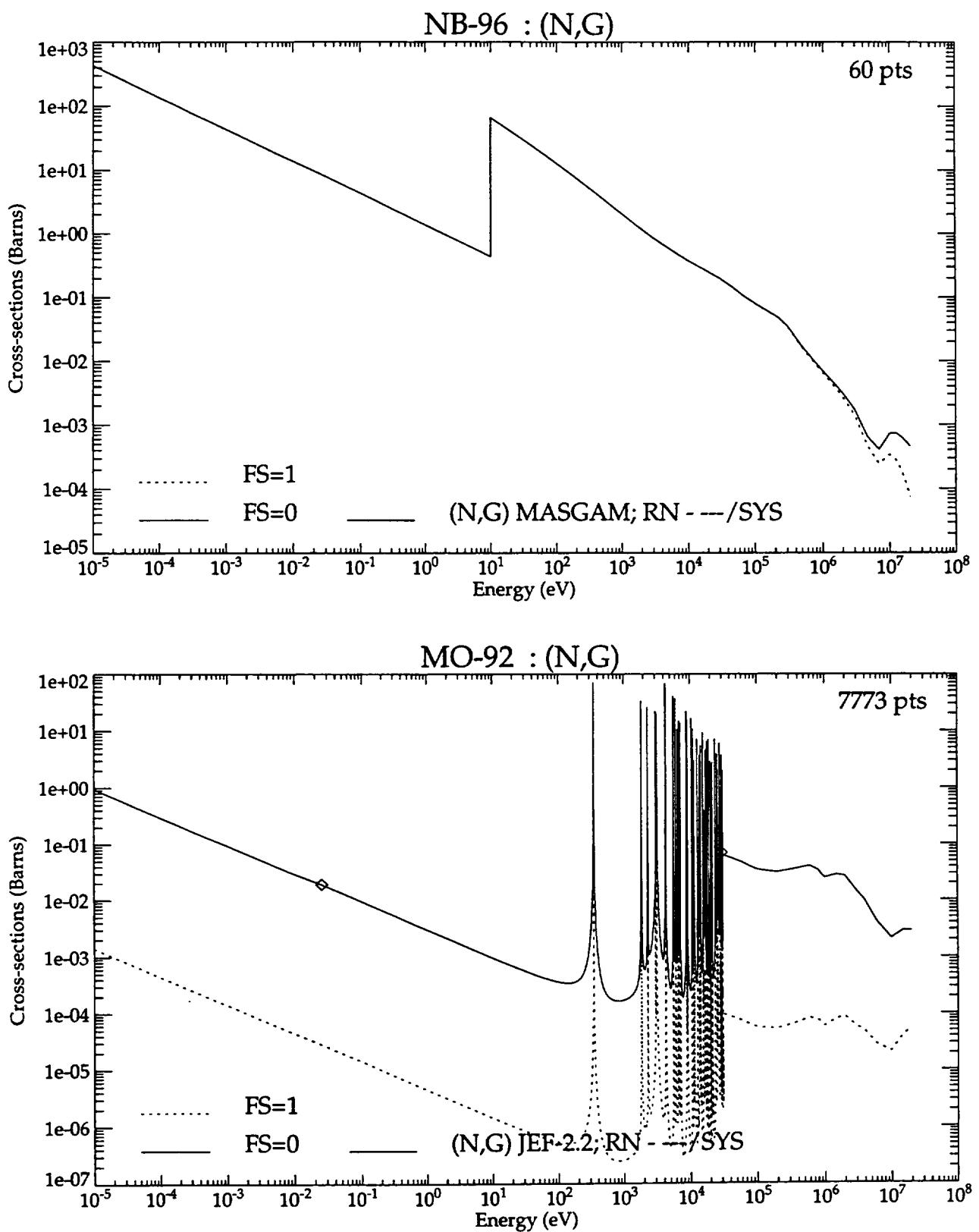


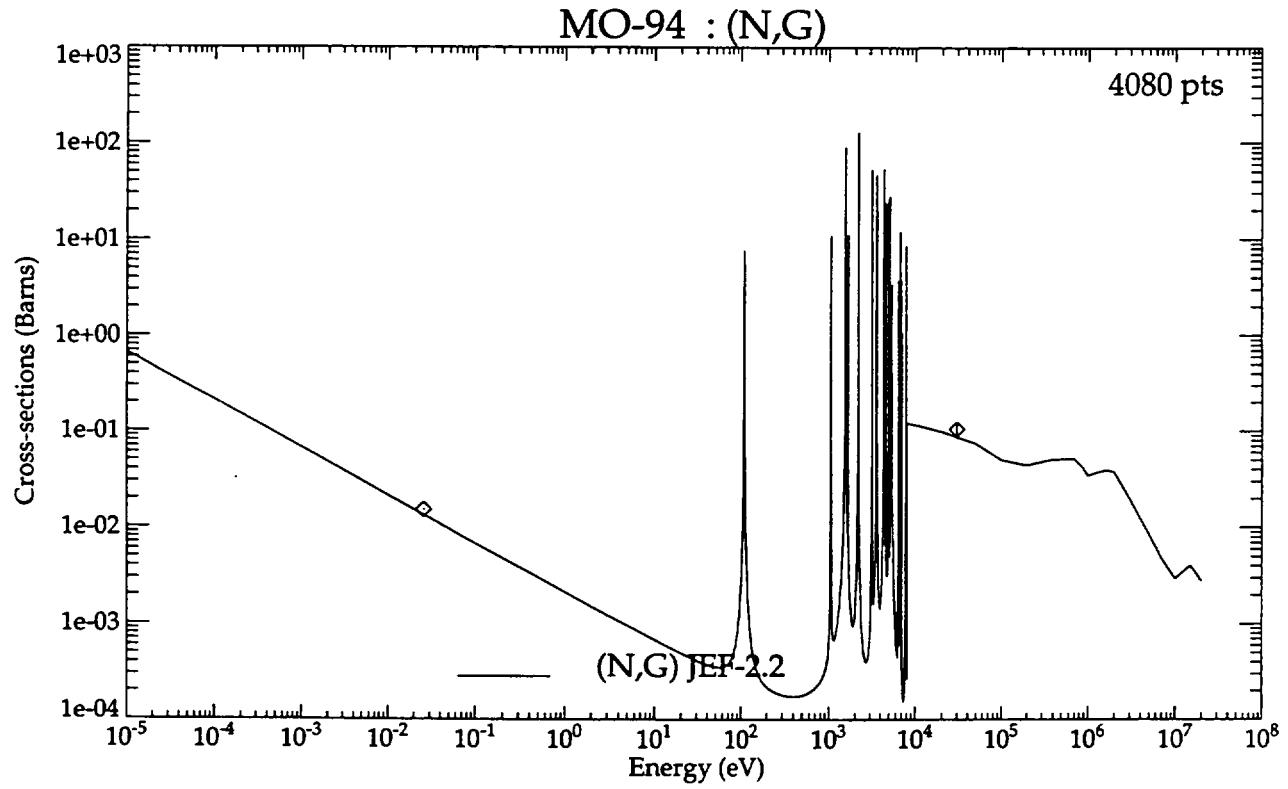
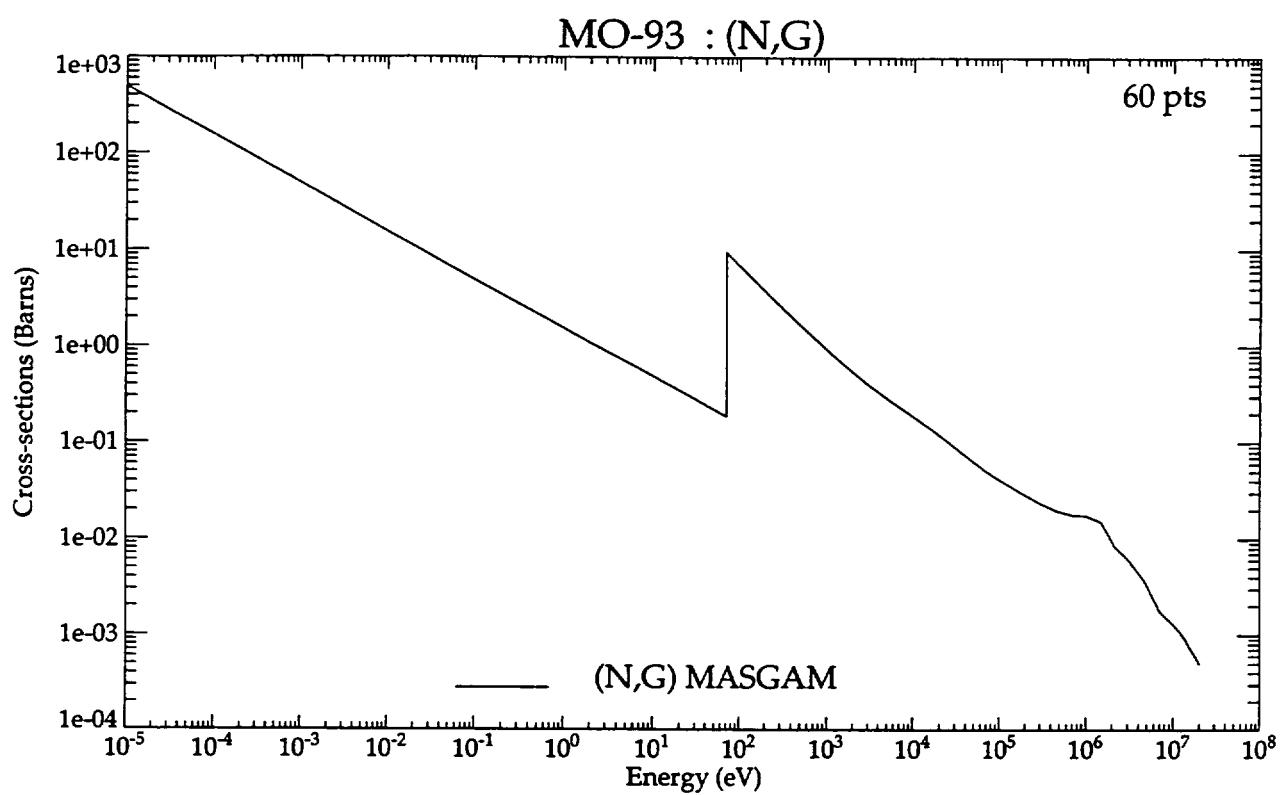


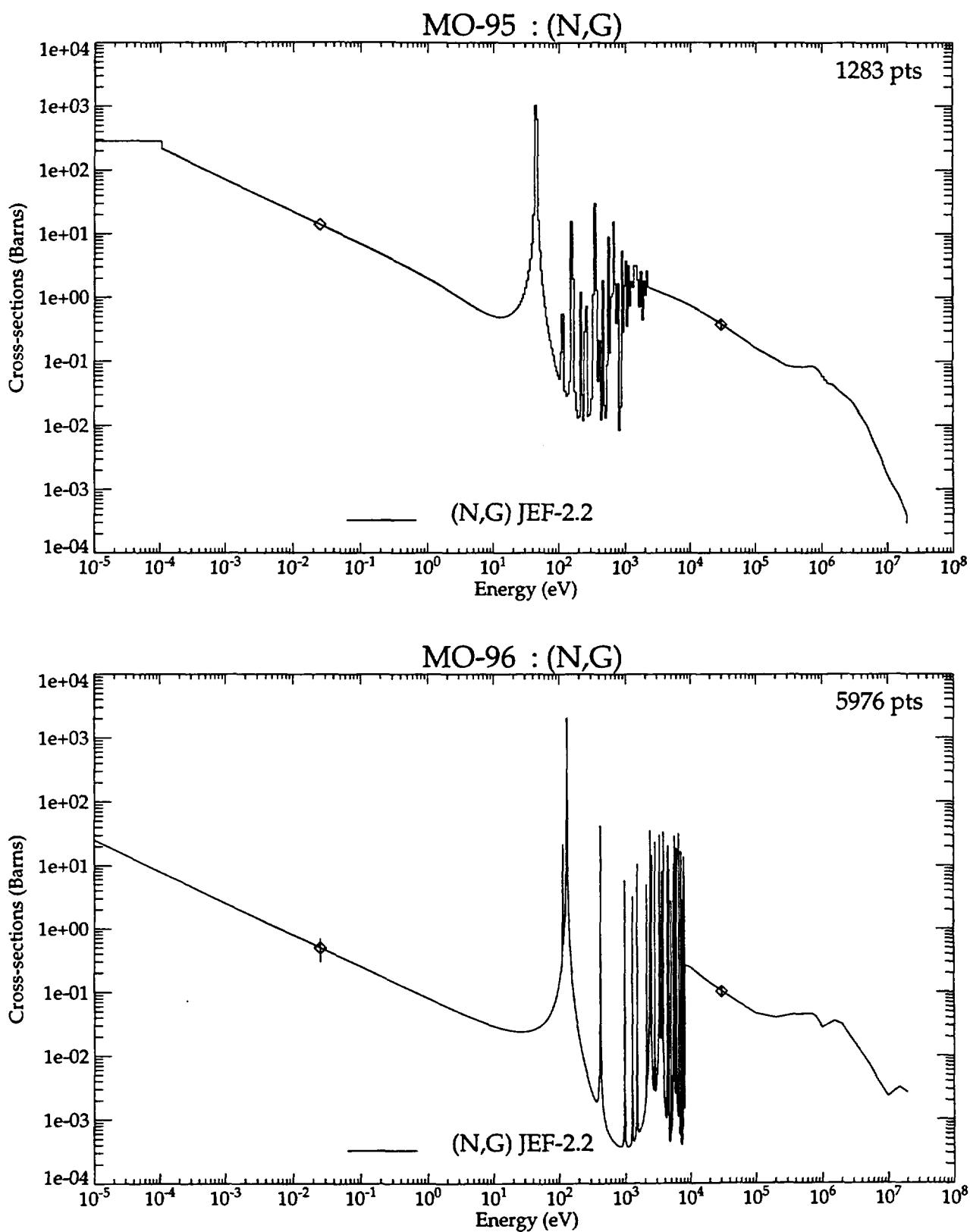


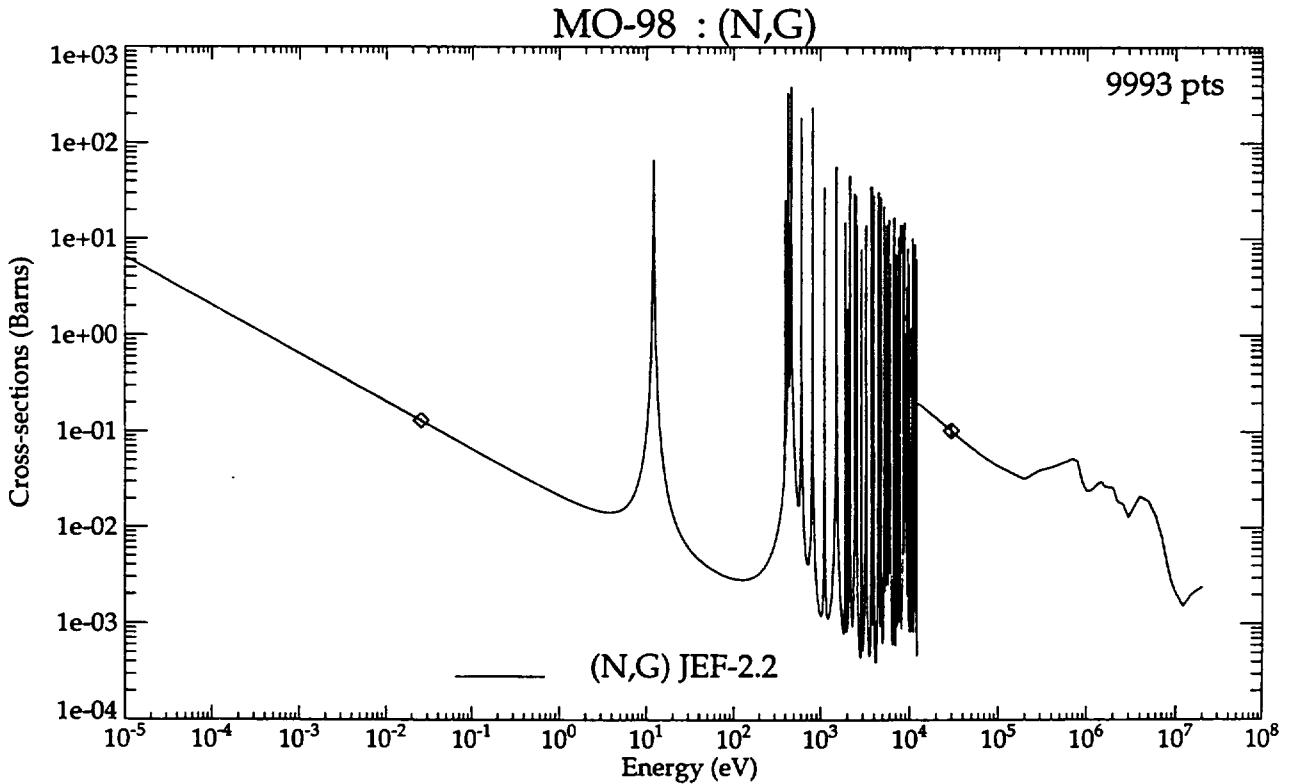
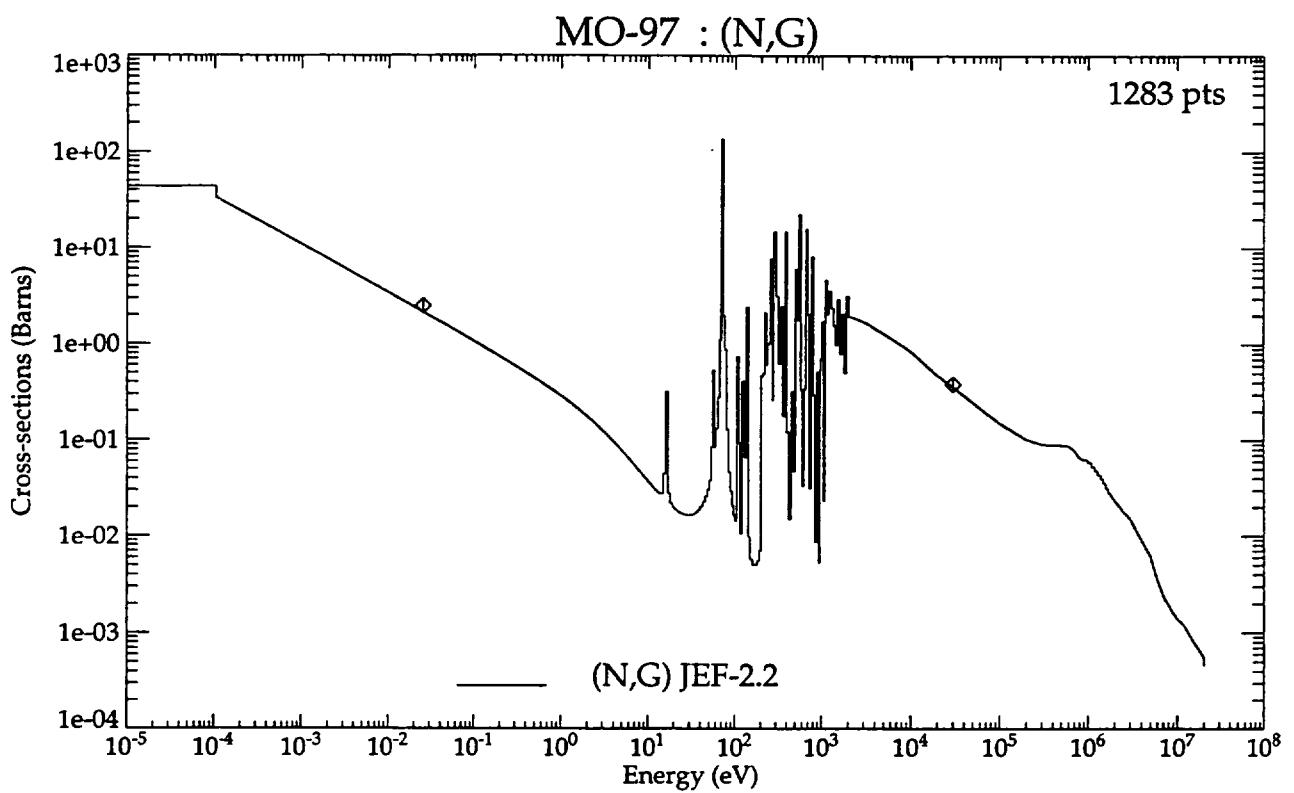


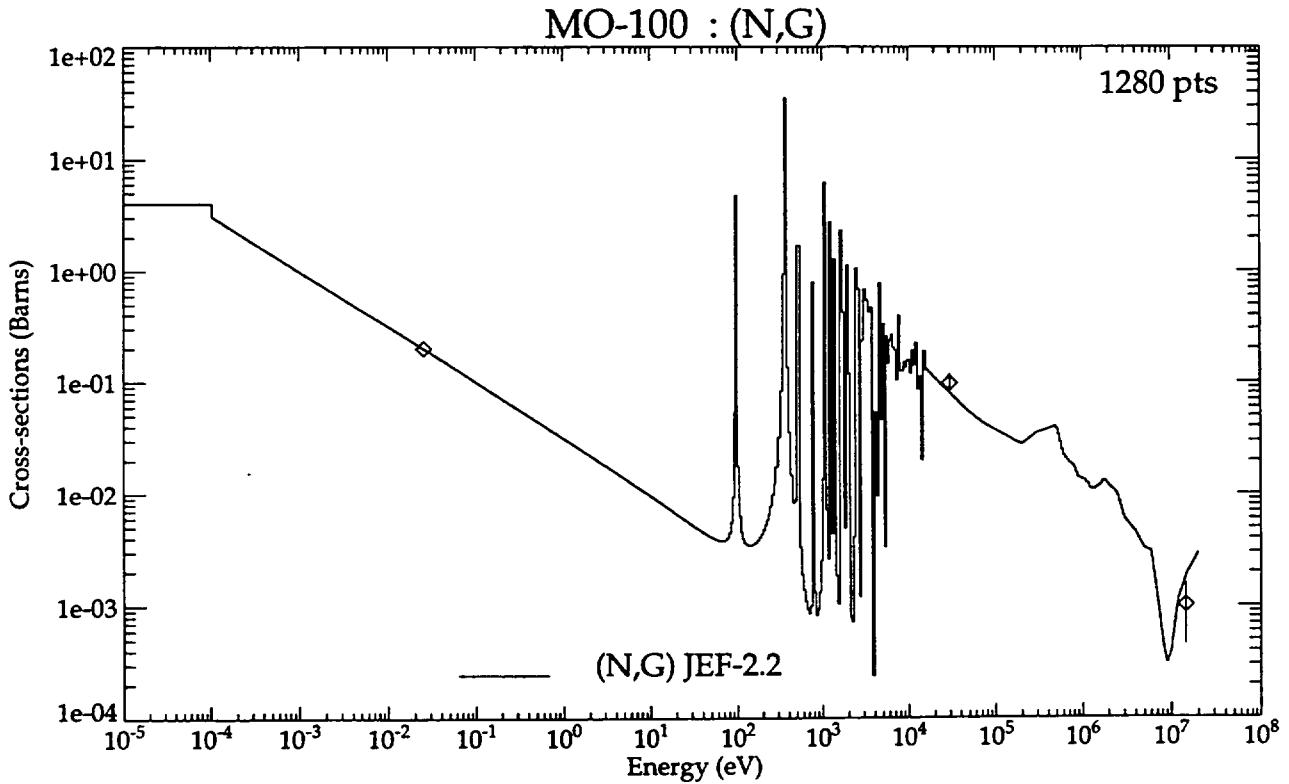
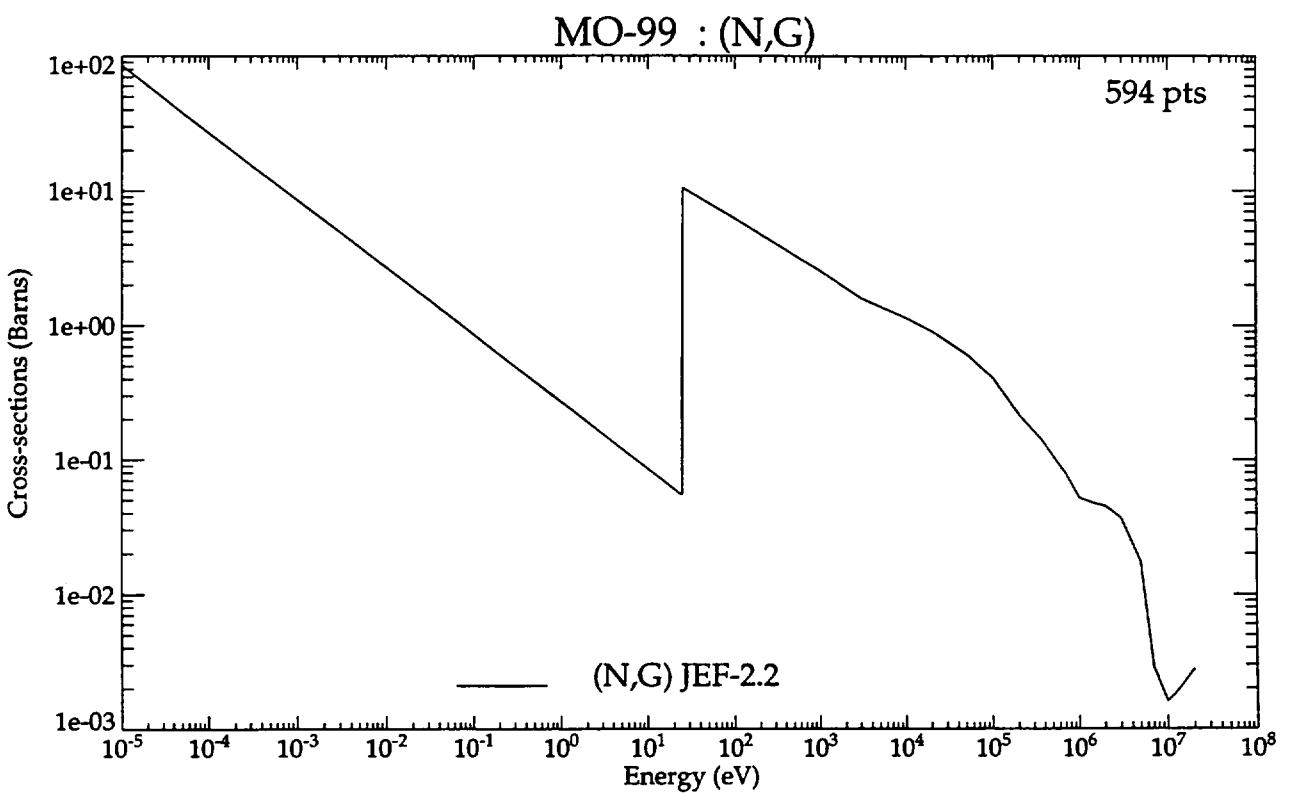


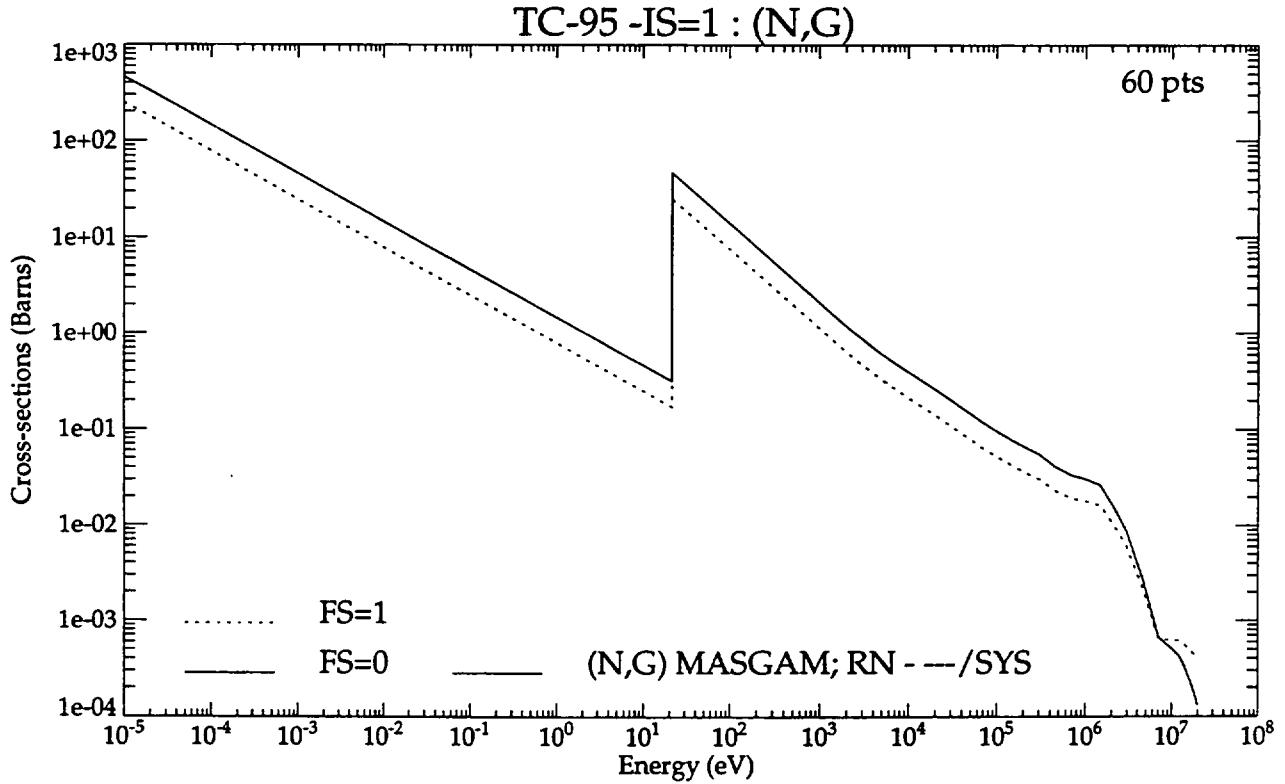
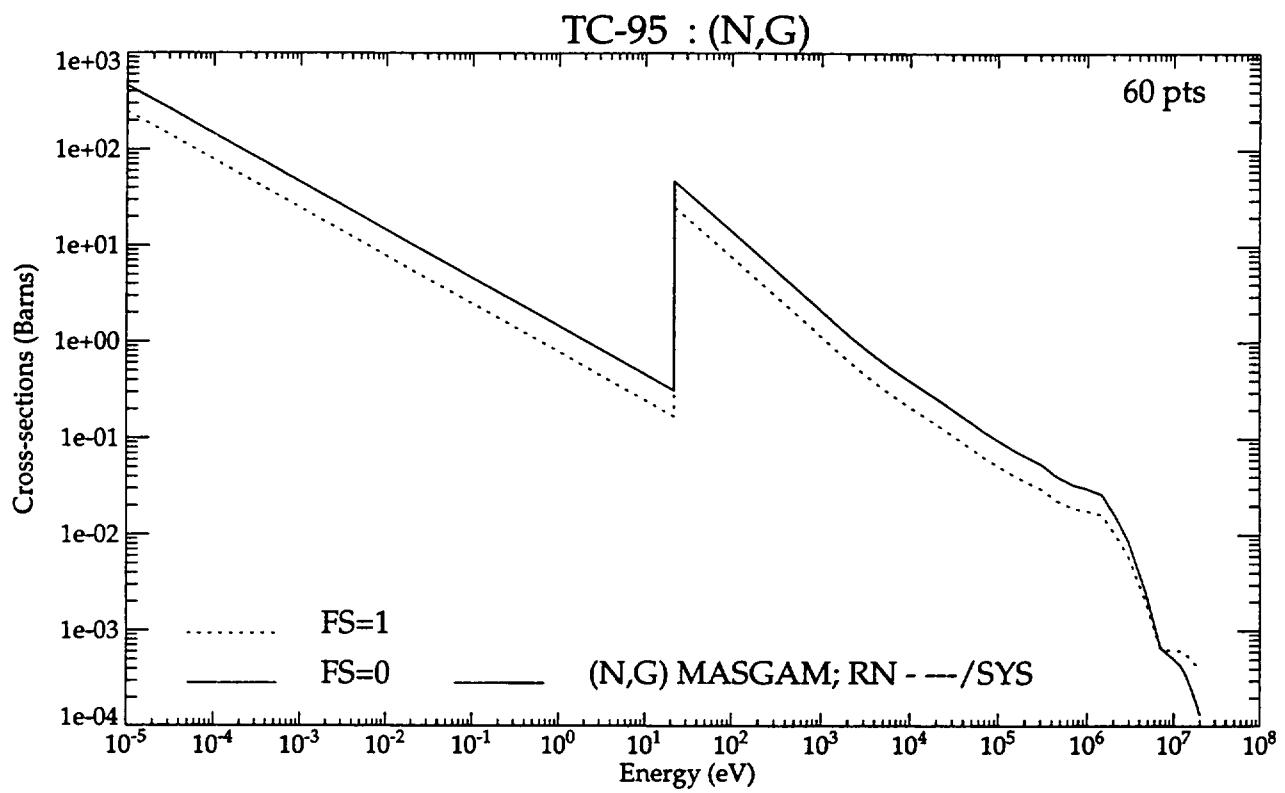


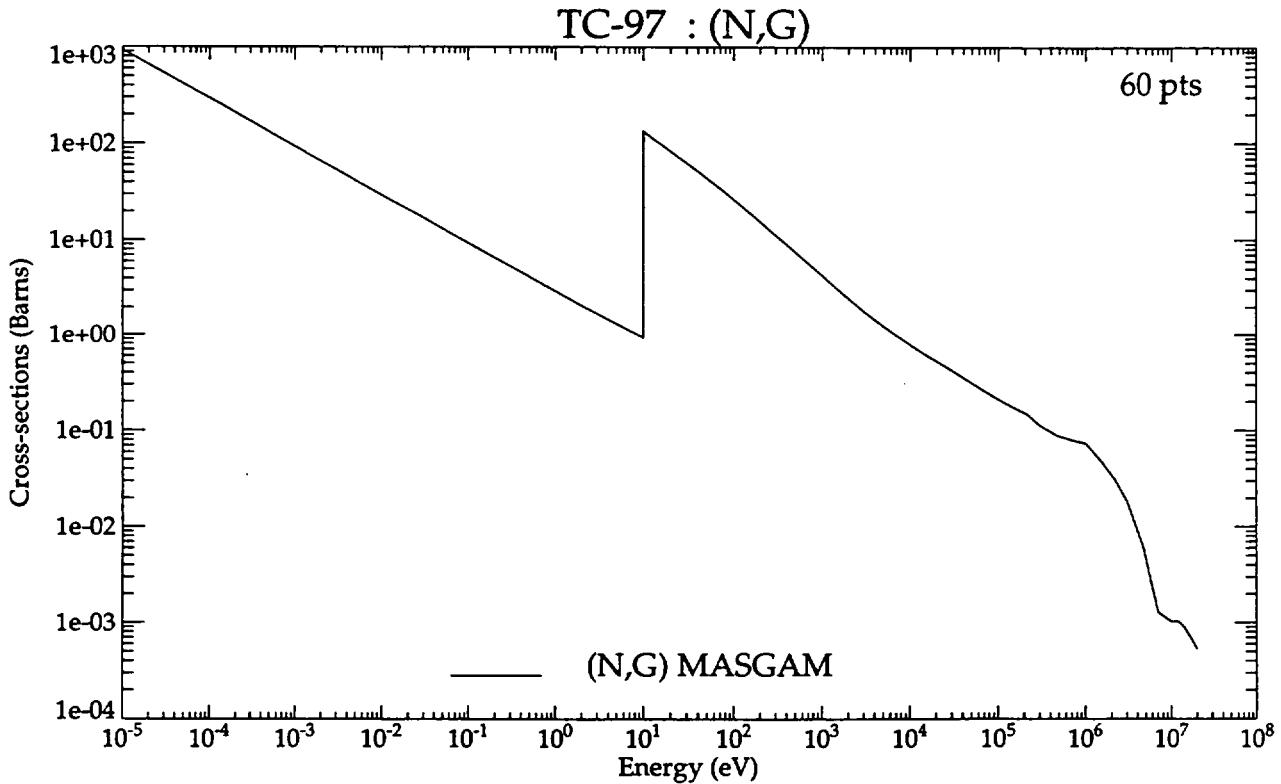
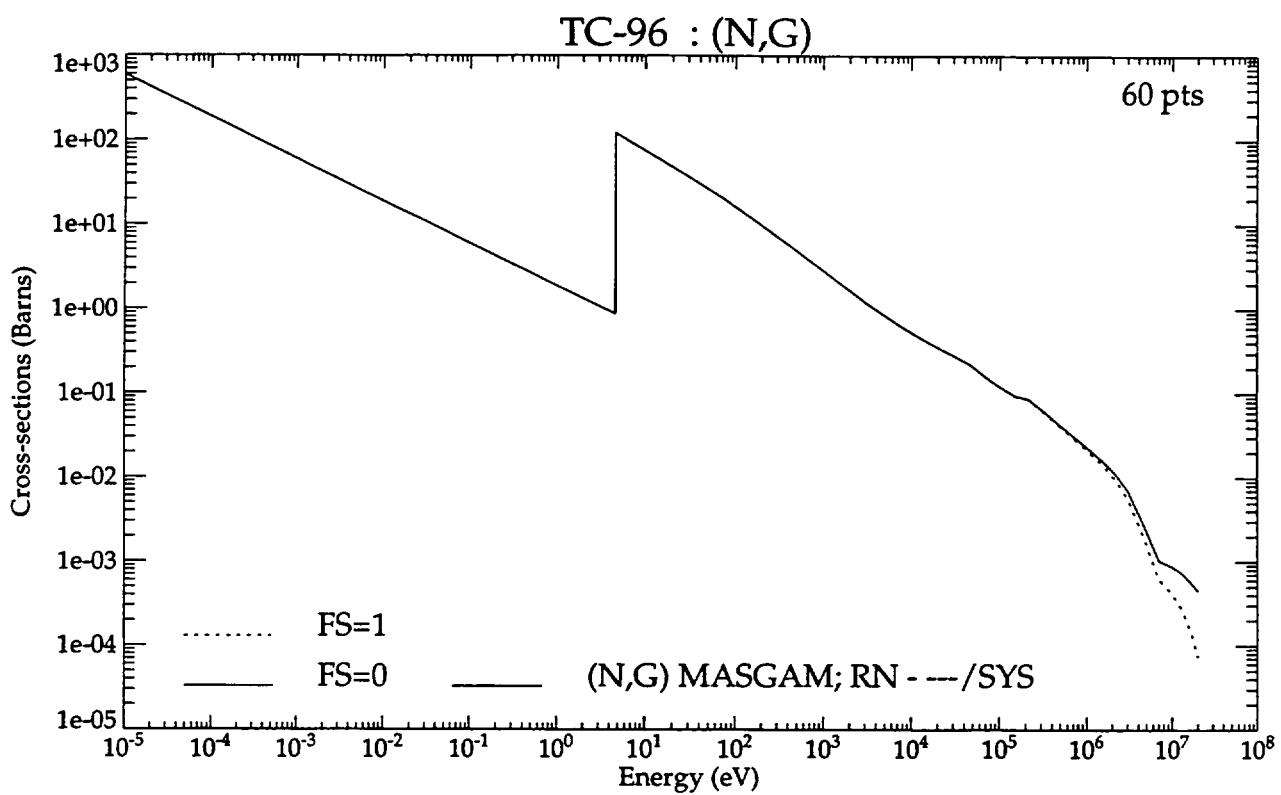




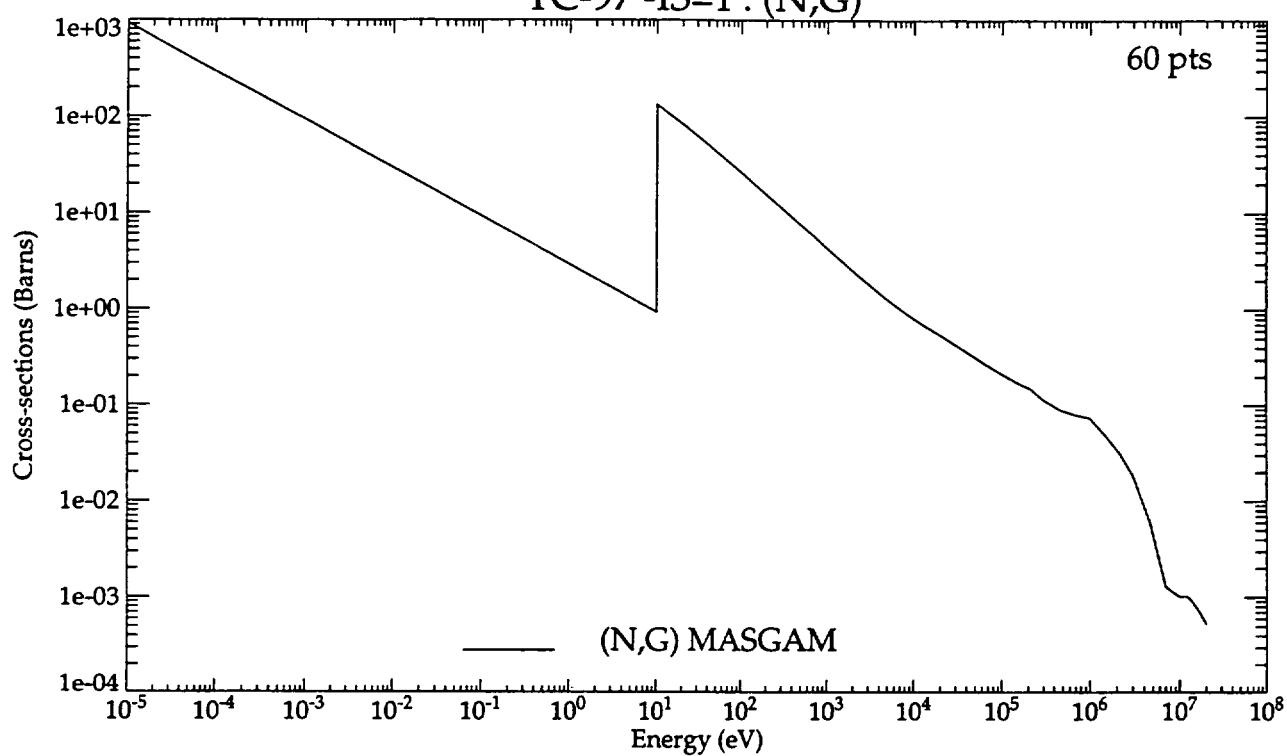




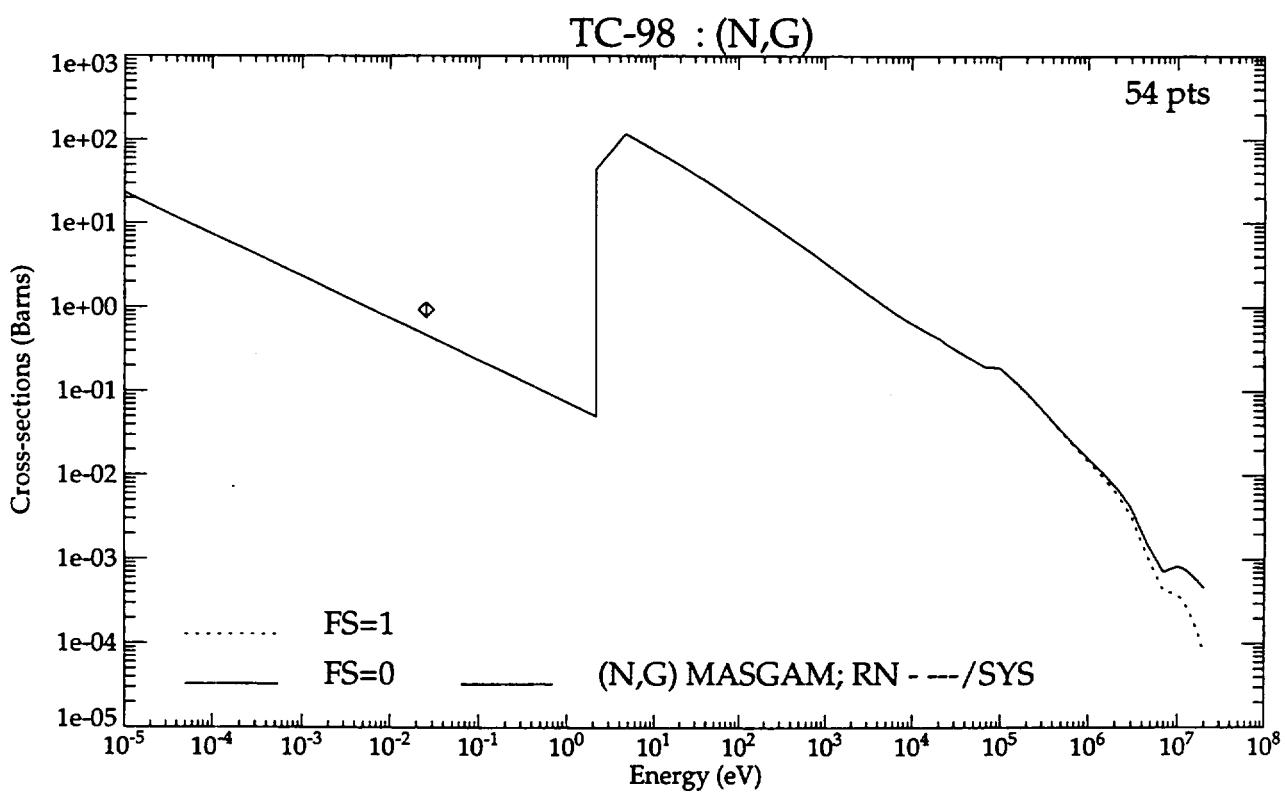


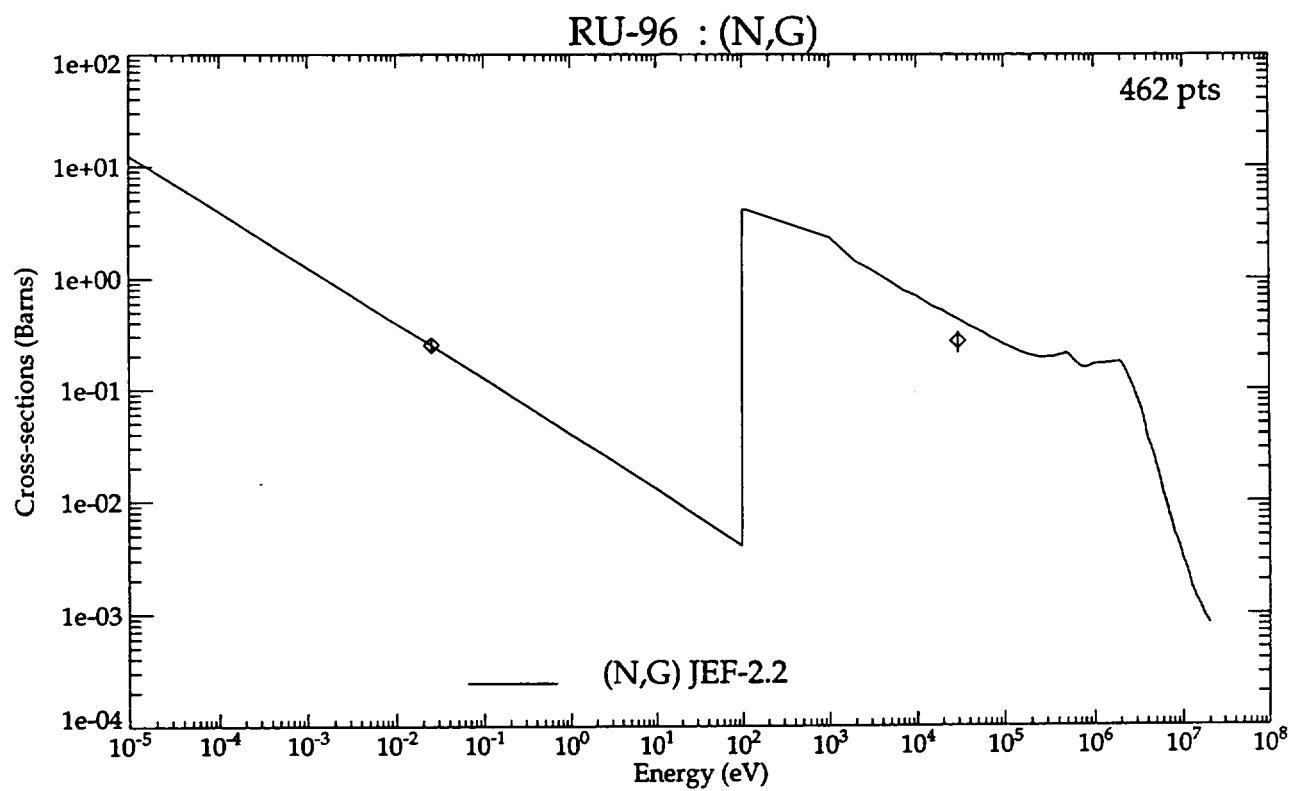
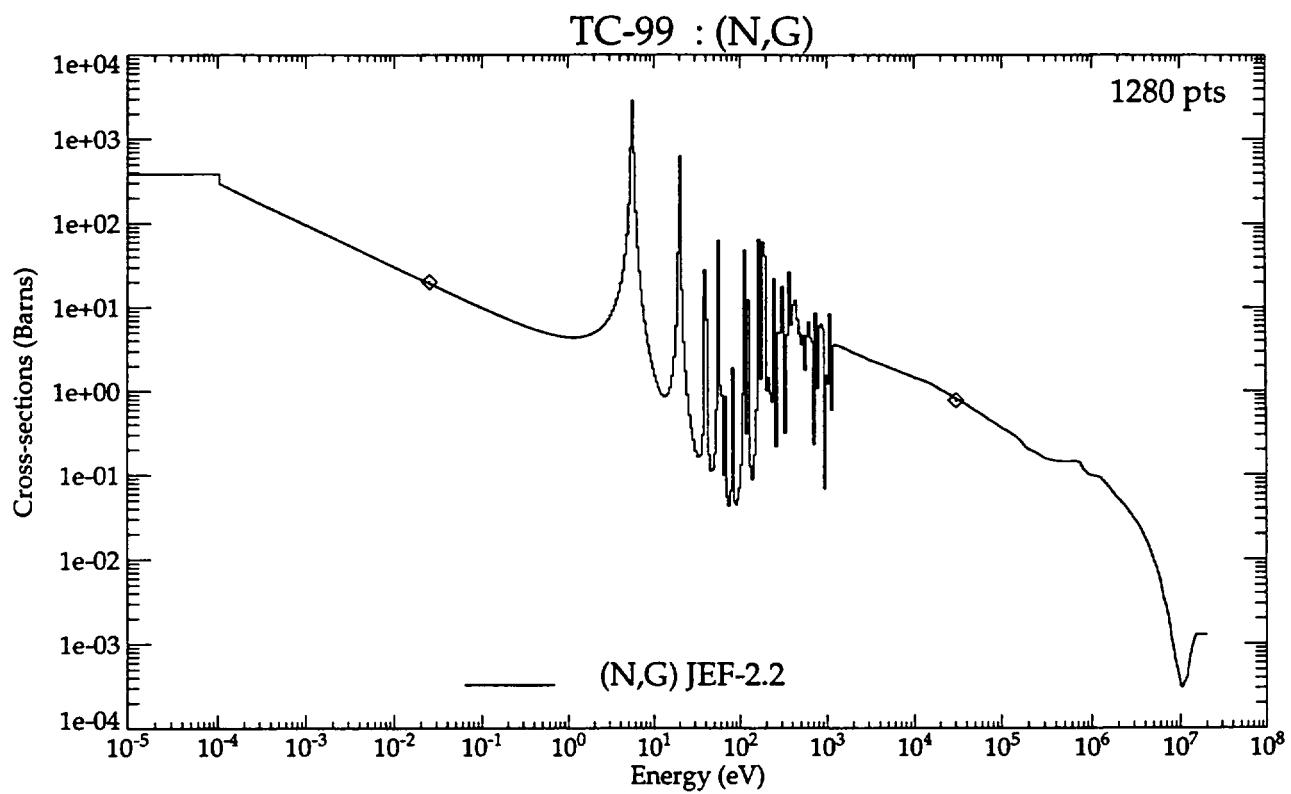


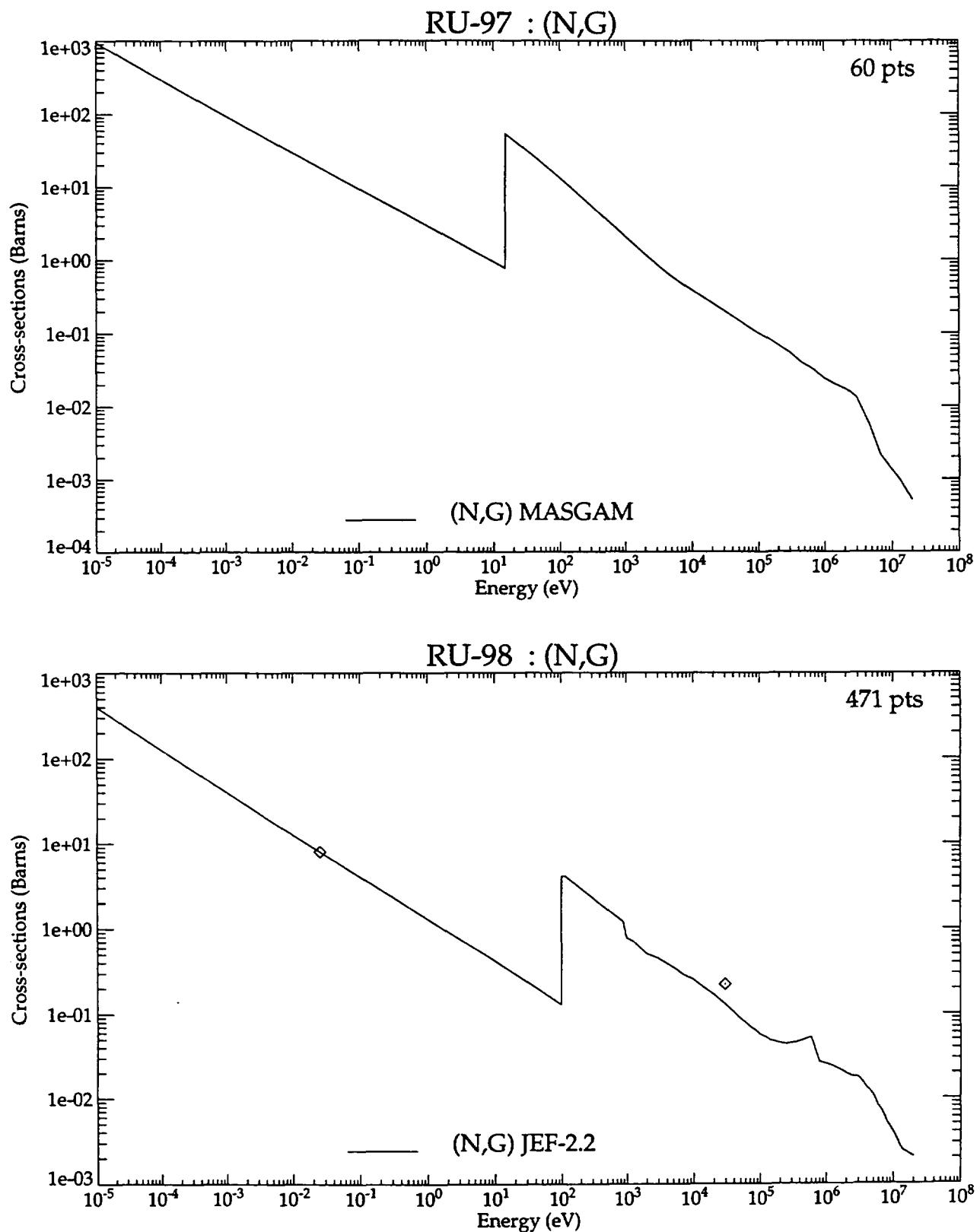
TC-97 -IS=1 : (N,G)

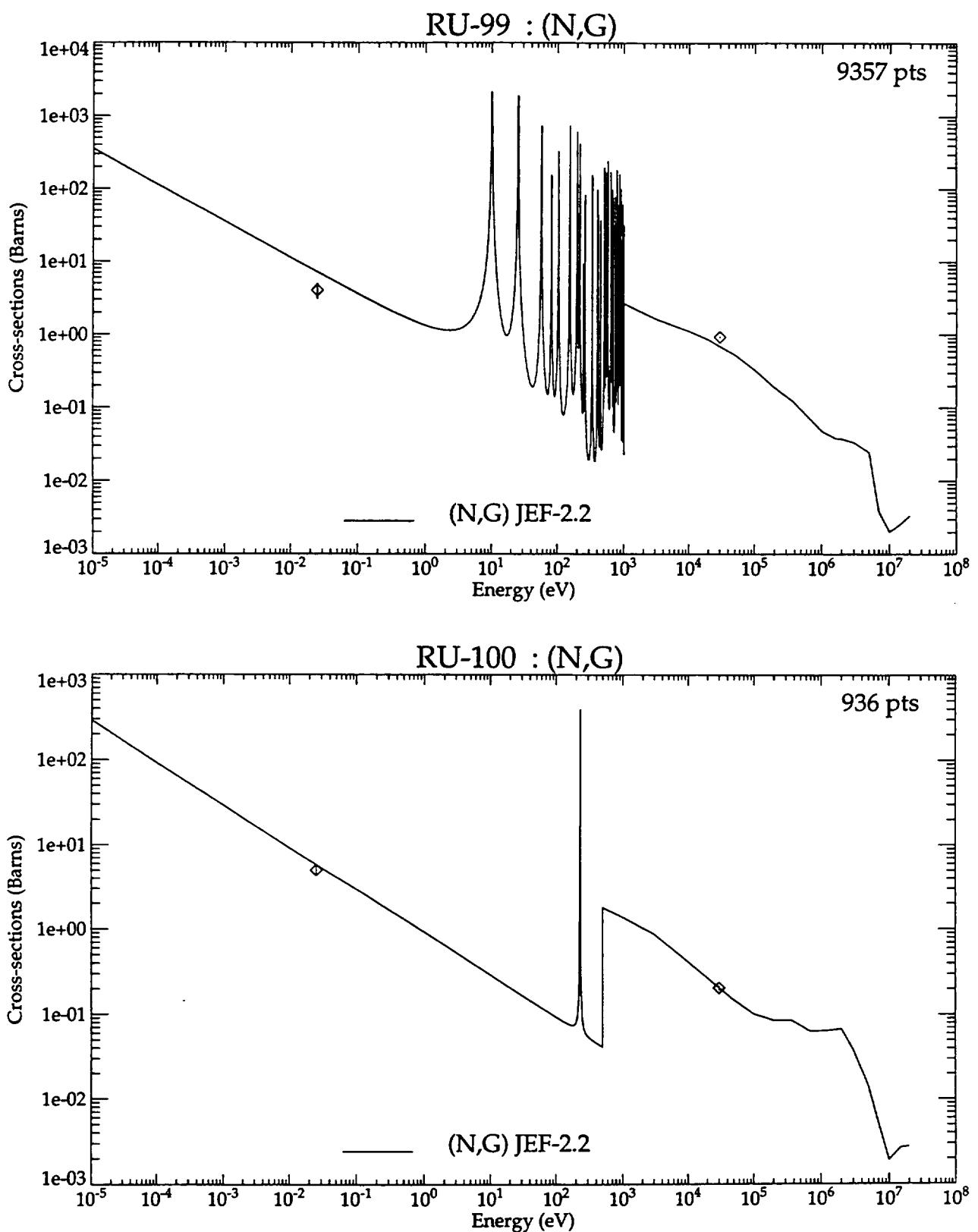


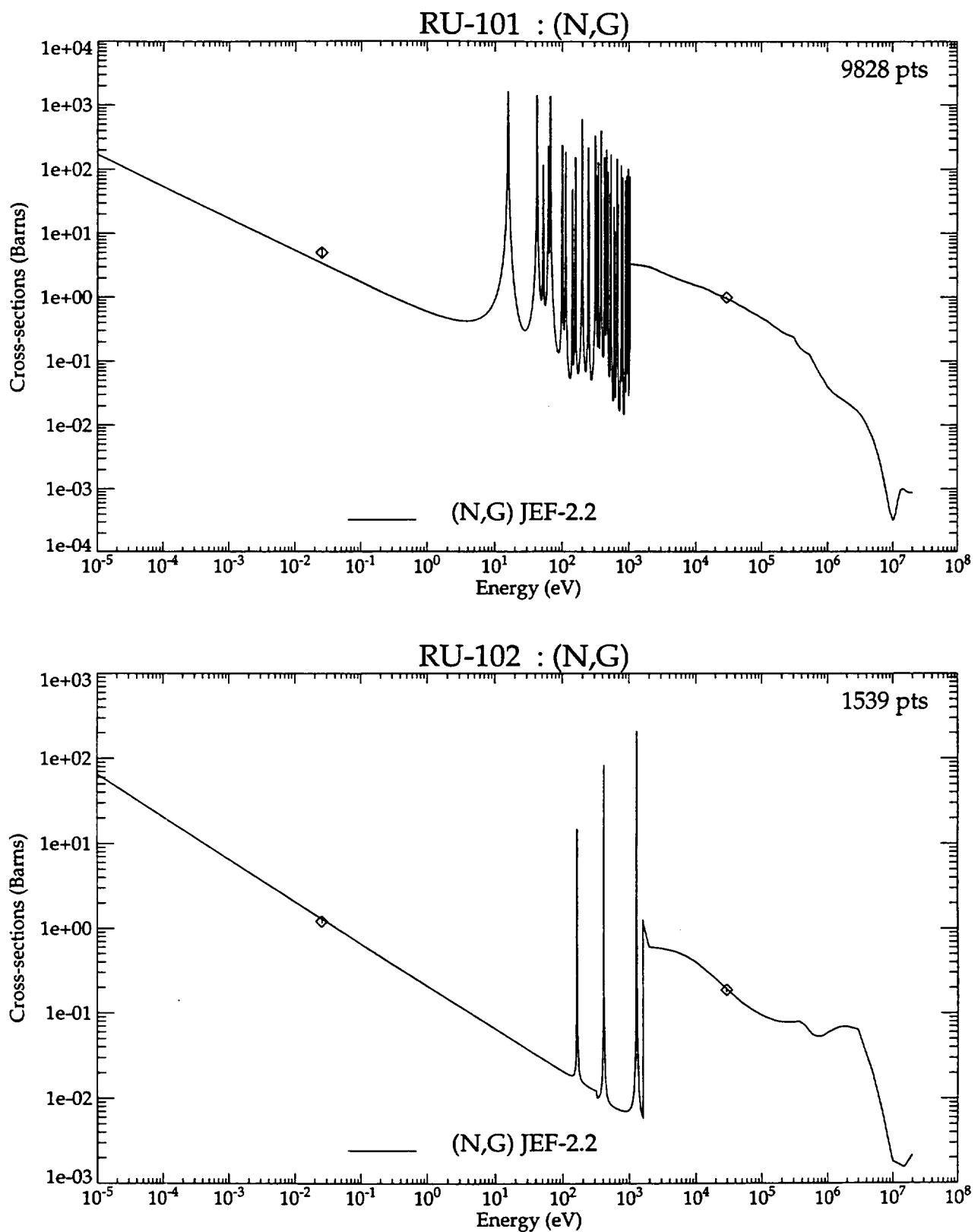
(N,G) MASGAM

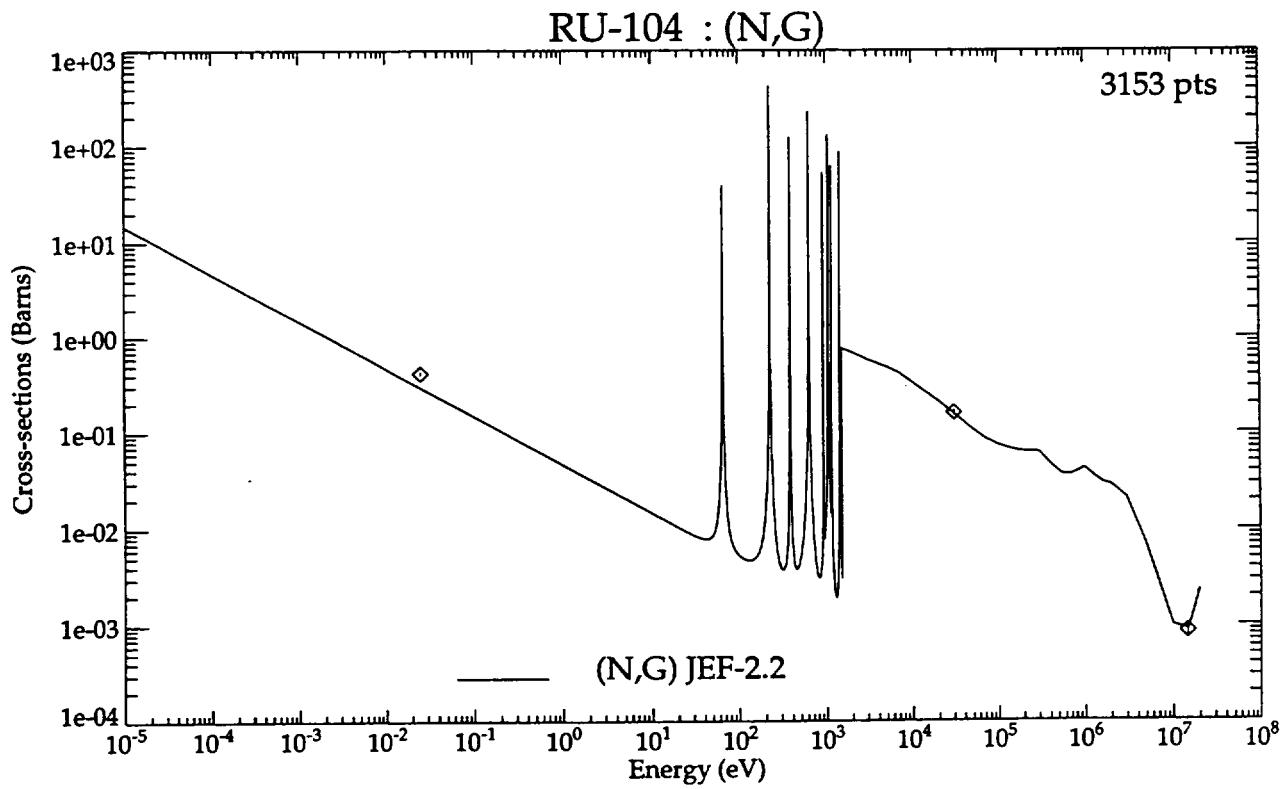
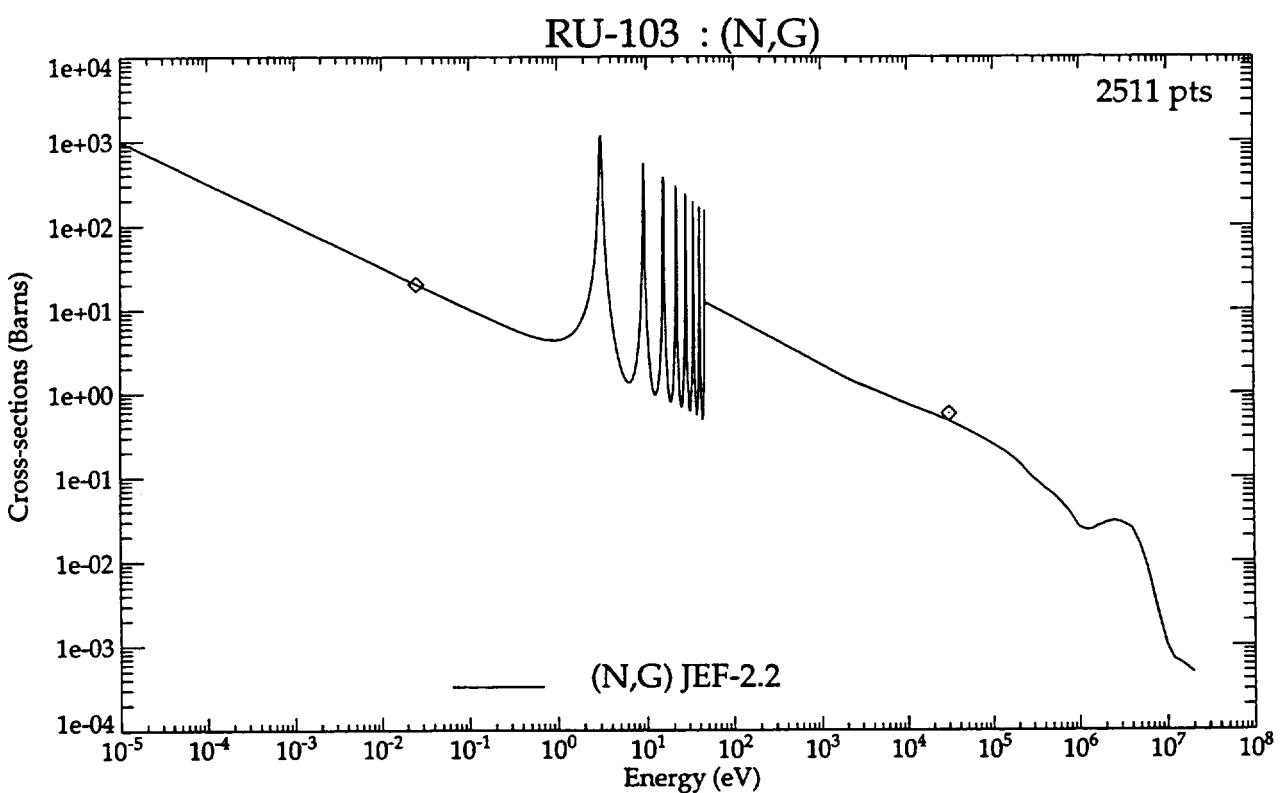


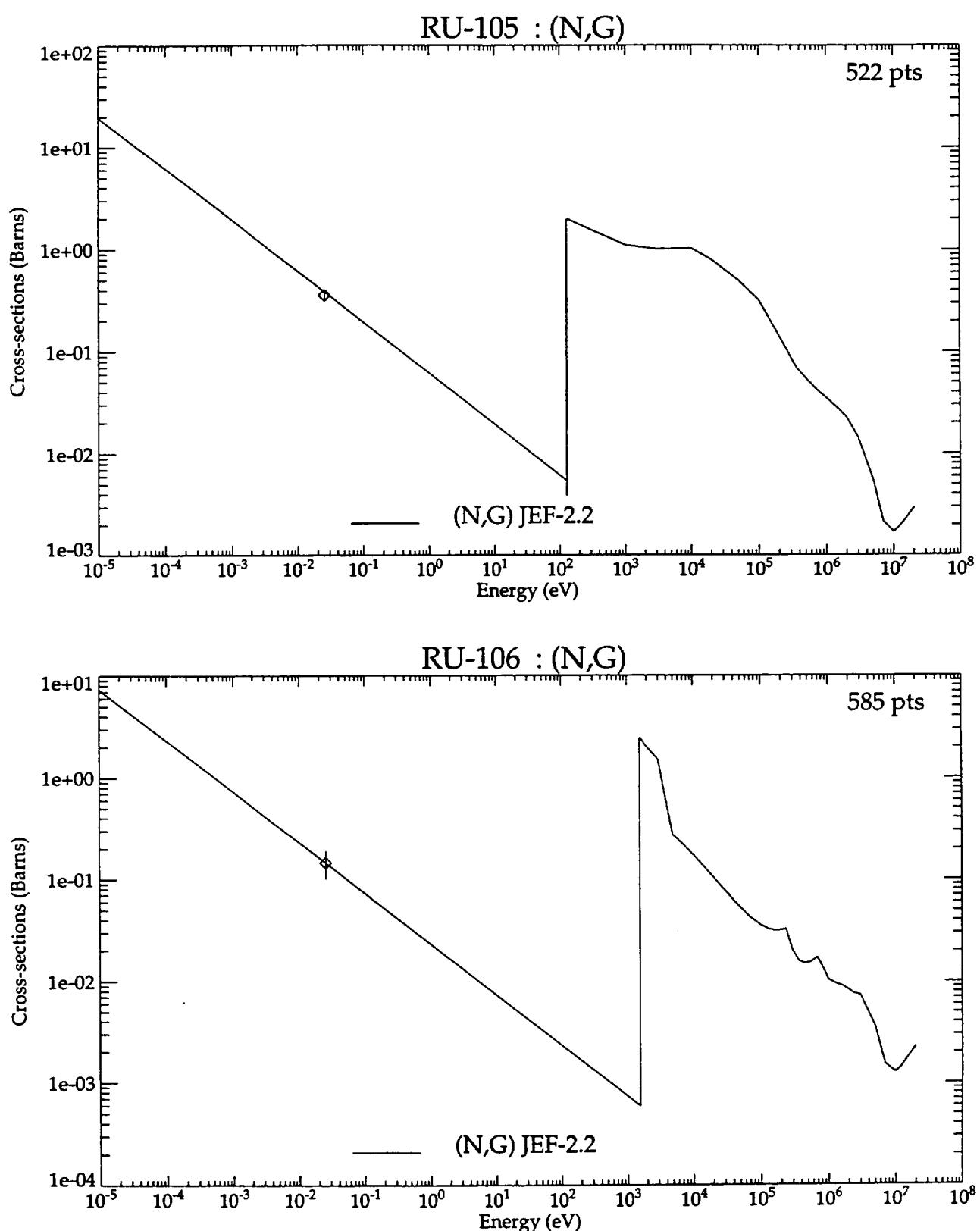


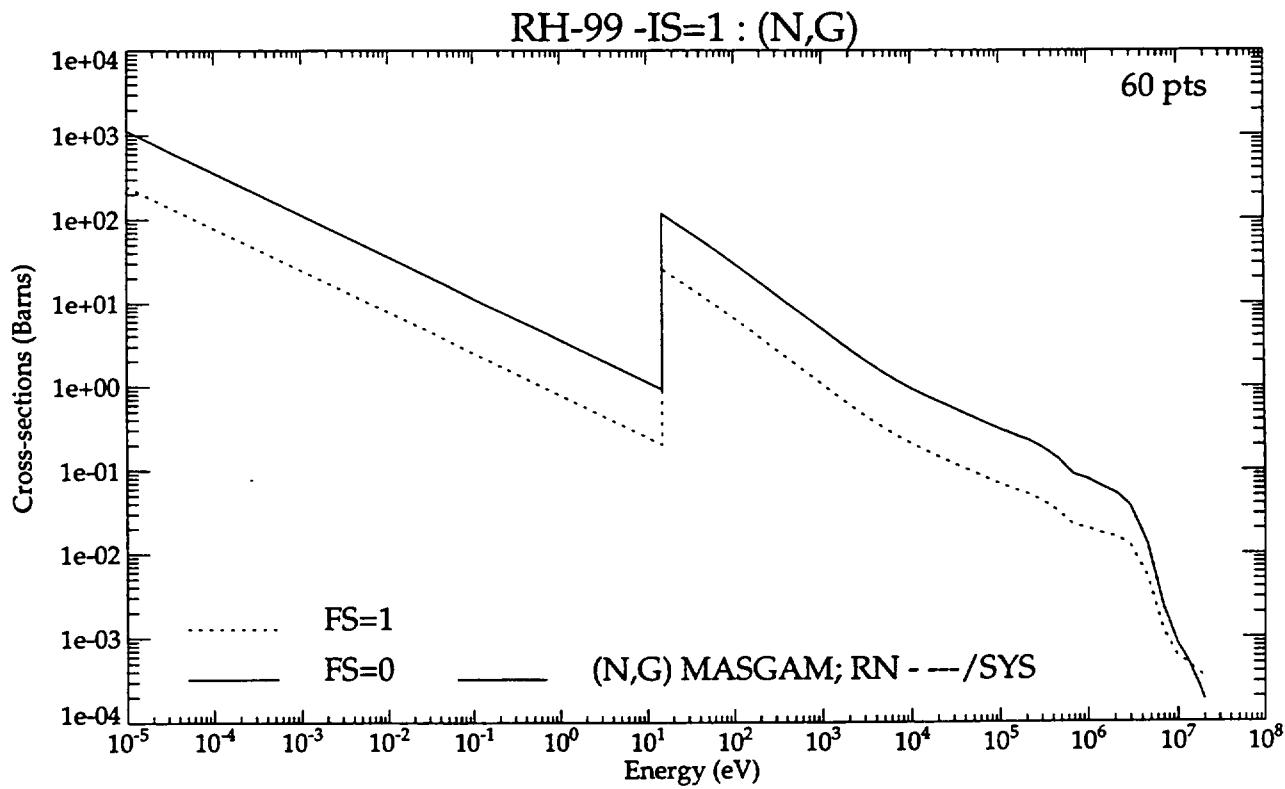
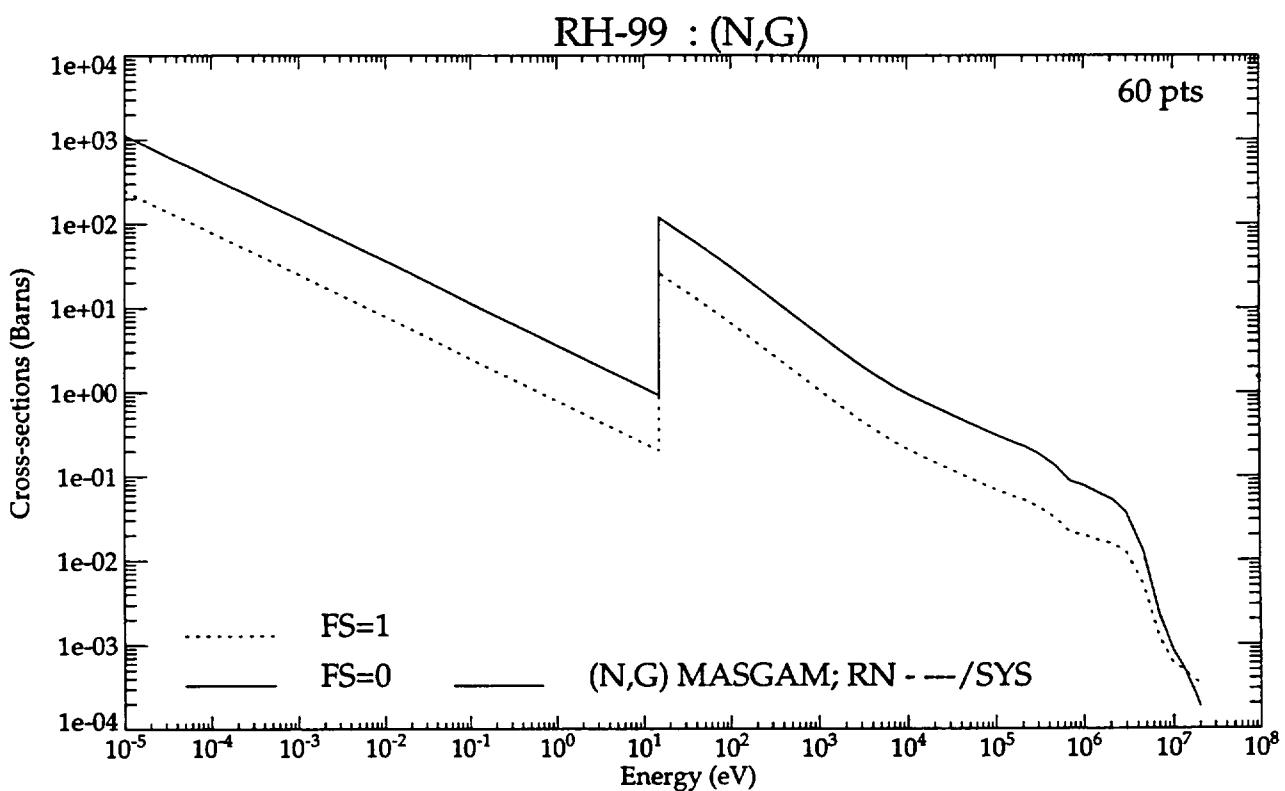


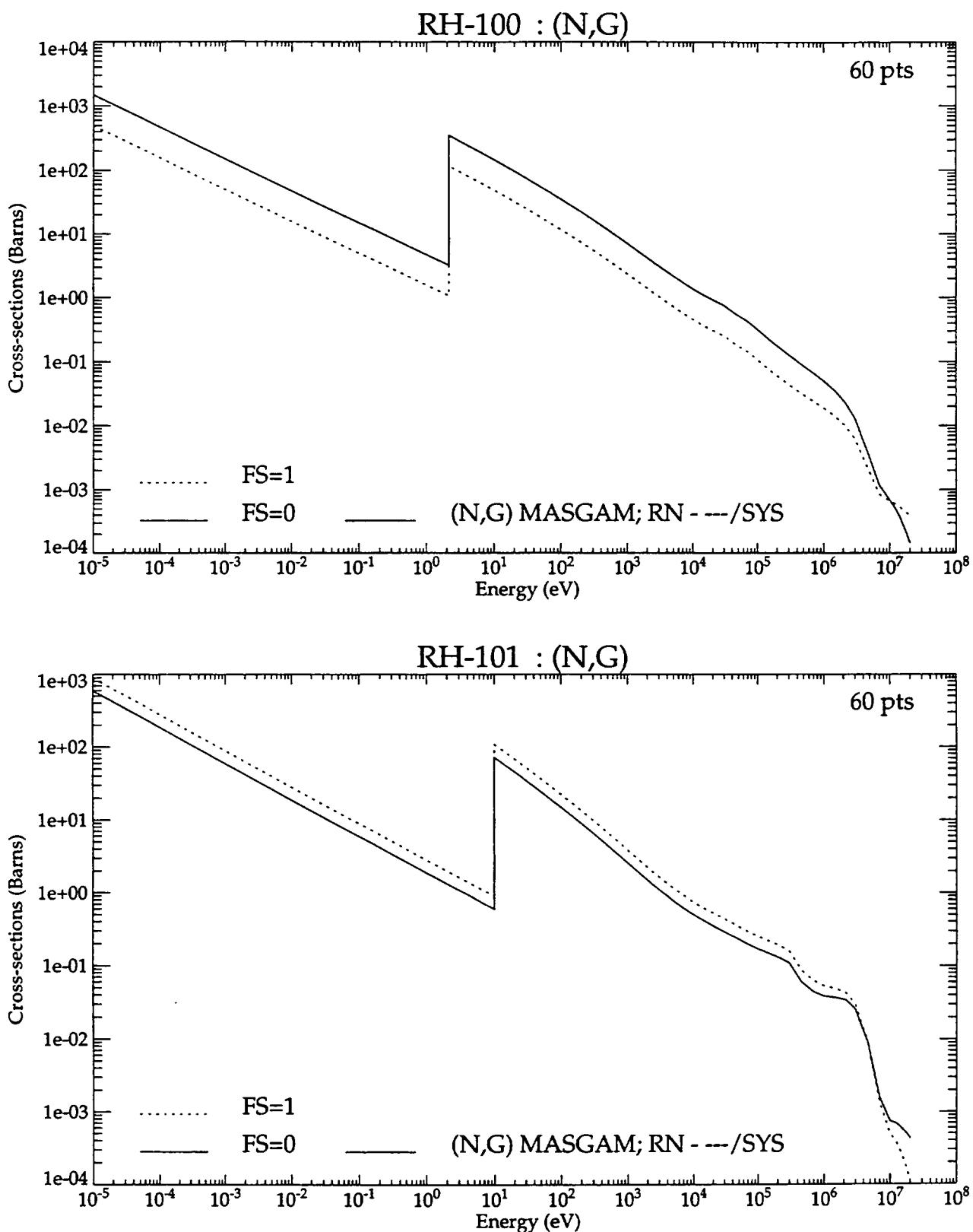


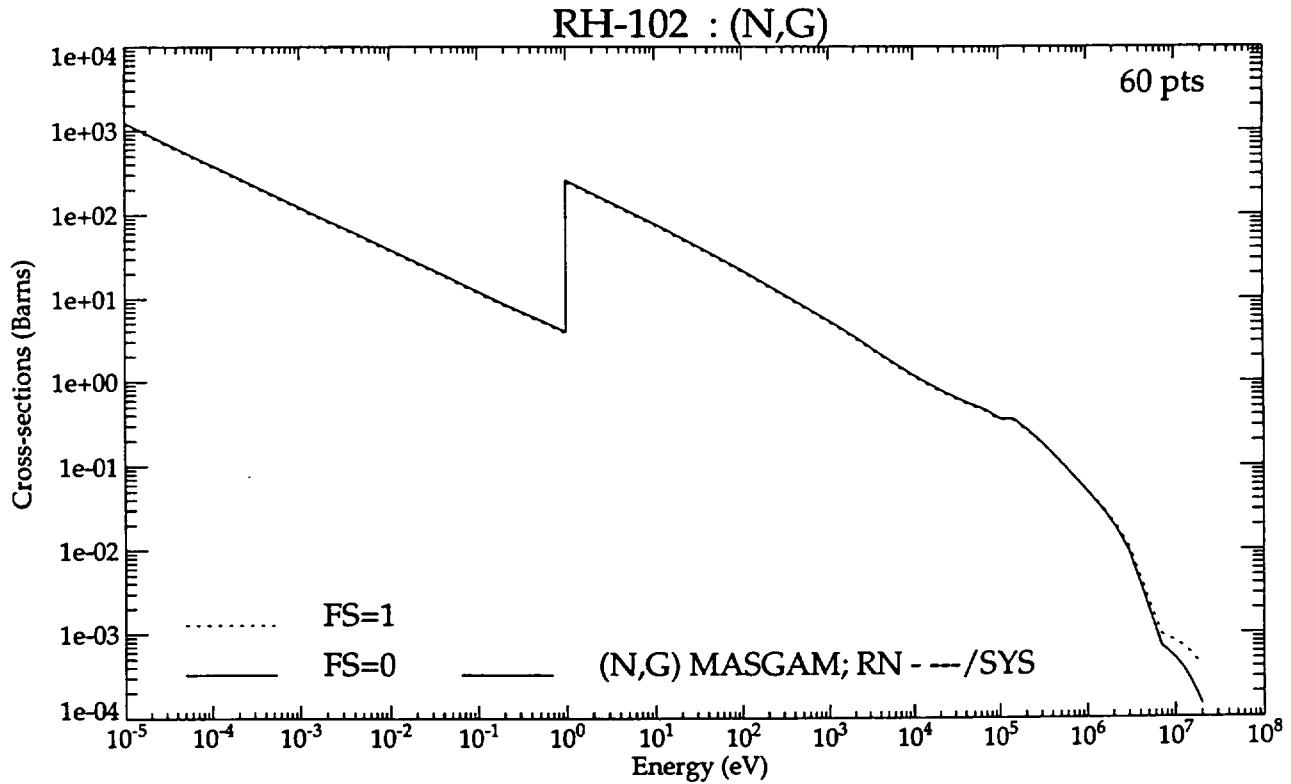
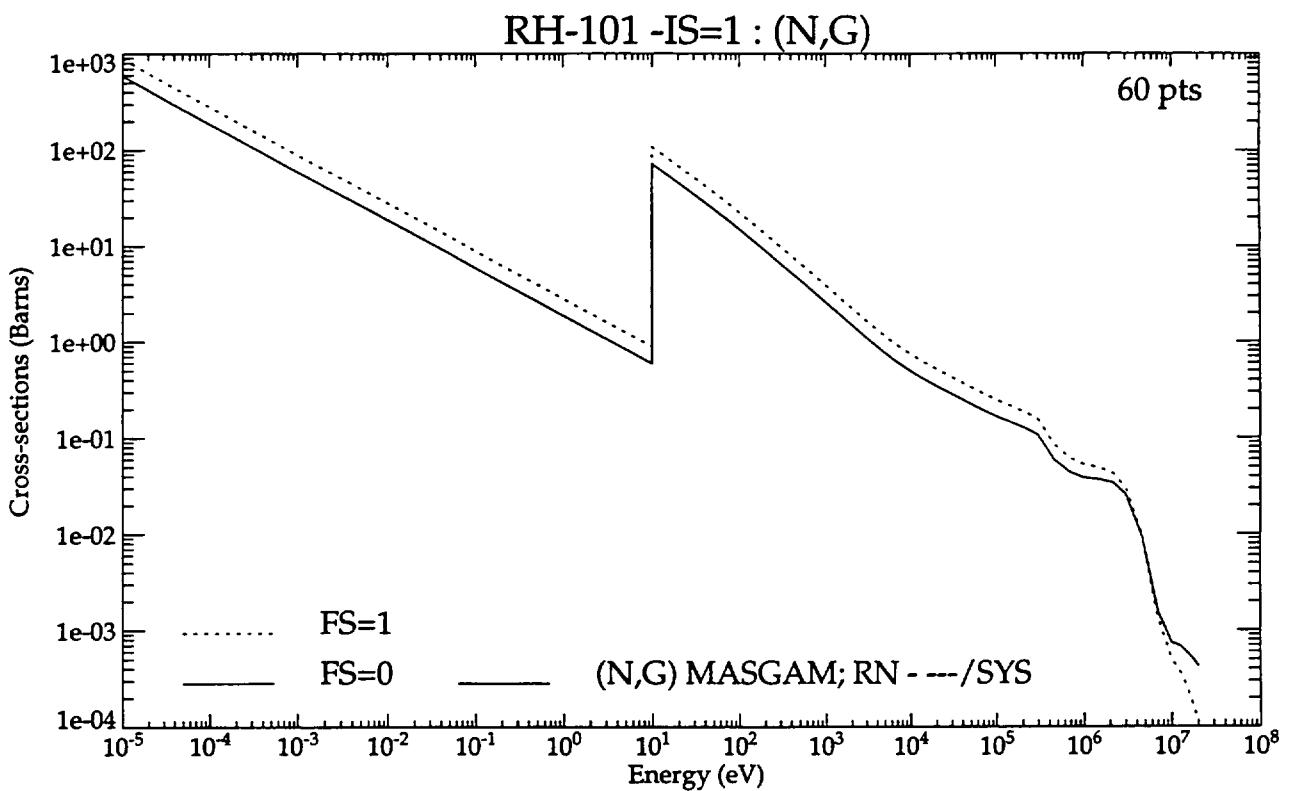




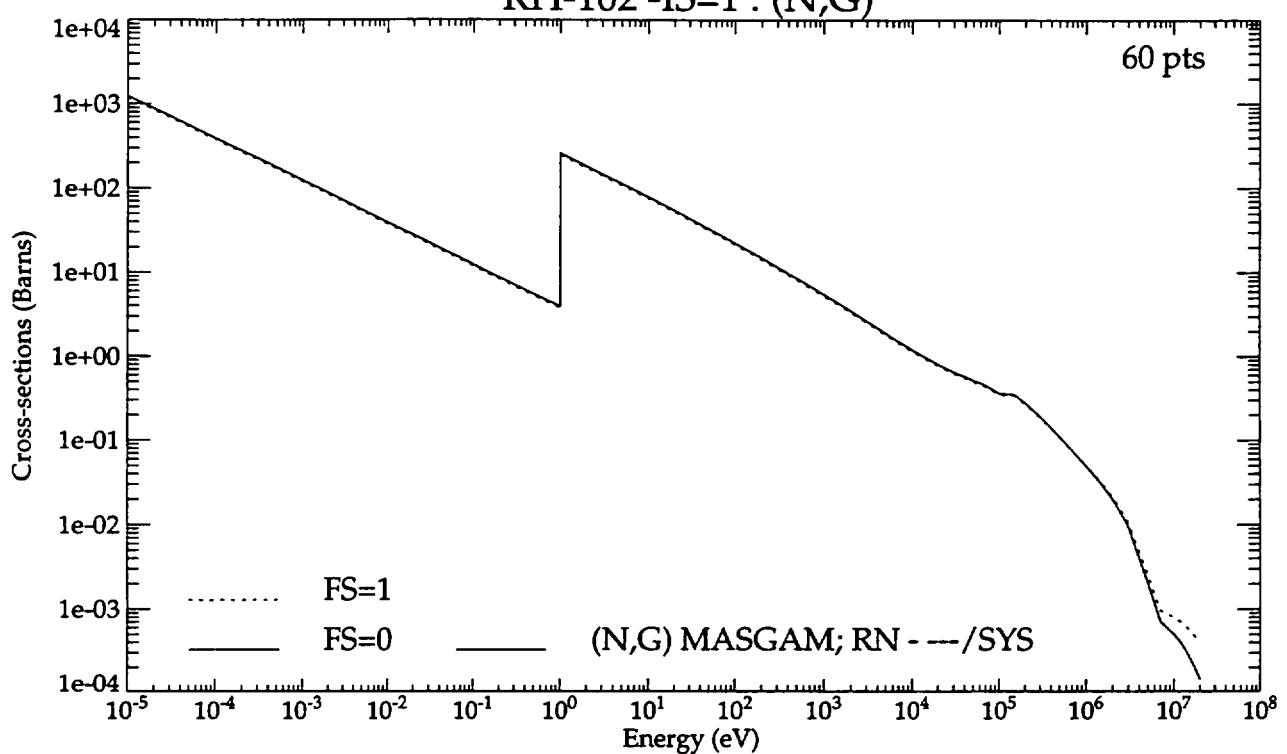




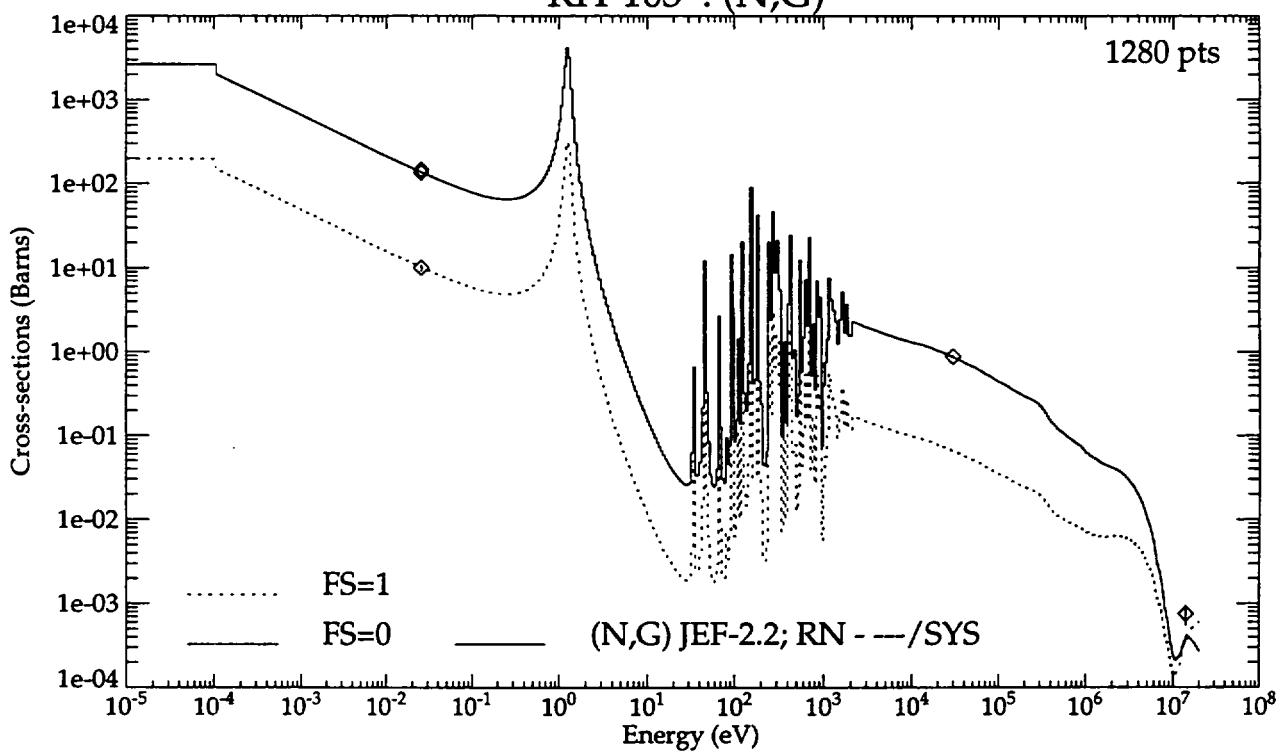


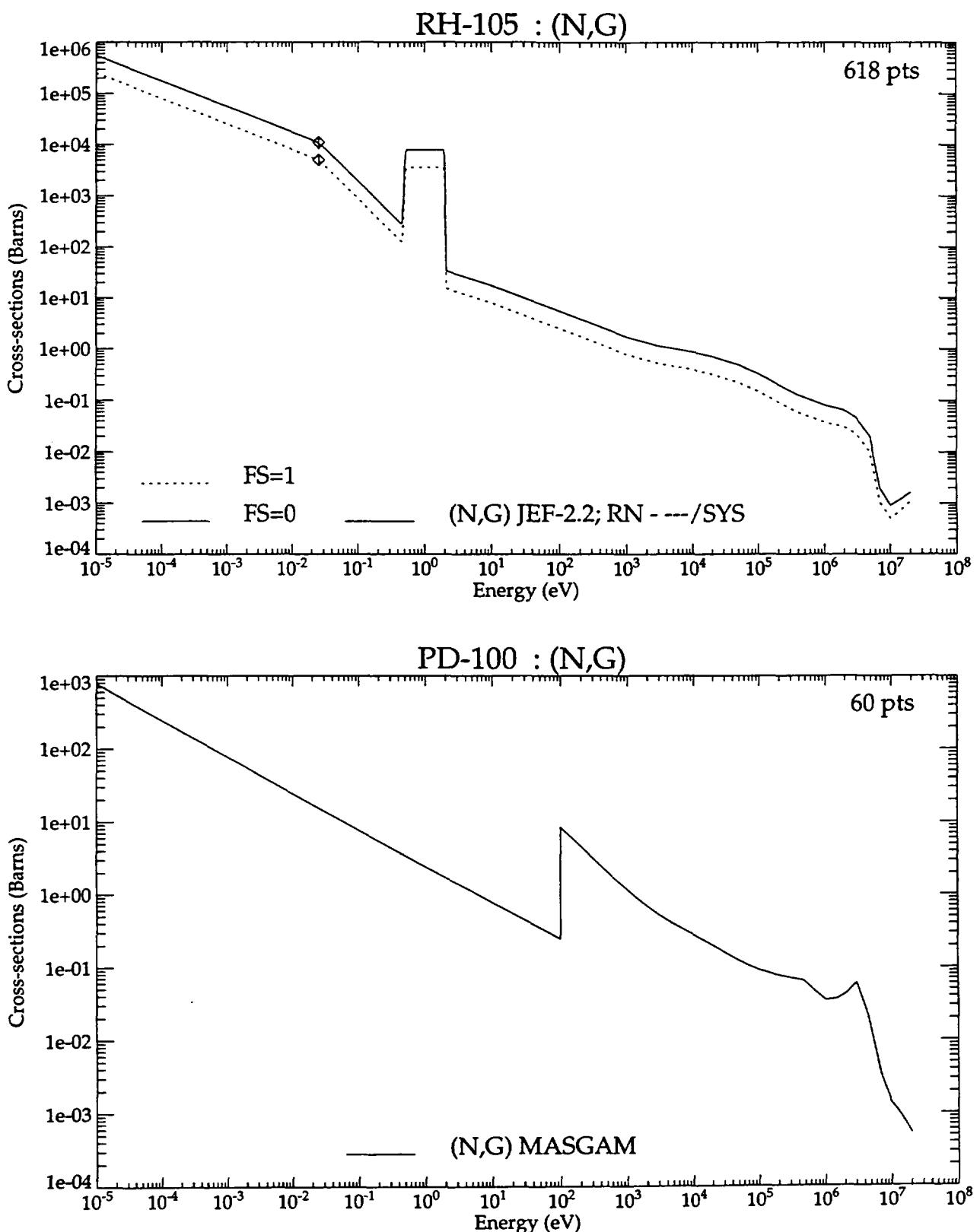


RH-102 -IS=1 : (N,G)

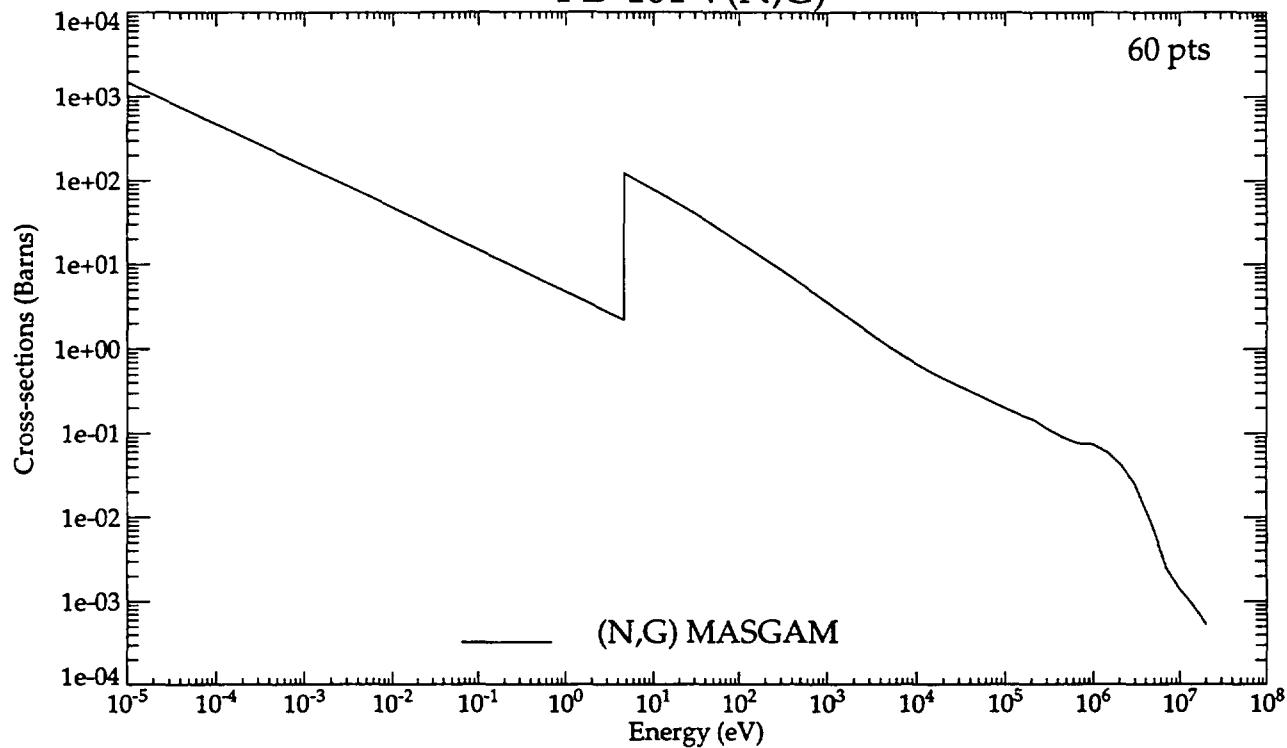


RH-103 : (N,G)

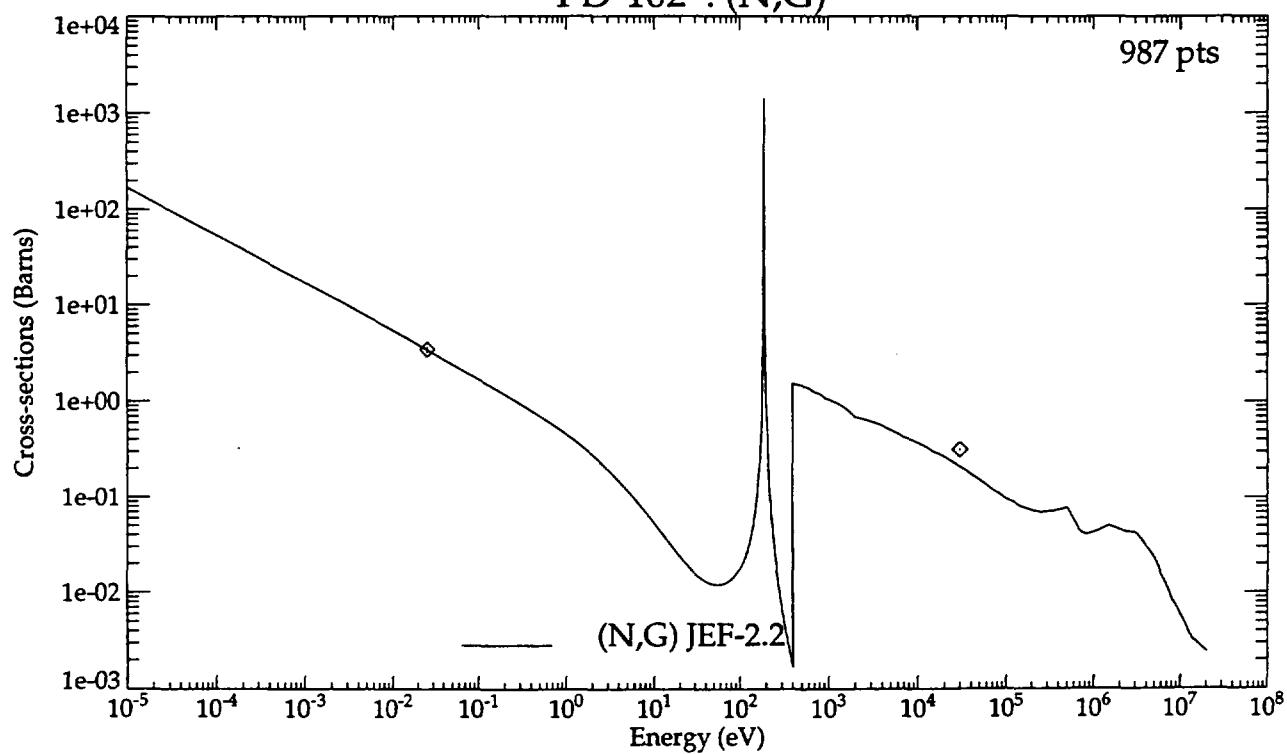


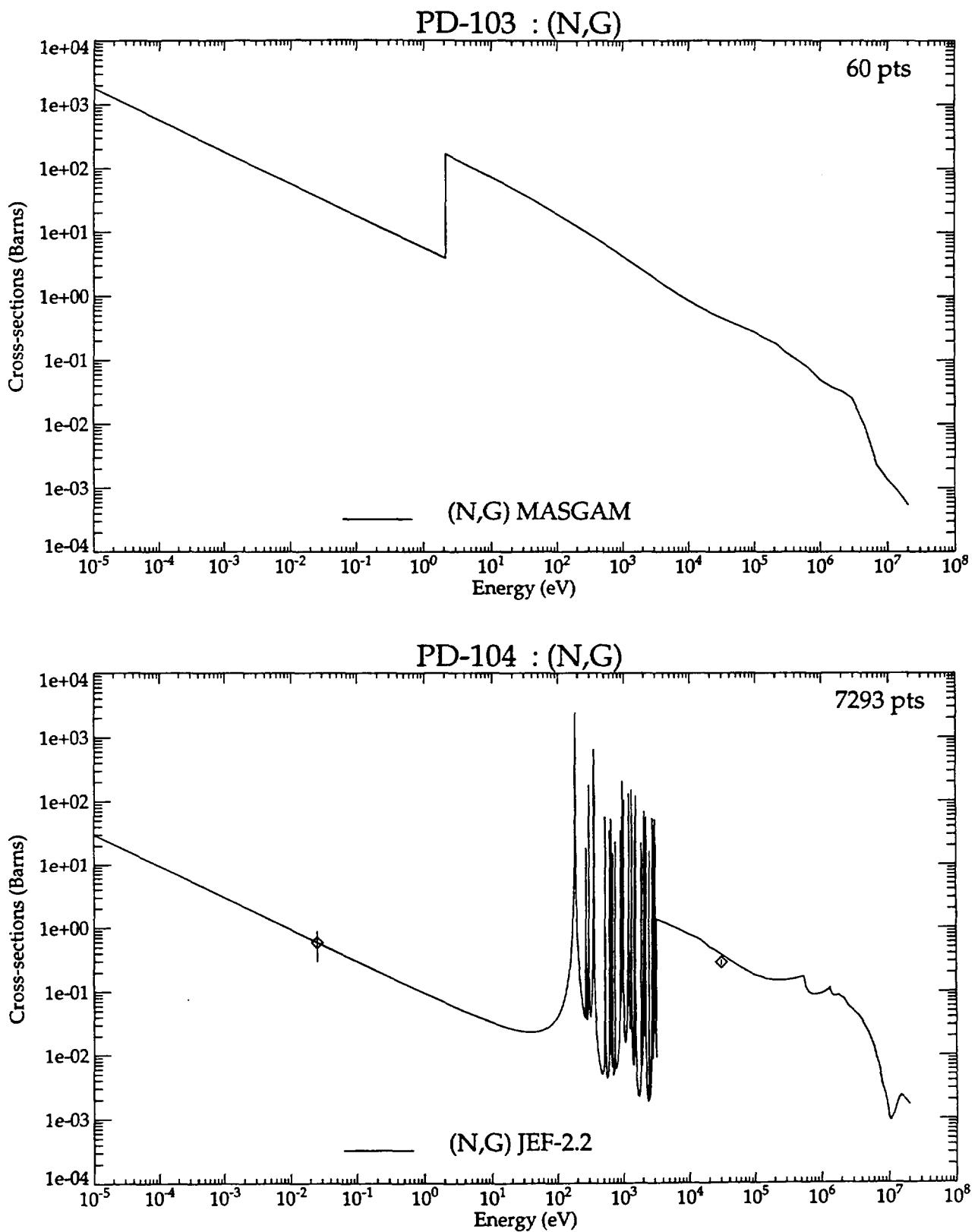


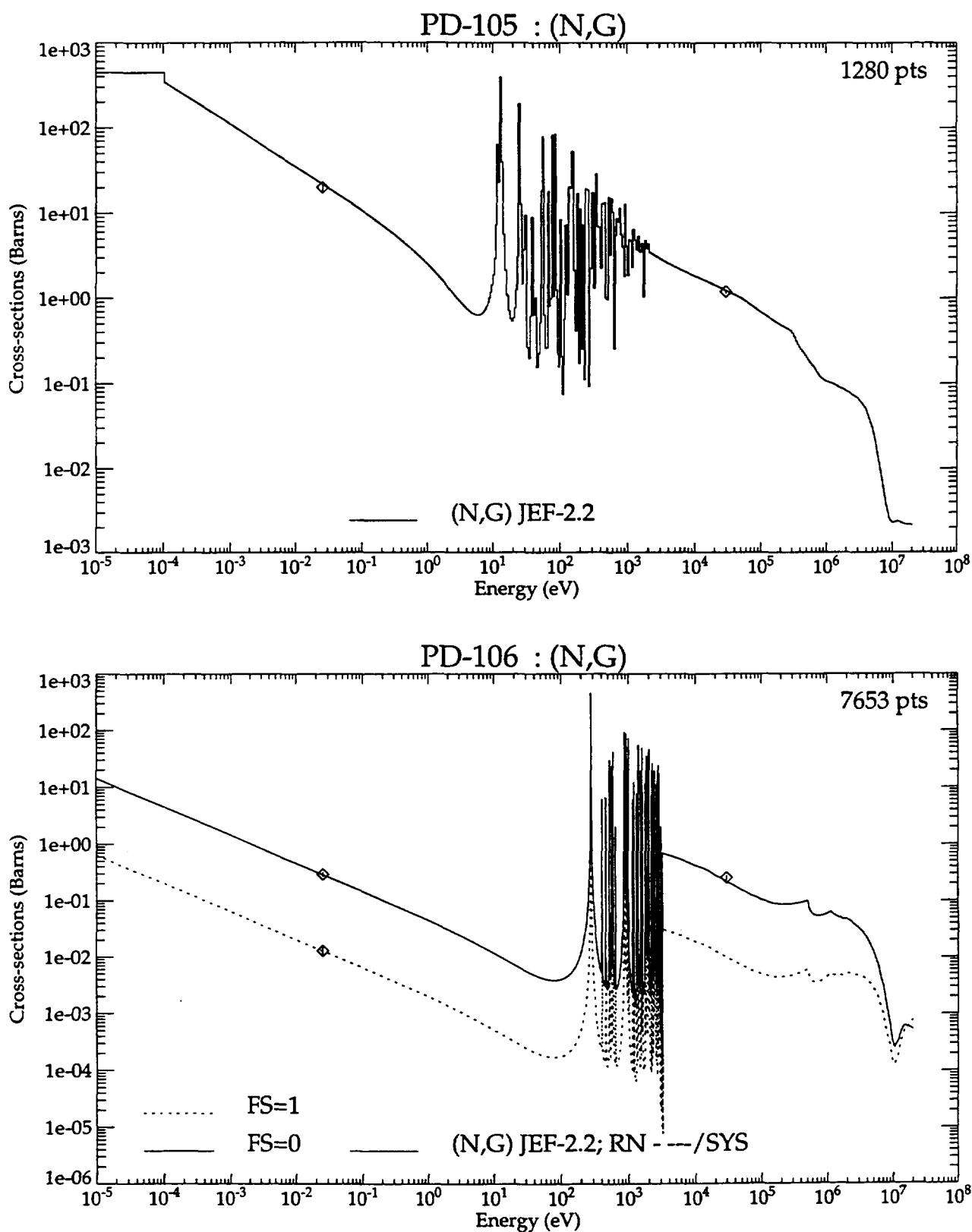
PD-101 : (N,G)

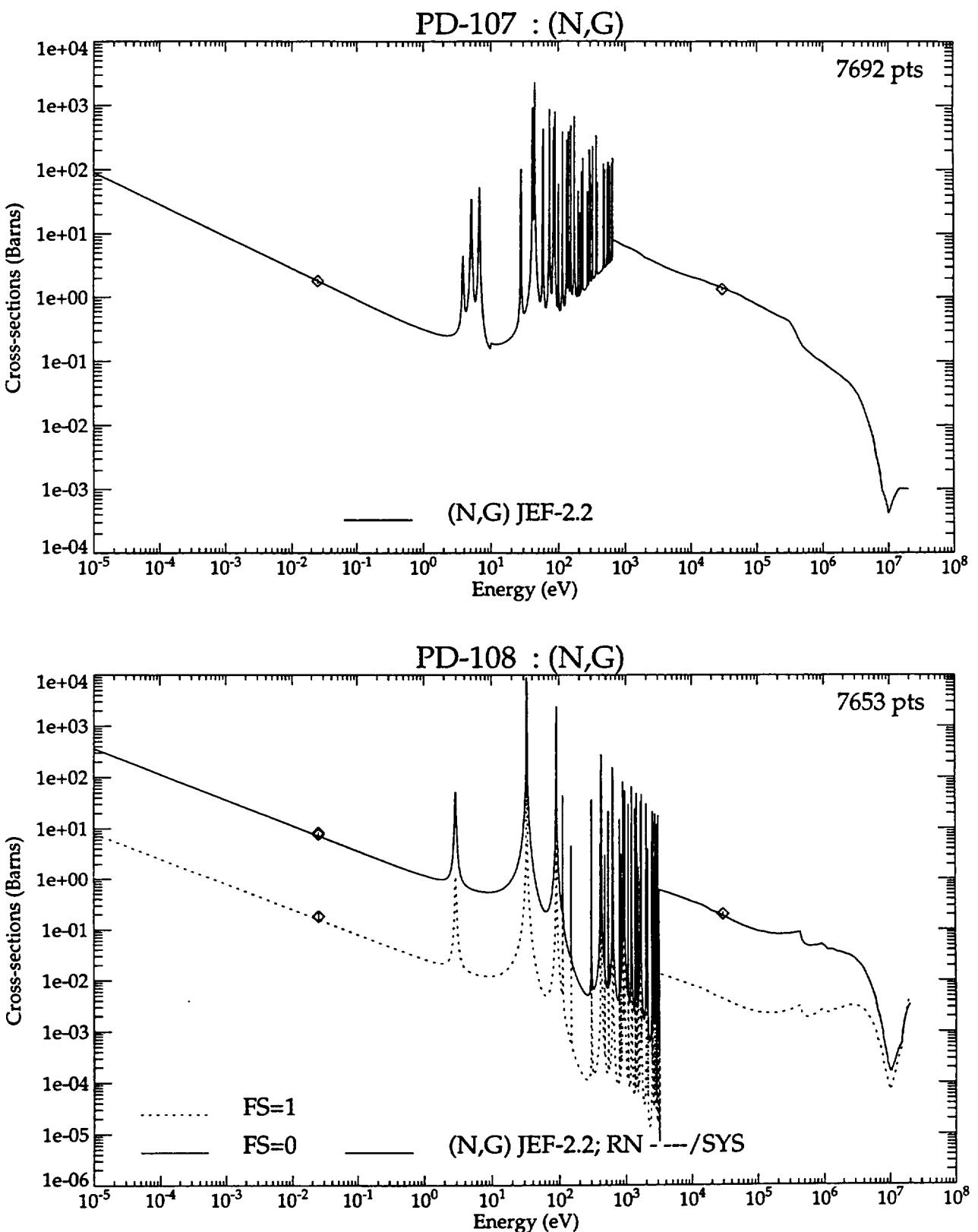


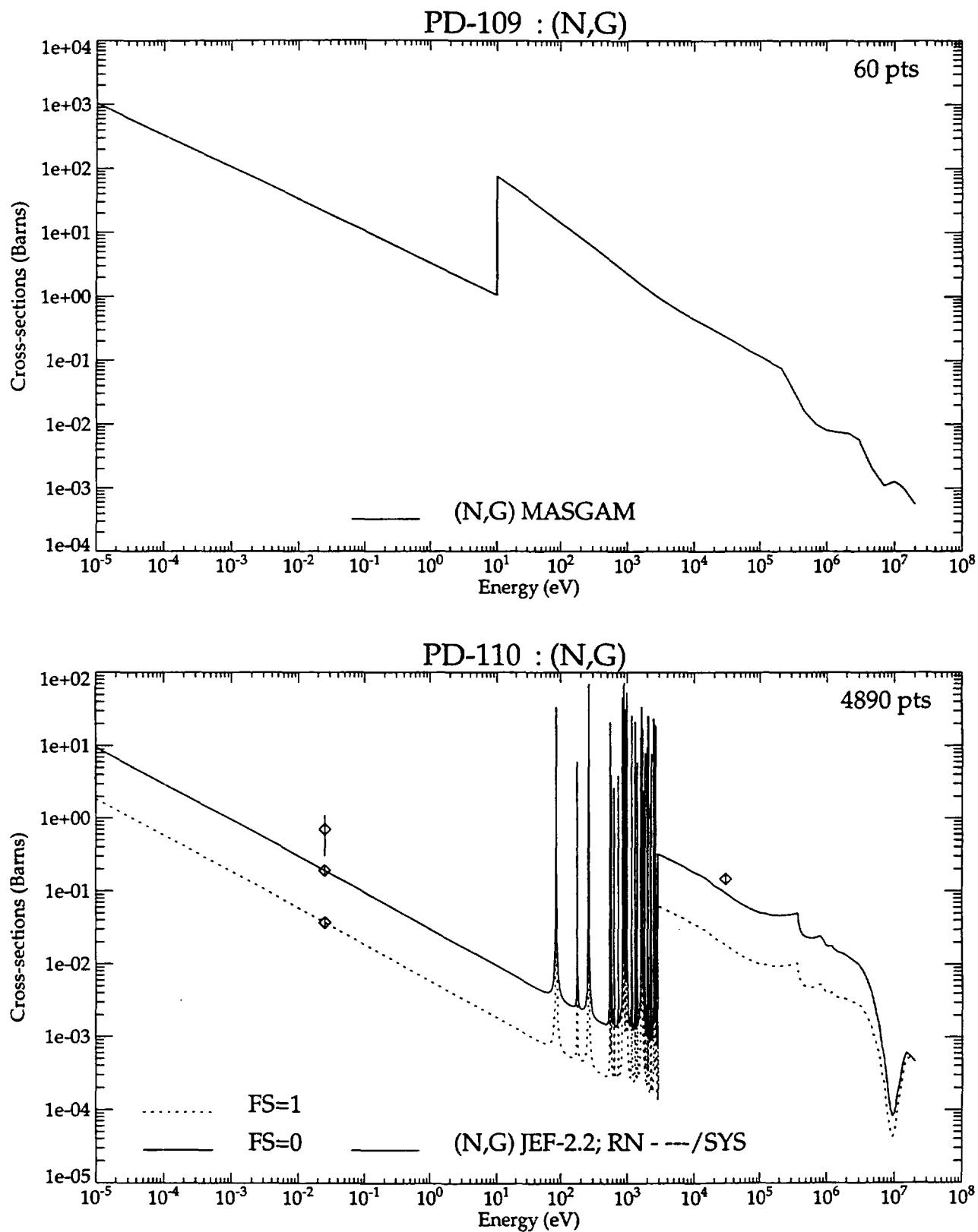
PD-102 : (N,G)

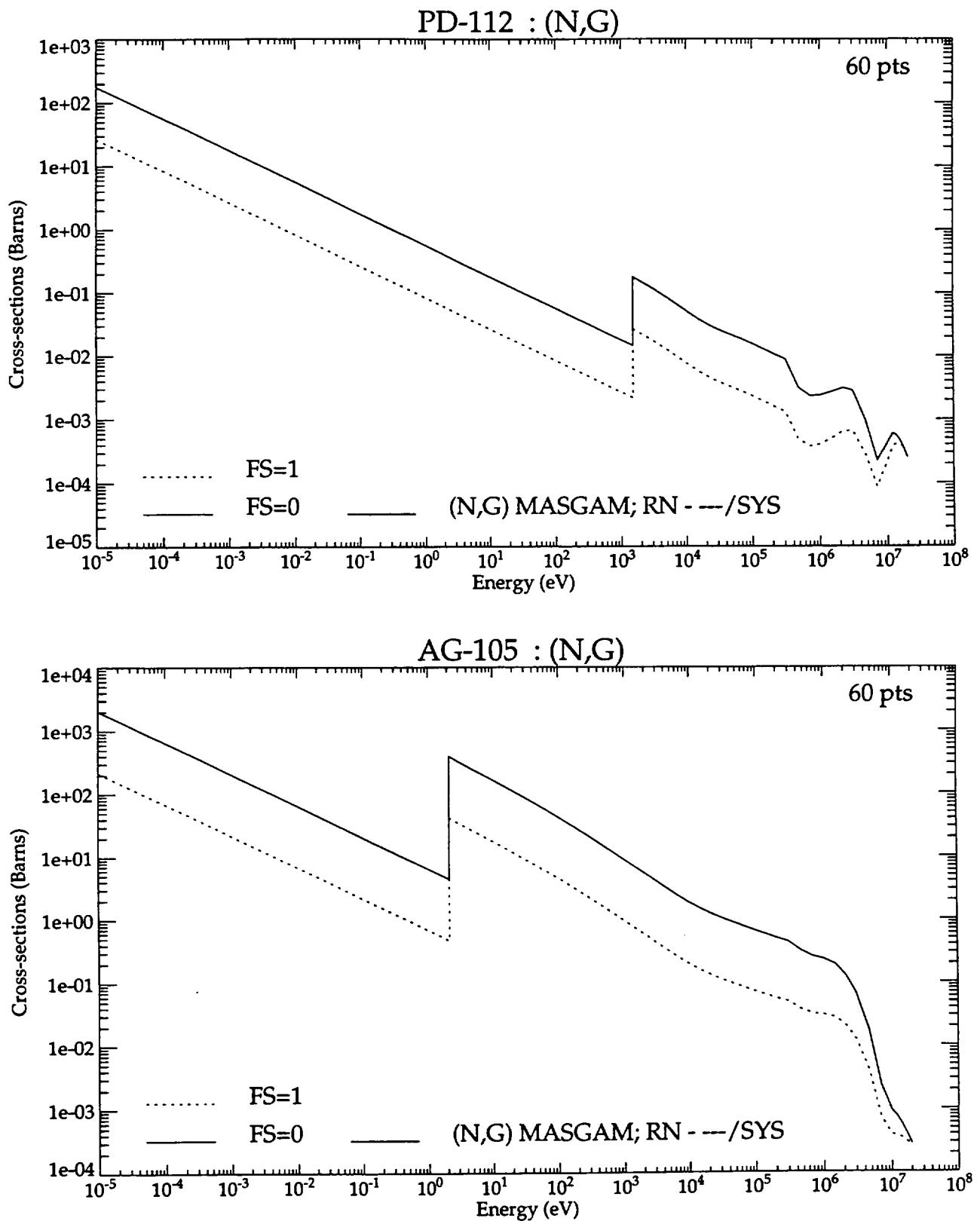


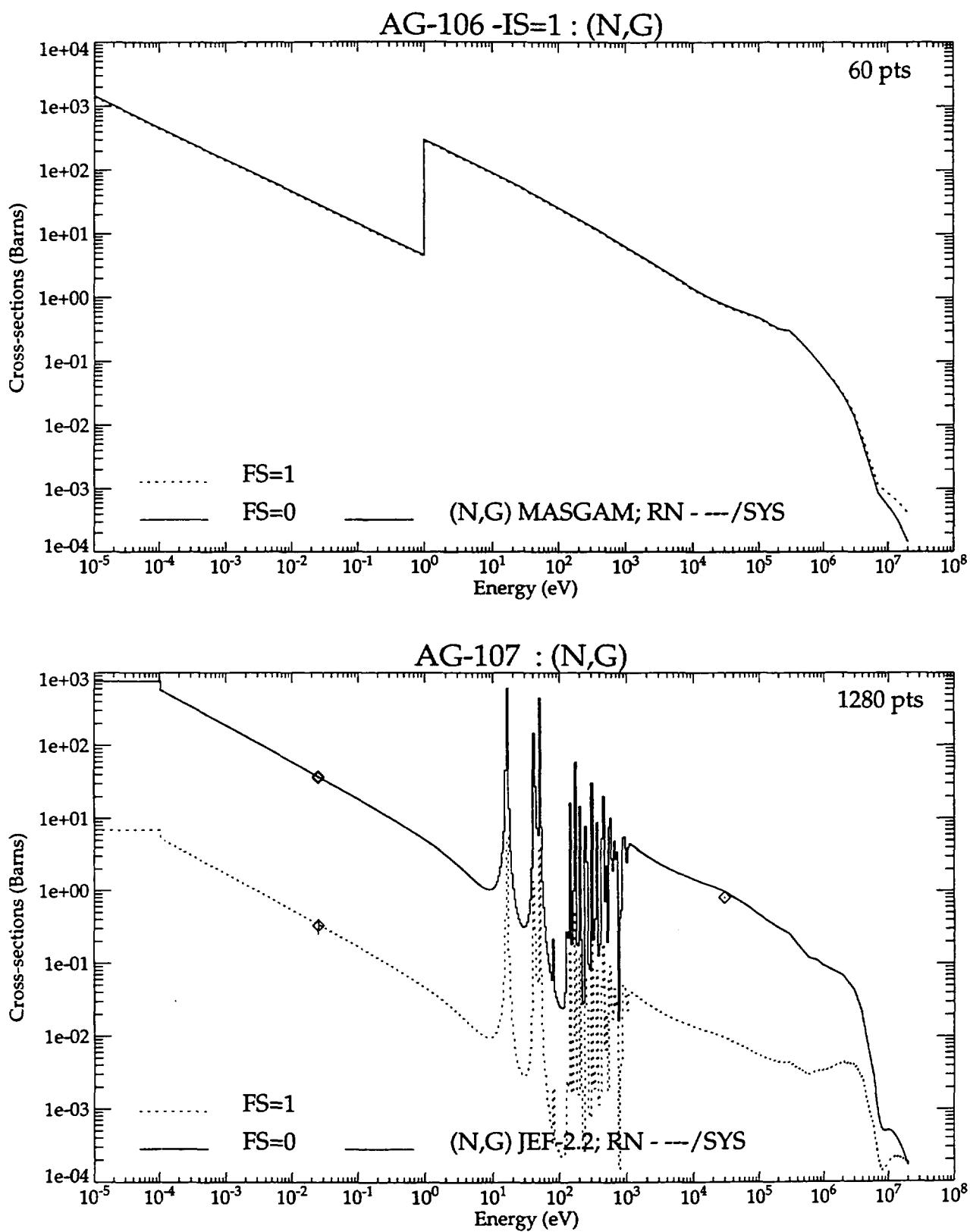


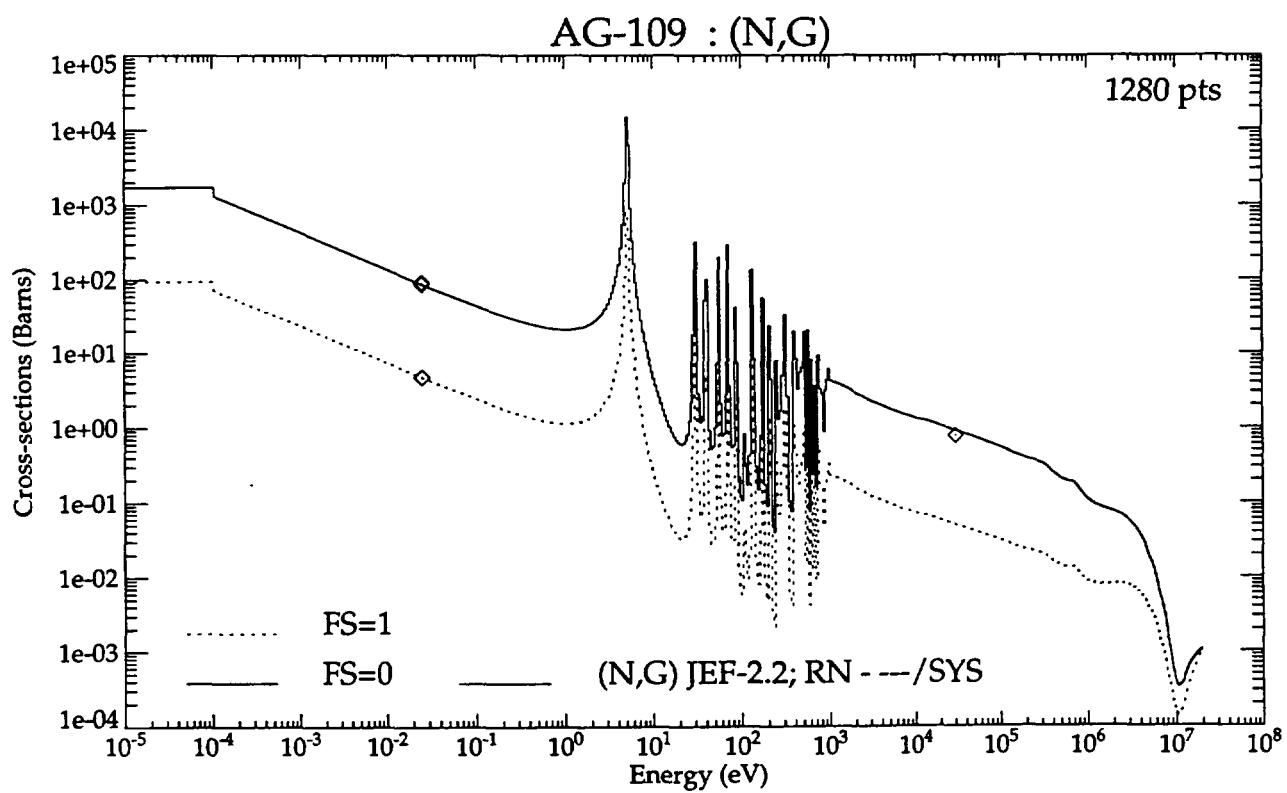
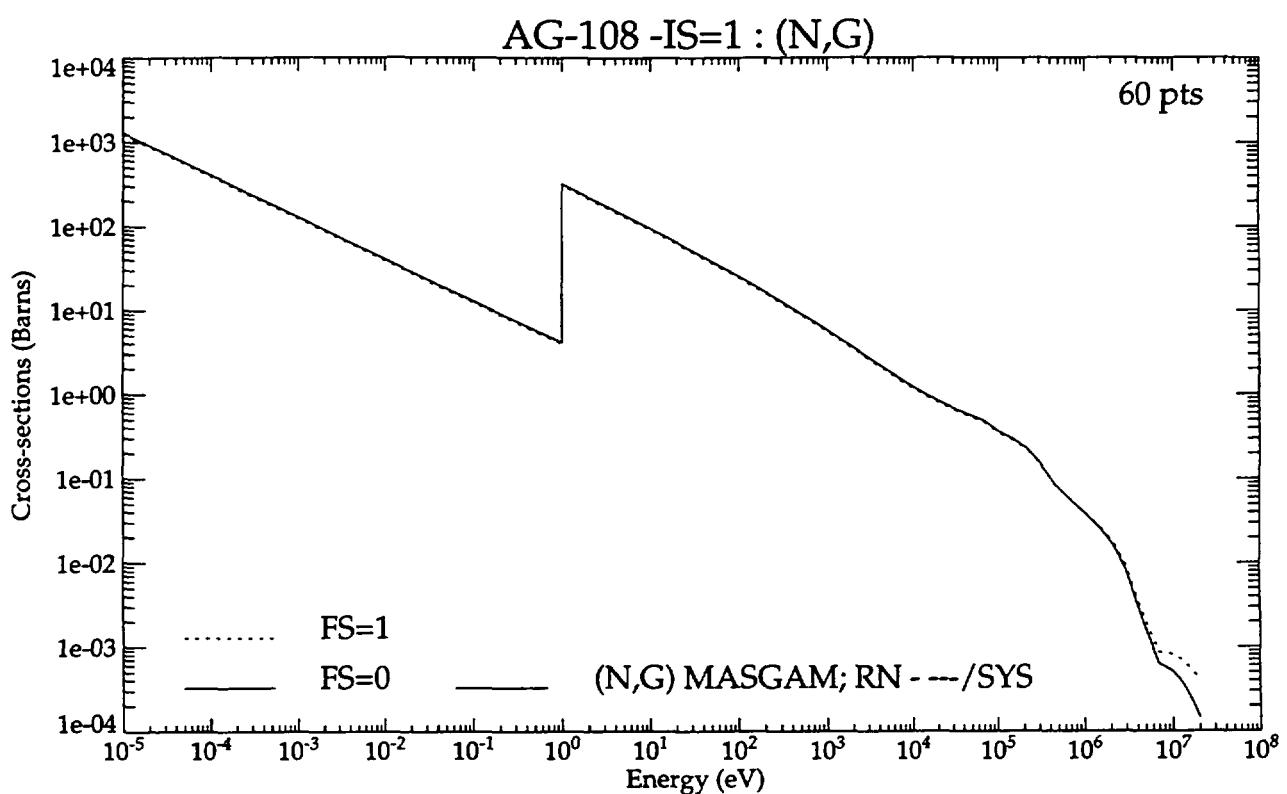


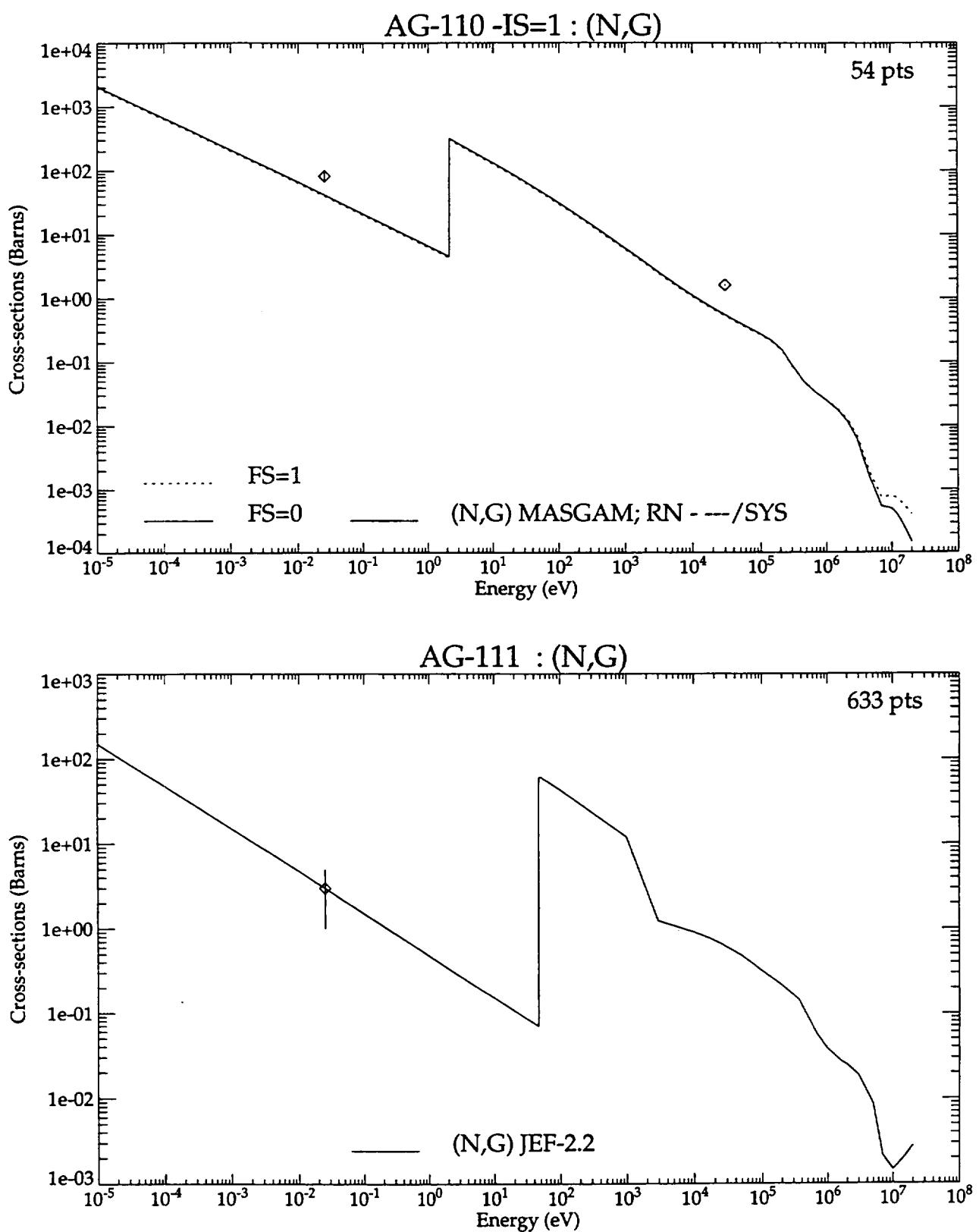




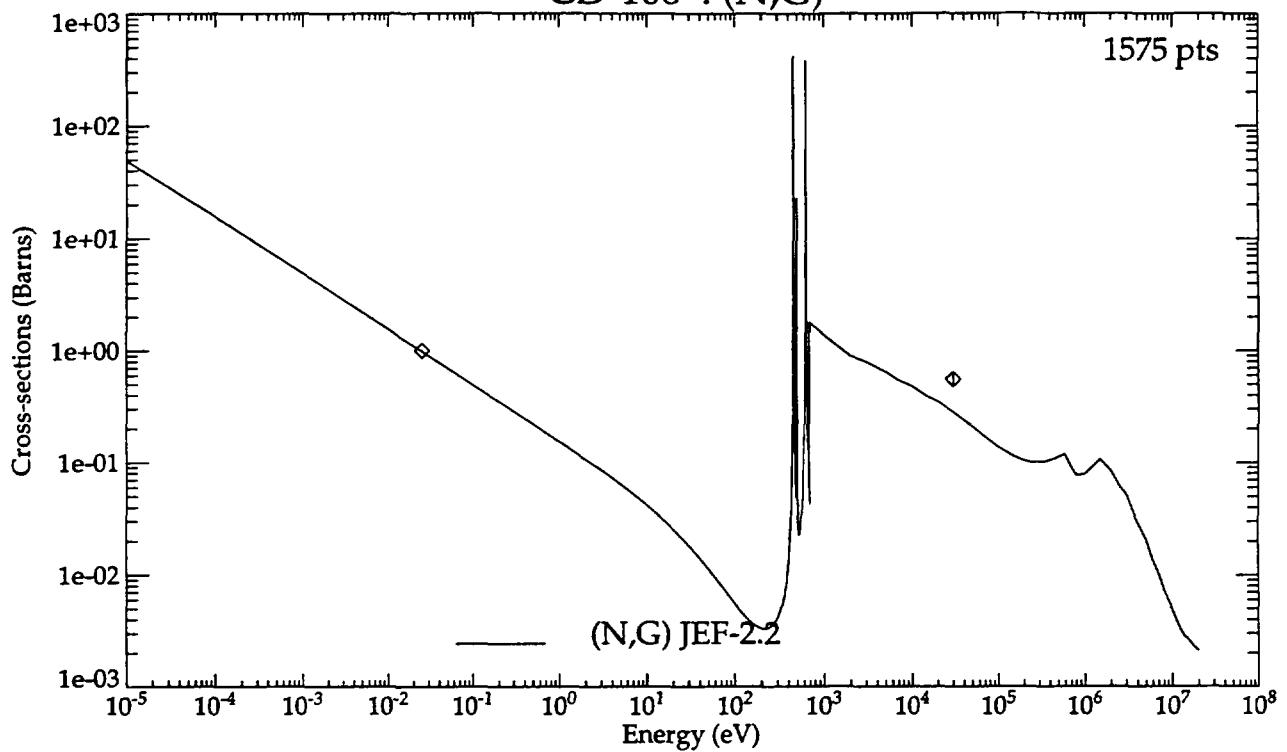




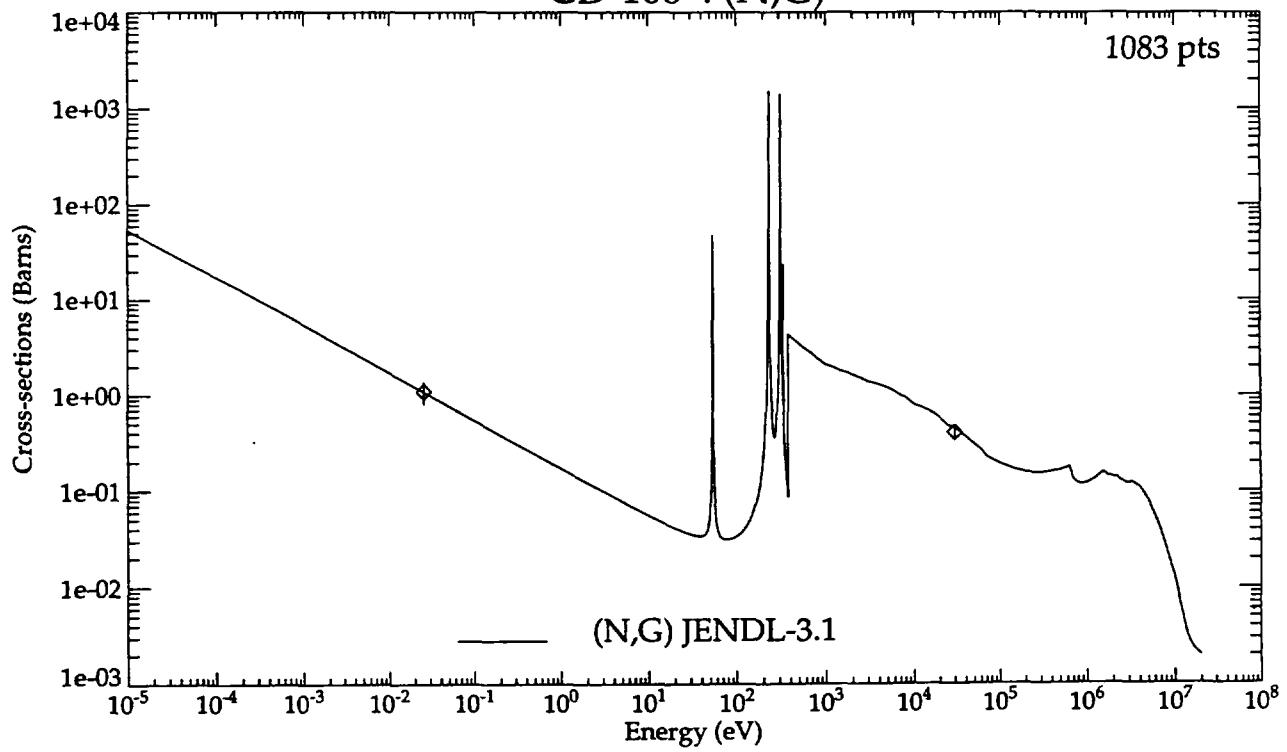


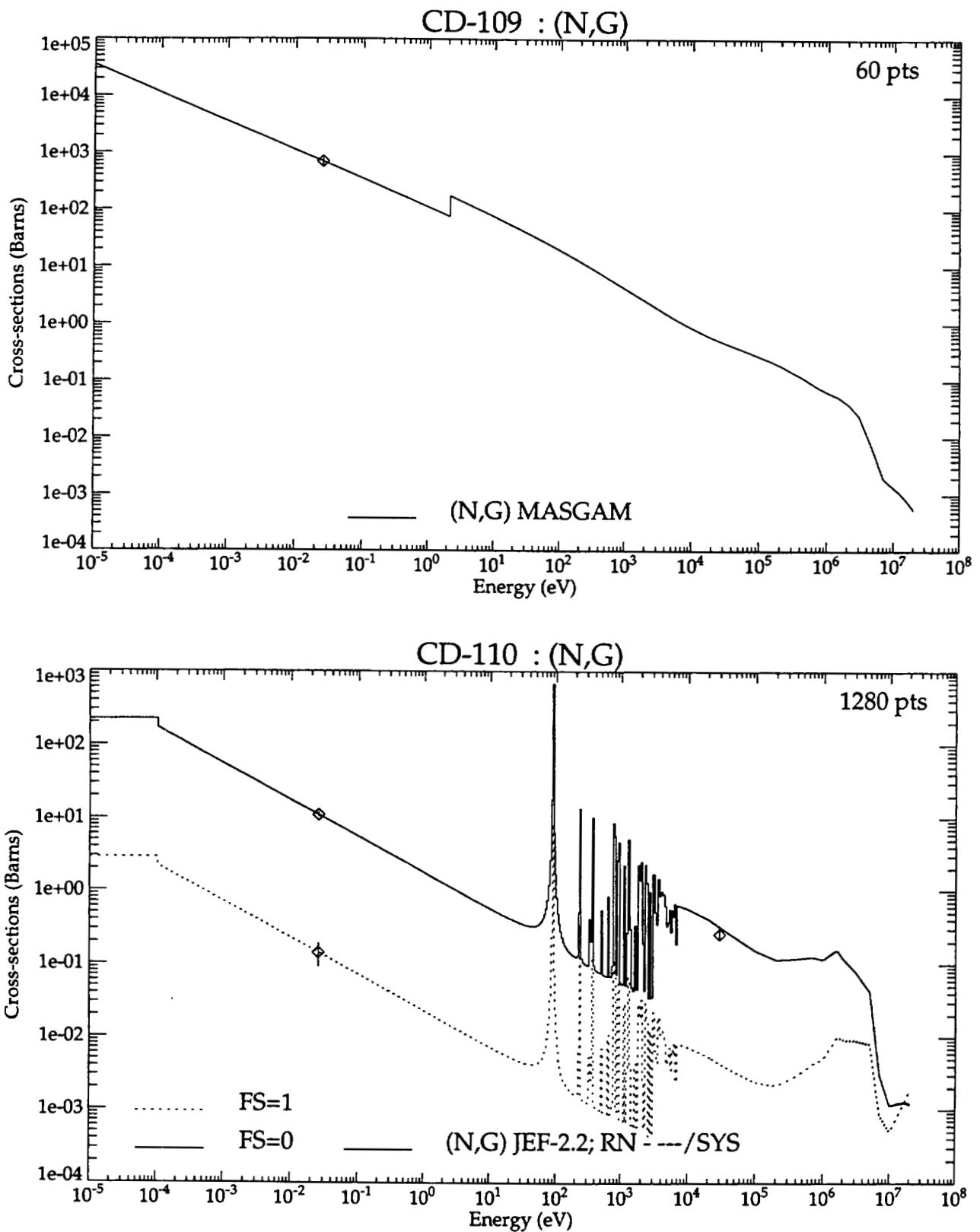


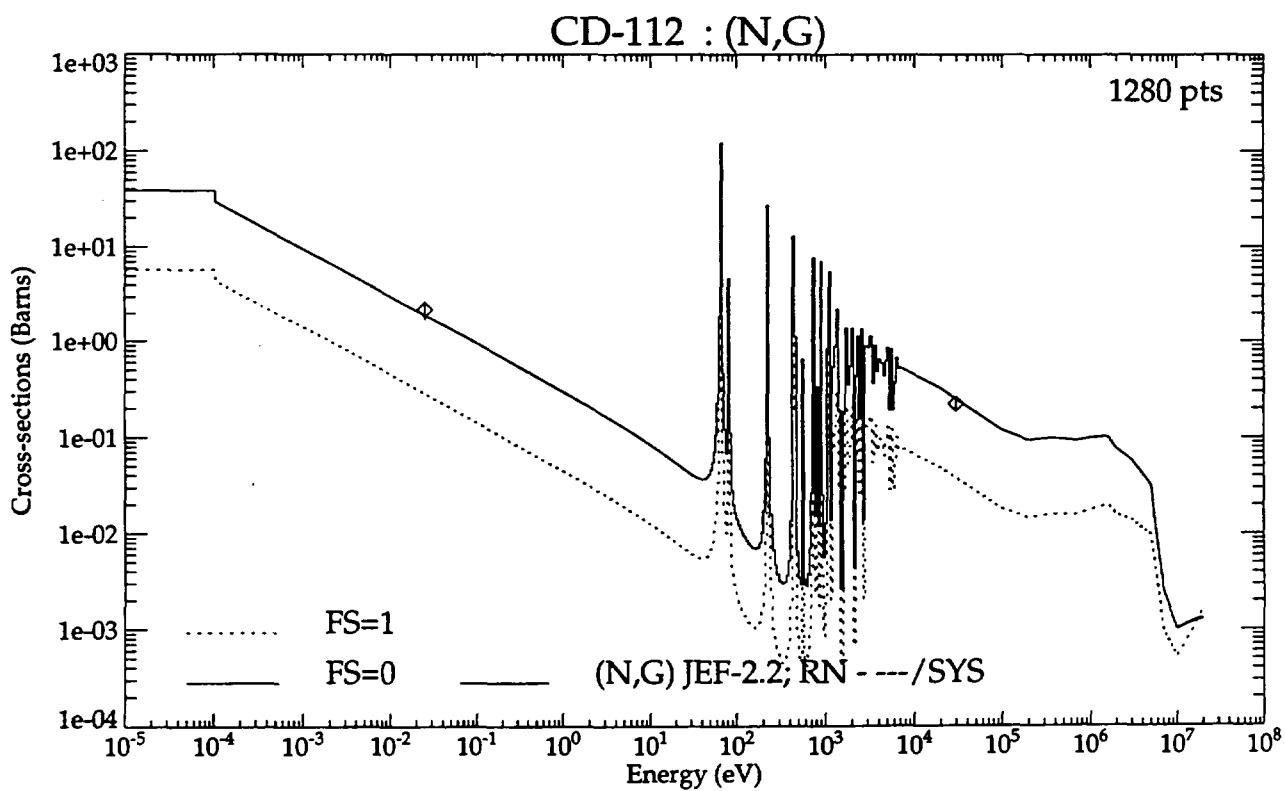
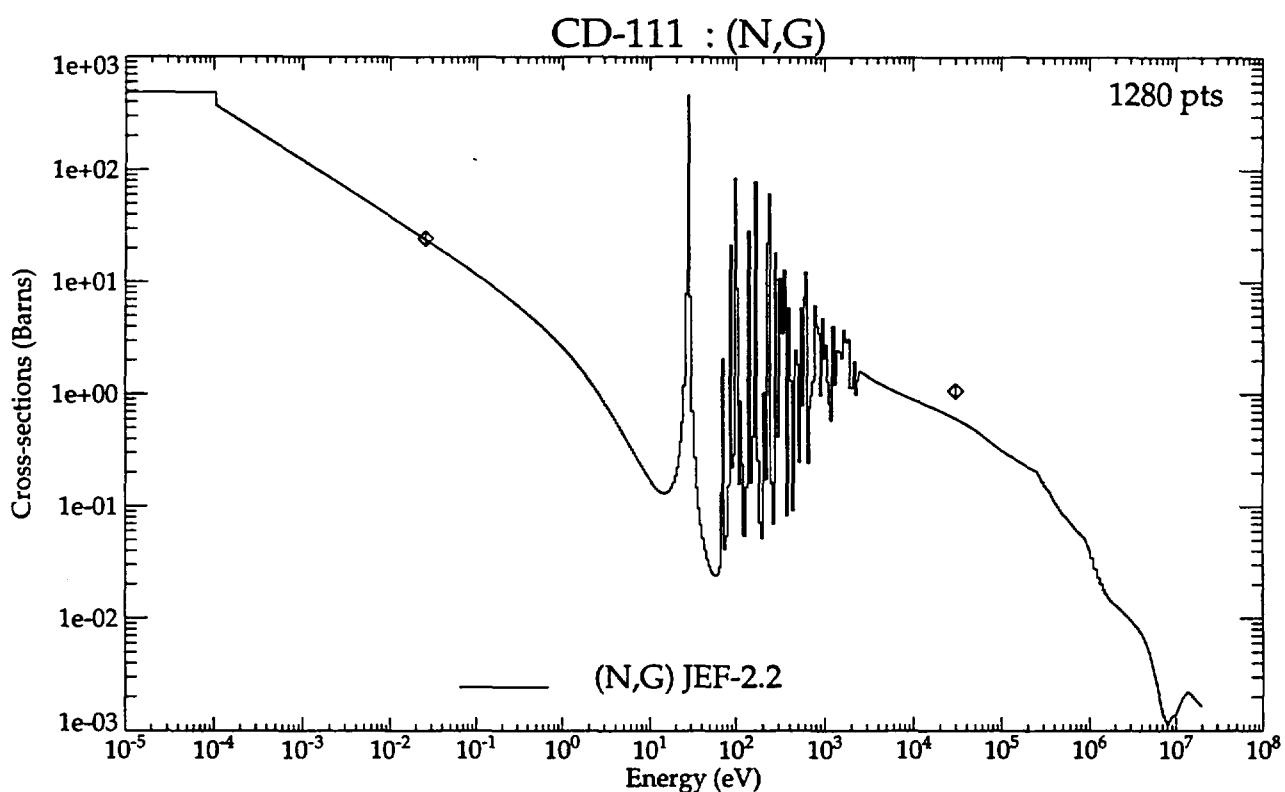
CD-106 : (N,G)

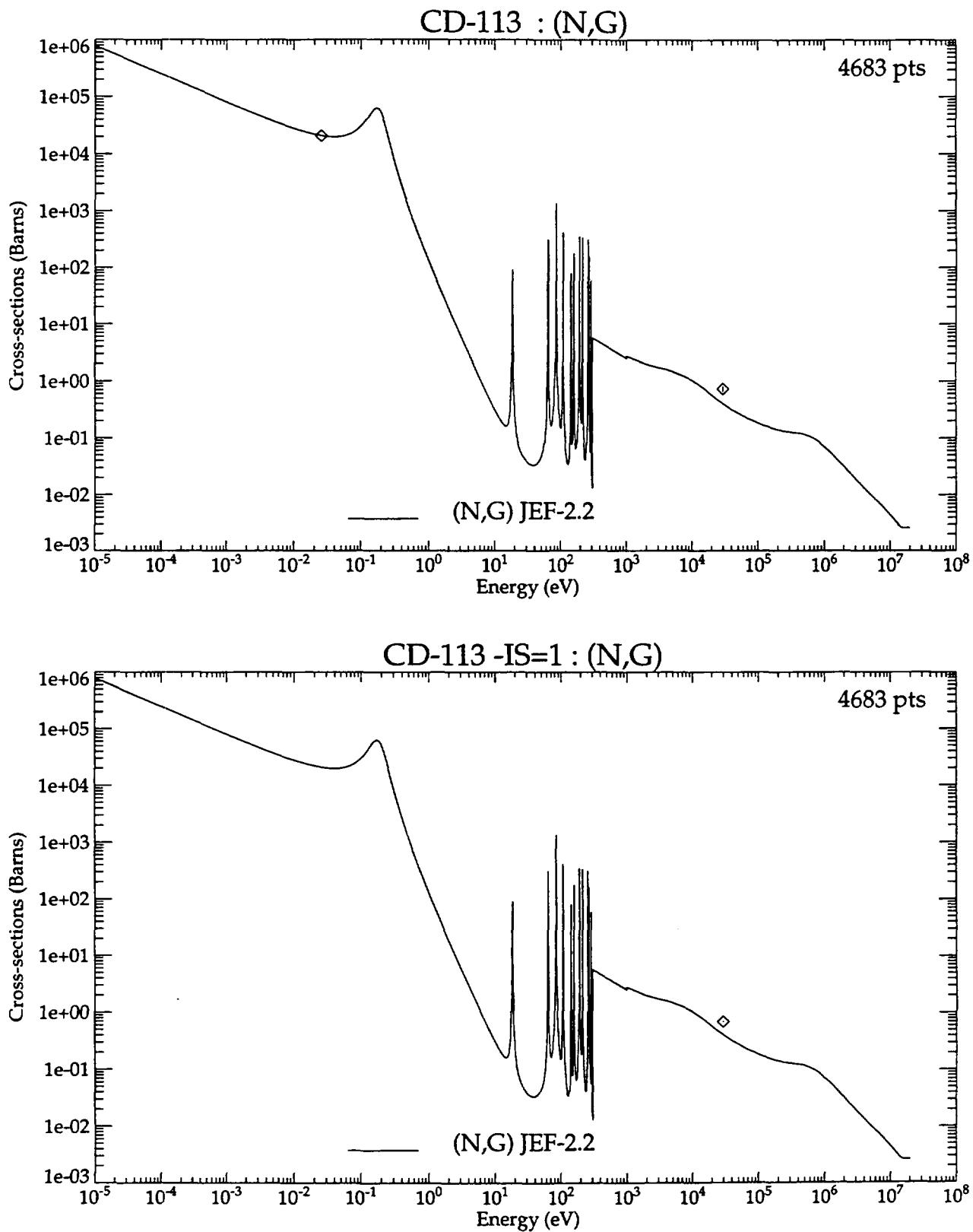


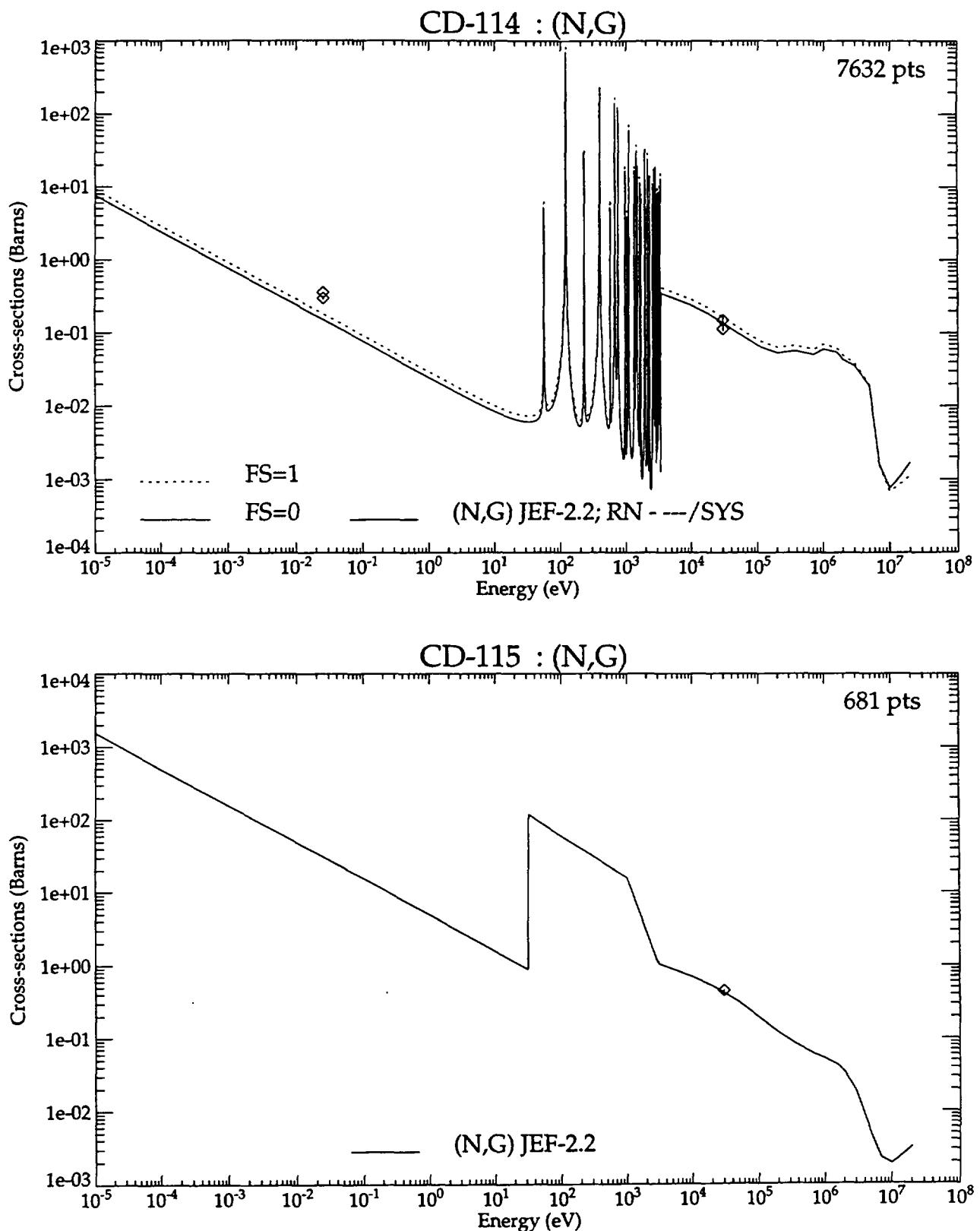
CD-108 : (N,G)



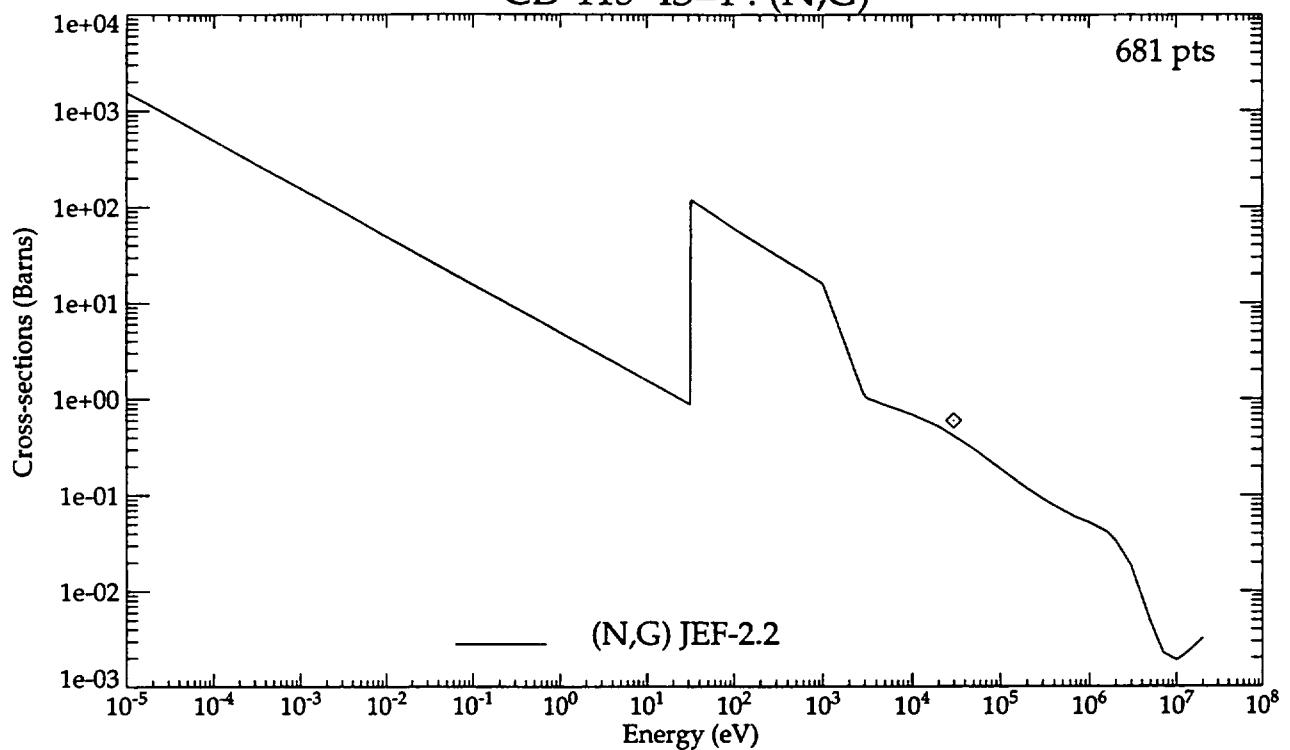




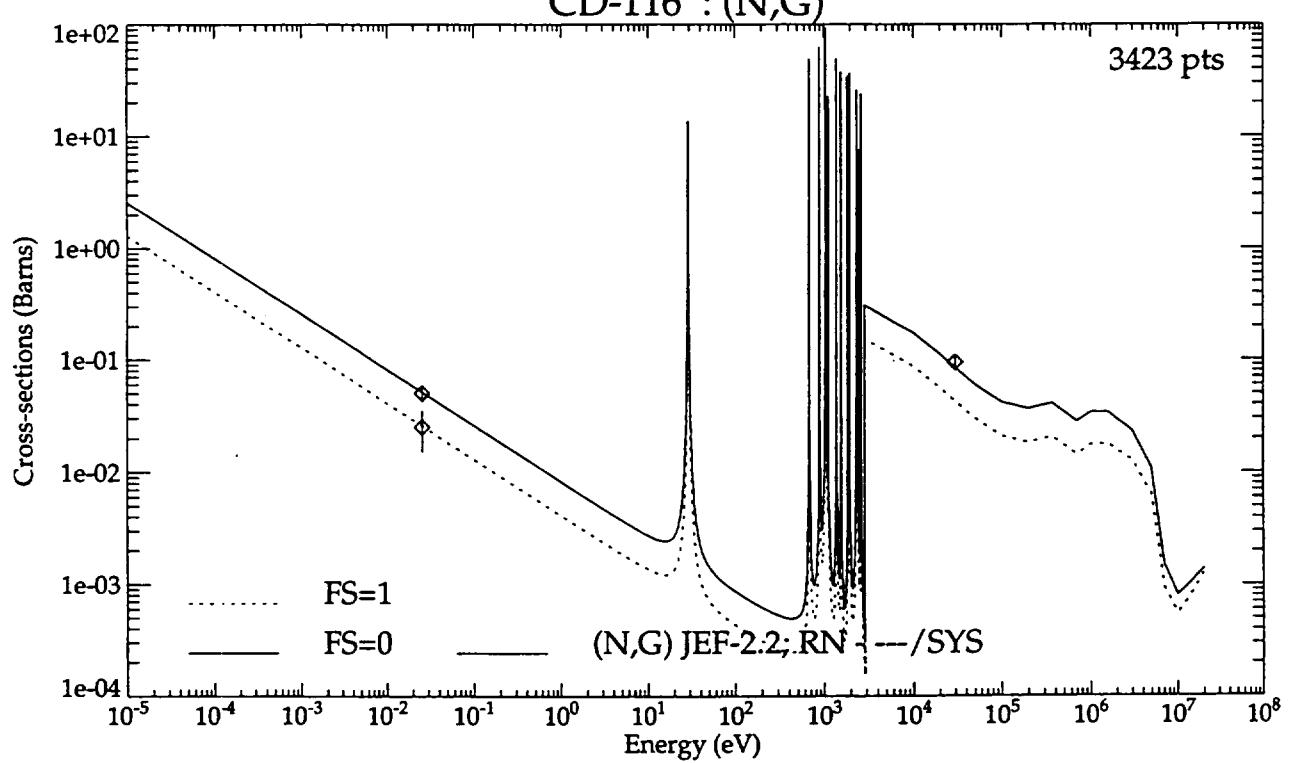




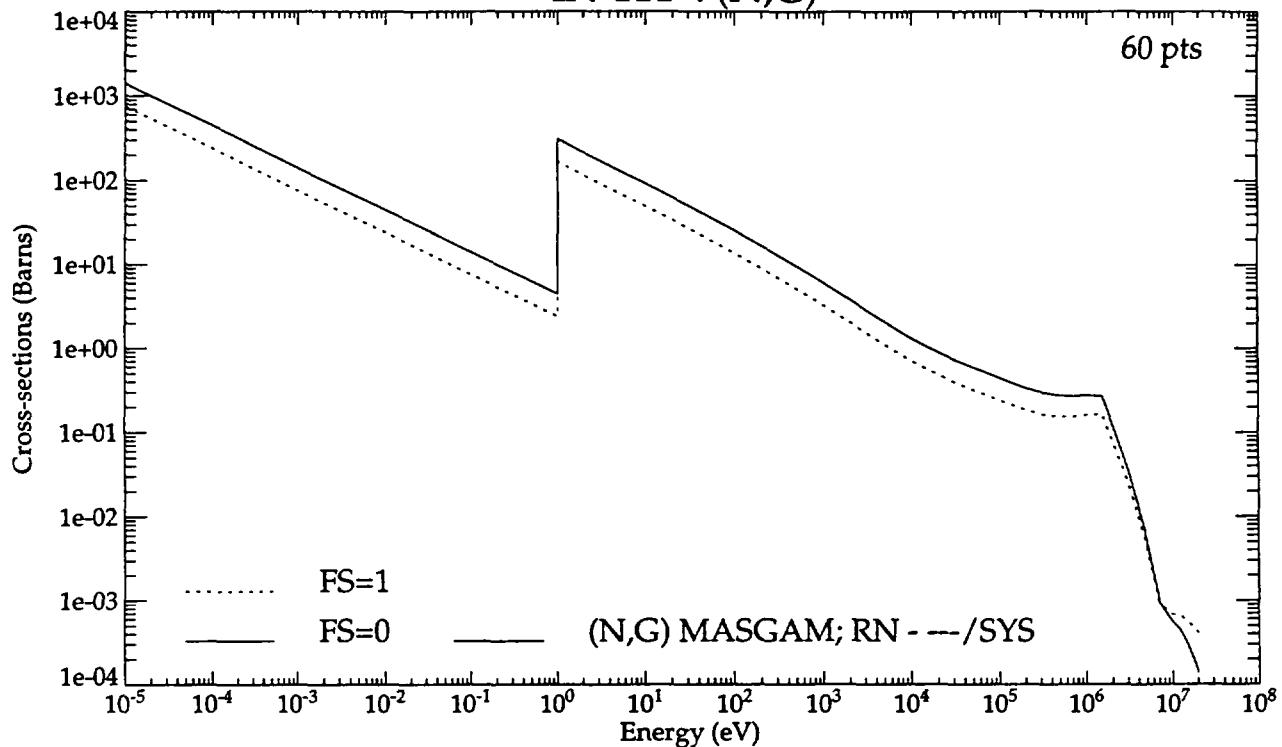
CD-115 -IS=1 : (N,G)



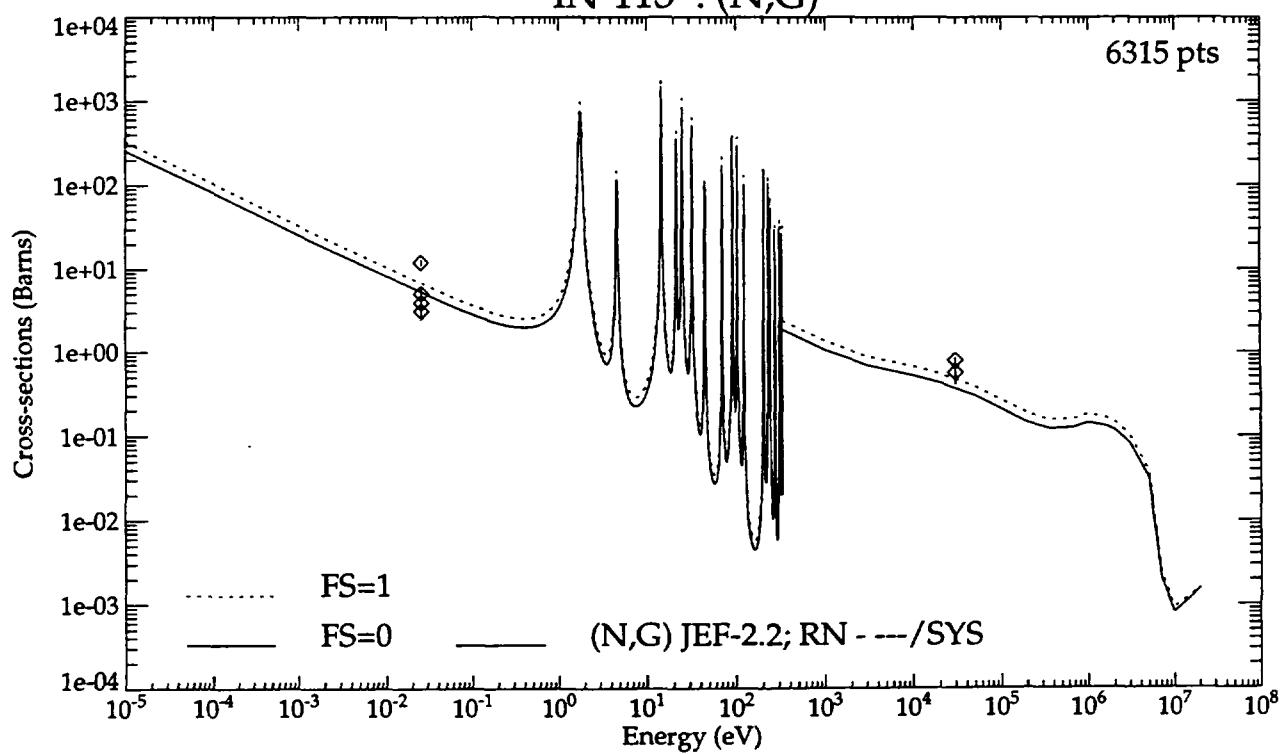
CD-116 : (N,G)

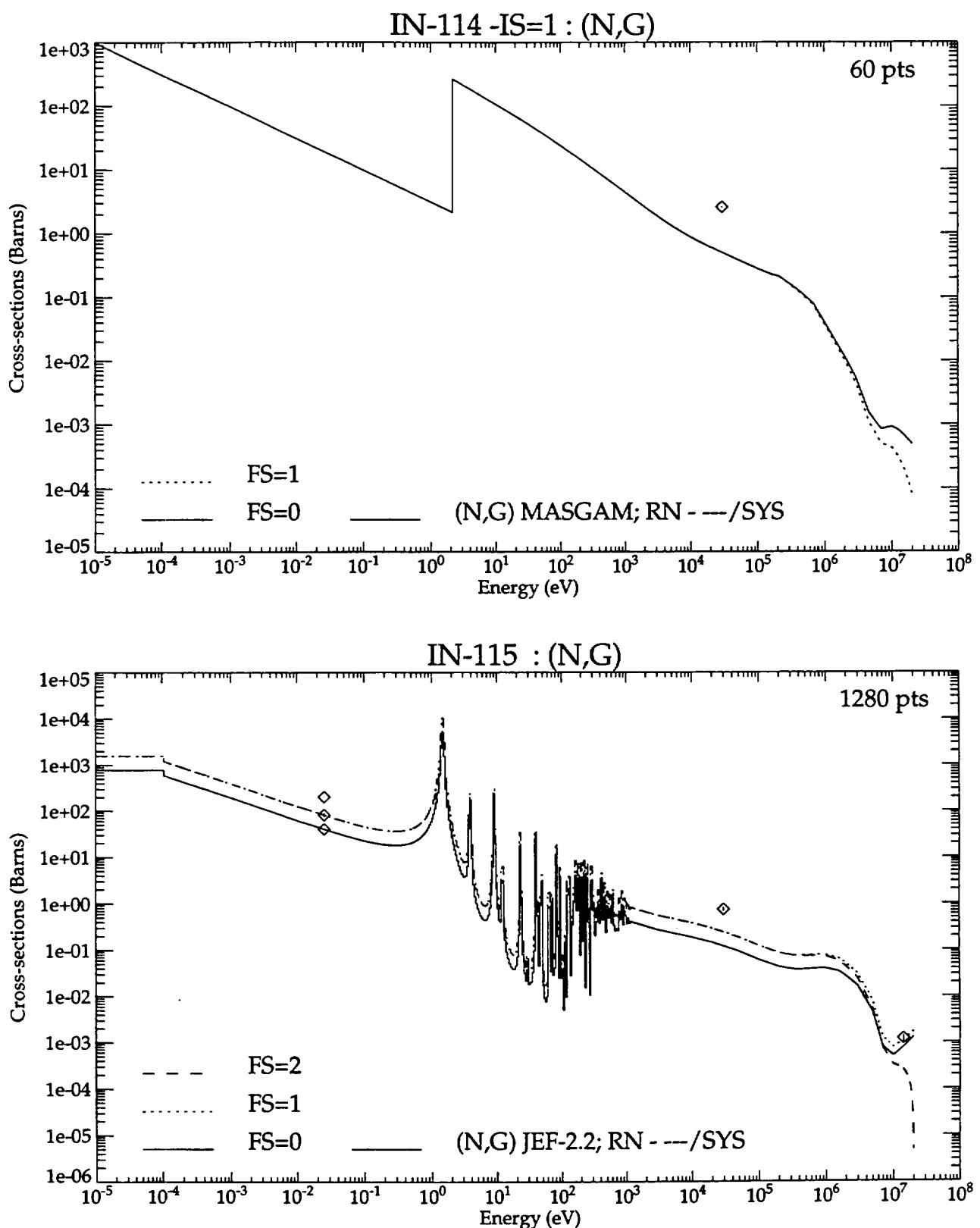


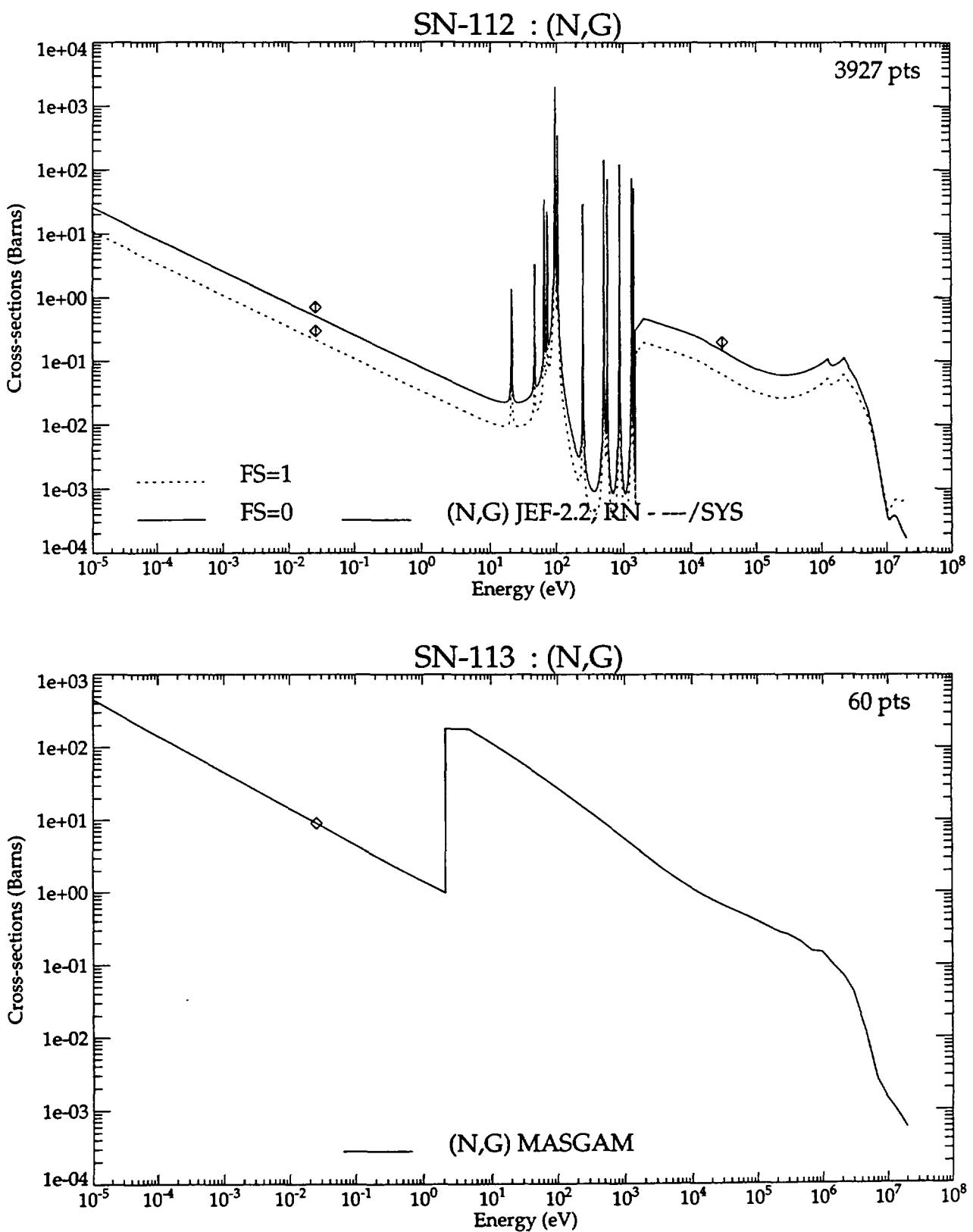
### IN-111 : (N,G)



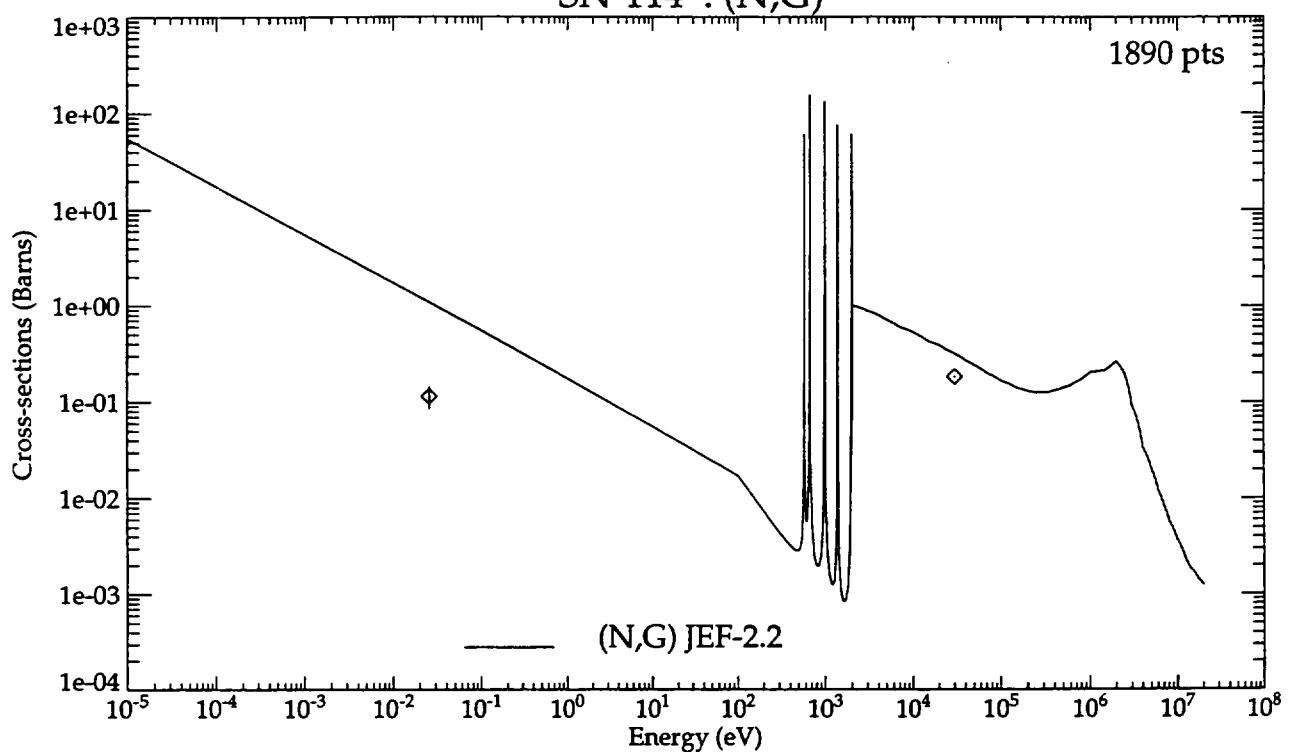
### IN-113 : (N,G)



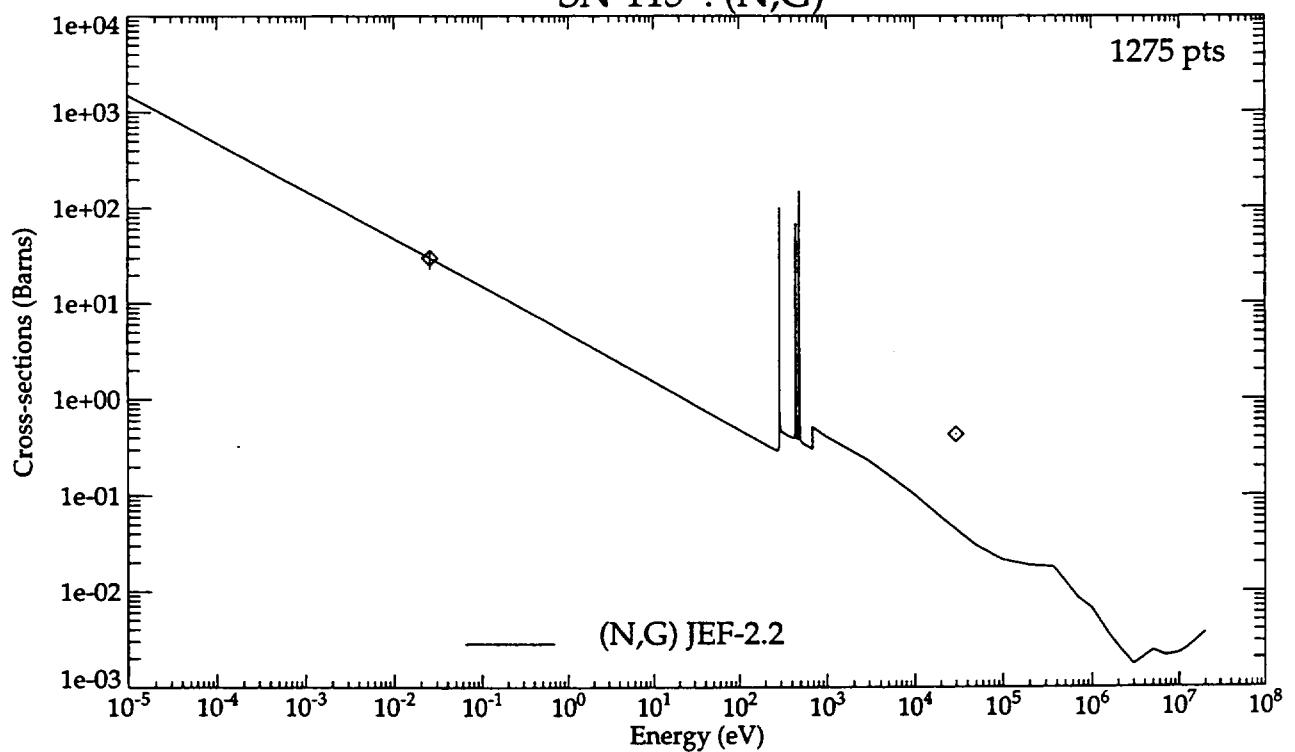


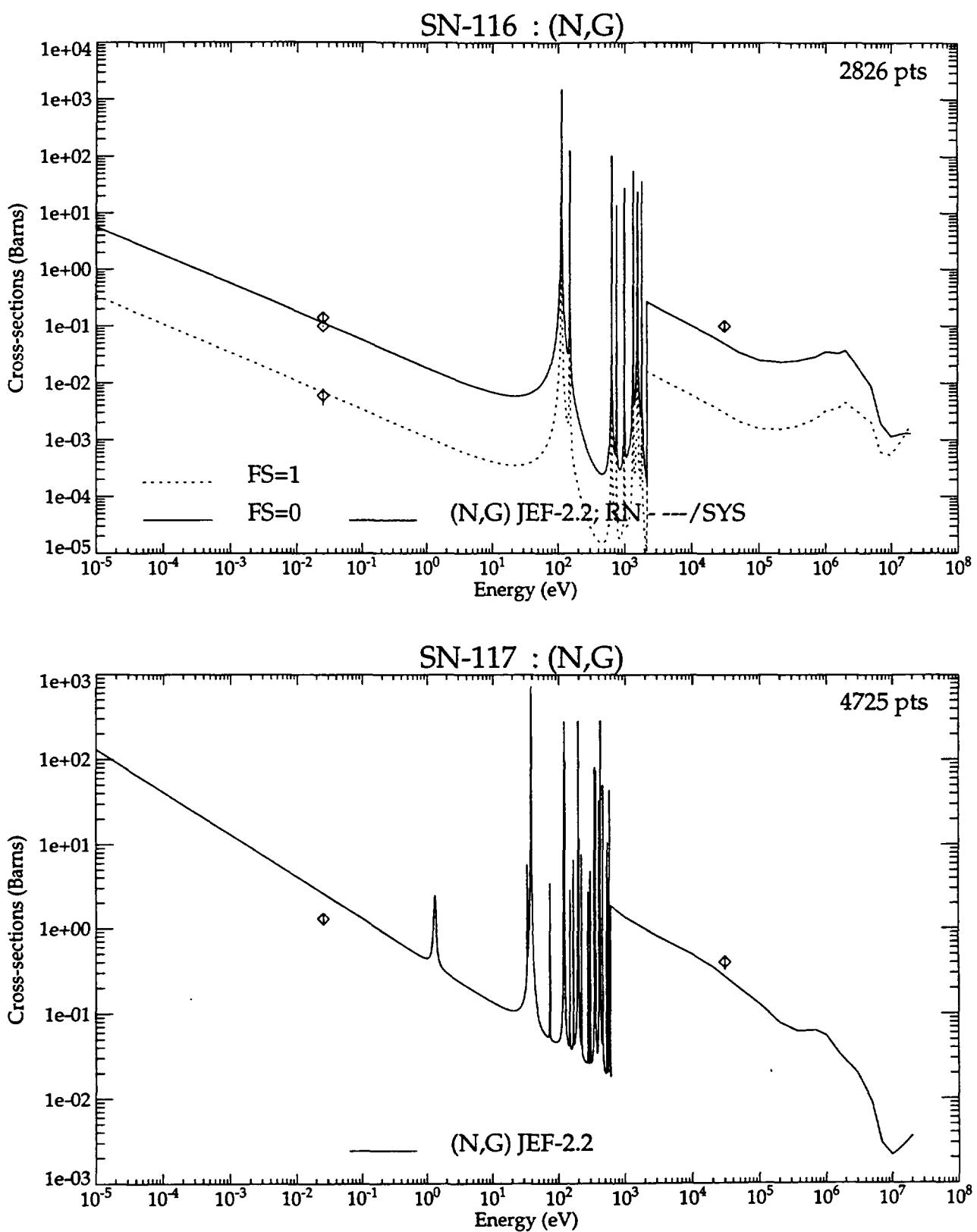


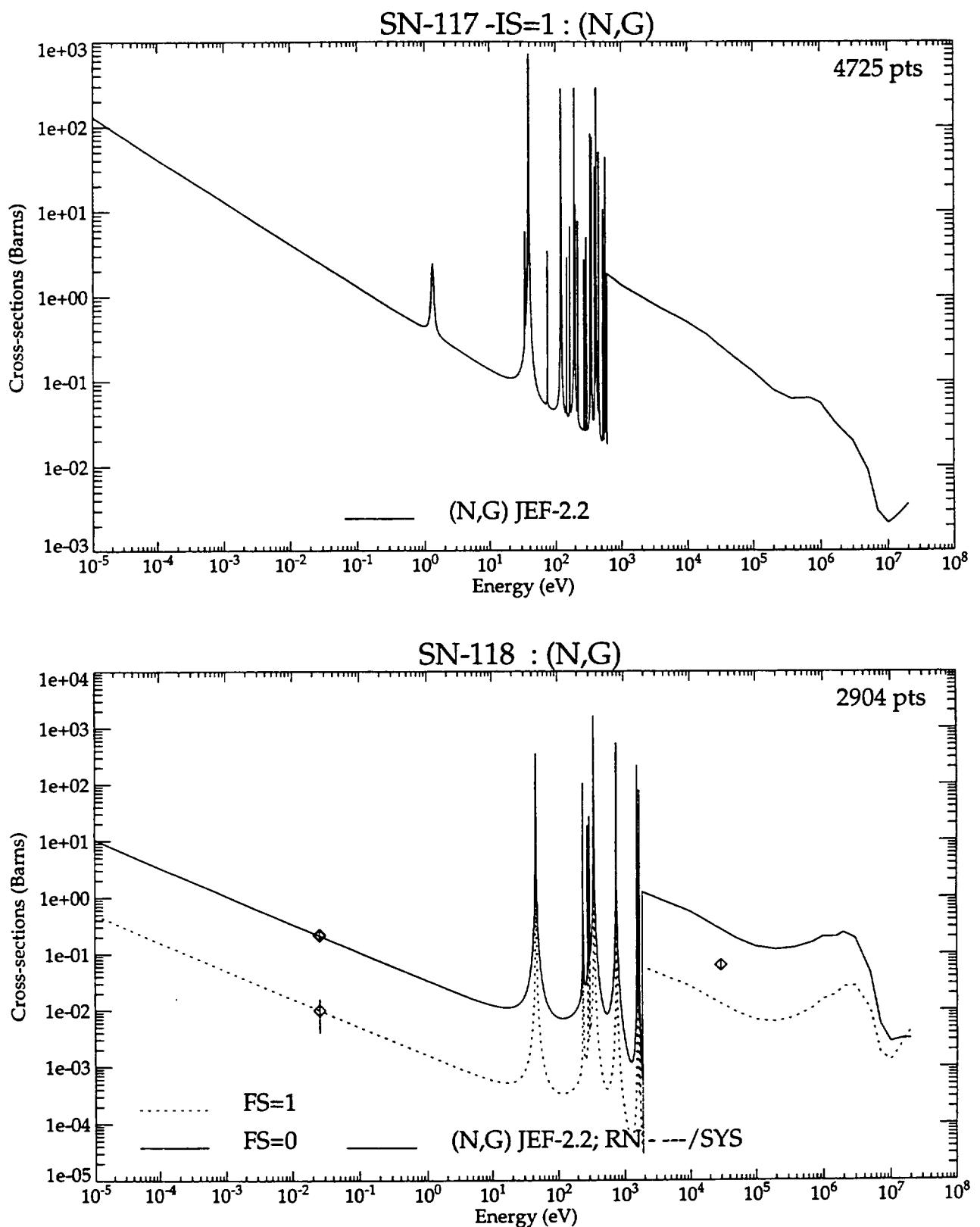
SN-114 : (N,G)

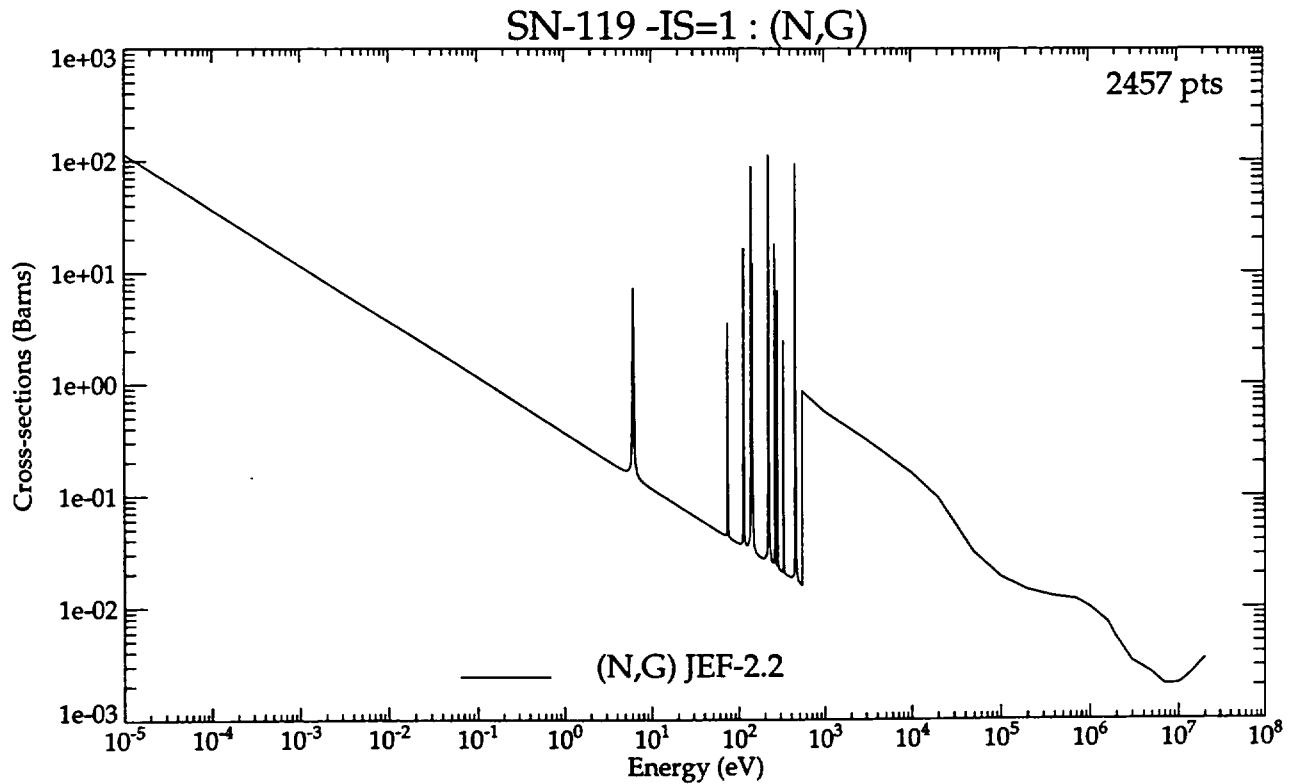
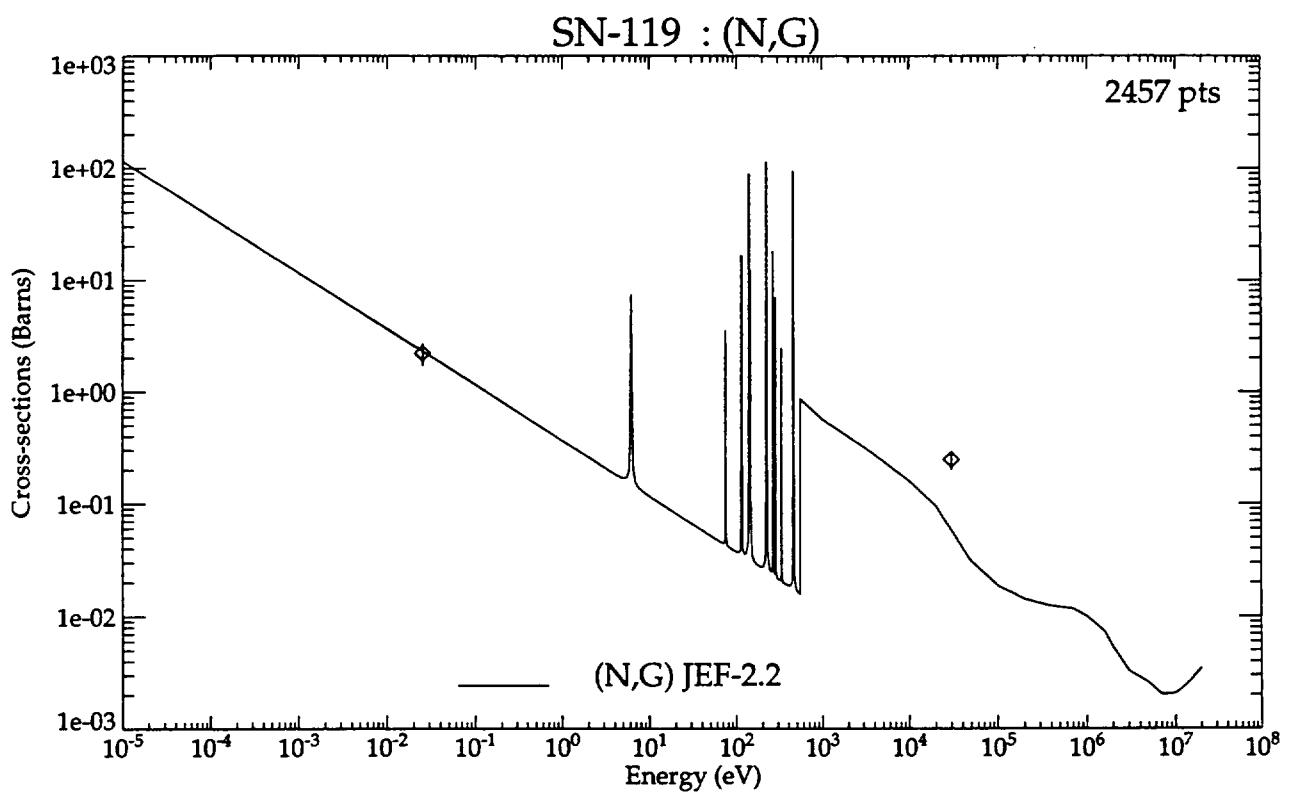


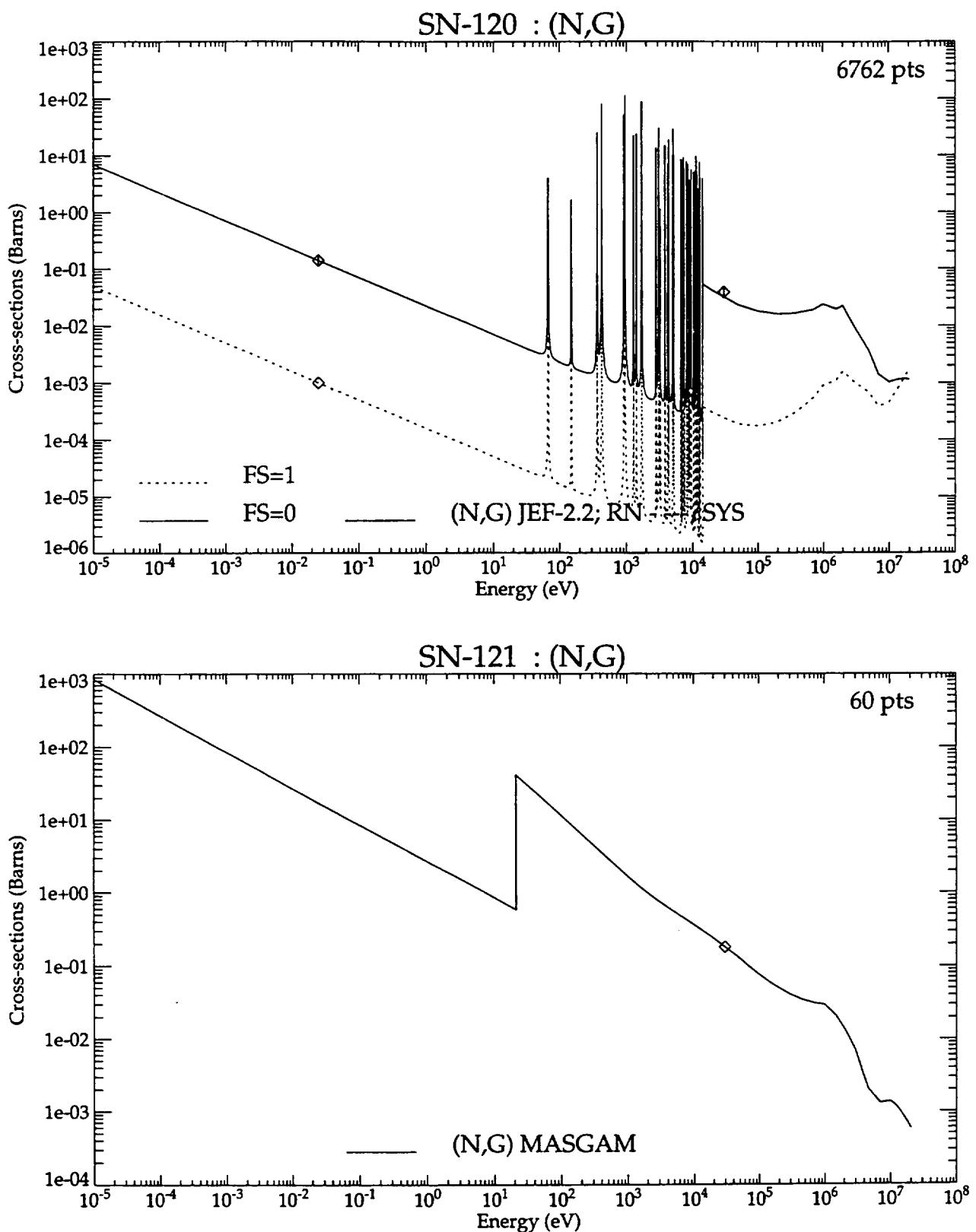
SN-115 : (N,G)

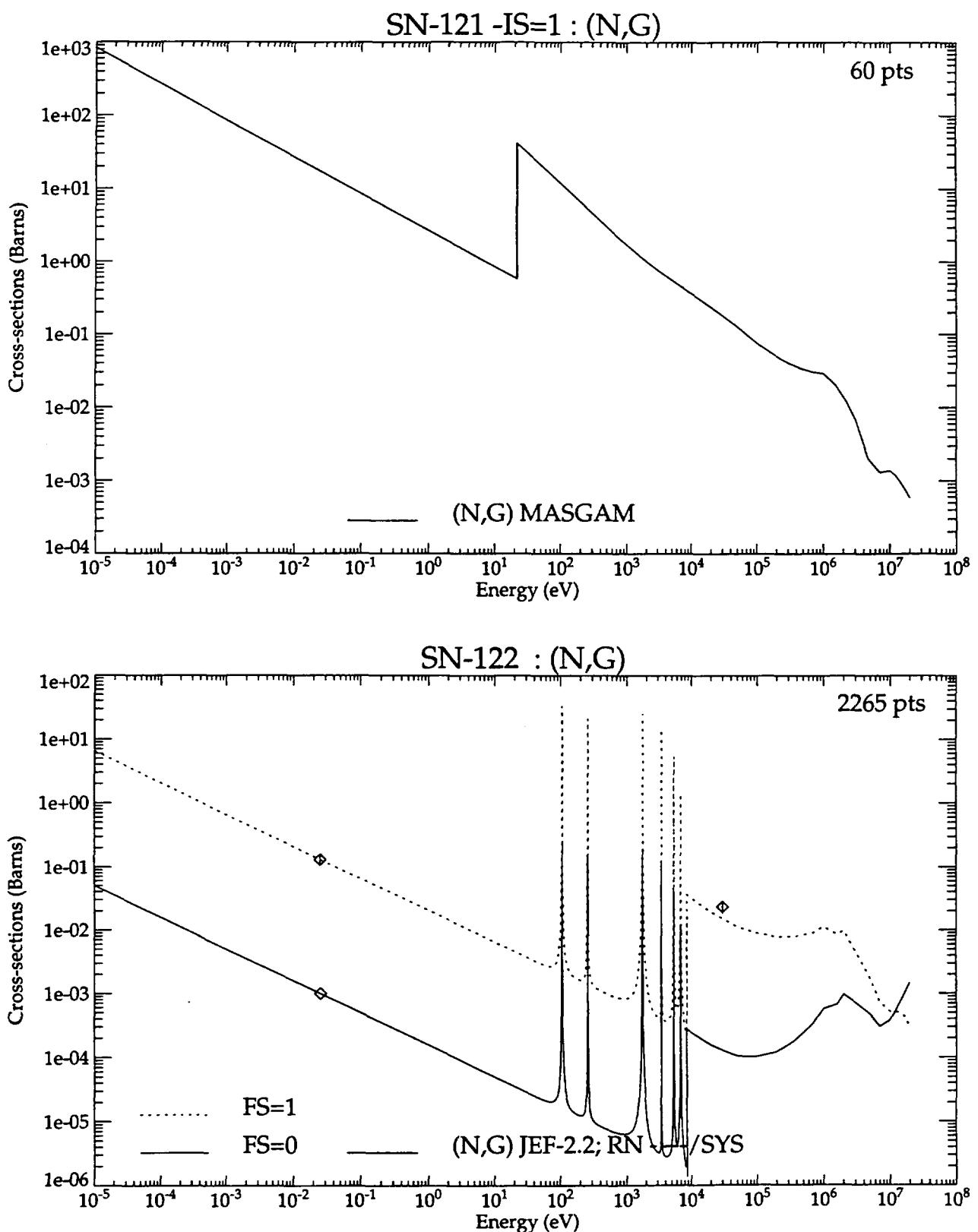


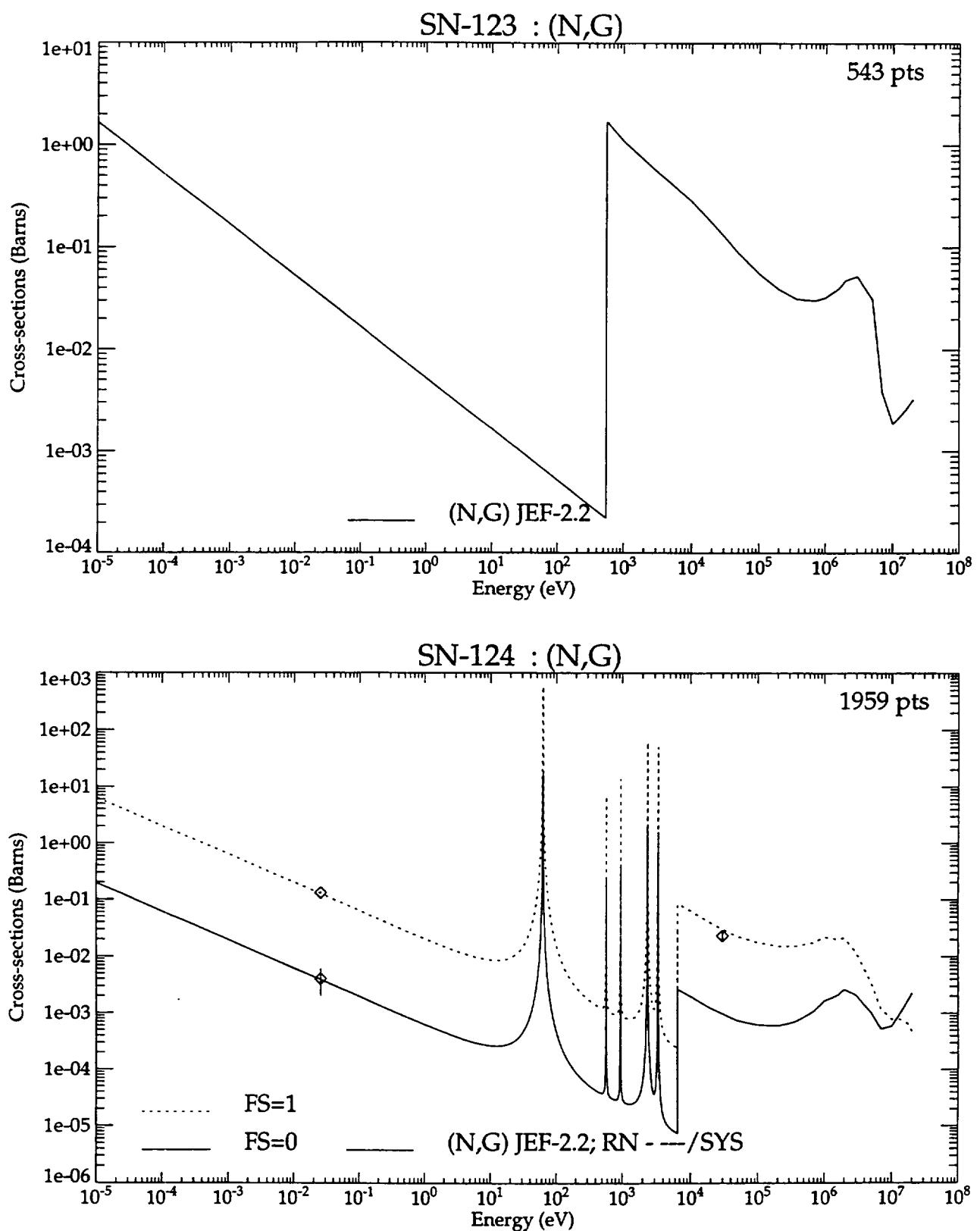


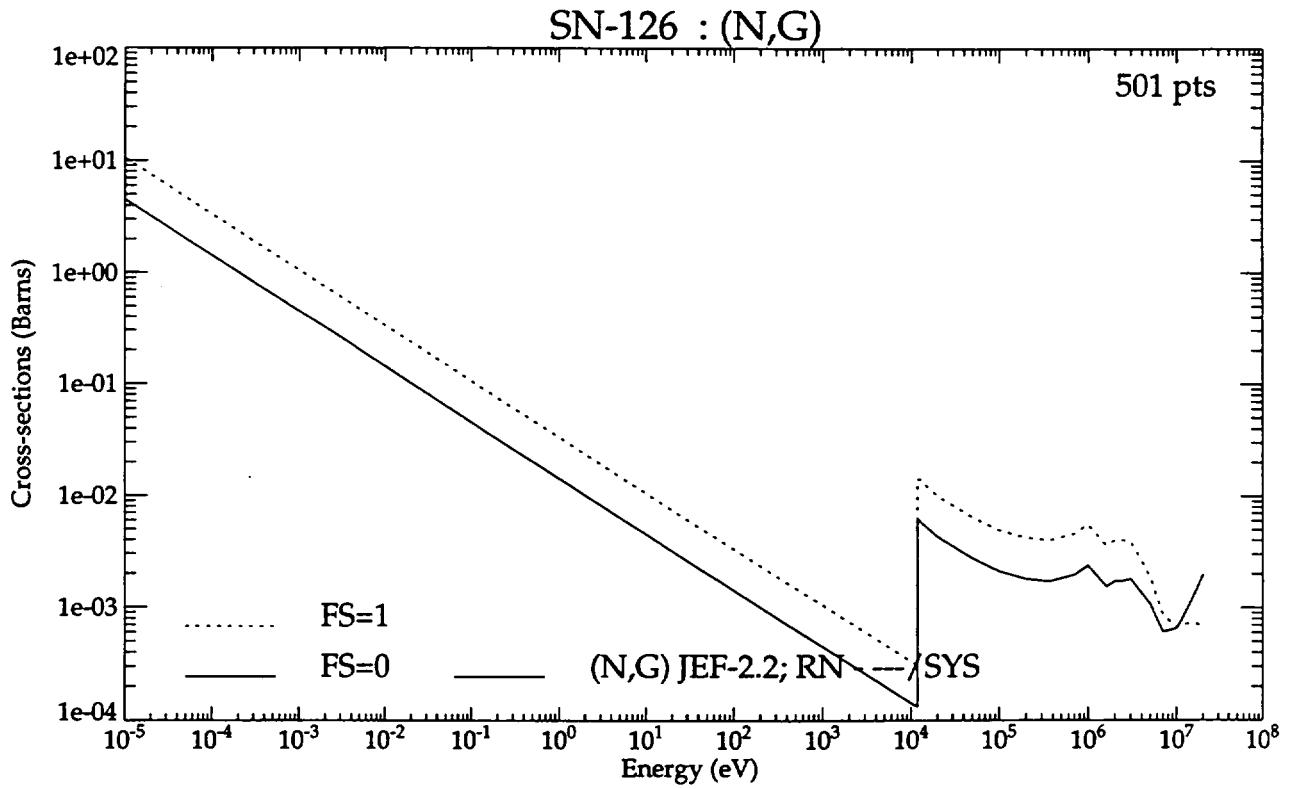
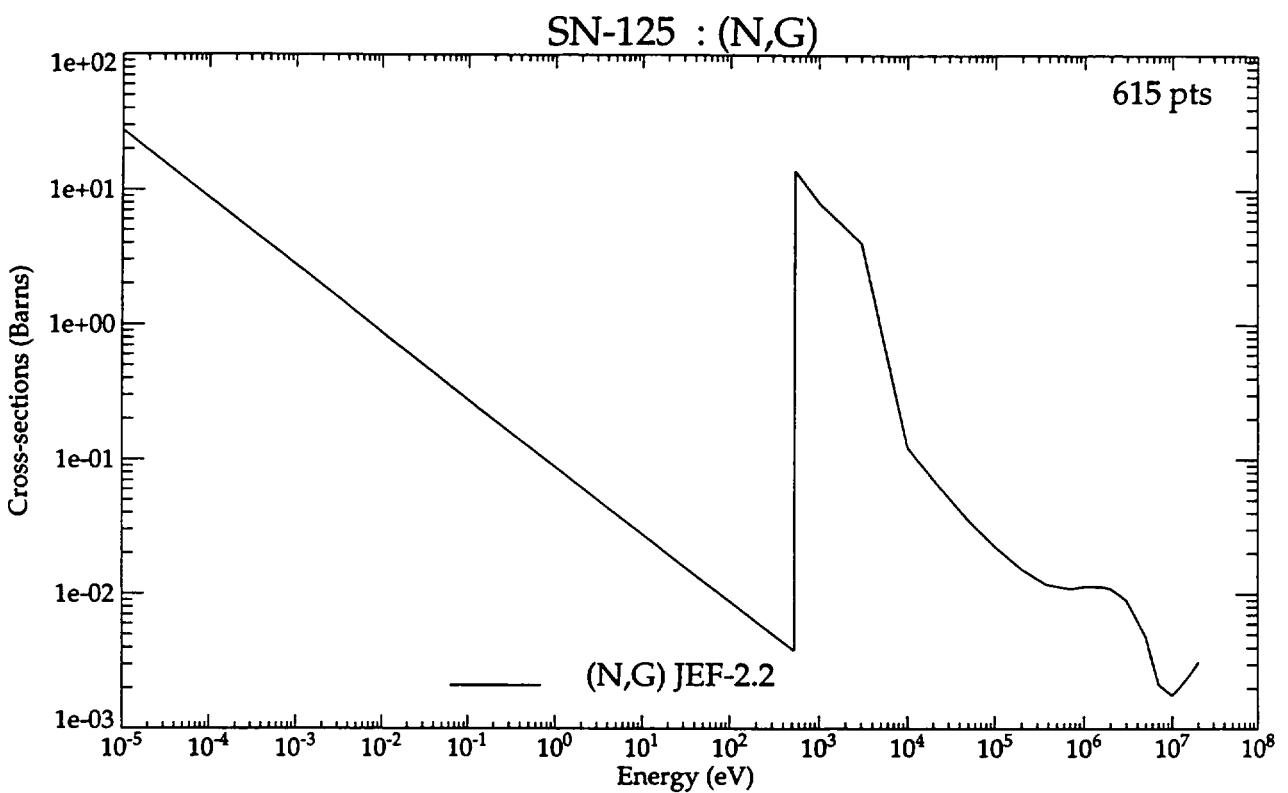


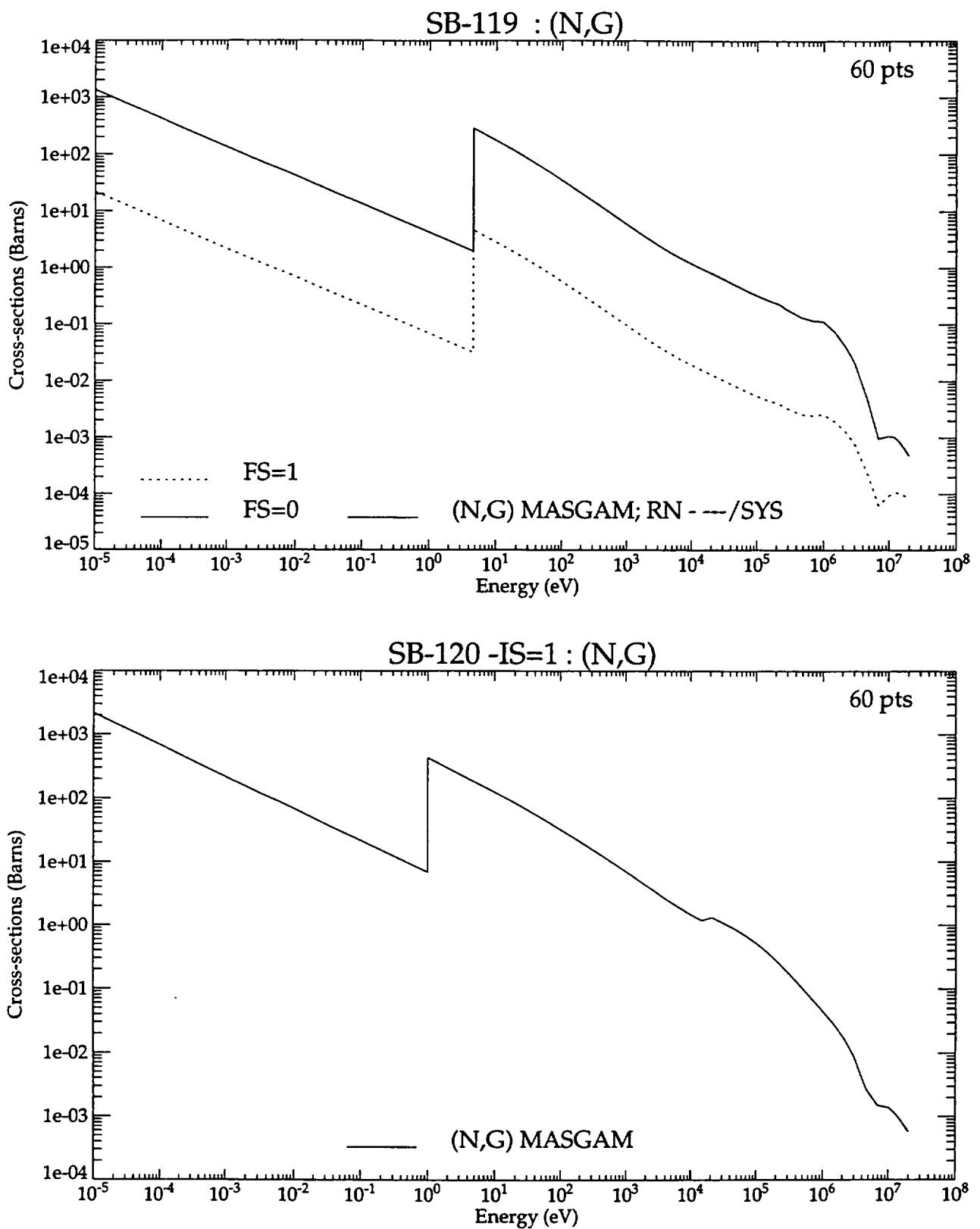


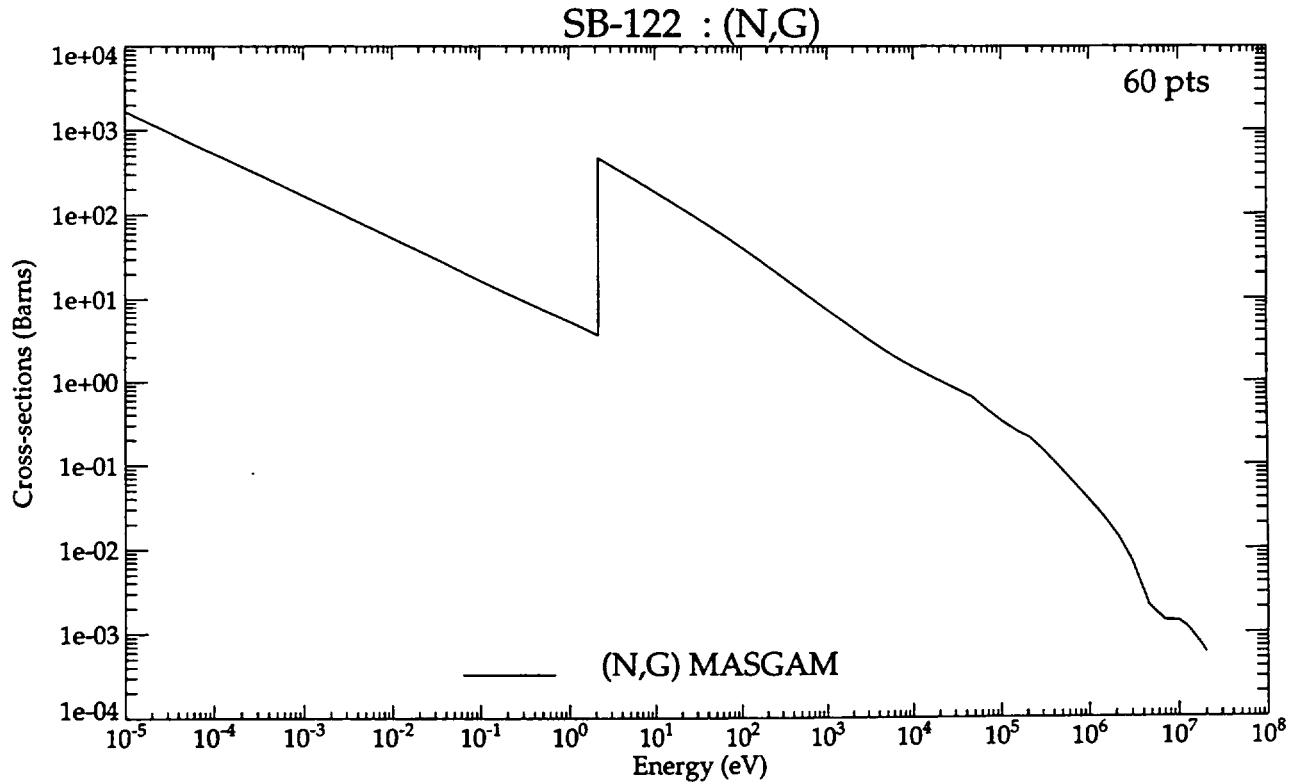
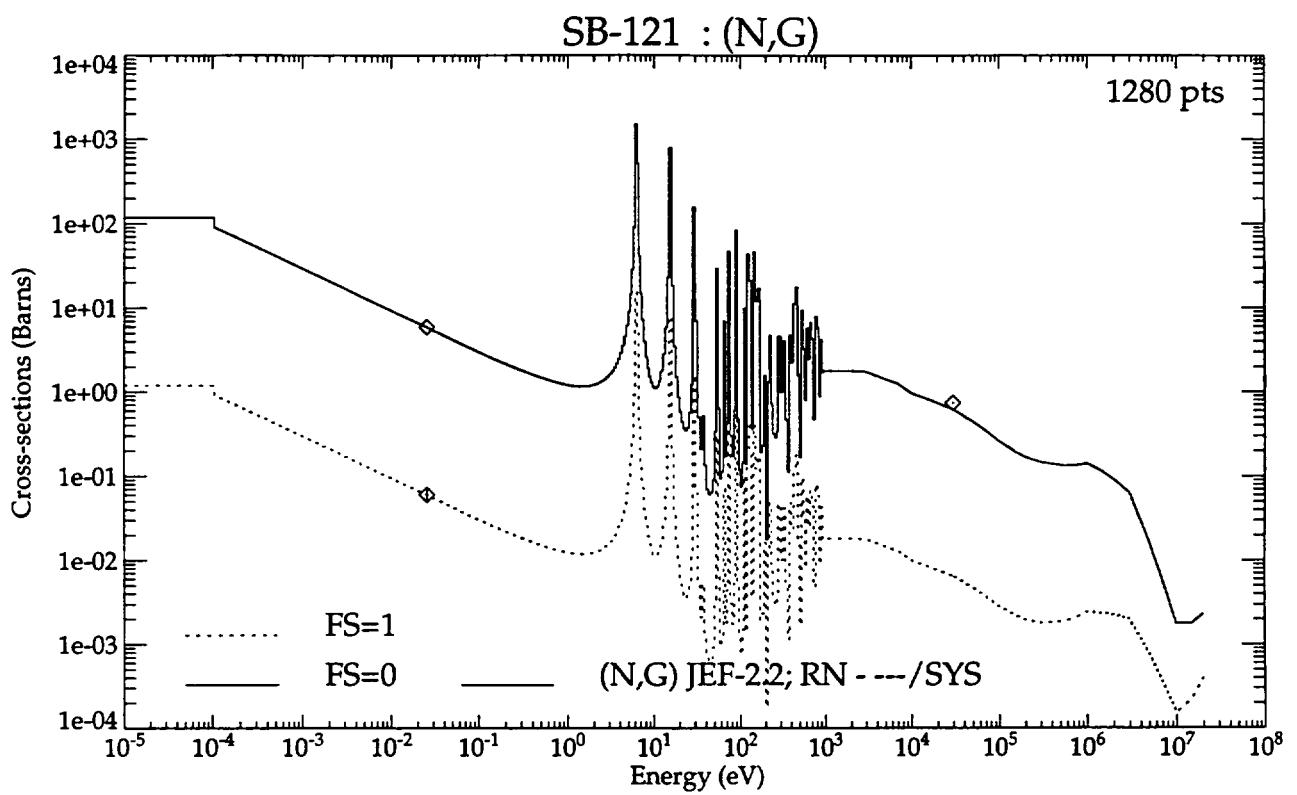


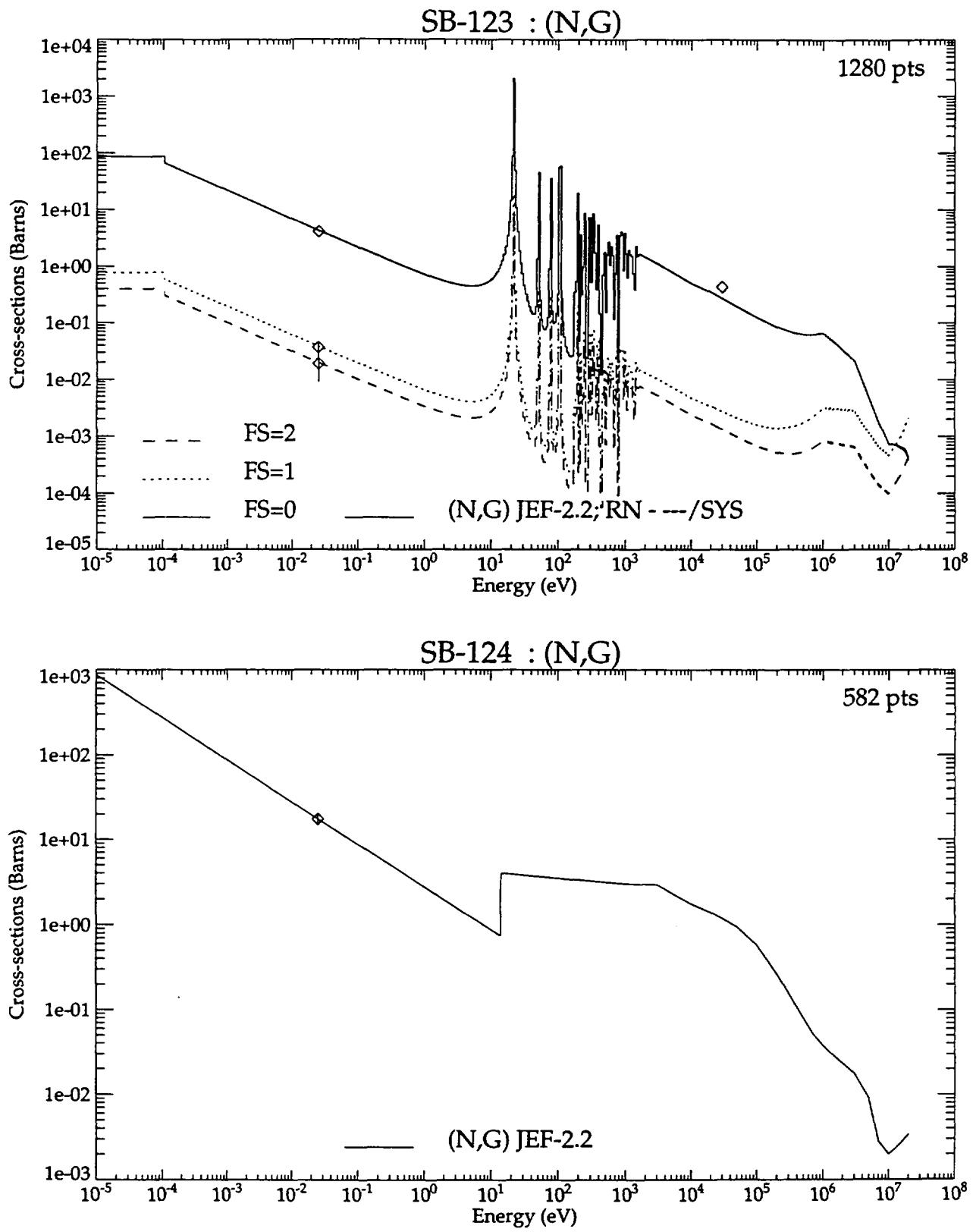


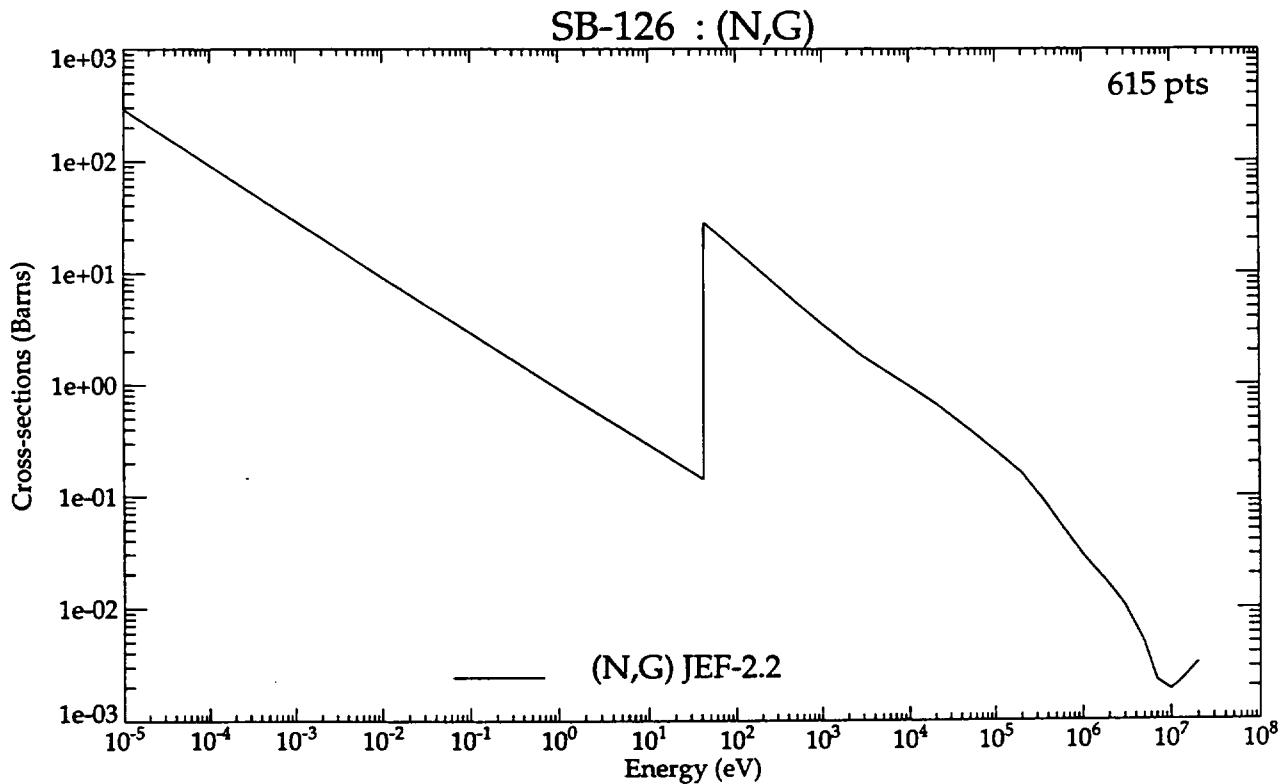
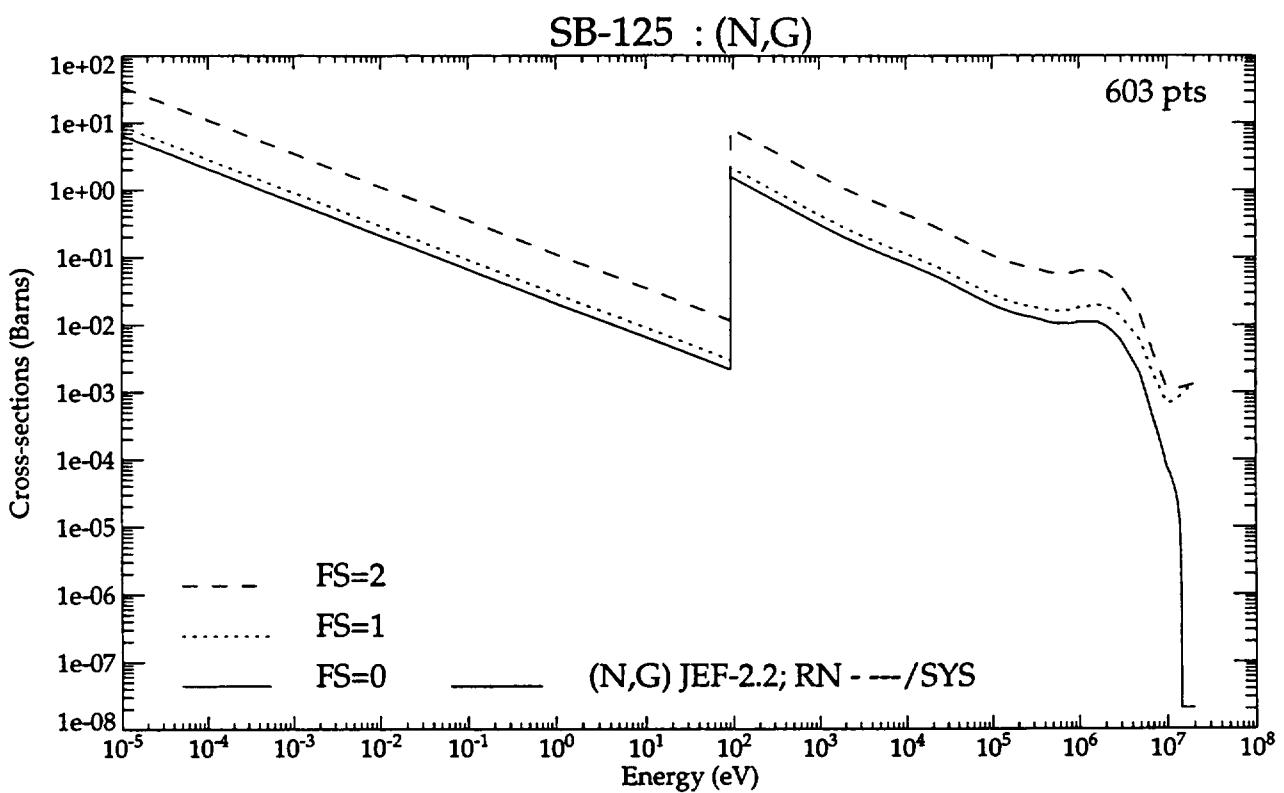


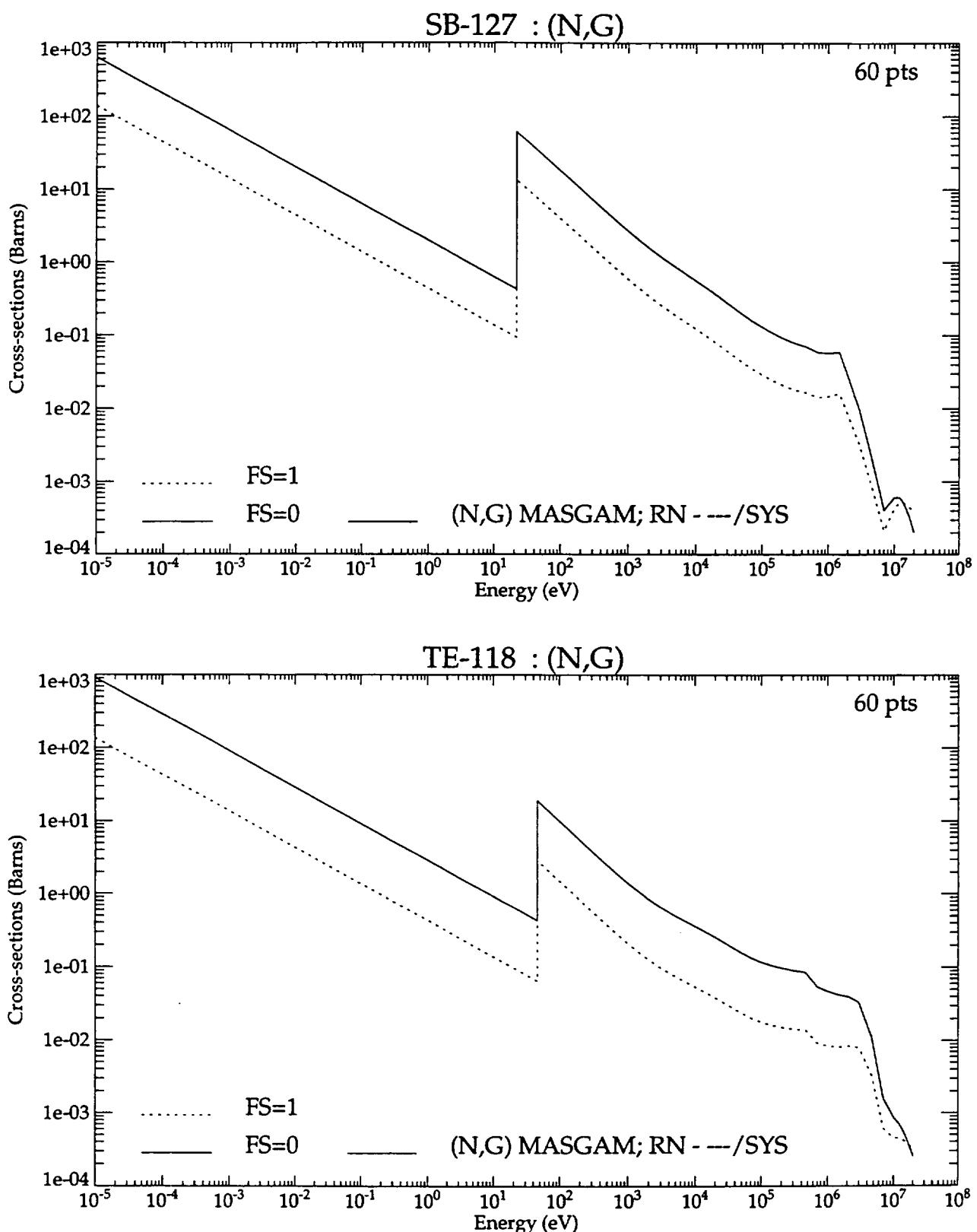


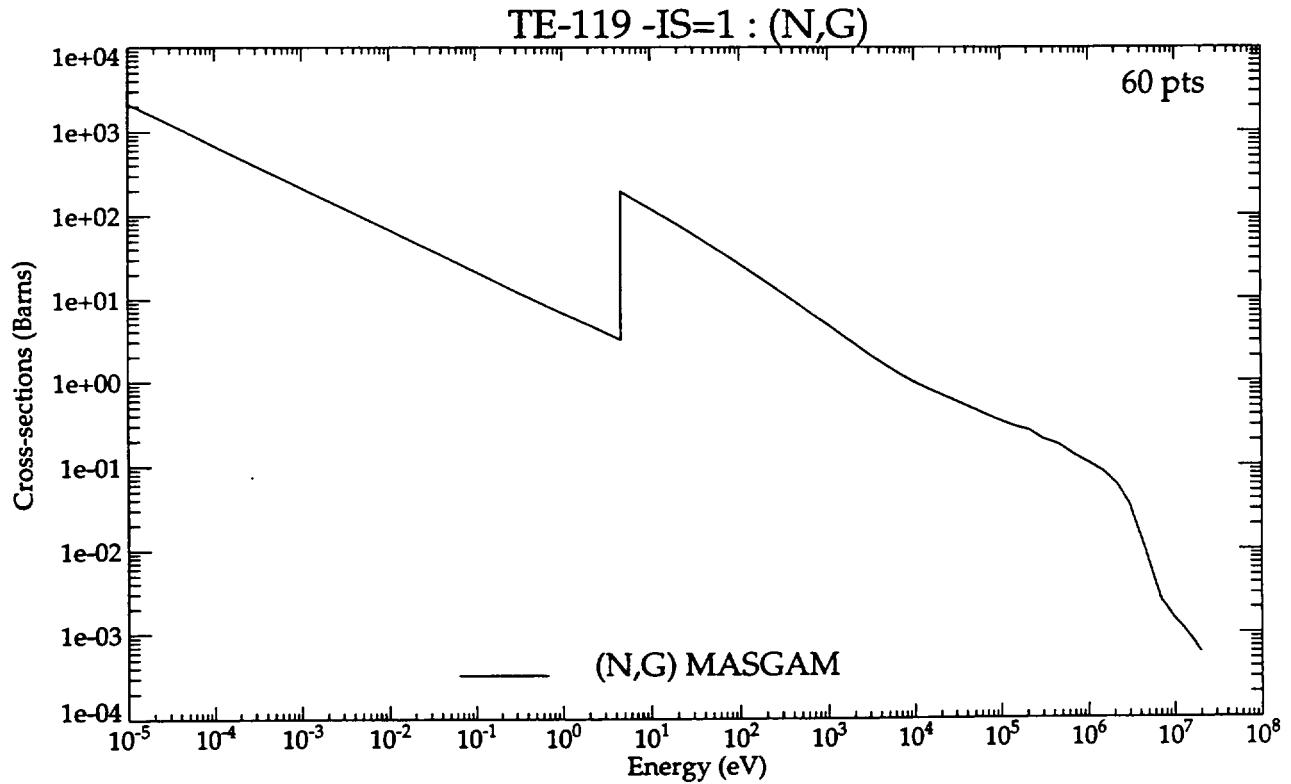
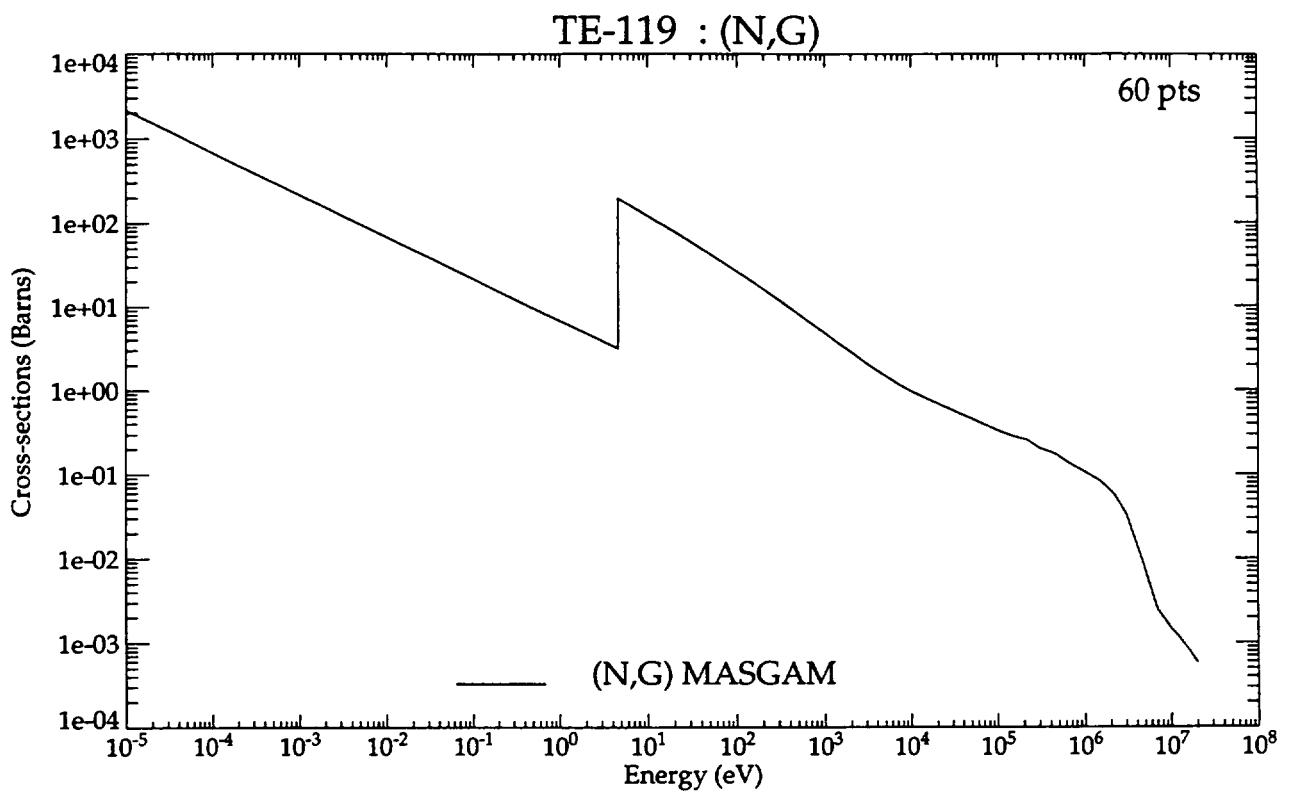


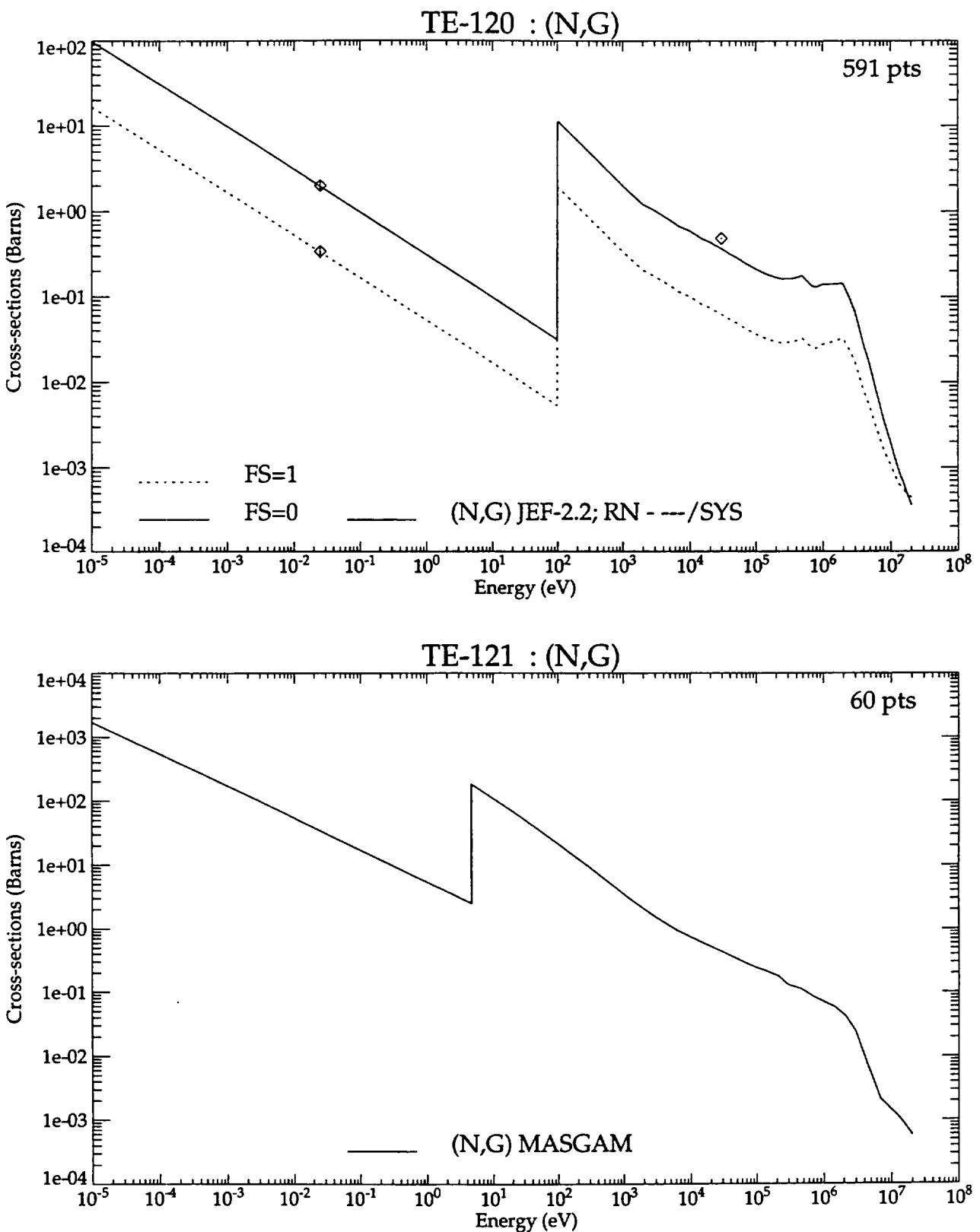


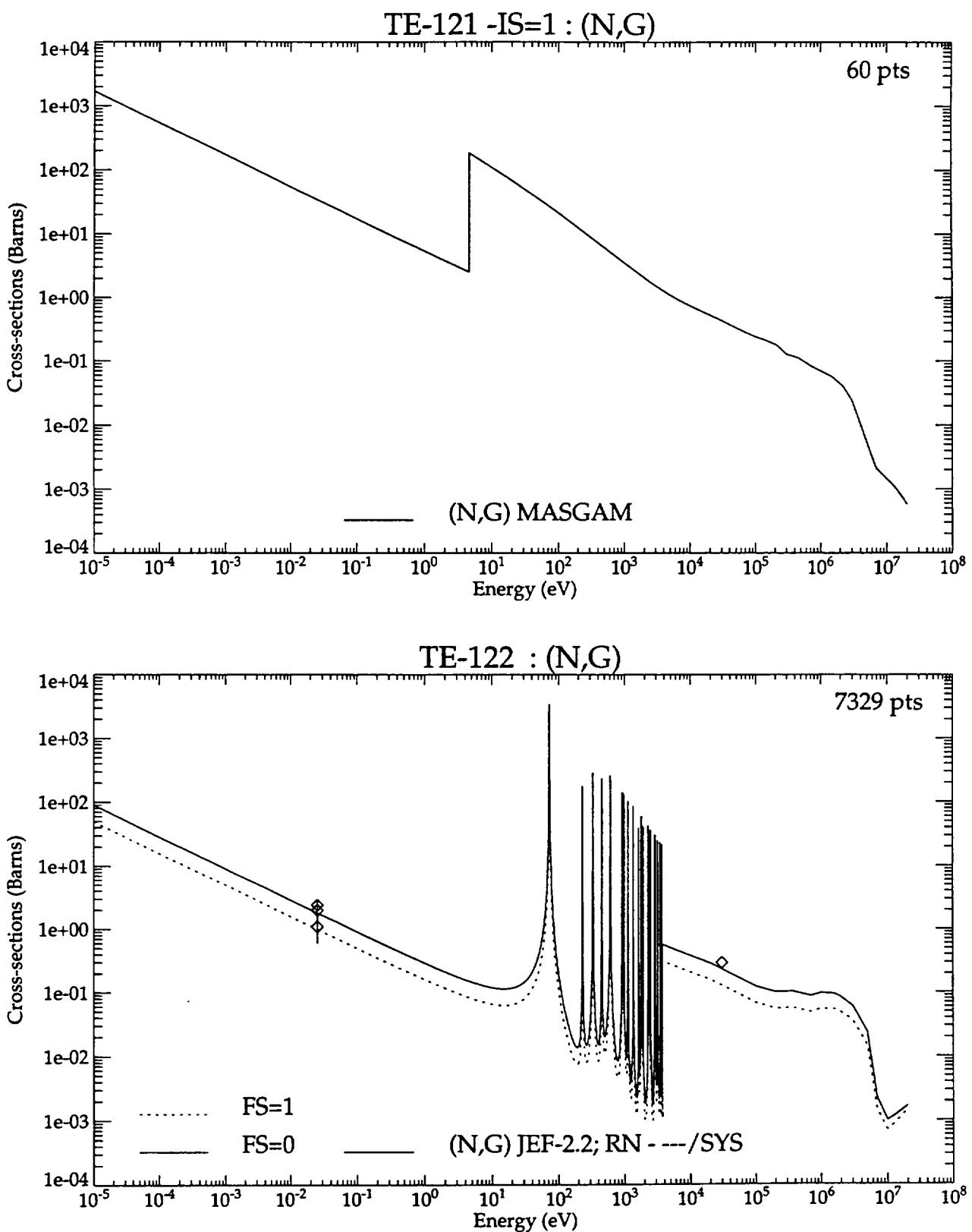


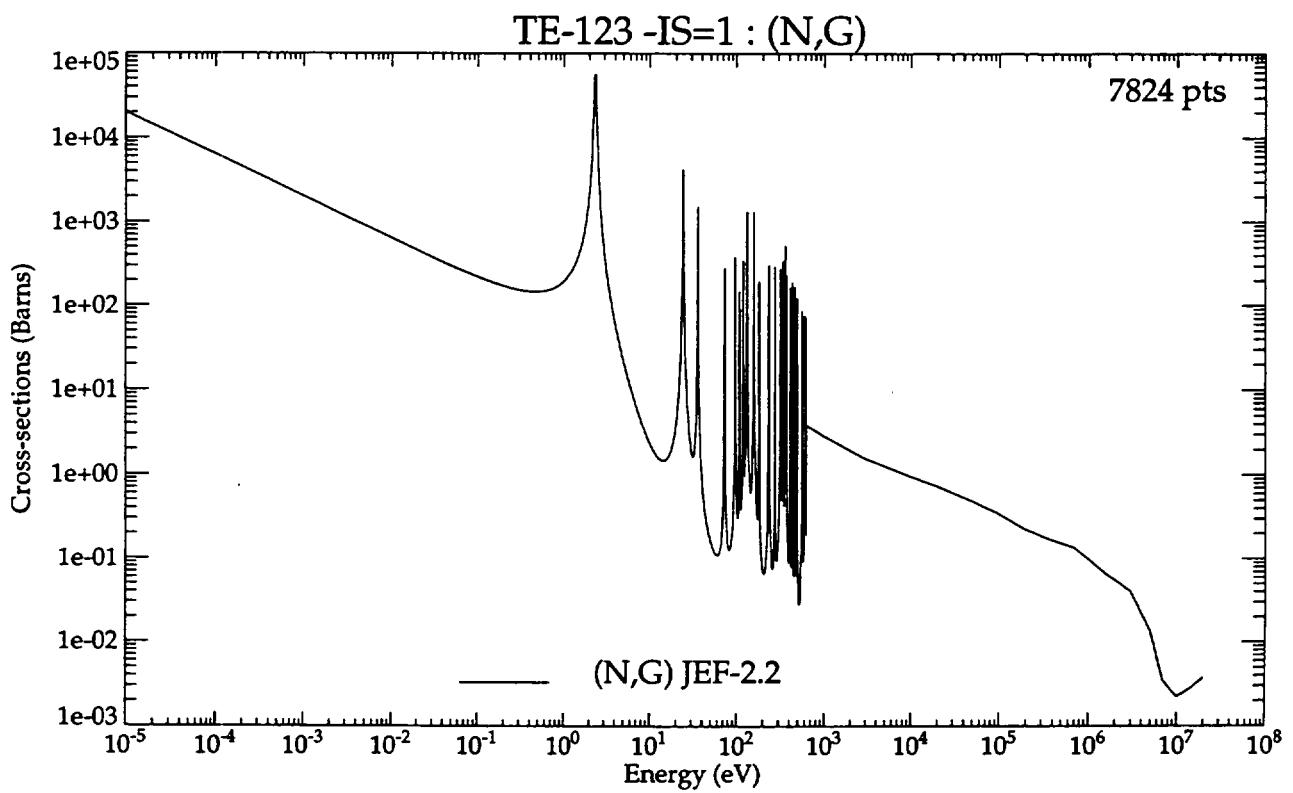
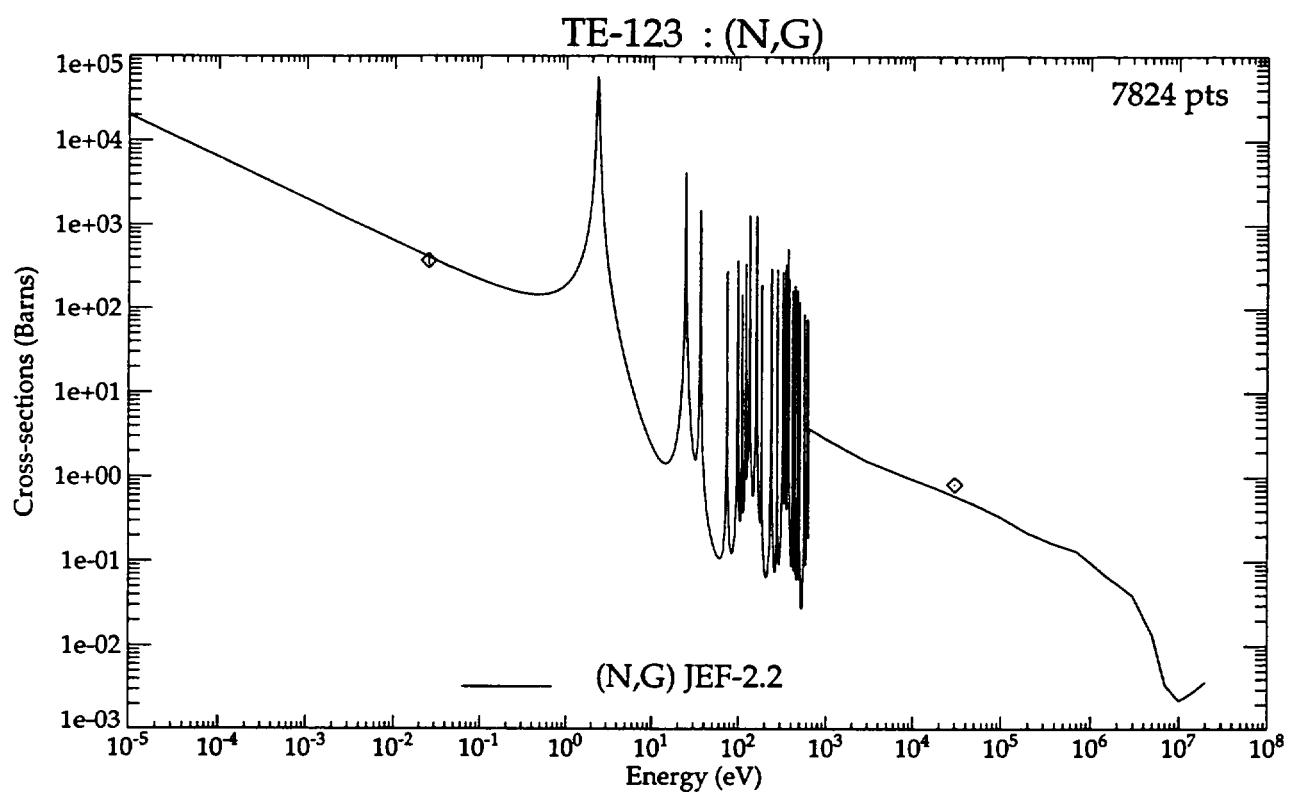


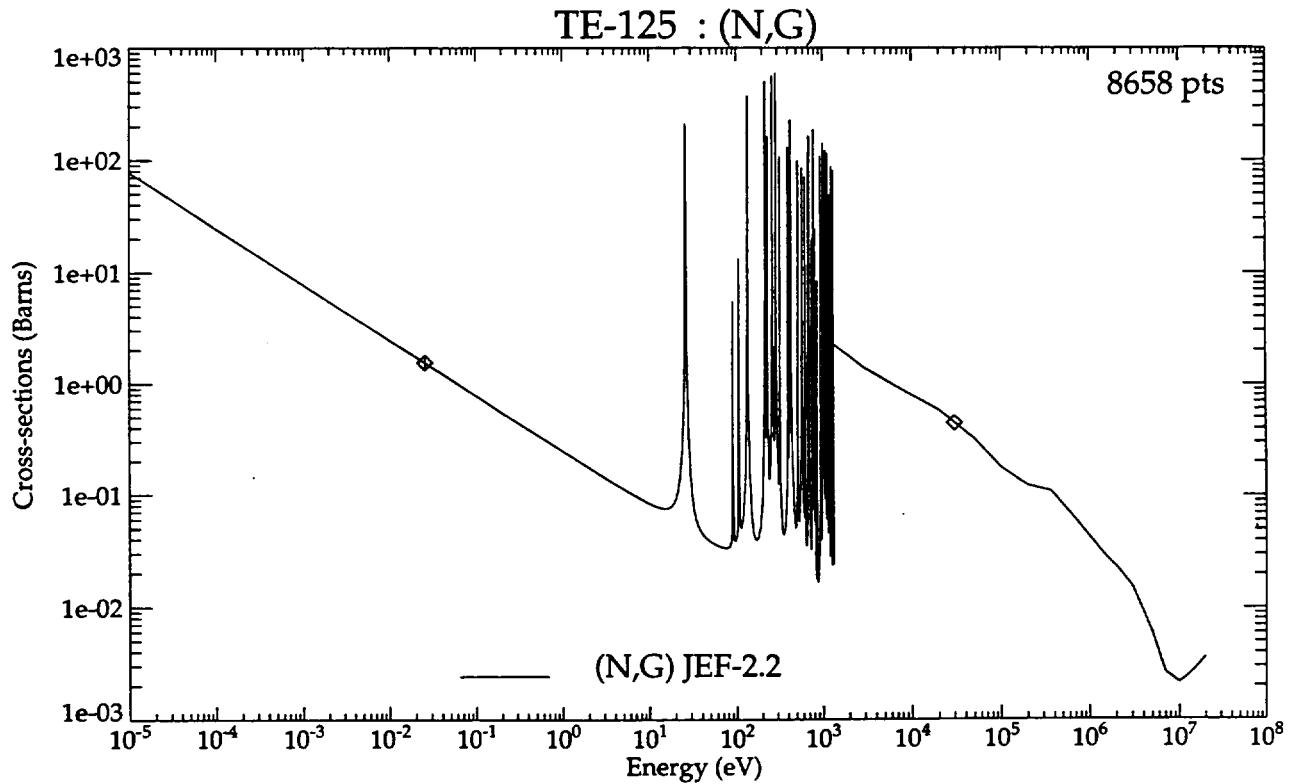
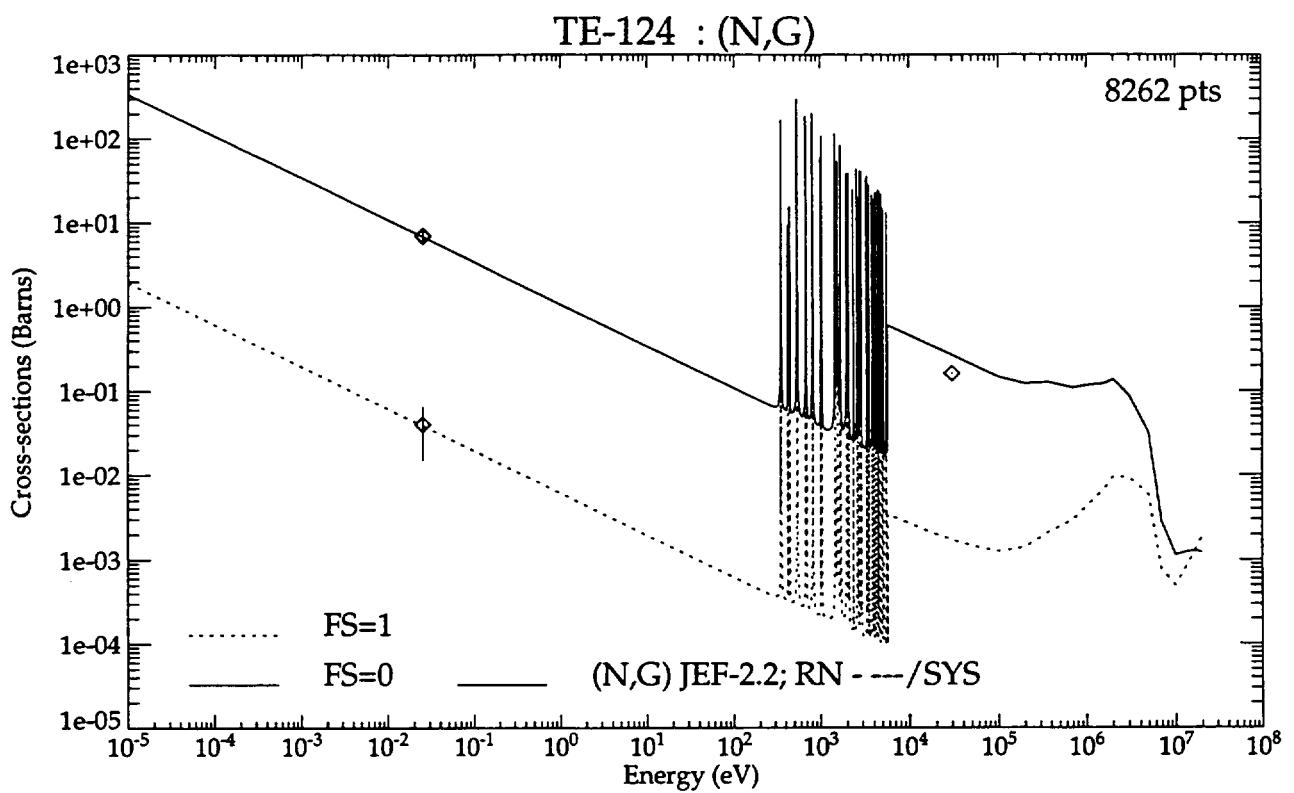


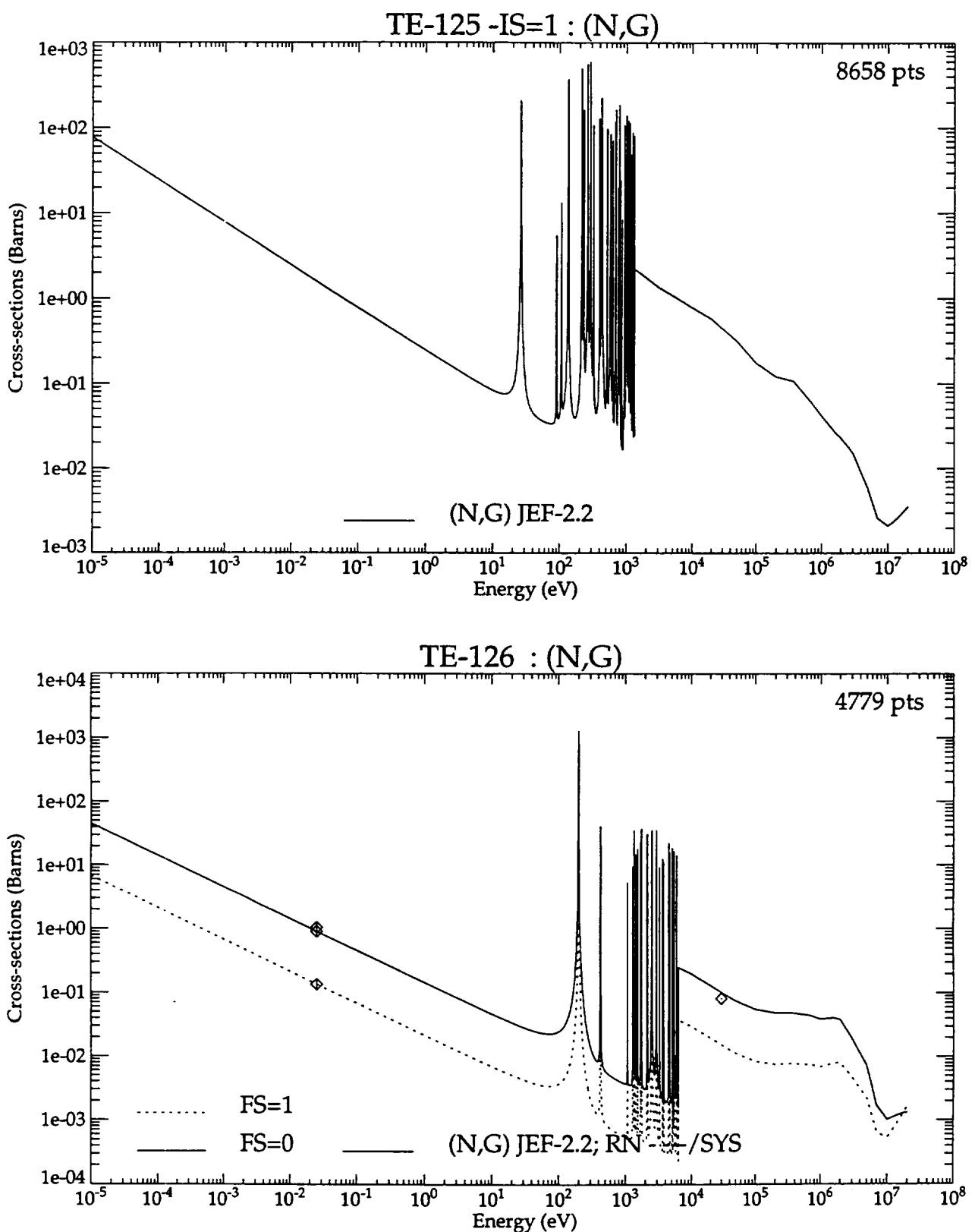


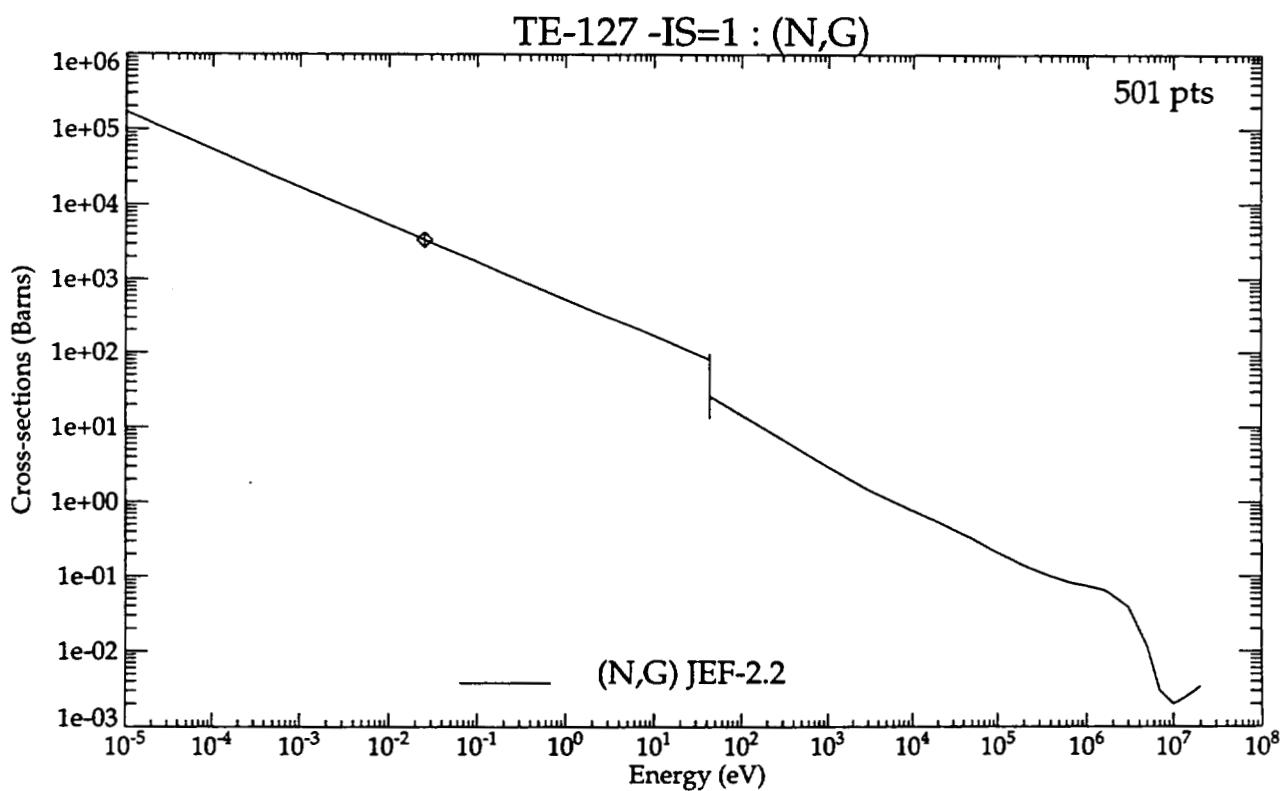
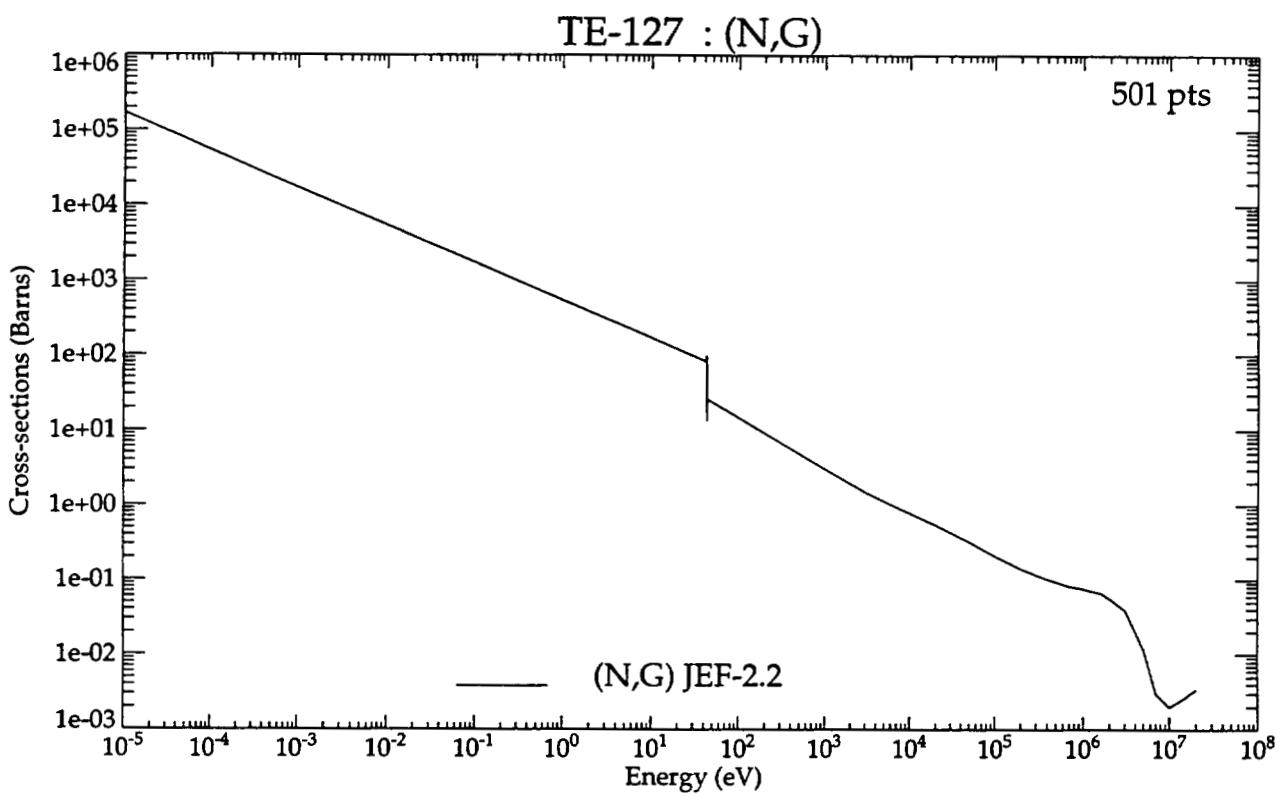


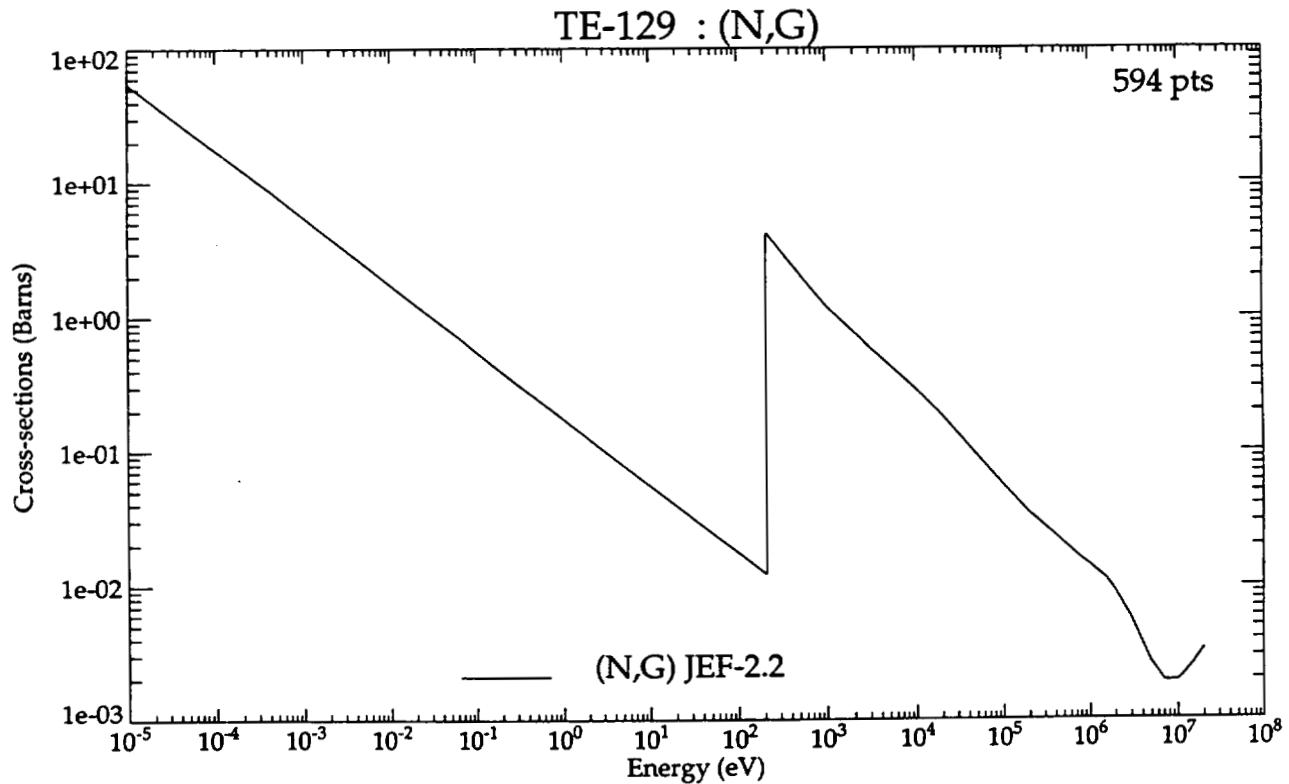
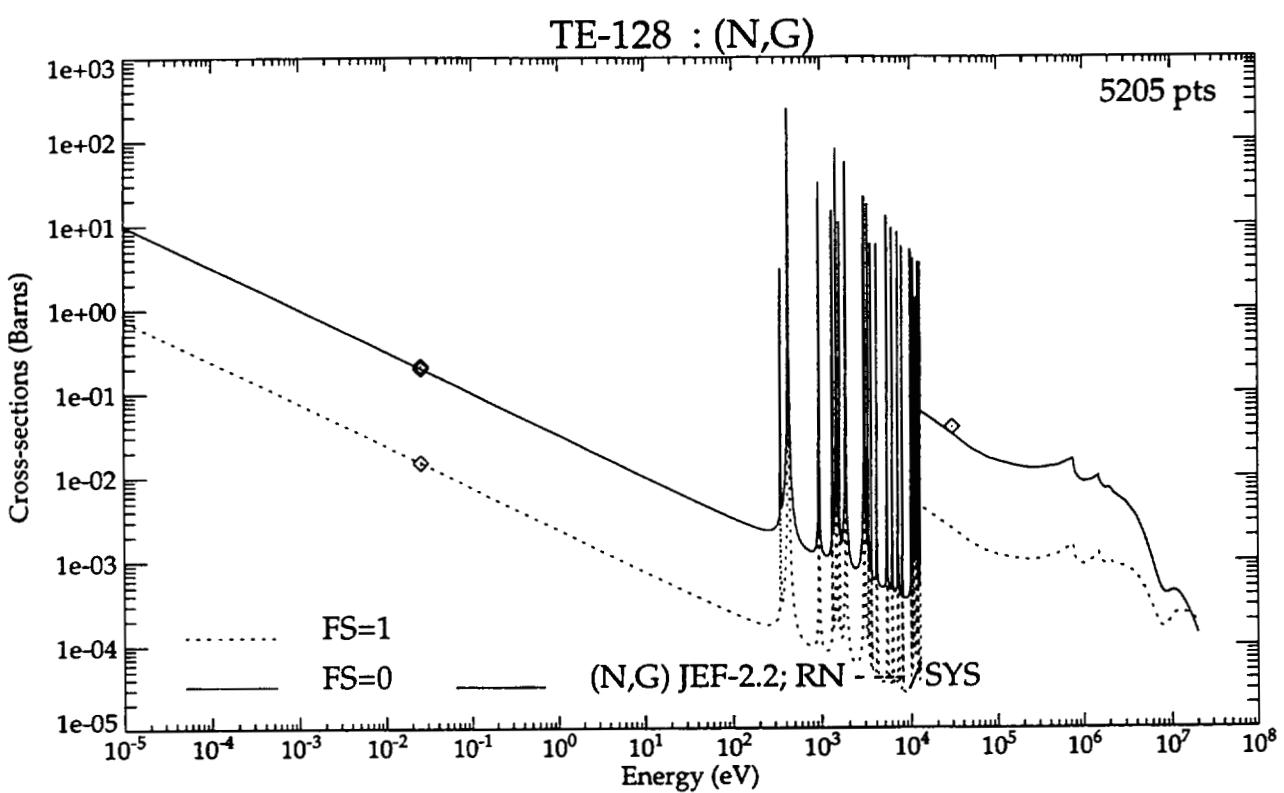


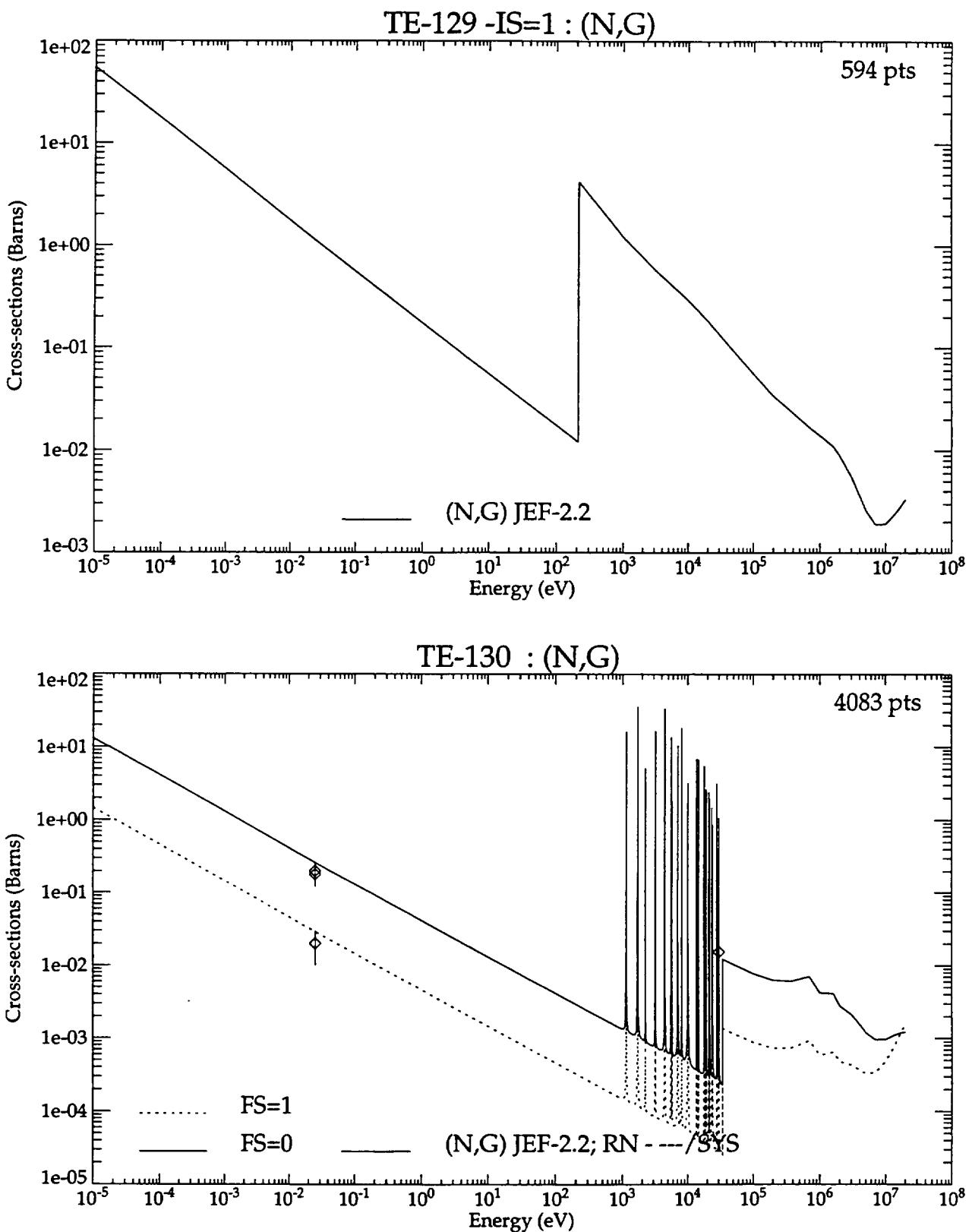


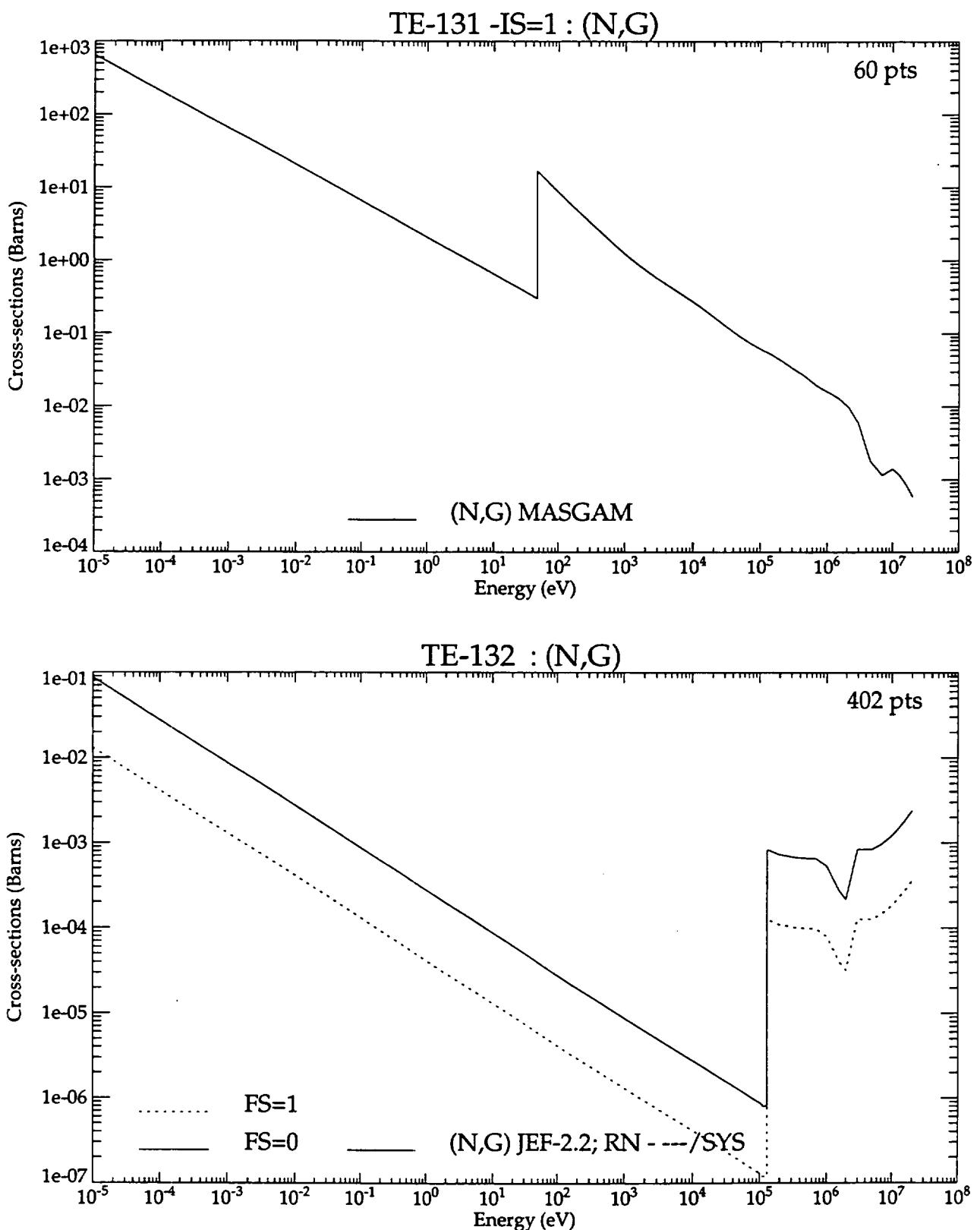


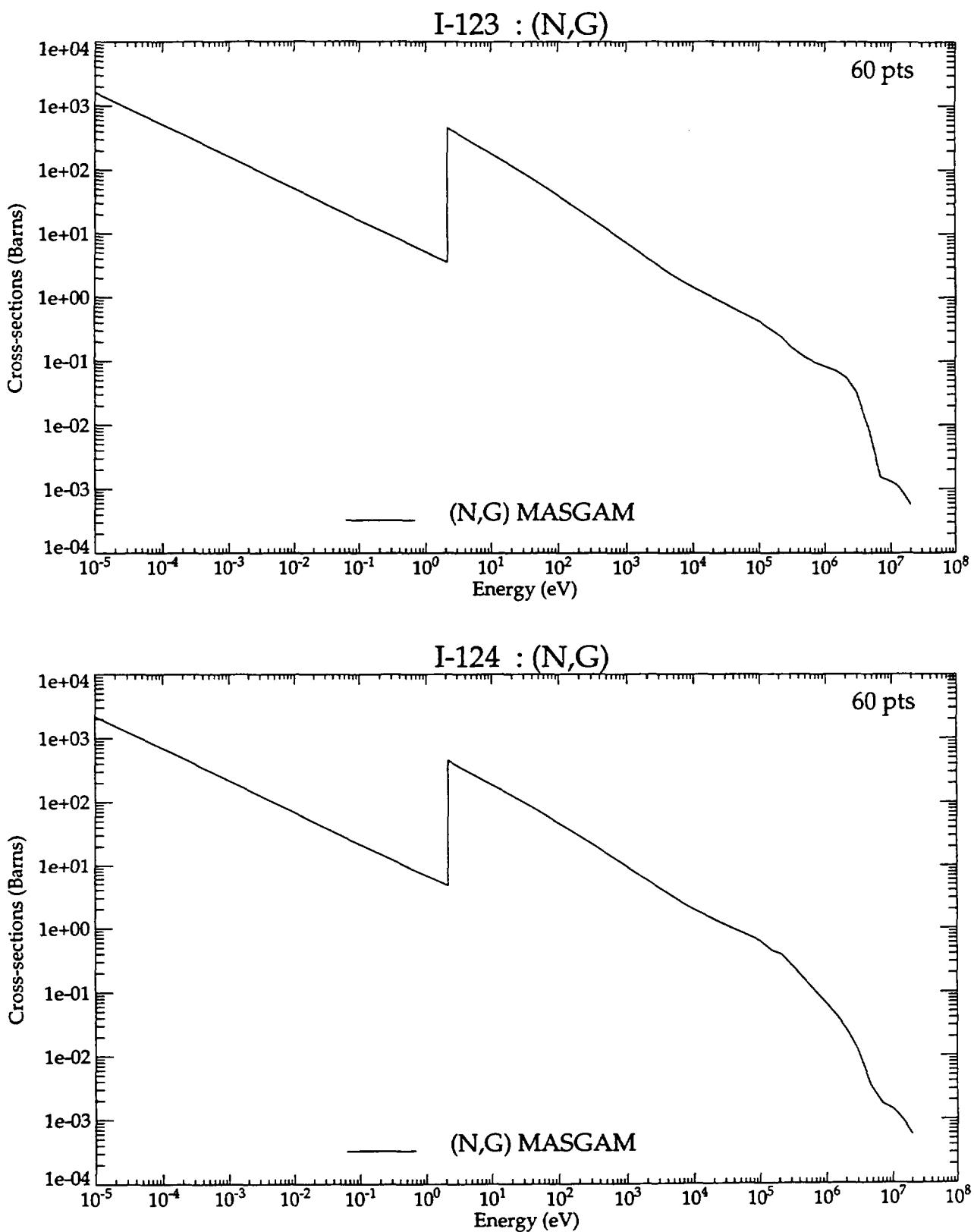


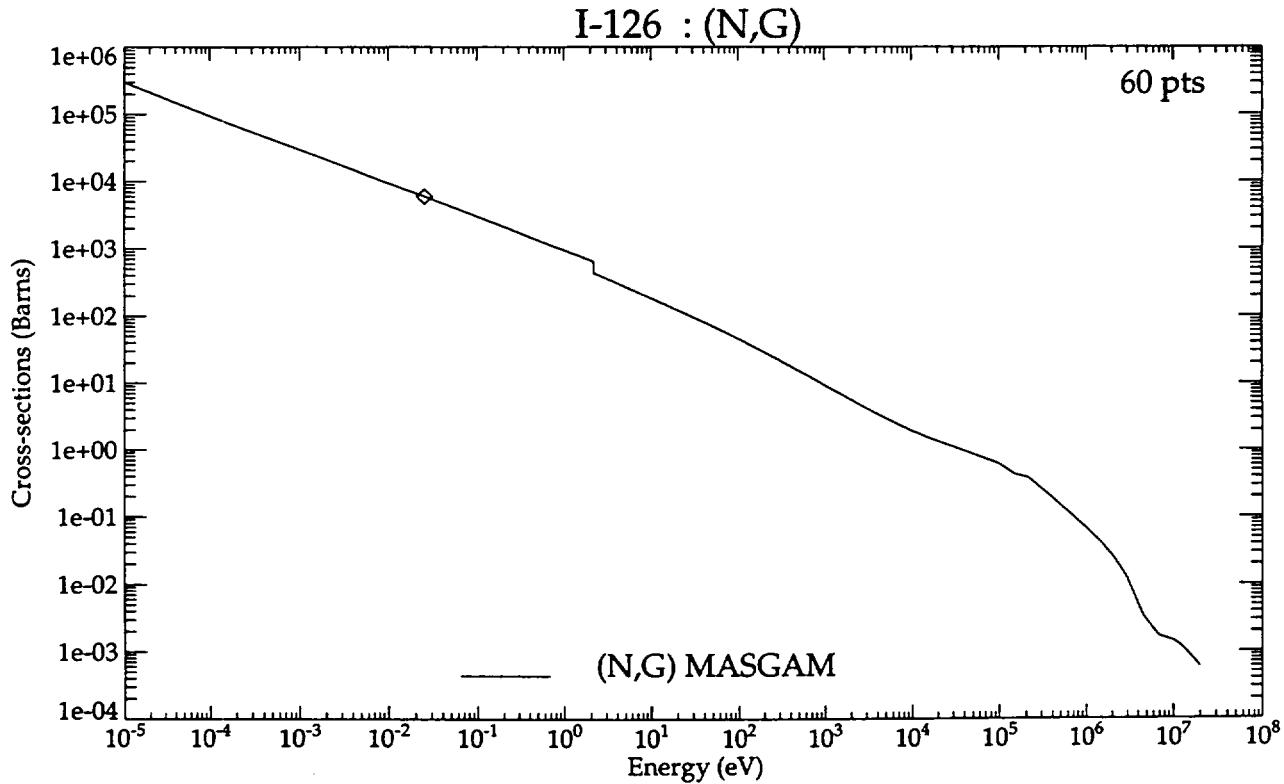
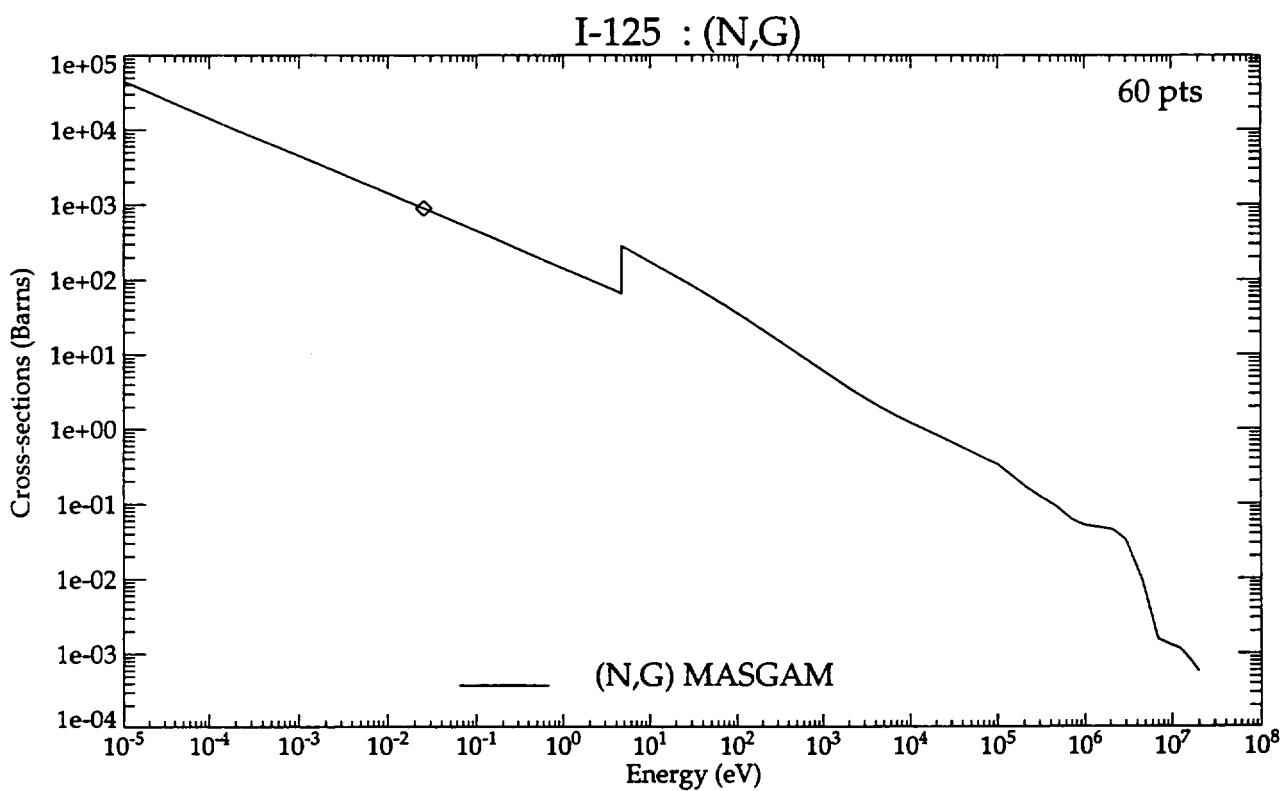


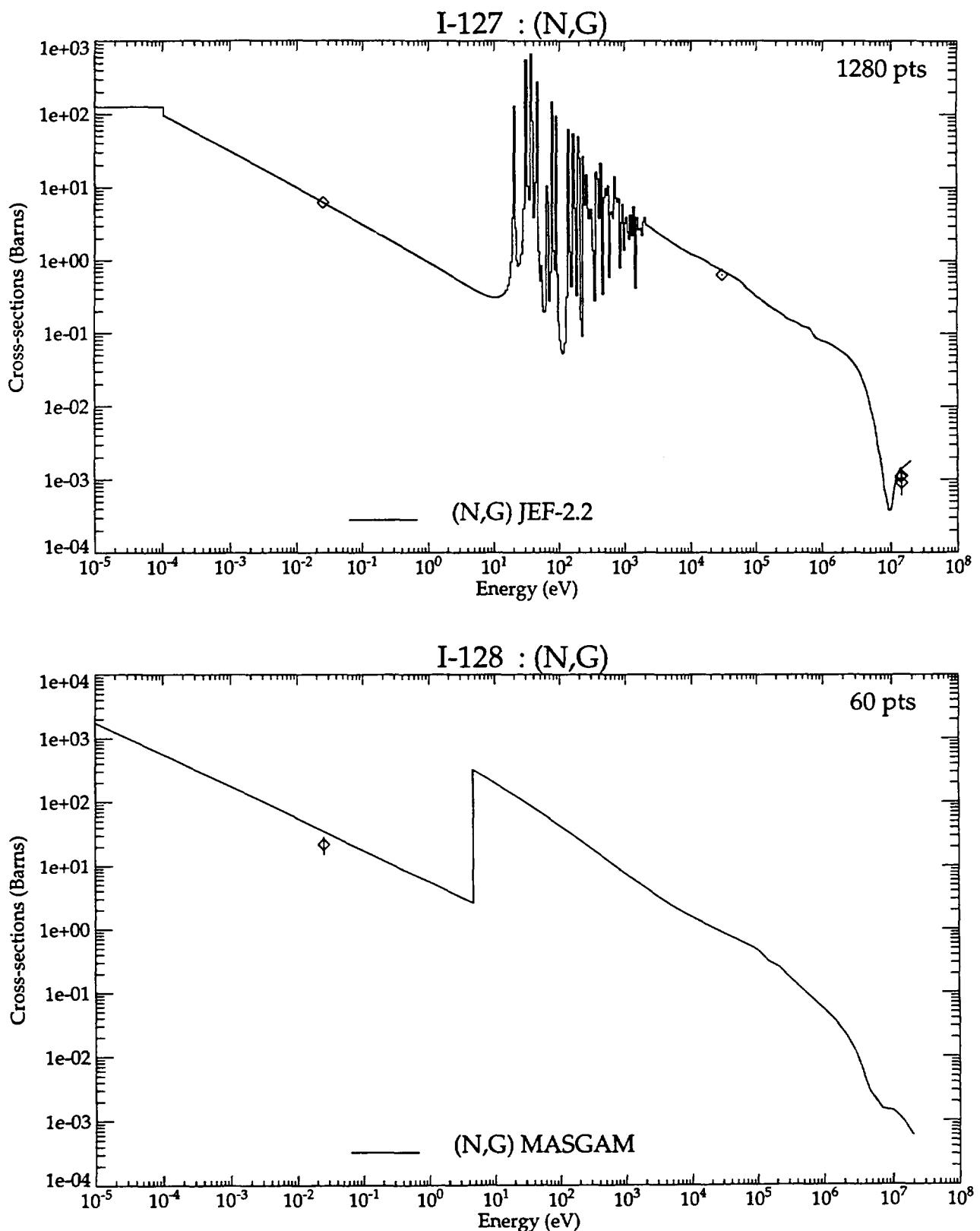


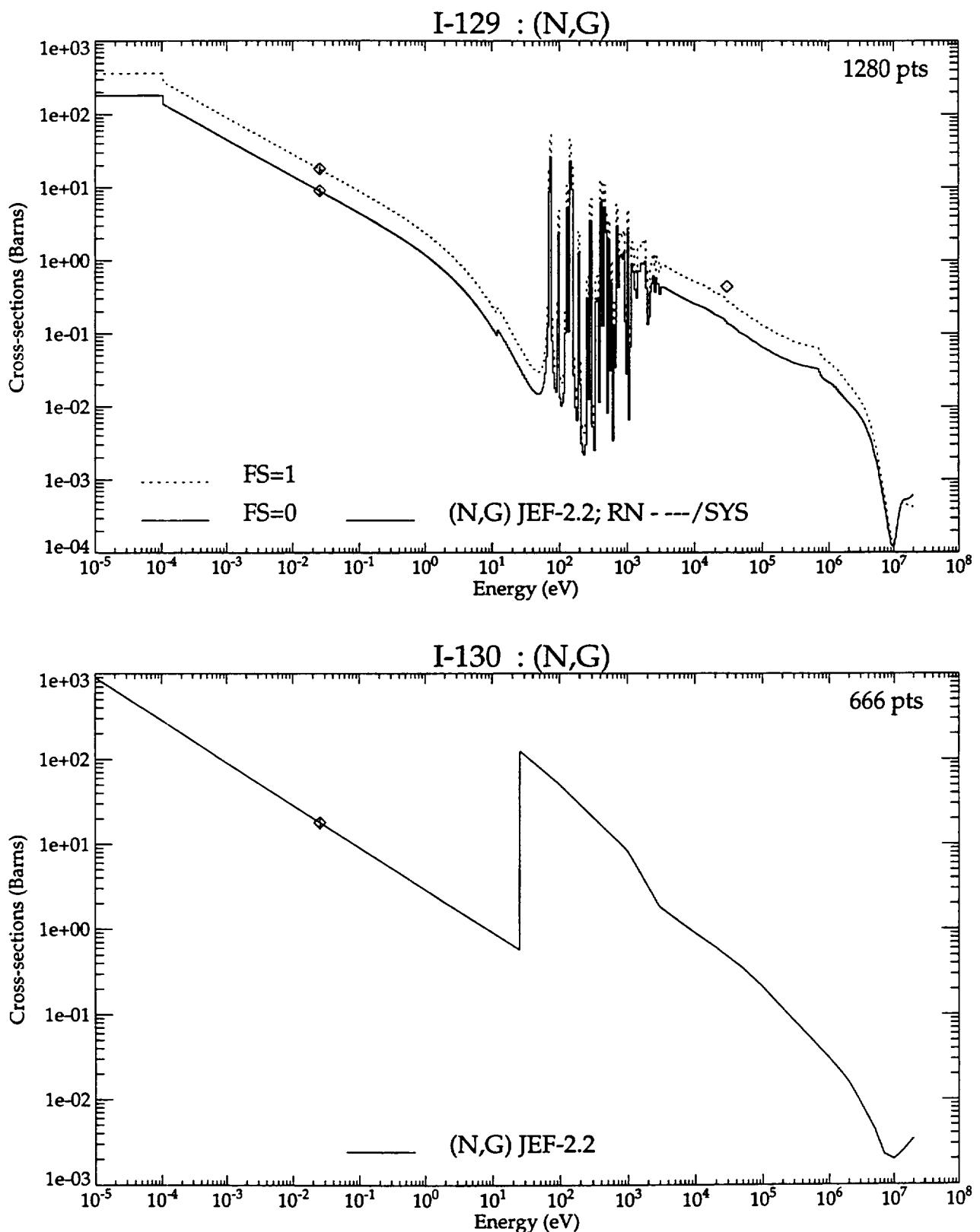


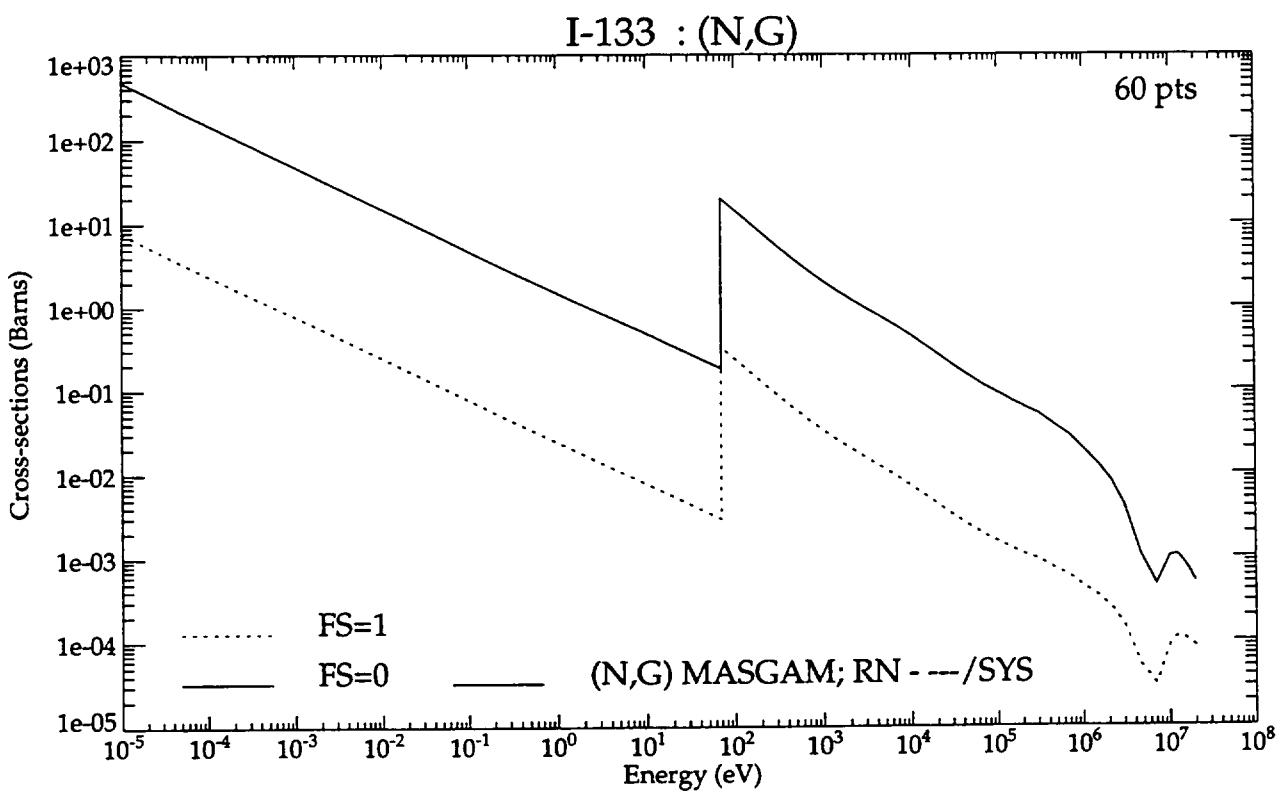
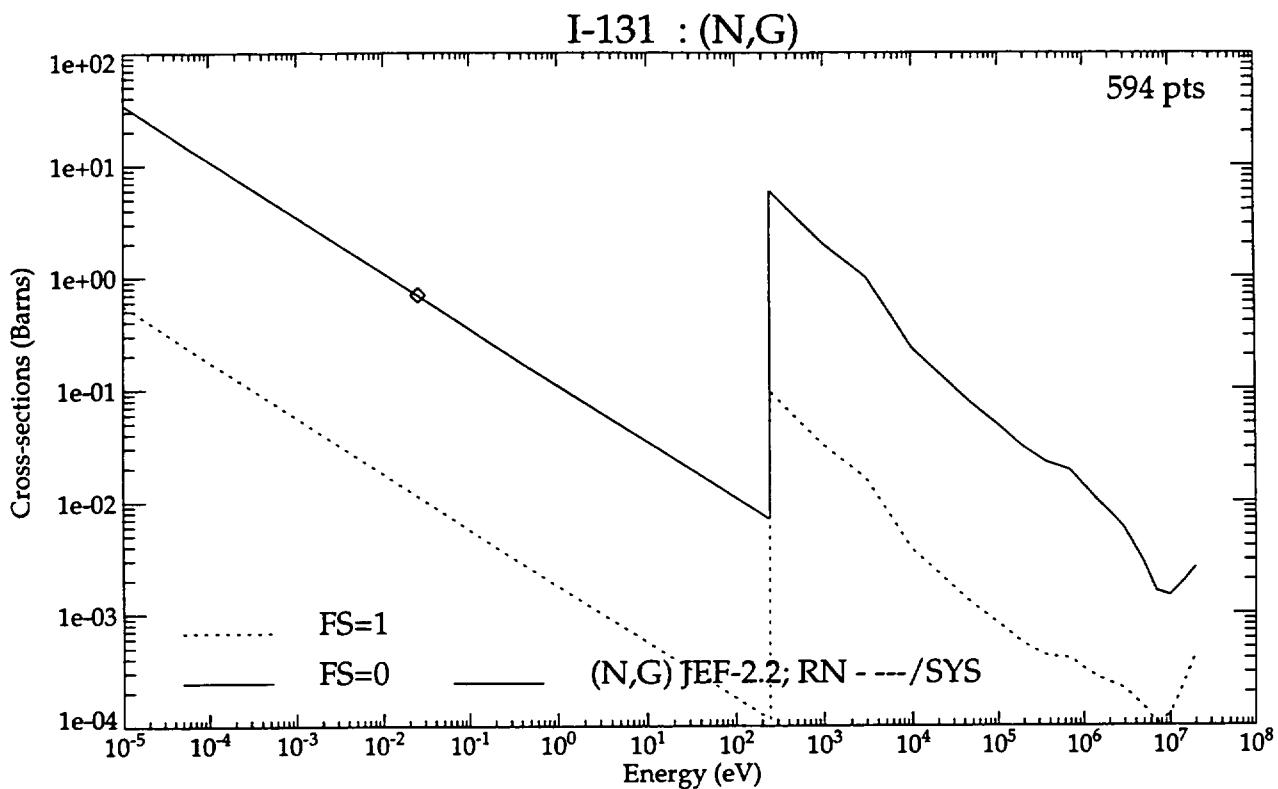


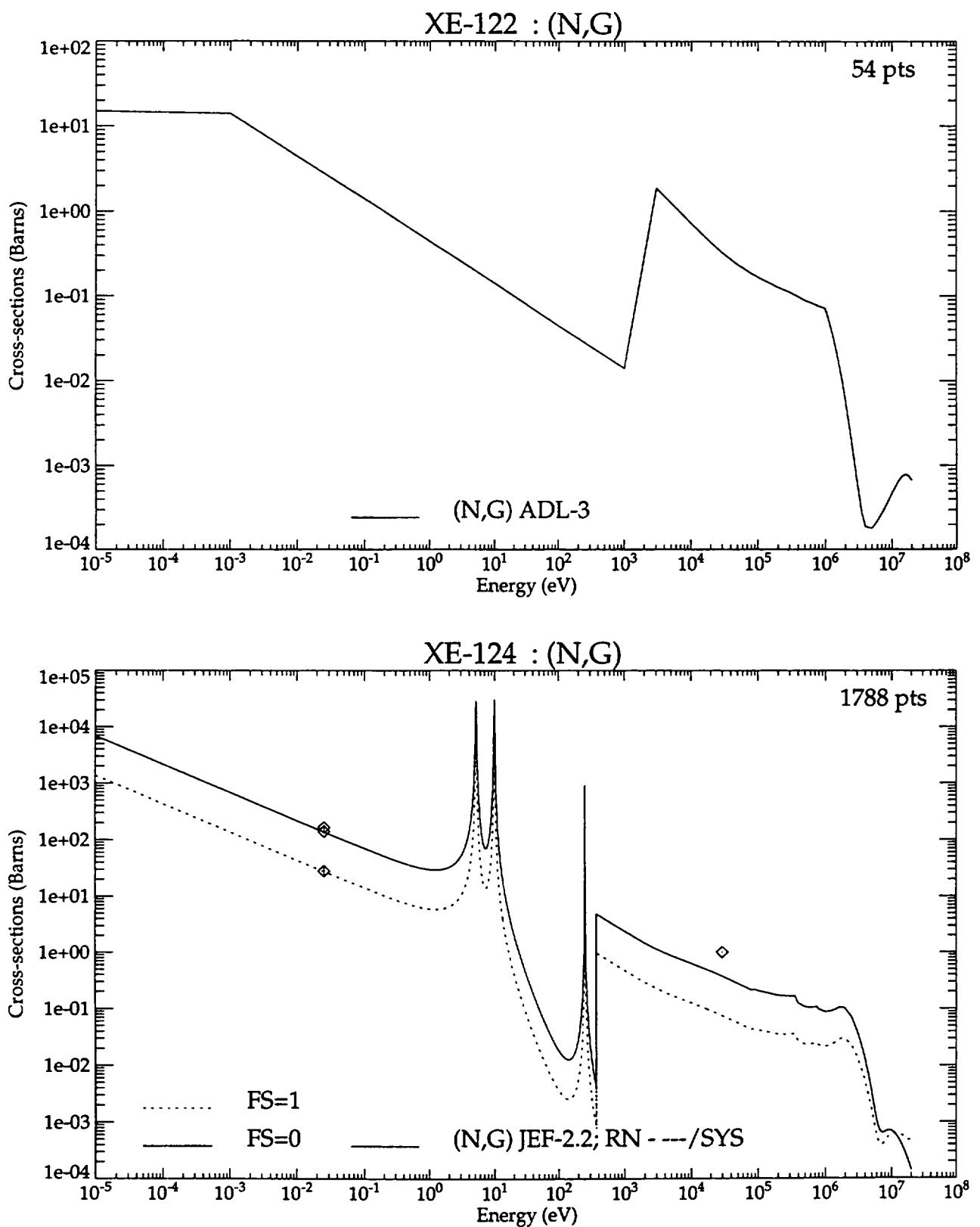


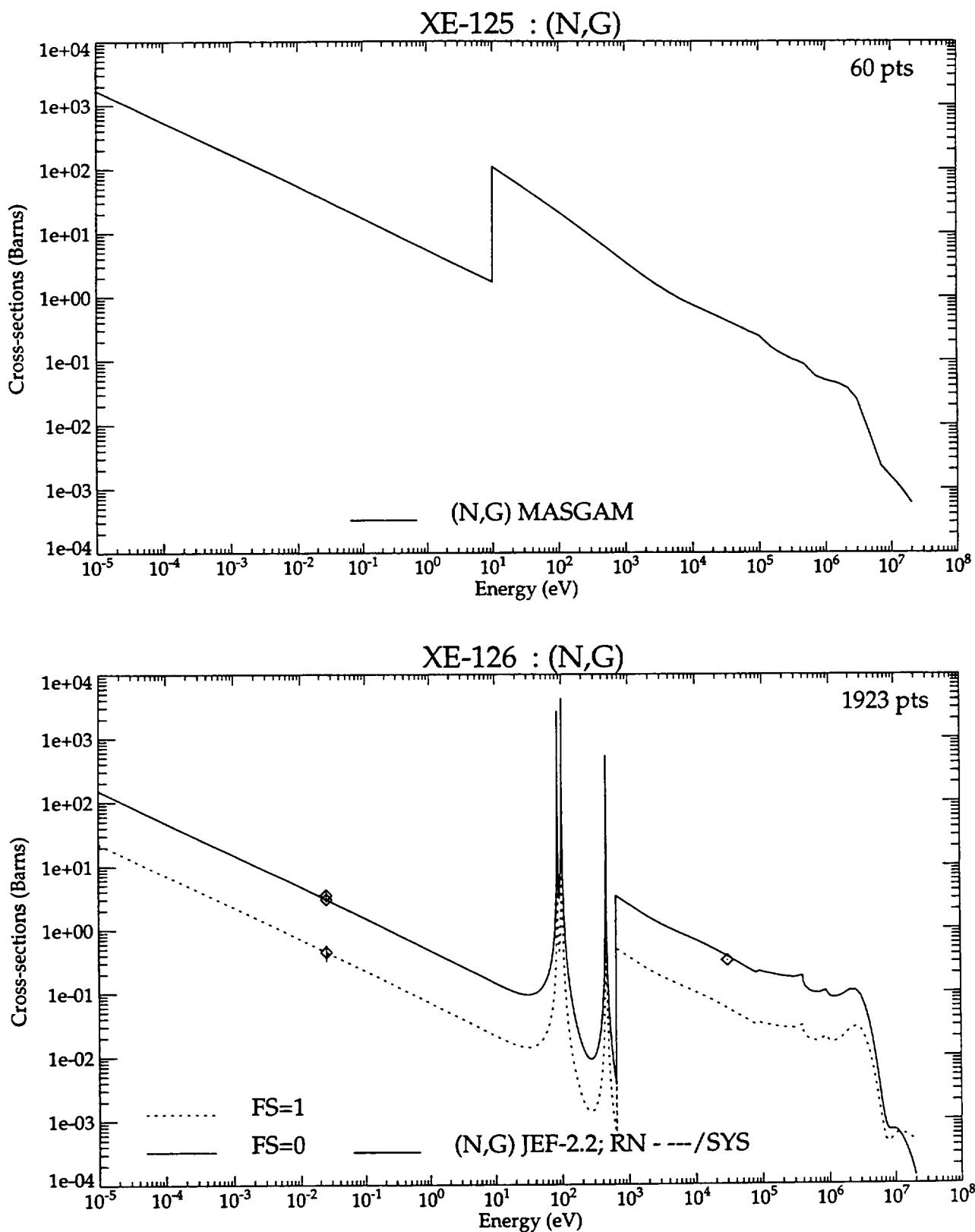


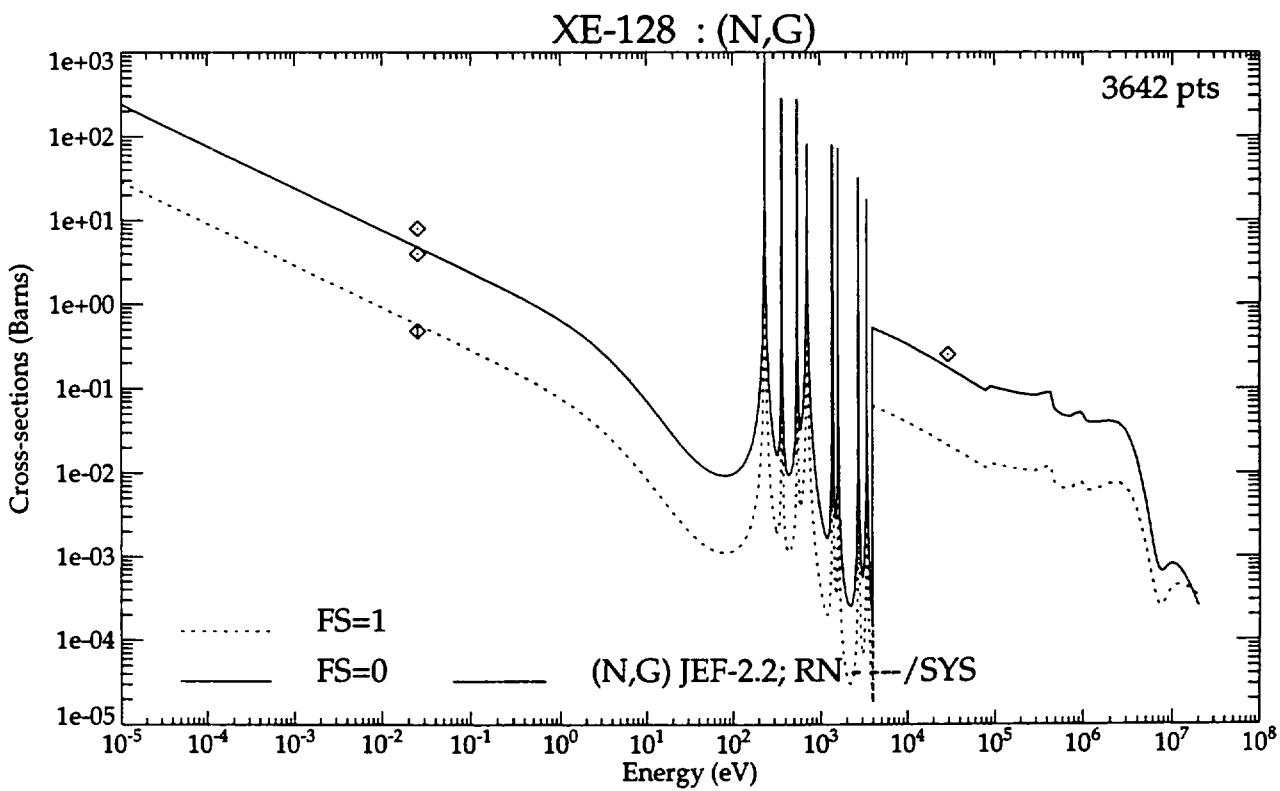
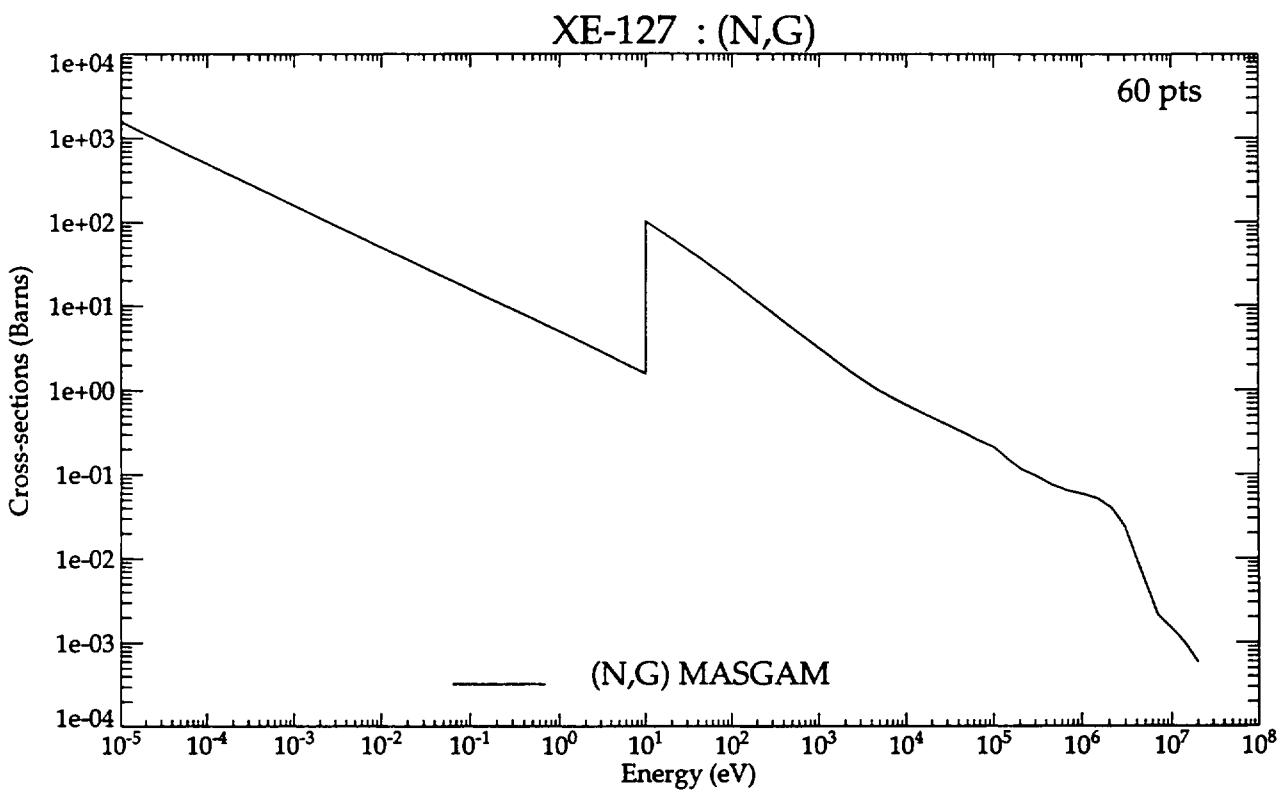


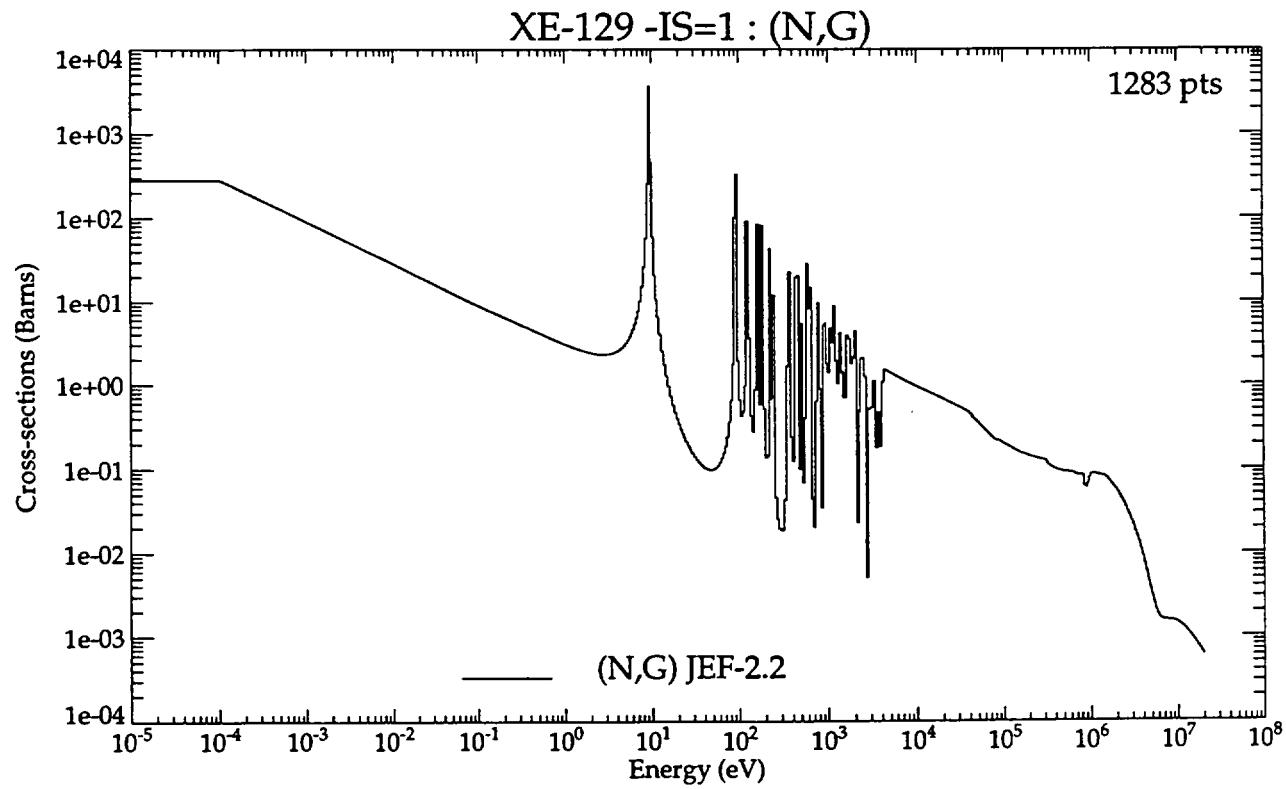
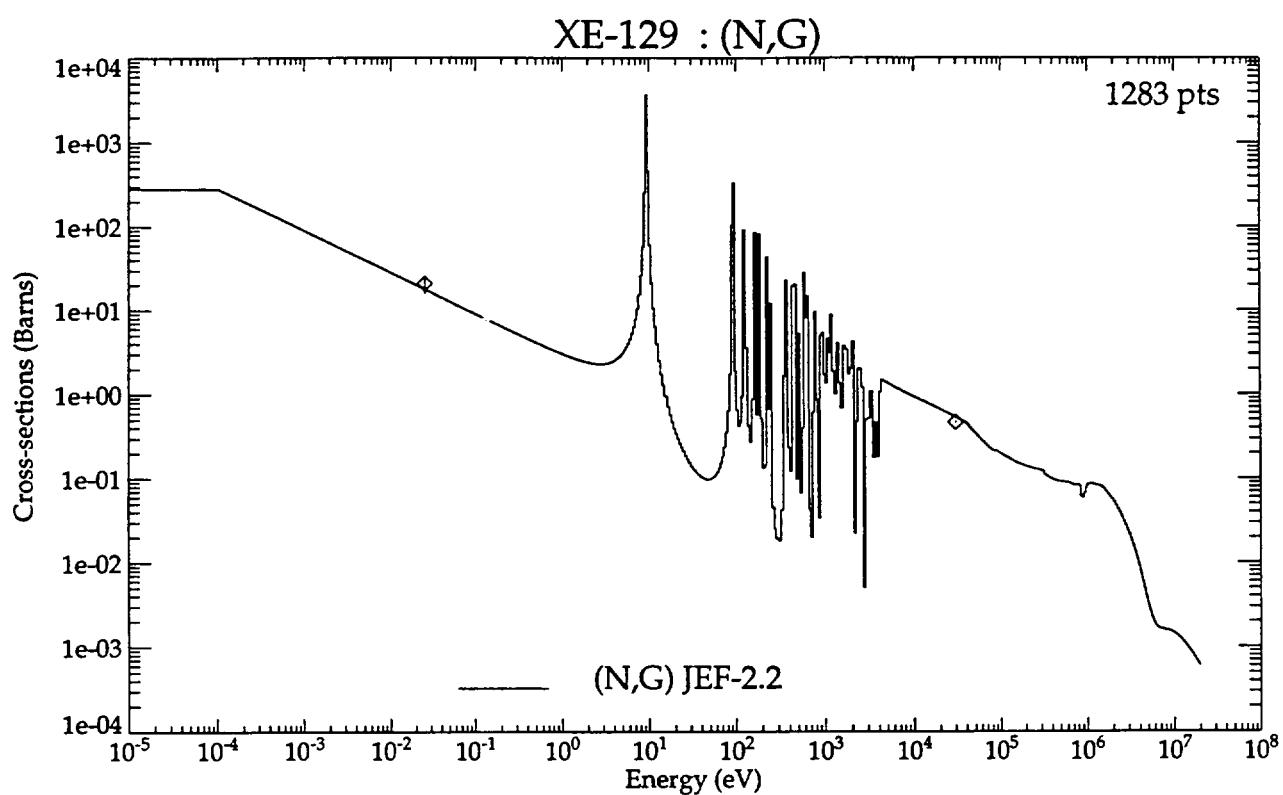


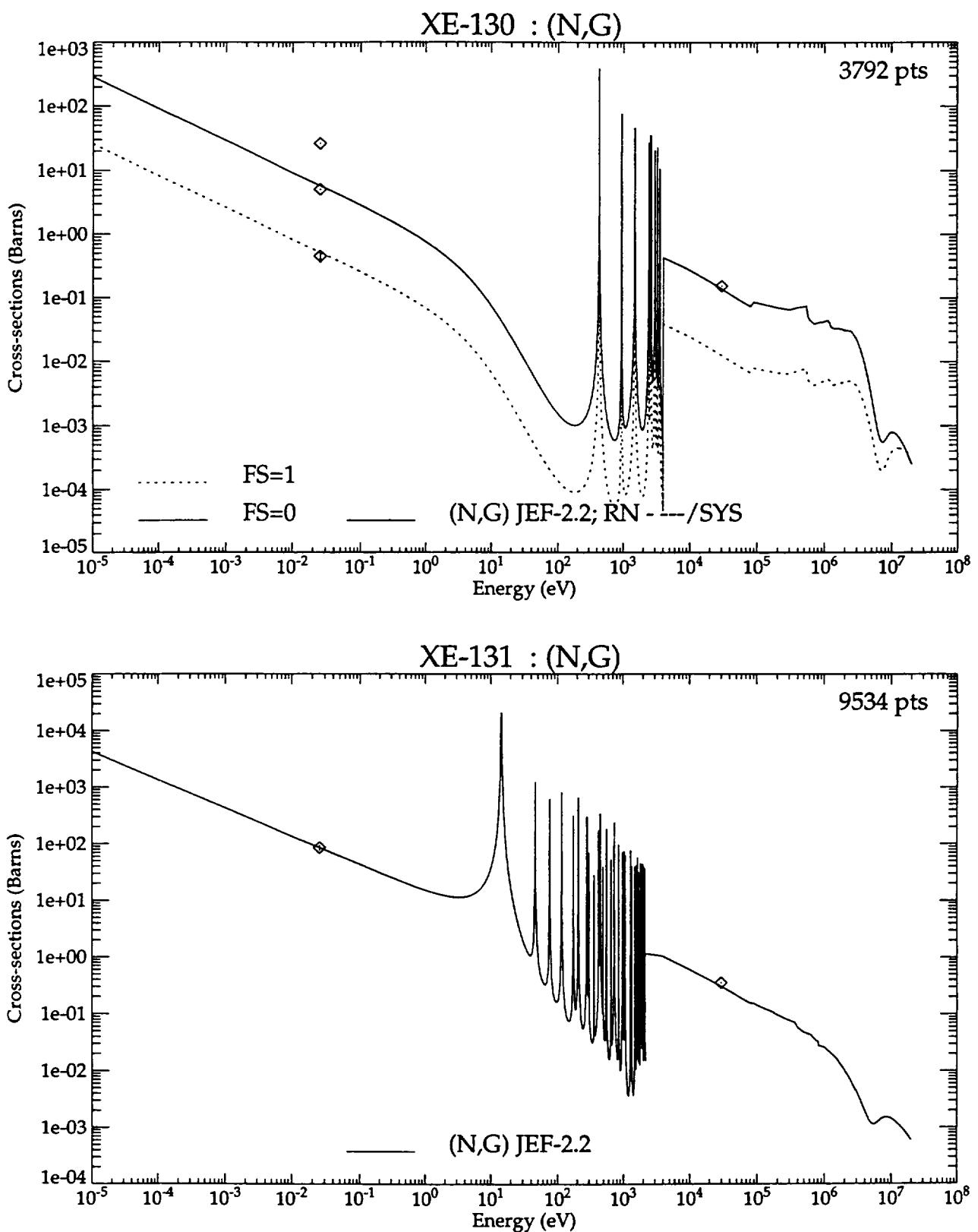


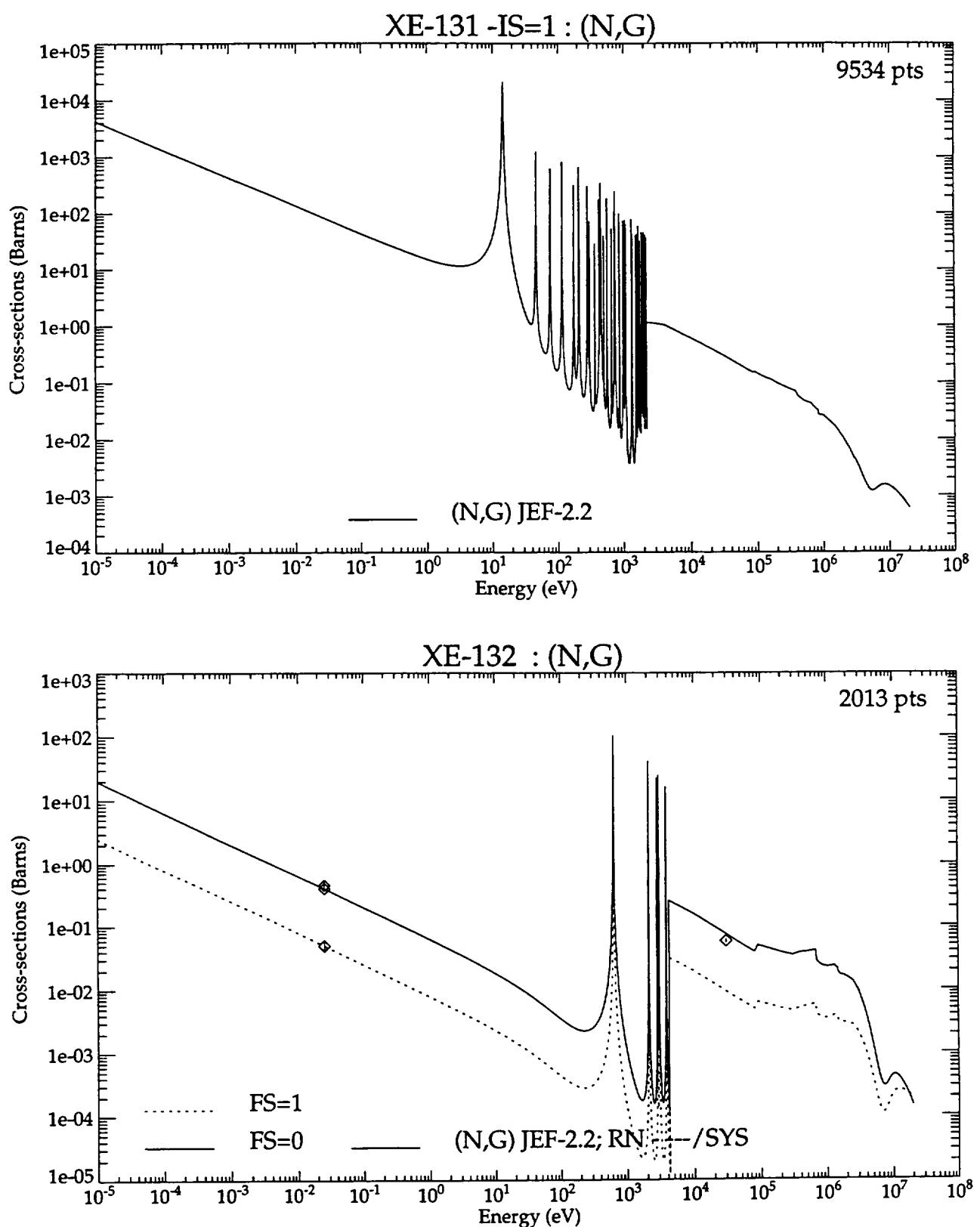


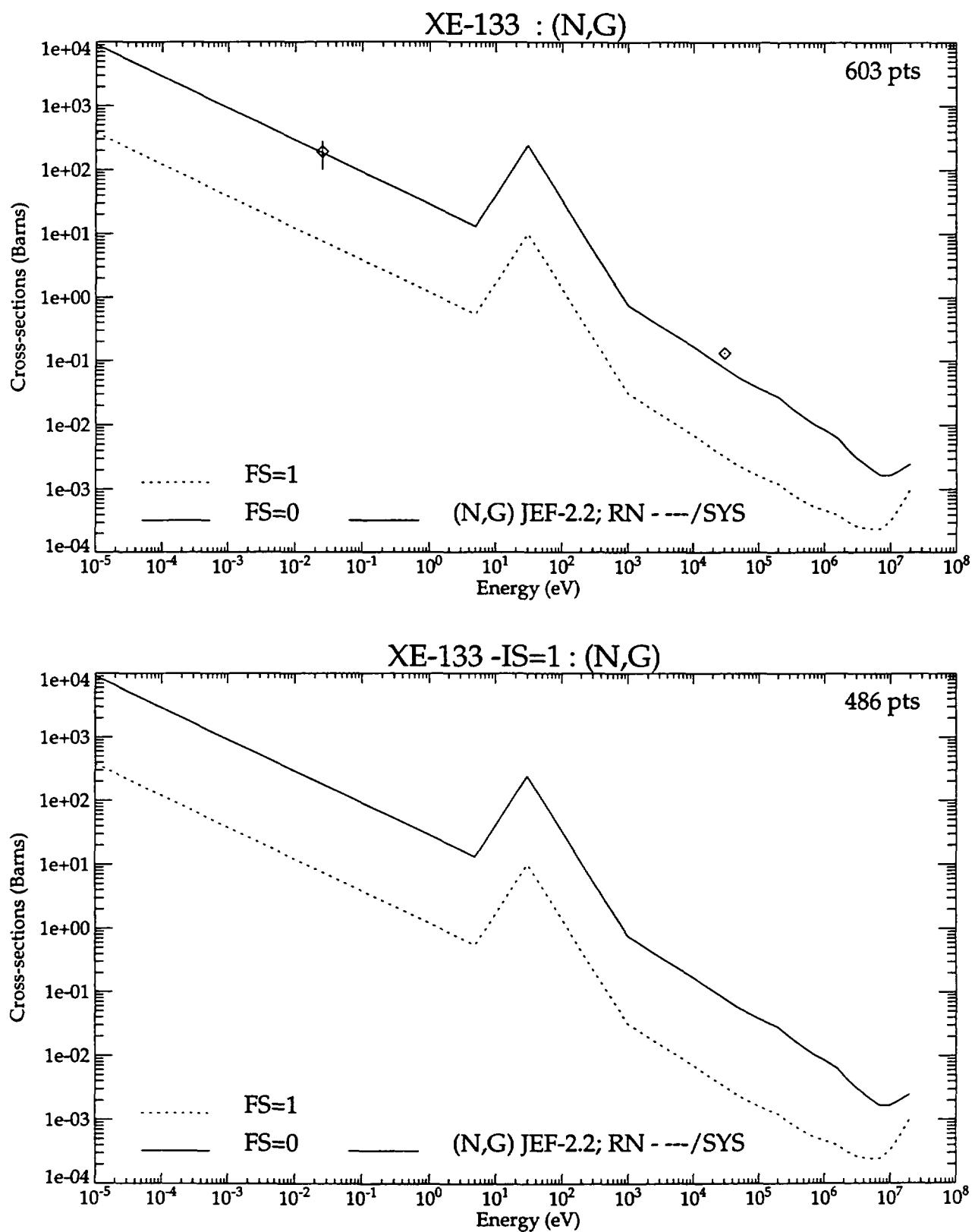


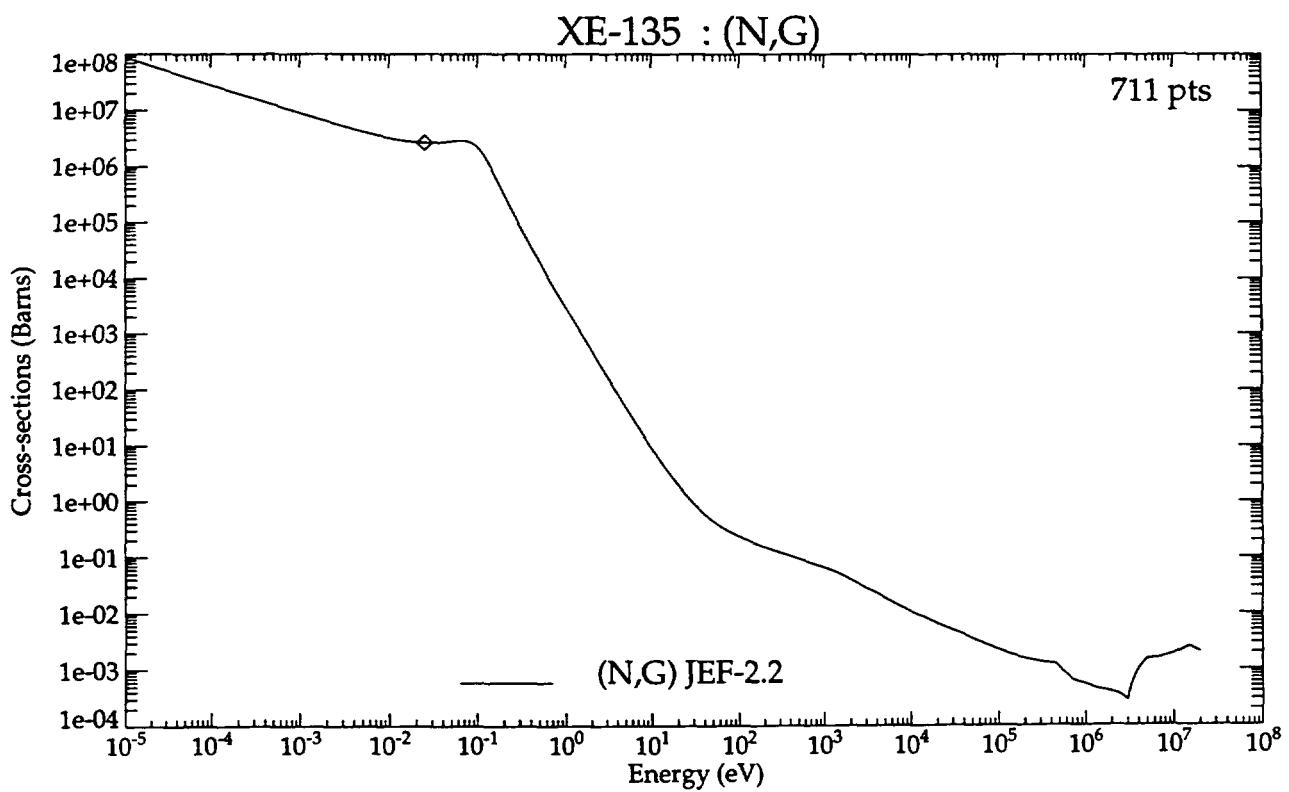
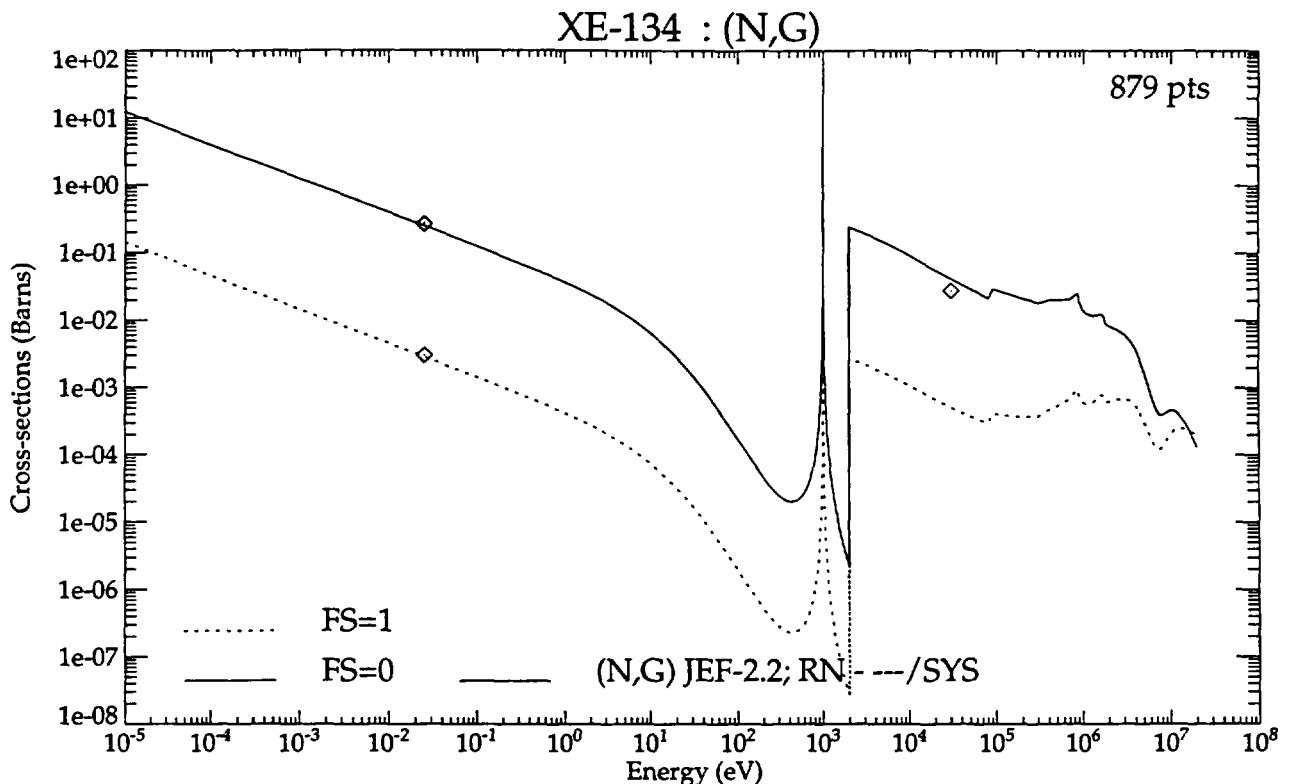


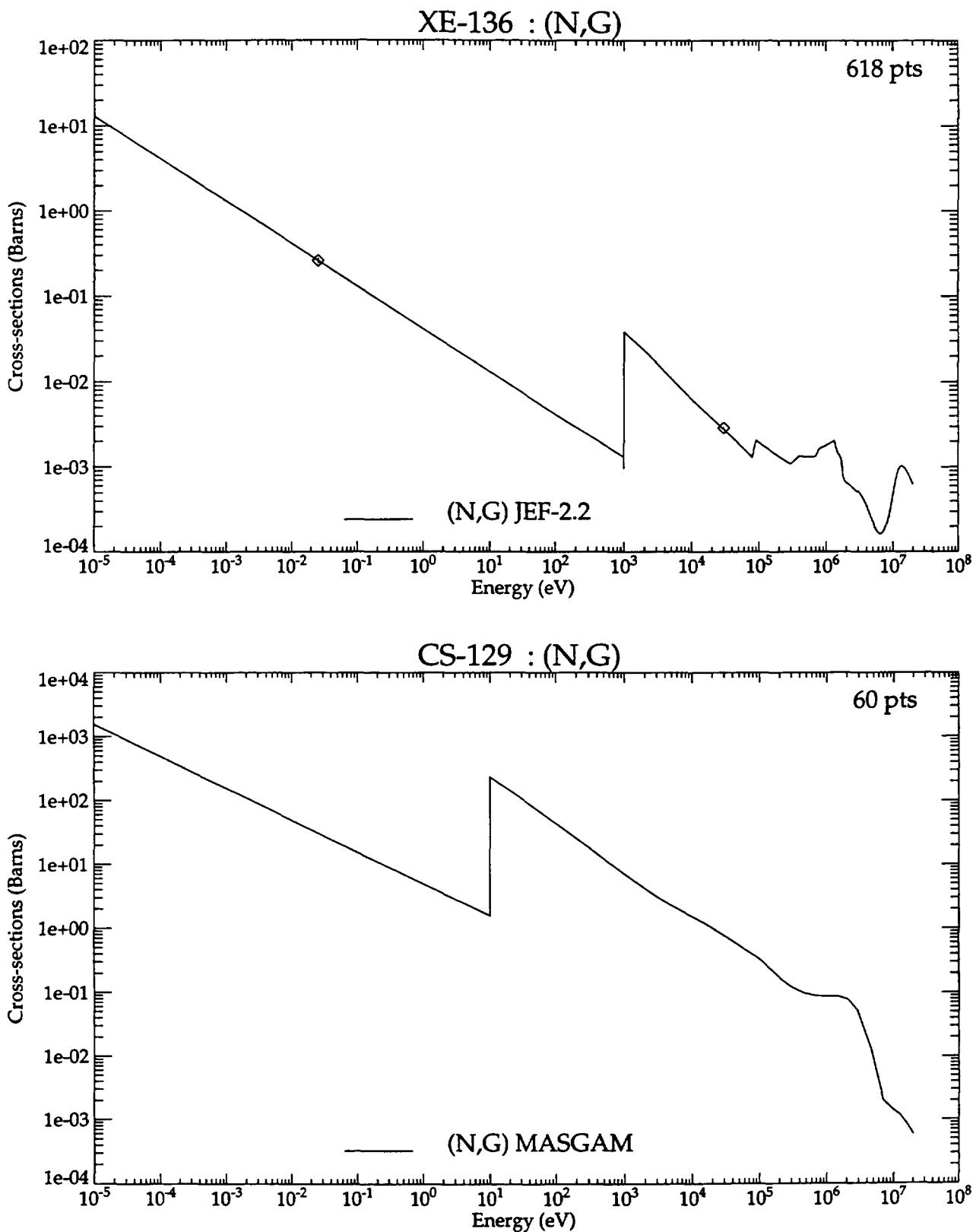


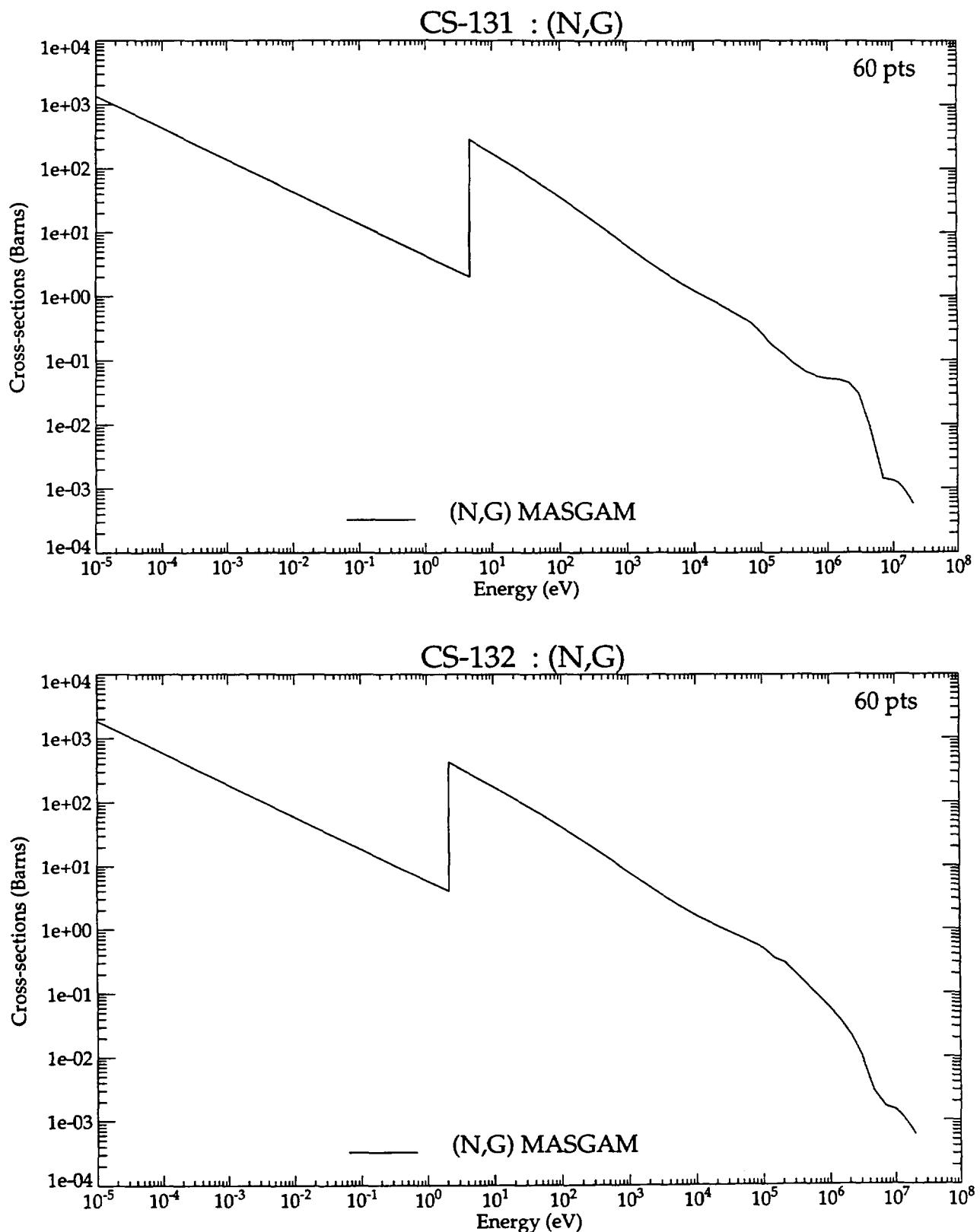


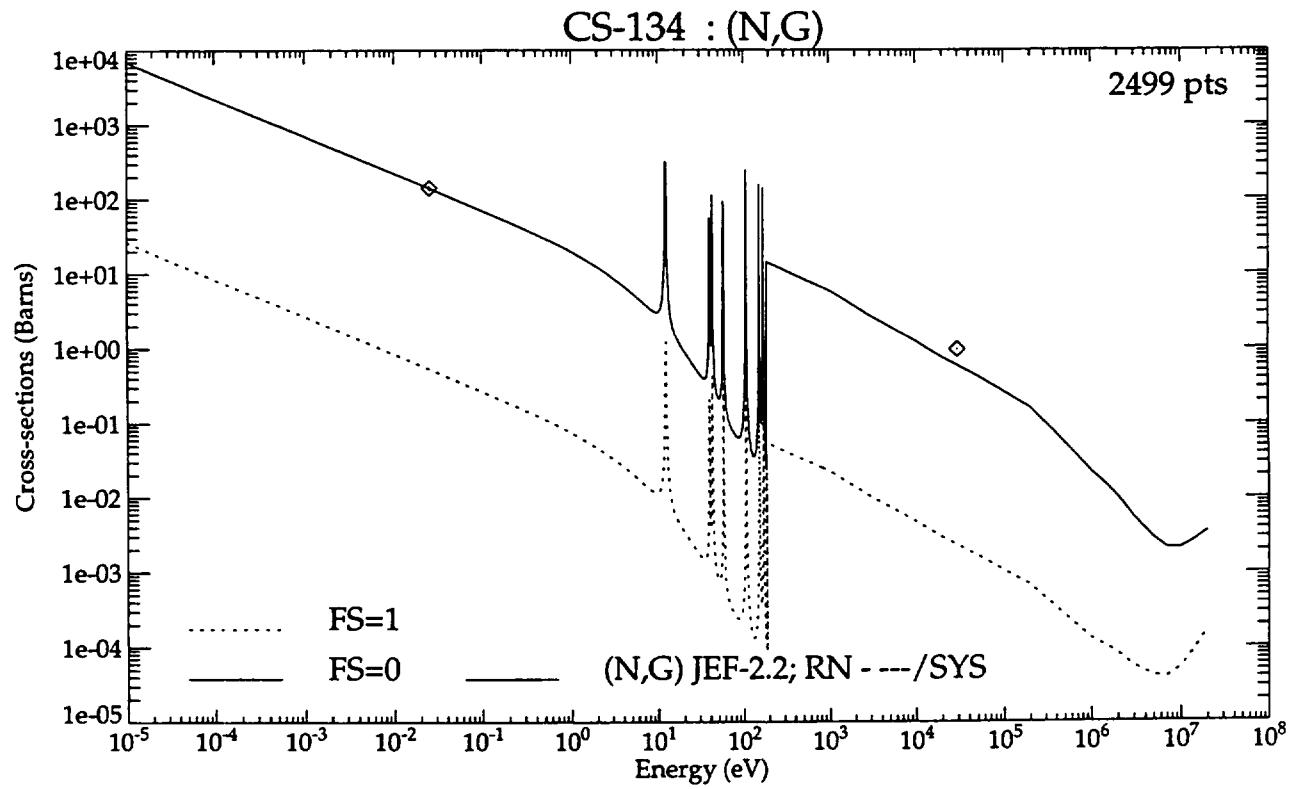
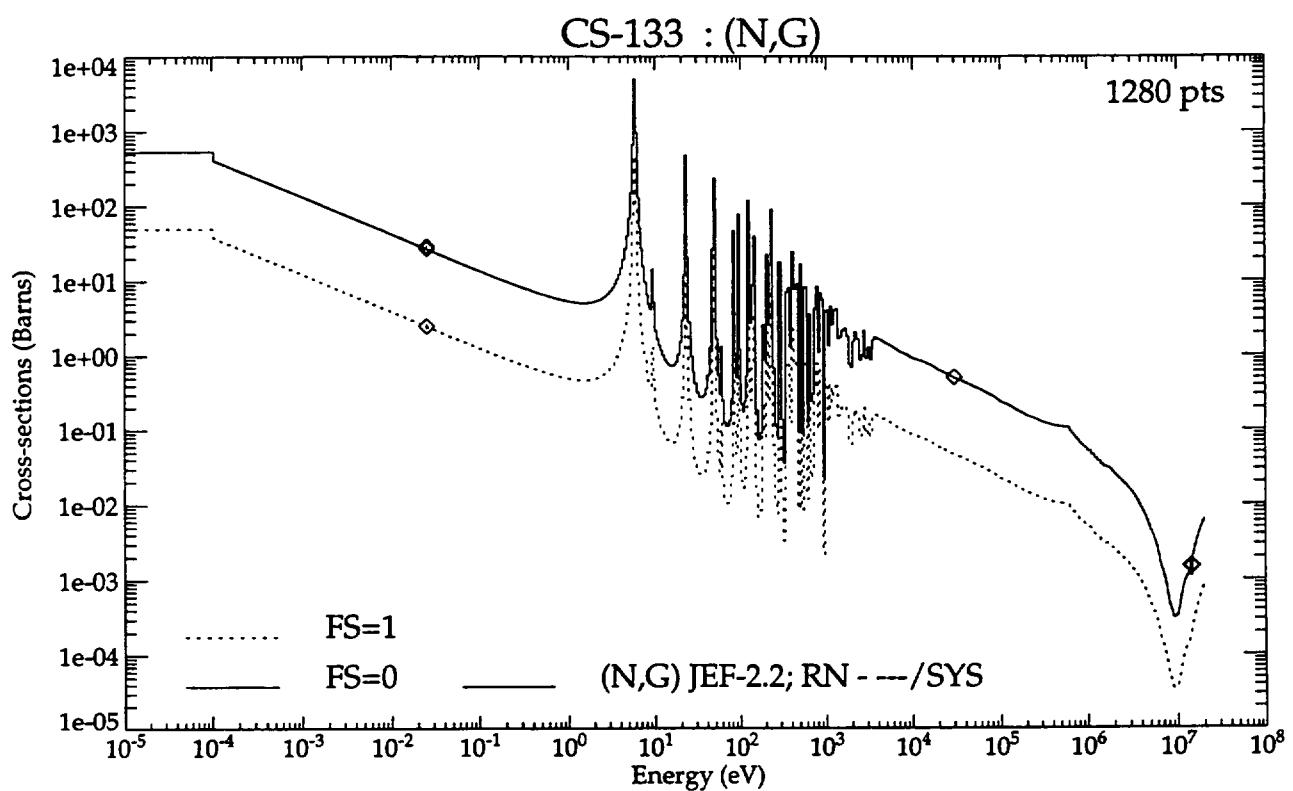


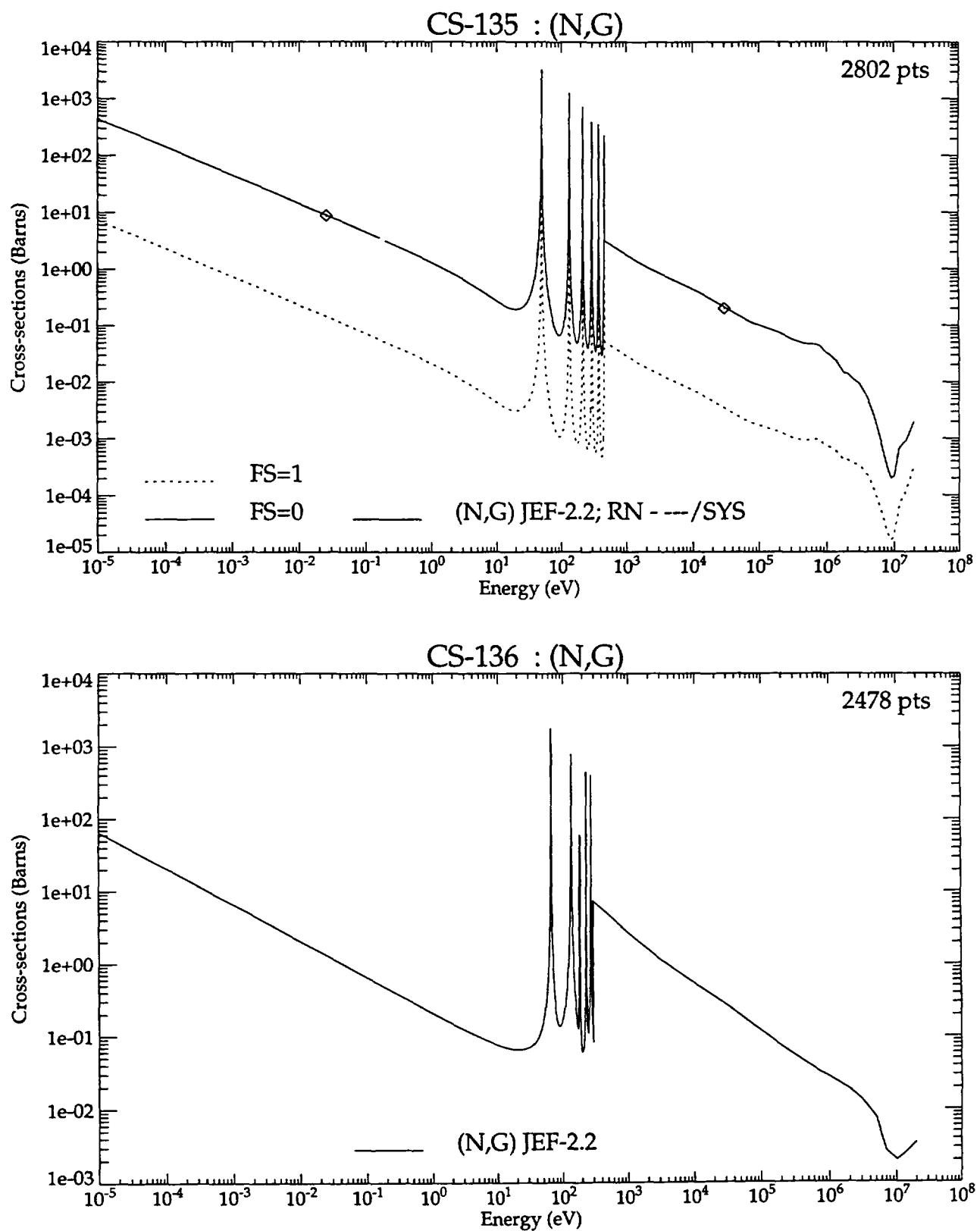


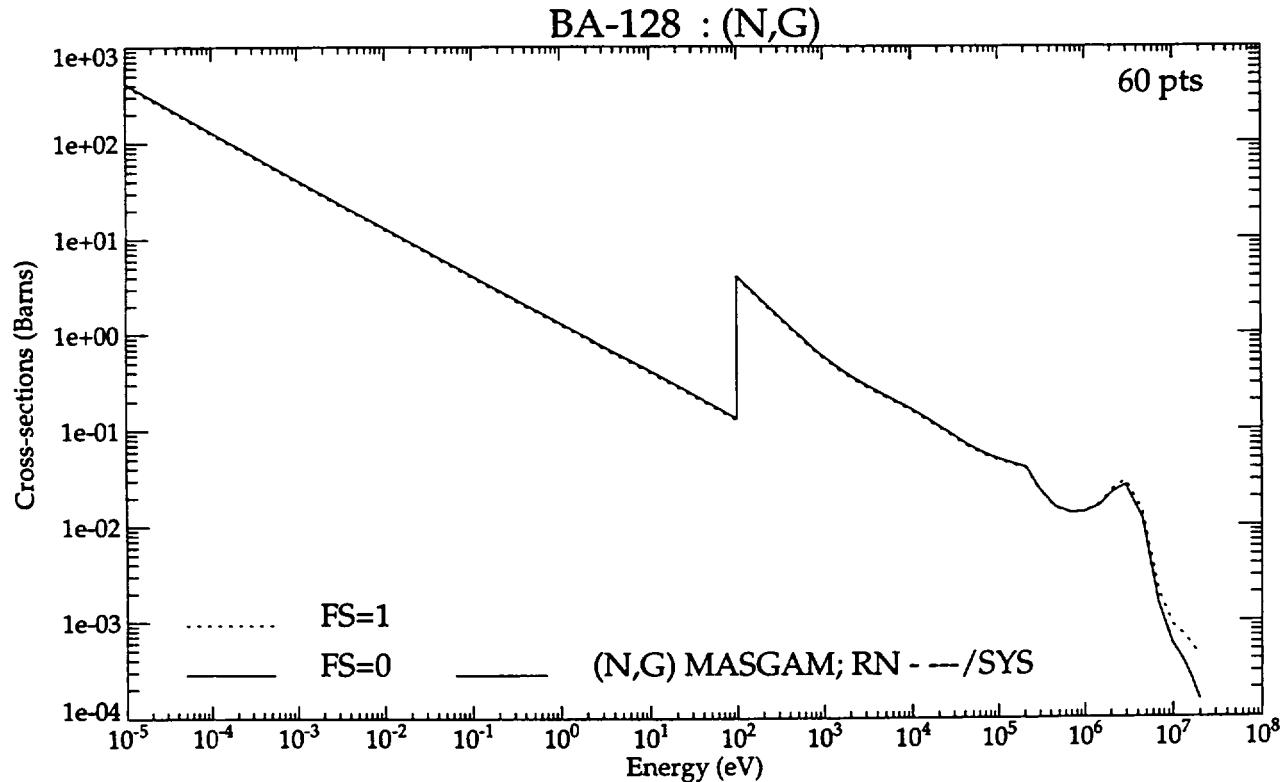
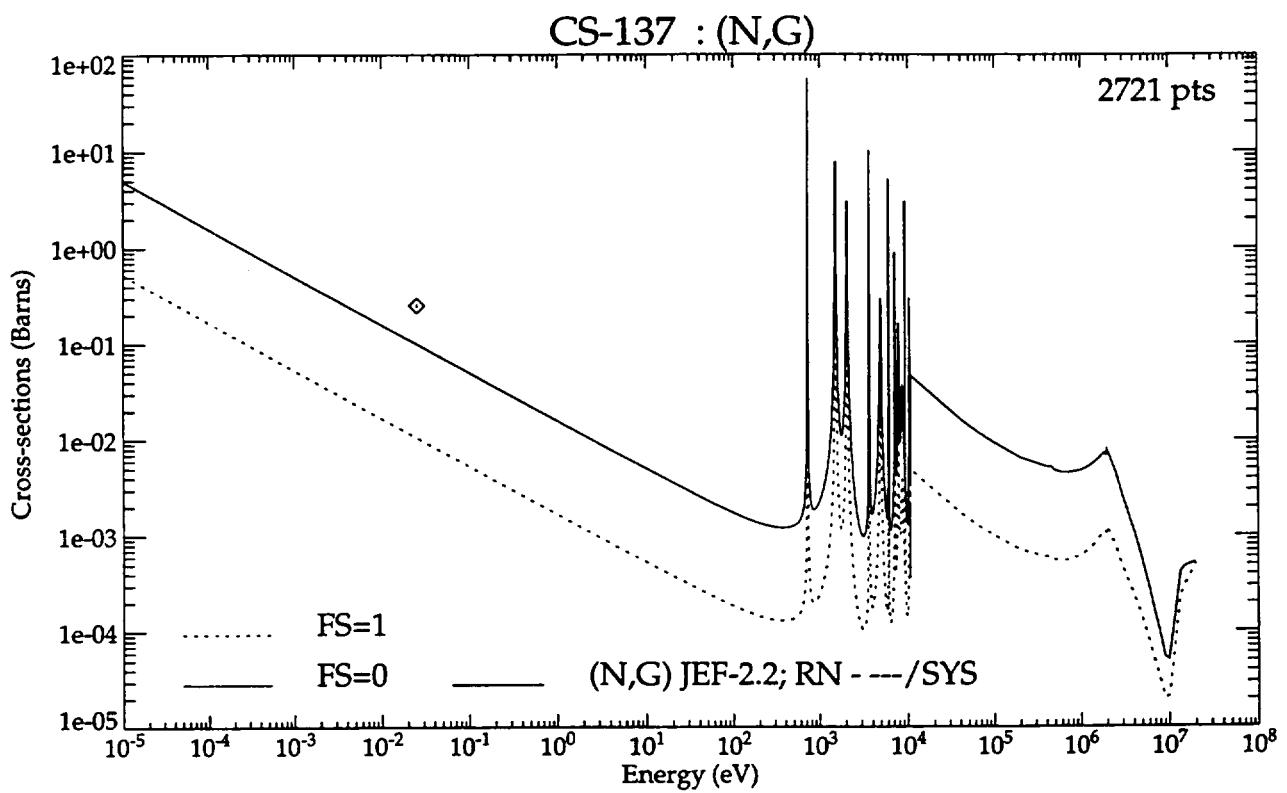


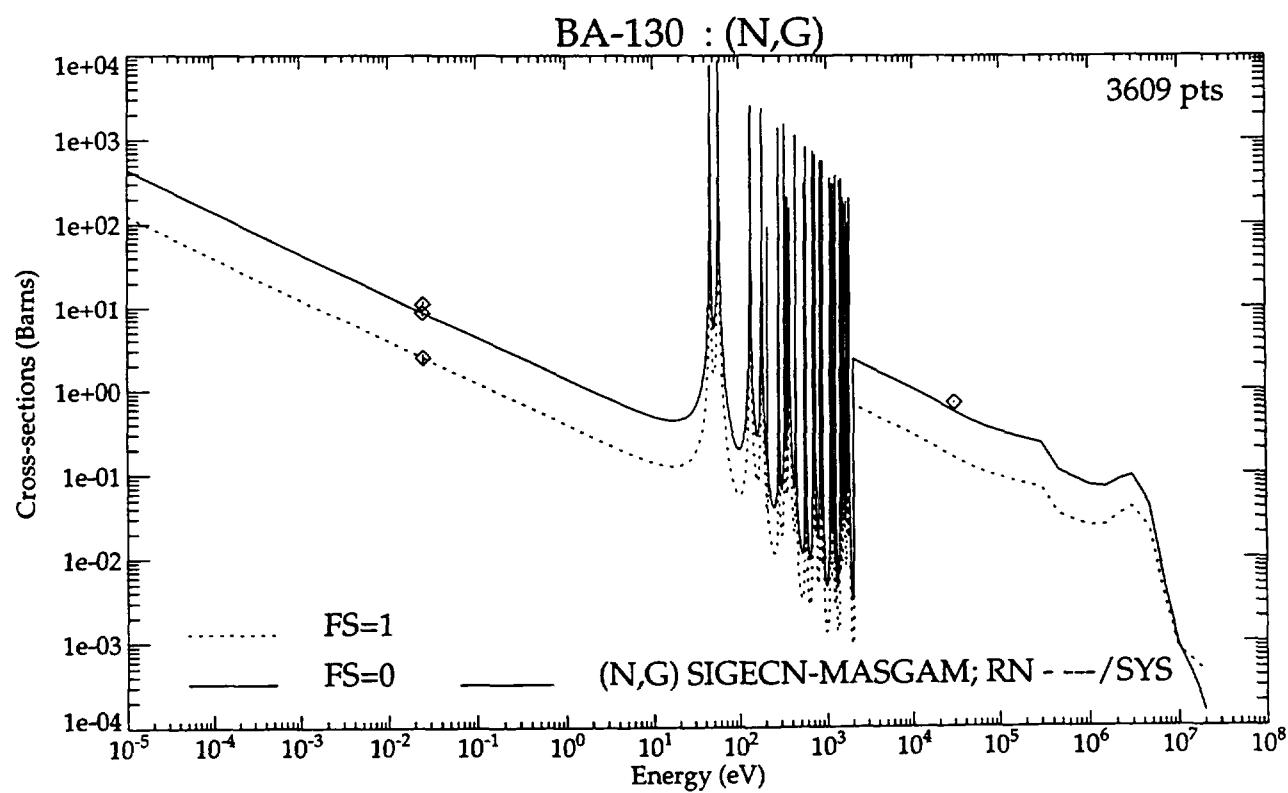
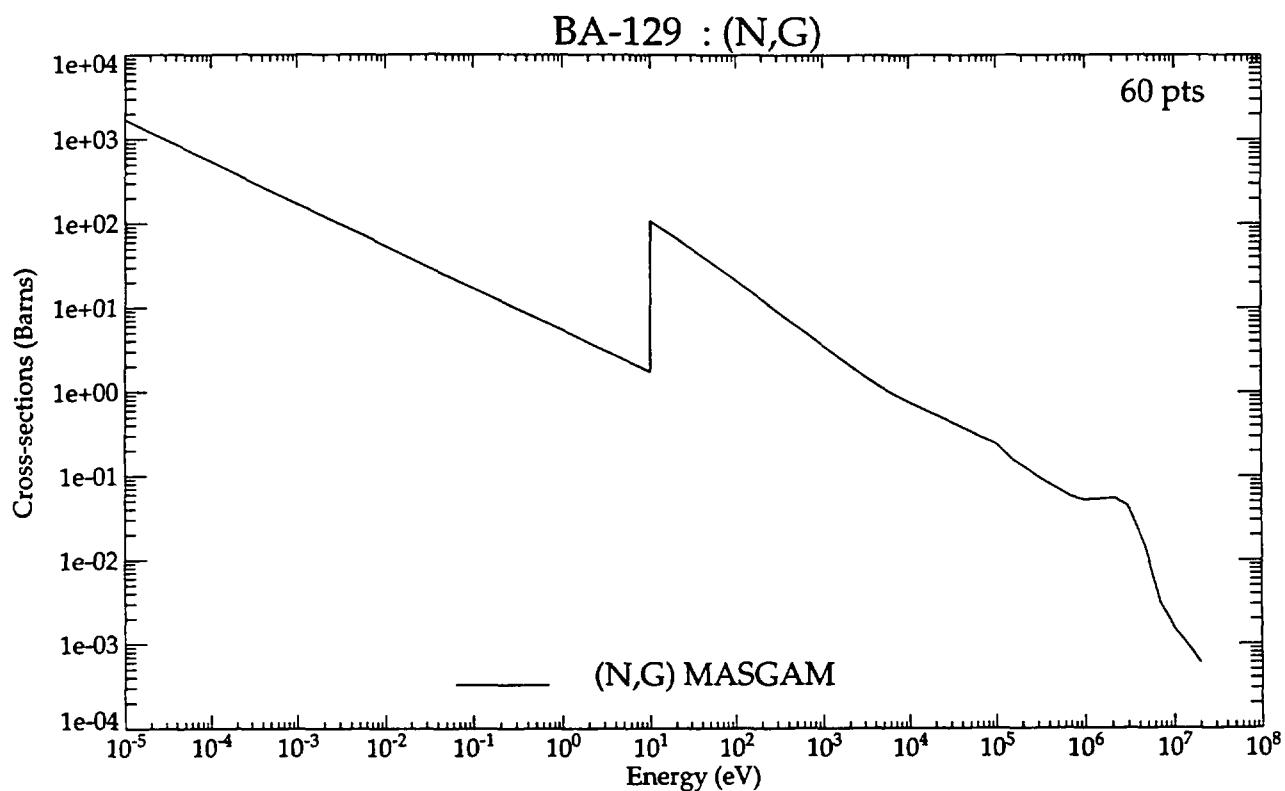


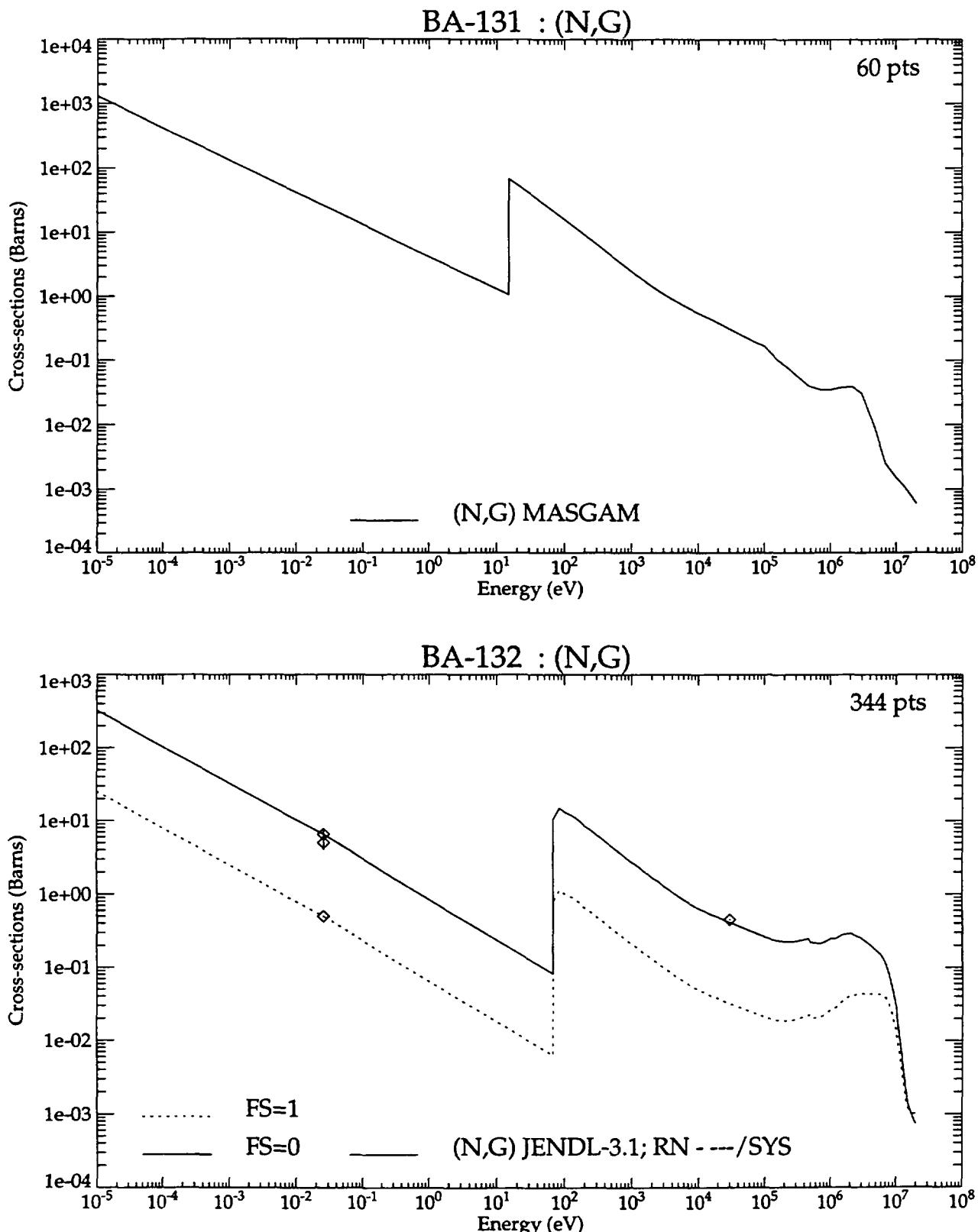


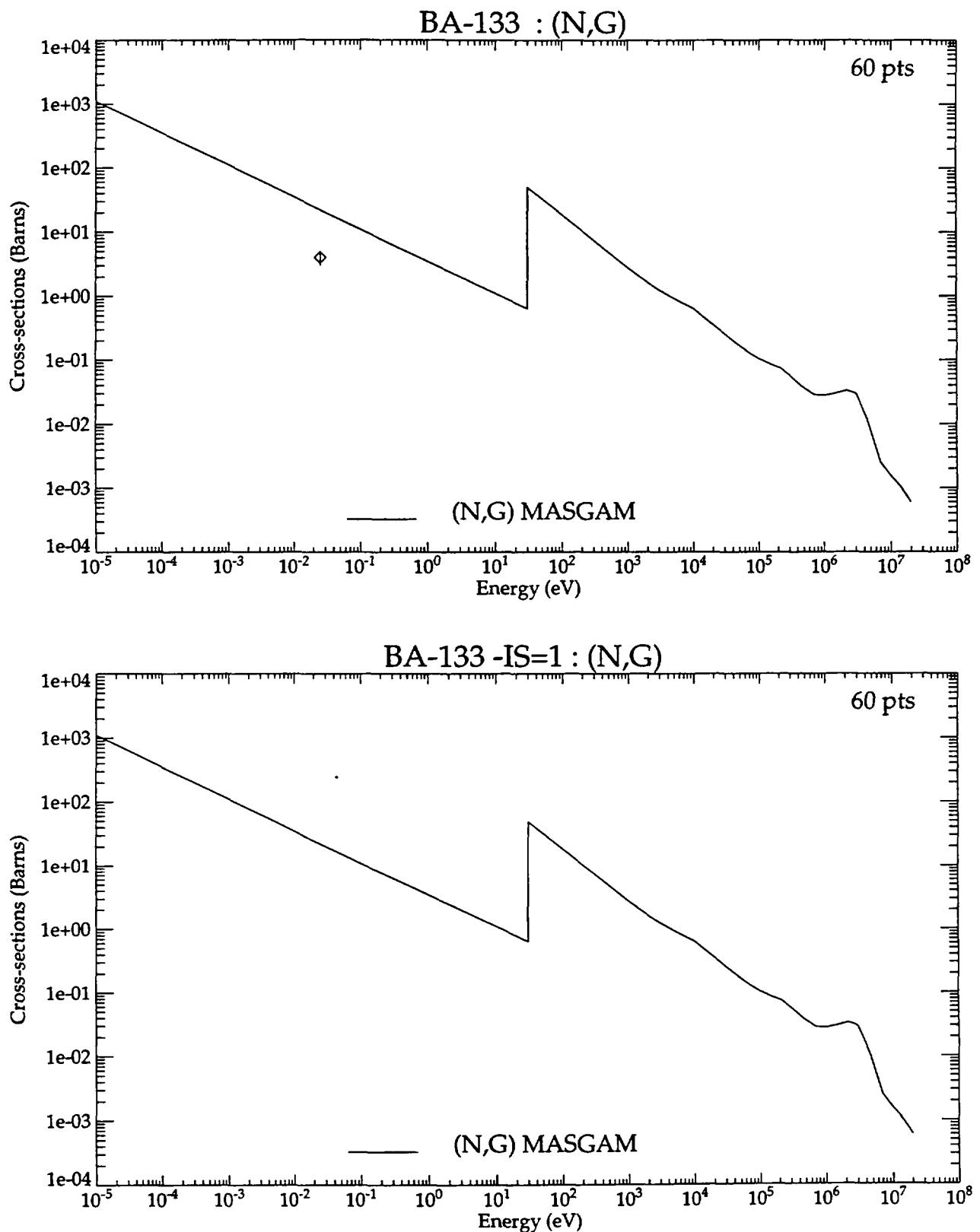


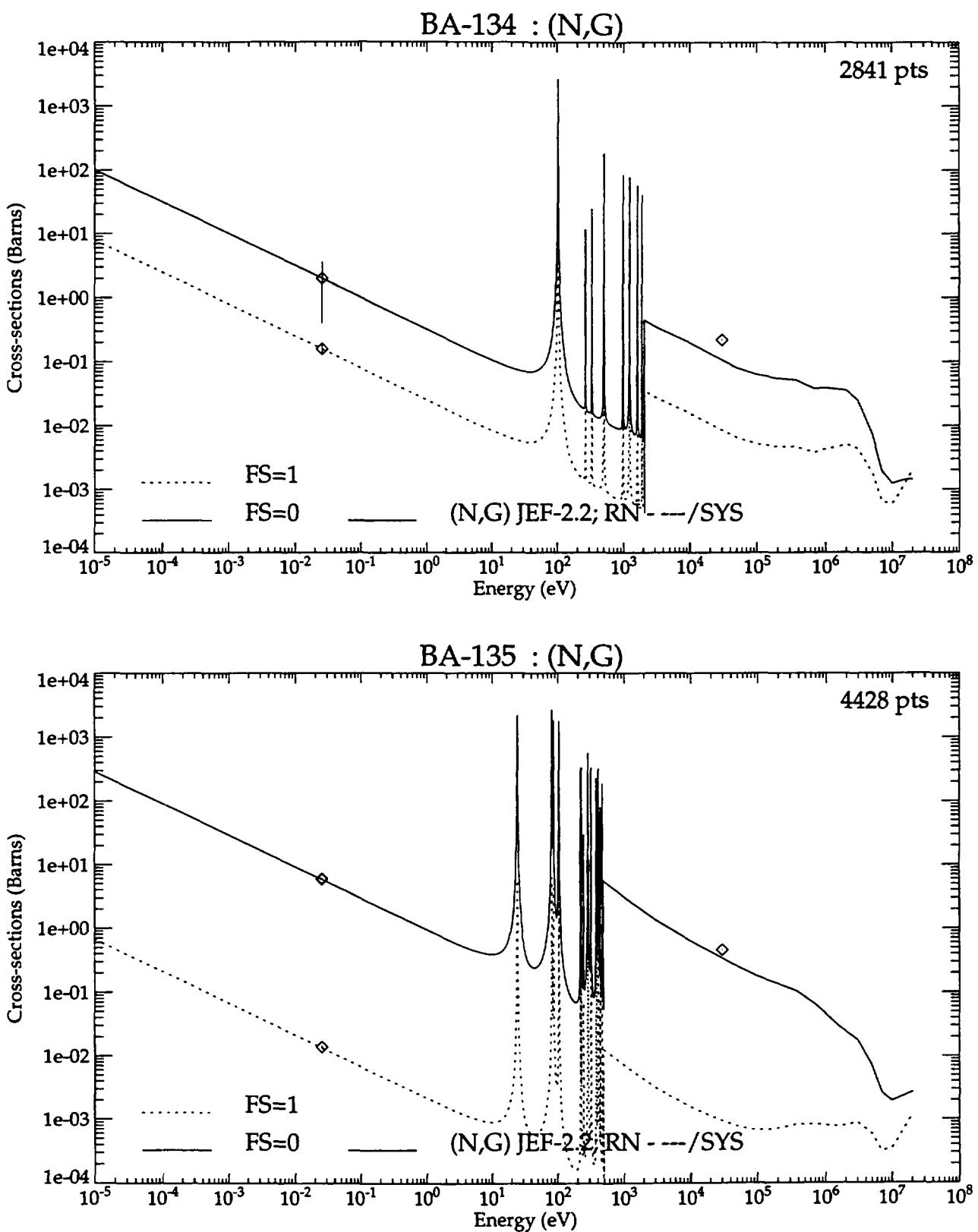


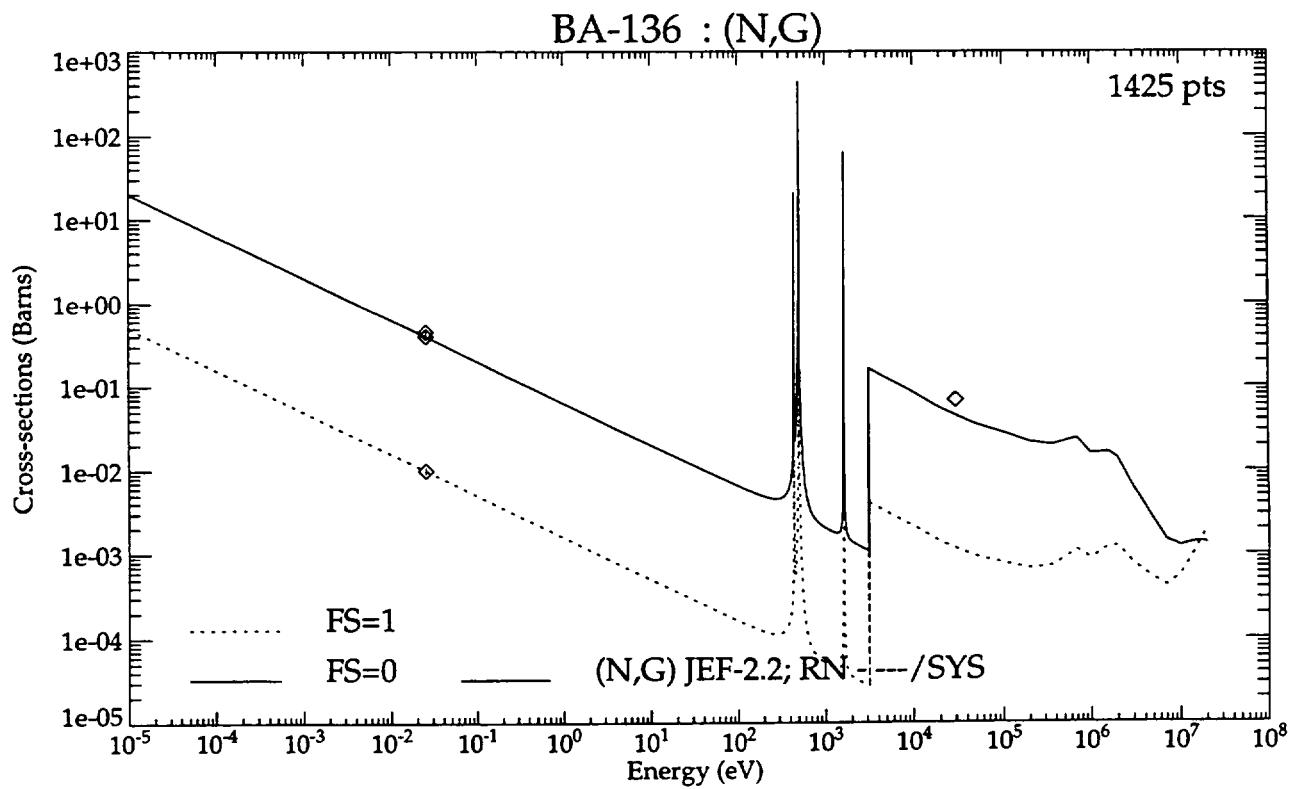
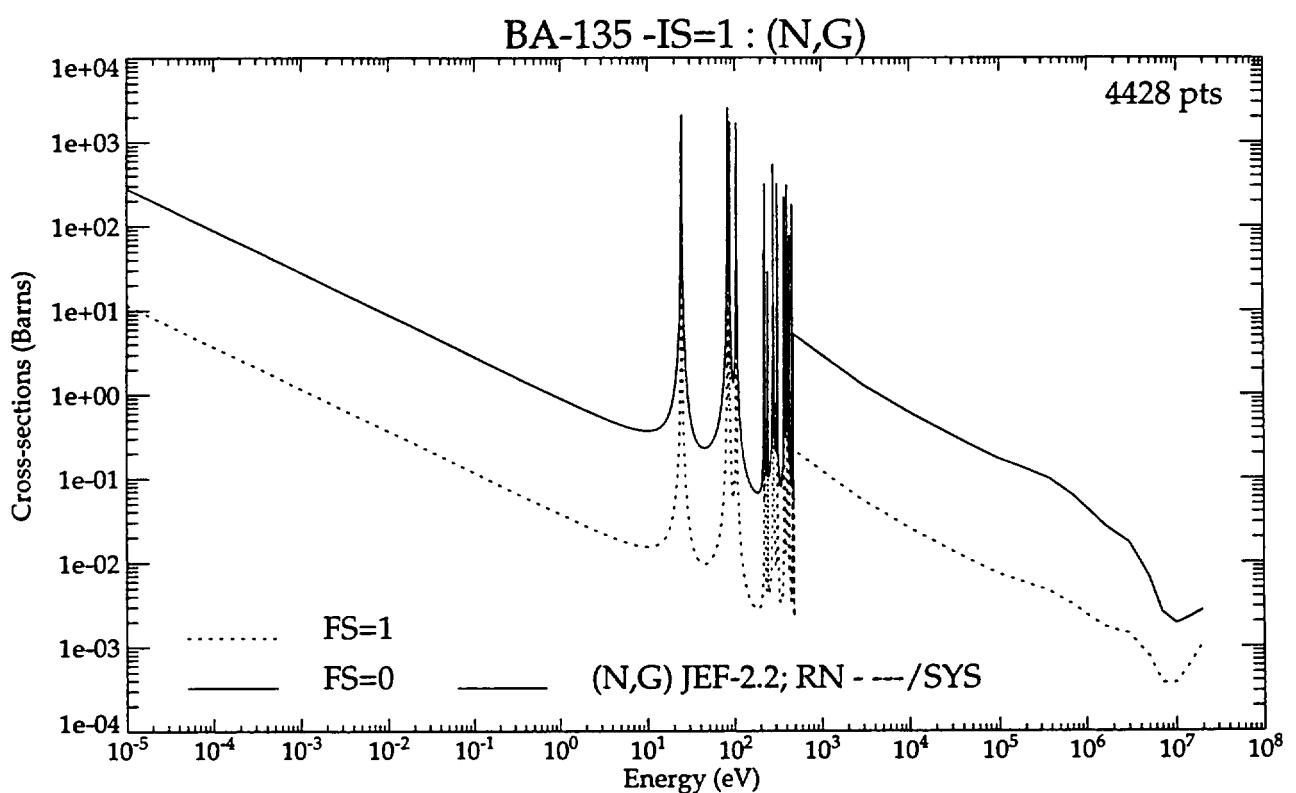


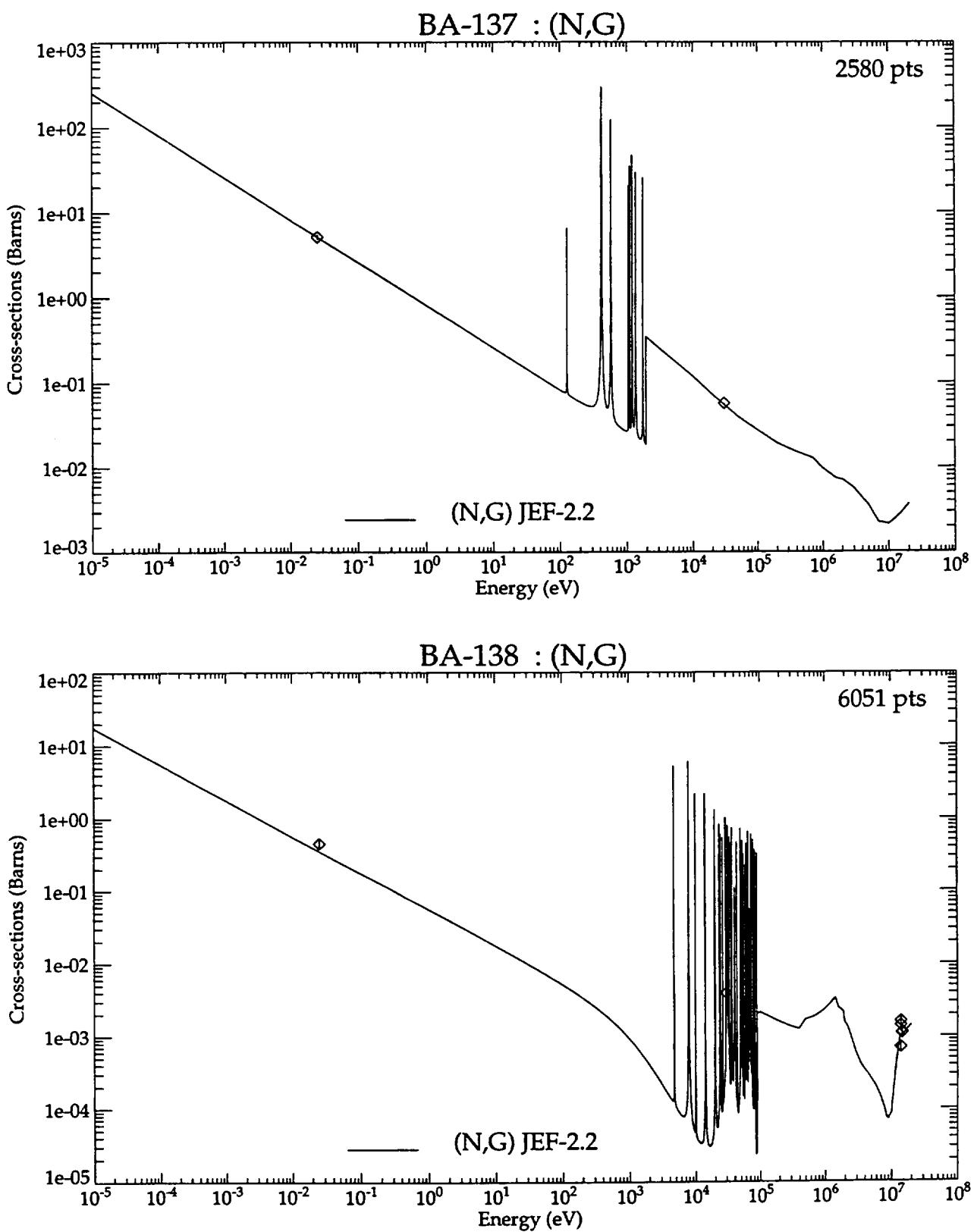


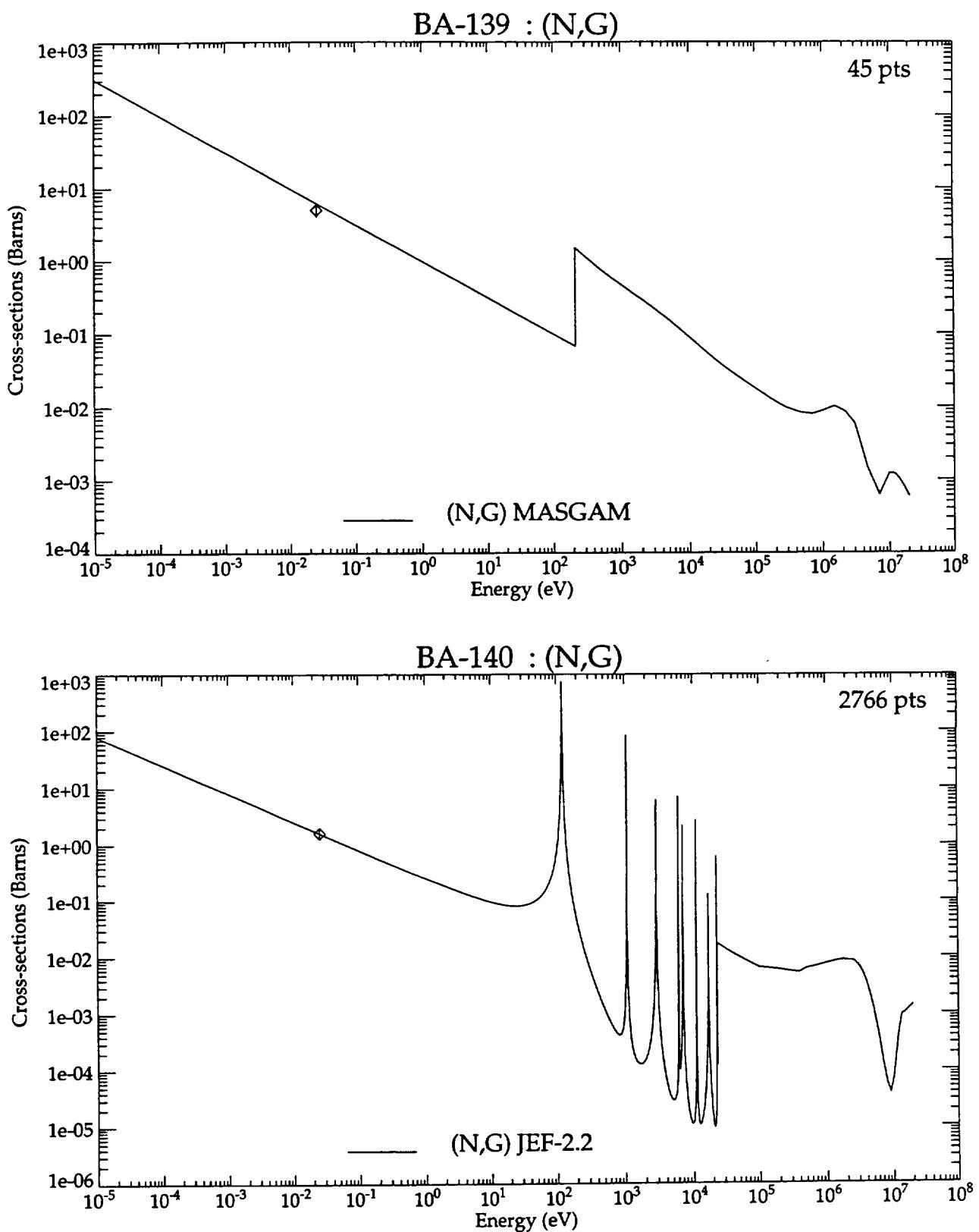


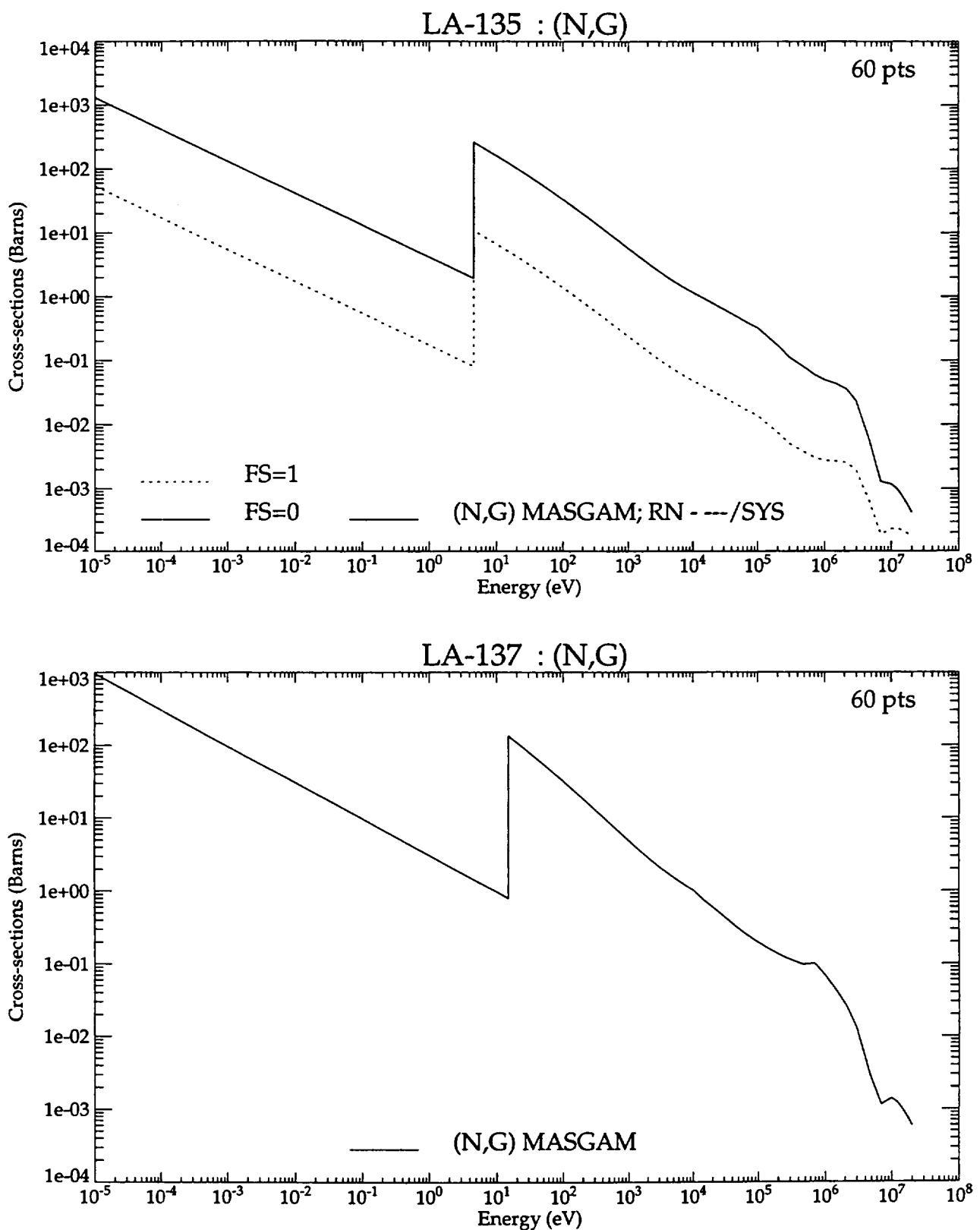


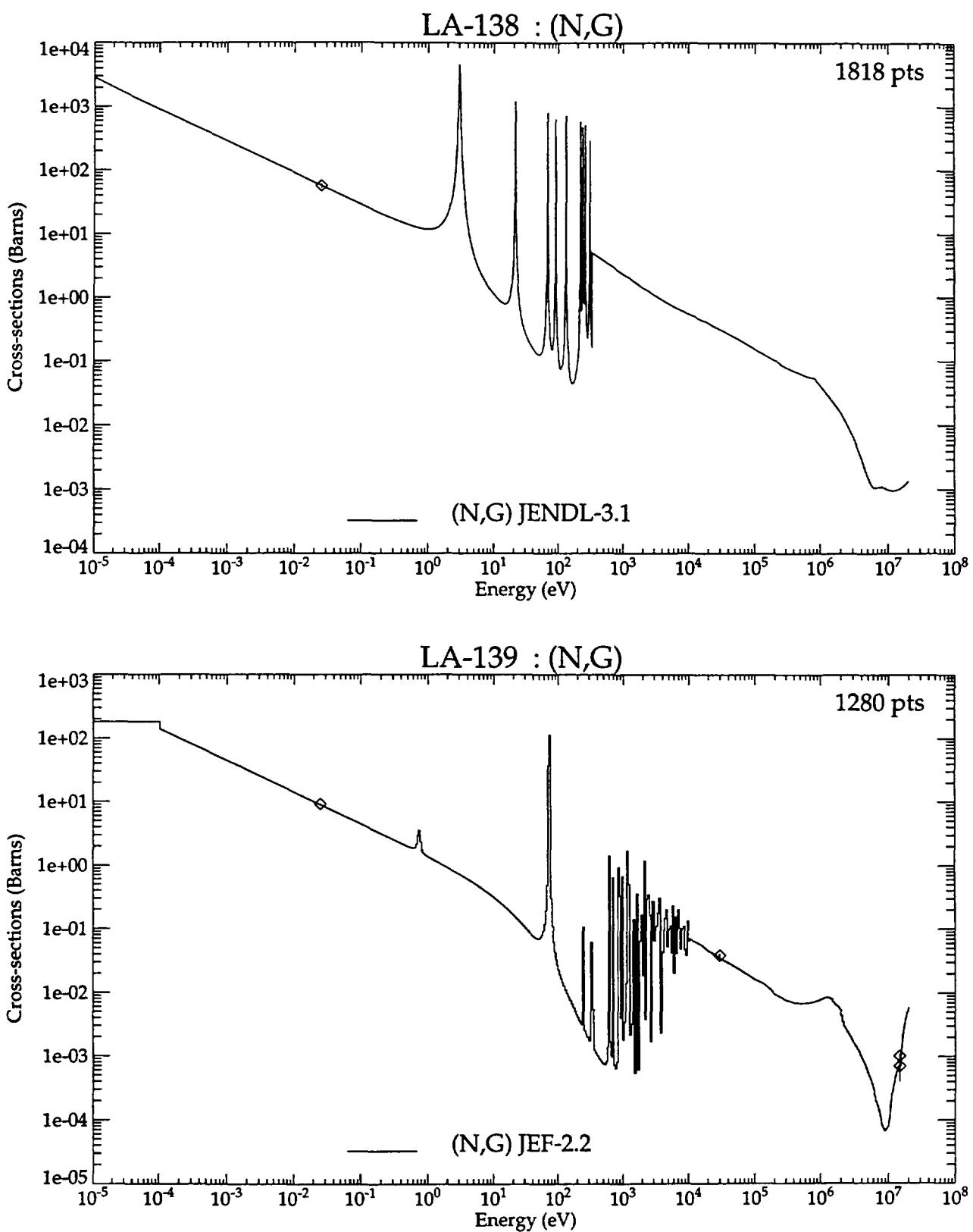


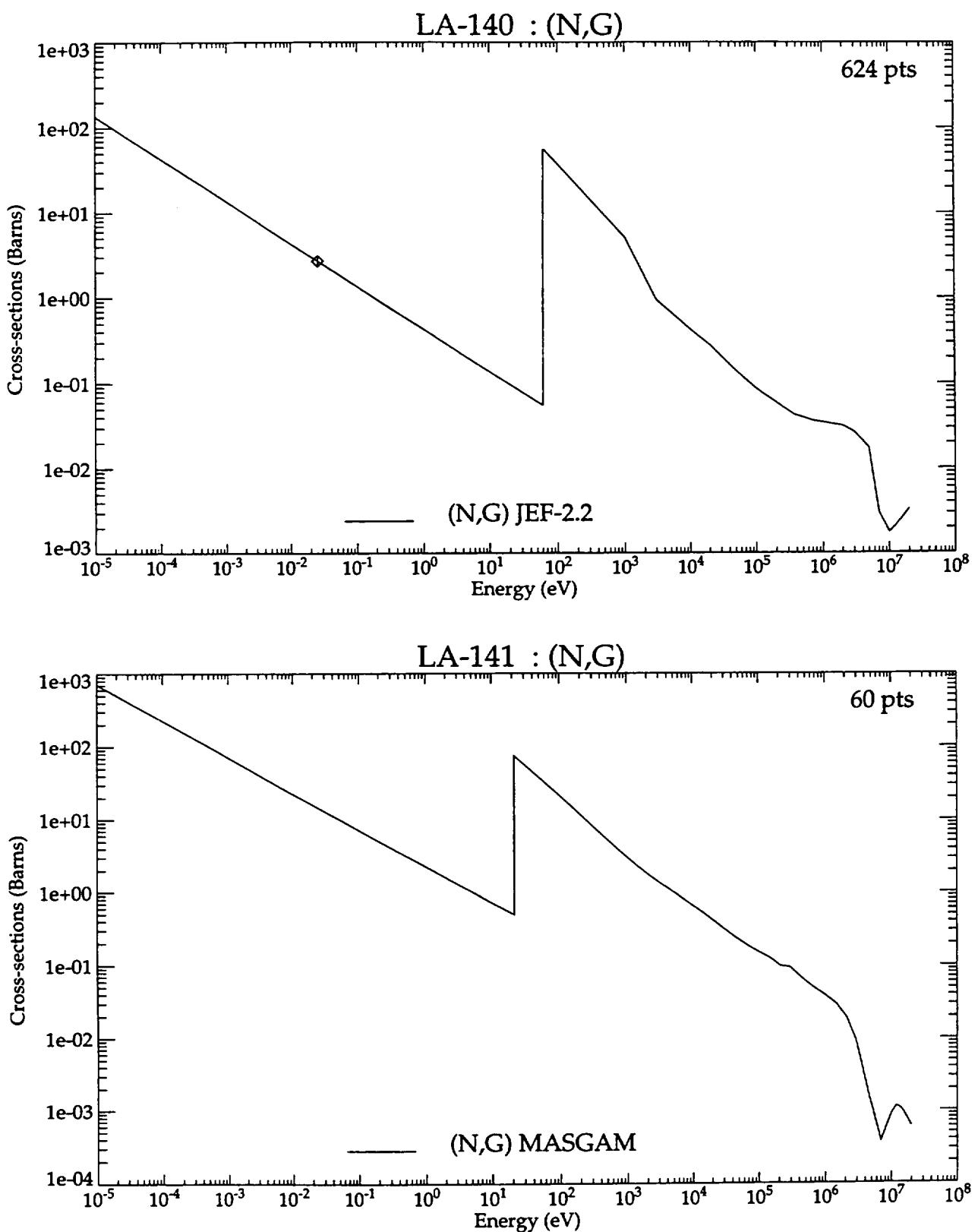


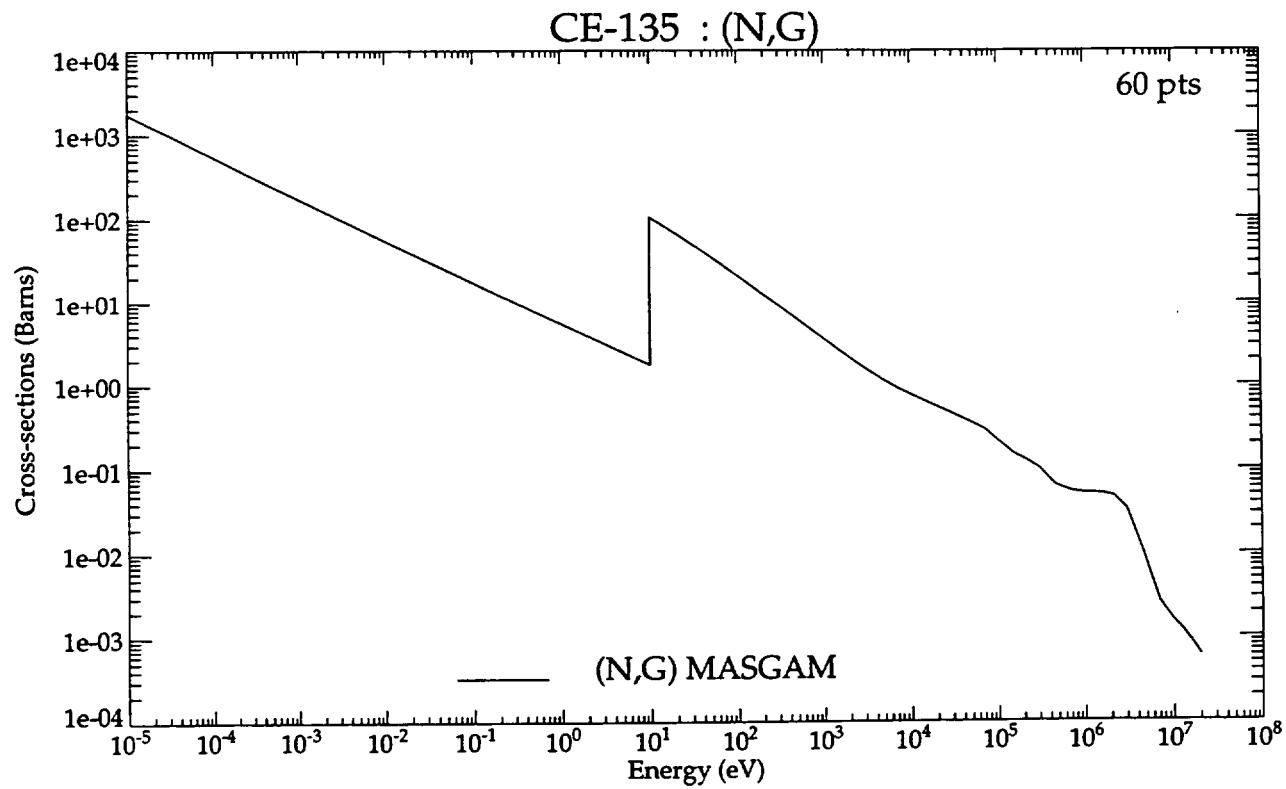
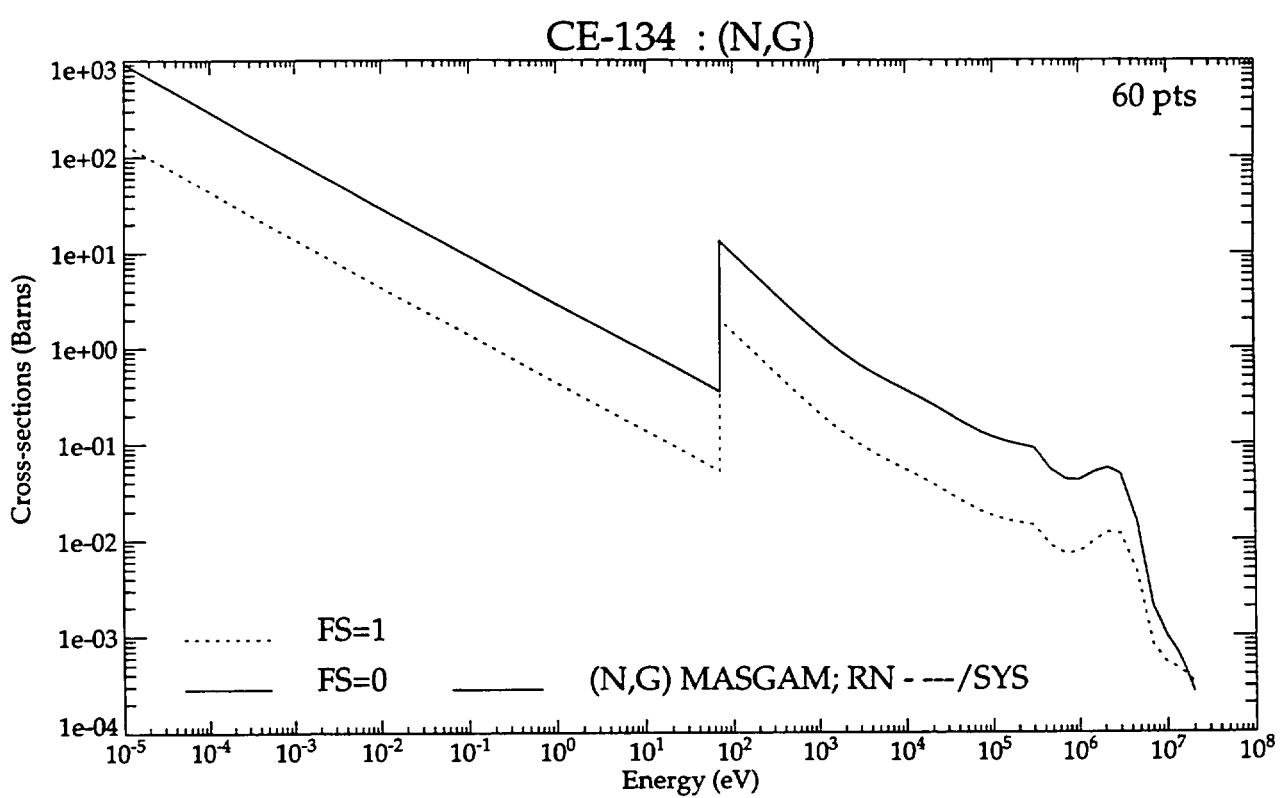


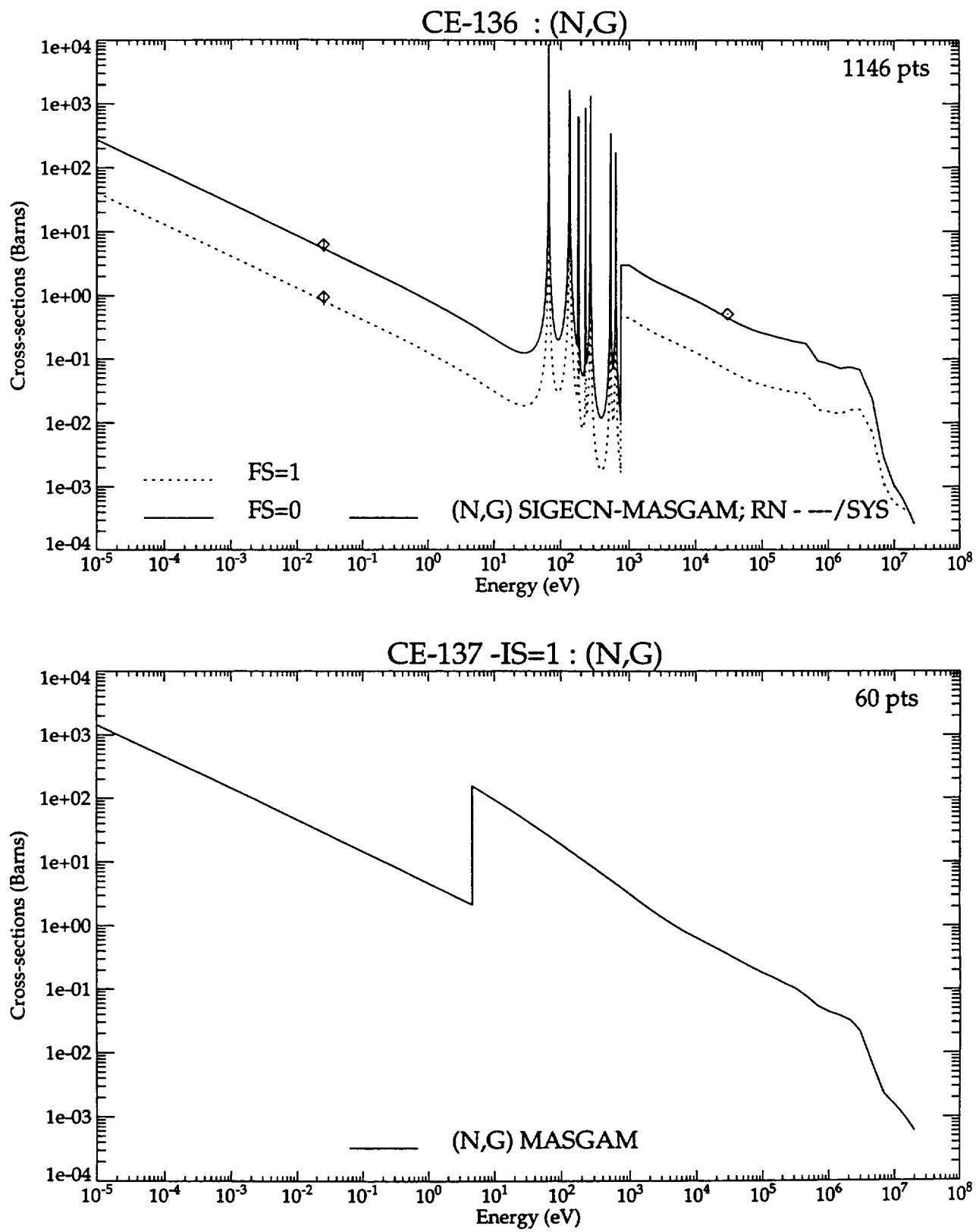


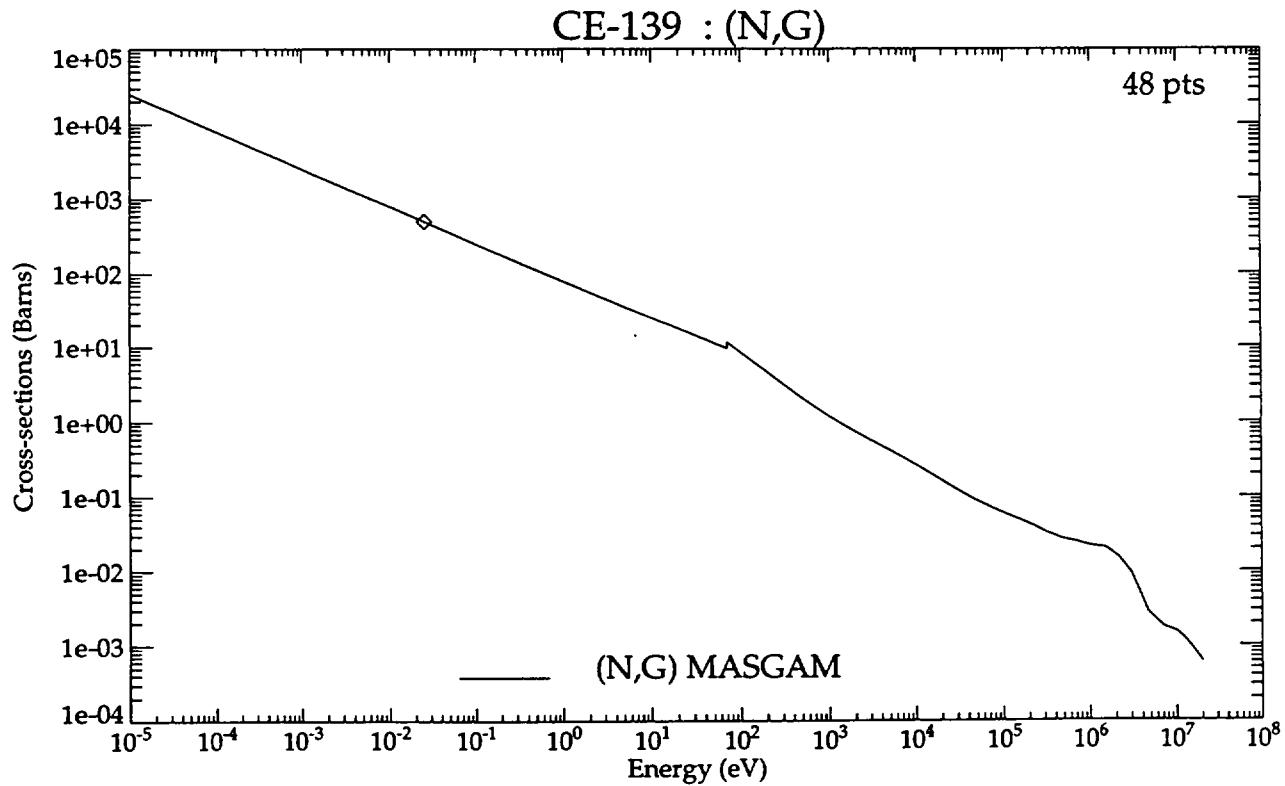
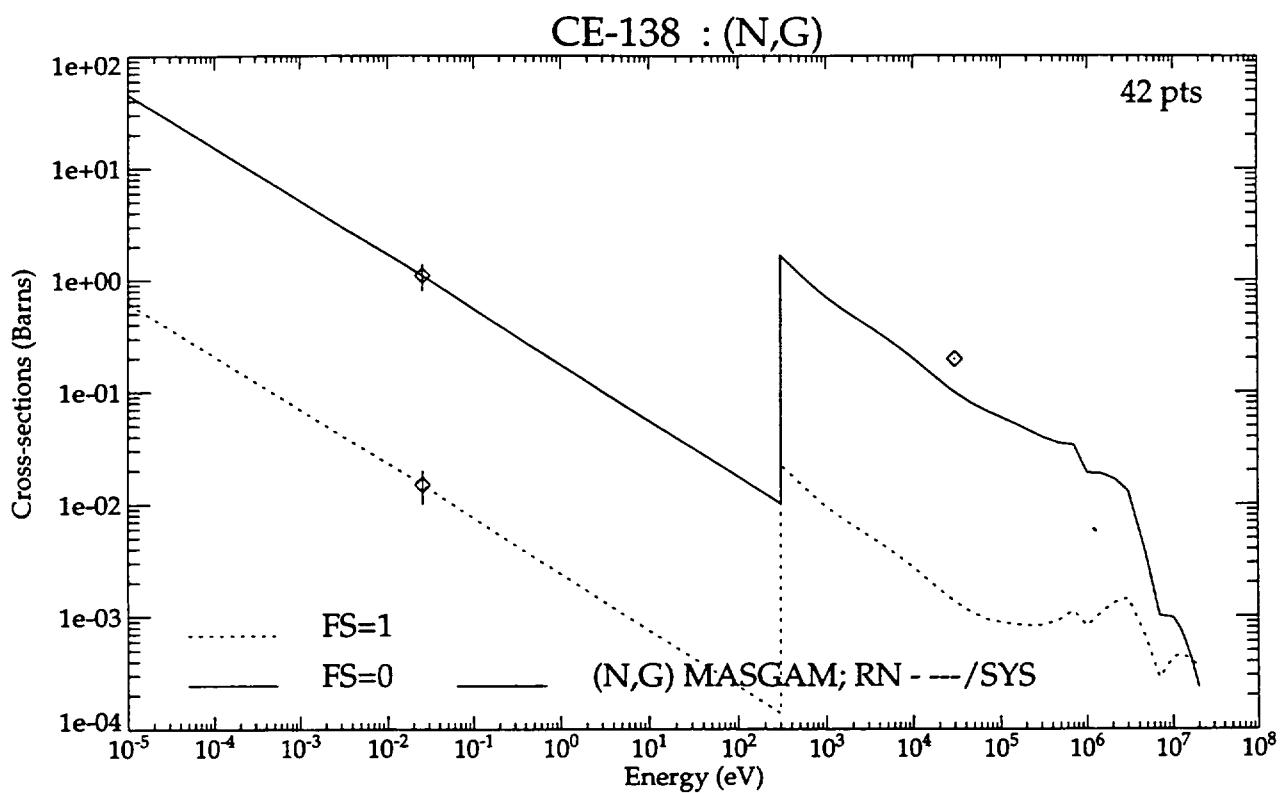


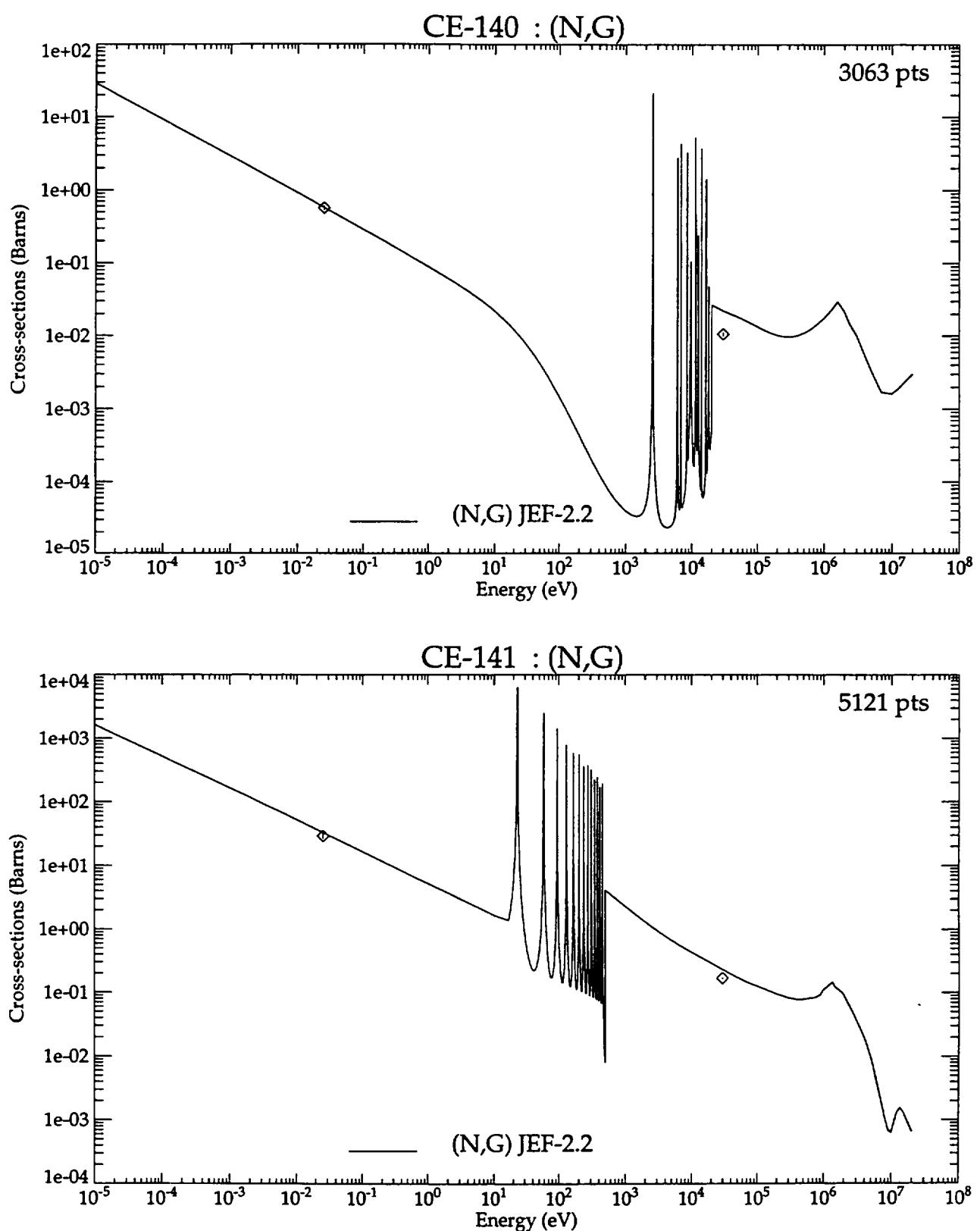


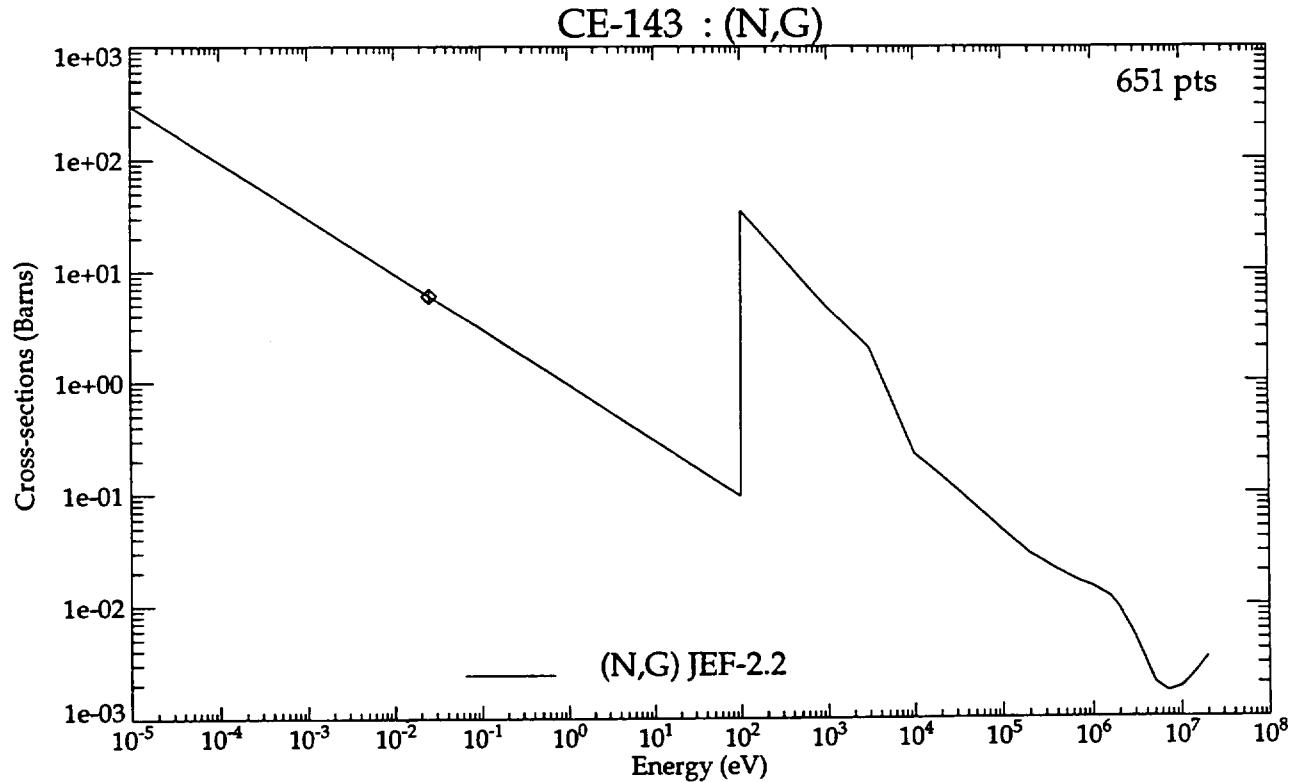
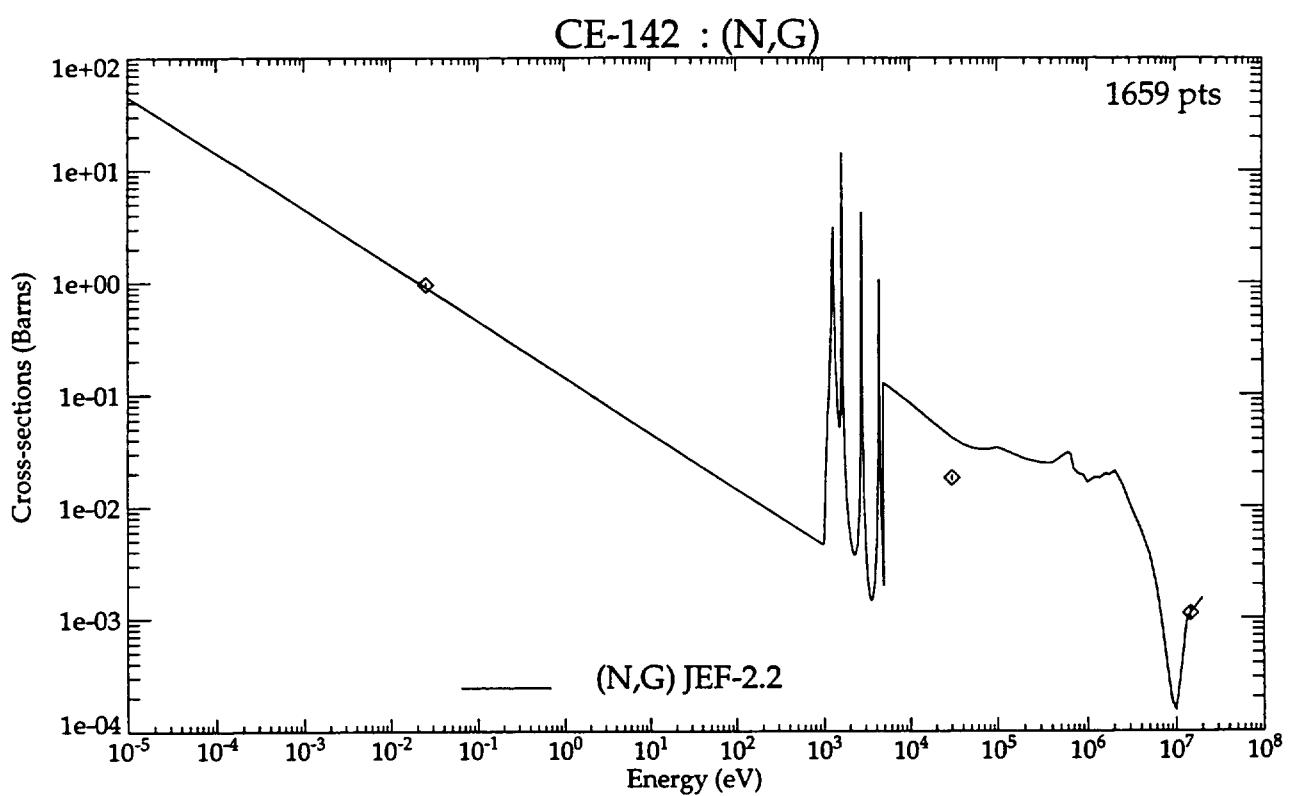


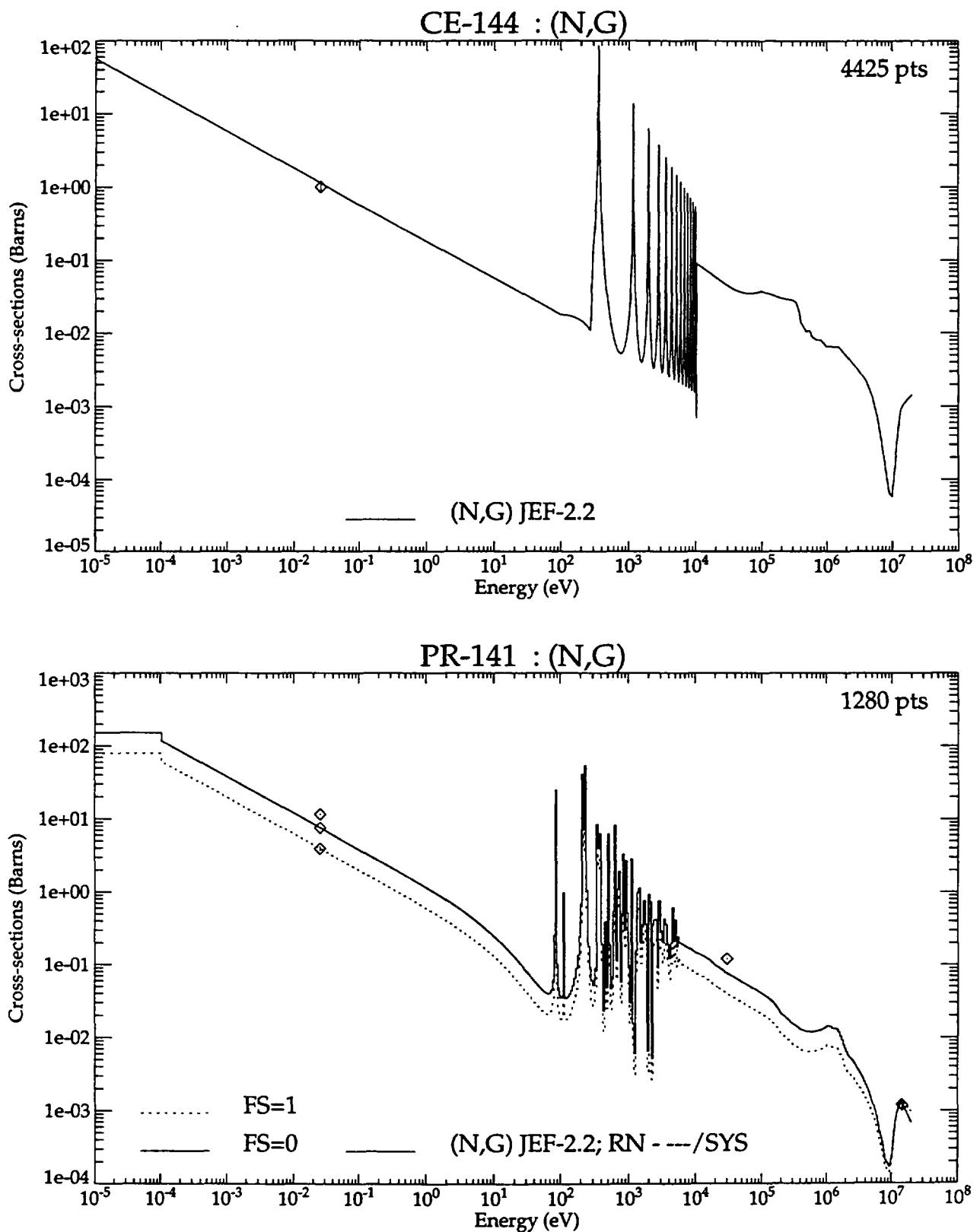


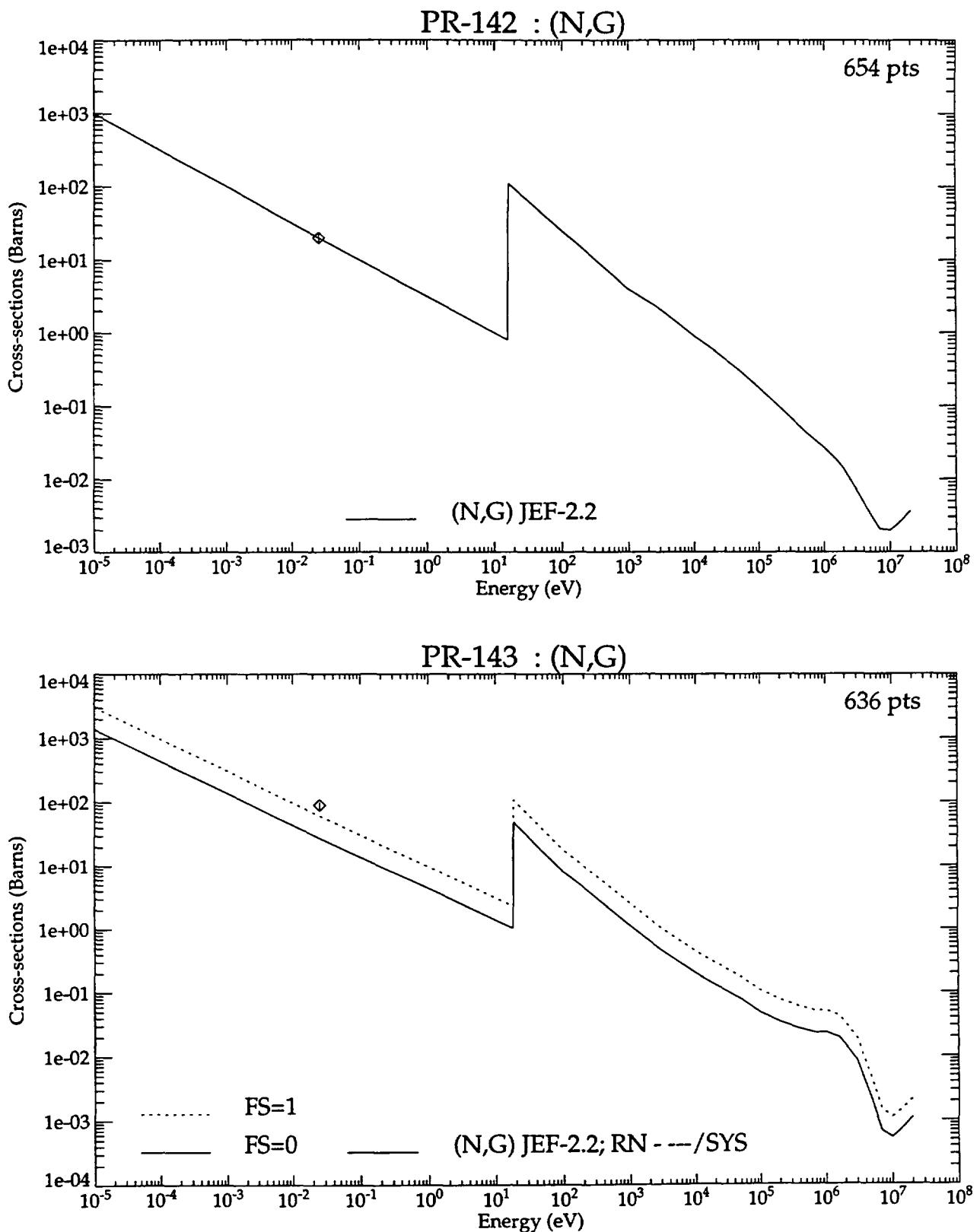


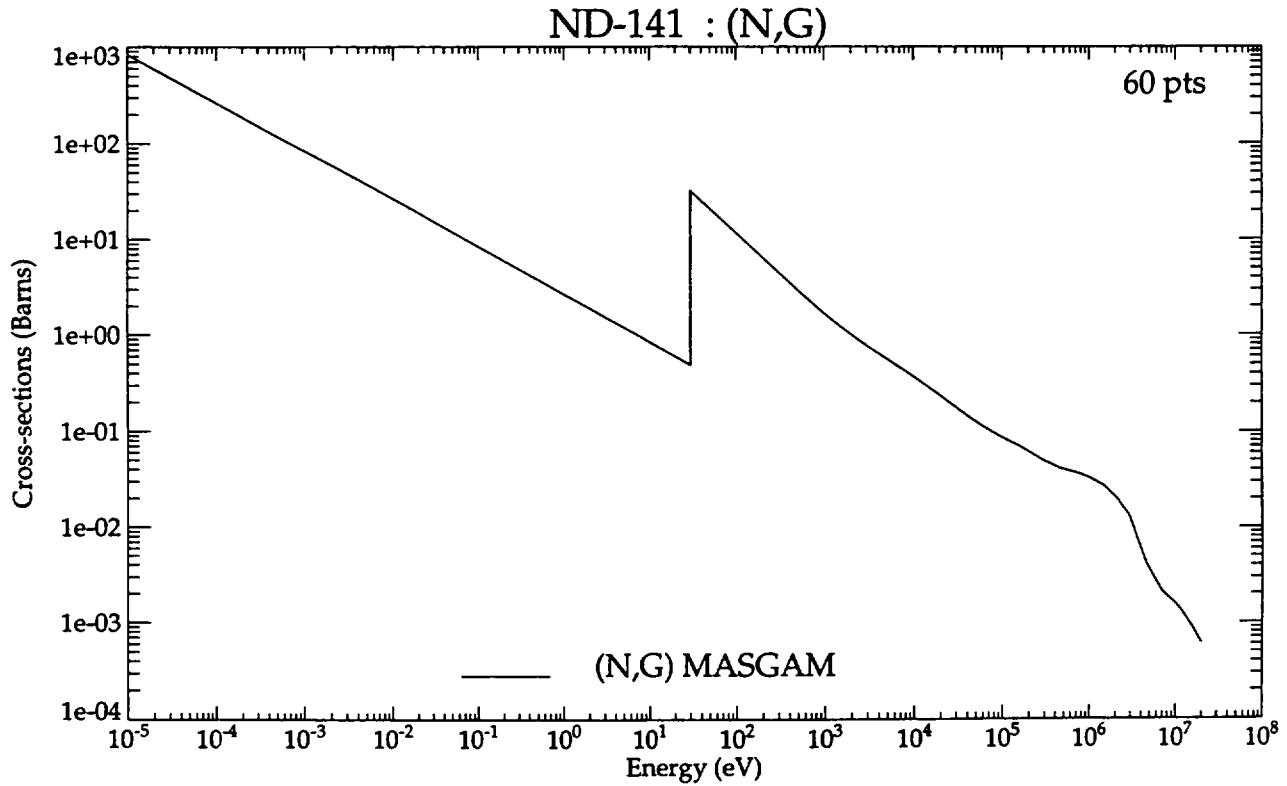
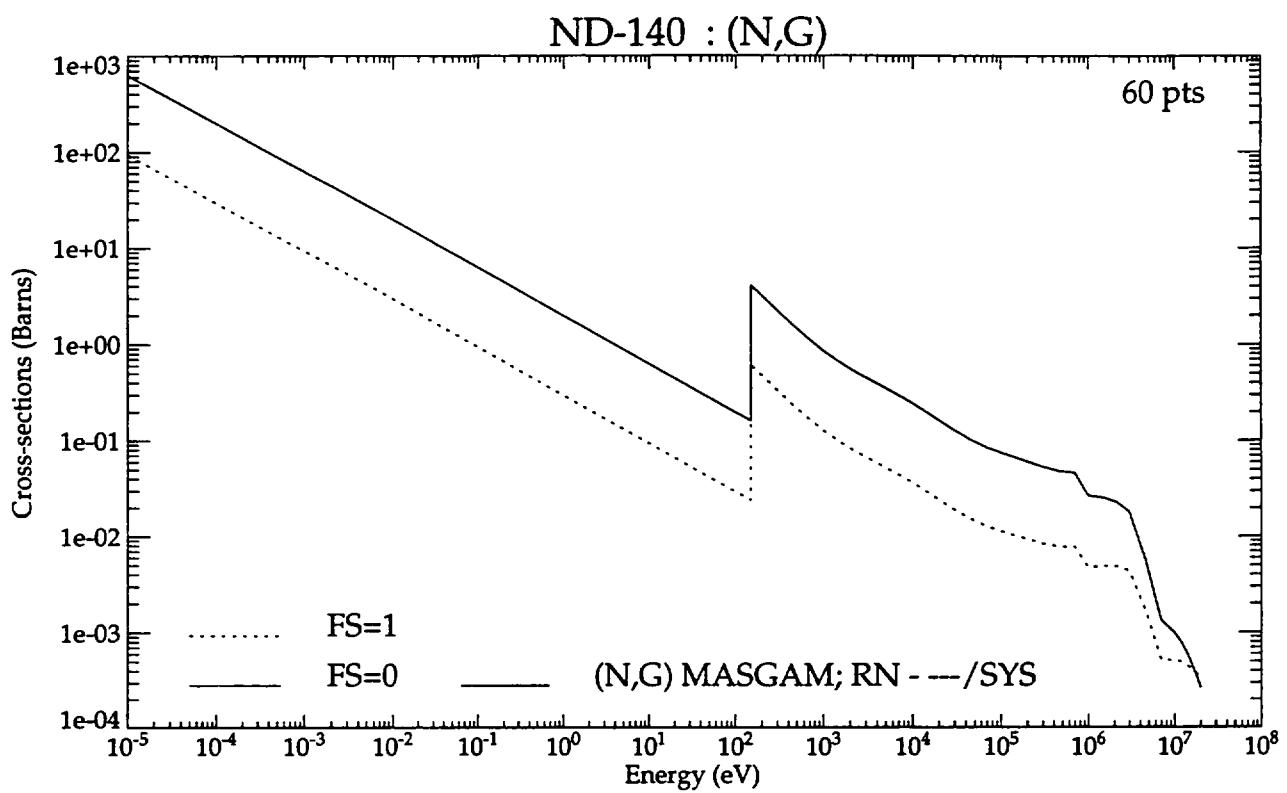


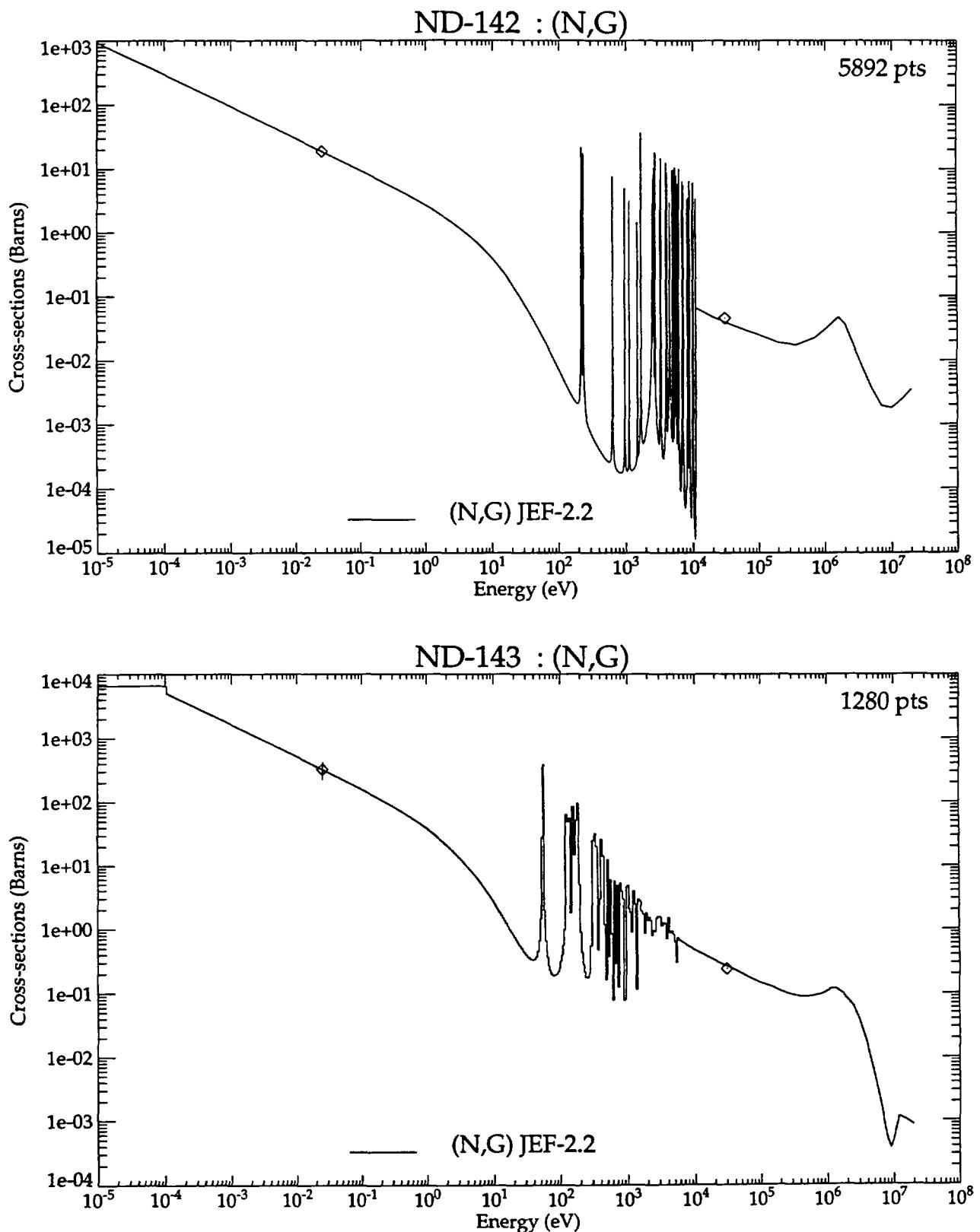




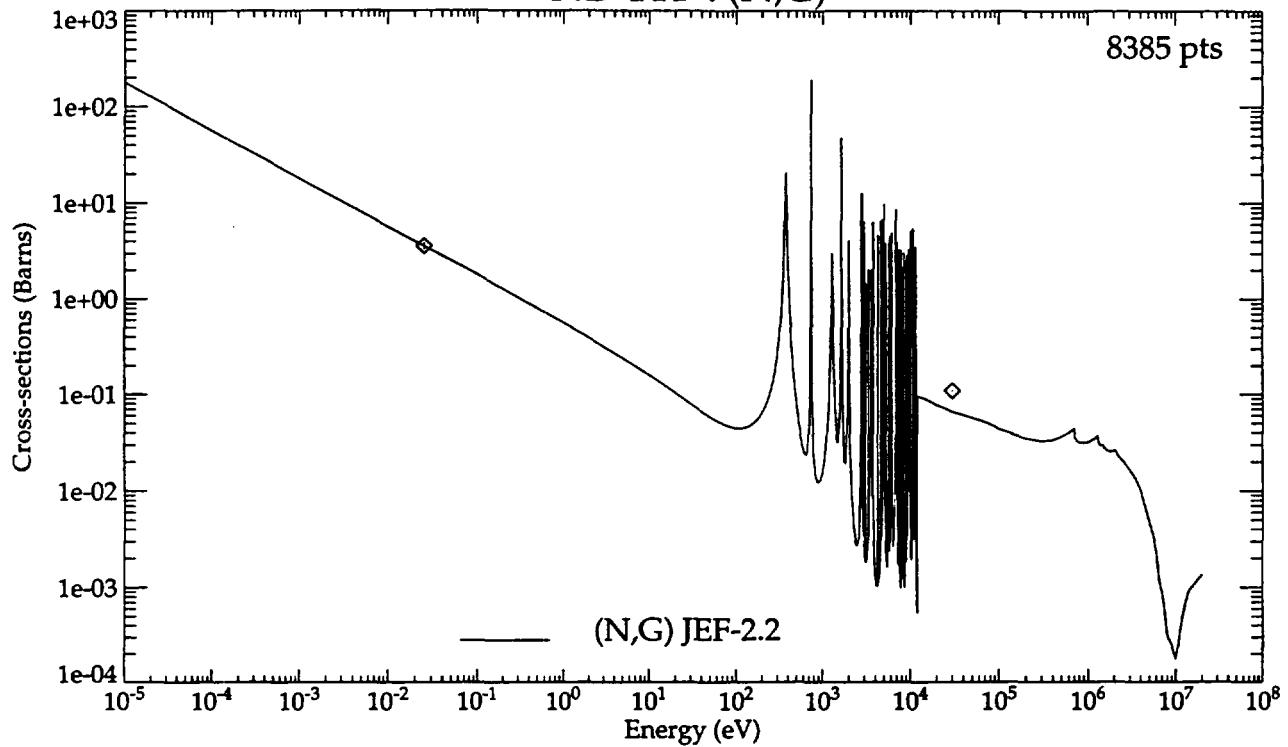




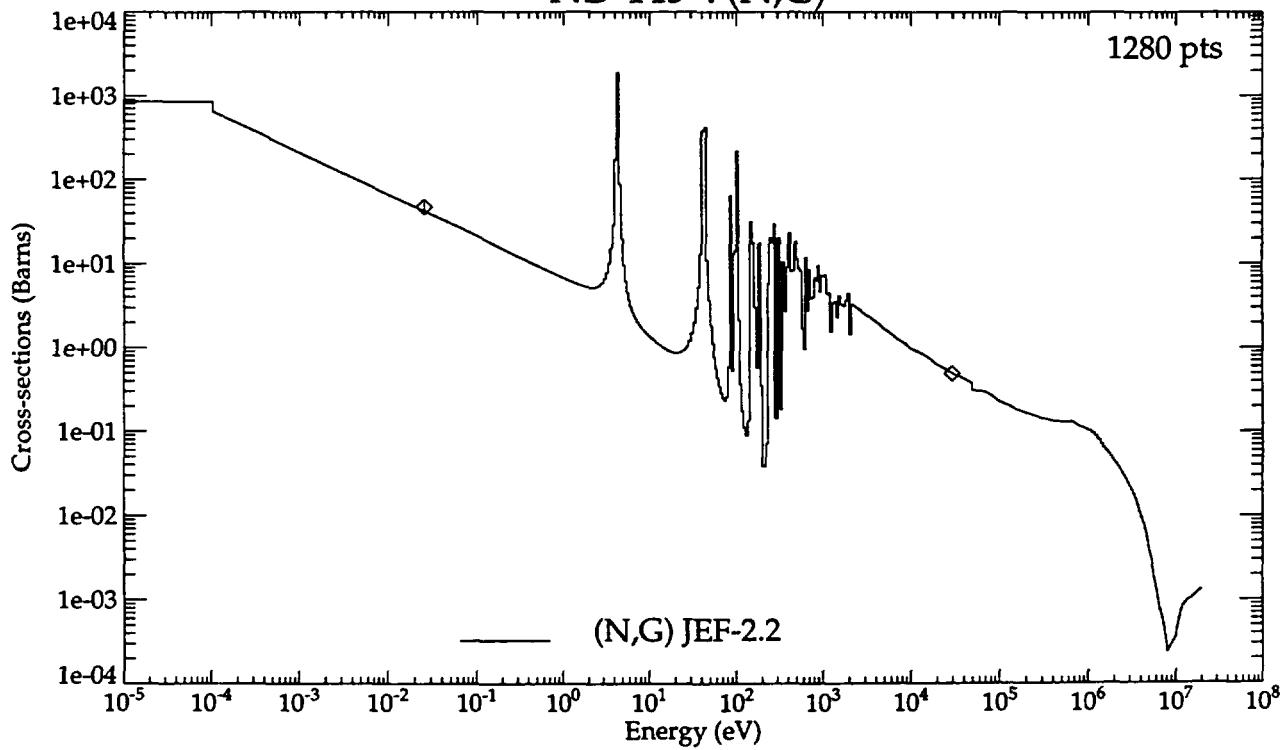


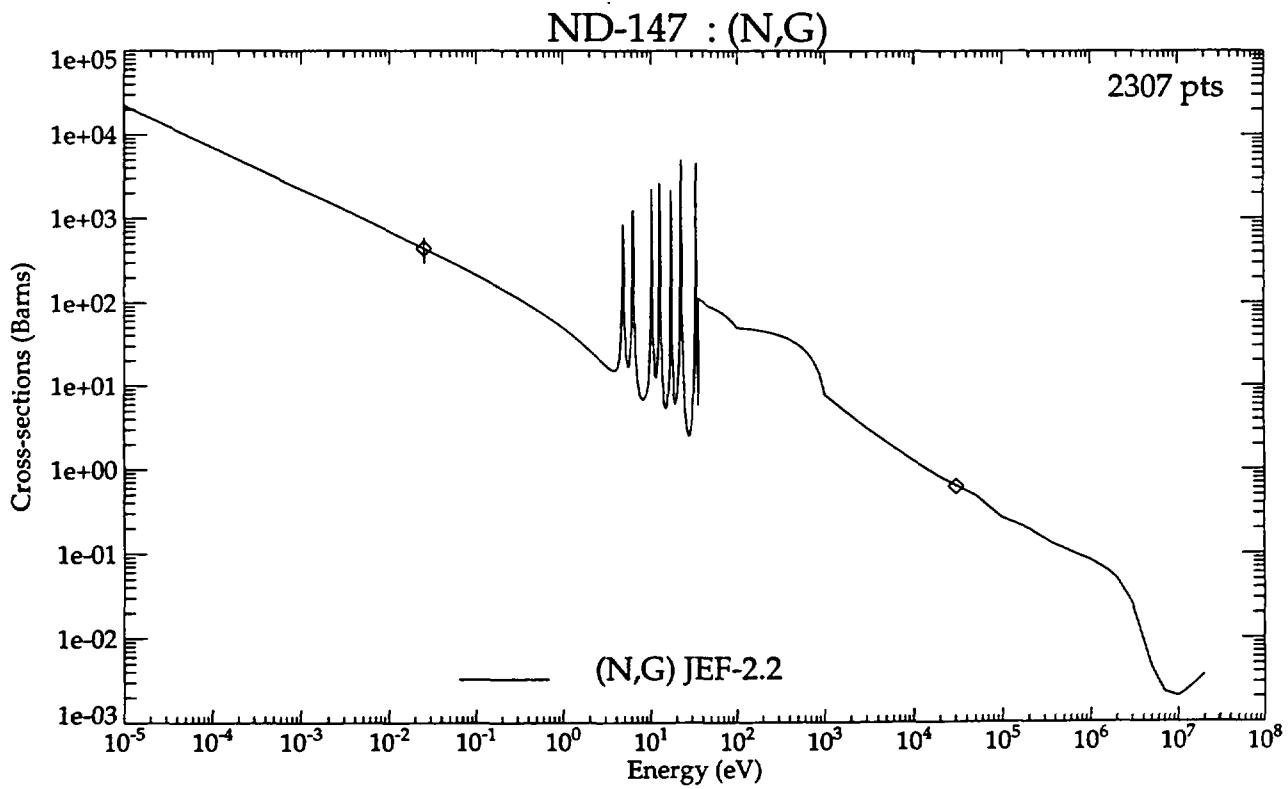
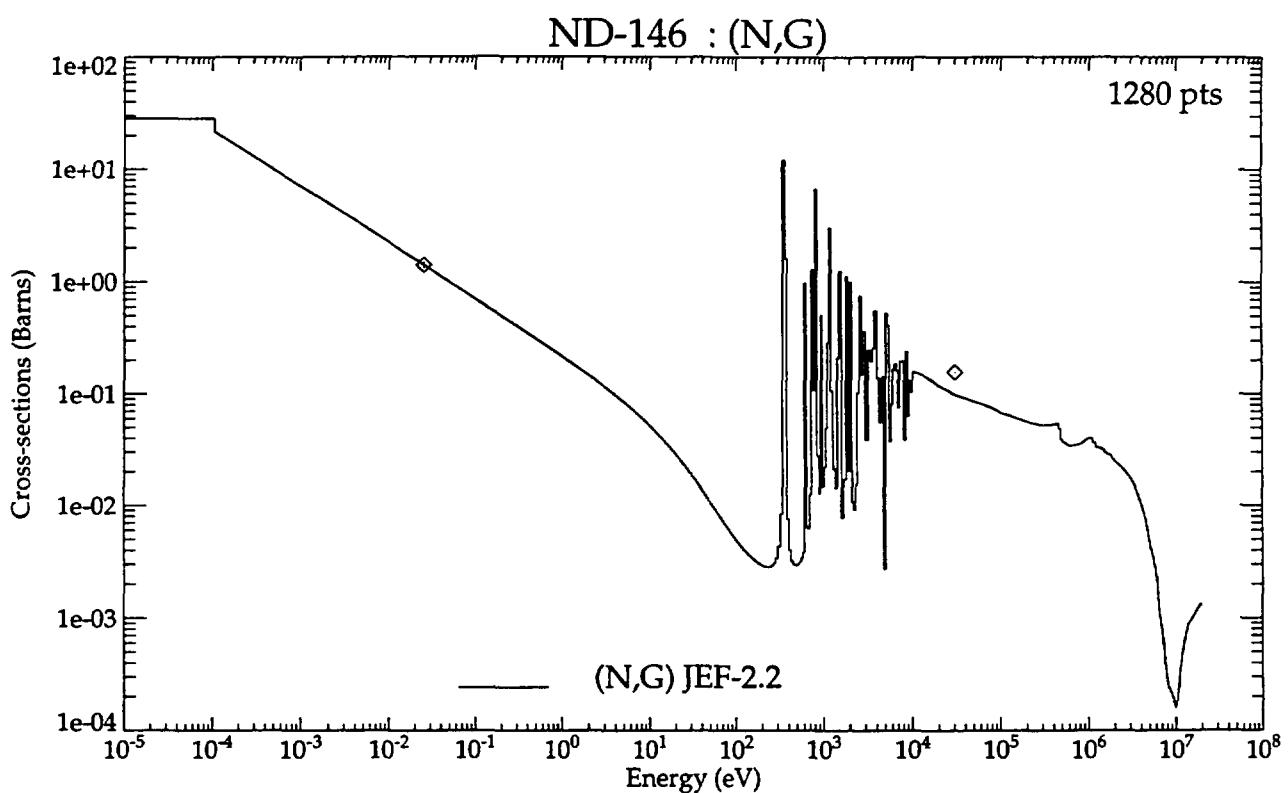


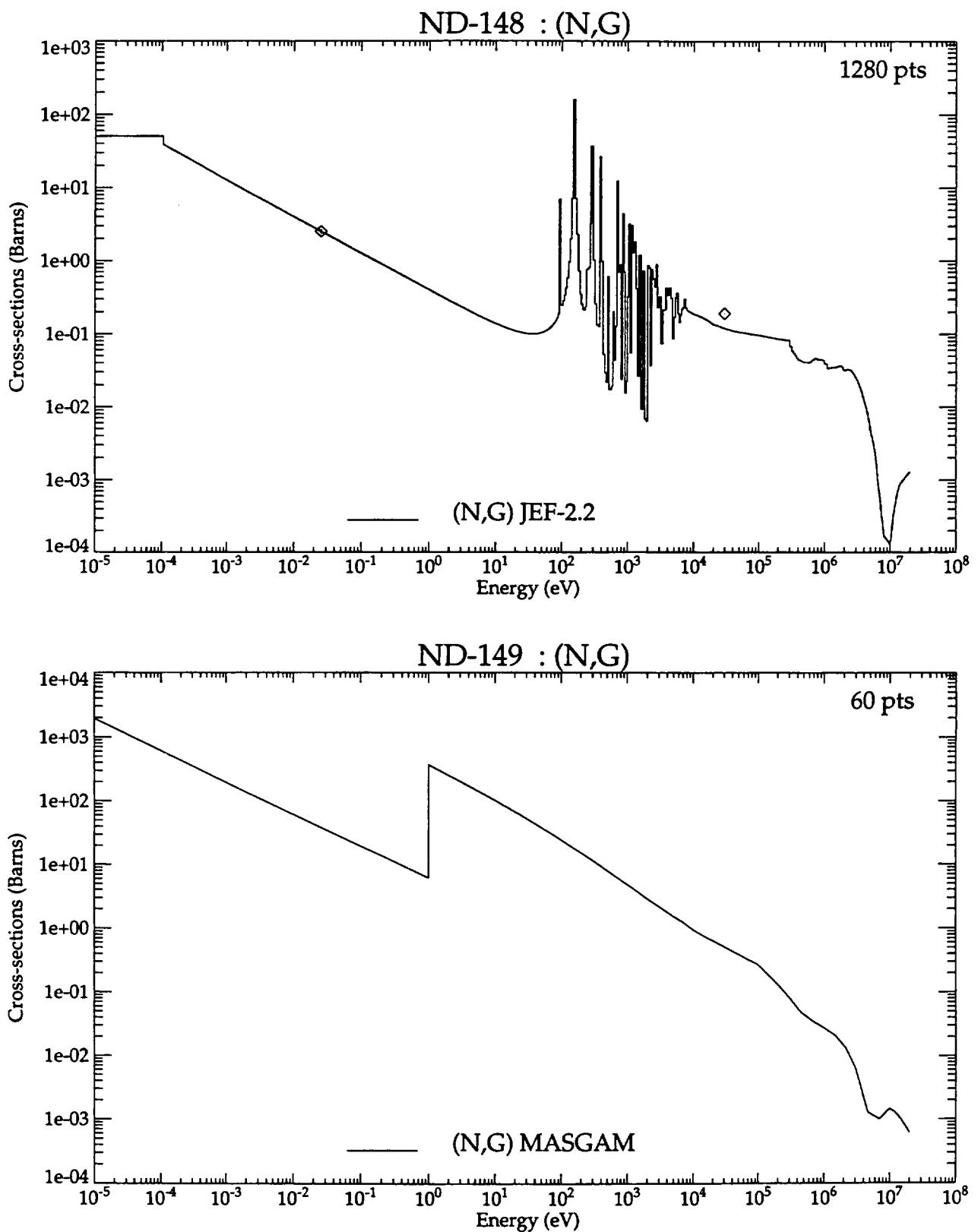
ND-144 : (N,G)

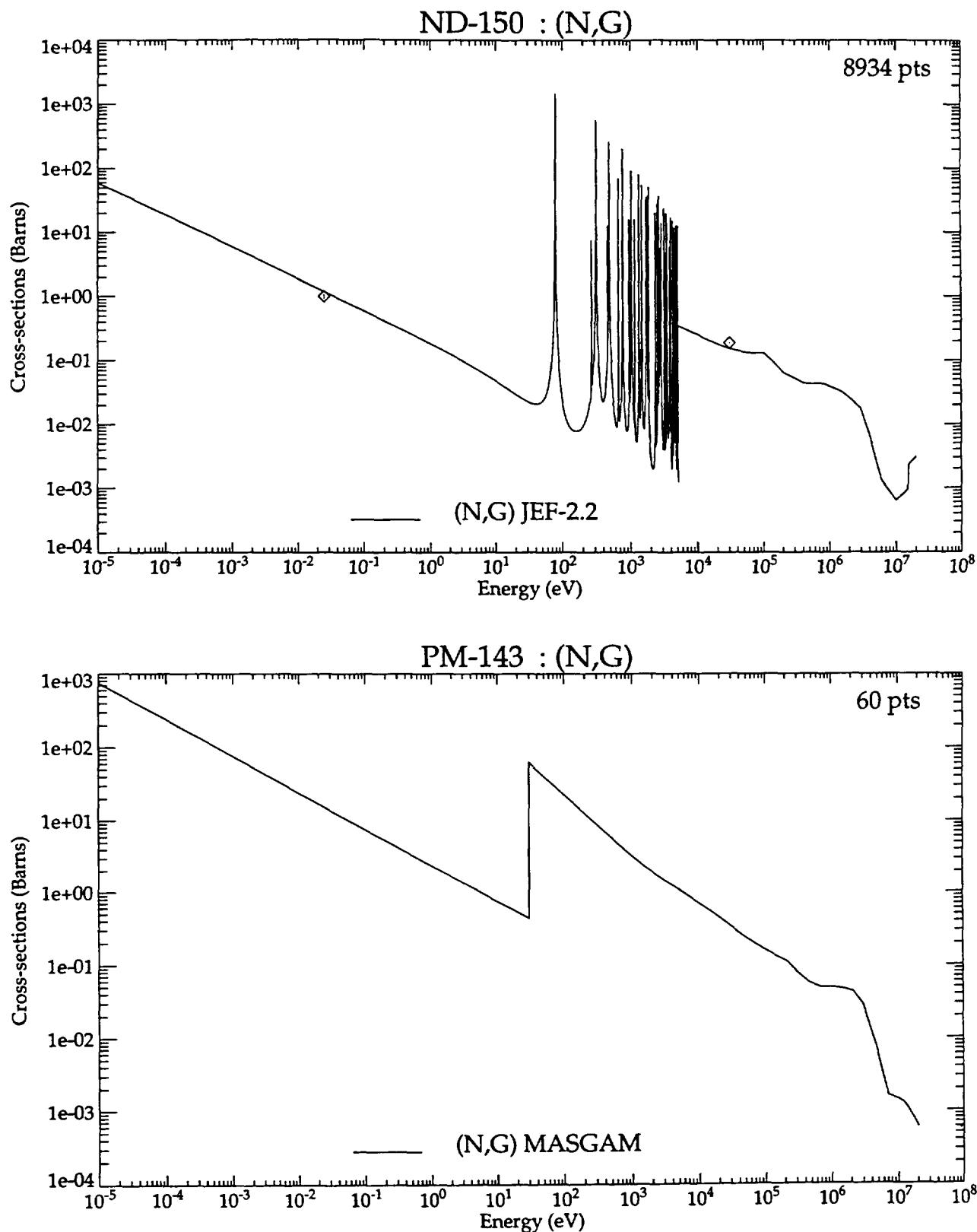


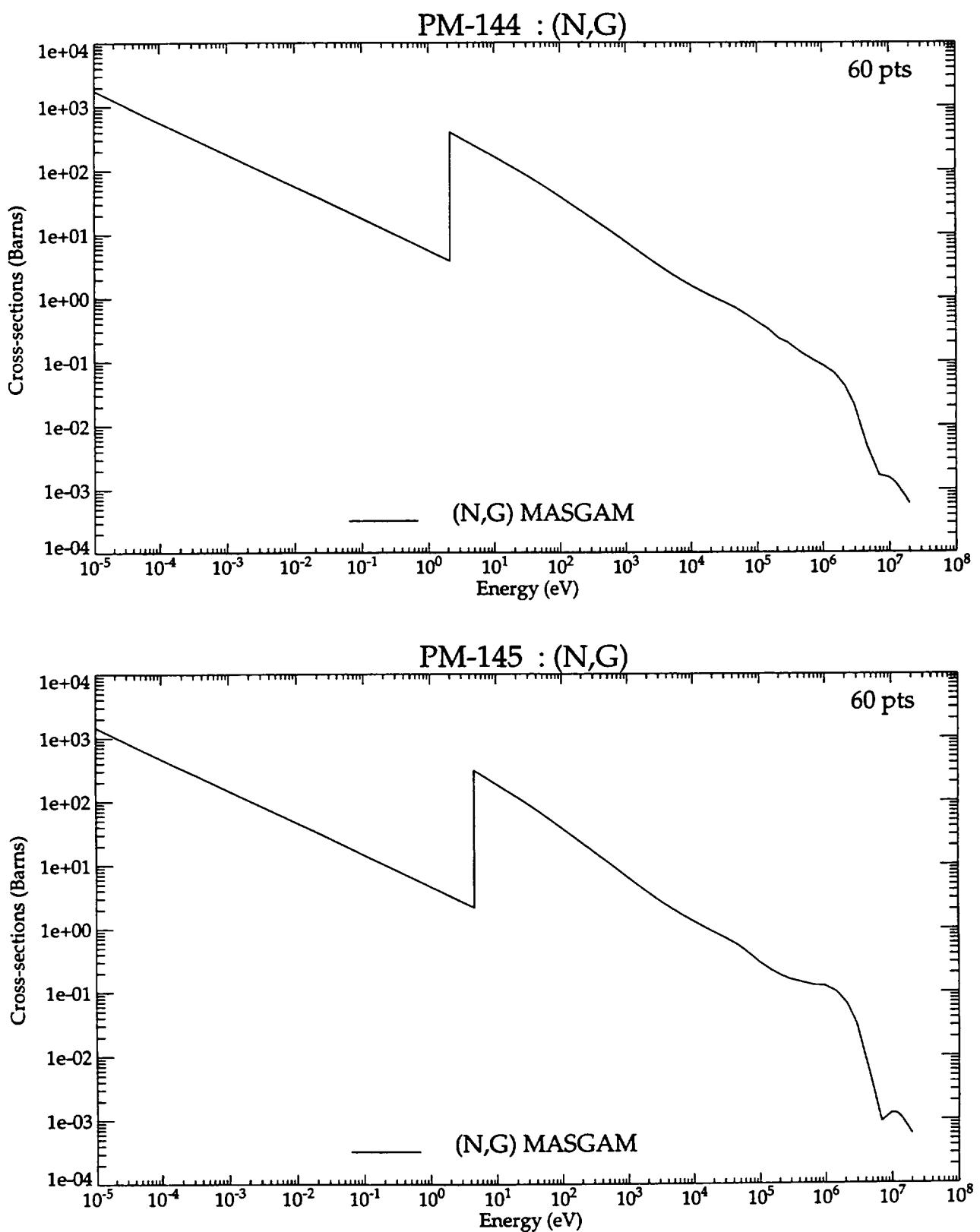
ND-145 : (N,G)

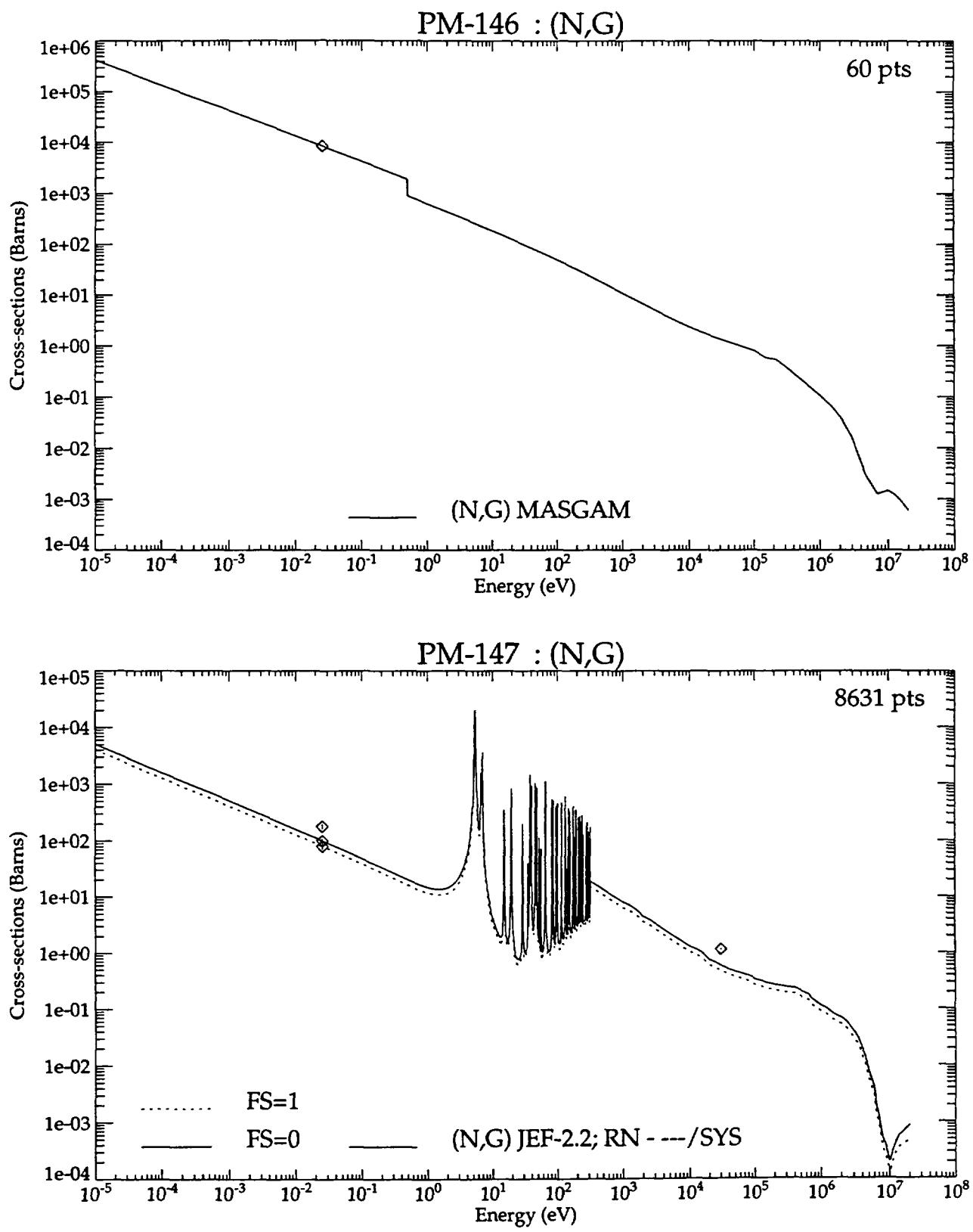


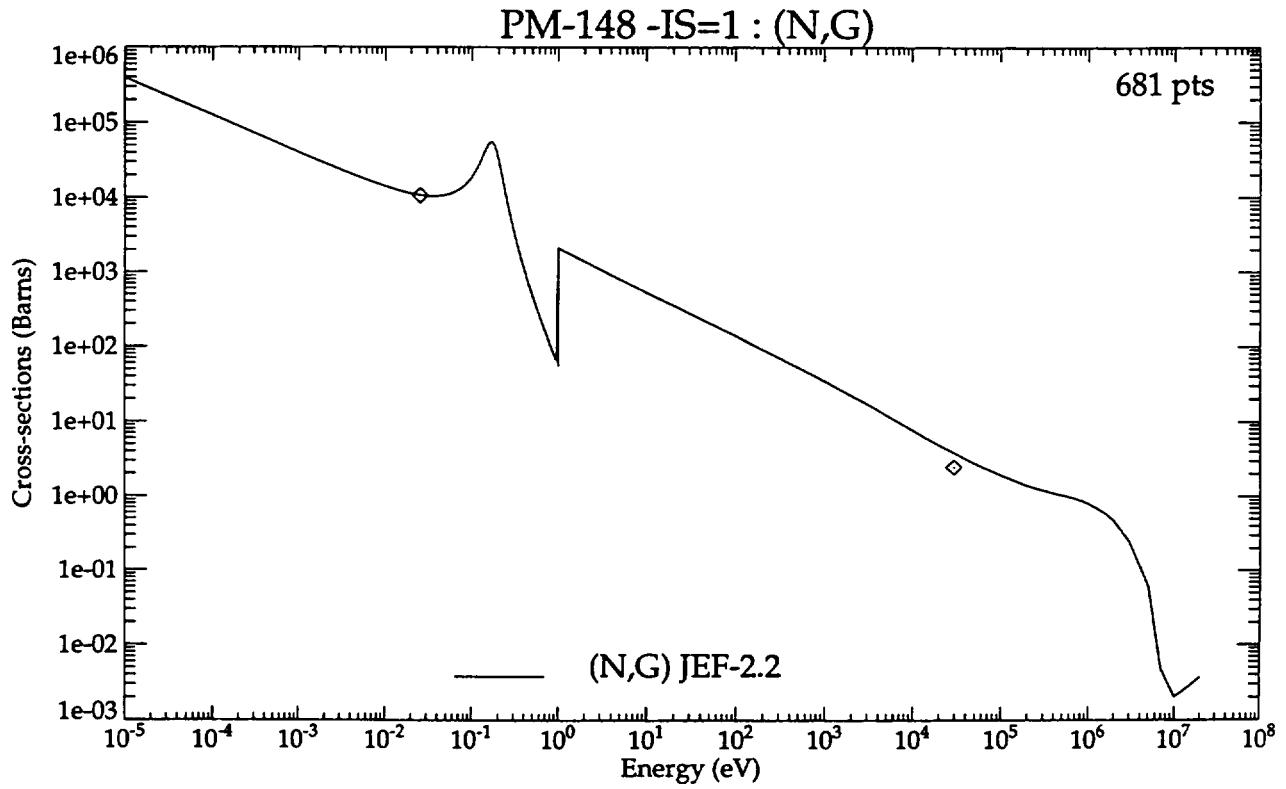
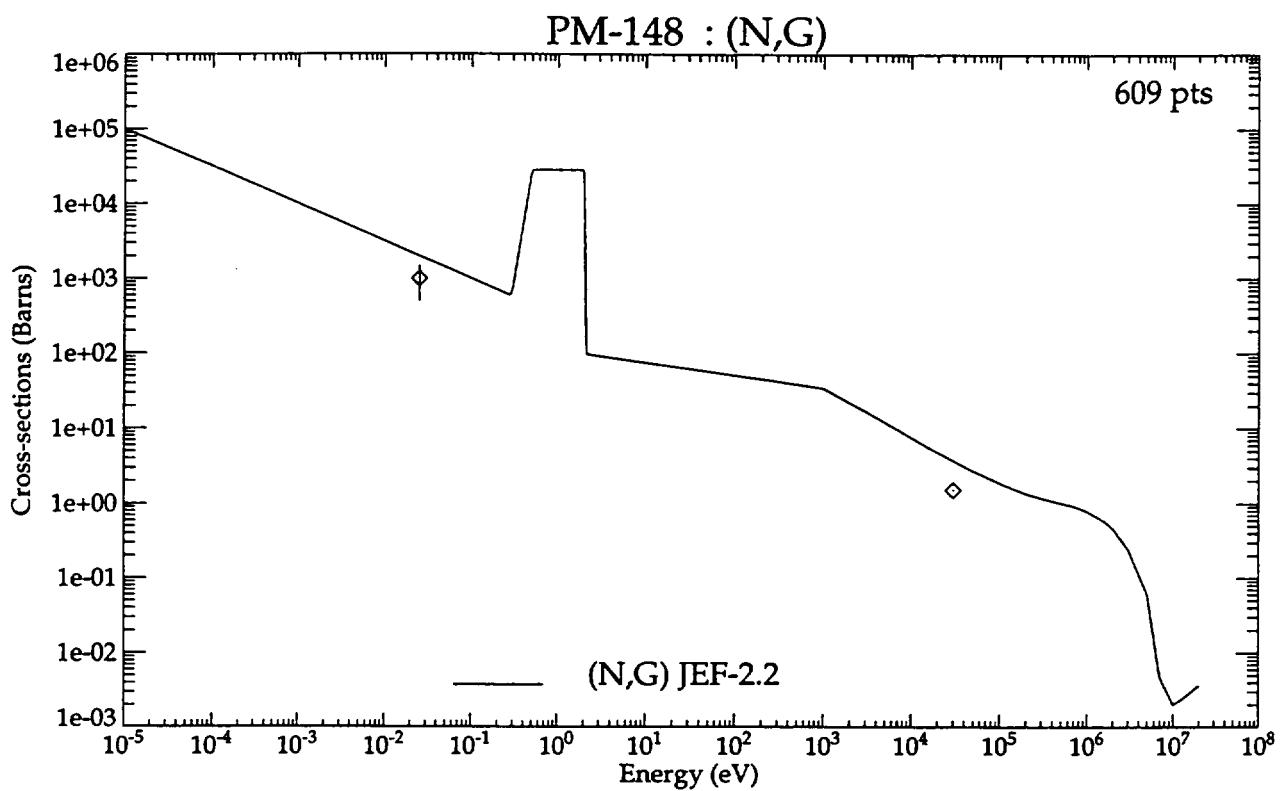


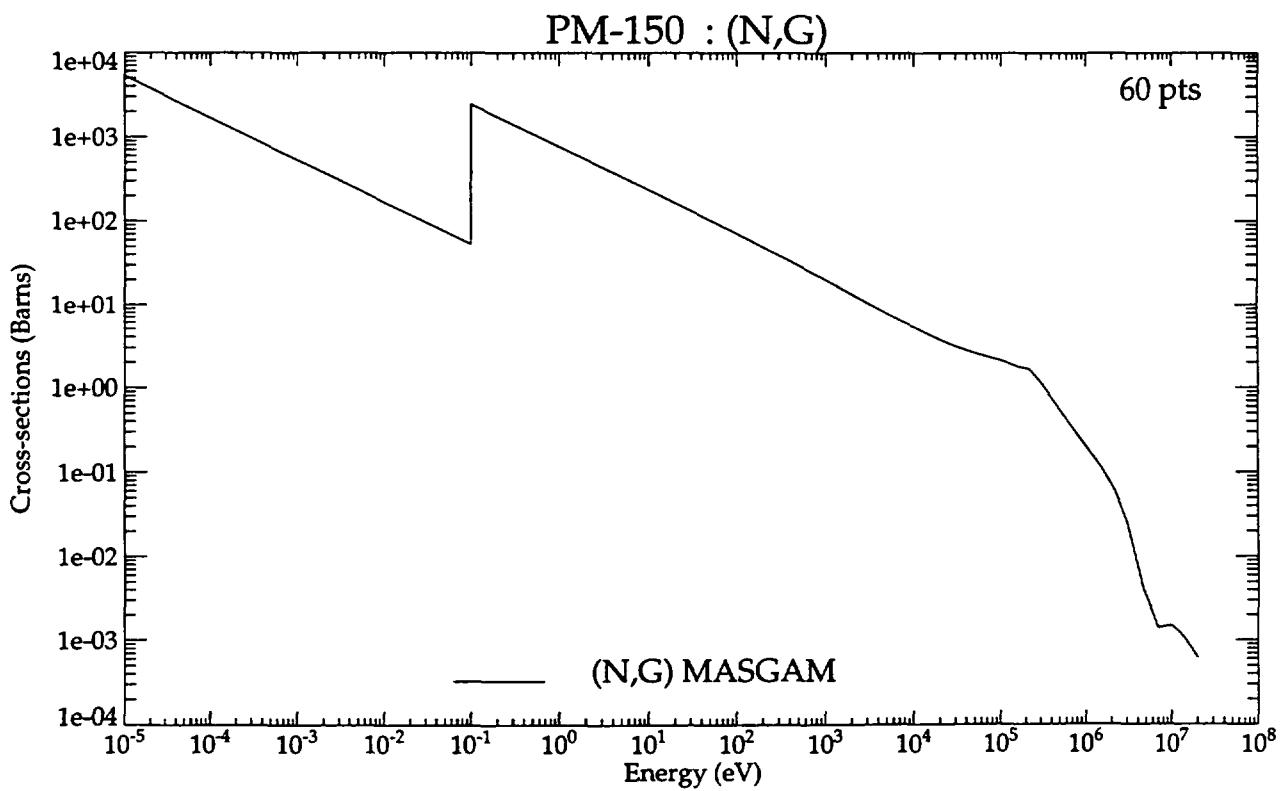
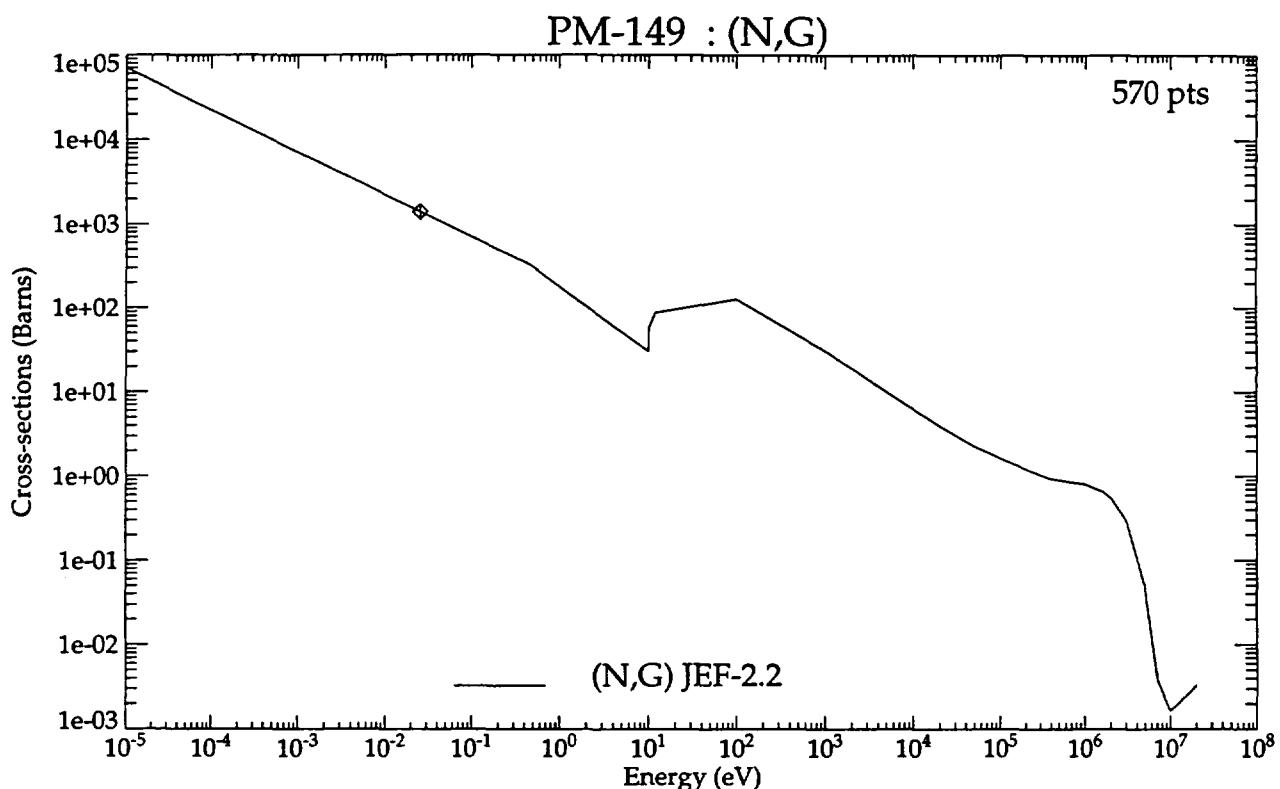


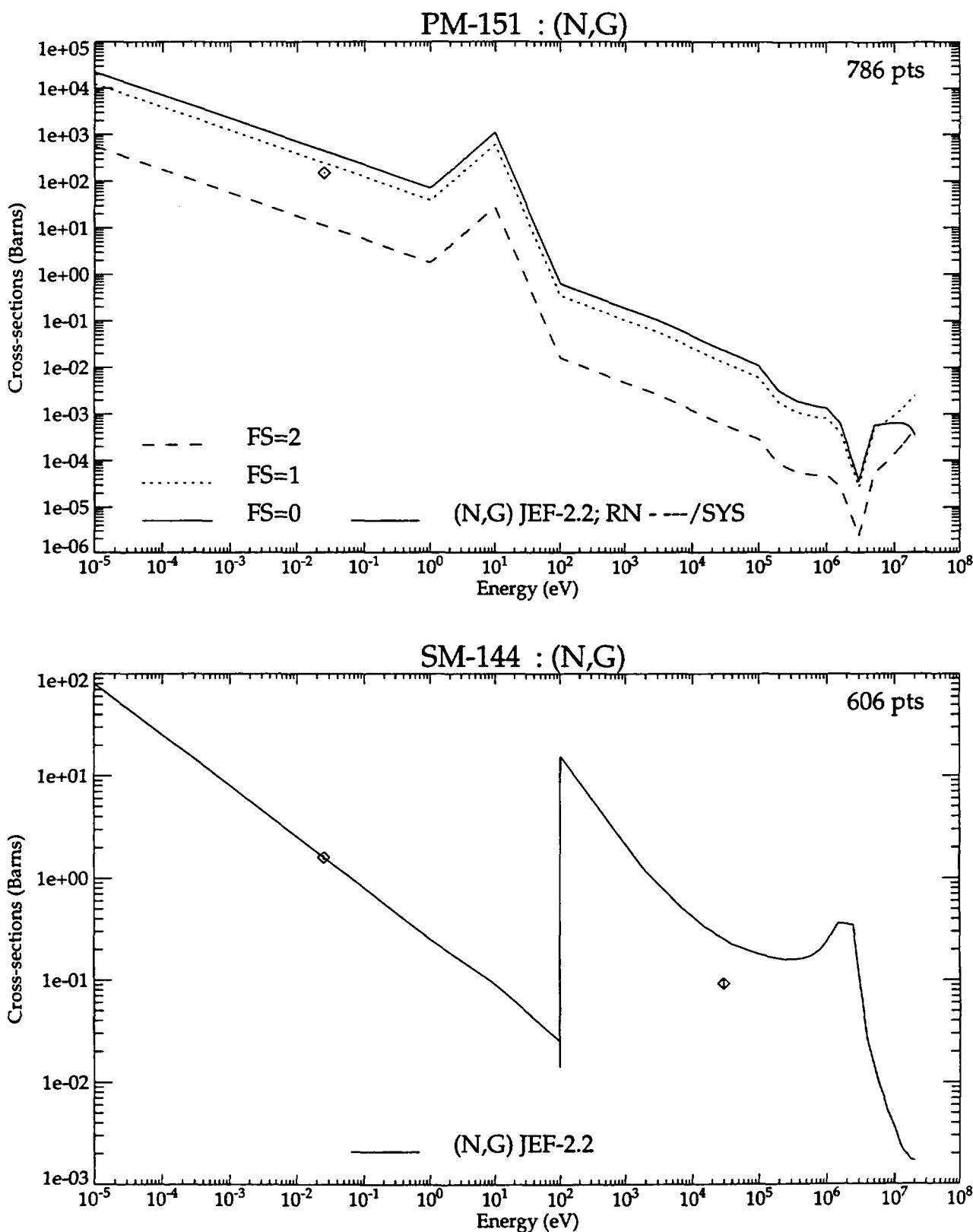


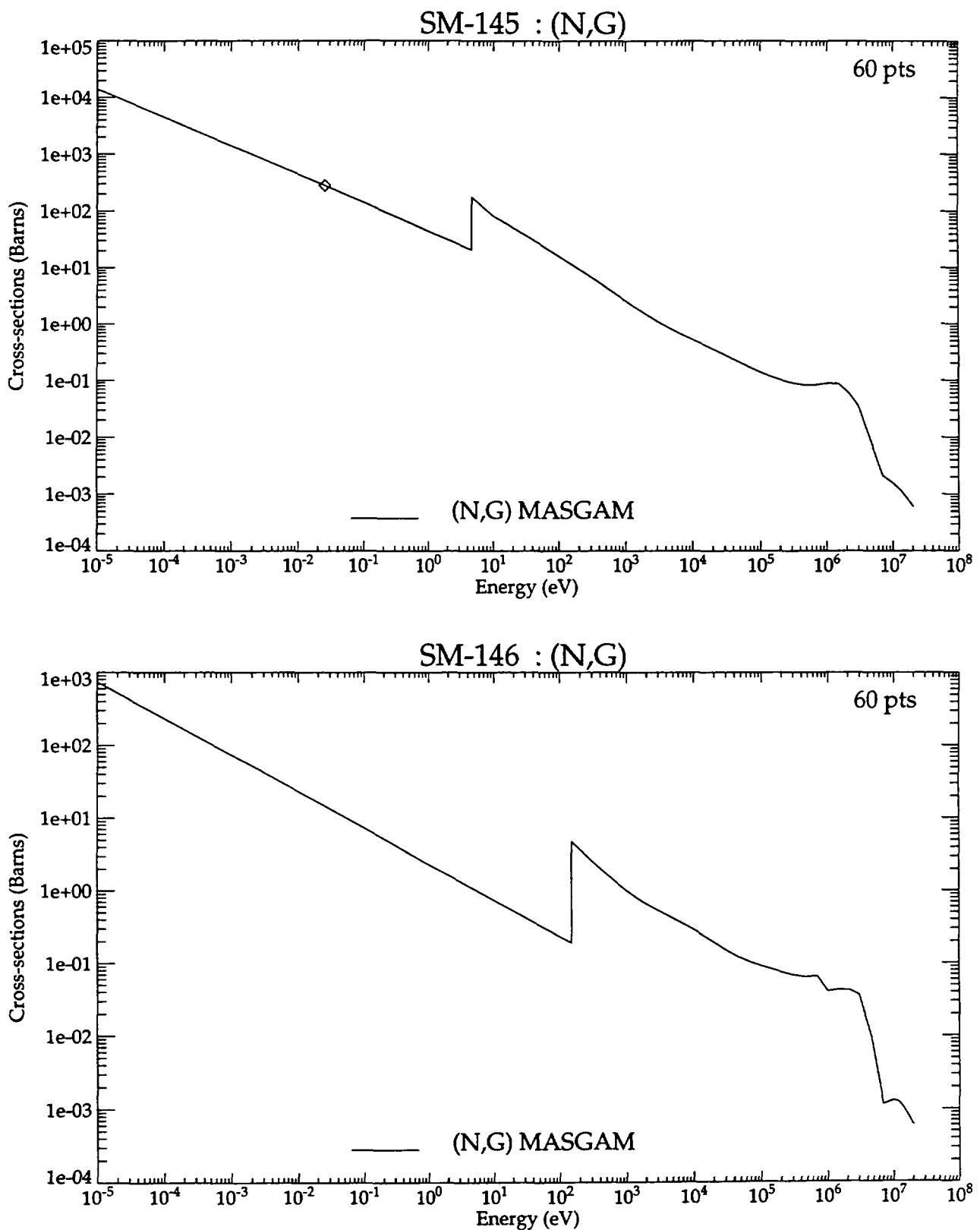


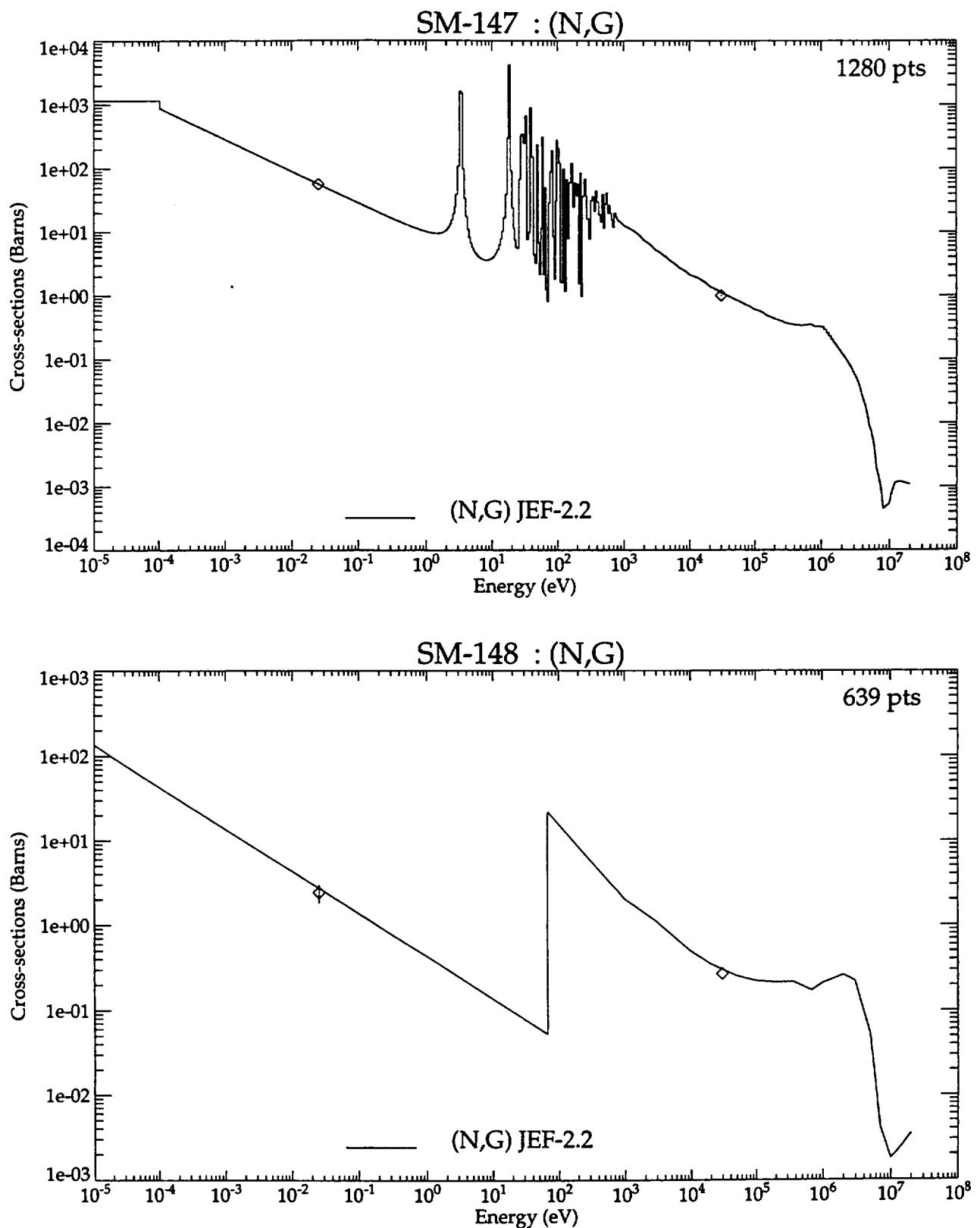


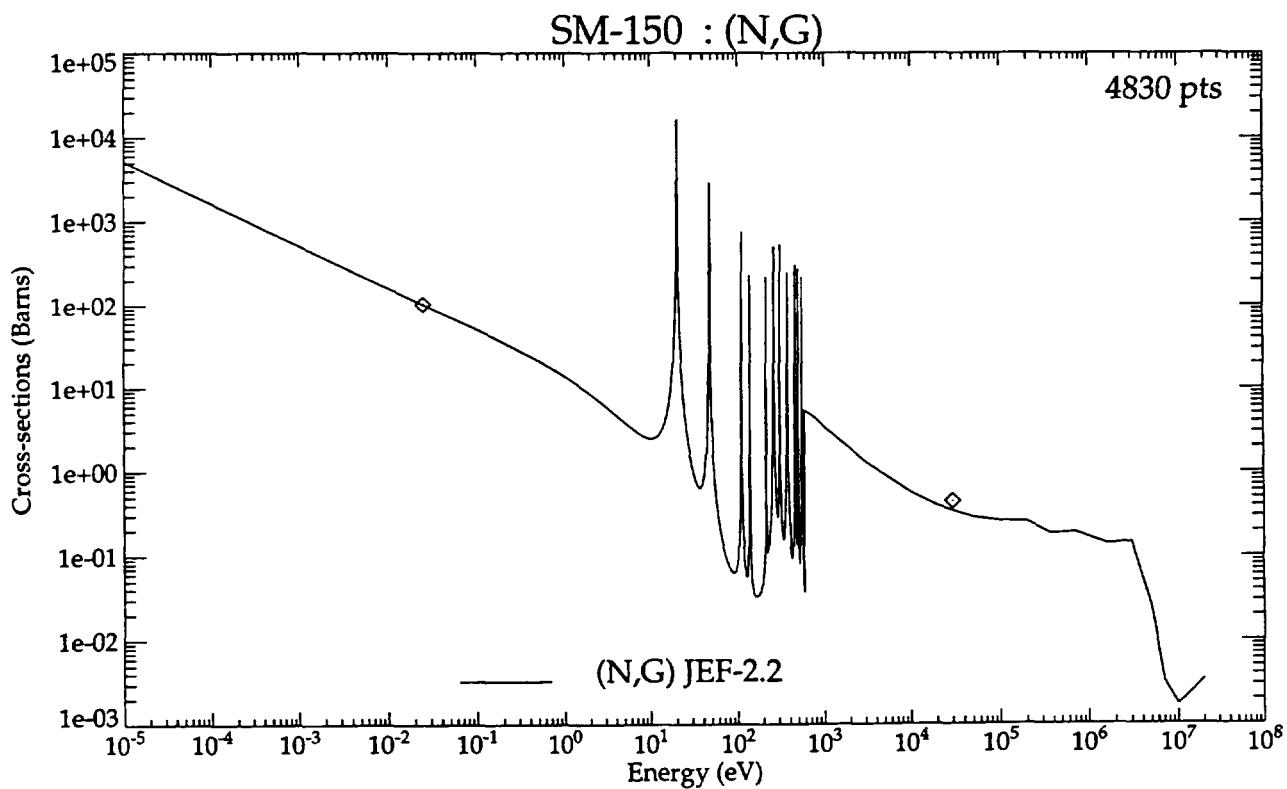
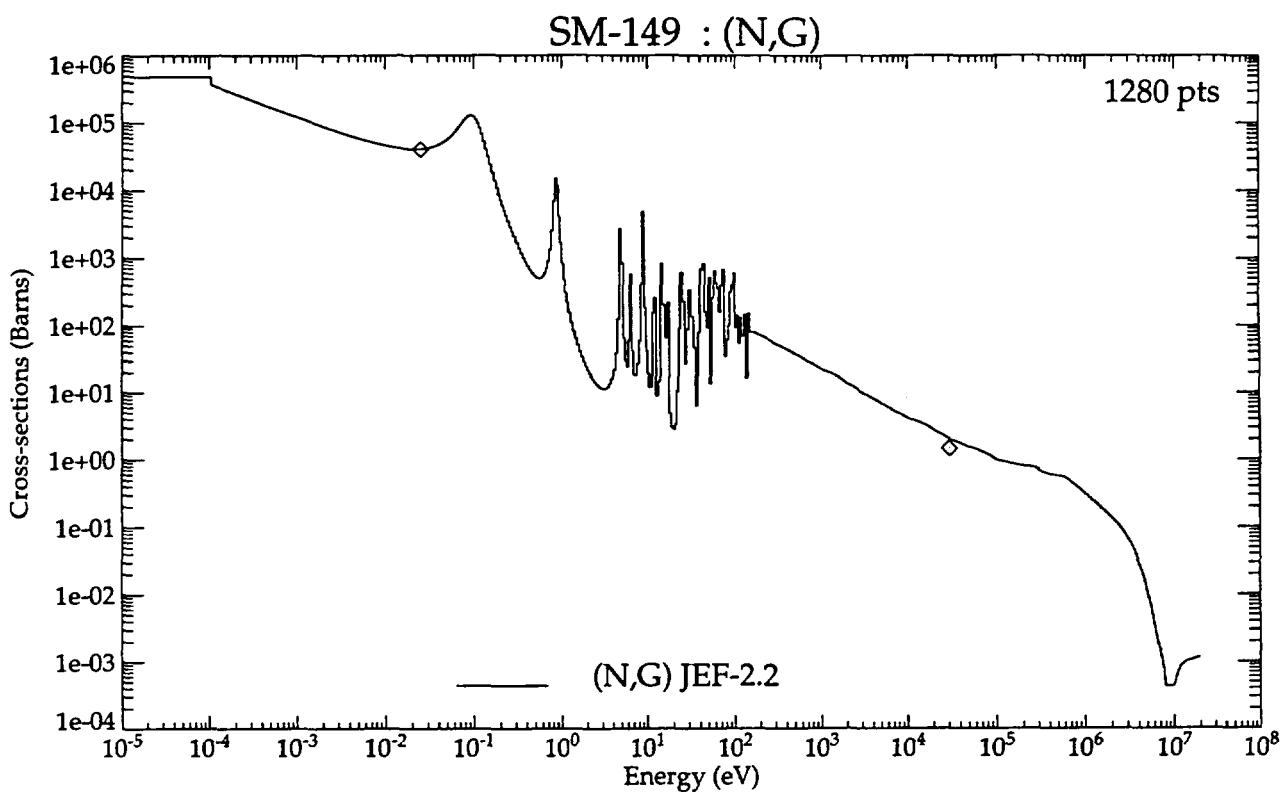


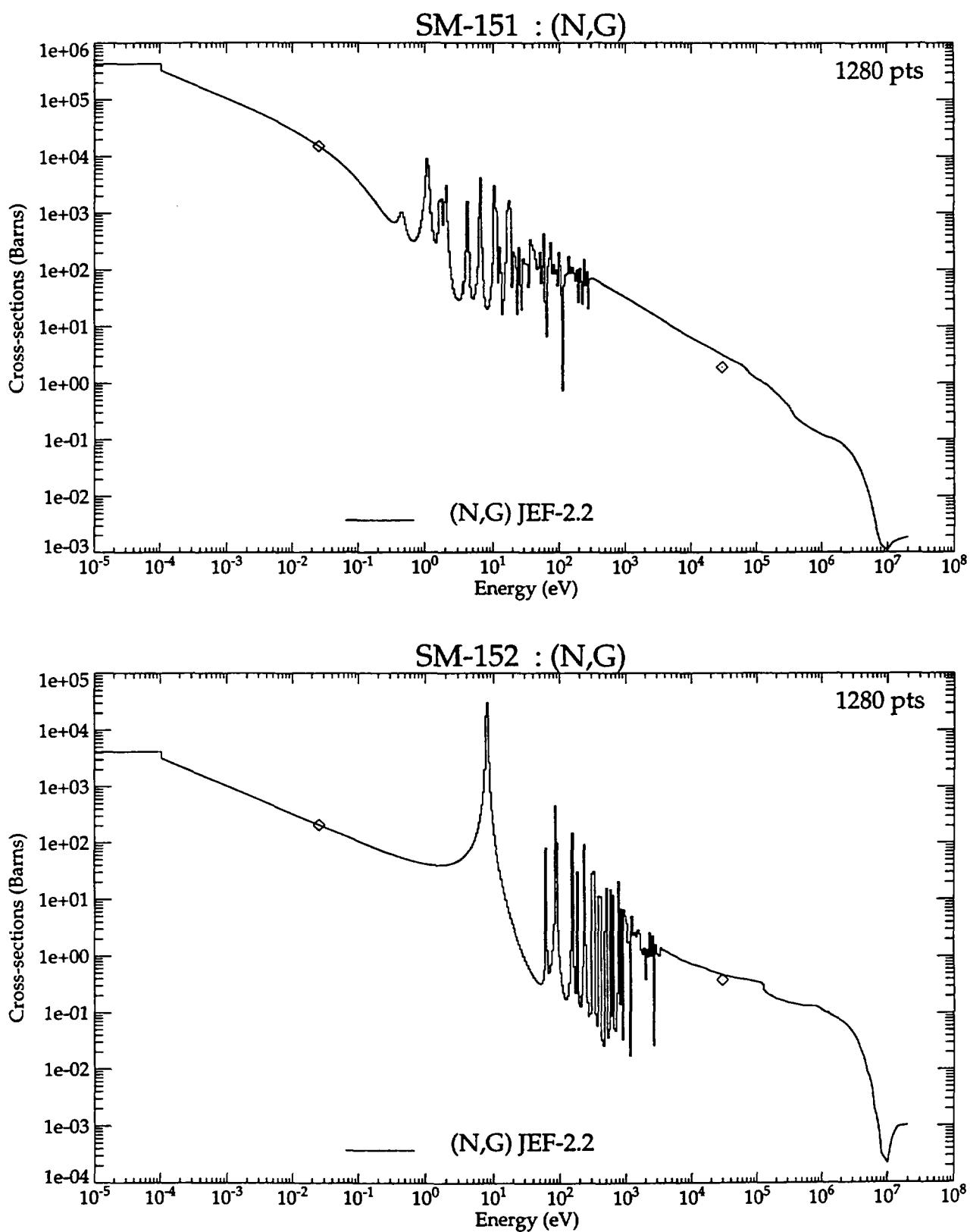


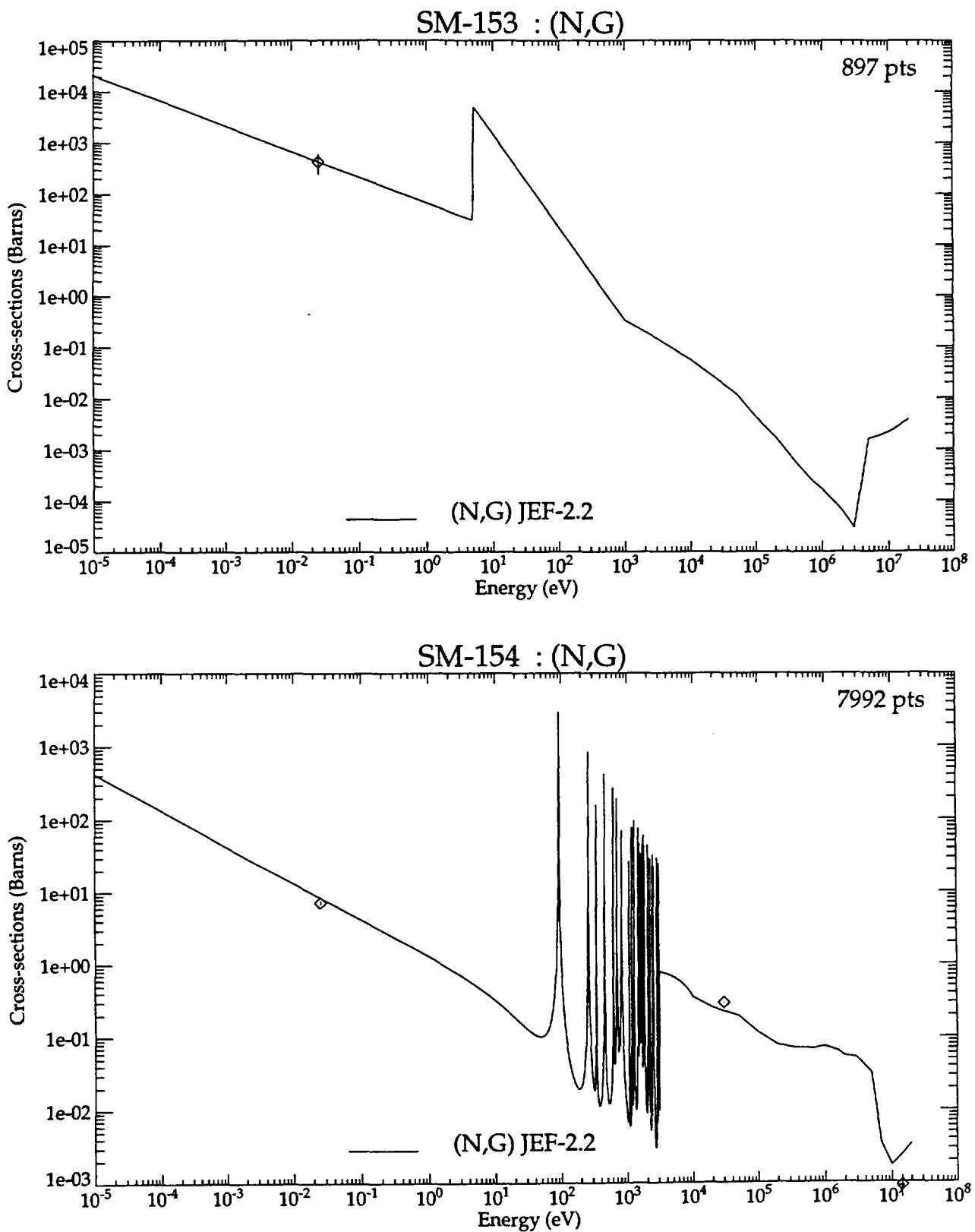


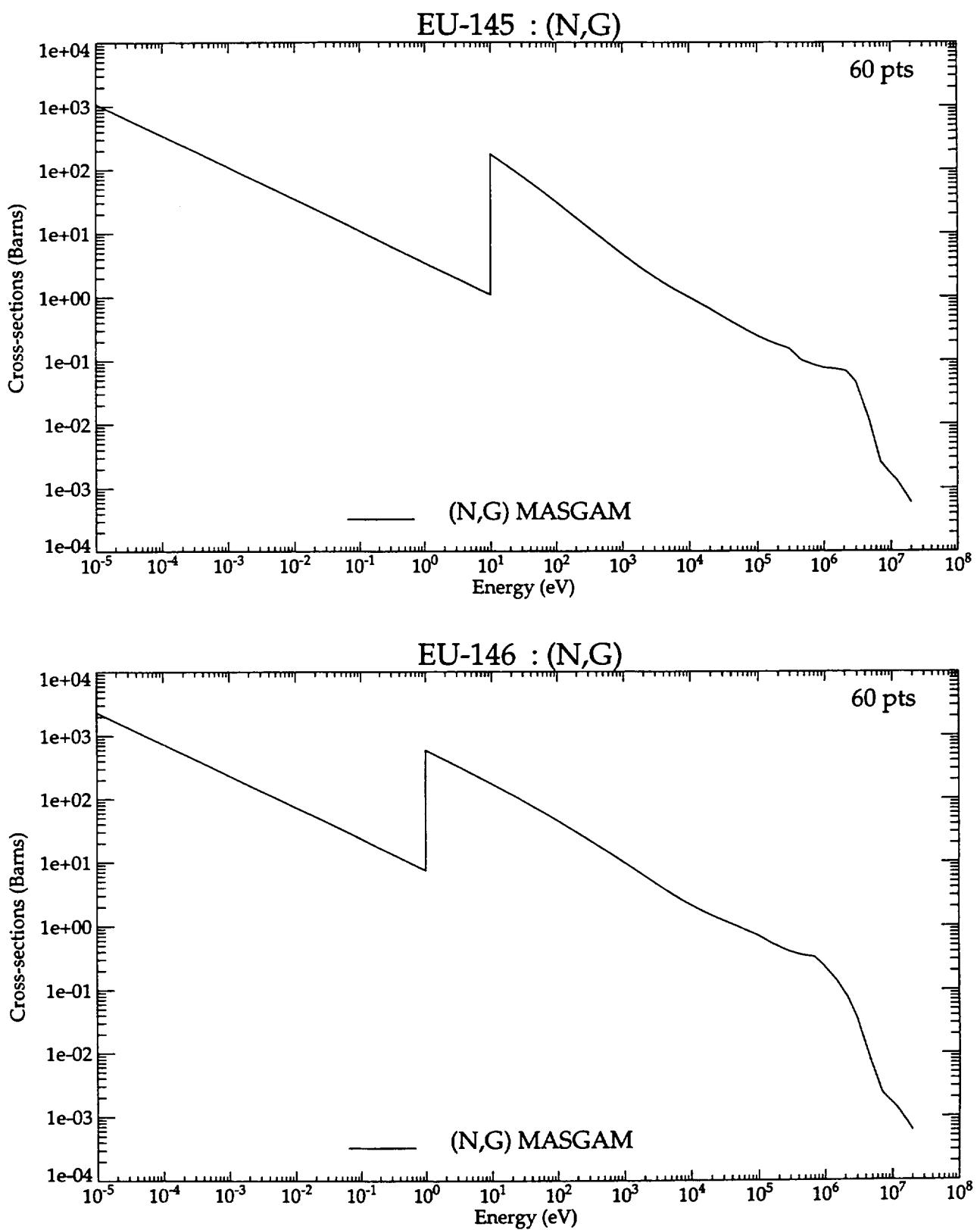




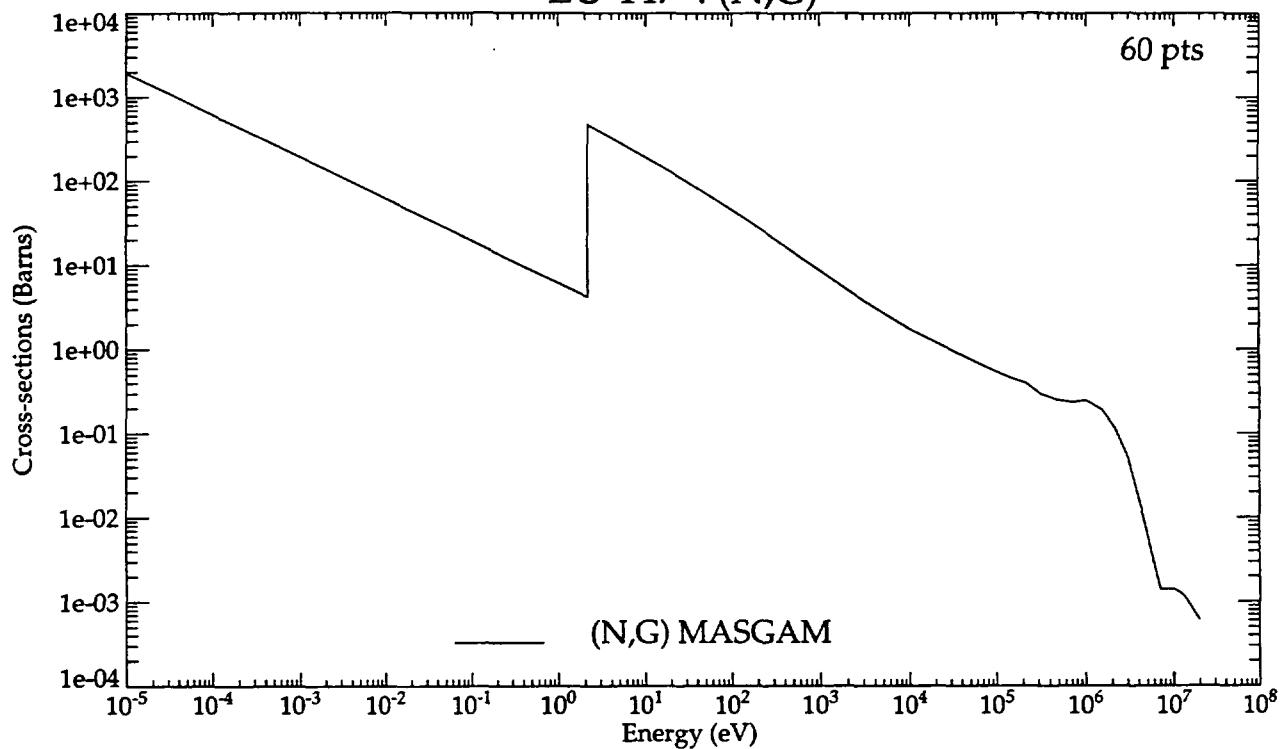




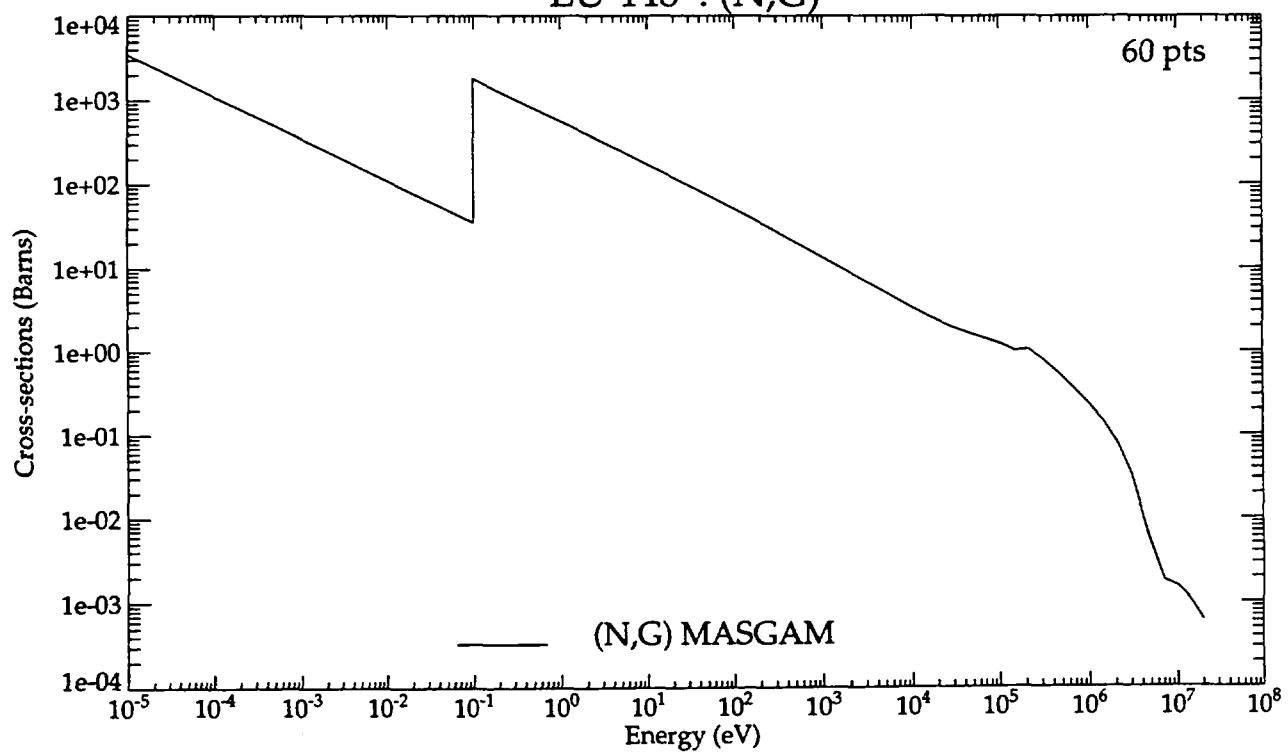


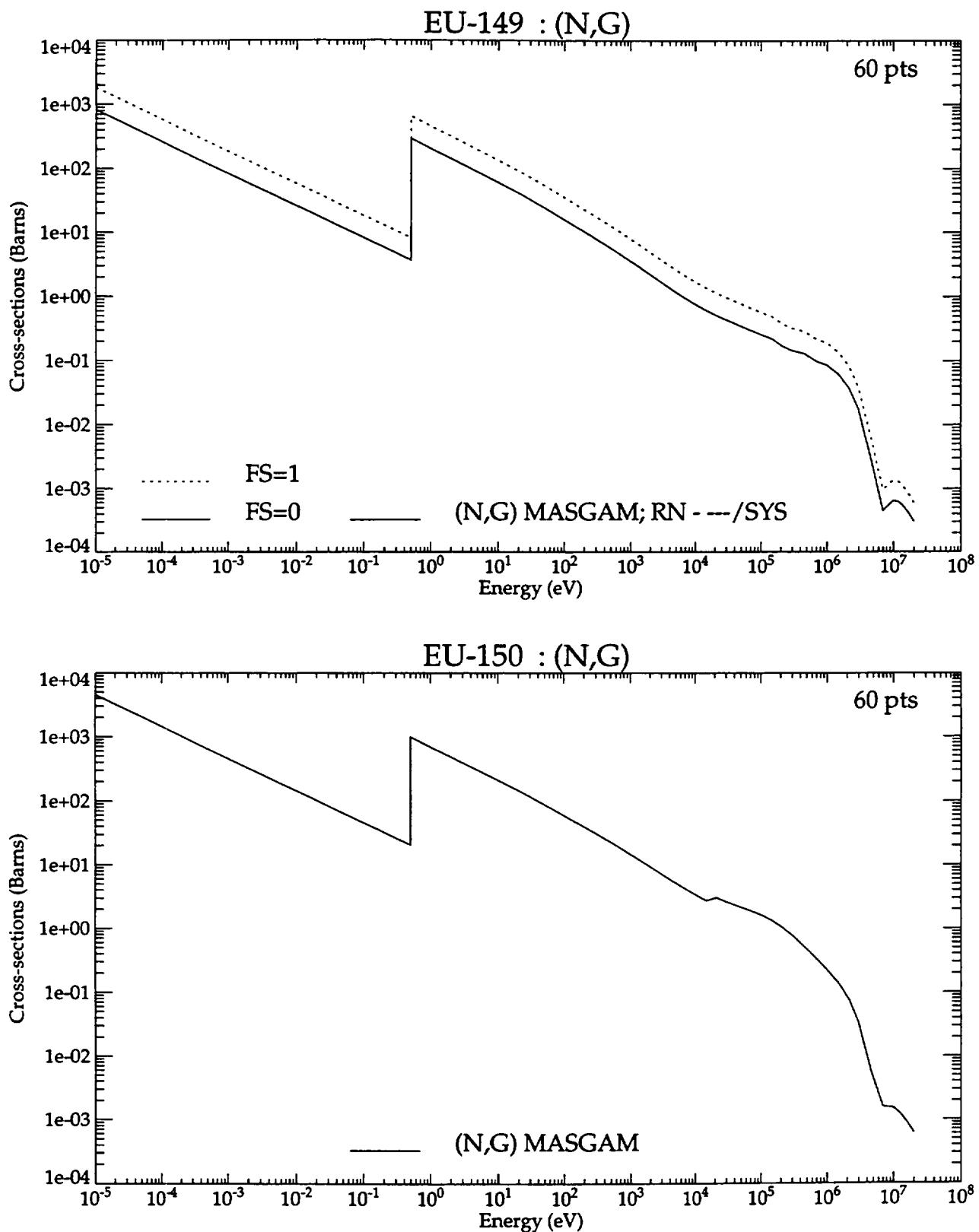


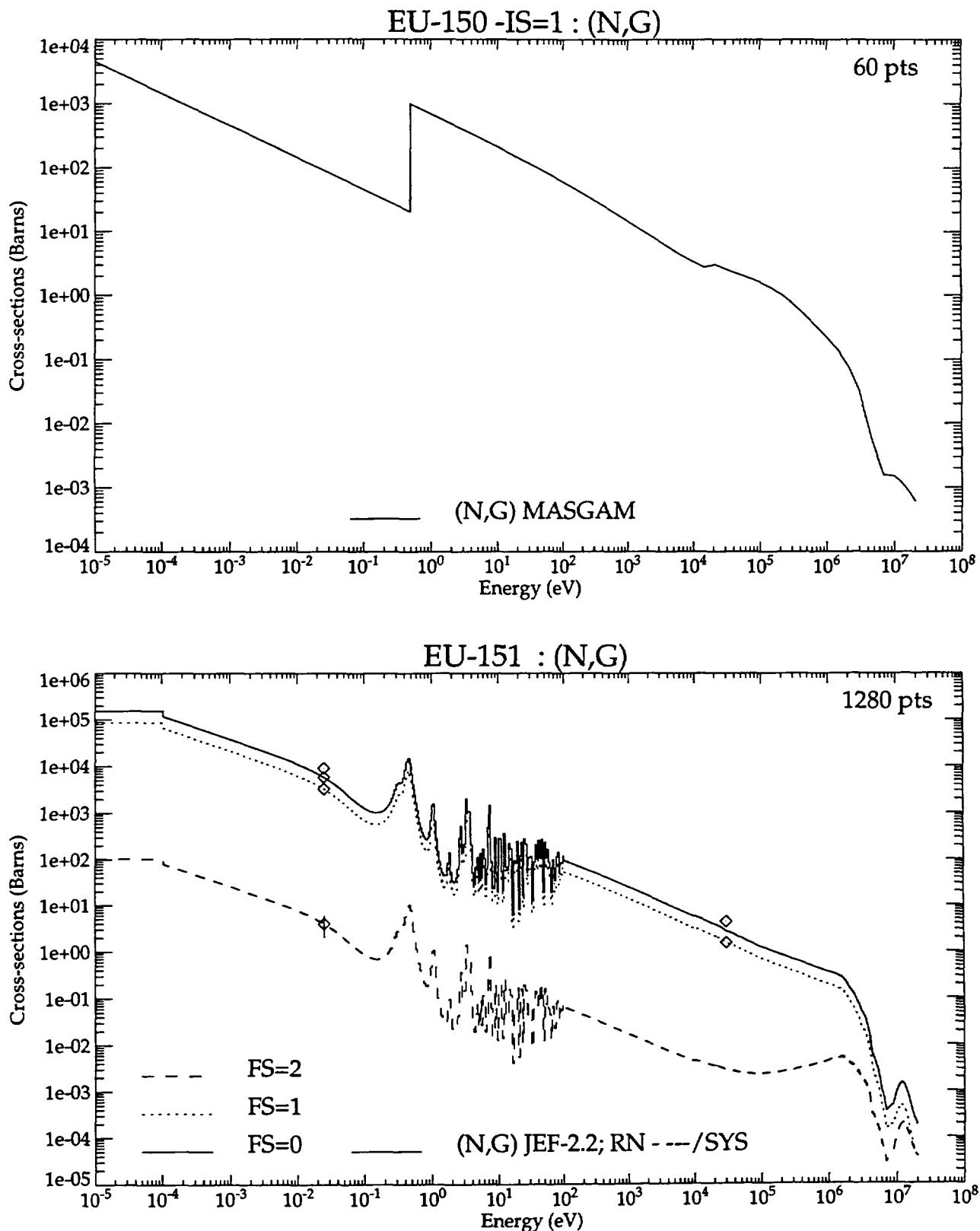
EU-147 : (N,G)

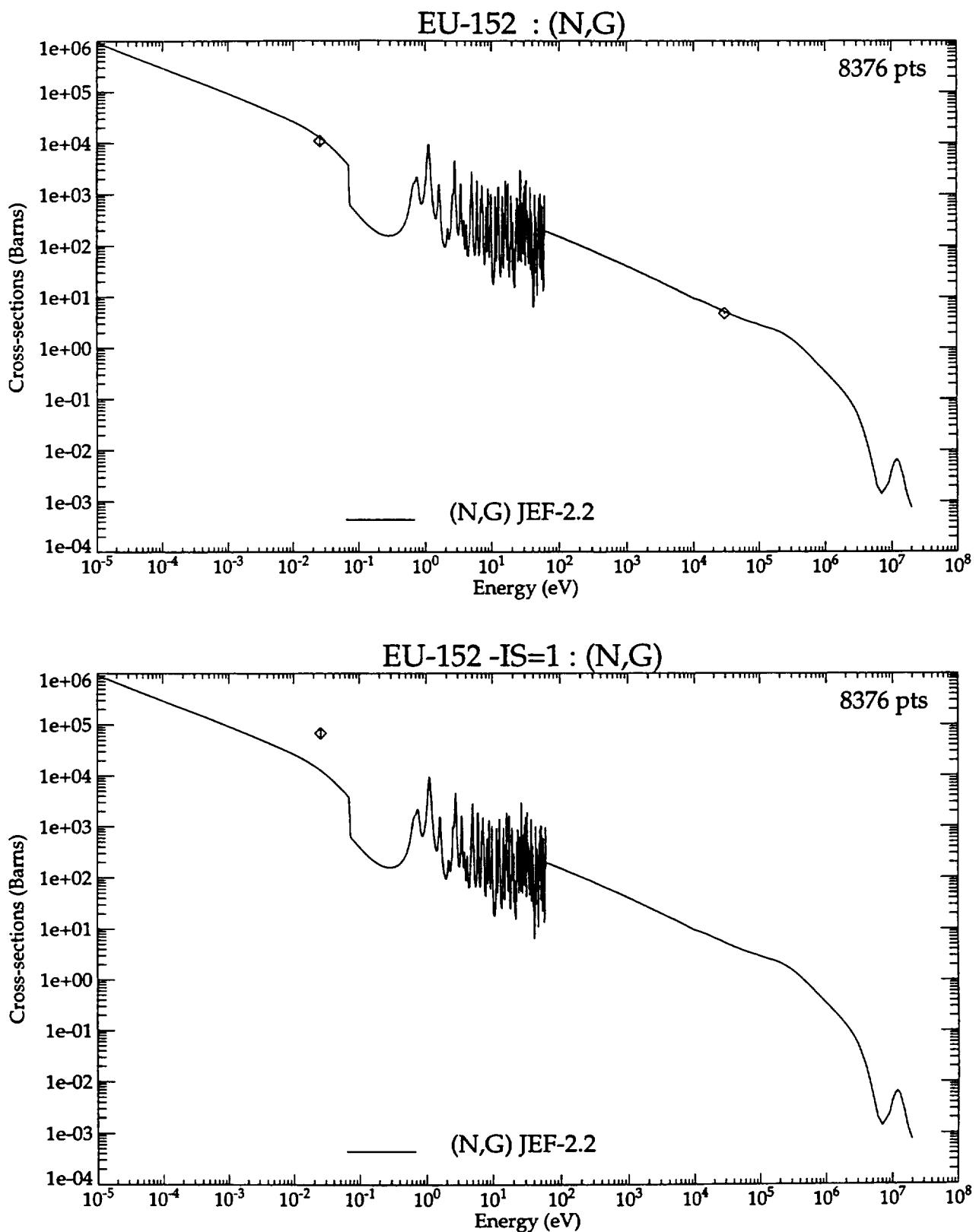


EU-148 : (N,G)

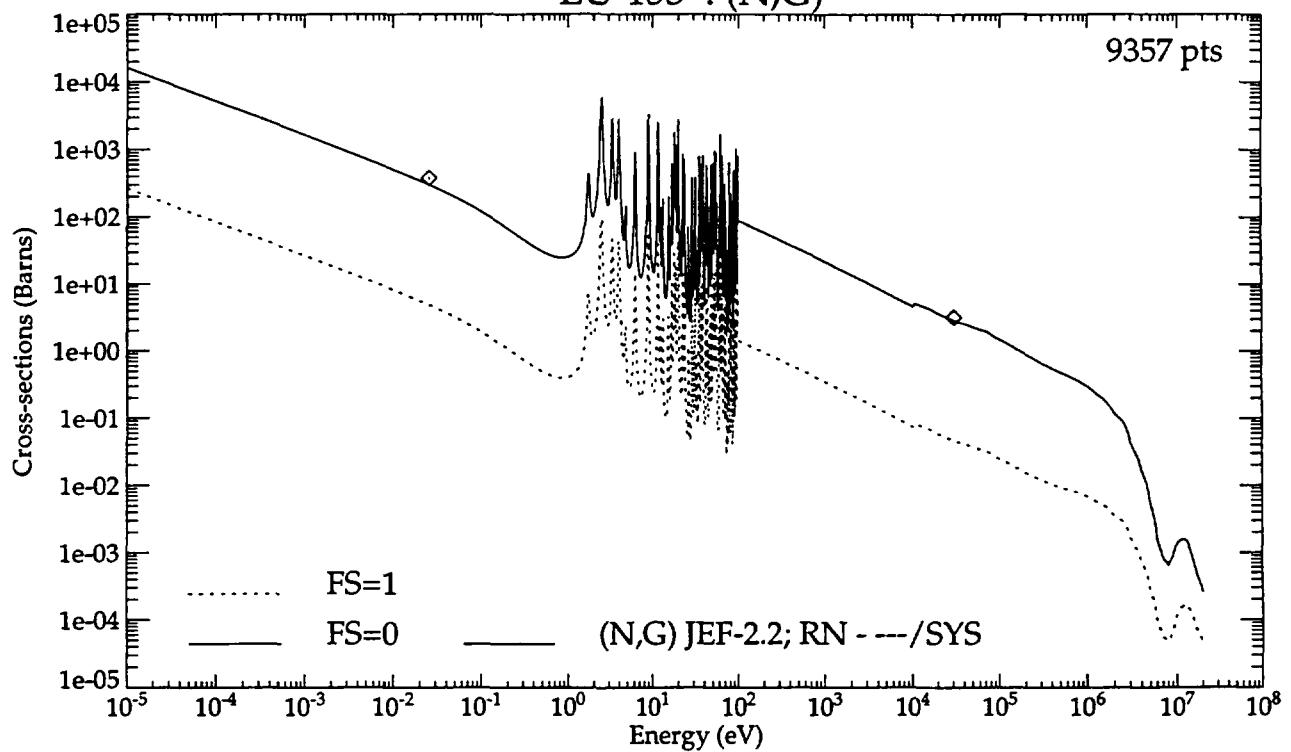




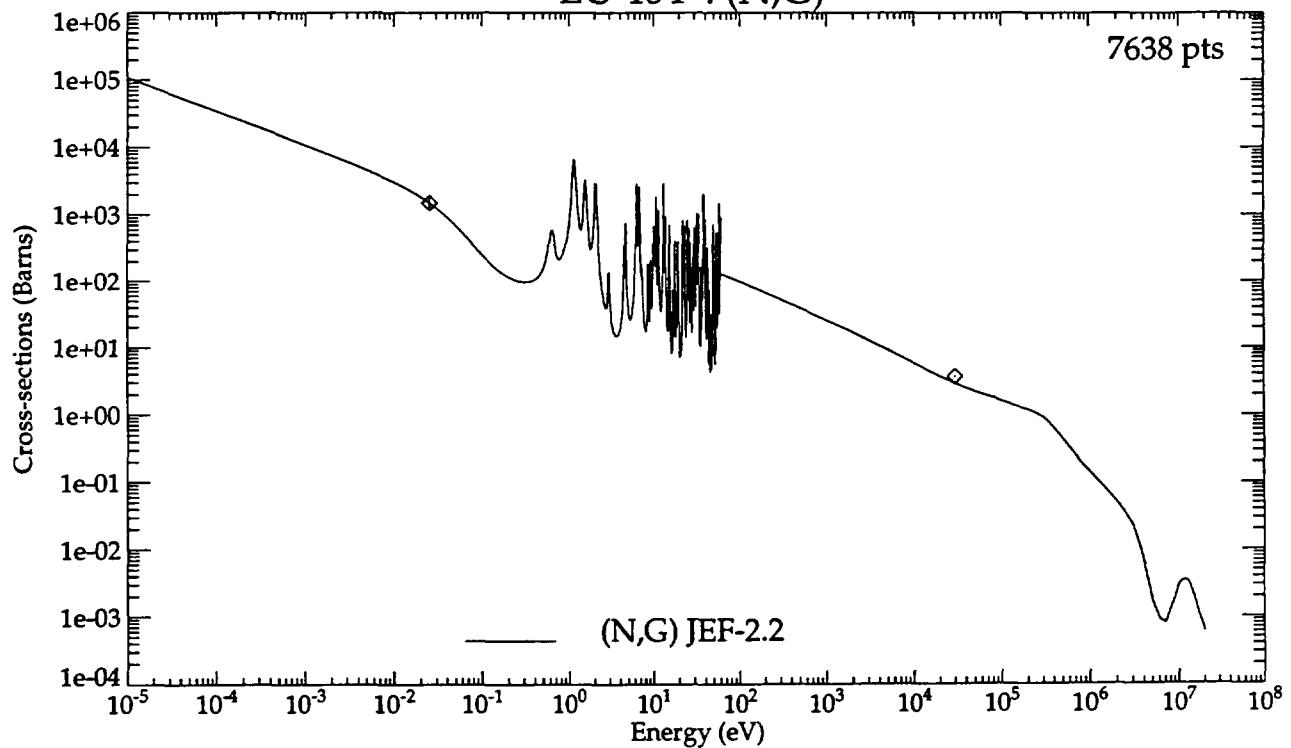


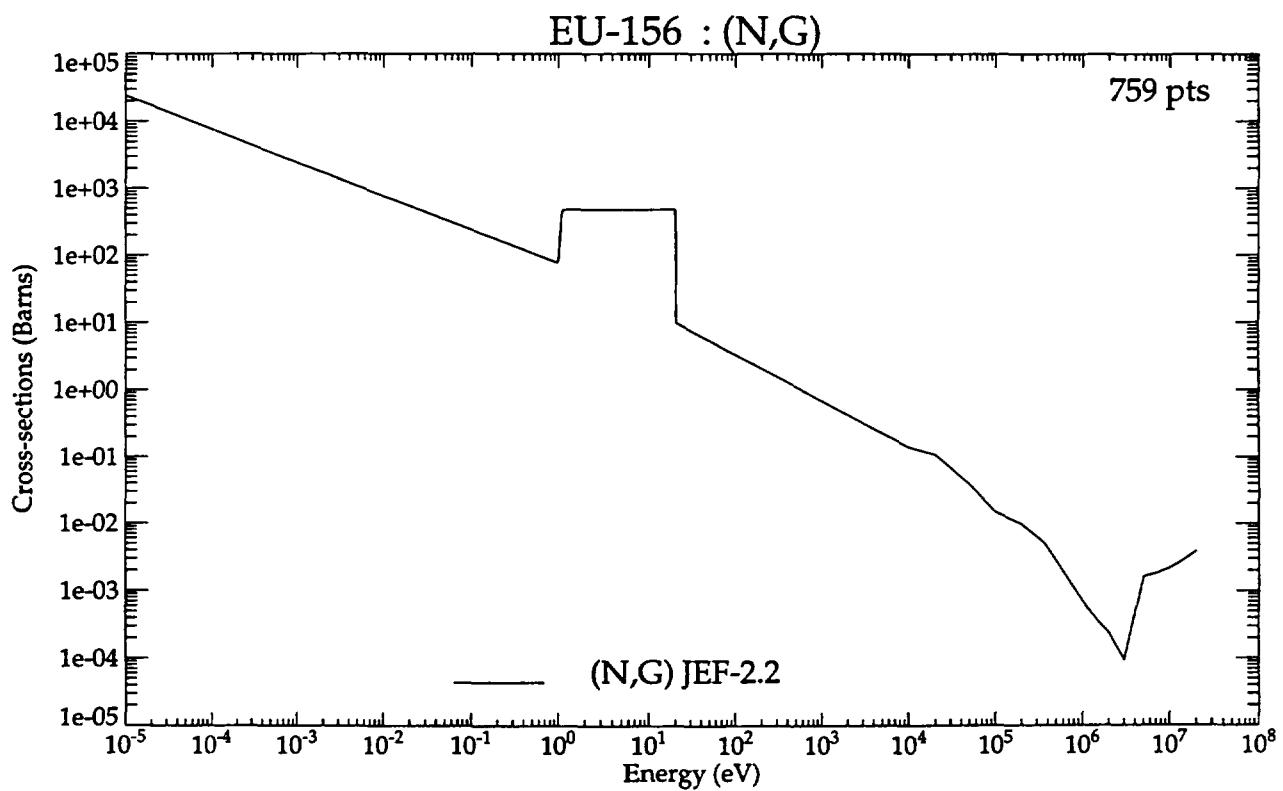
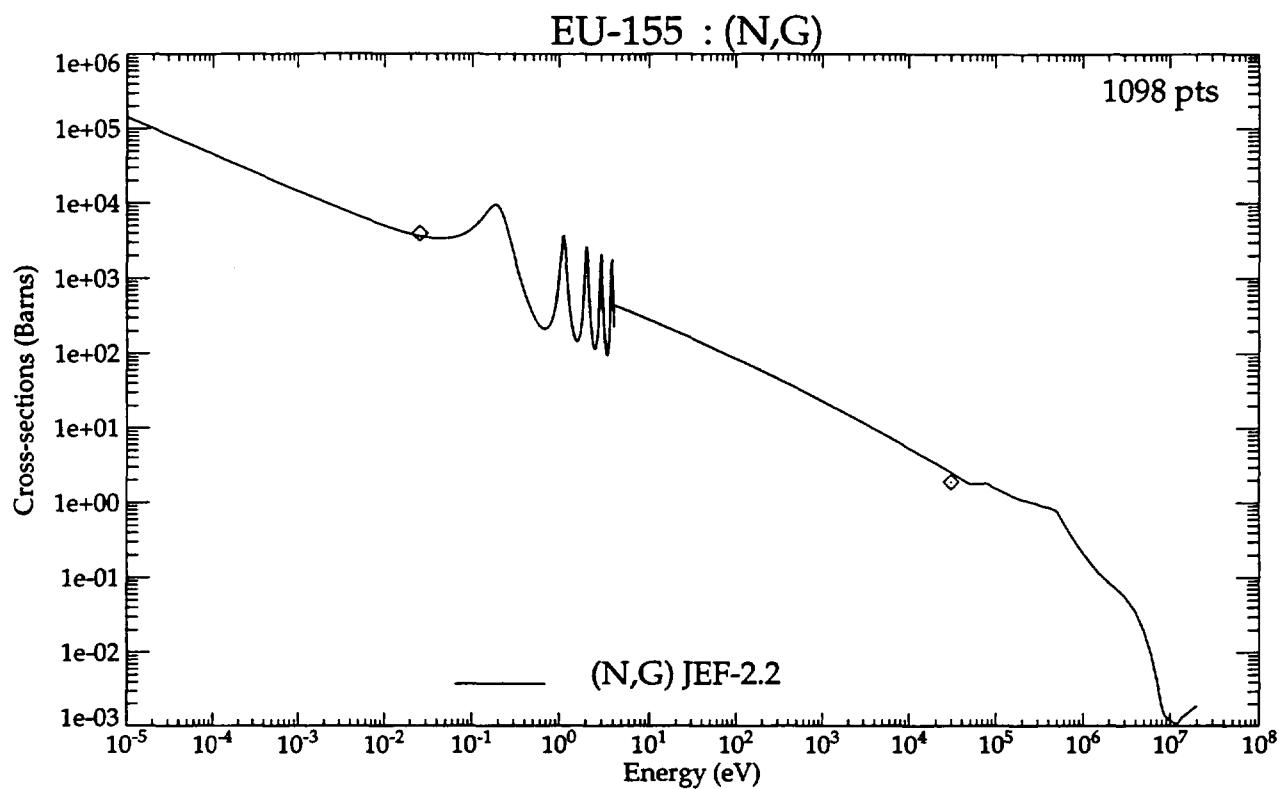


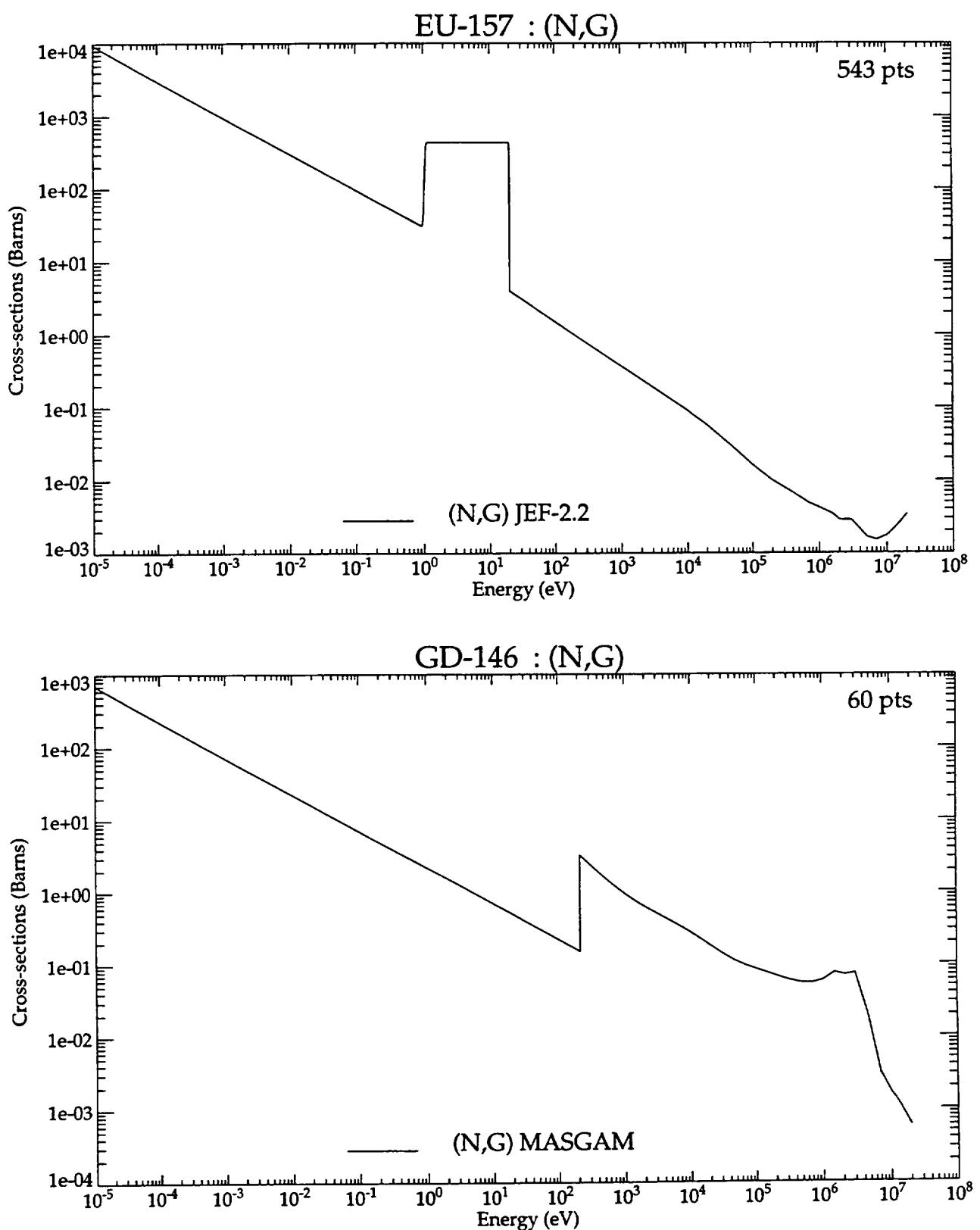
EU-153 : (N,G)

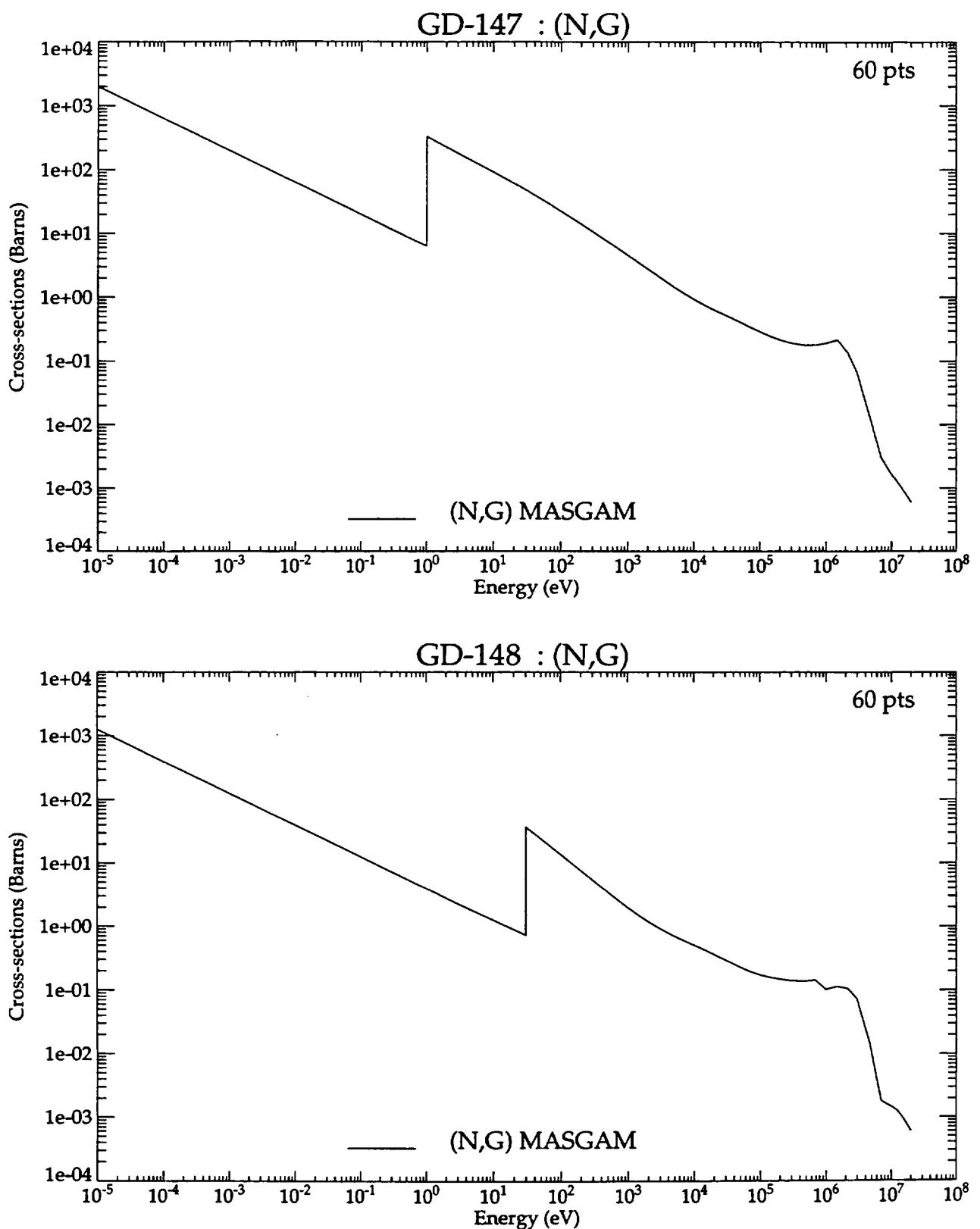


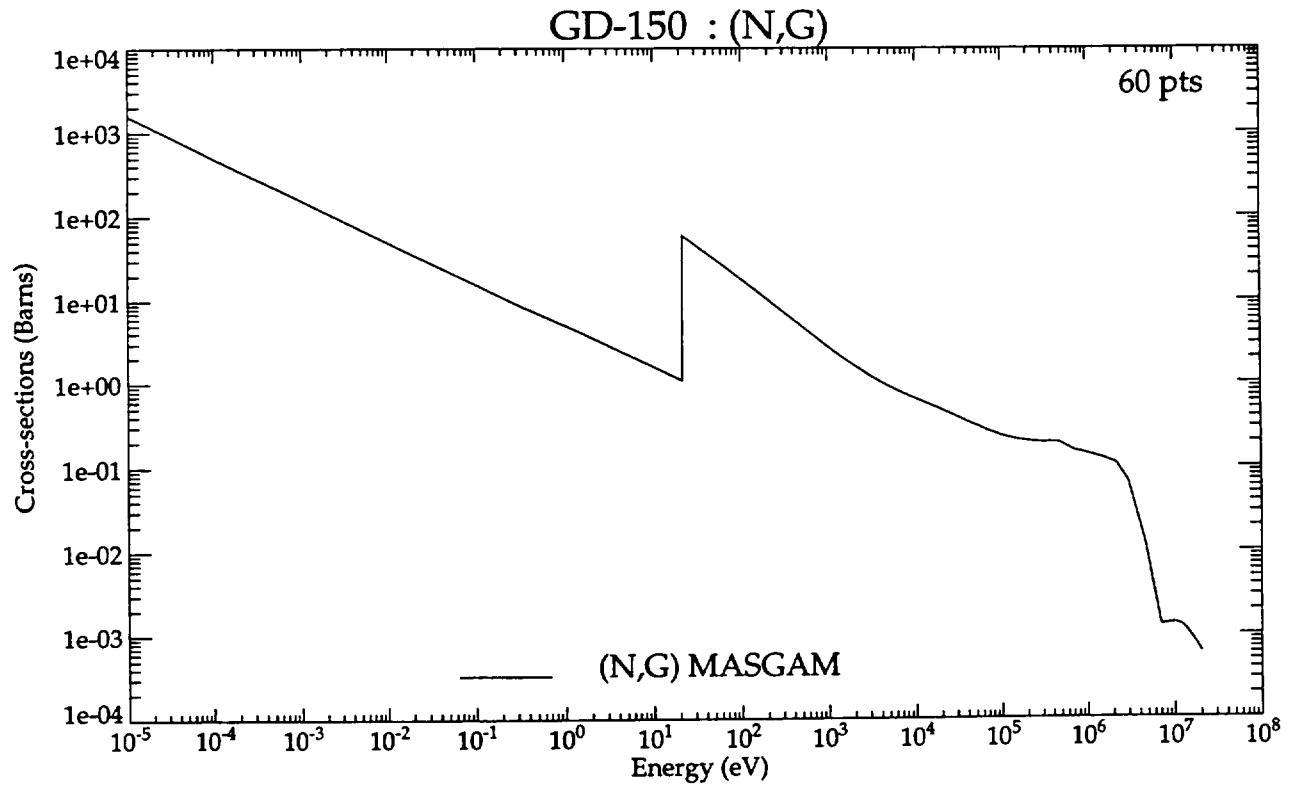
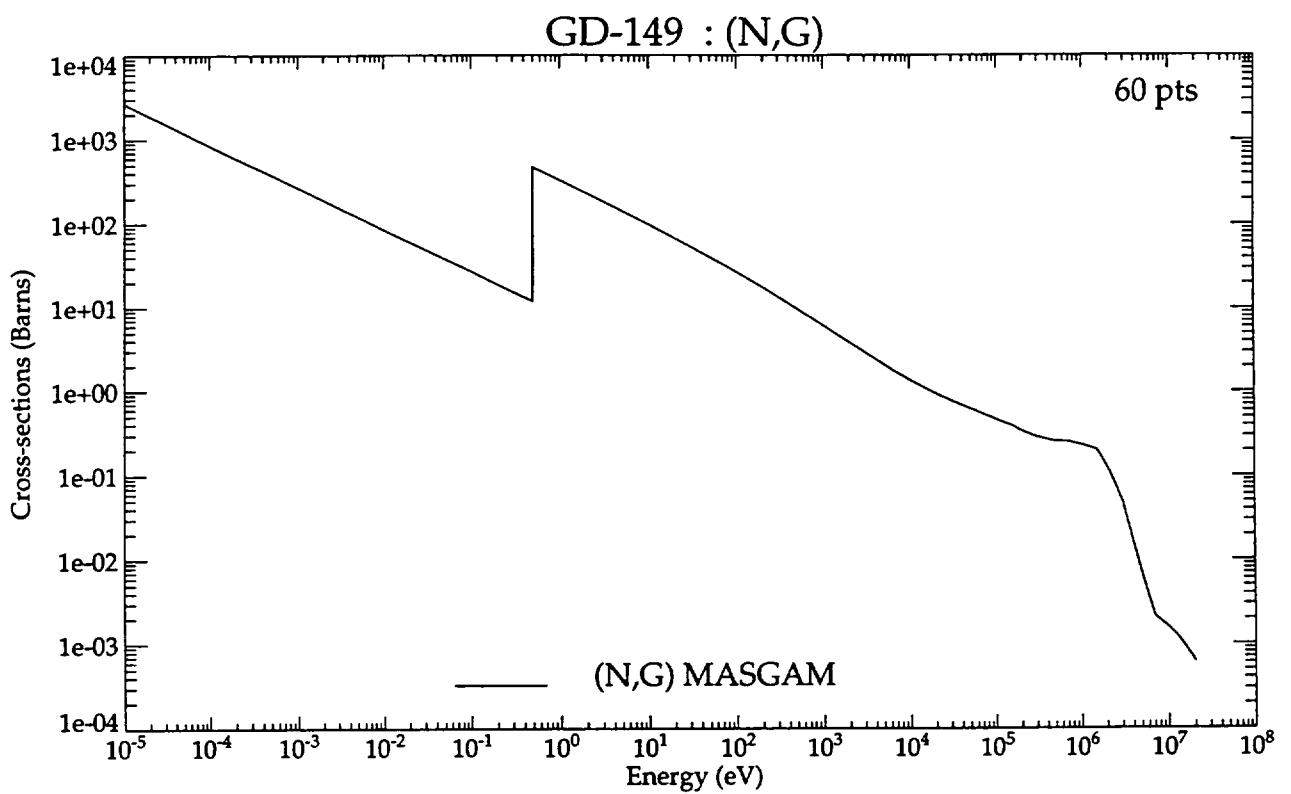
EU-154 : (N,G)

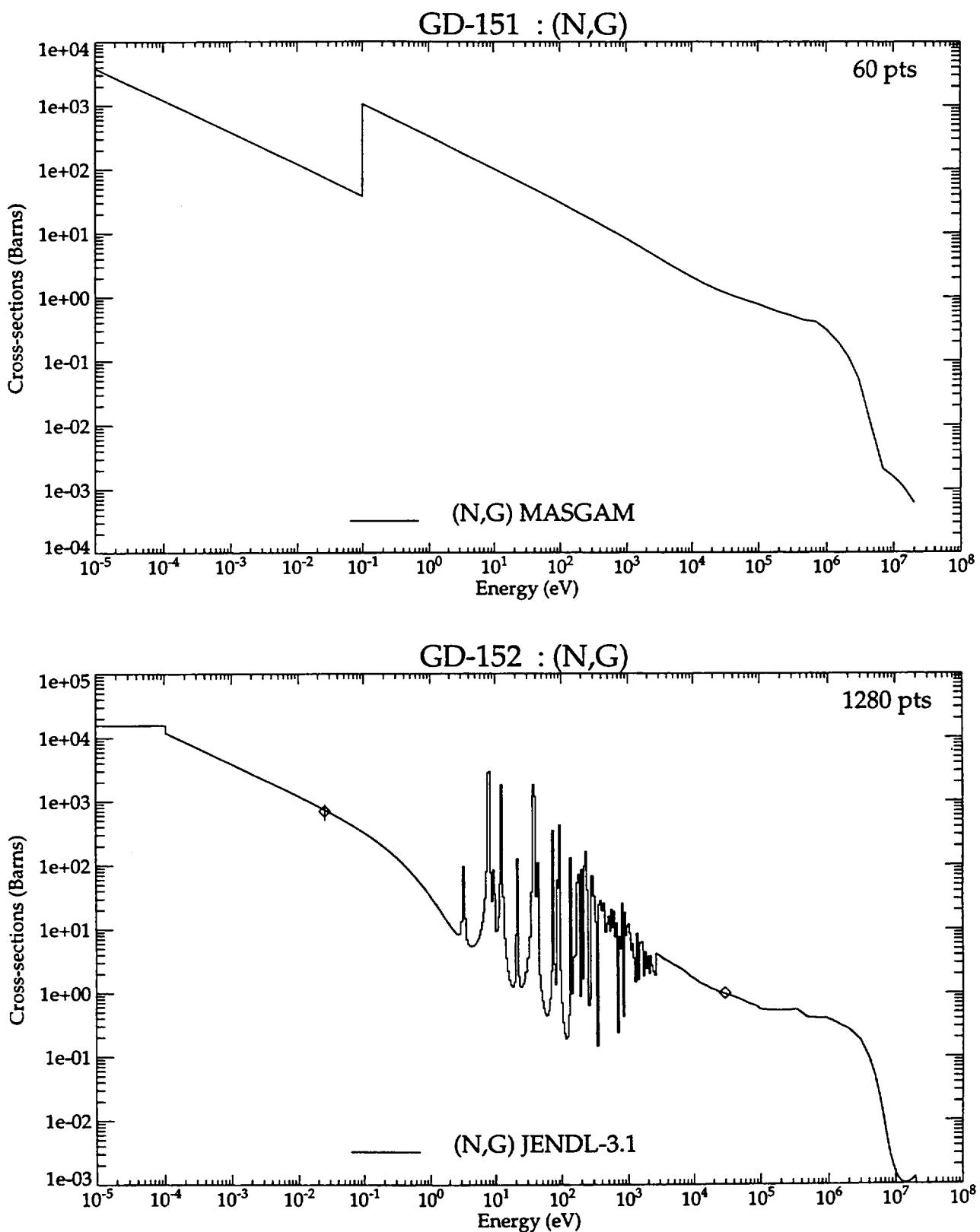


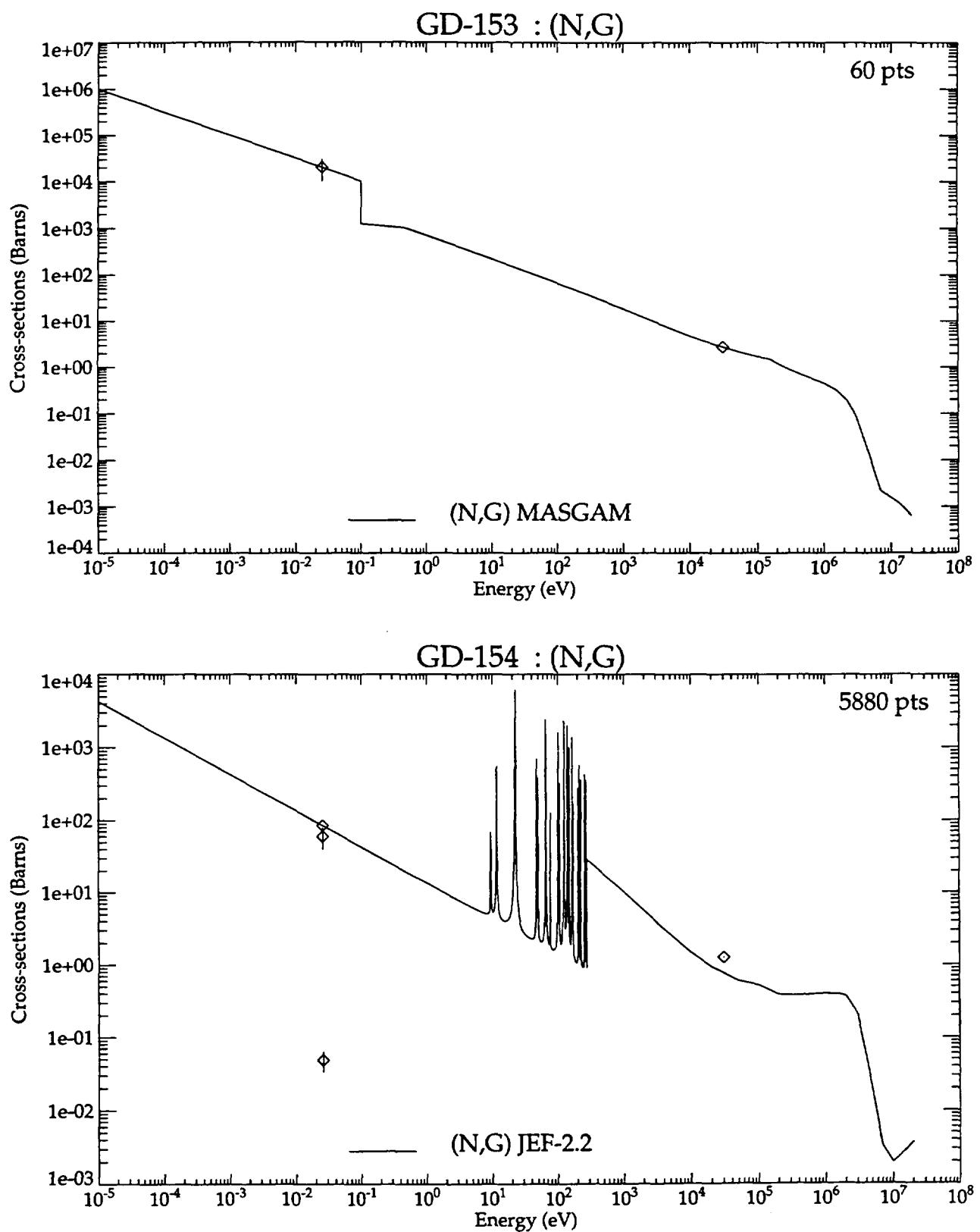


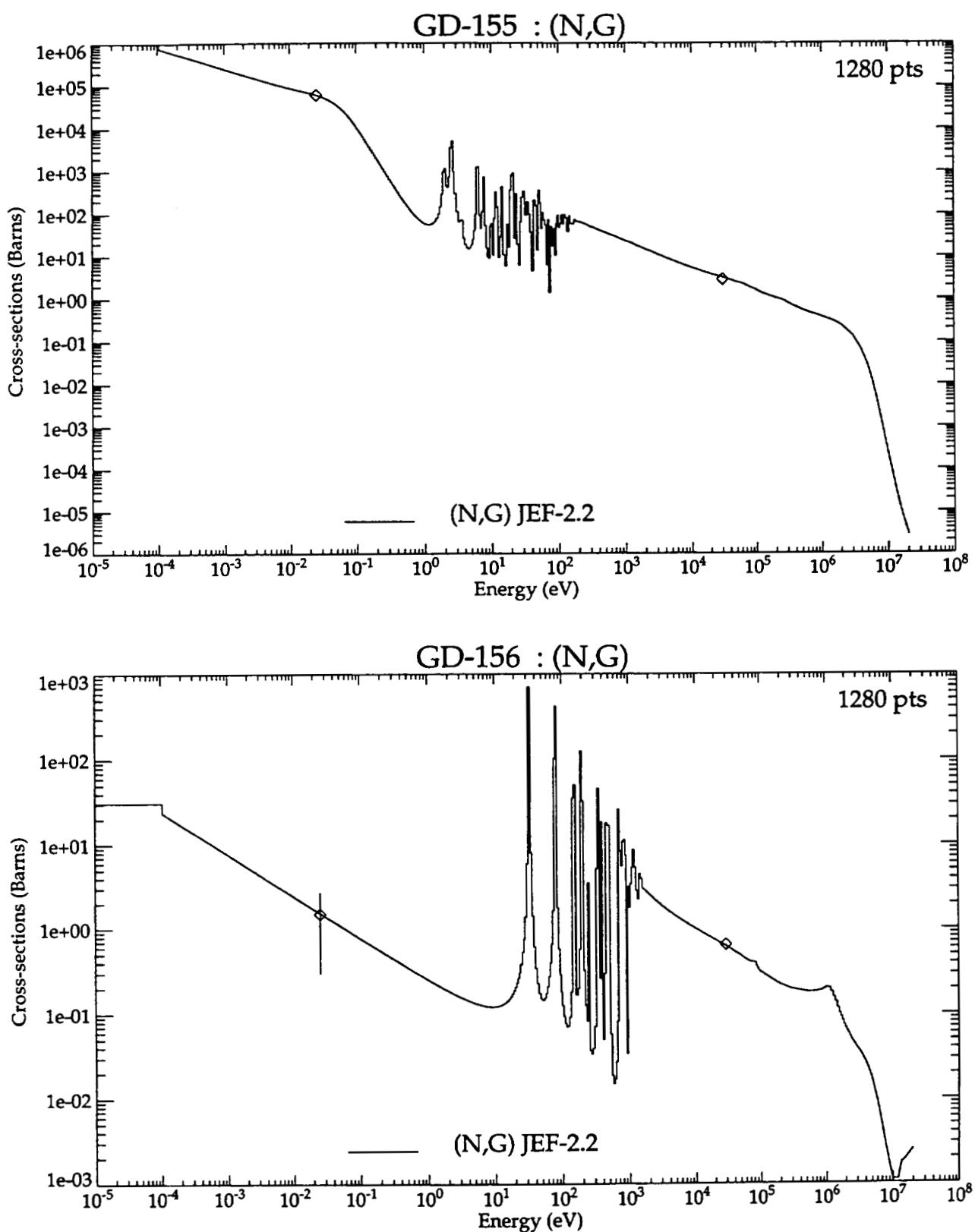


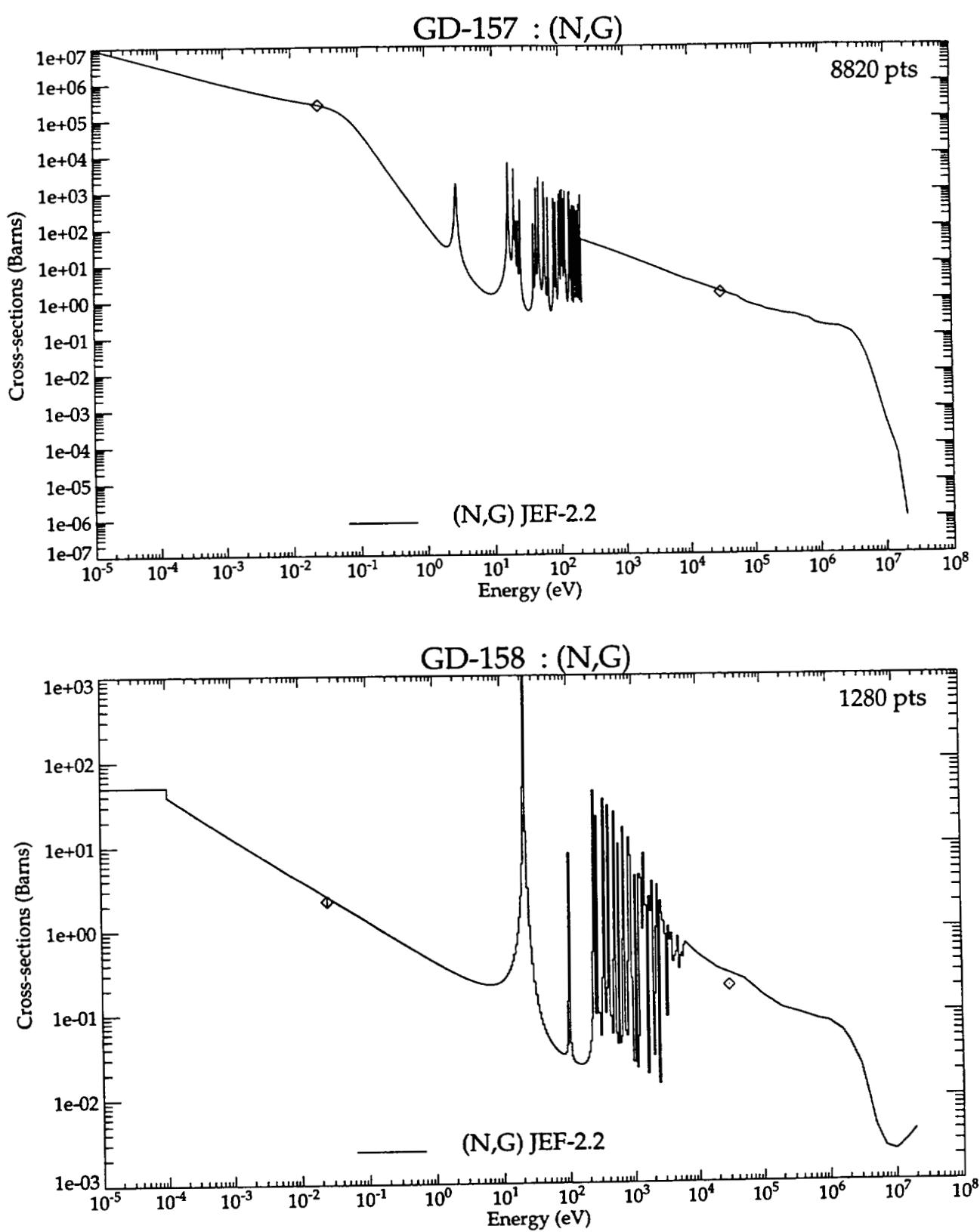


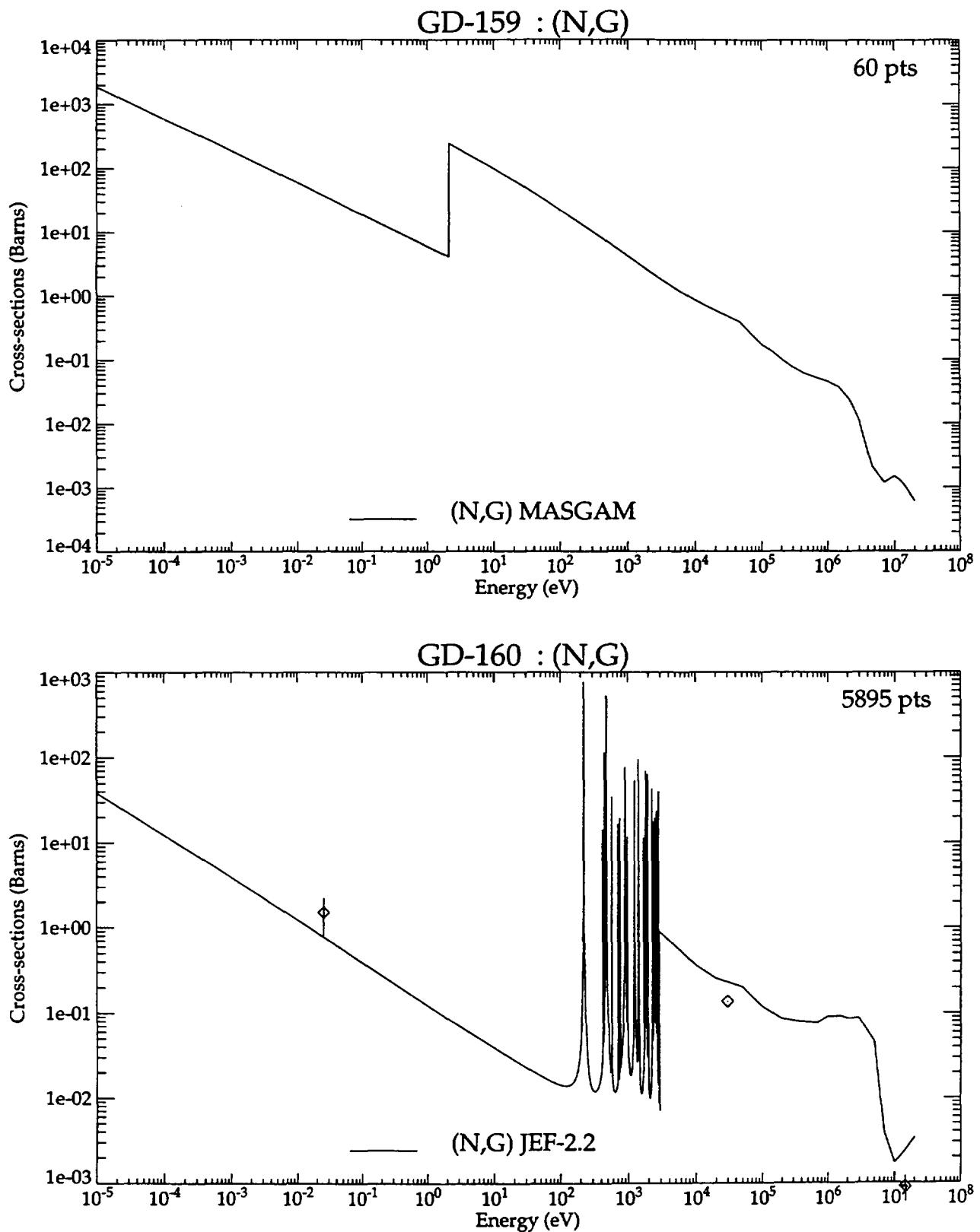


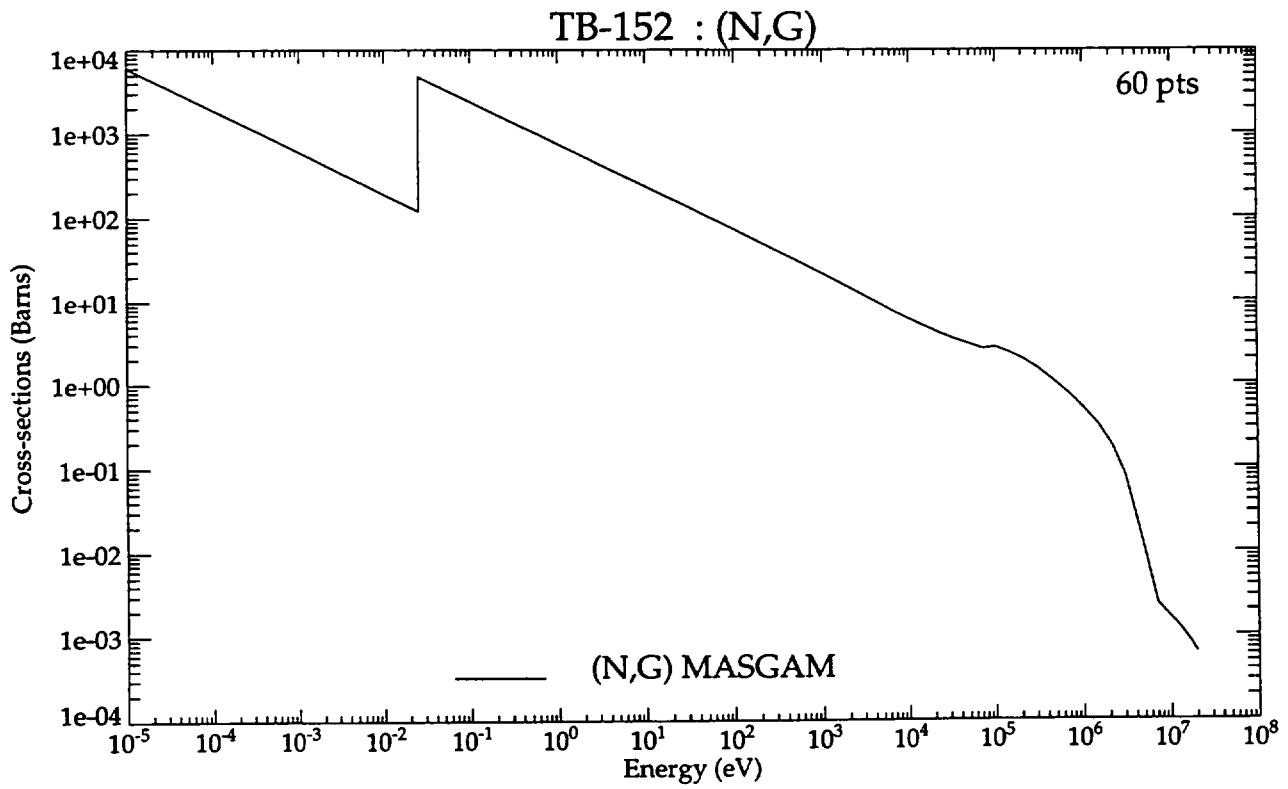
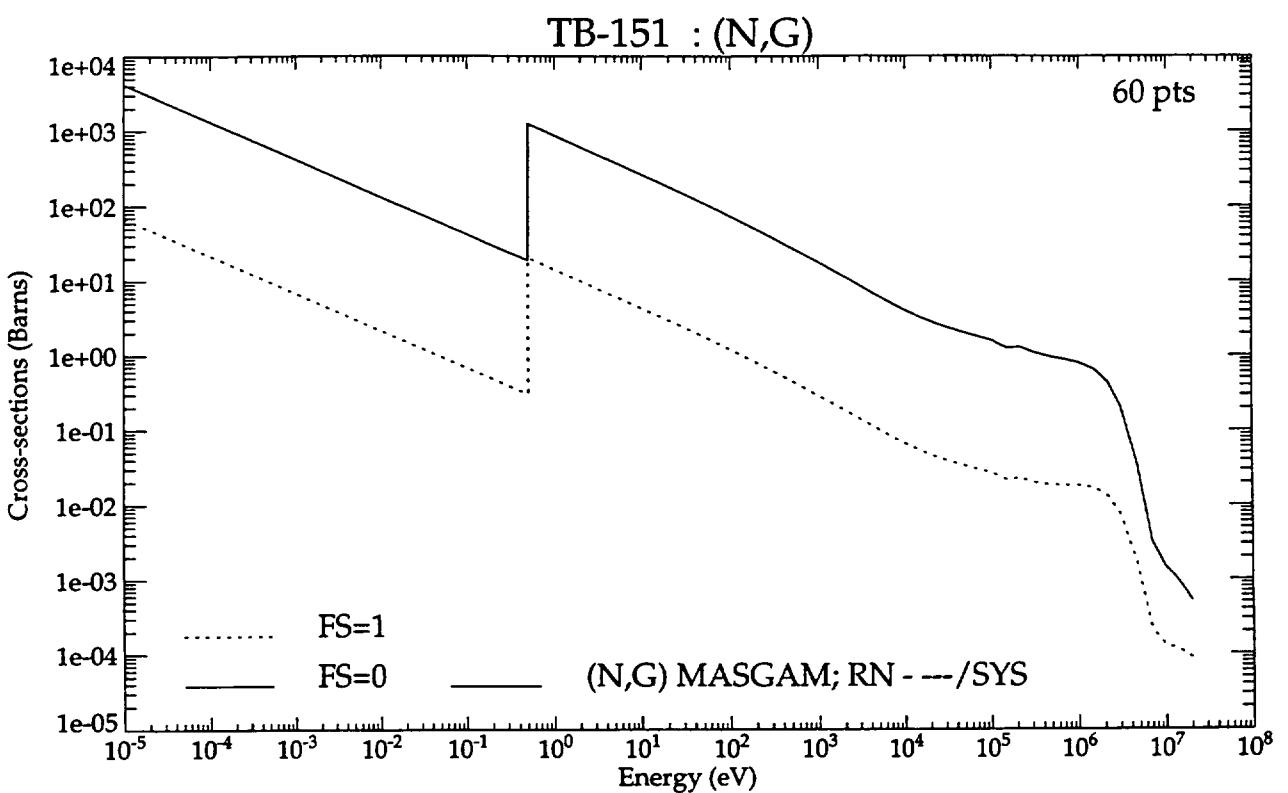


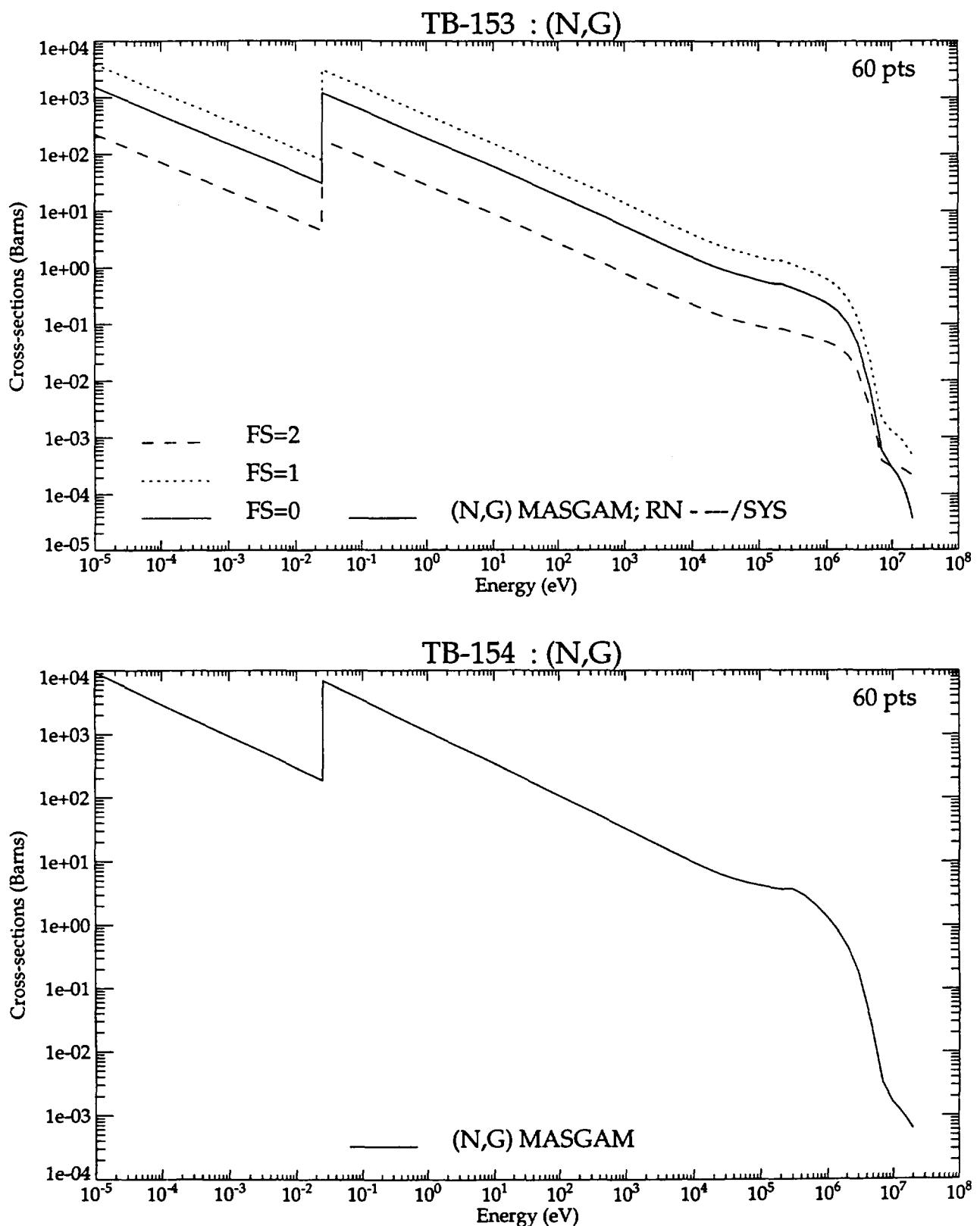


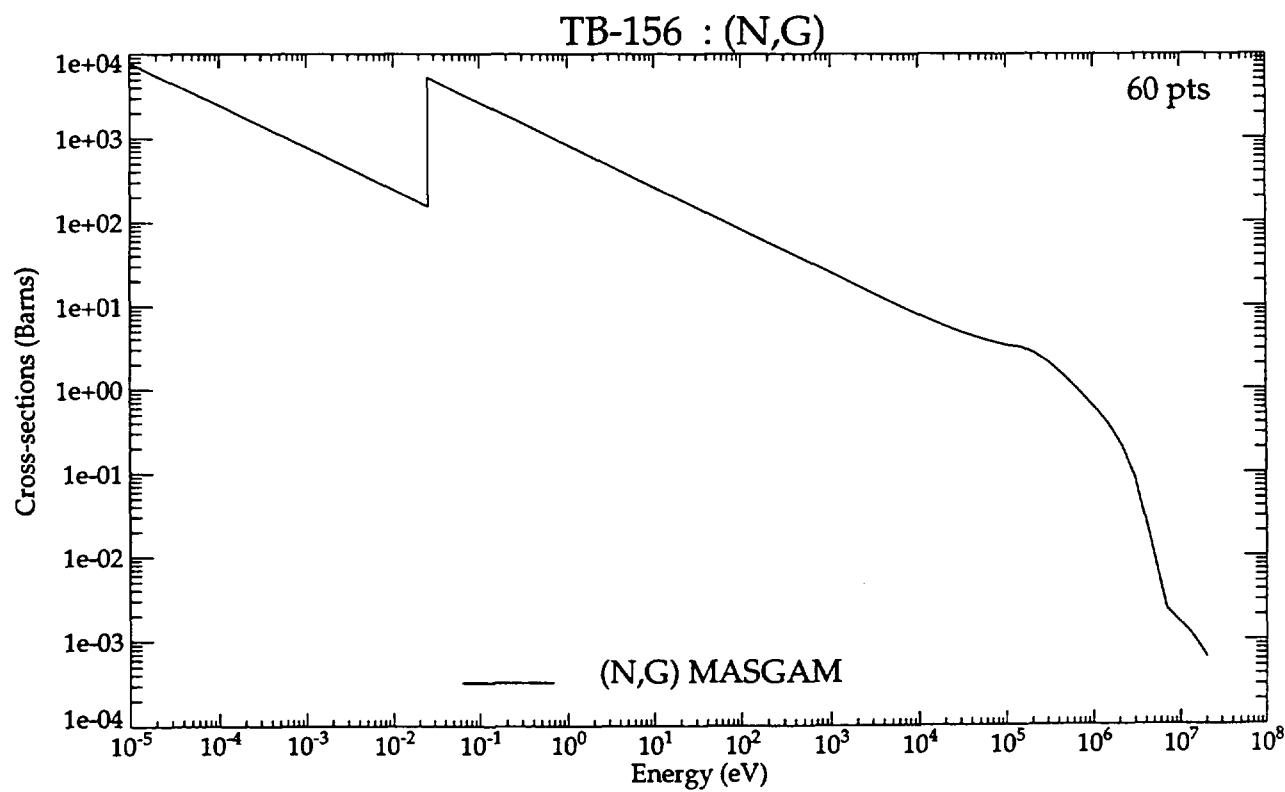
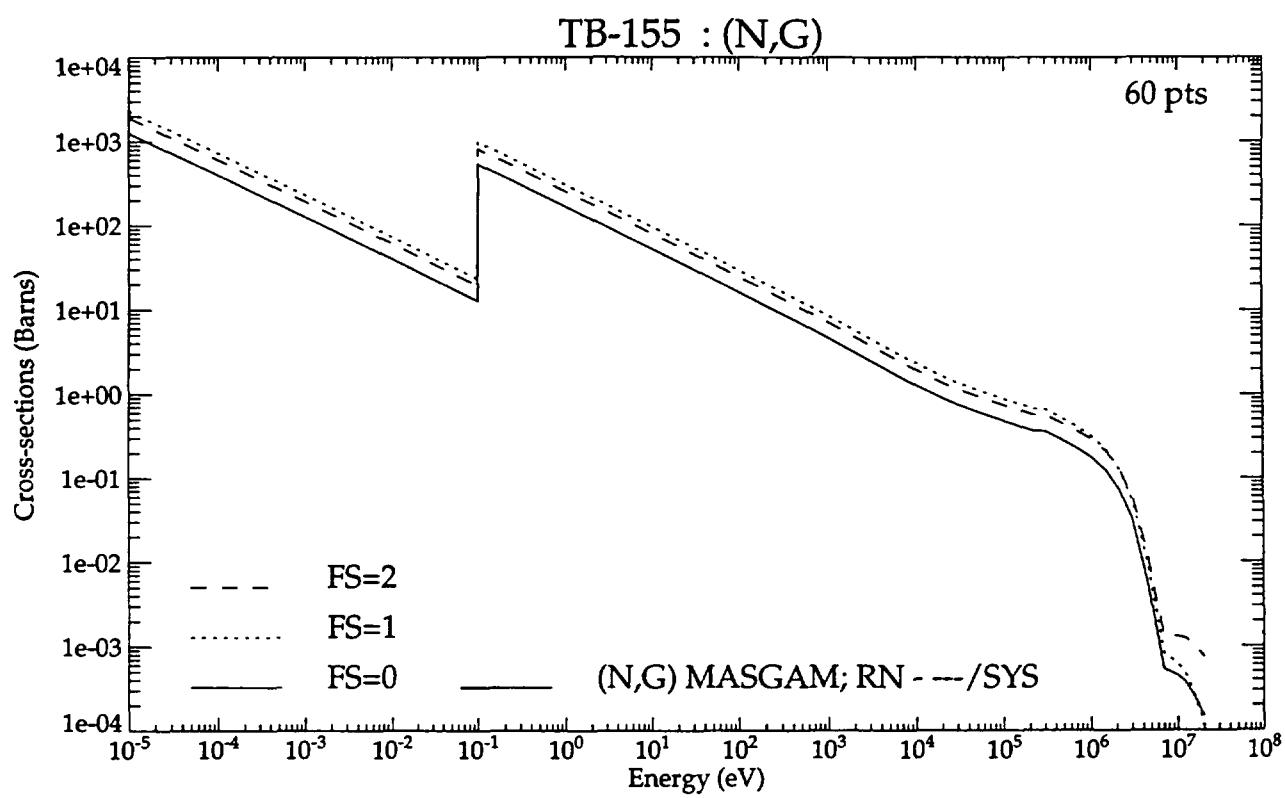


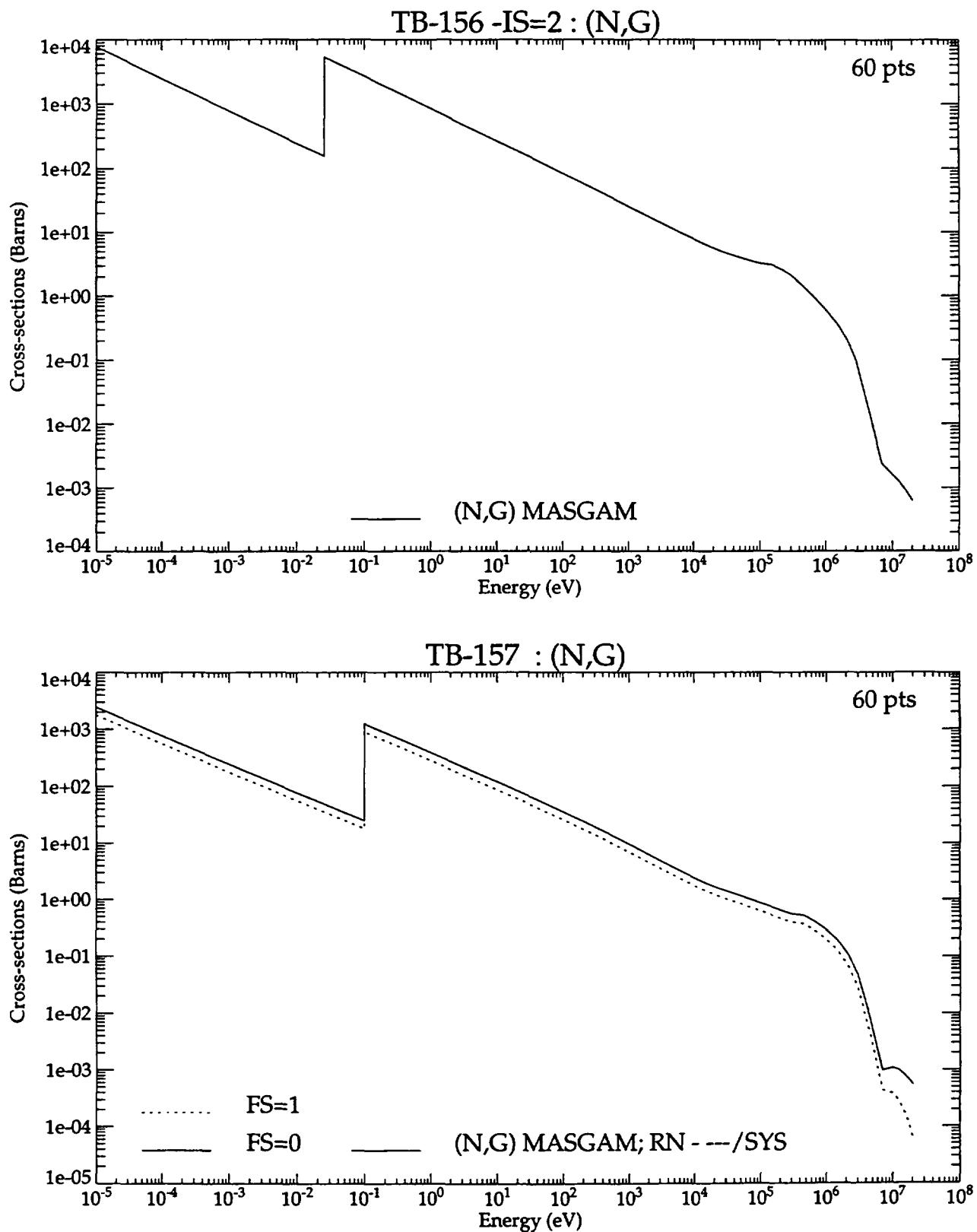


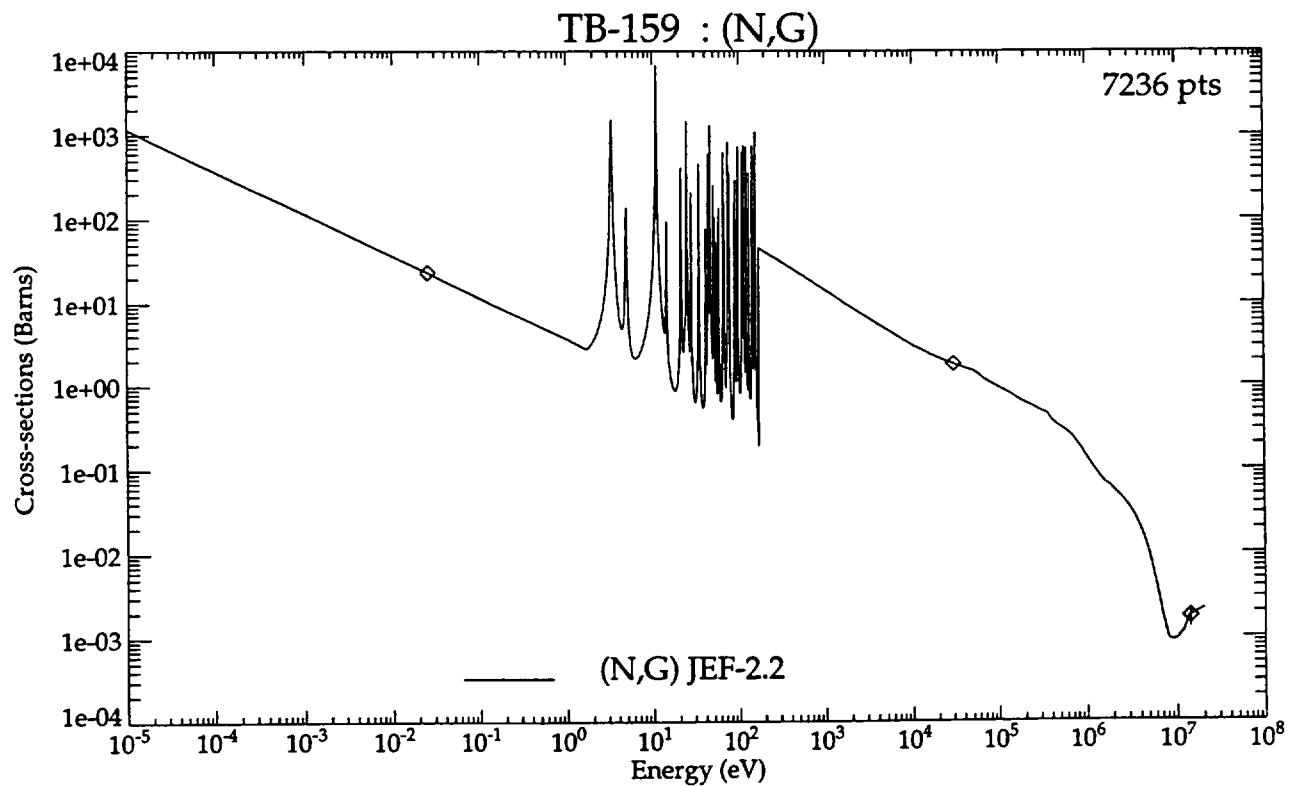
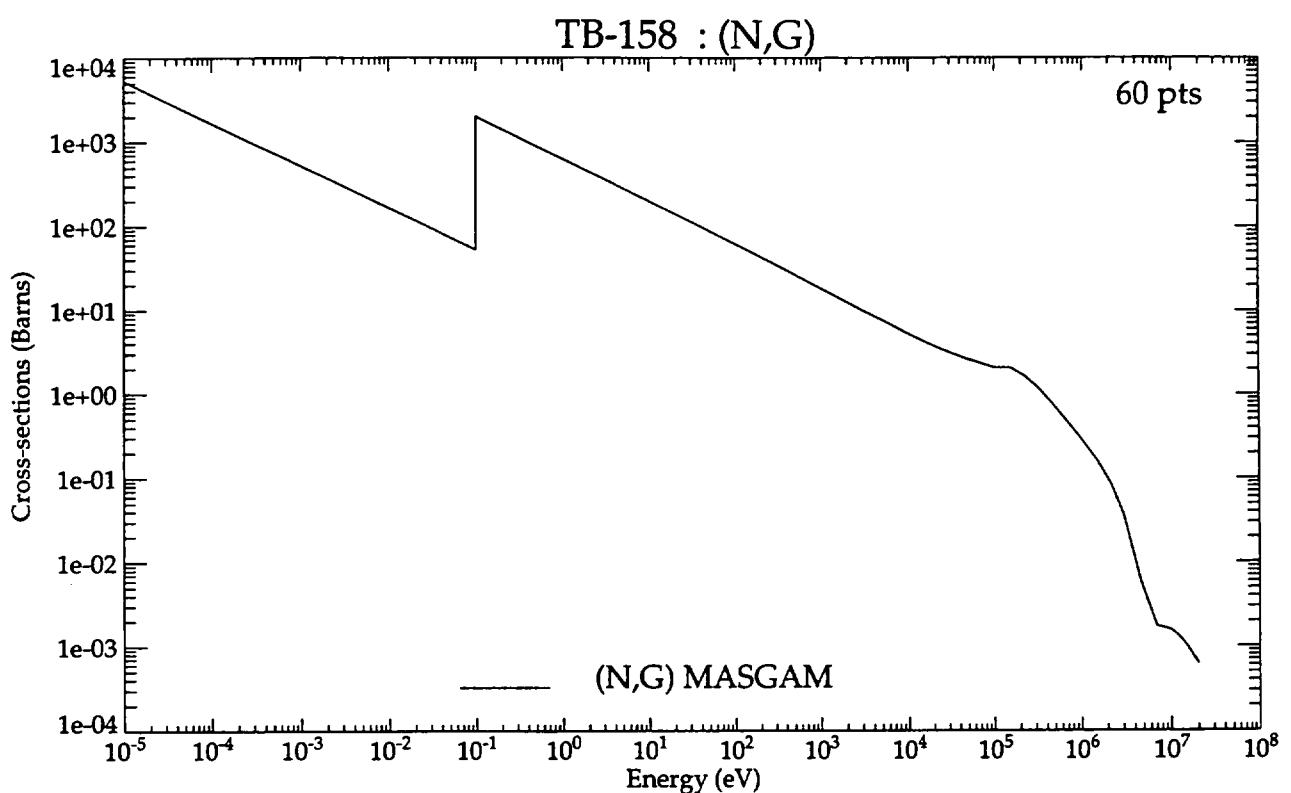


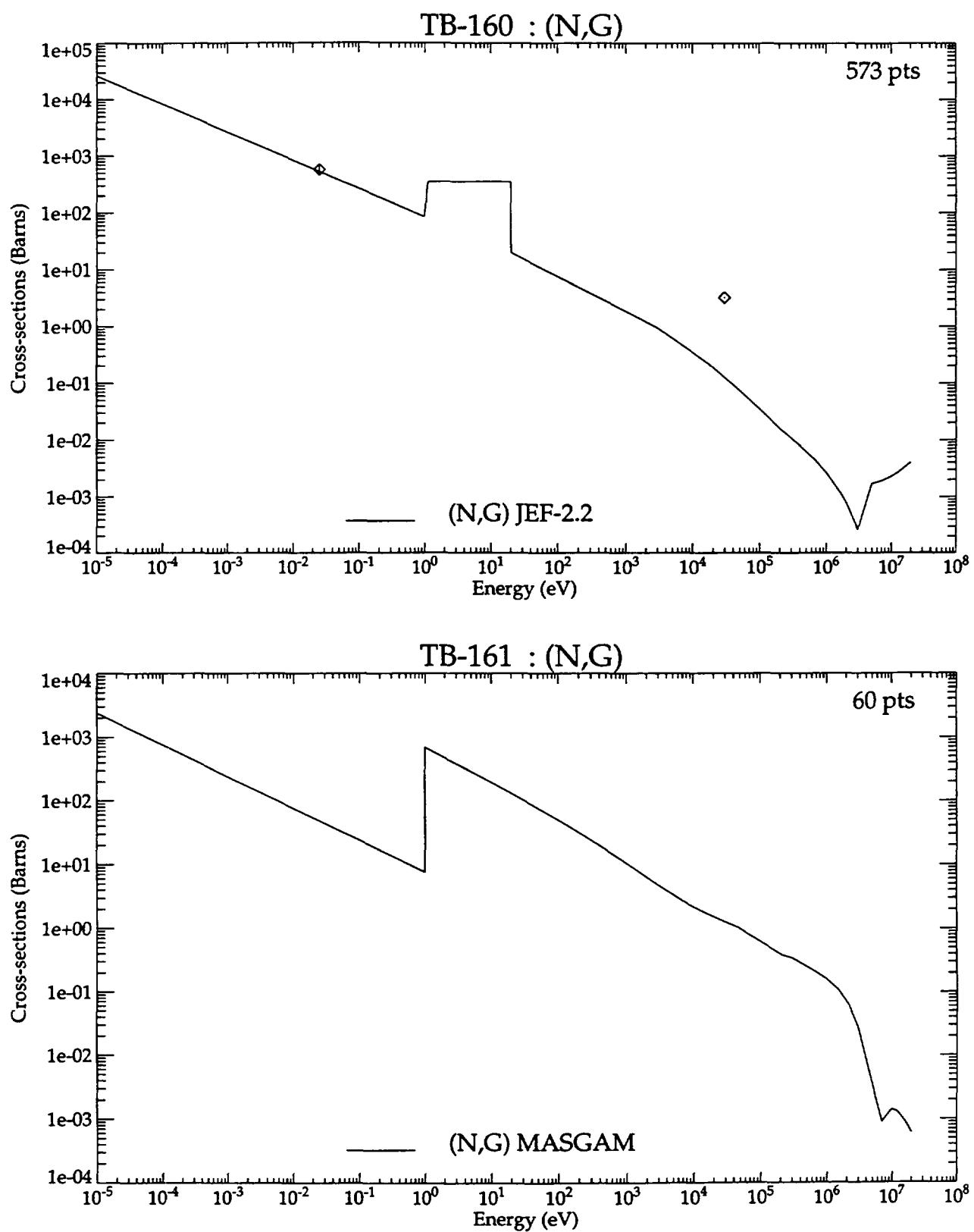


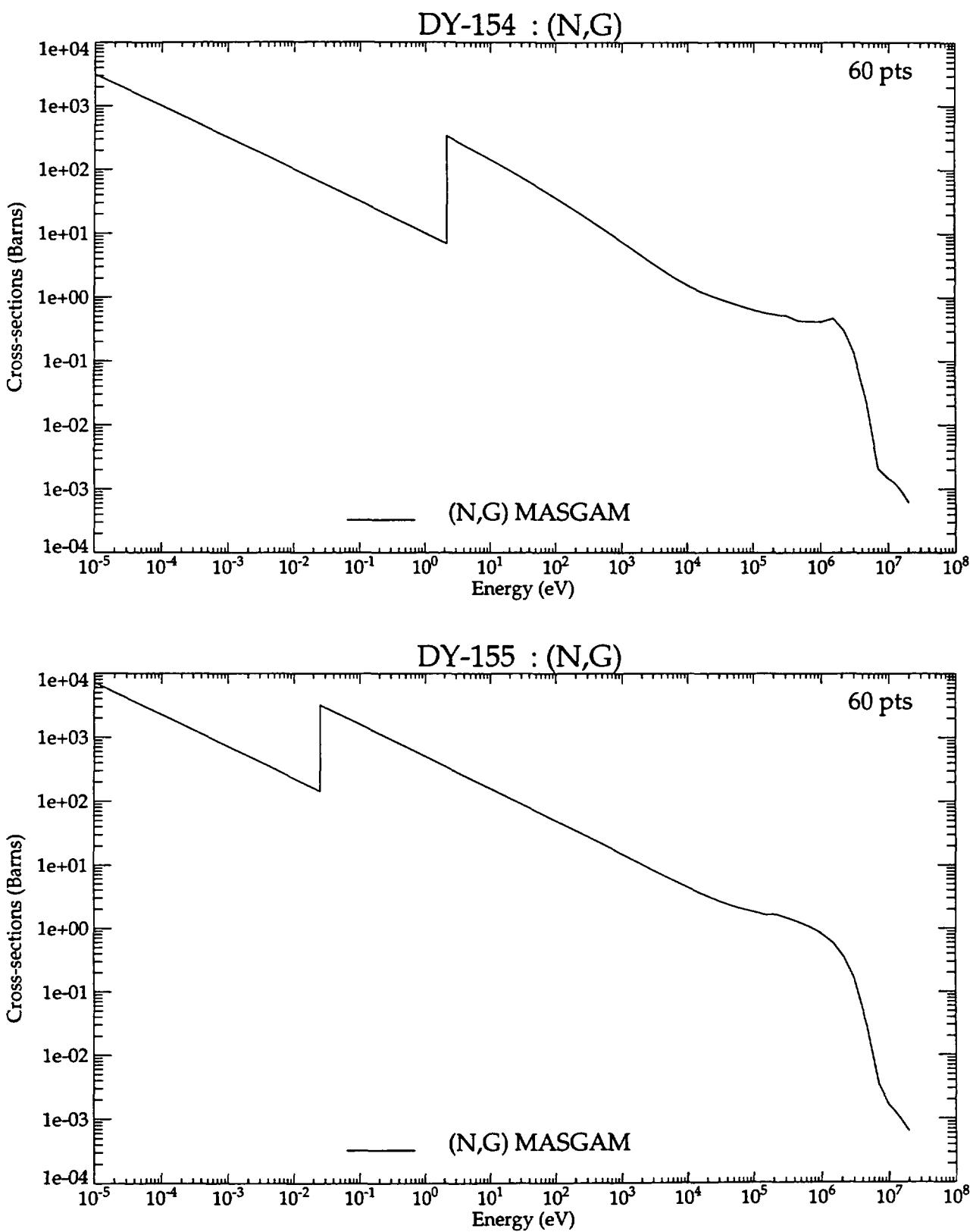


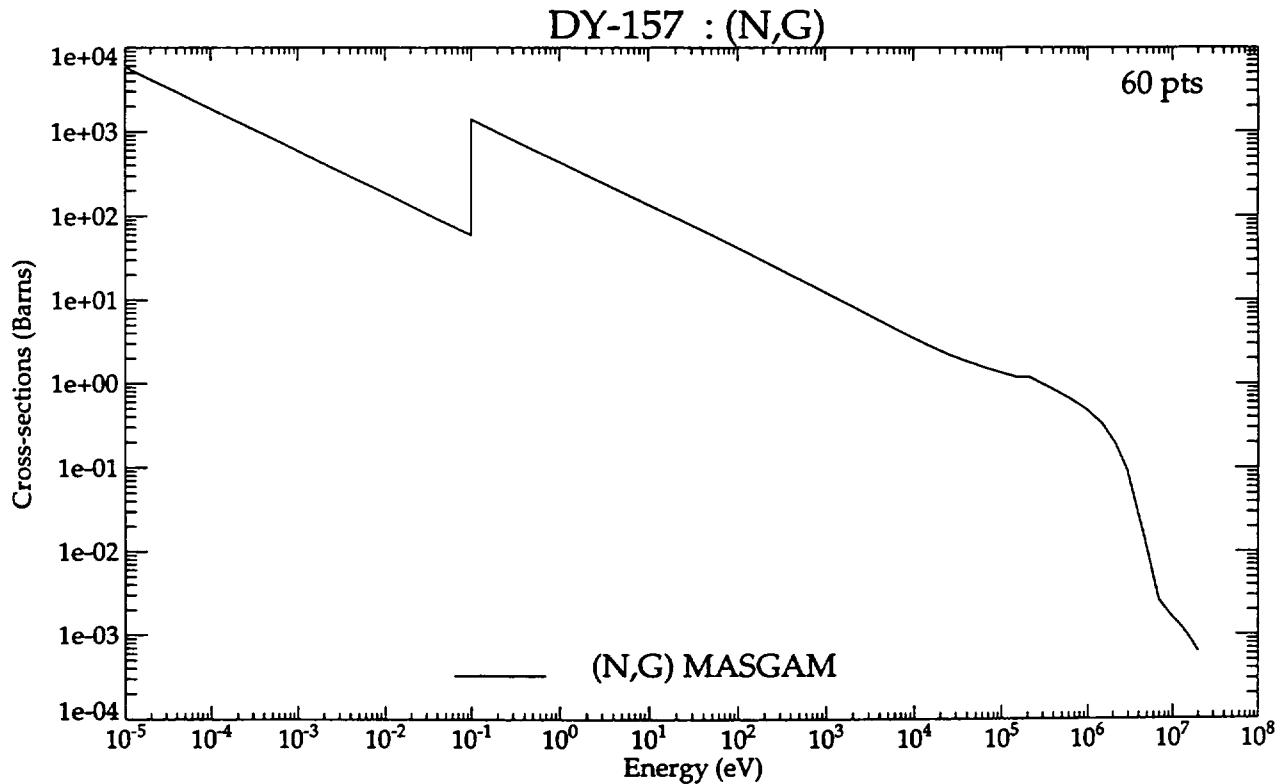
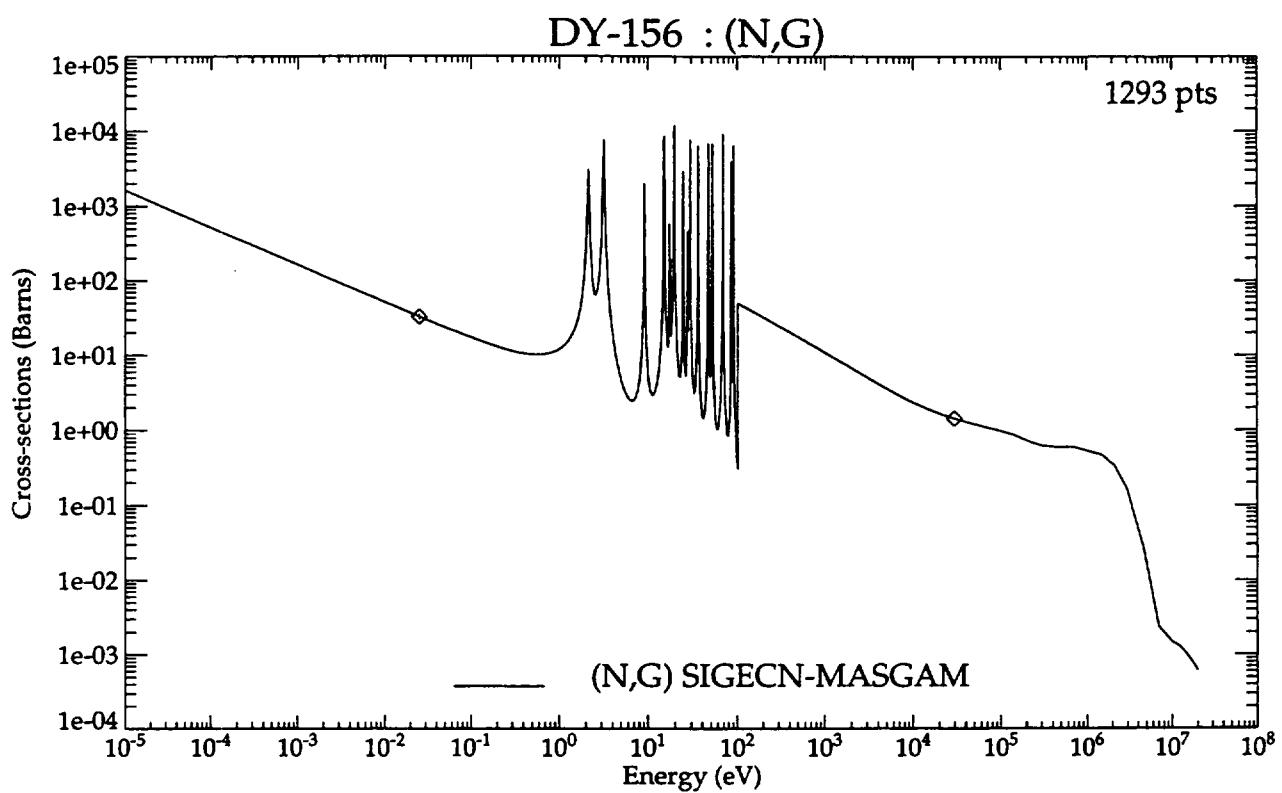


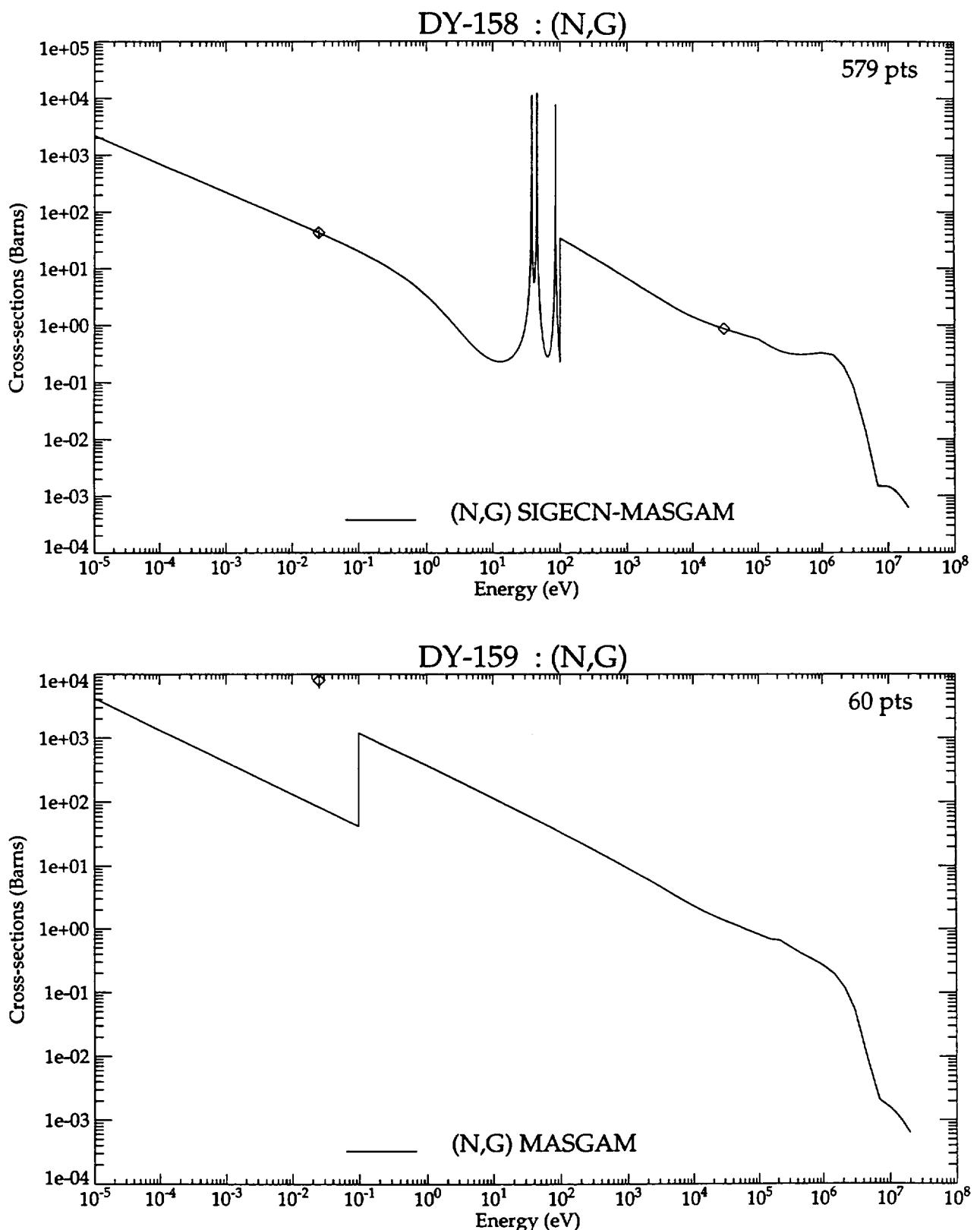


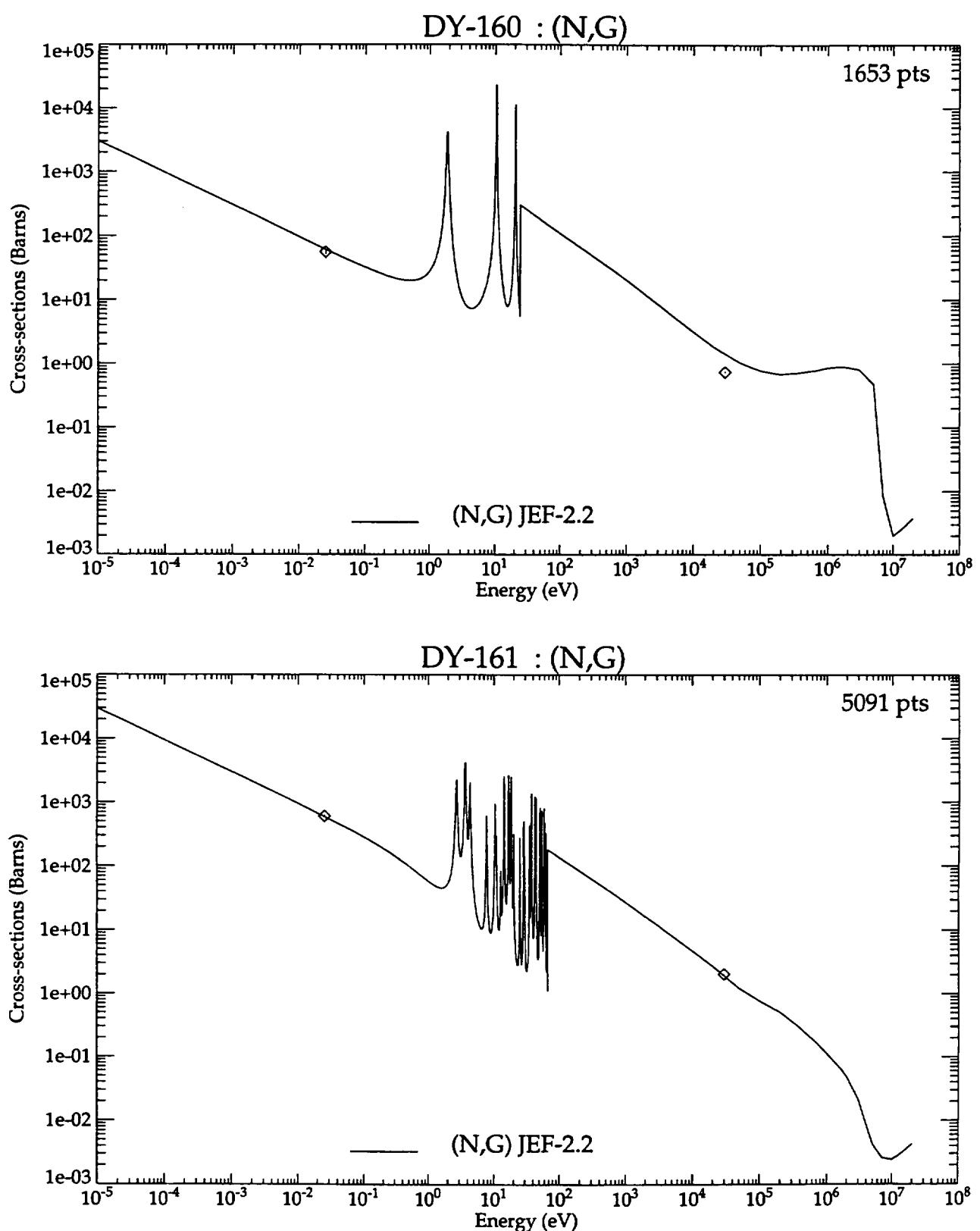


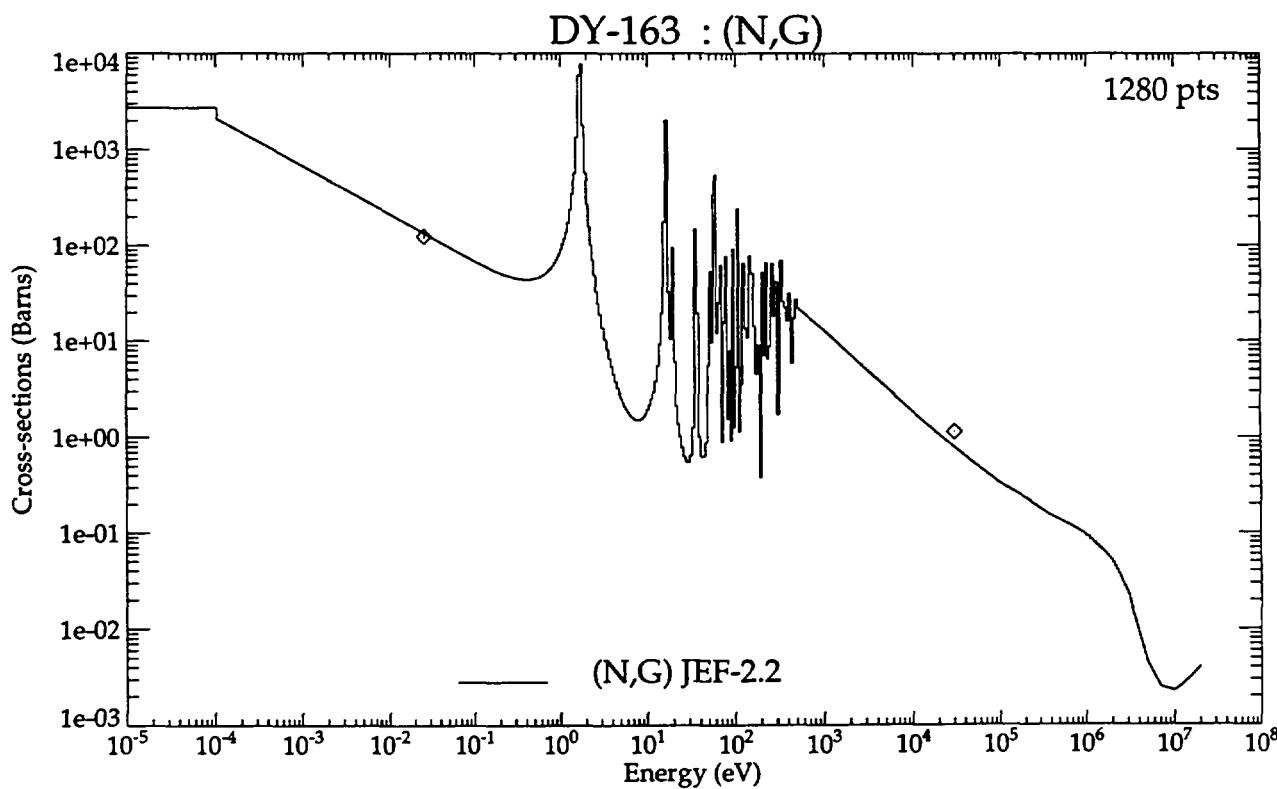
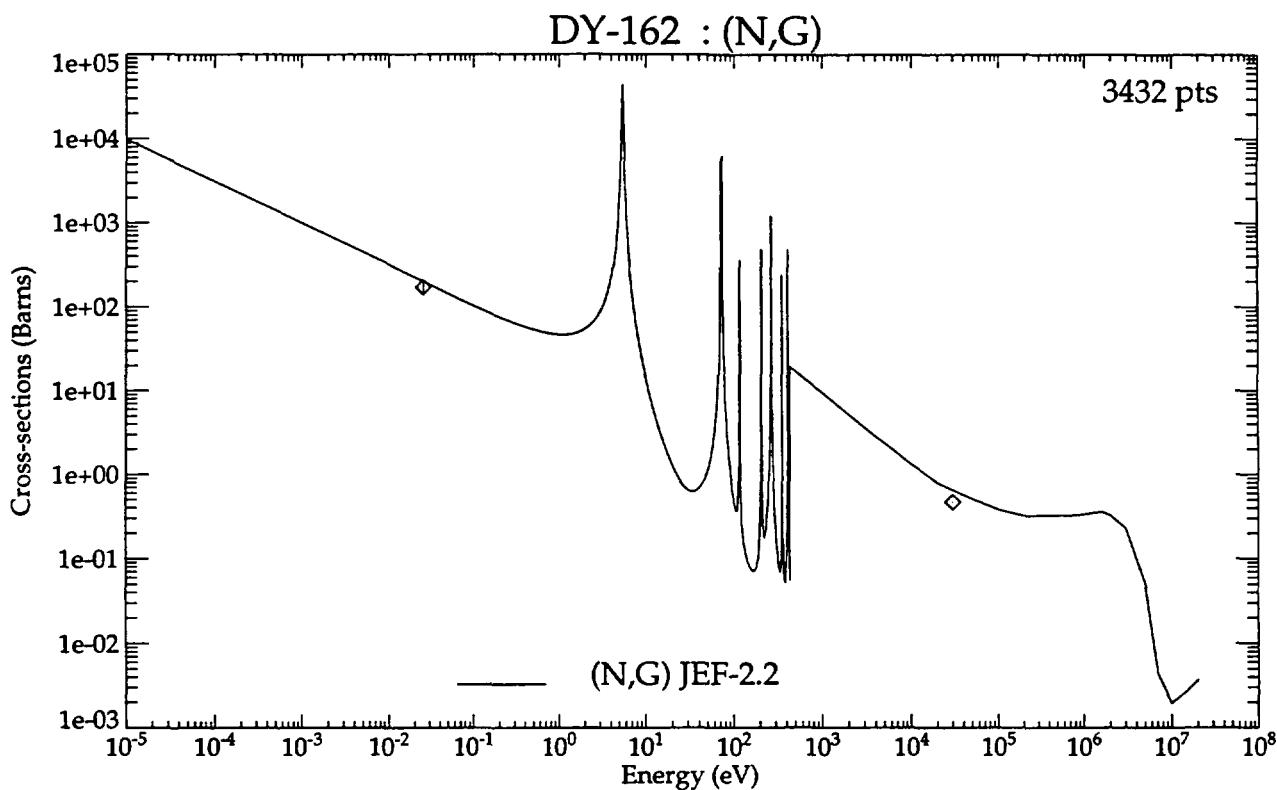


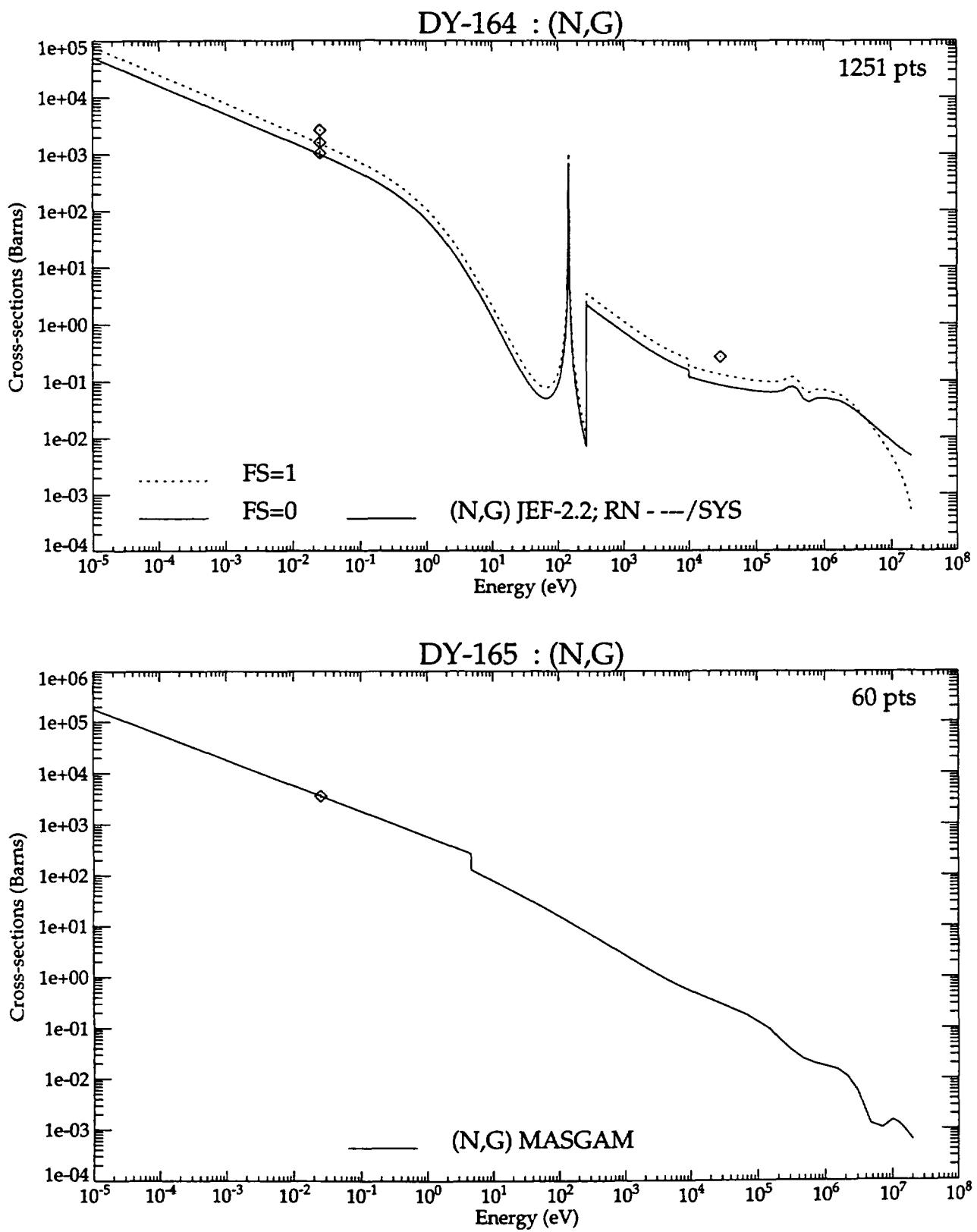


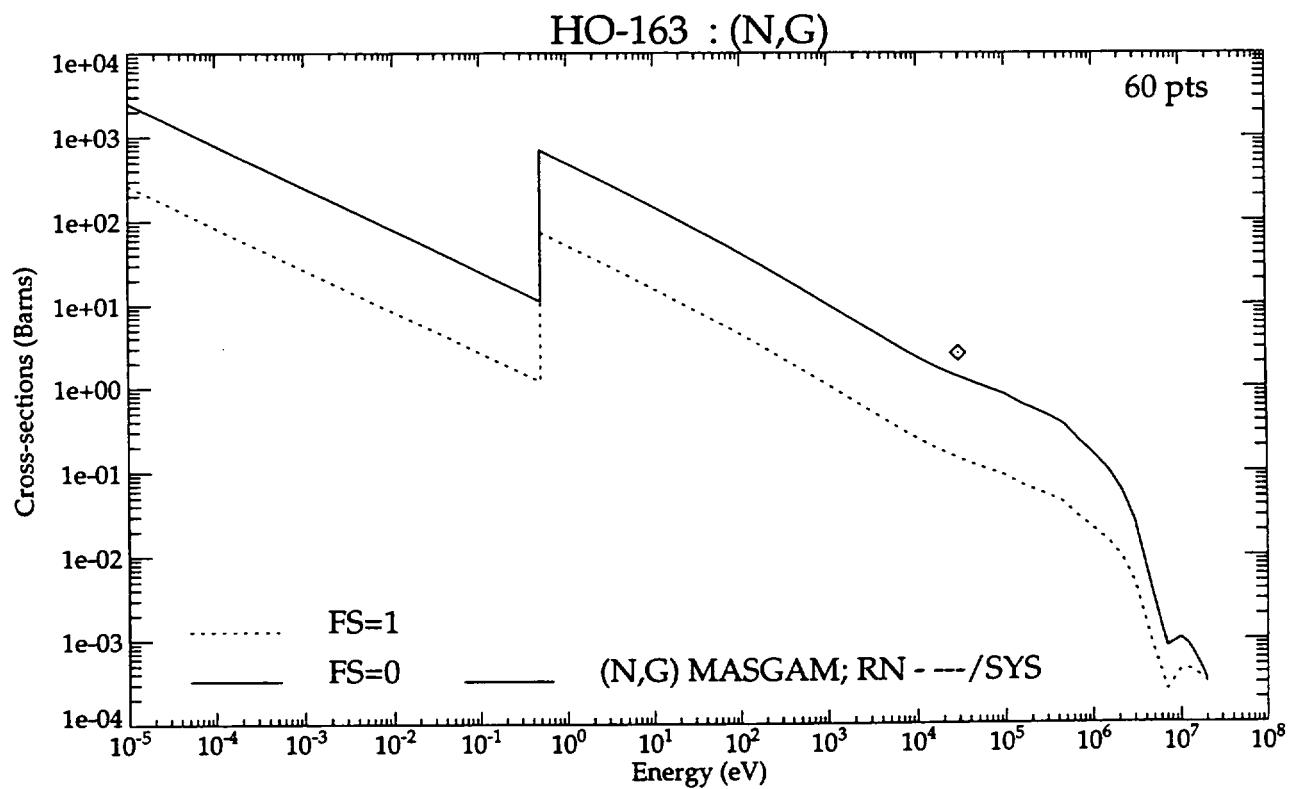
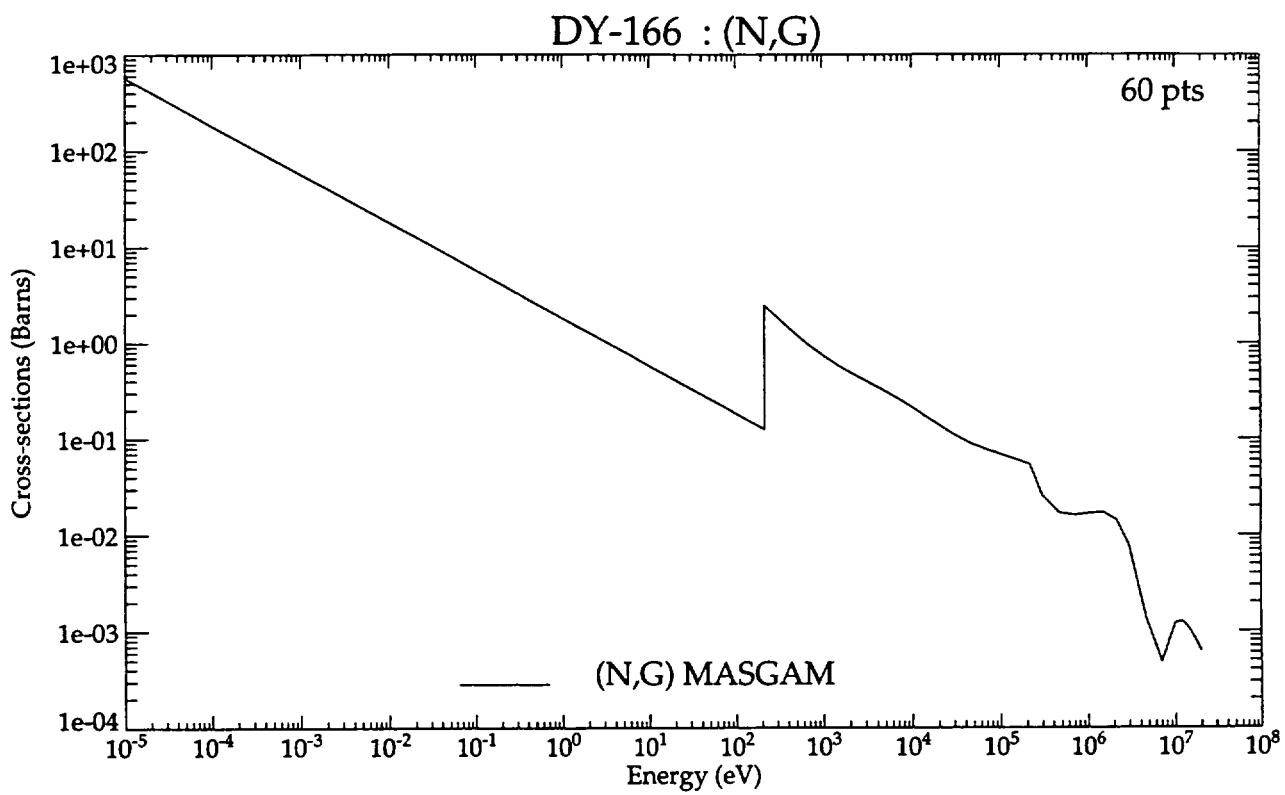




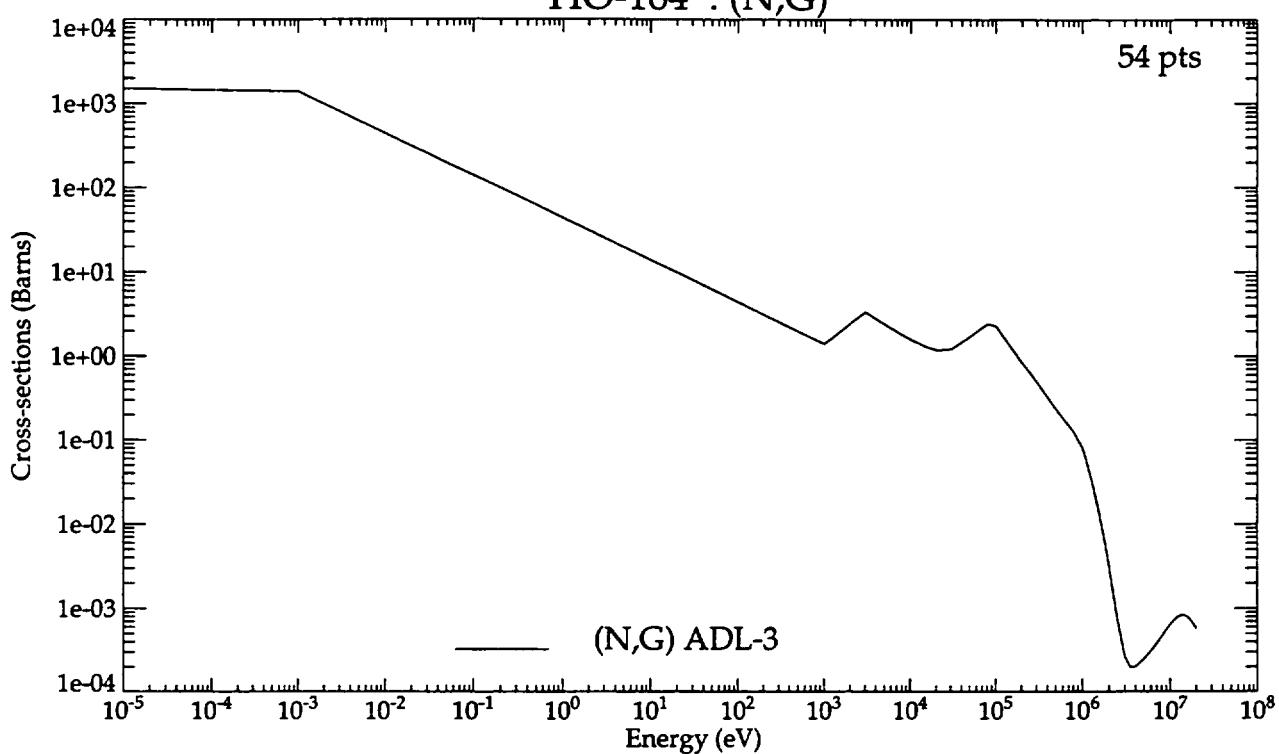




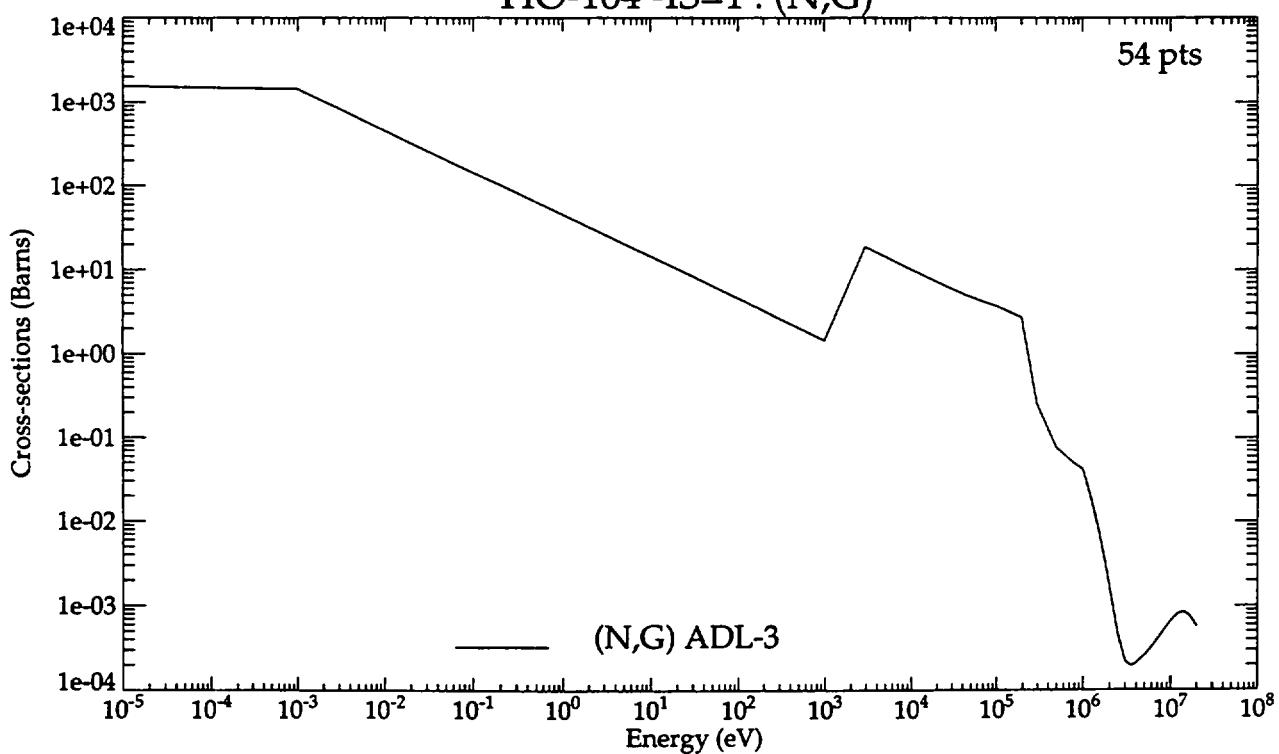


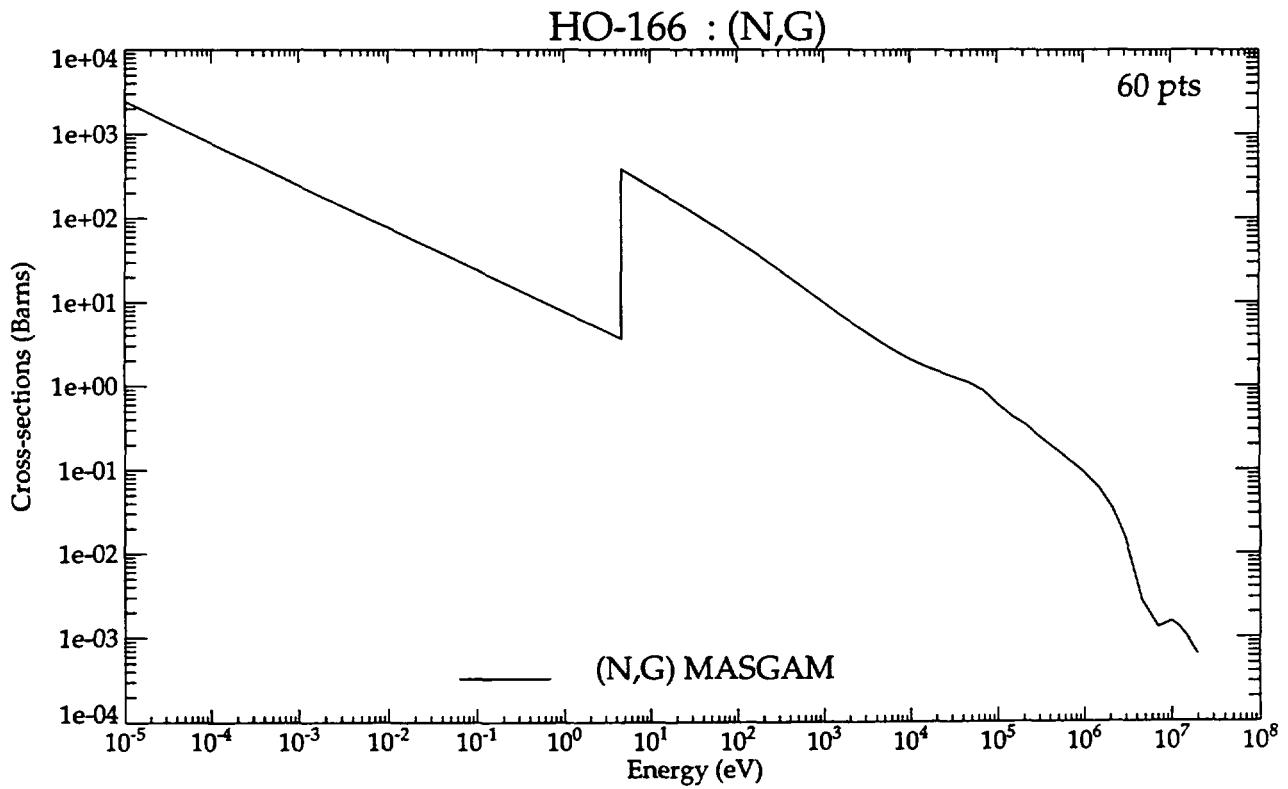
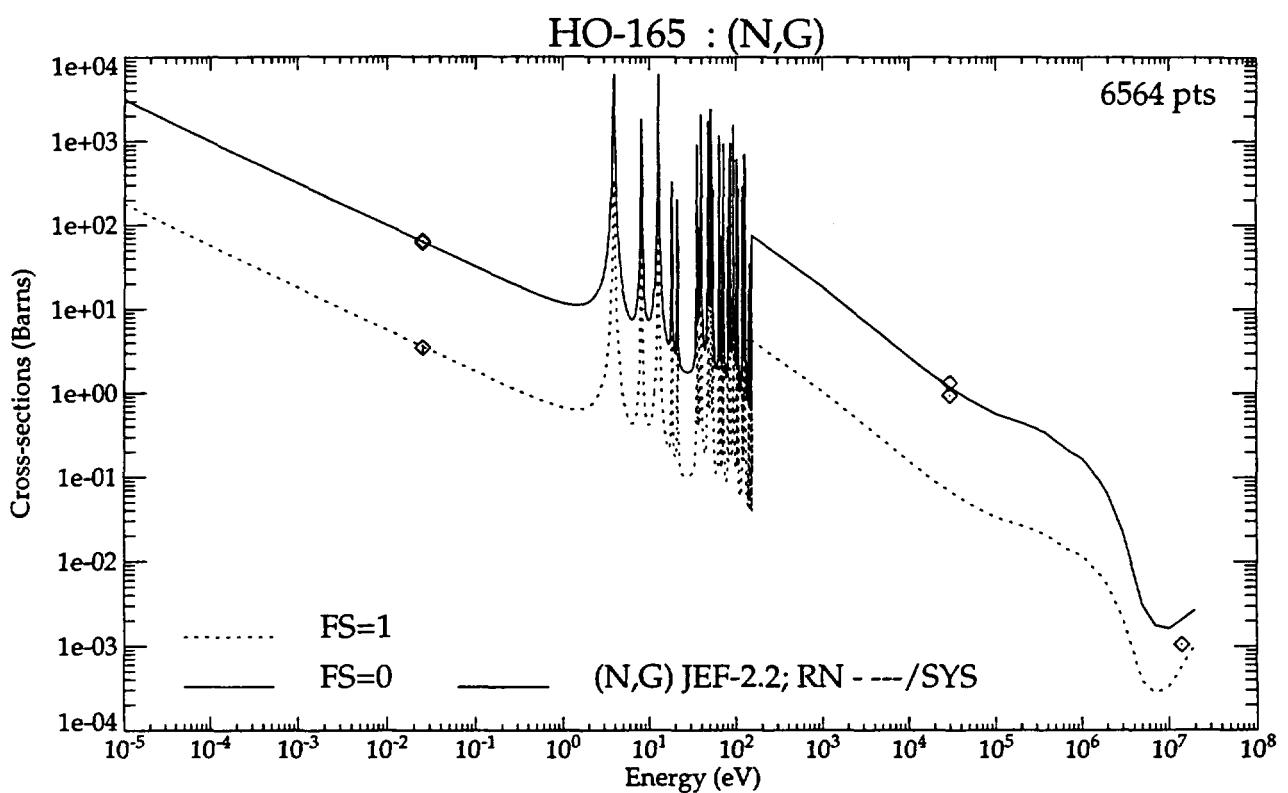


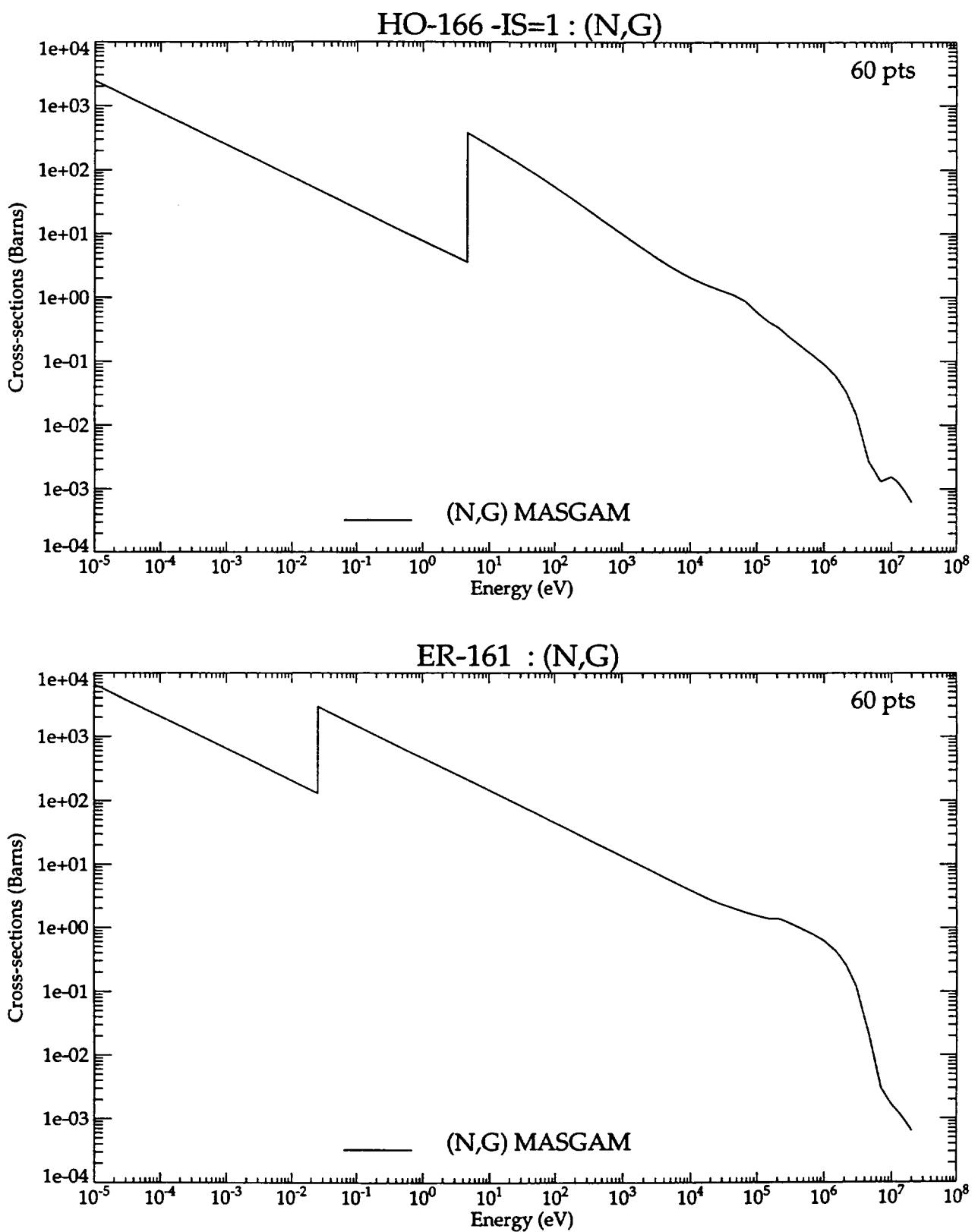
HO-164 : (N,G)

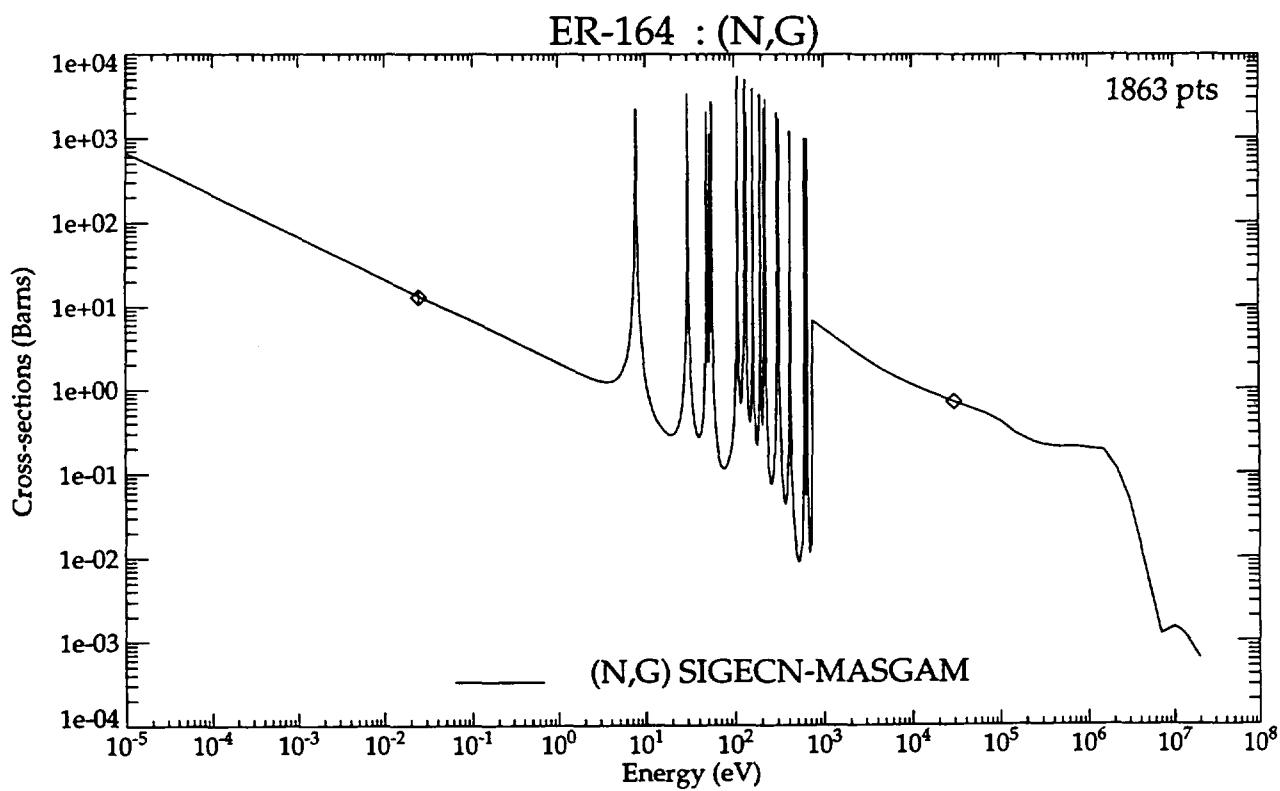
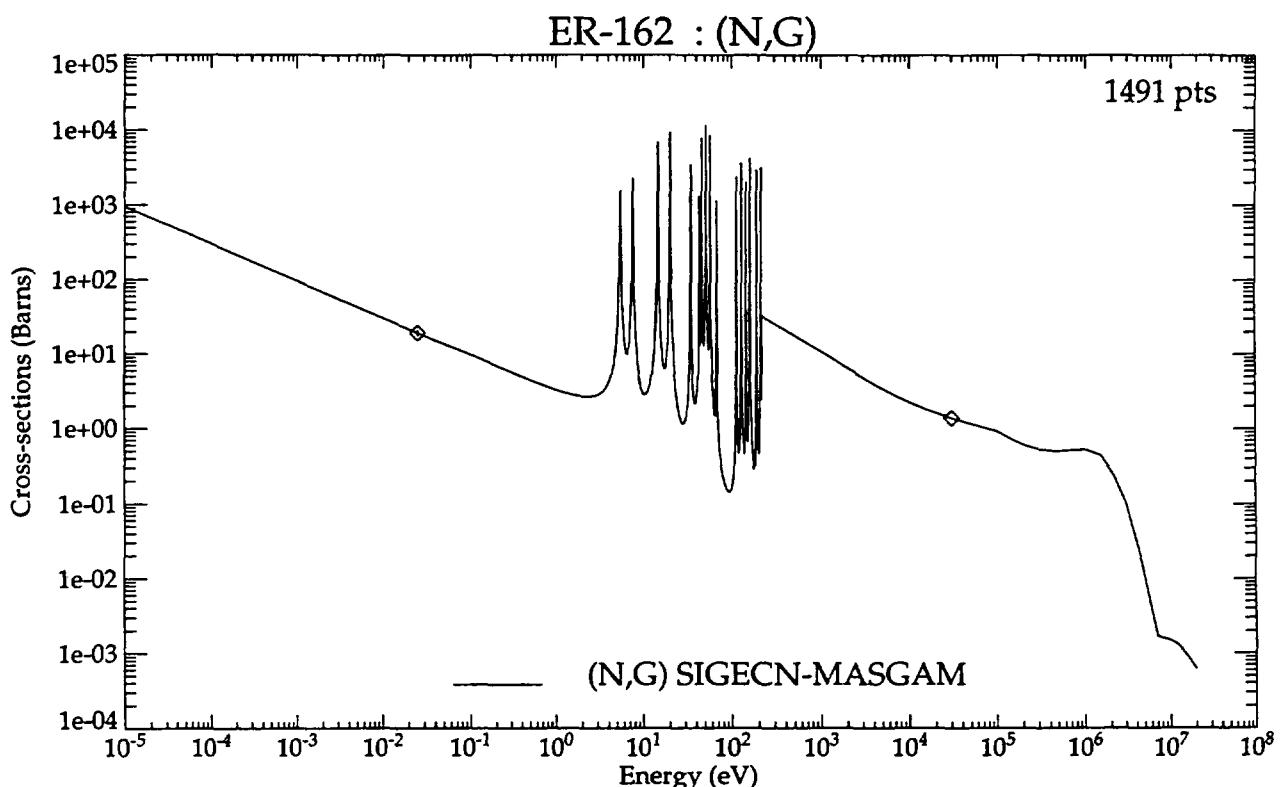


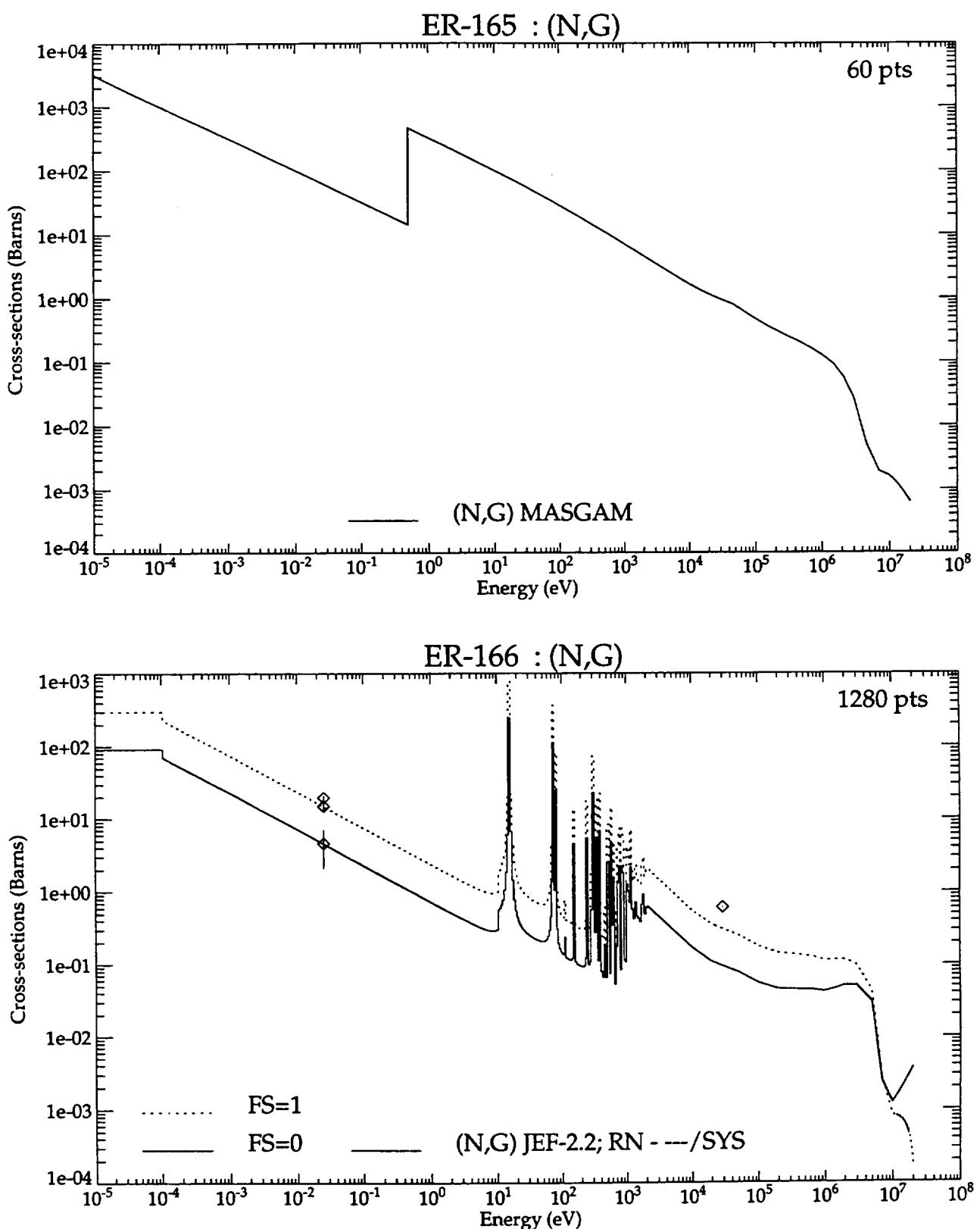
HO-164 -IS=1 : (N,G)

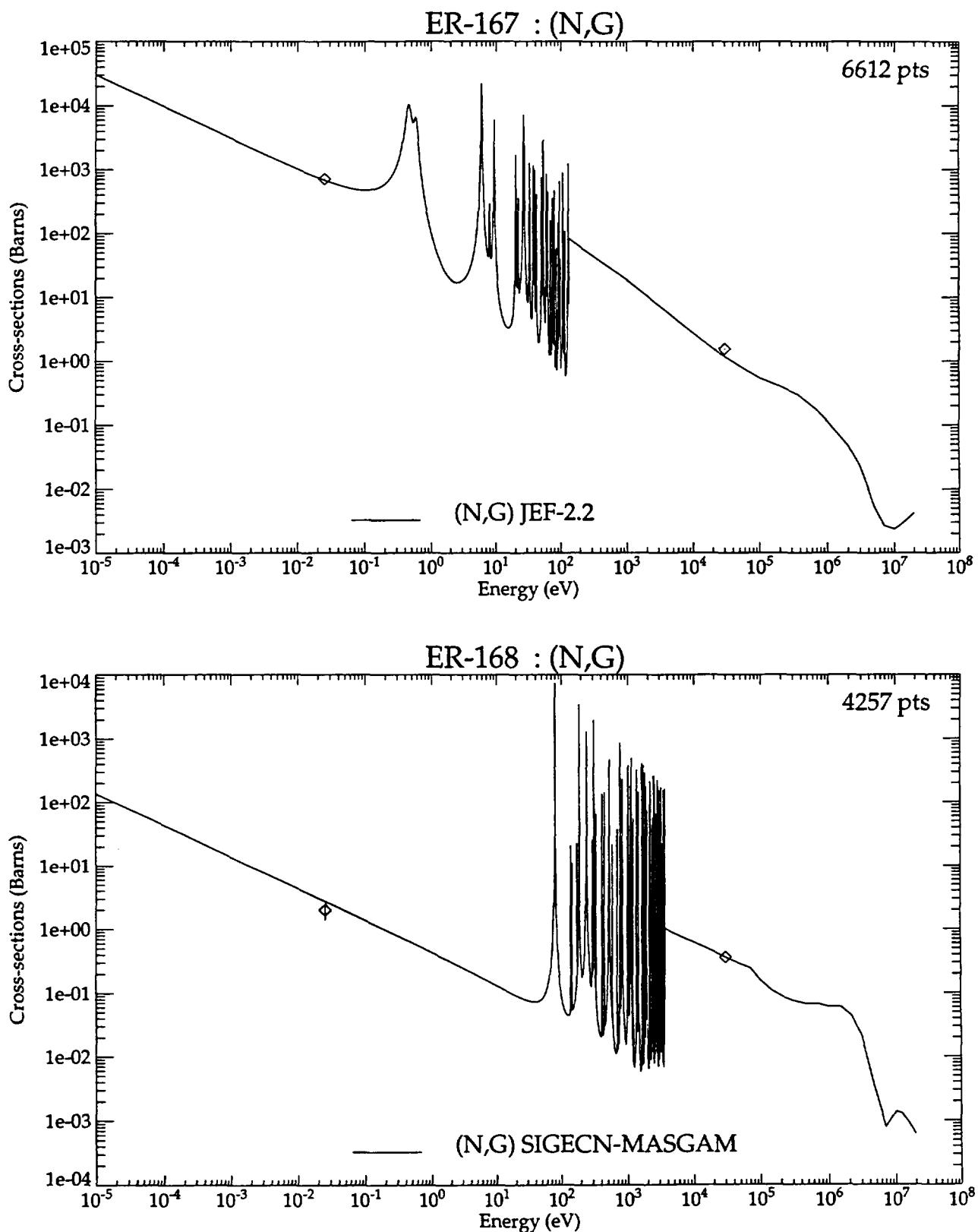


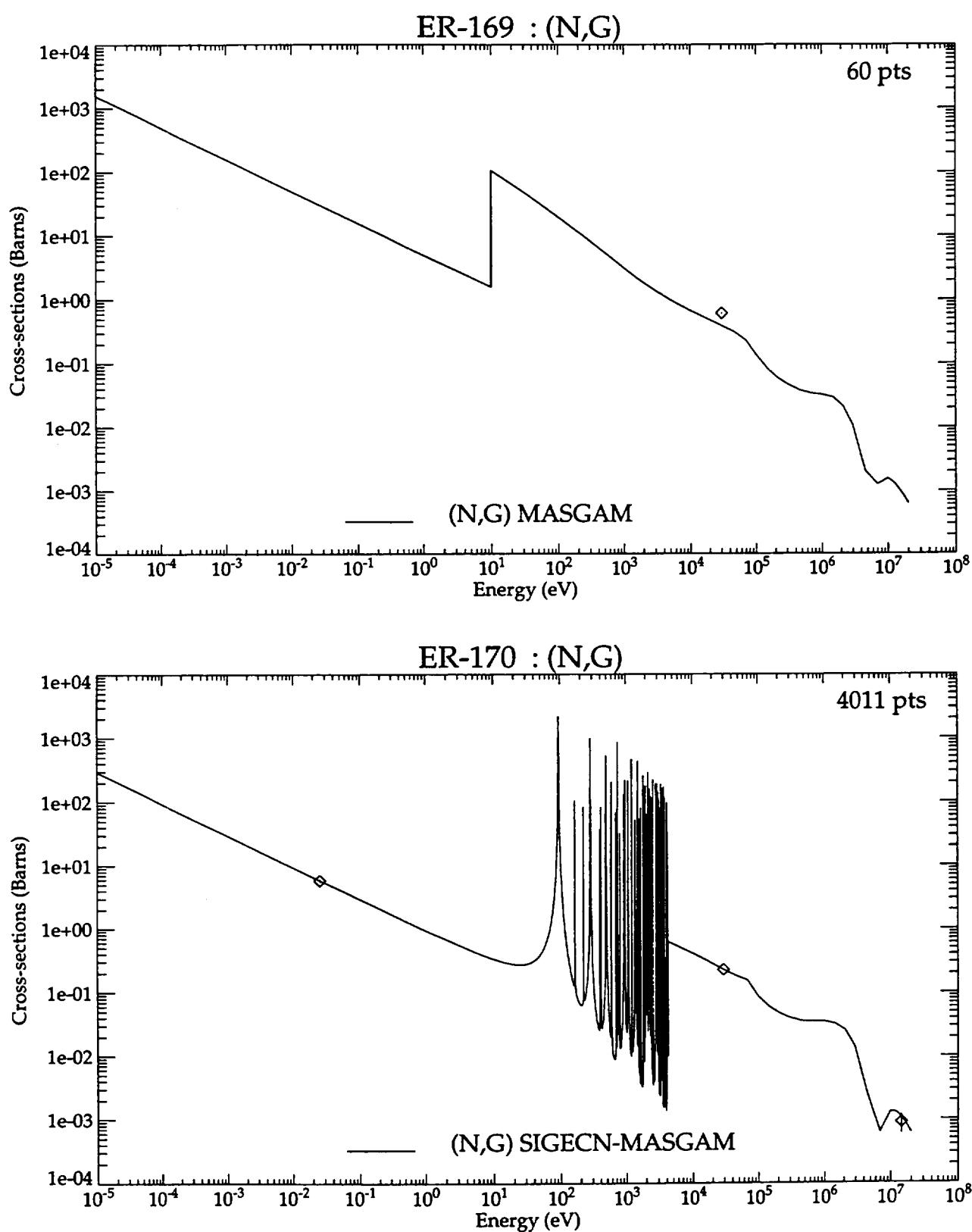


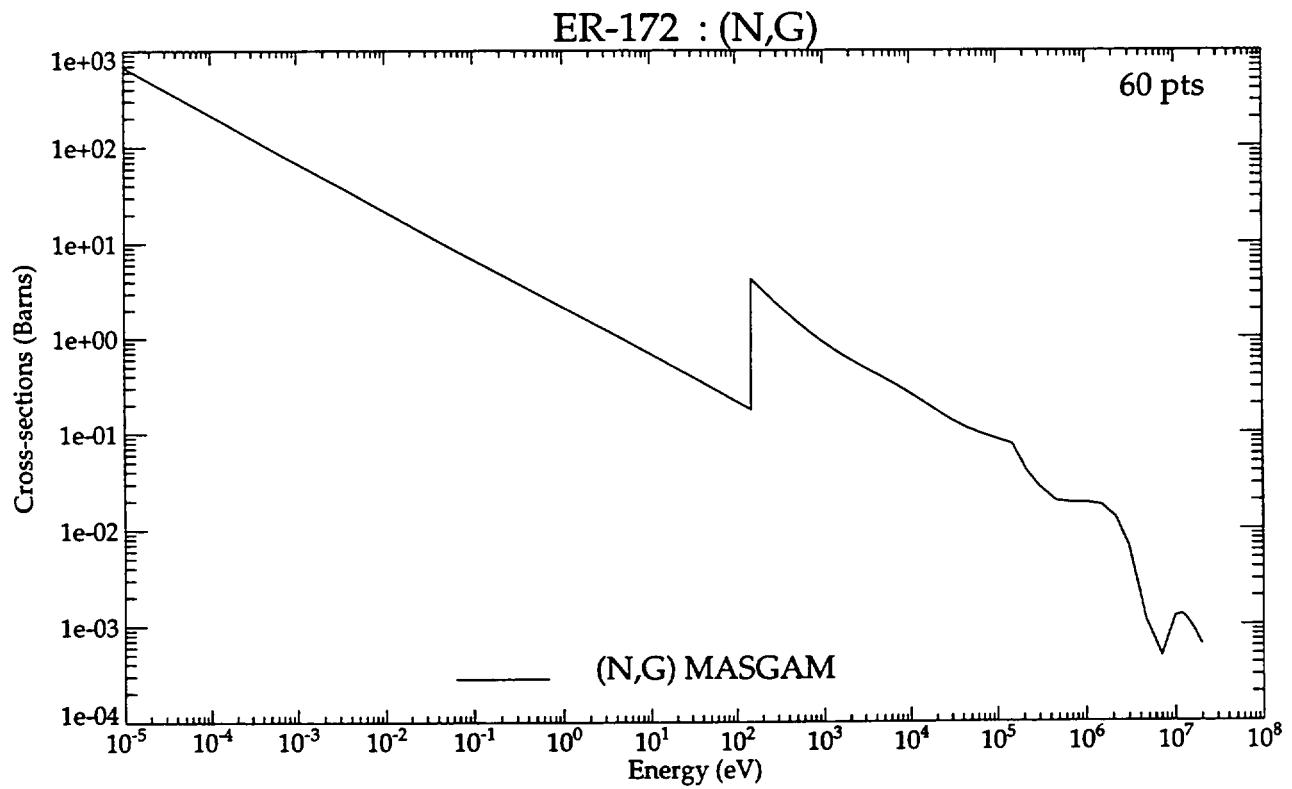
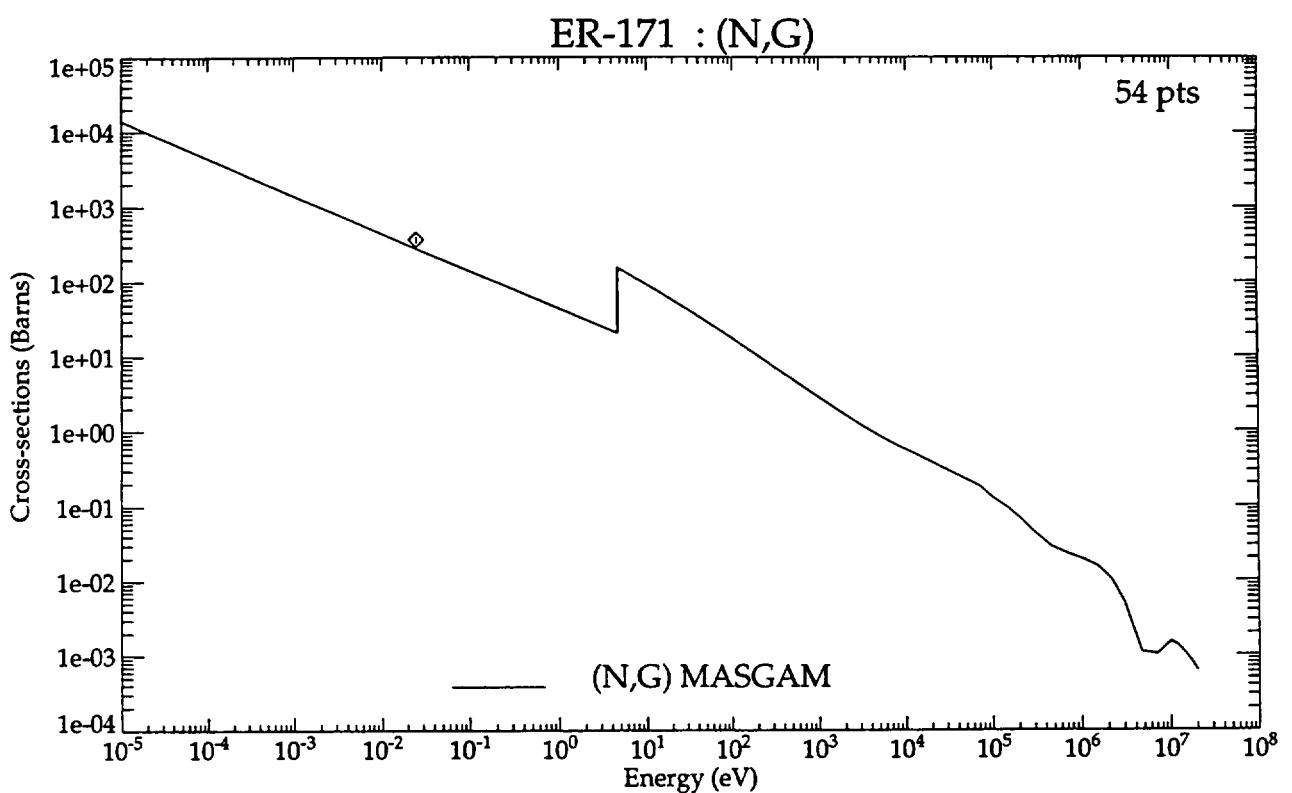


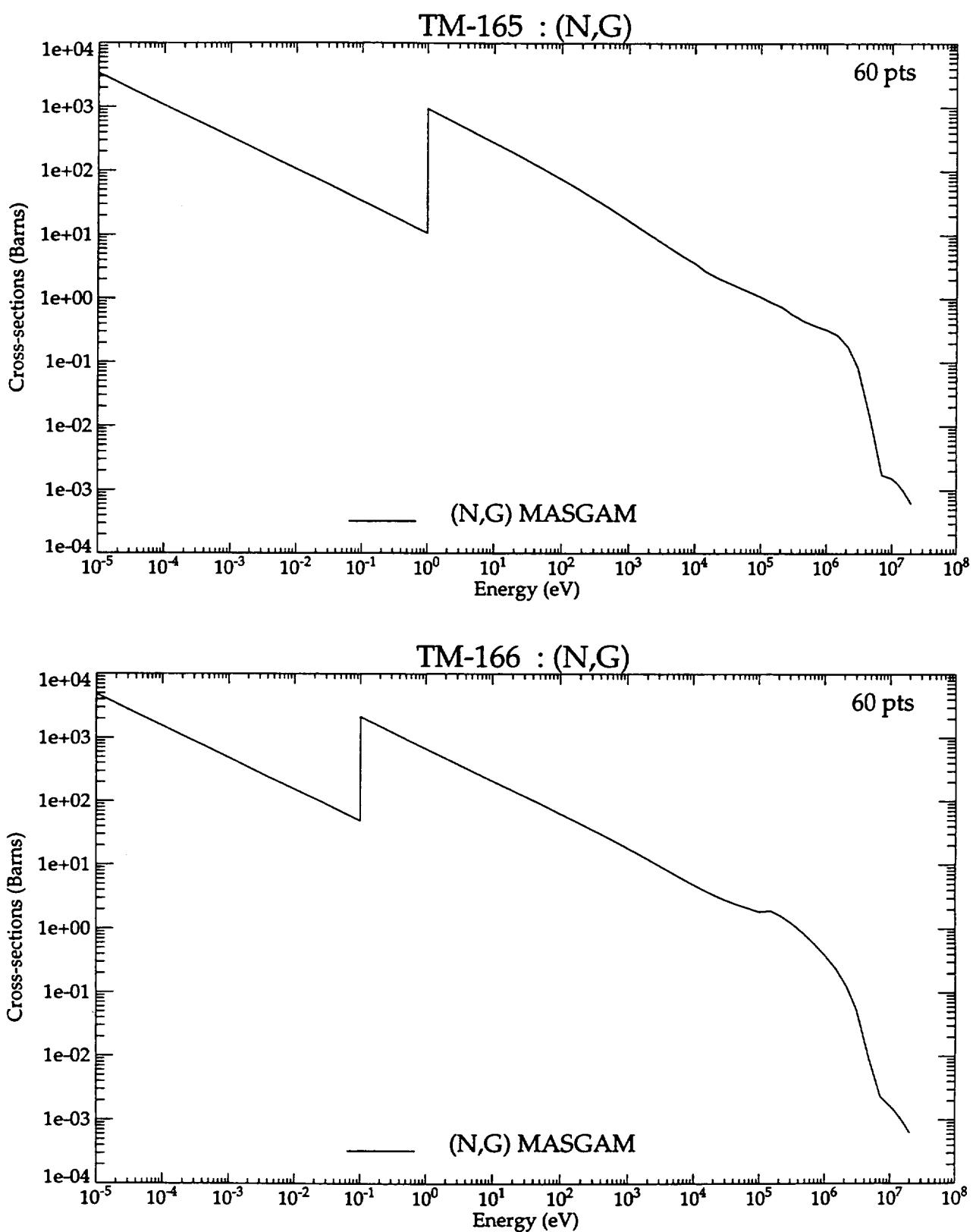


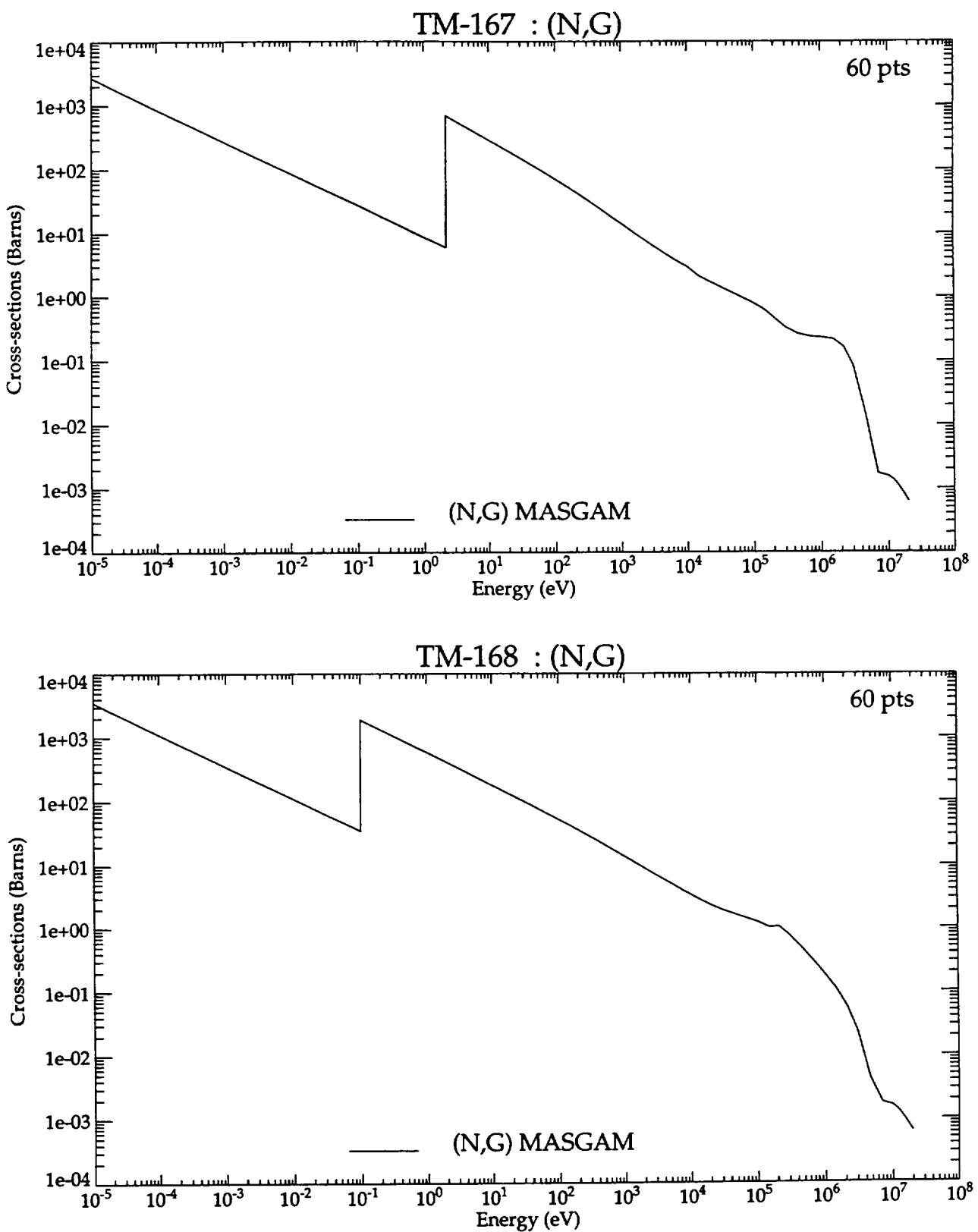


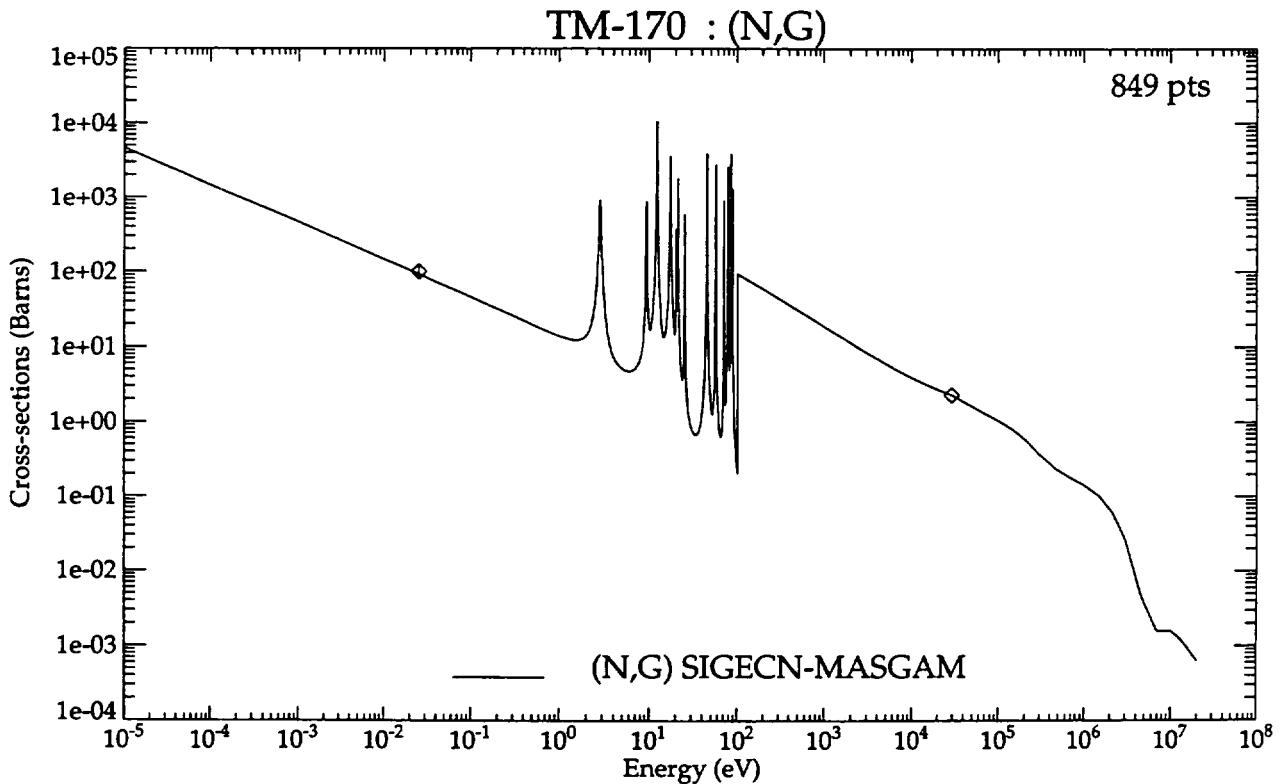
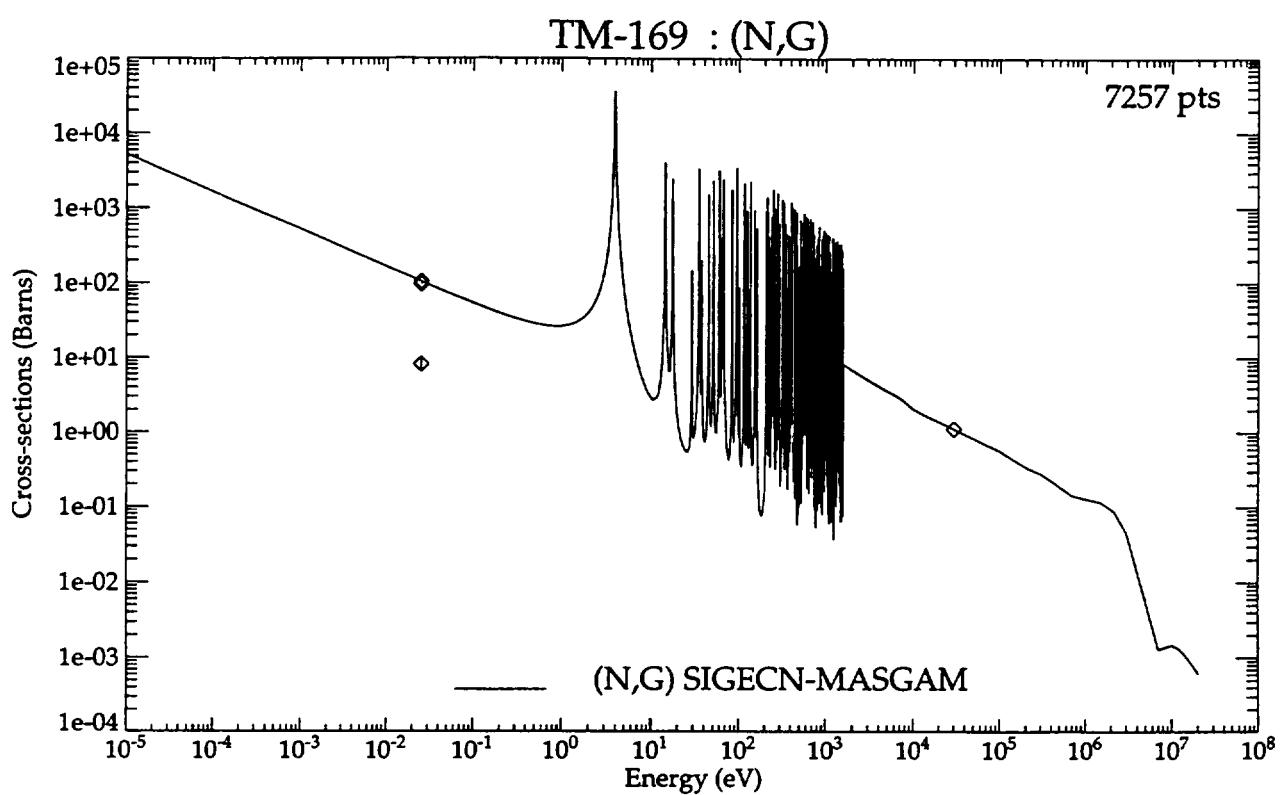


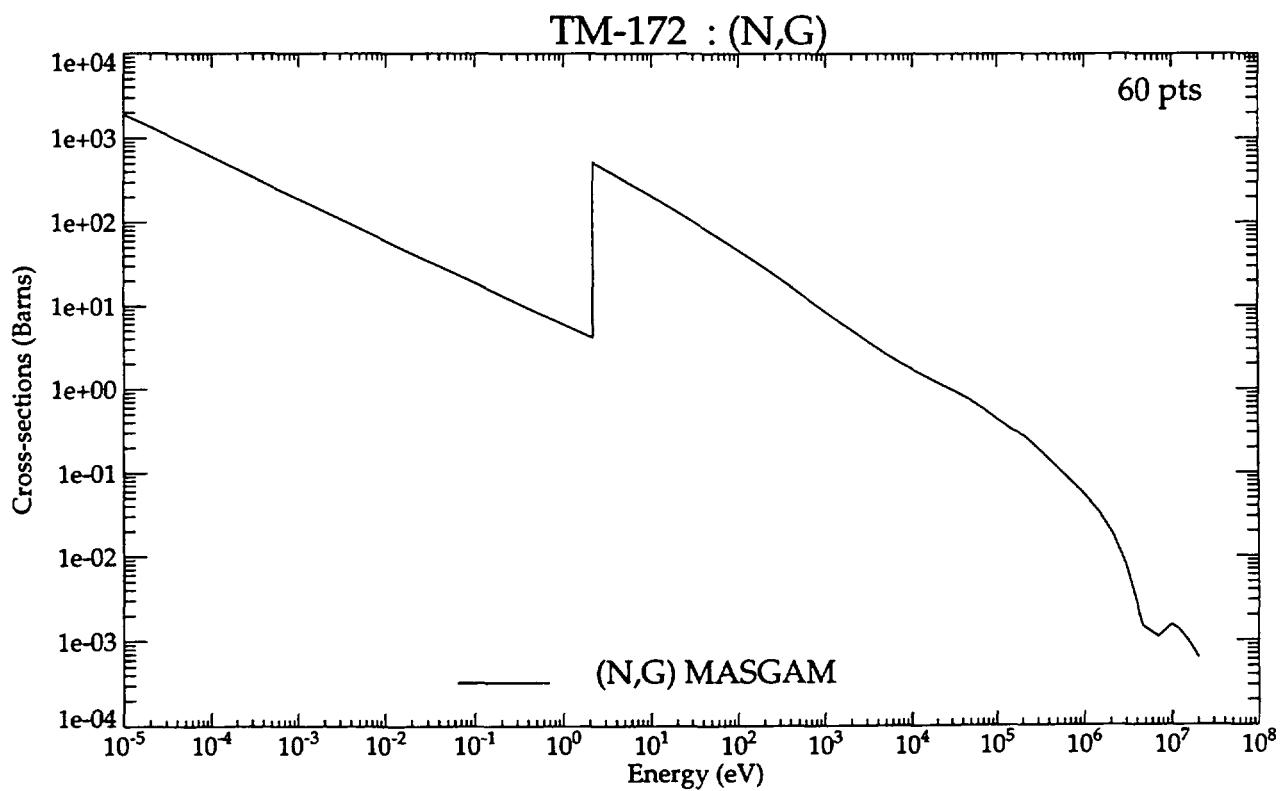
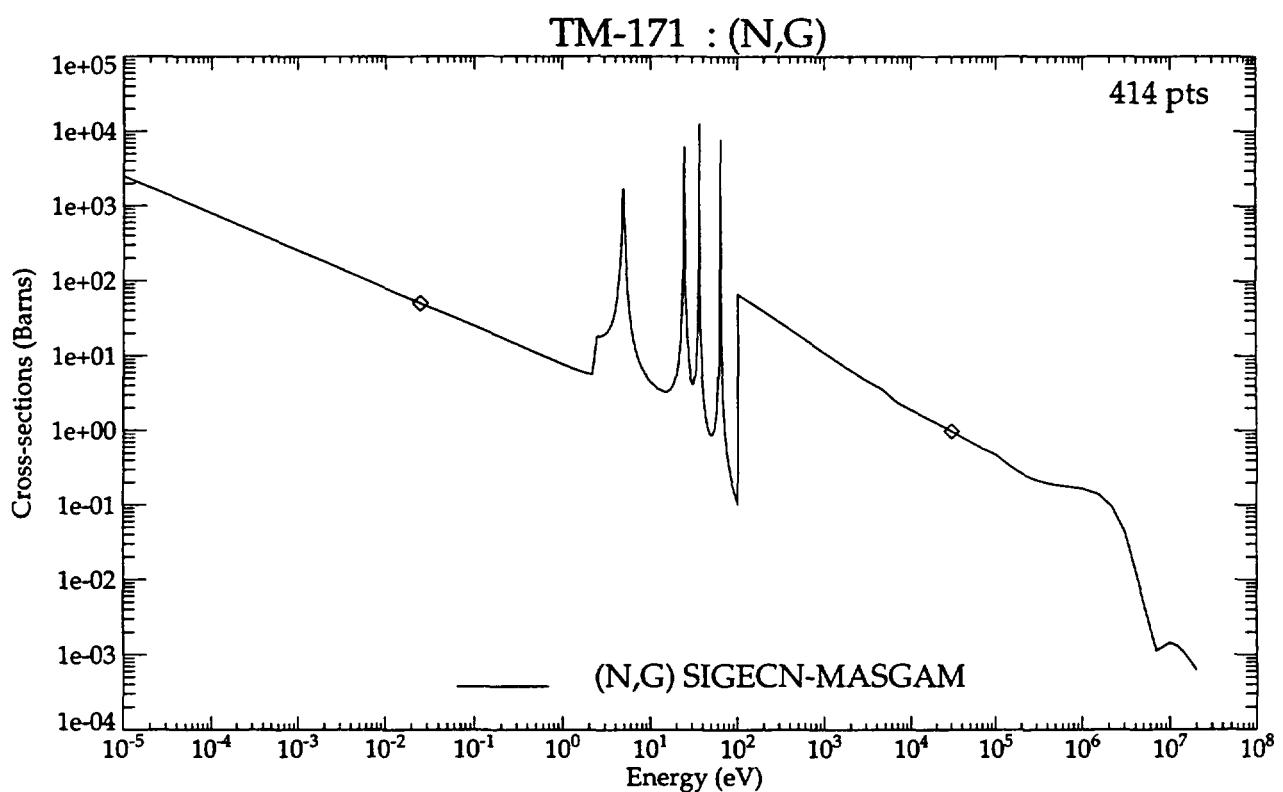


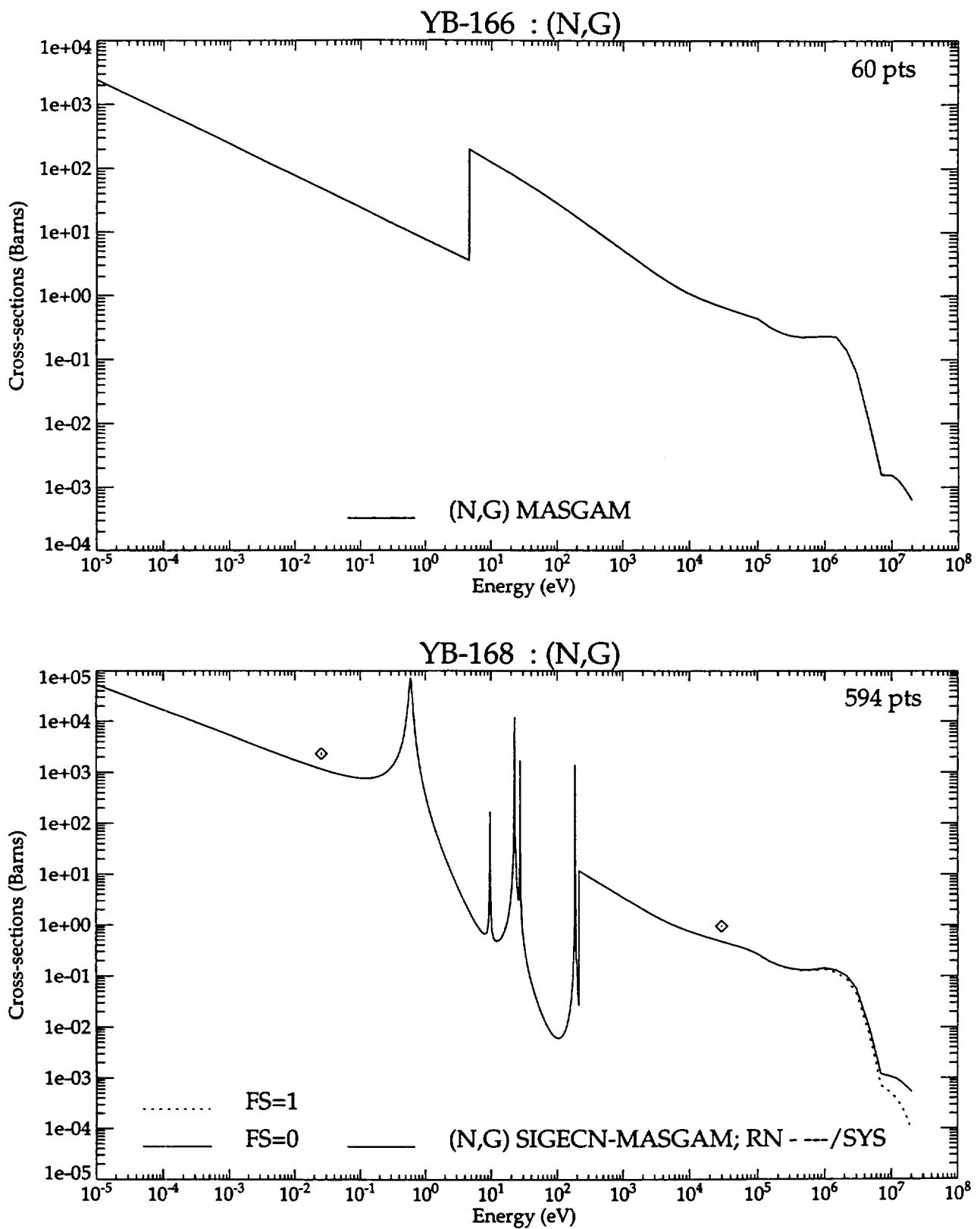


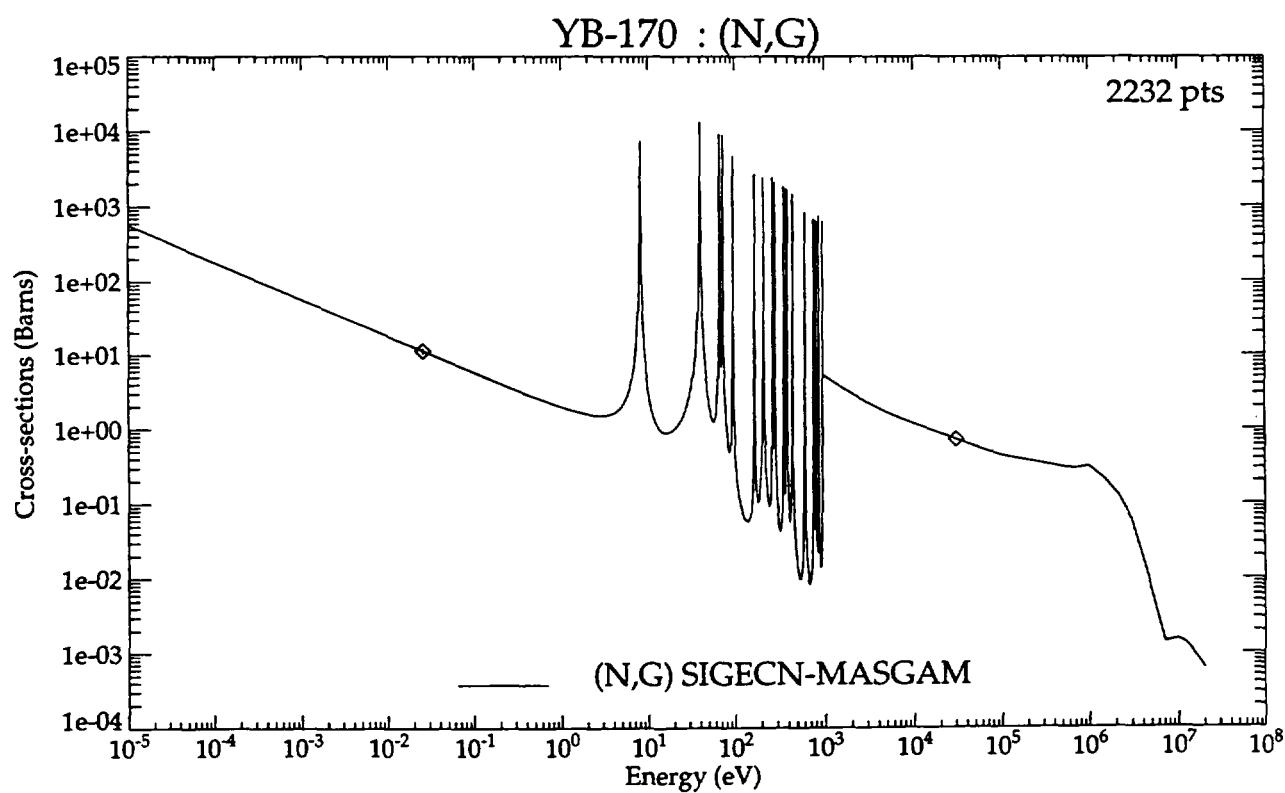
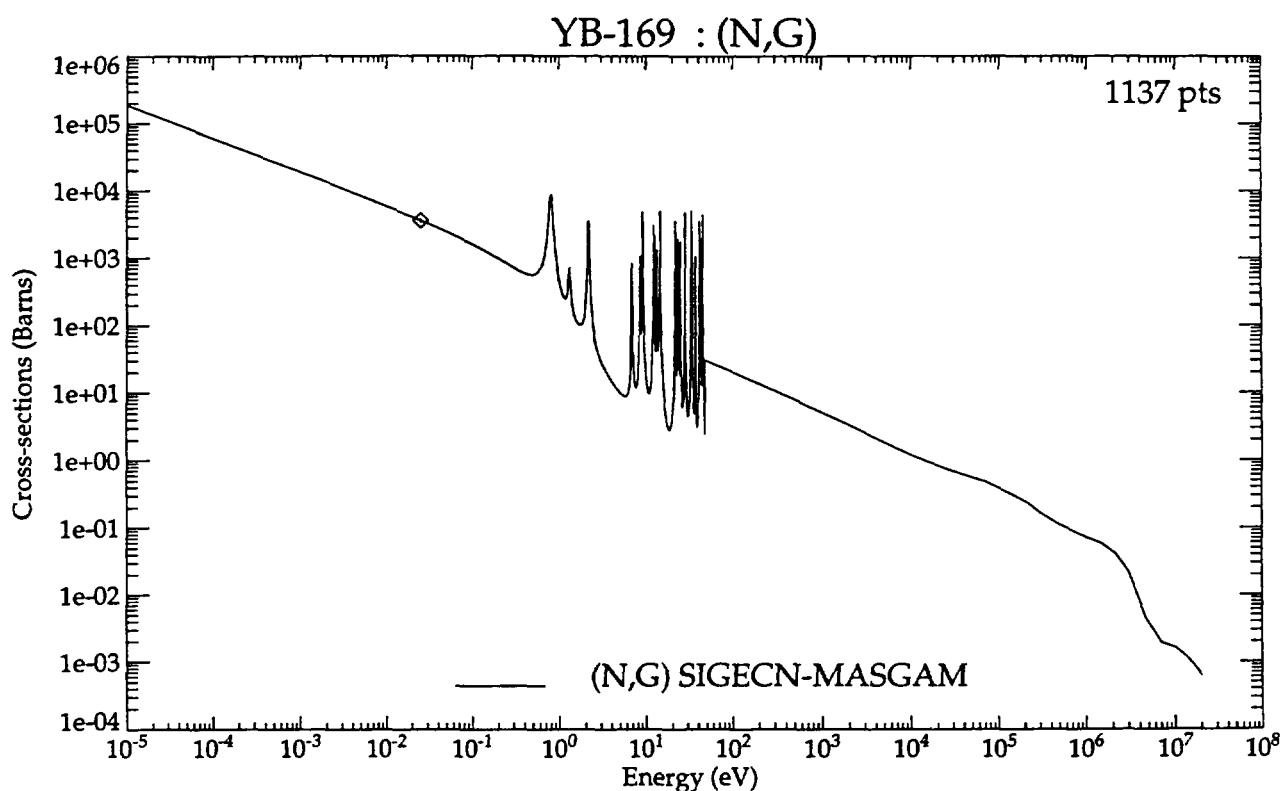


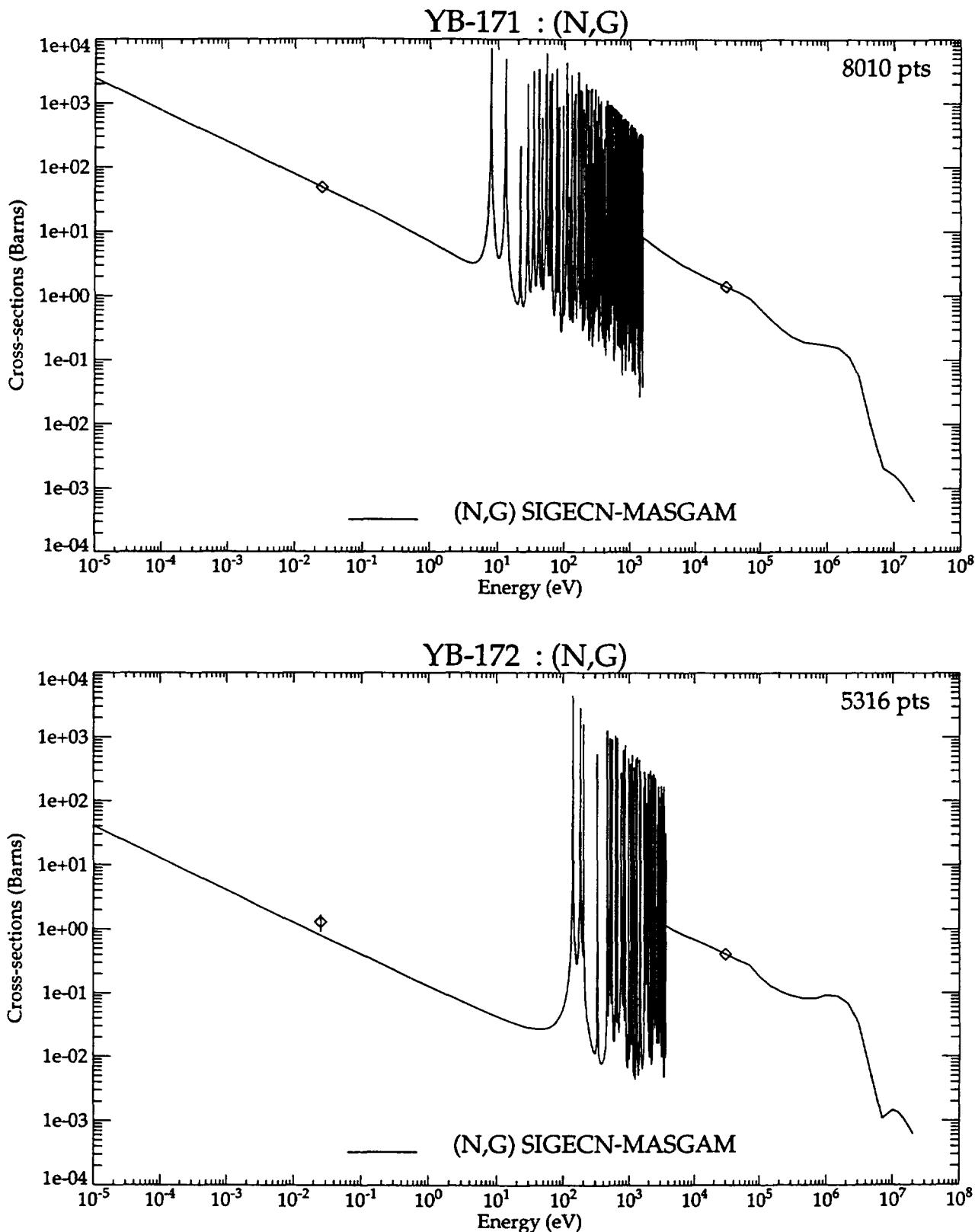


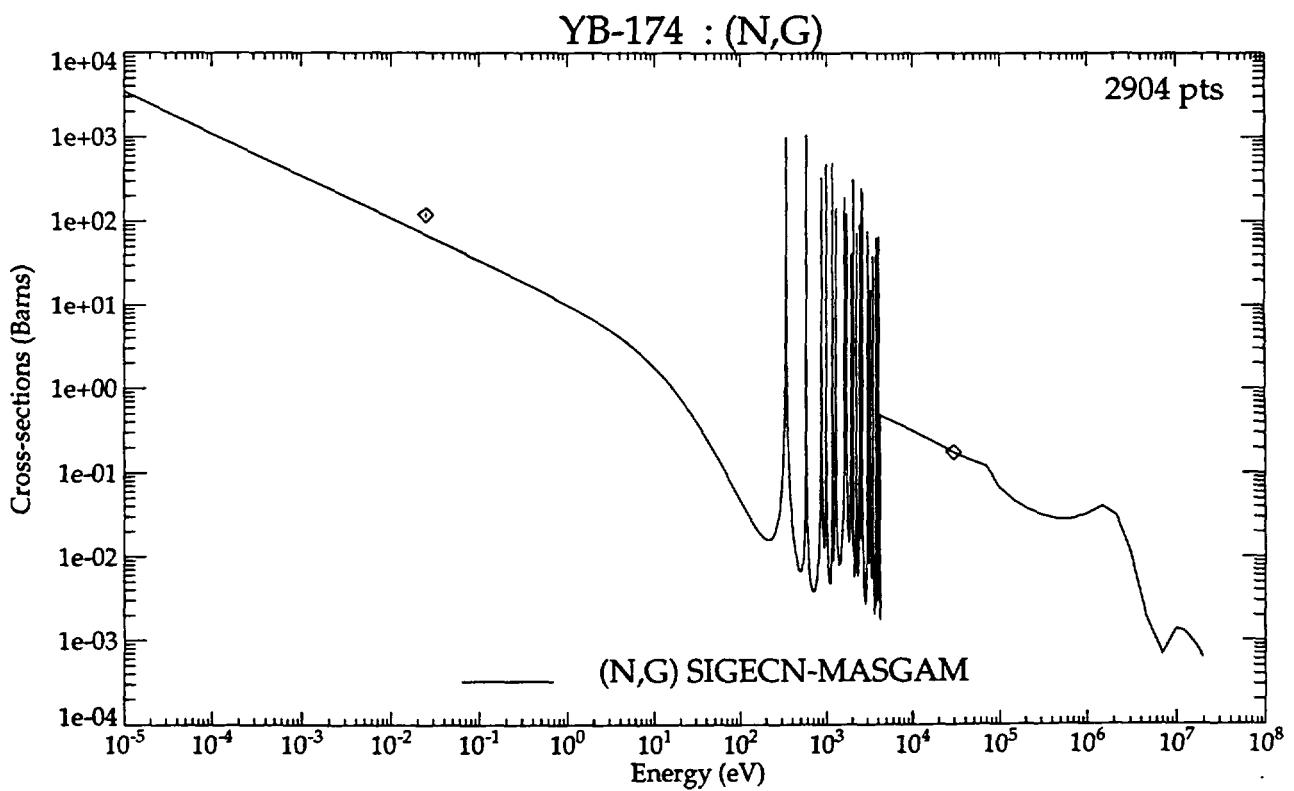
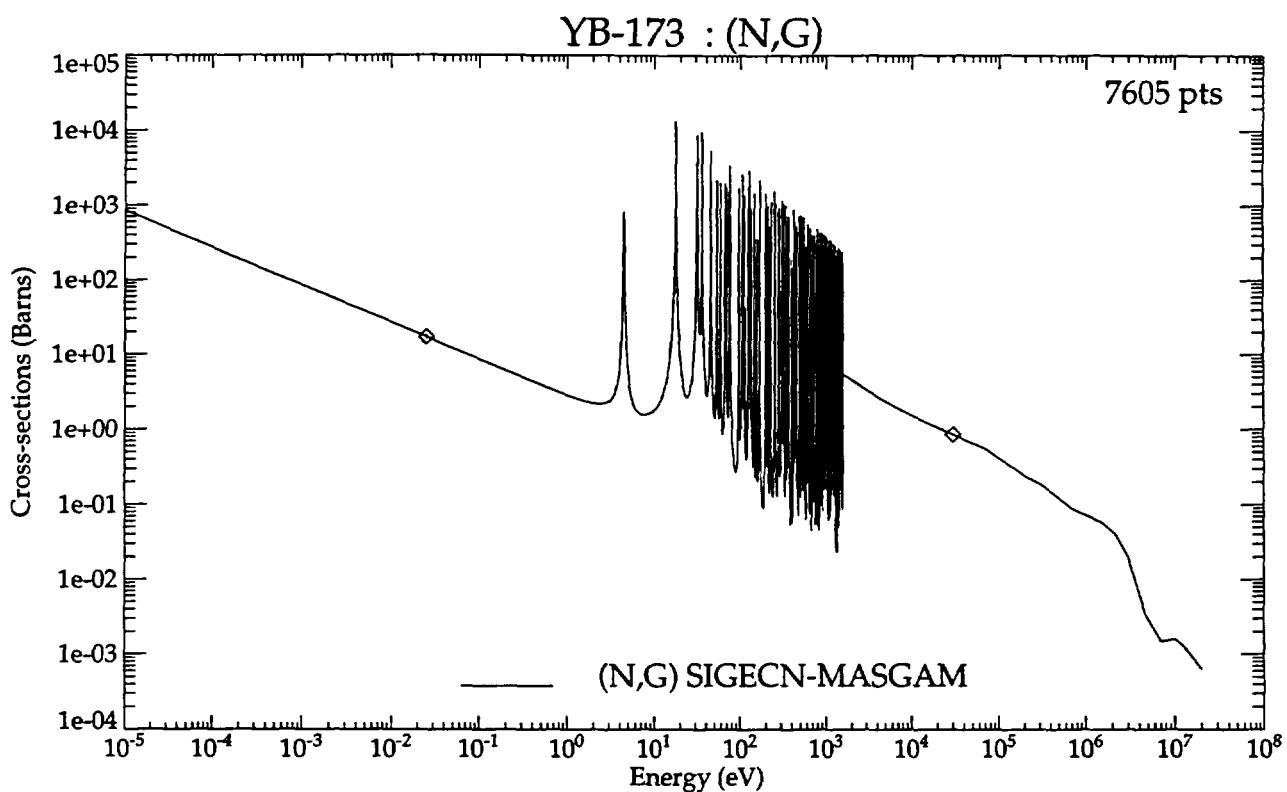


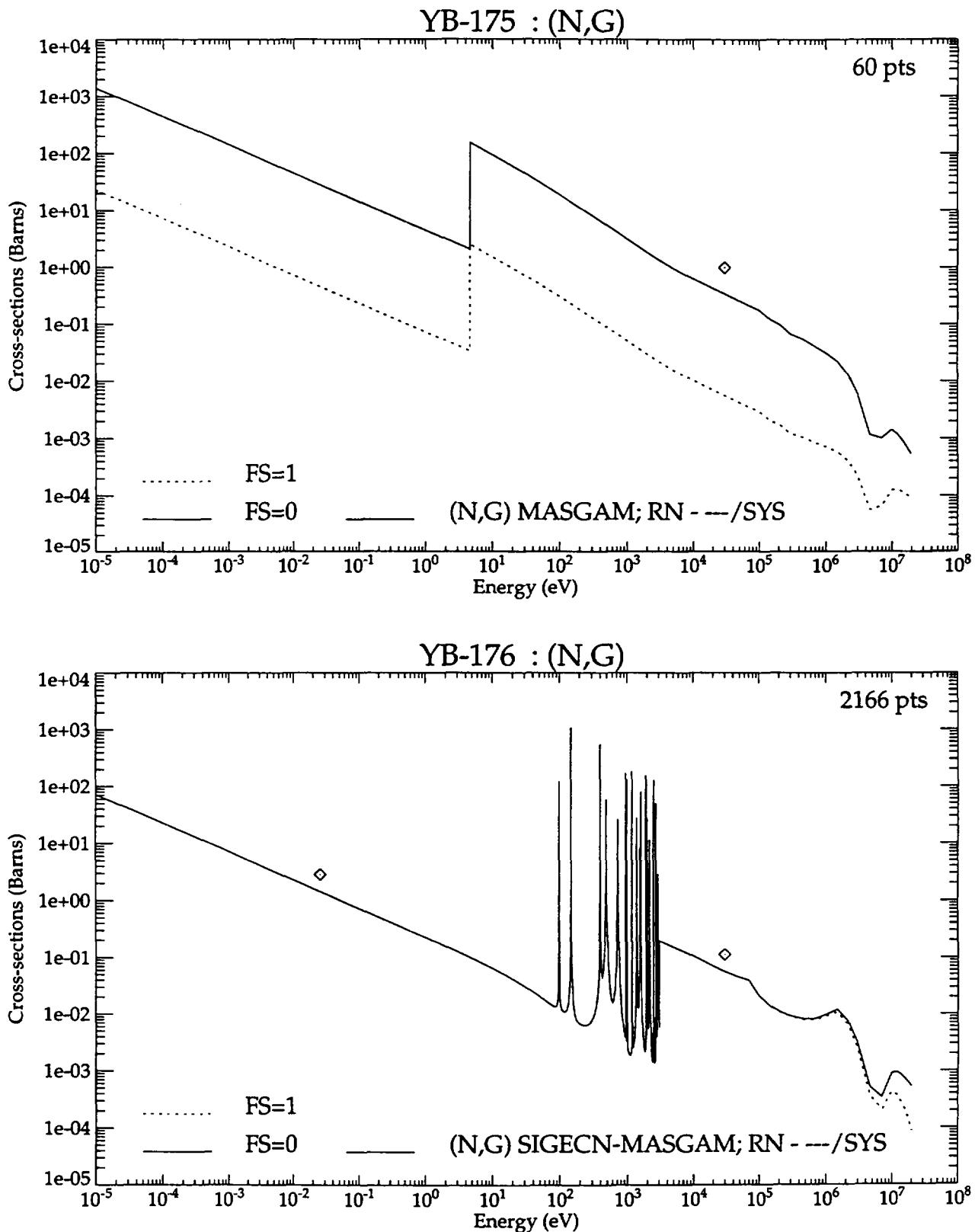


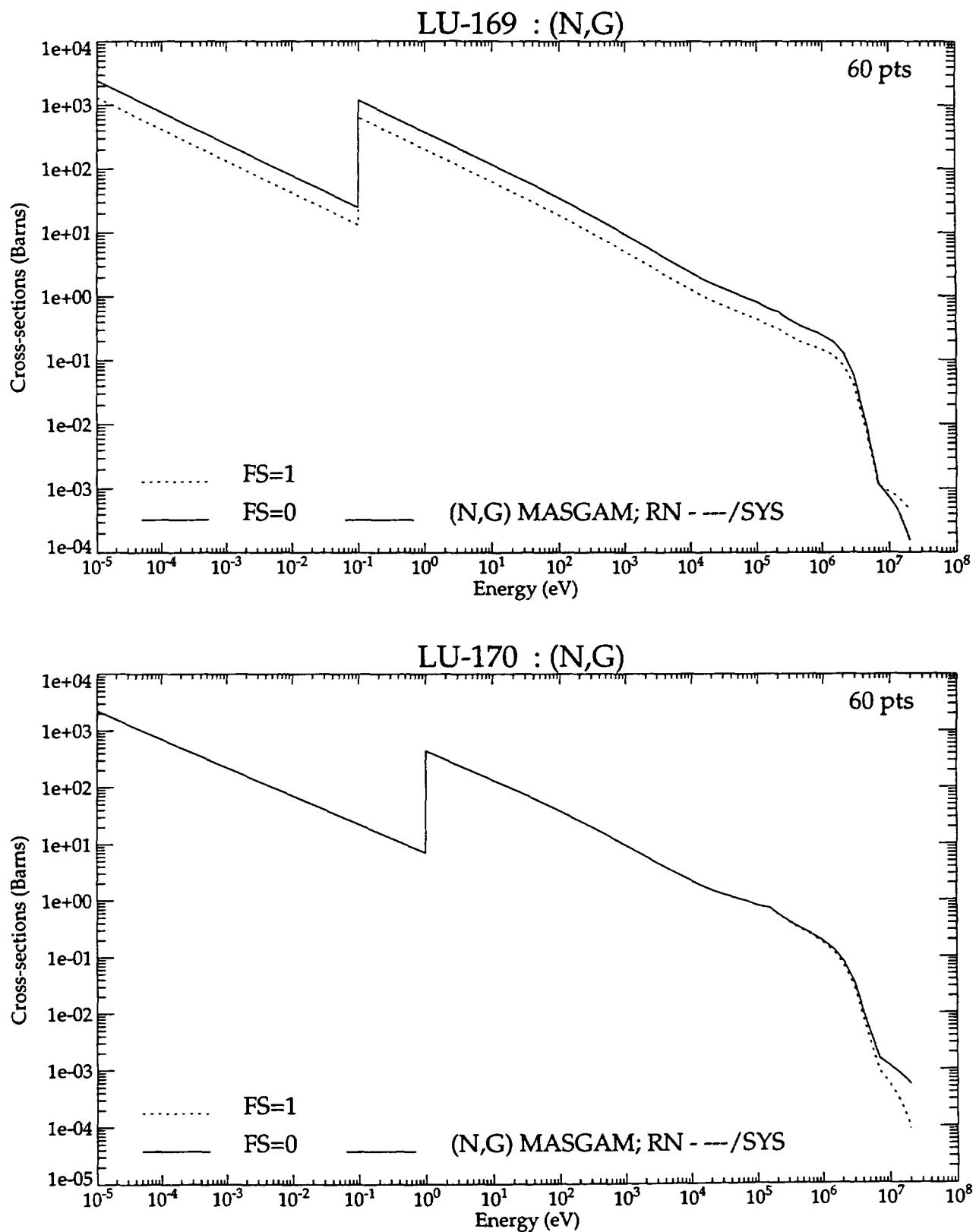


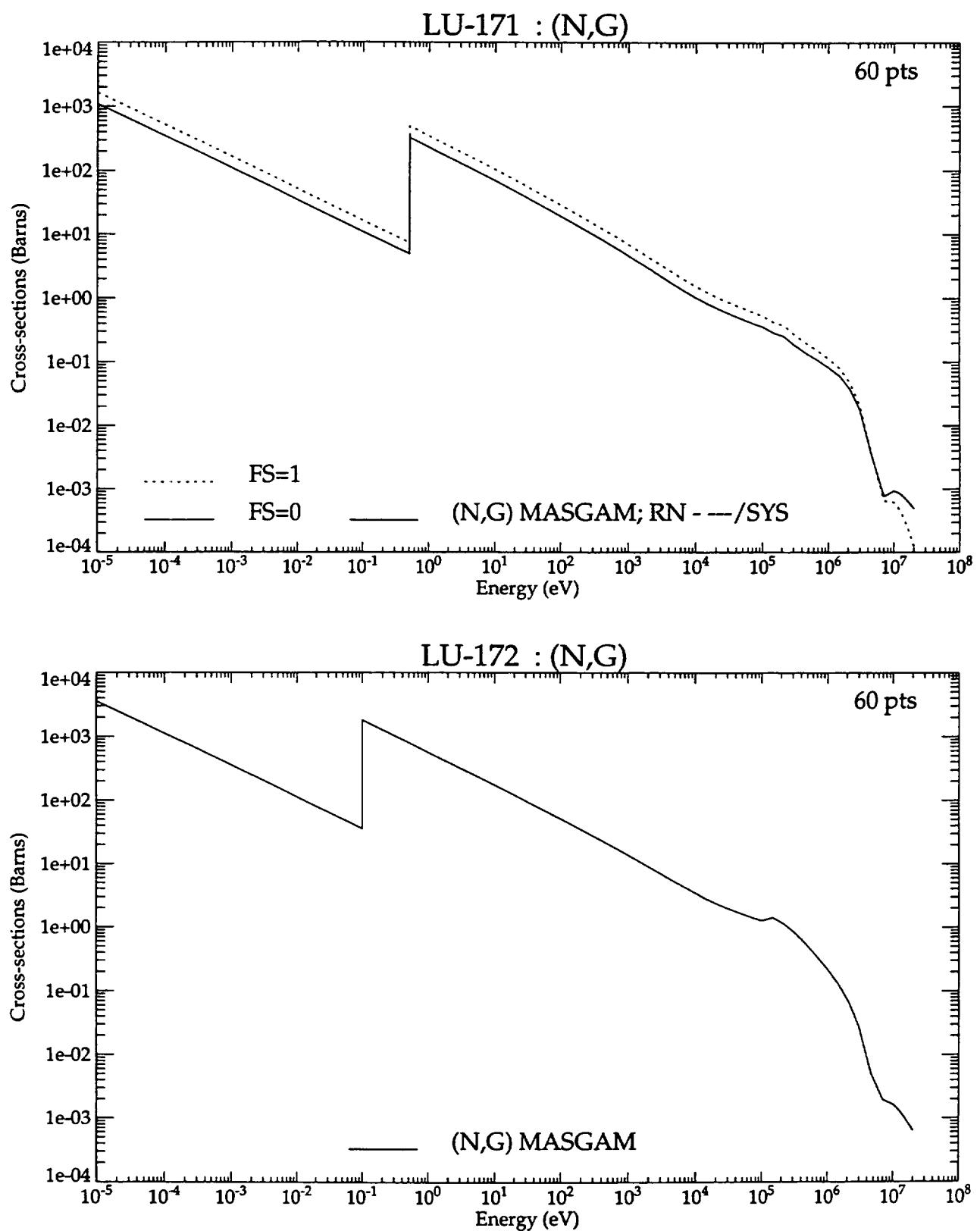


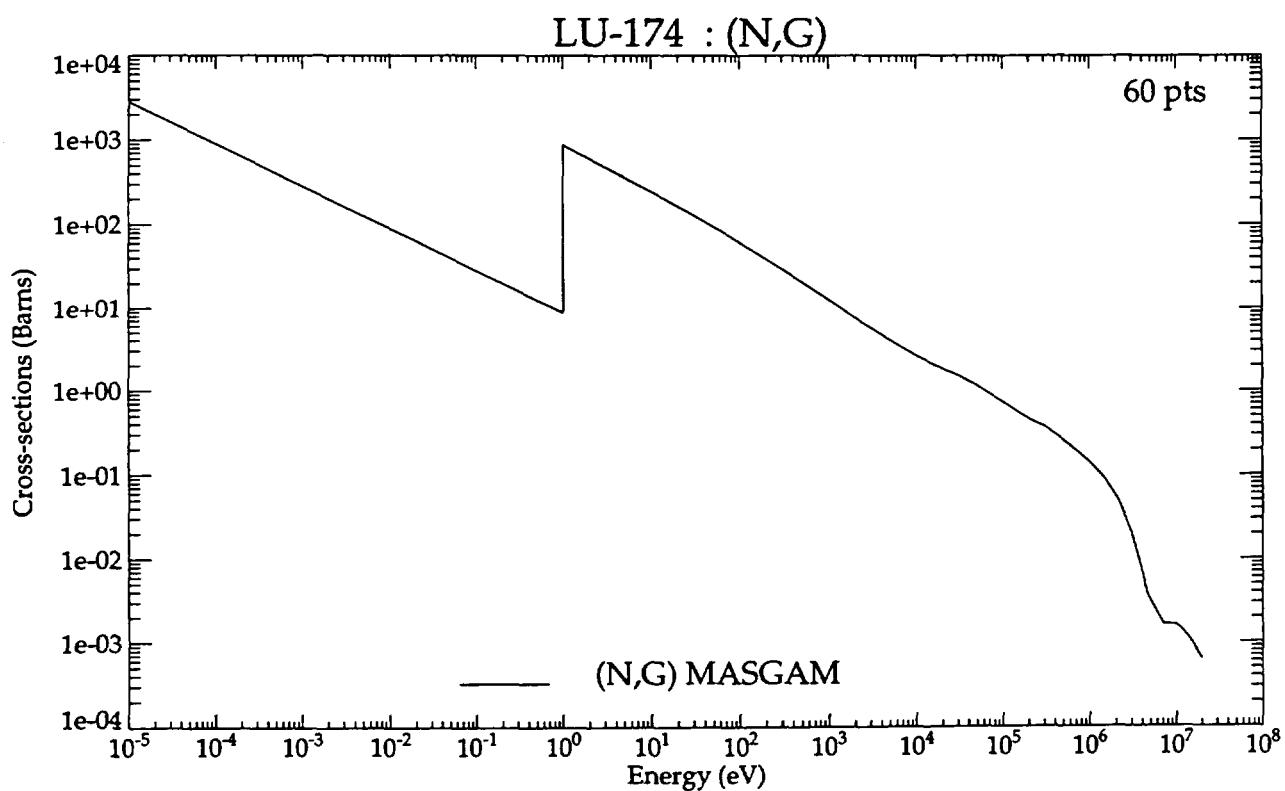
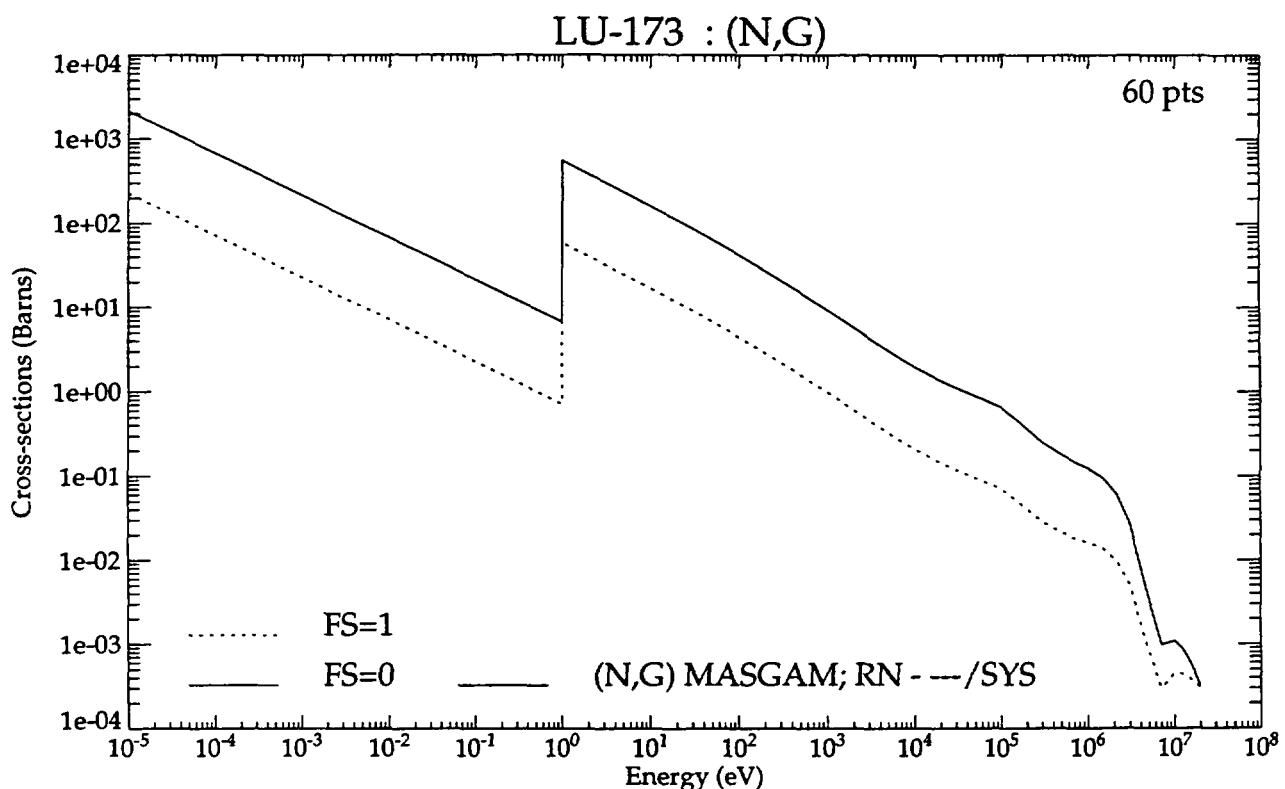


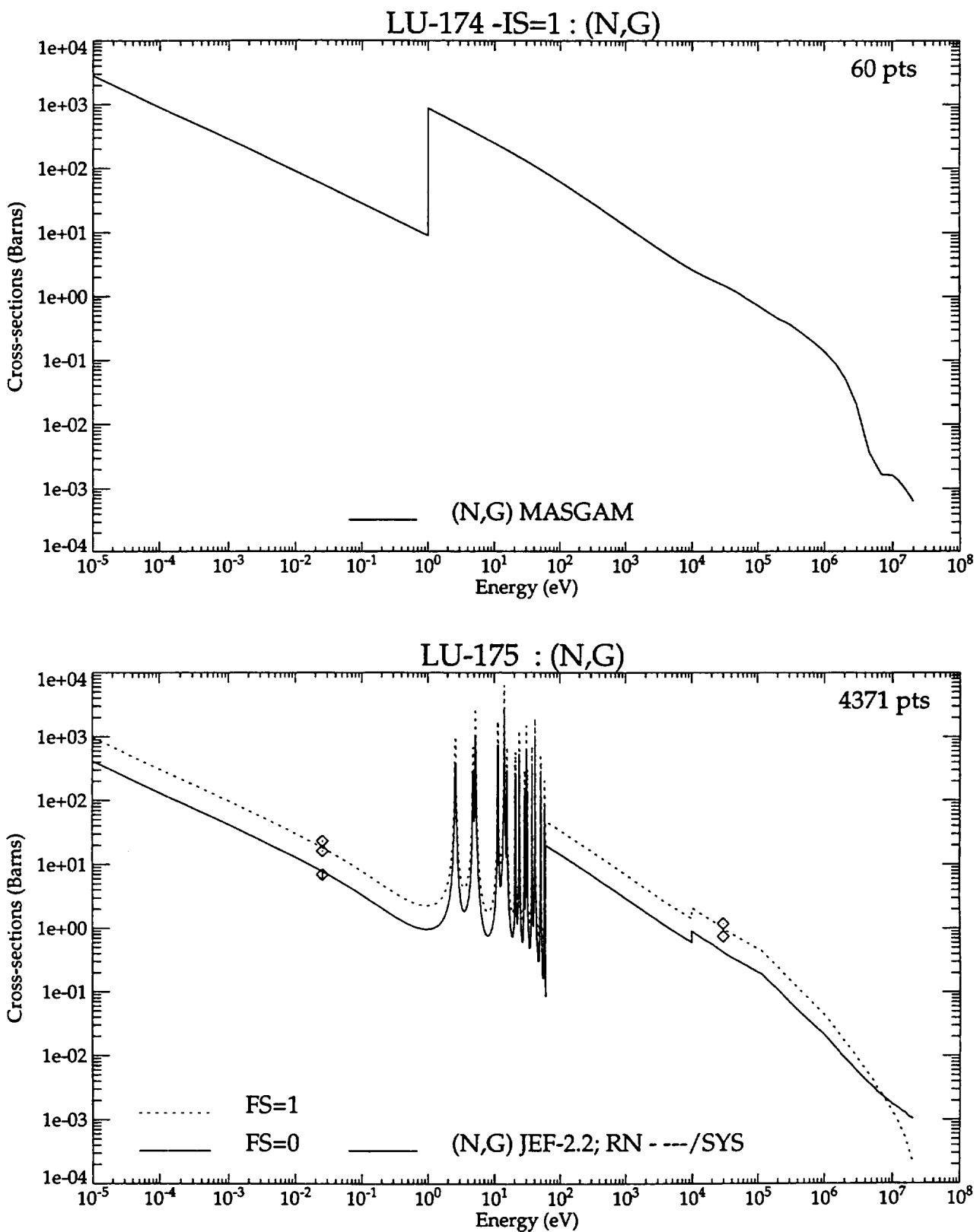


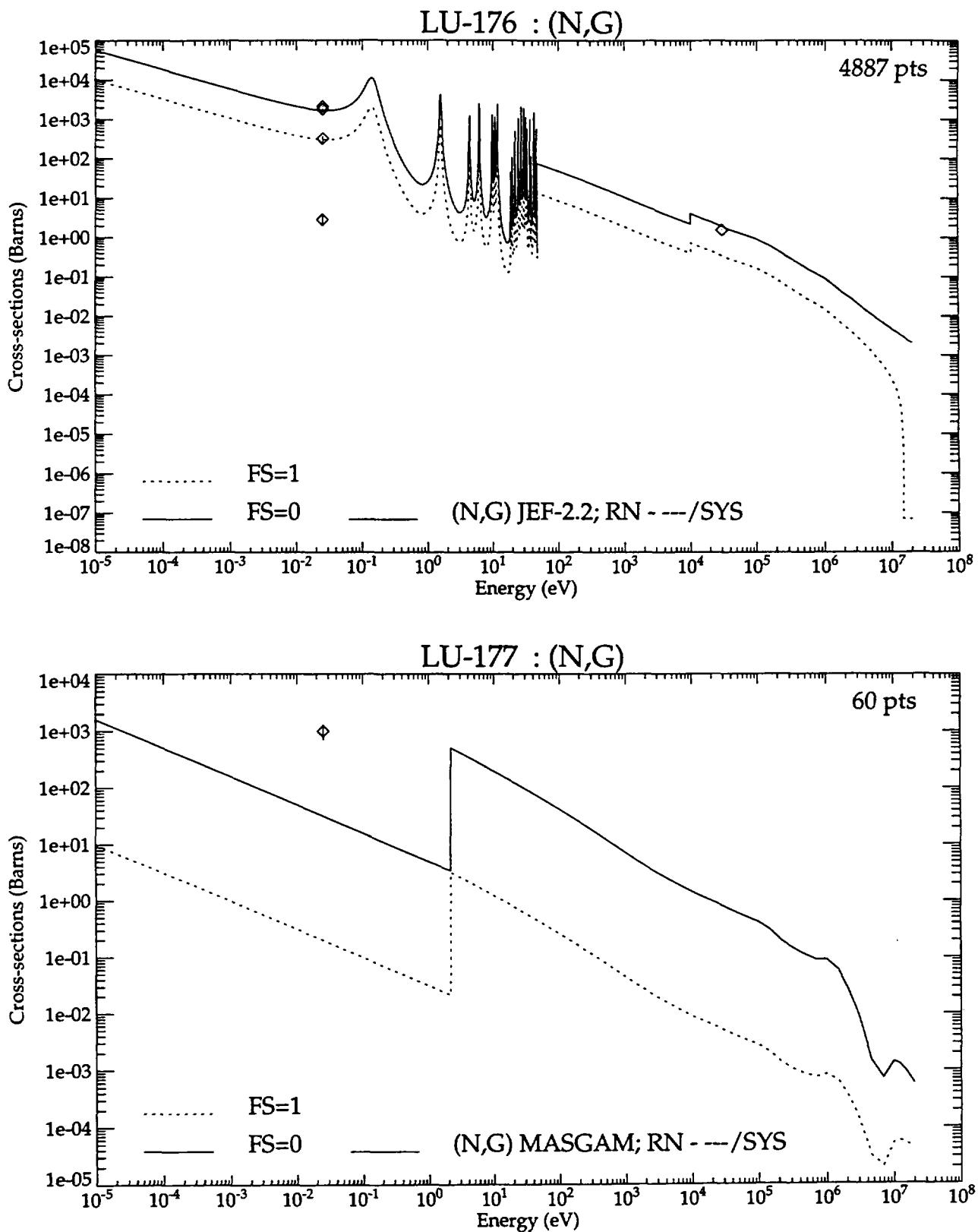


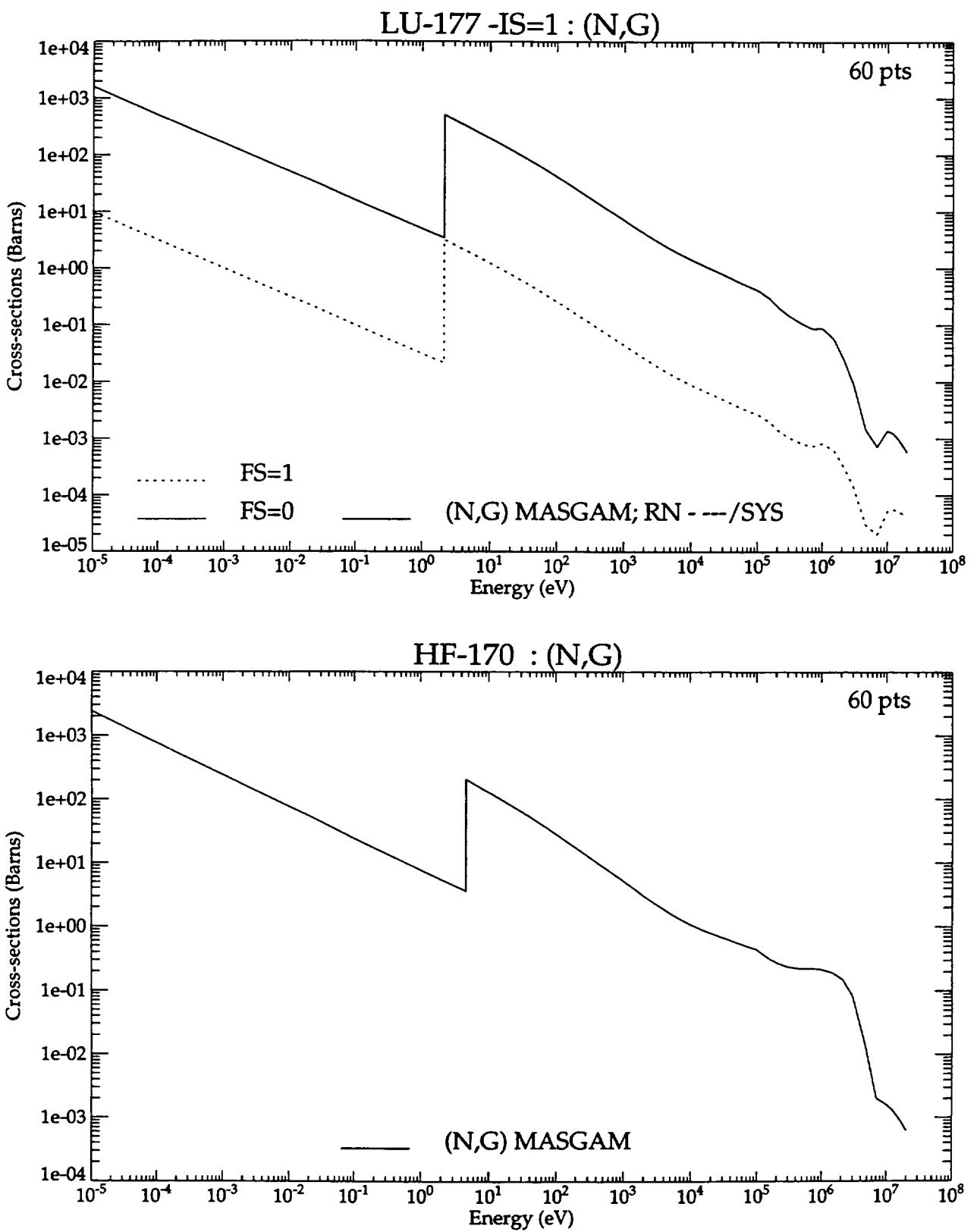


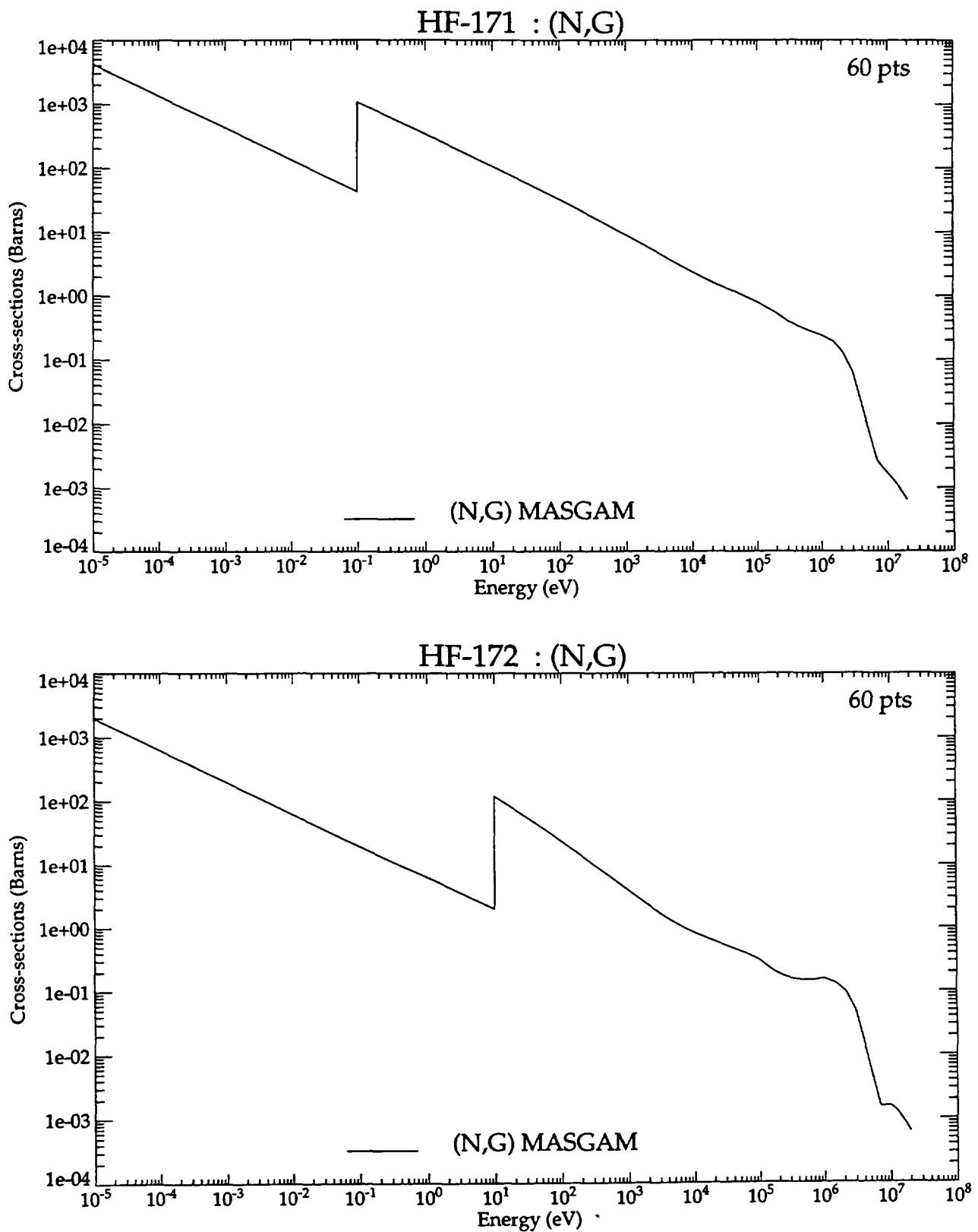


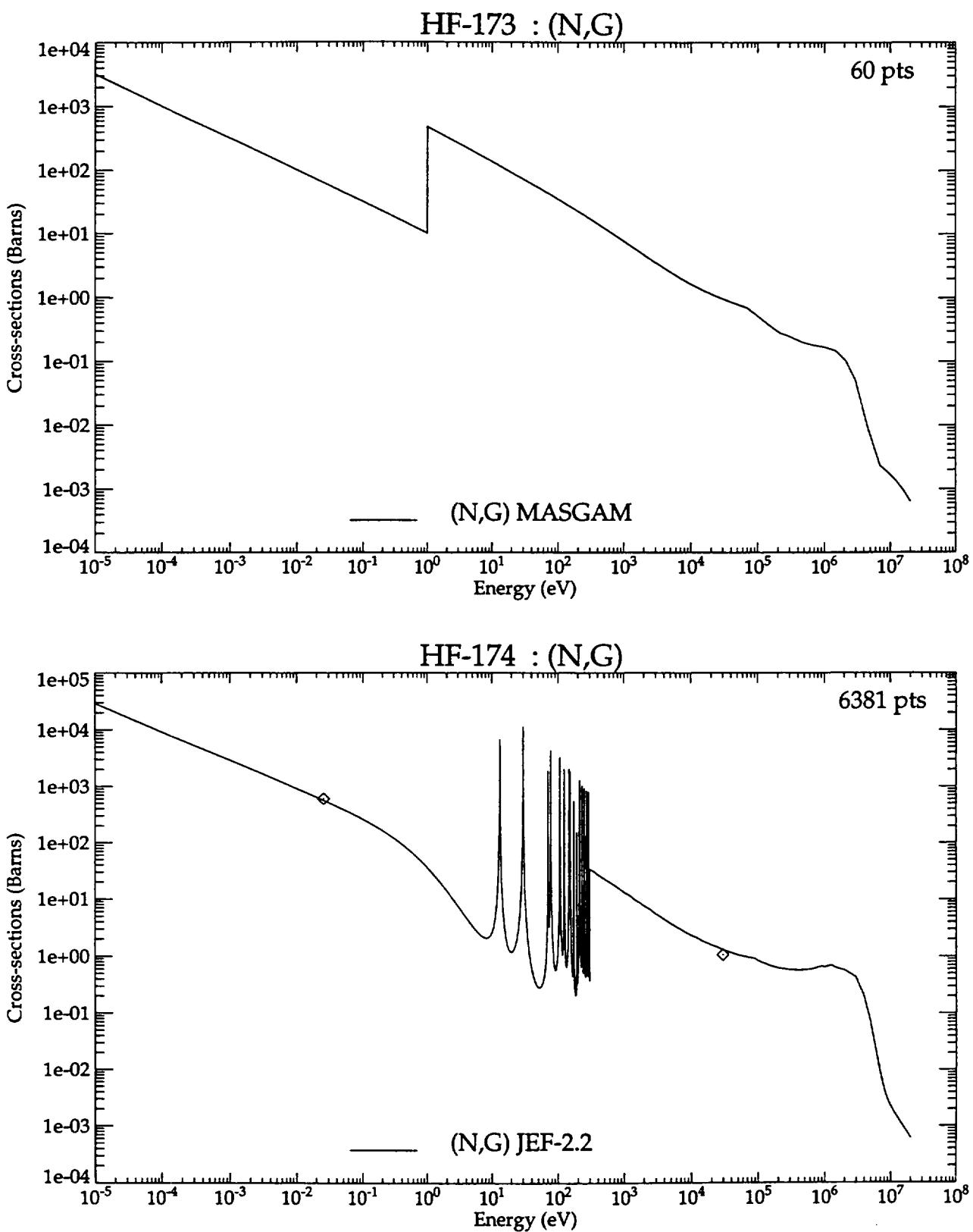


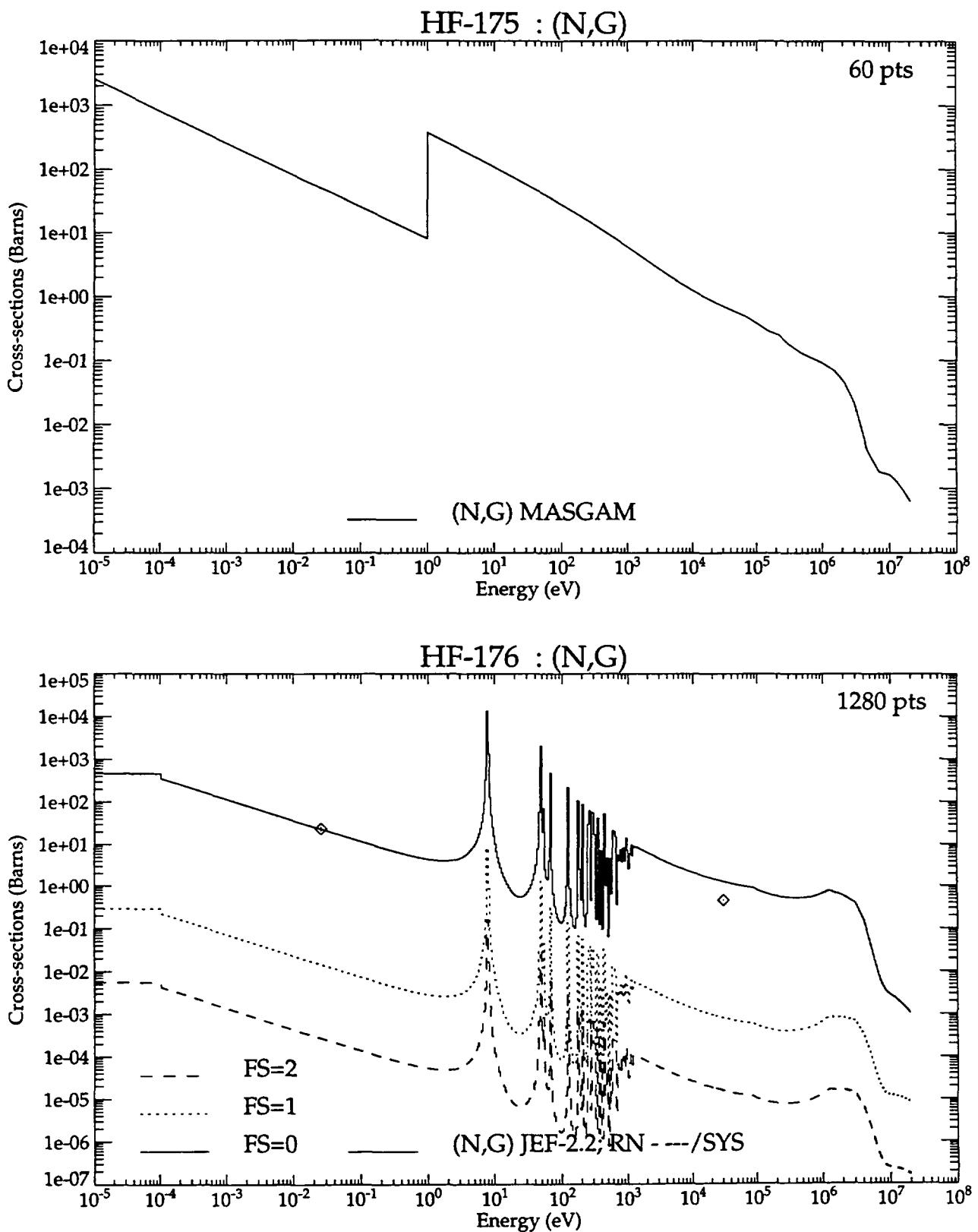


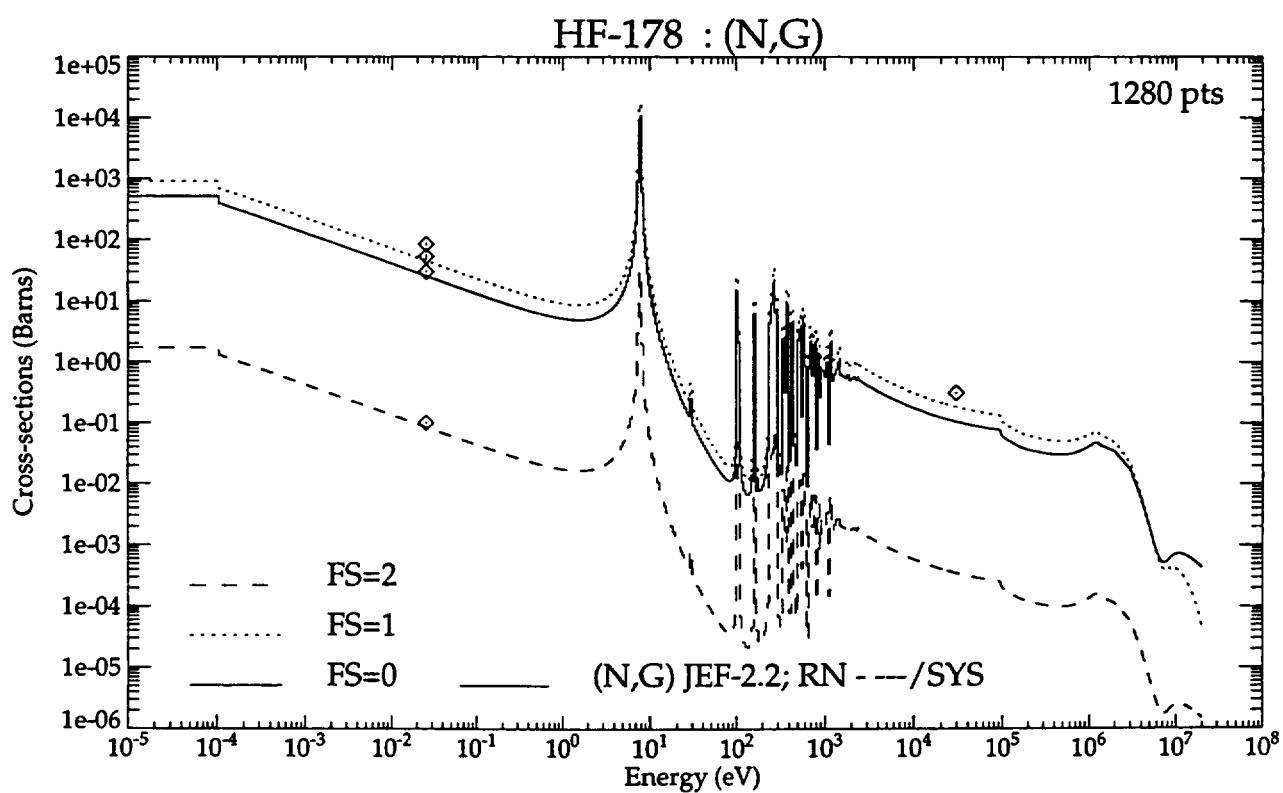
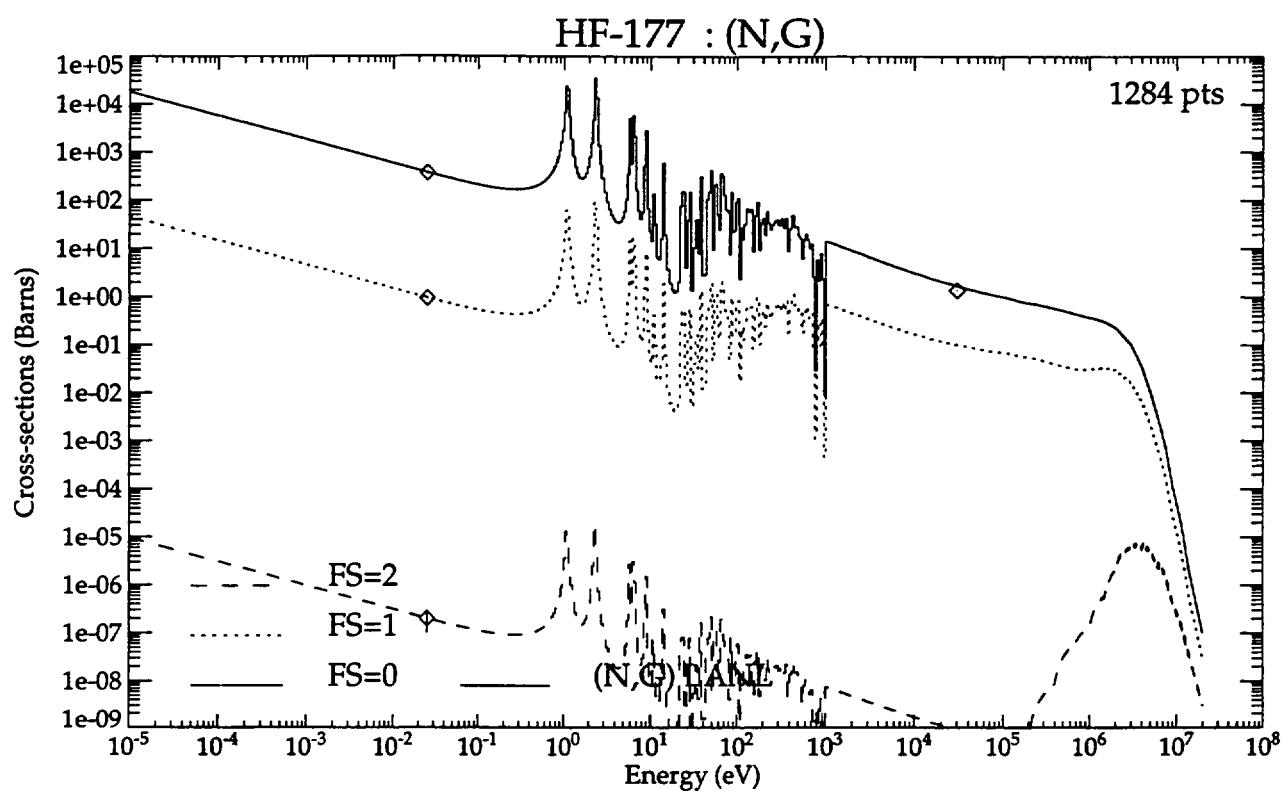




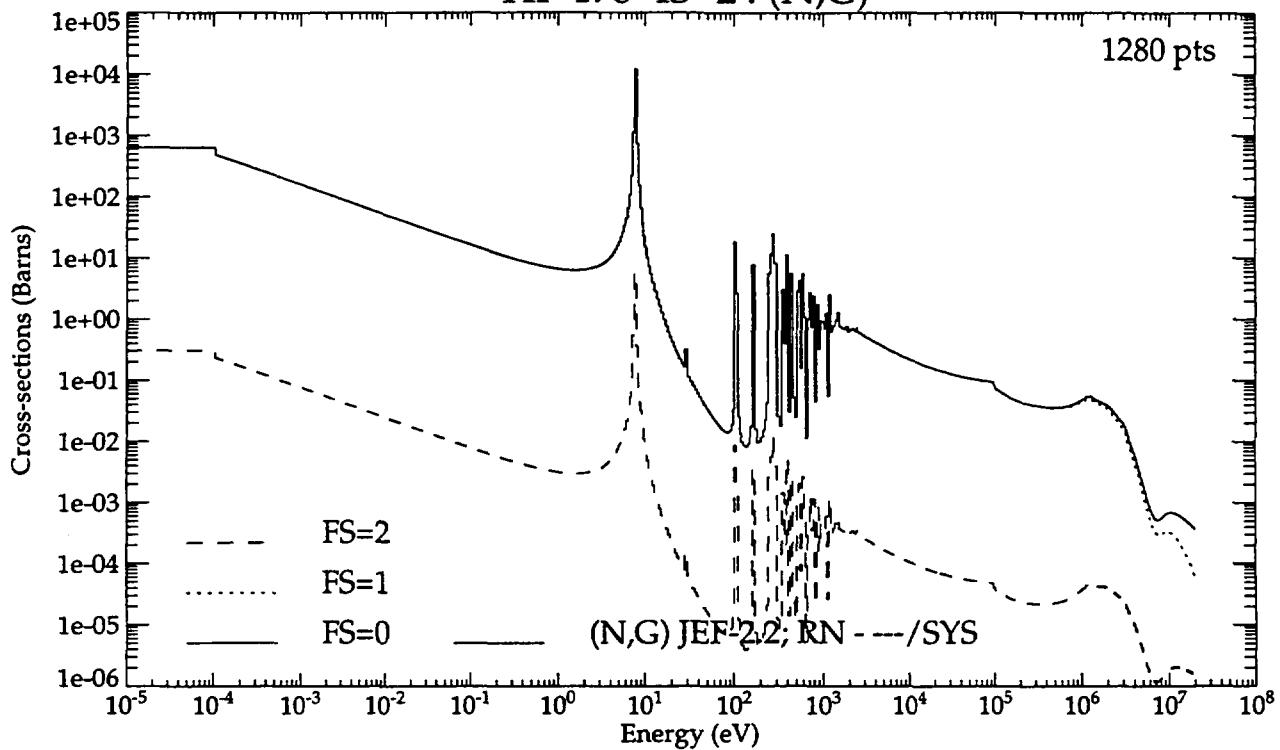




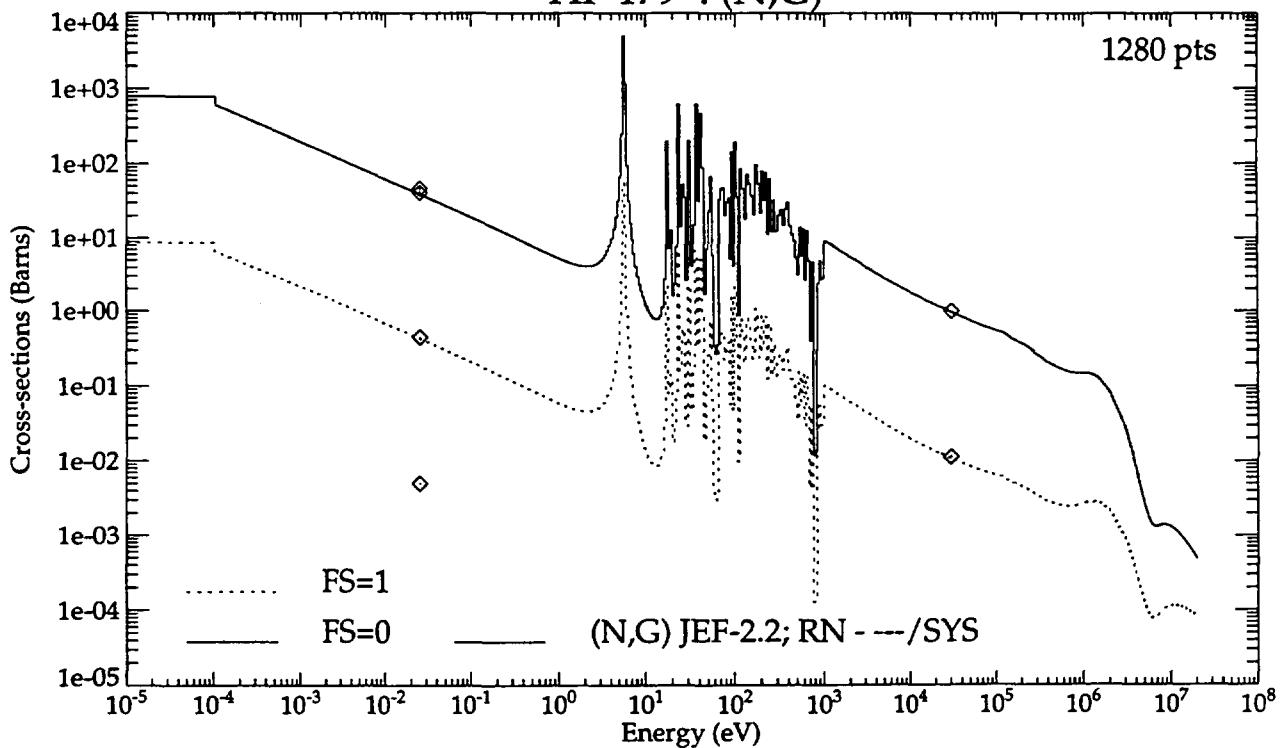


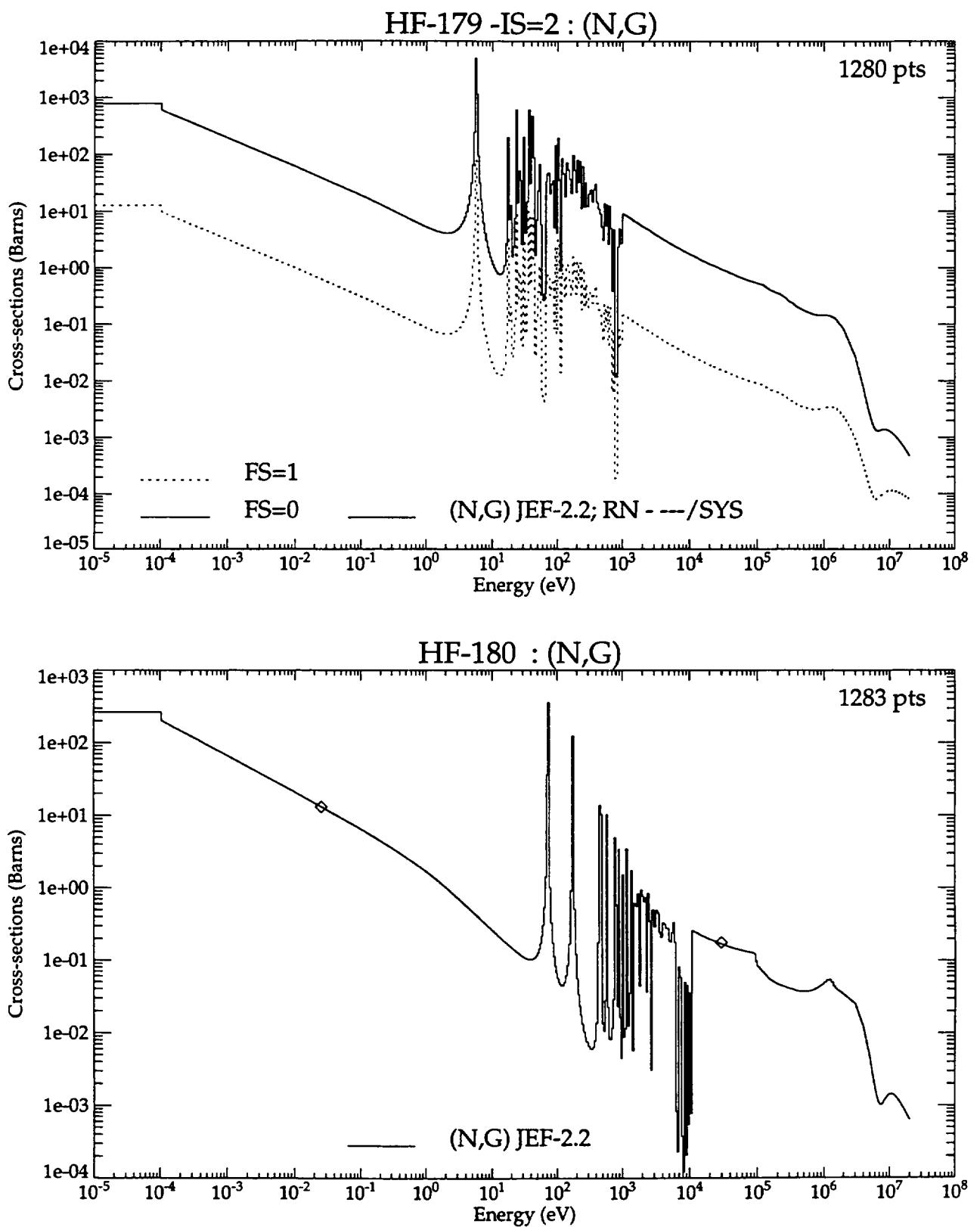


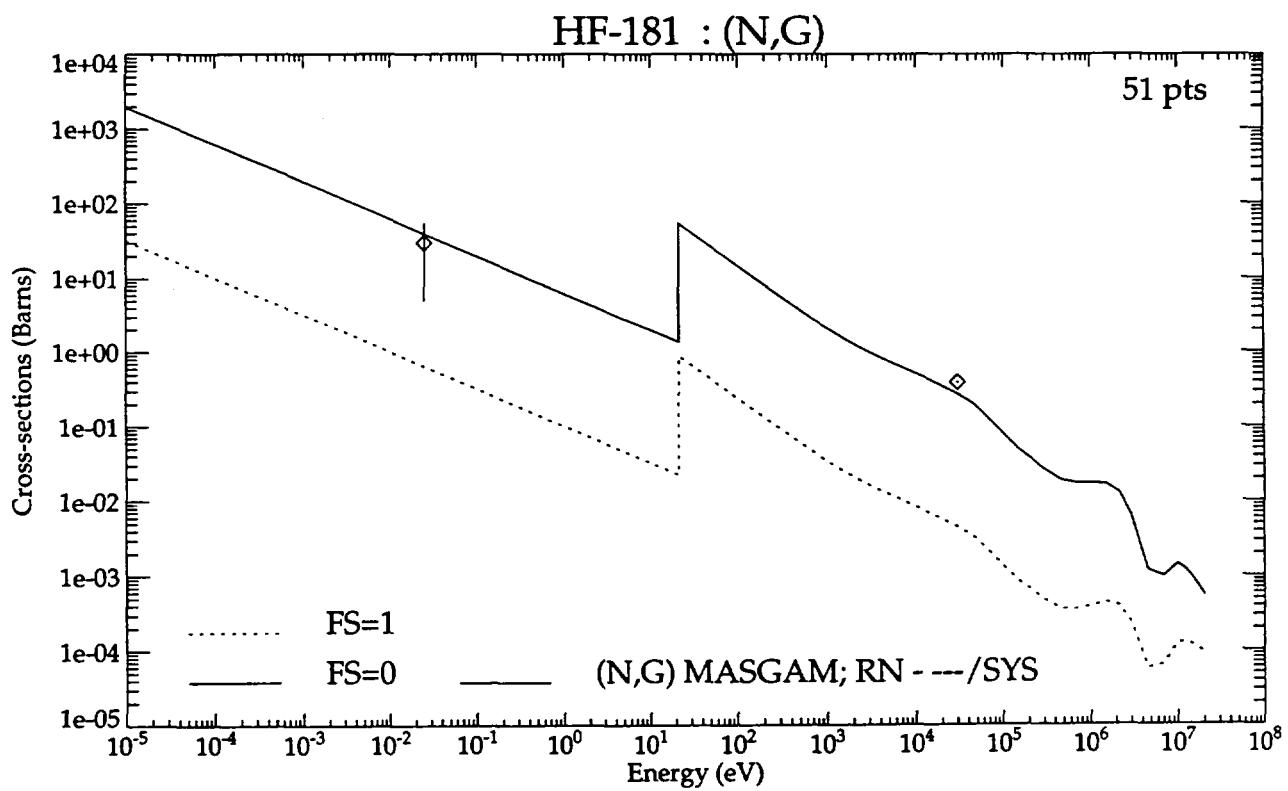
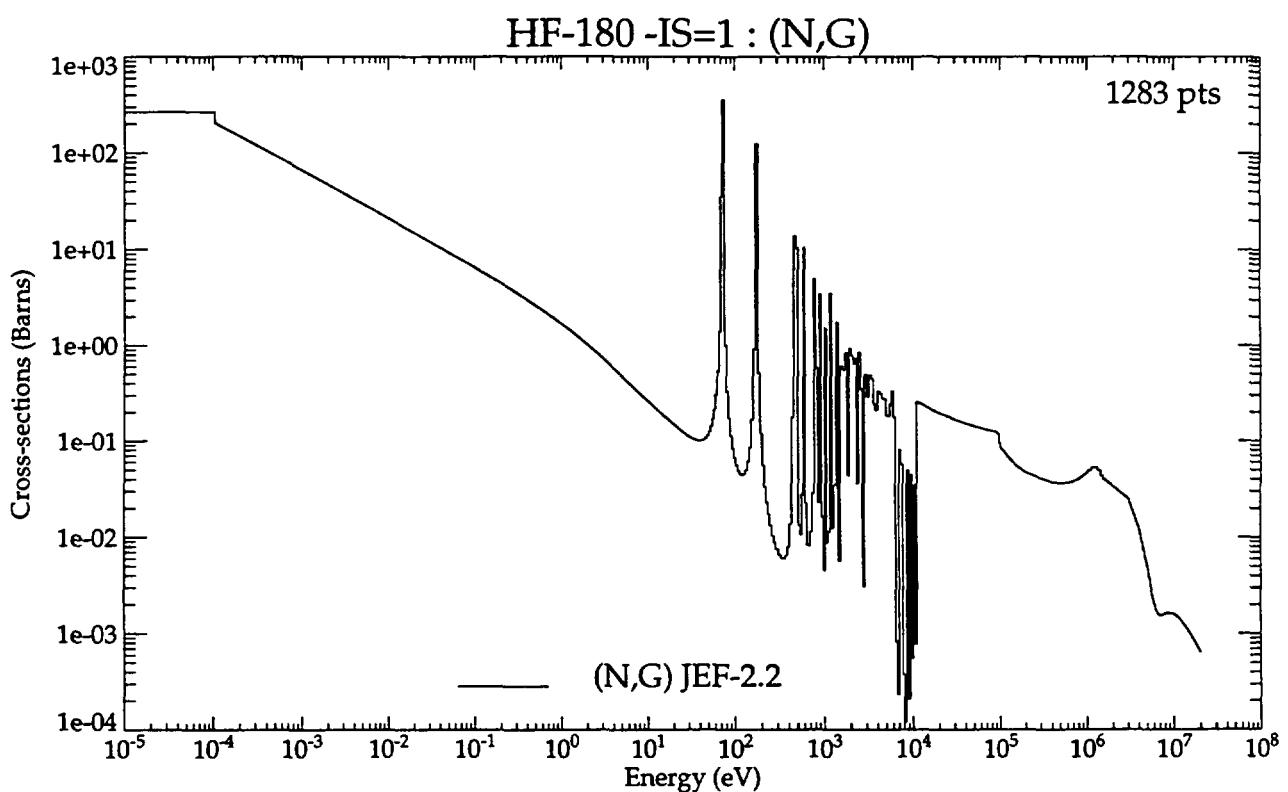
HF-178 -IS=2 : (N,G)

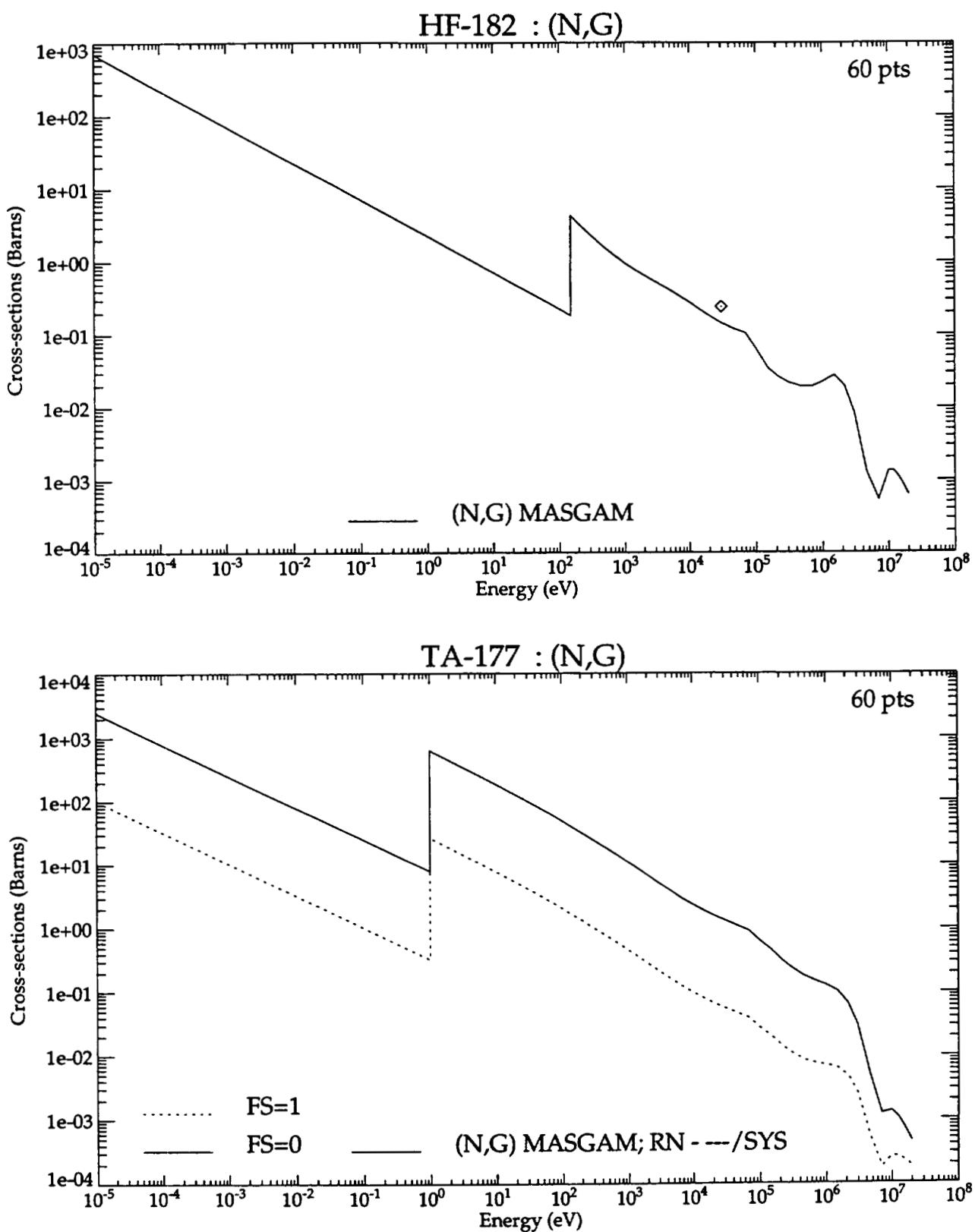


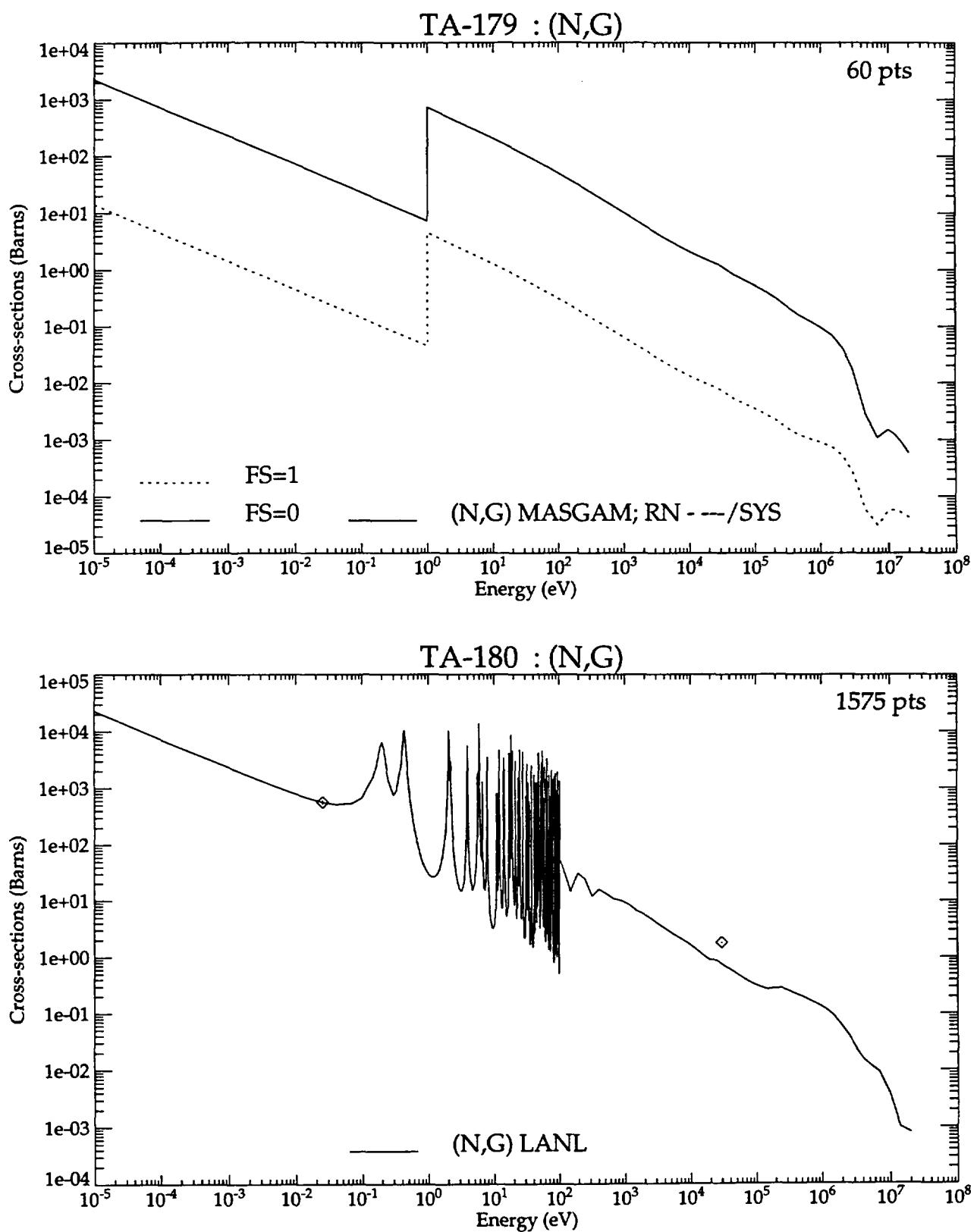
HF-179 : (N,G)

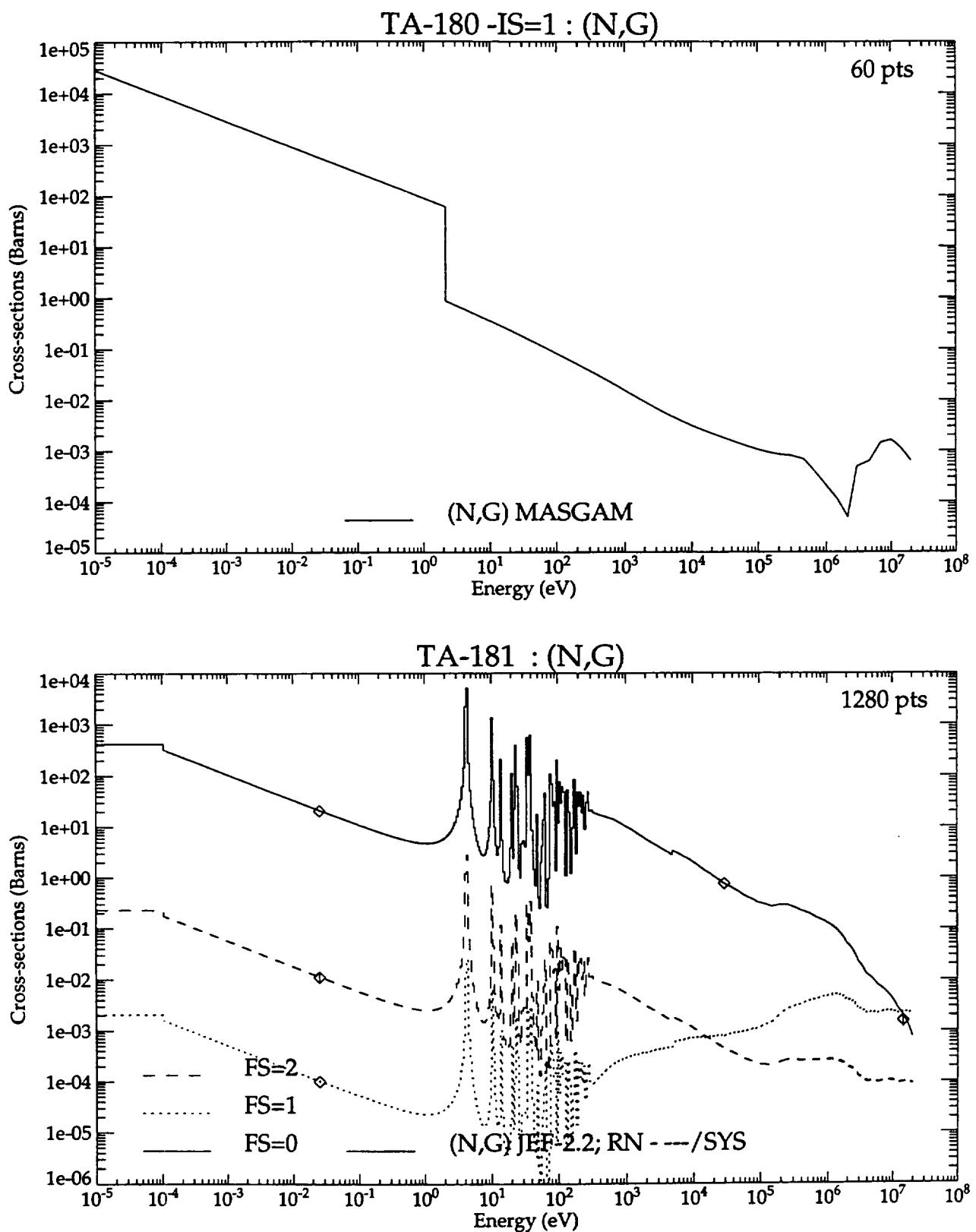


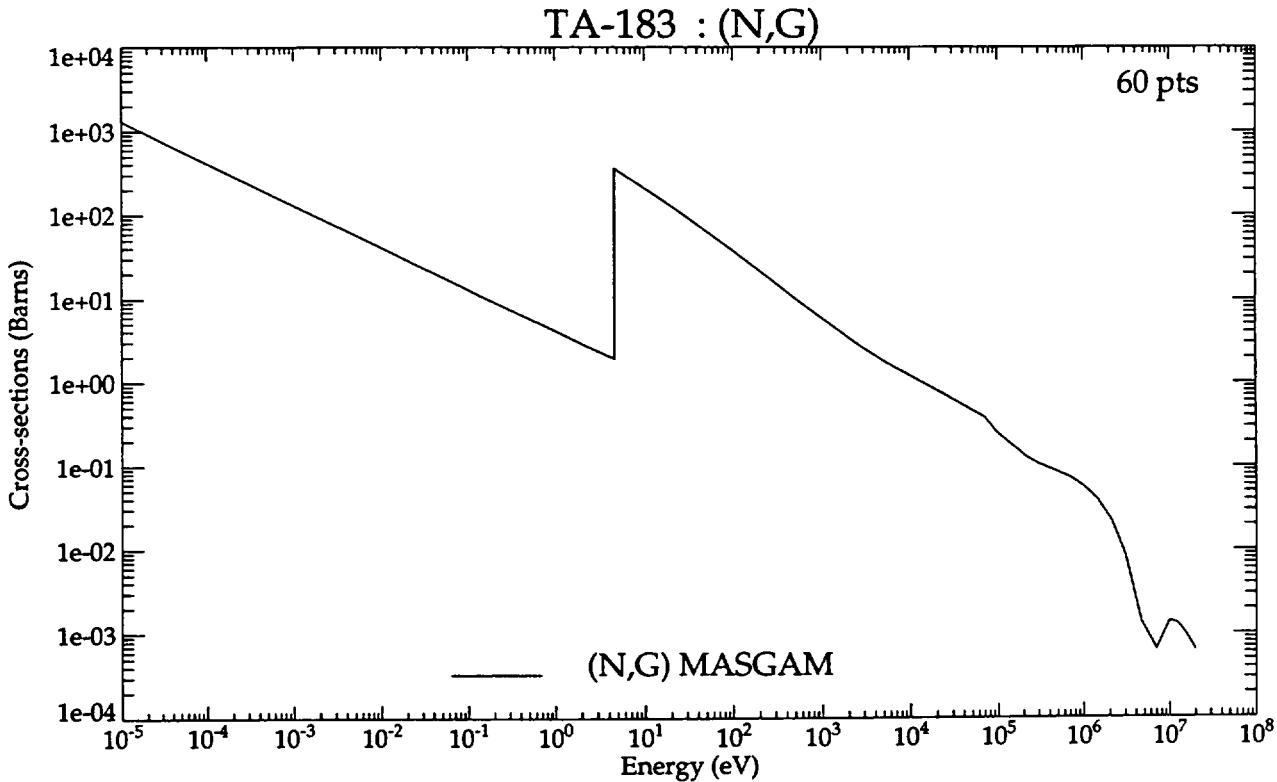
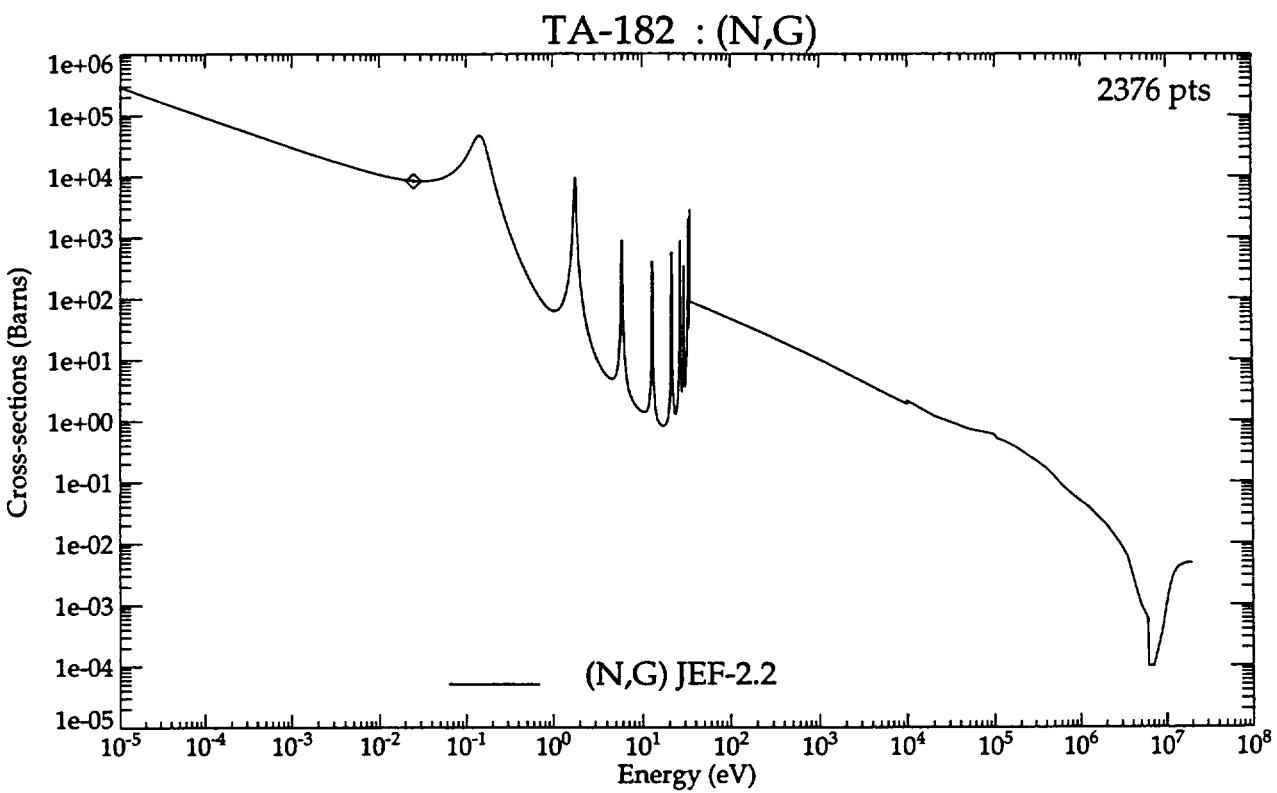


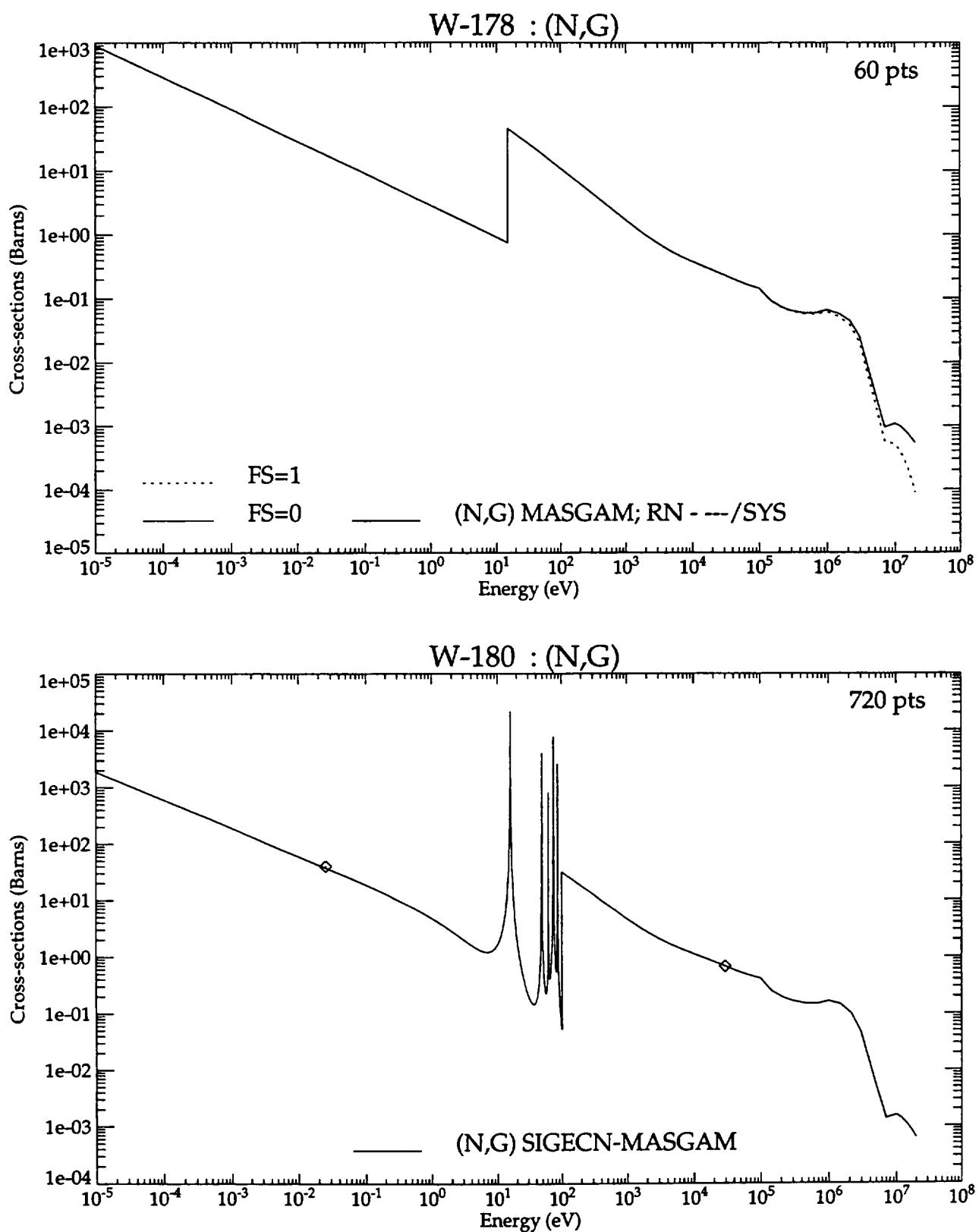


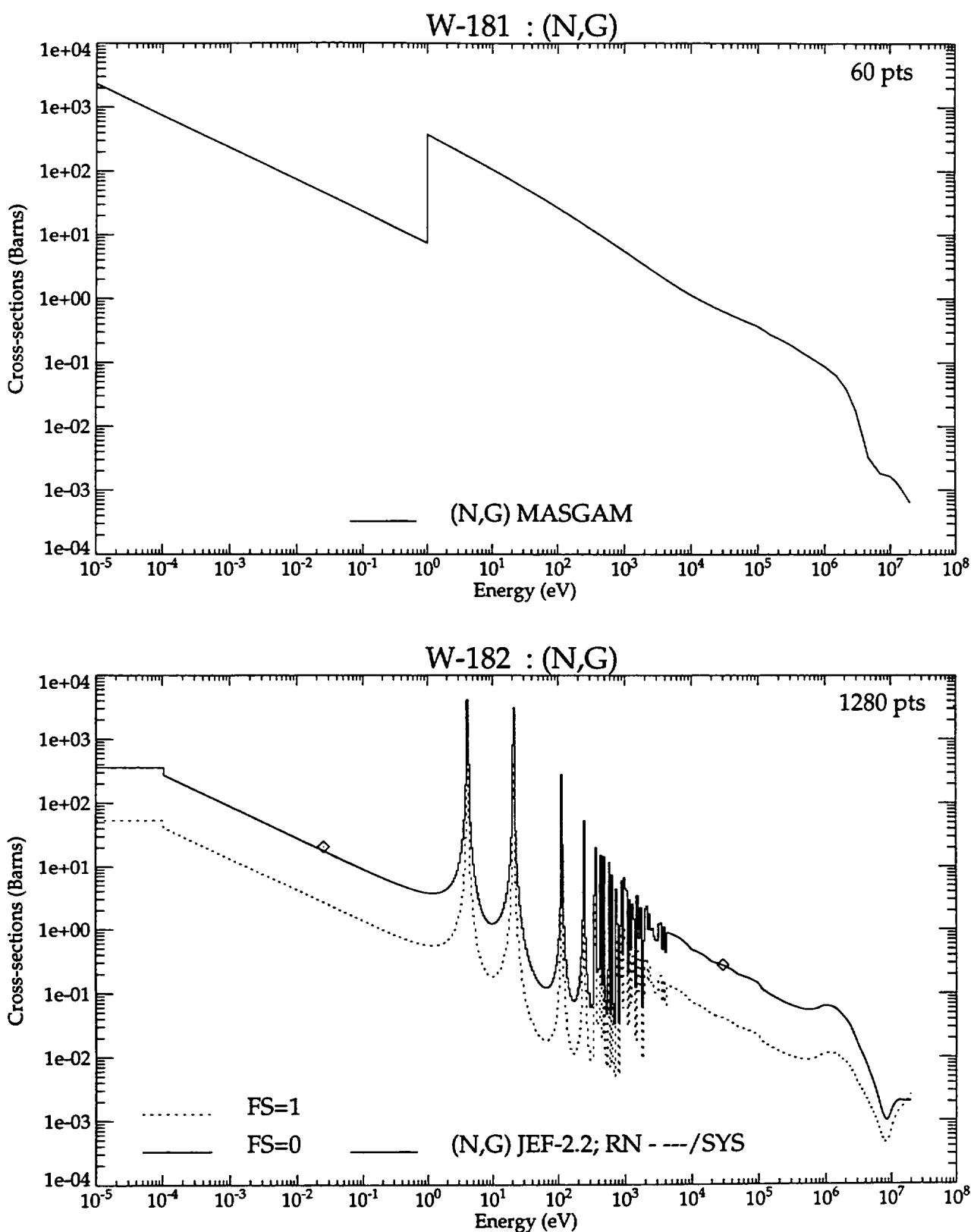


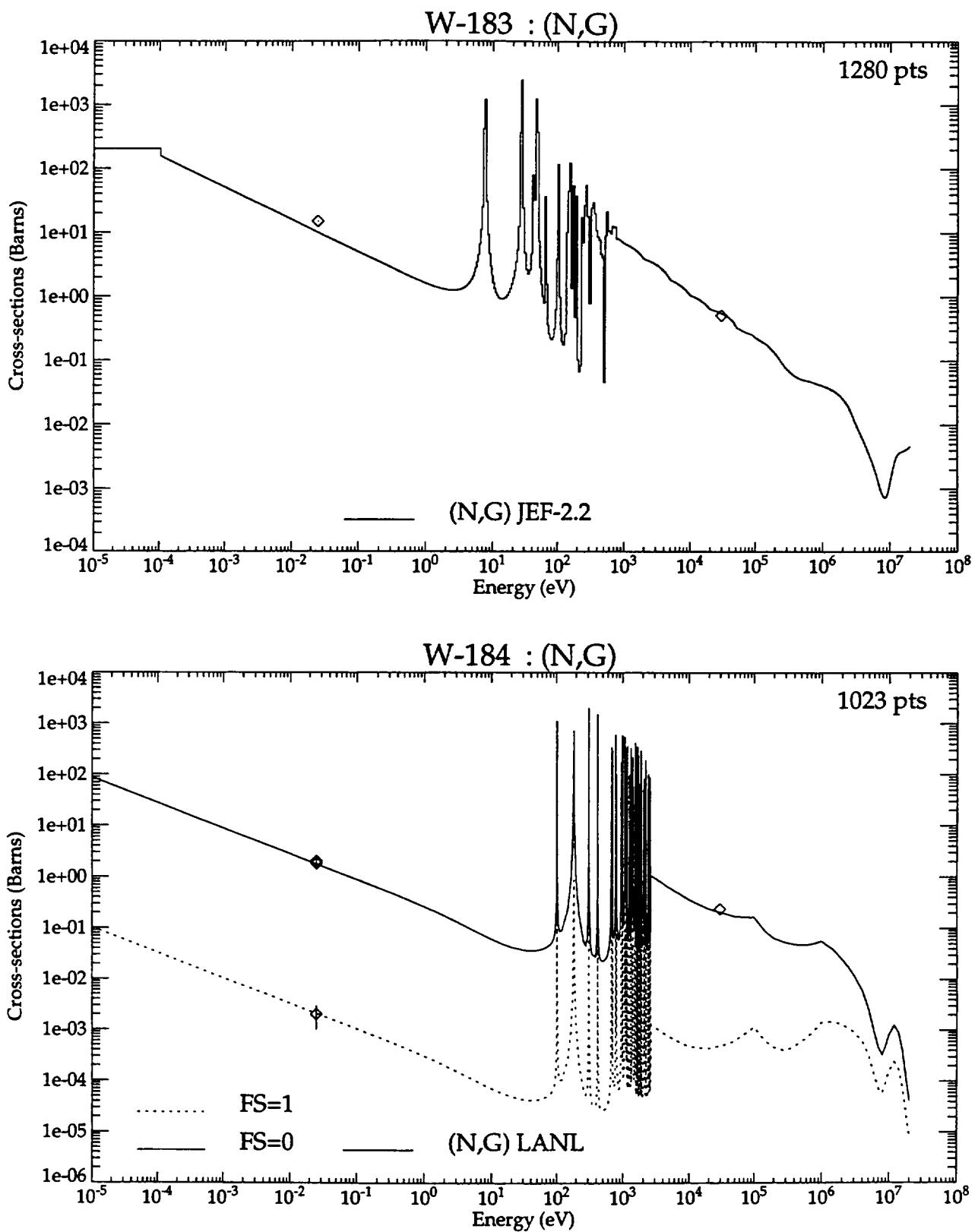


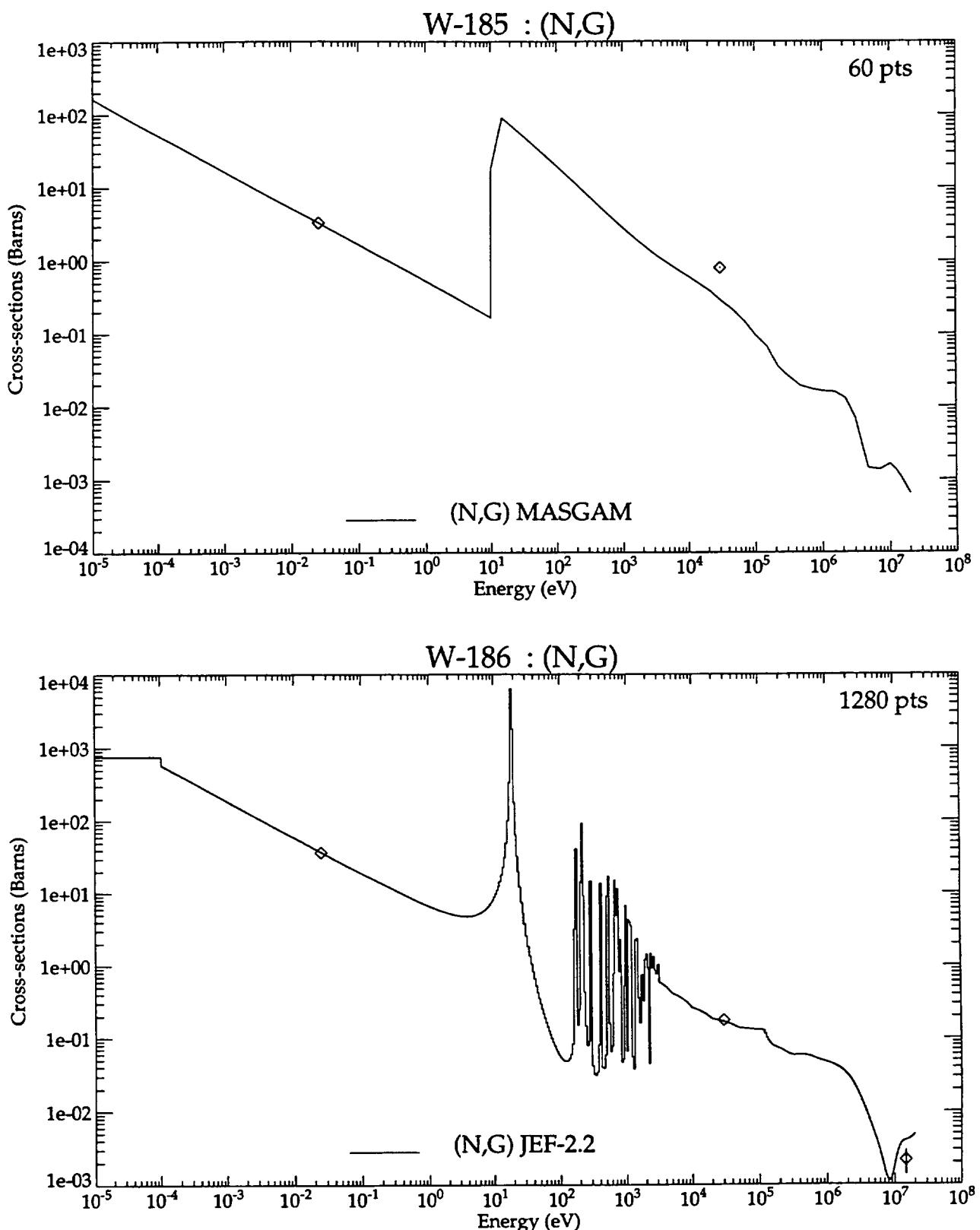


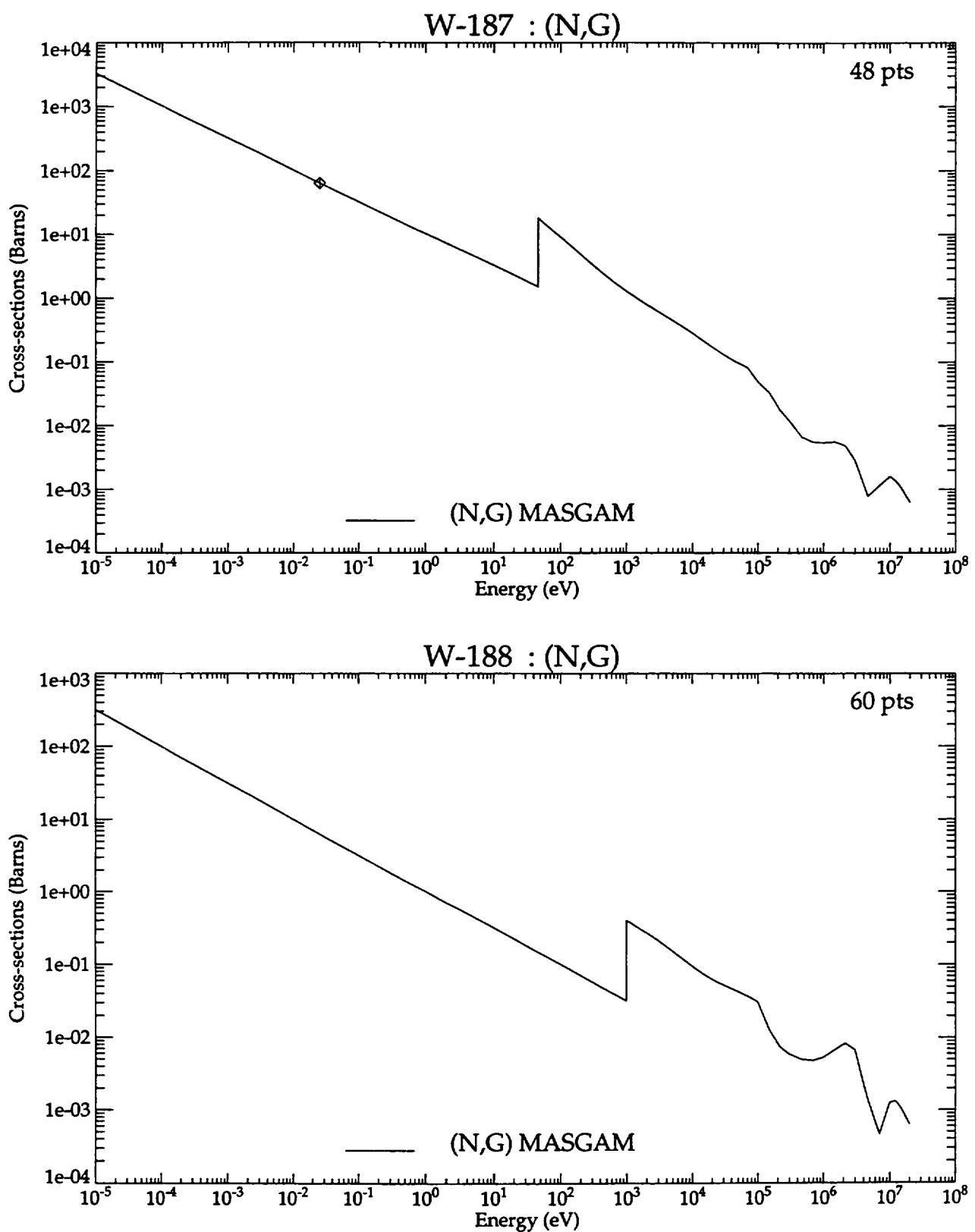


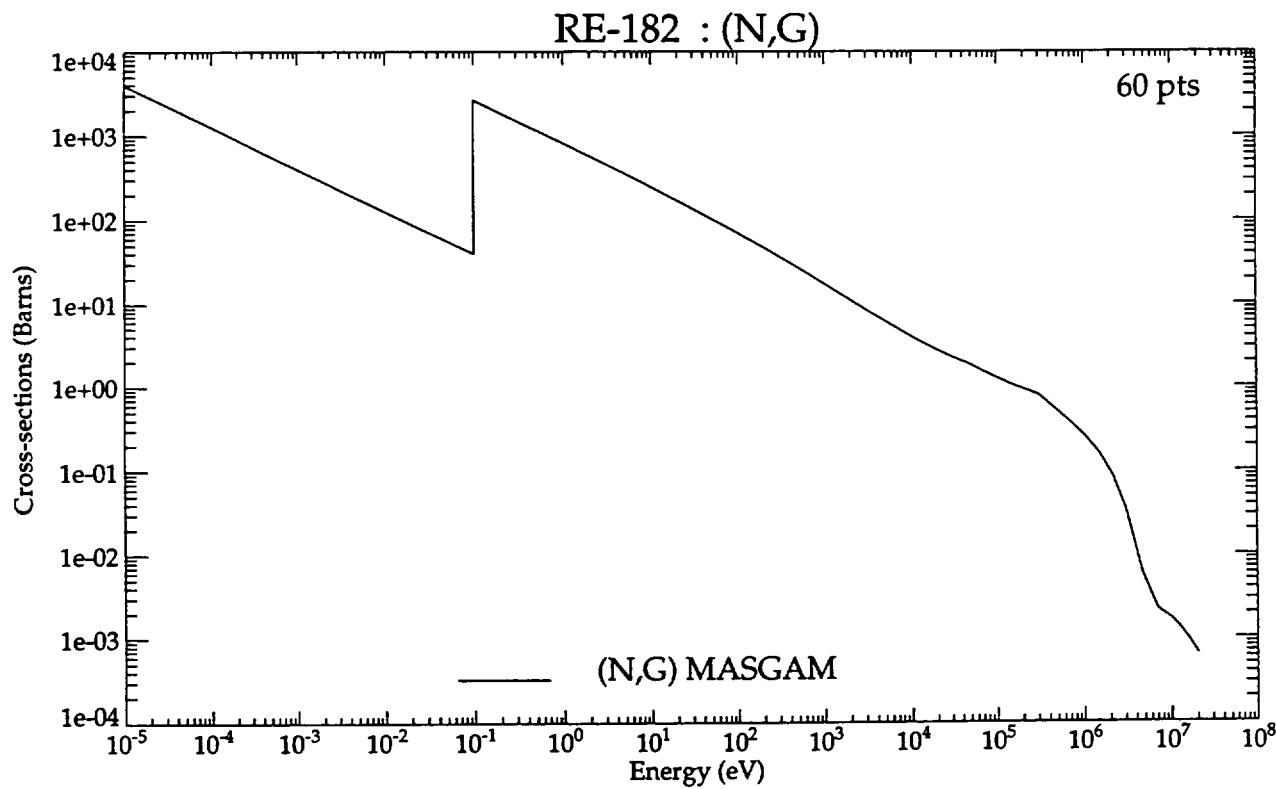
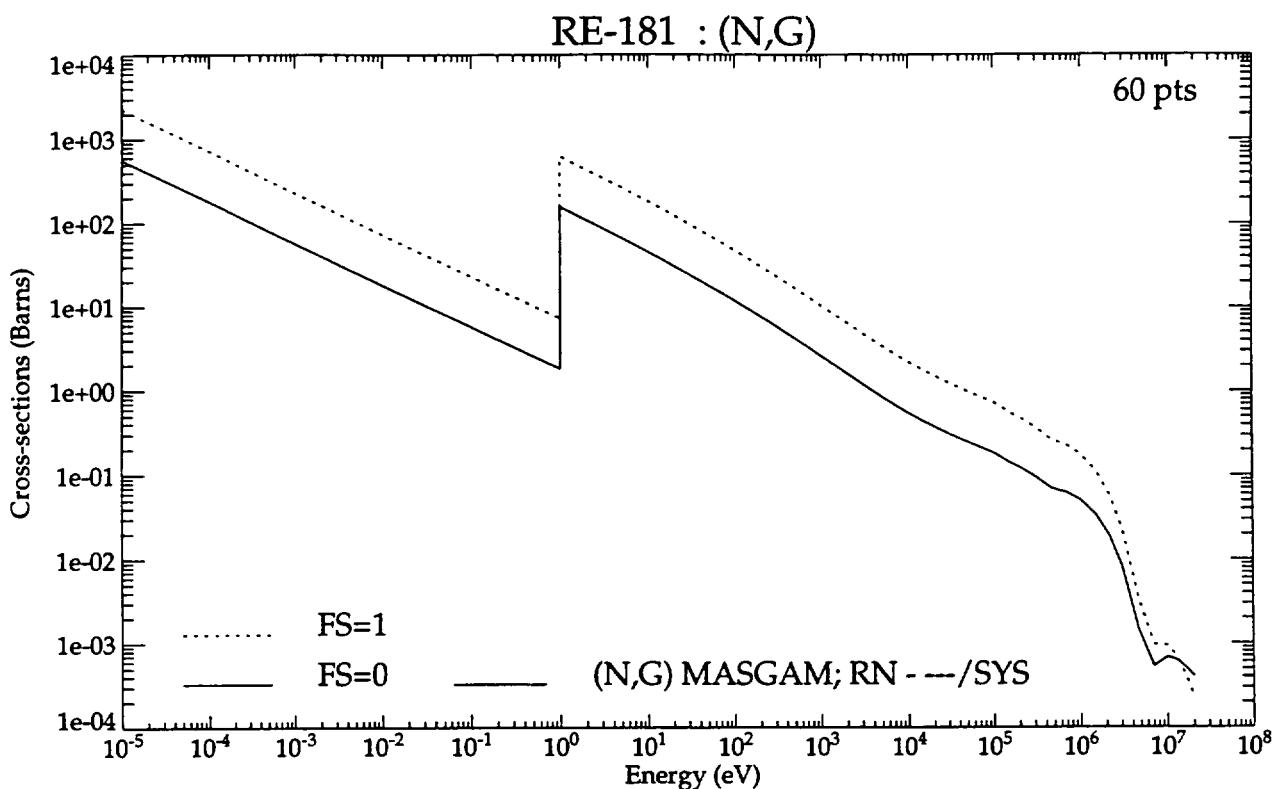




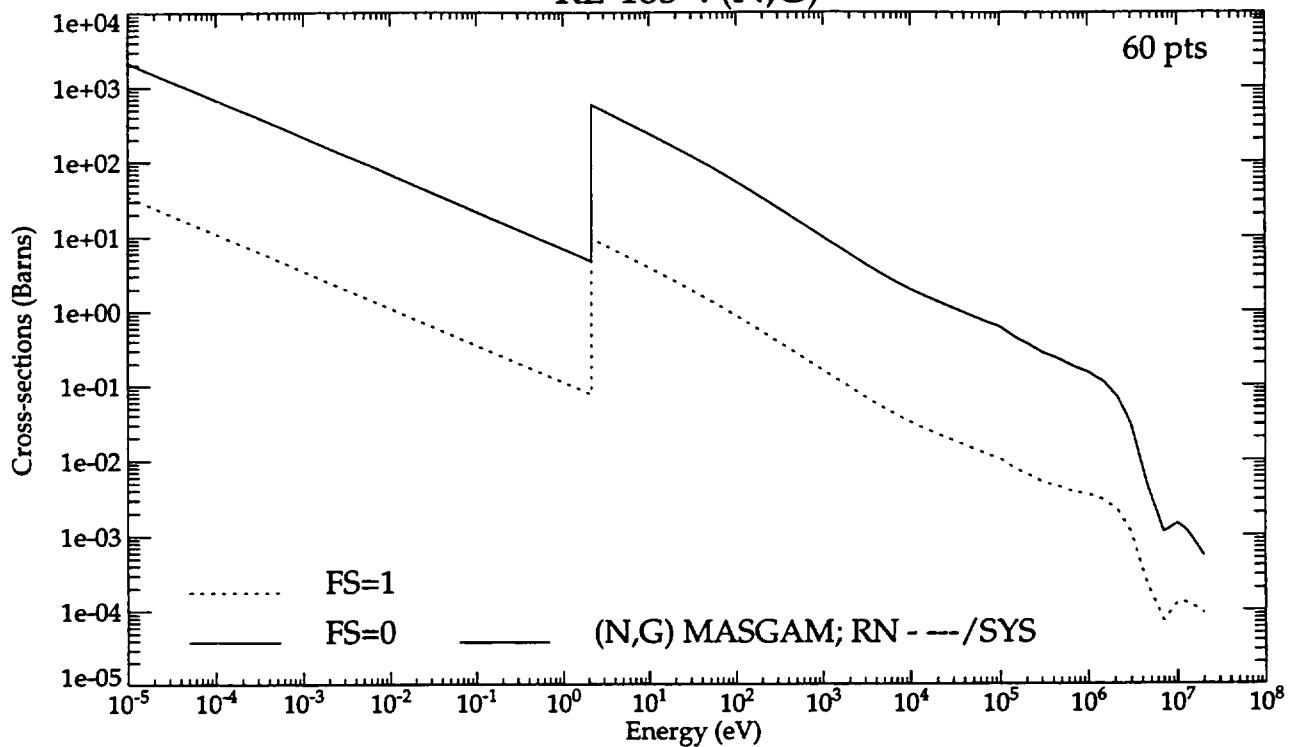




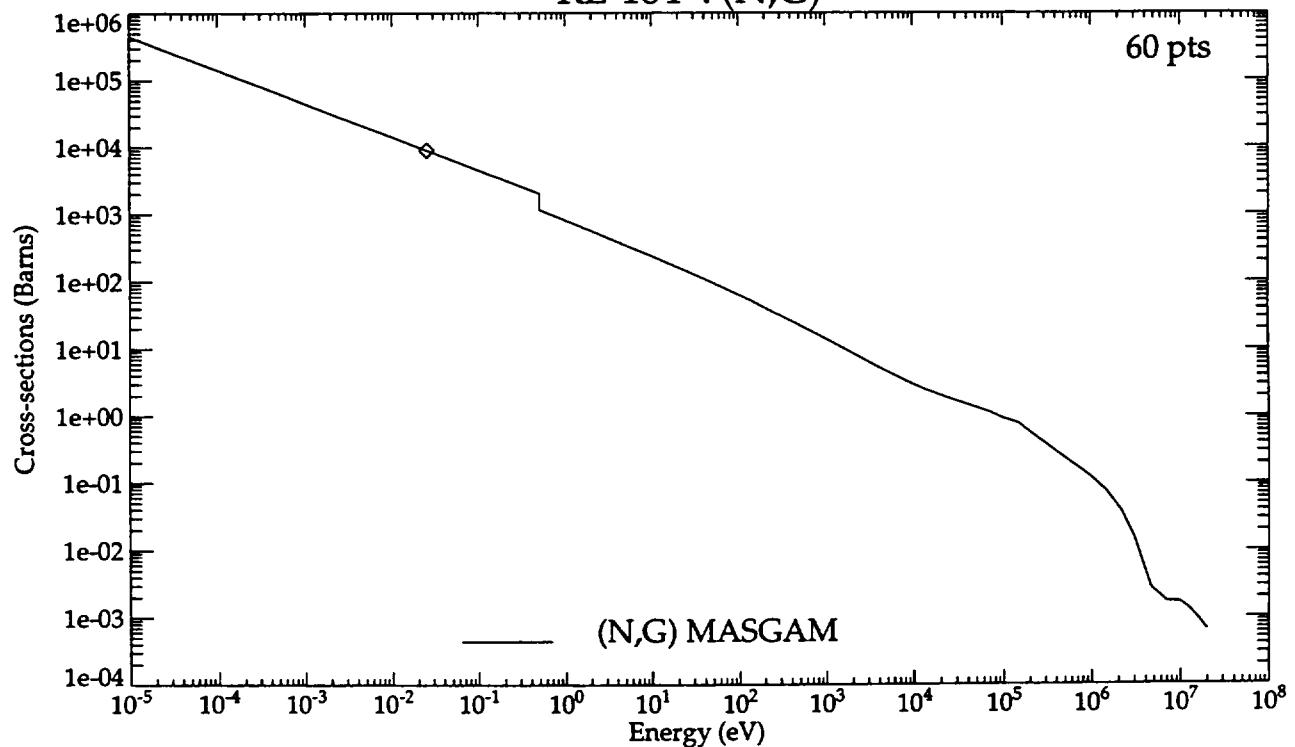


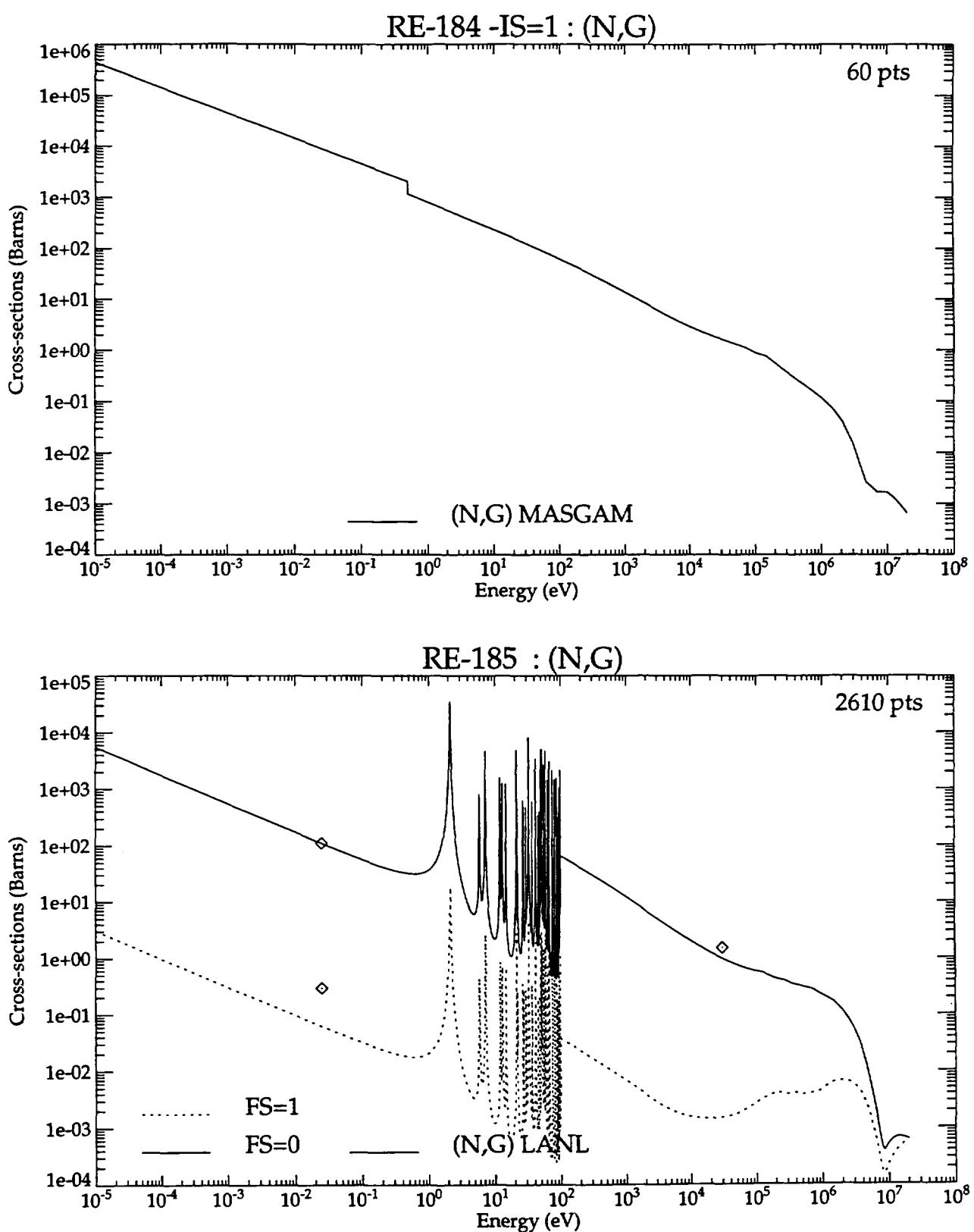


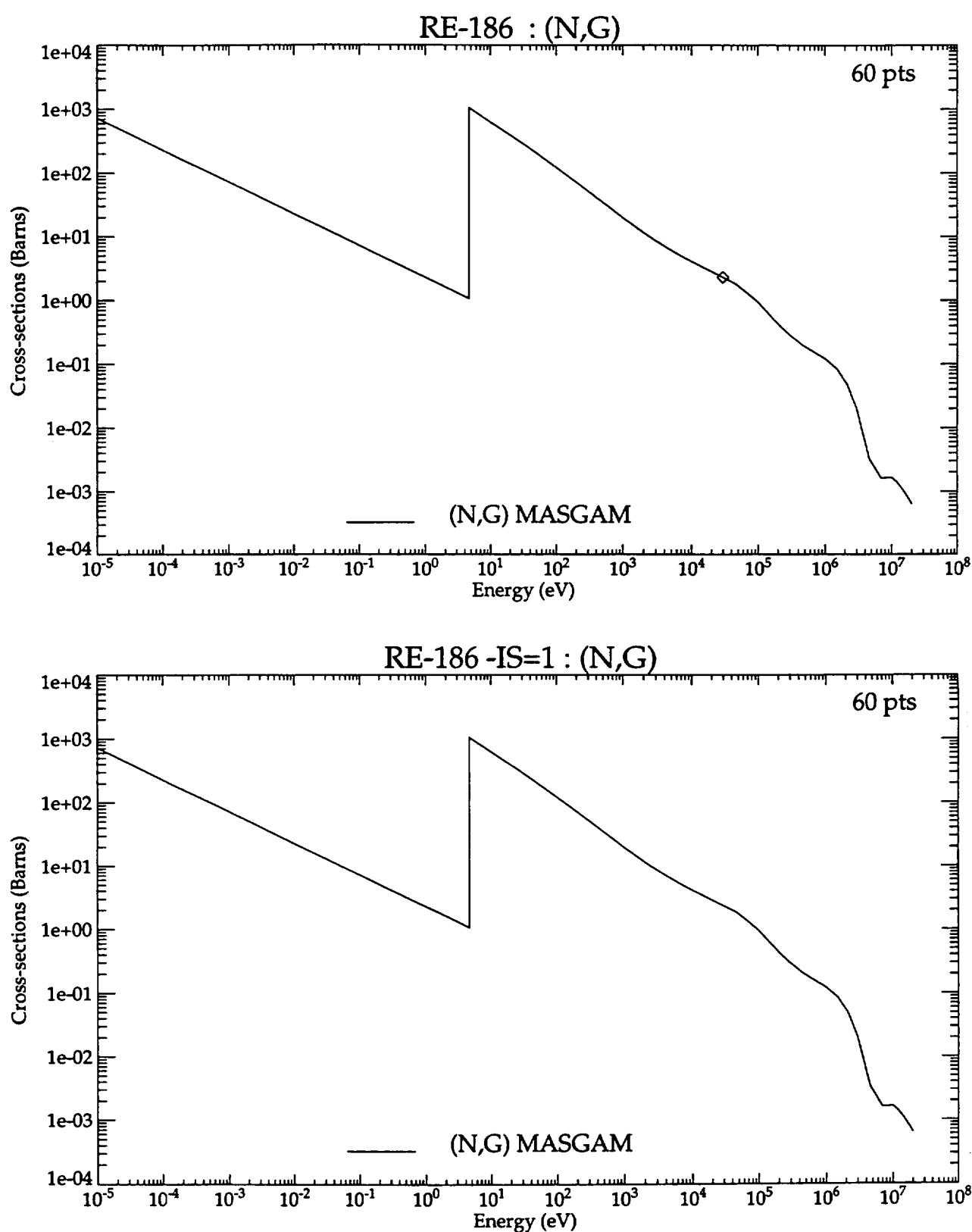
RE-183 : (N,G)

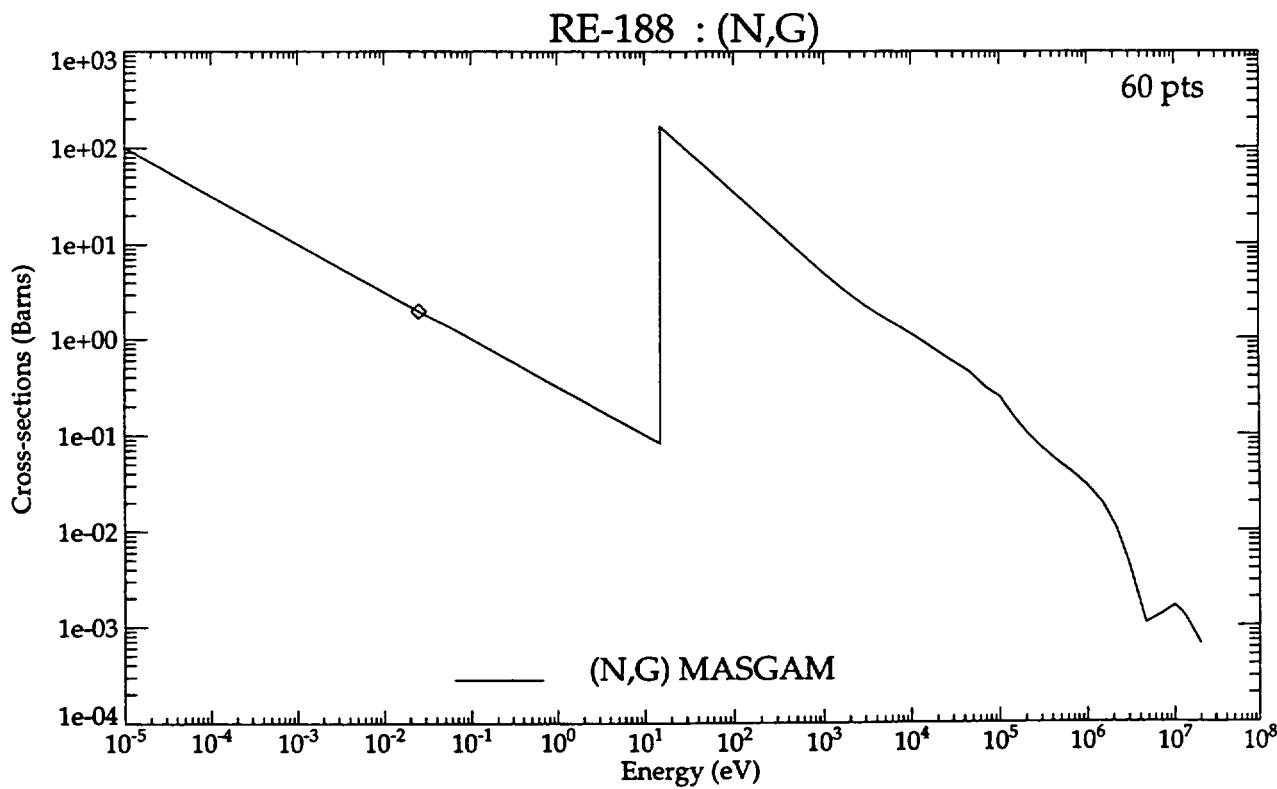
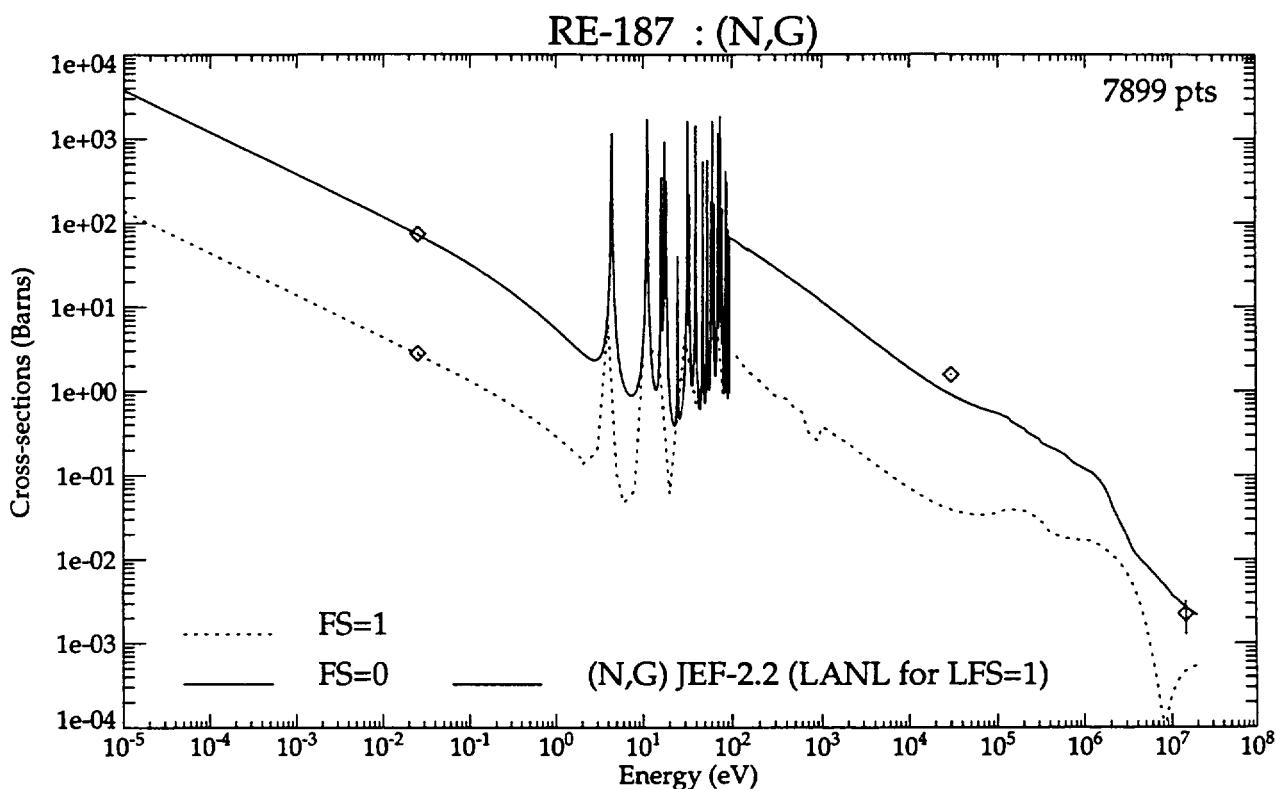


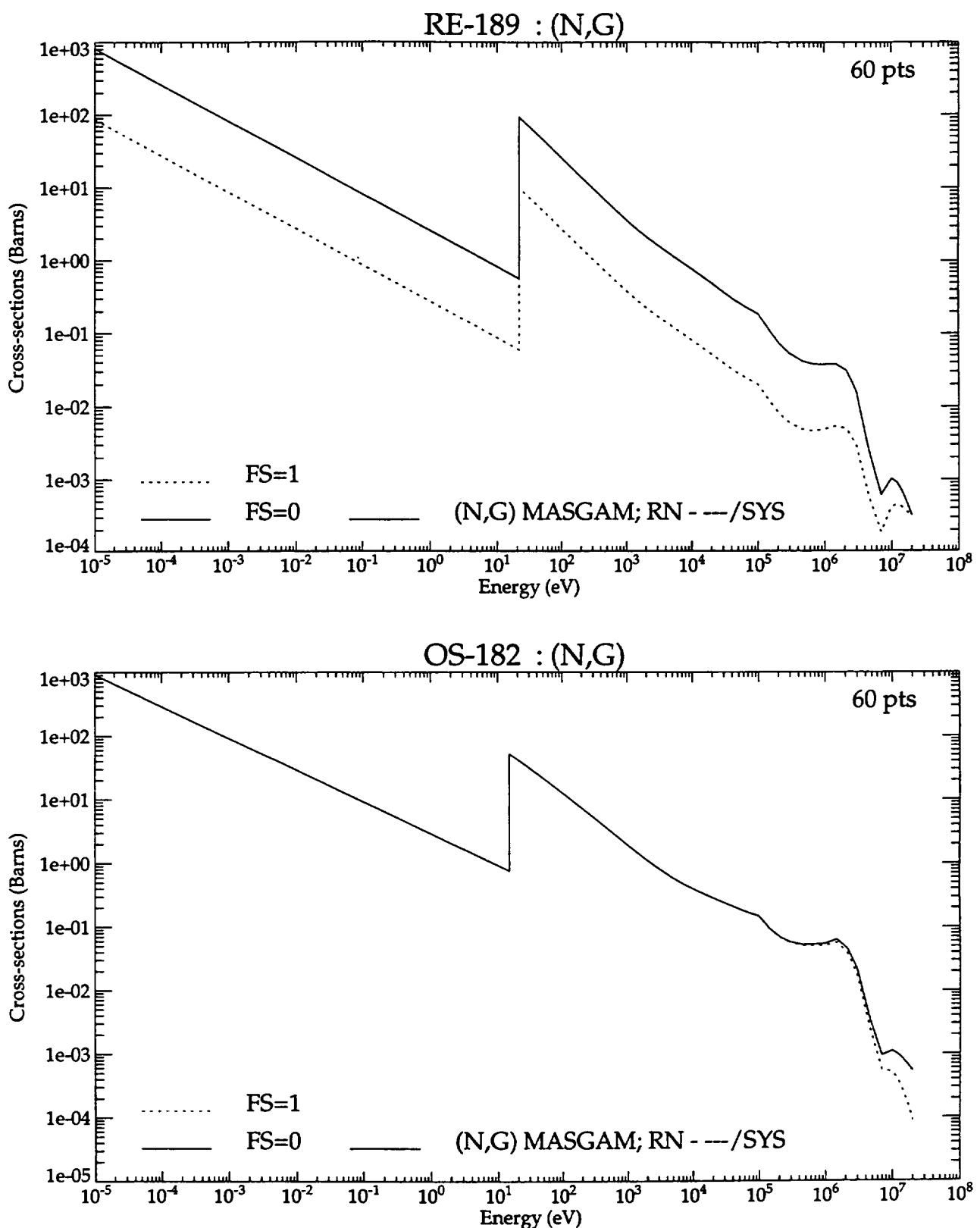
RE-184 : (N,G)

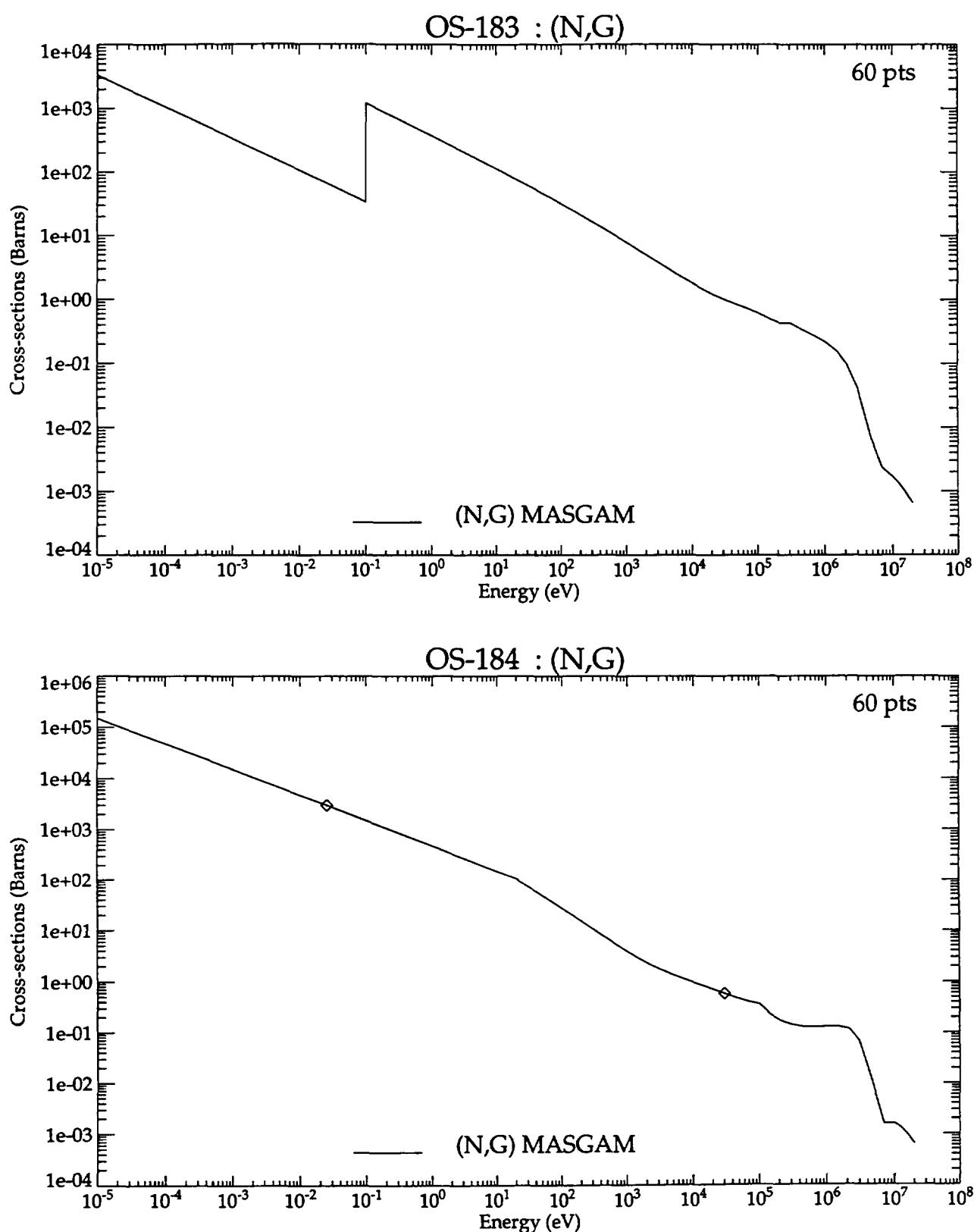


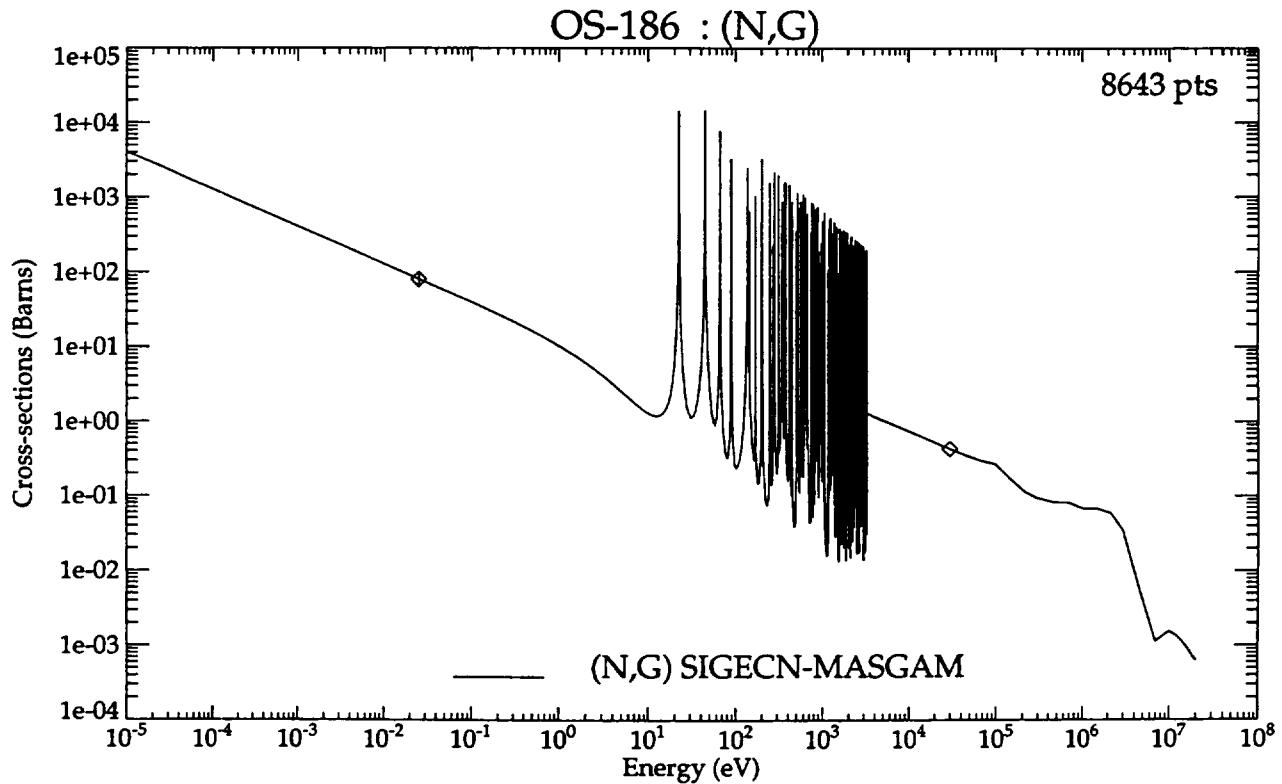
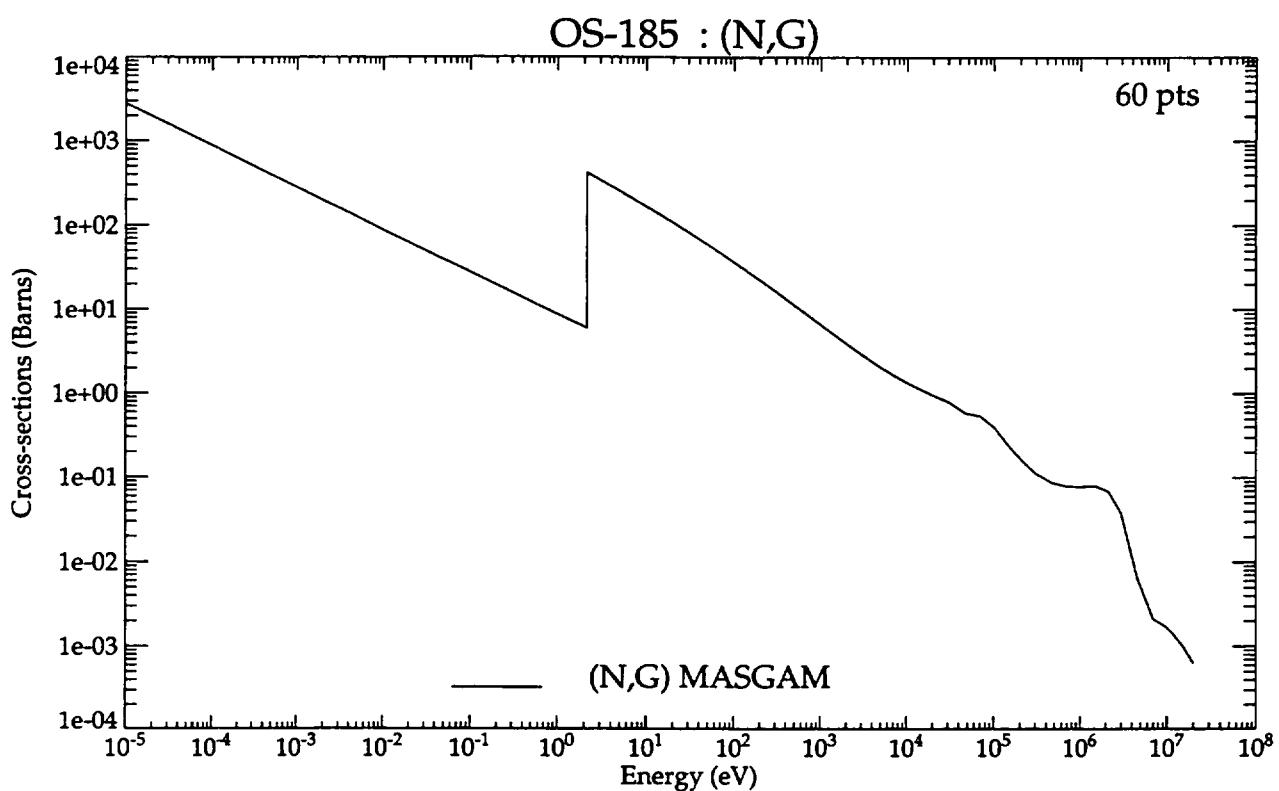


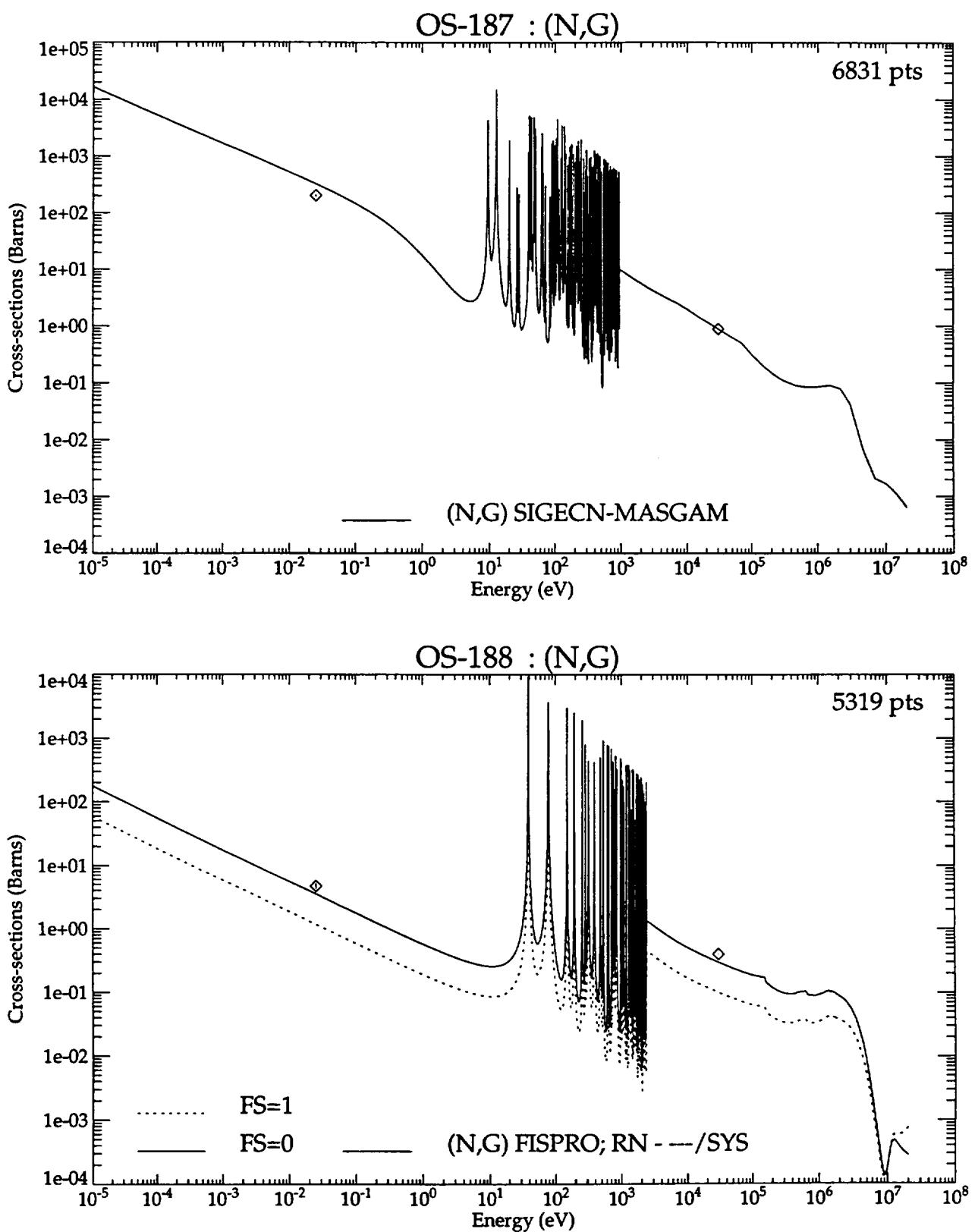


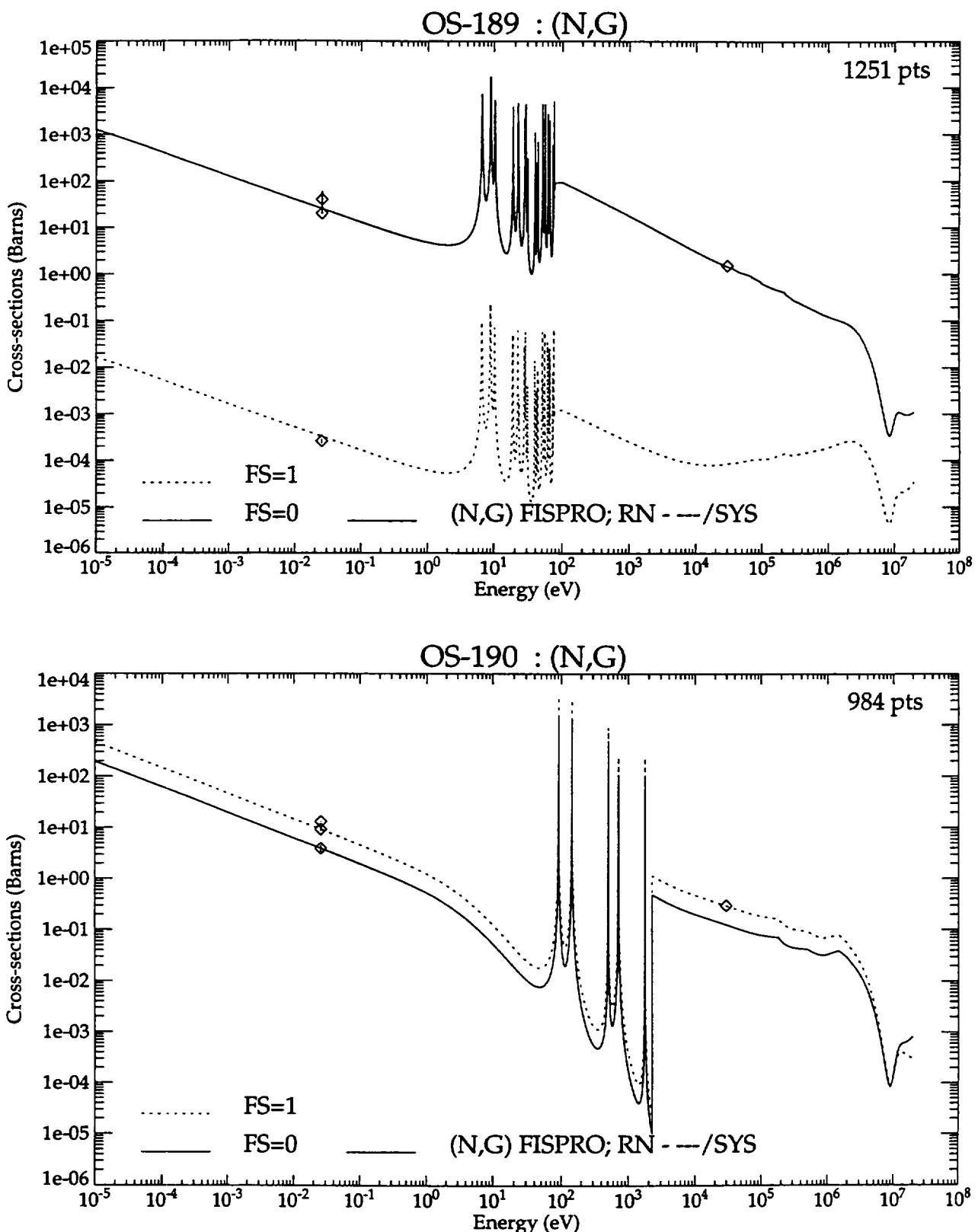


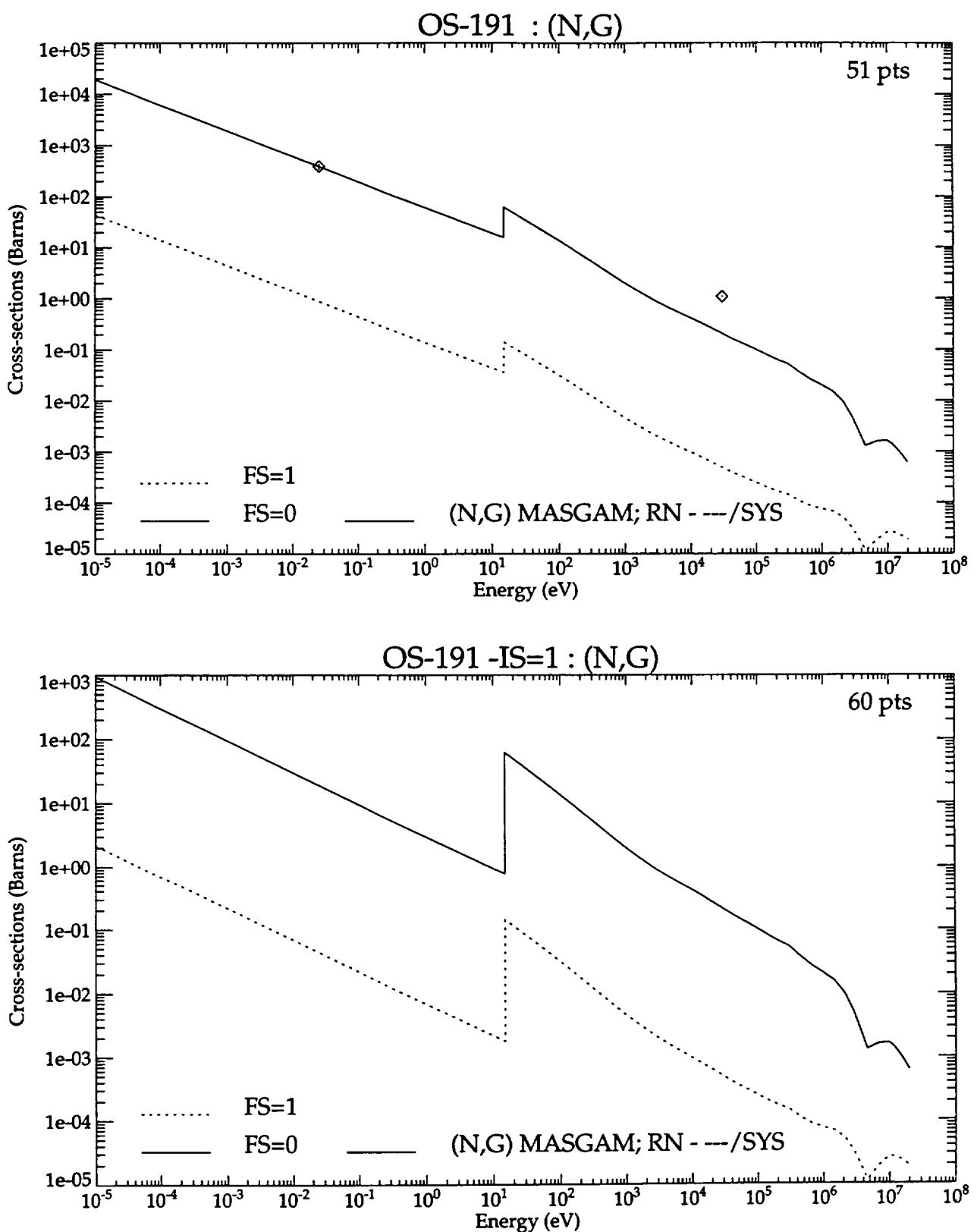


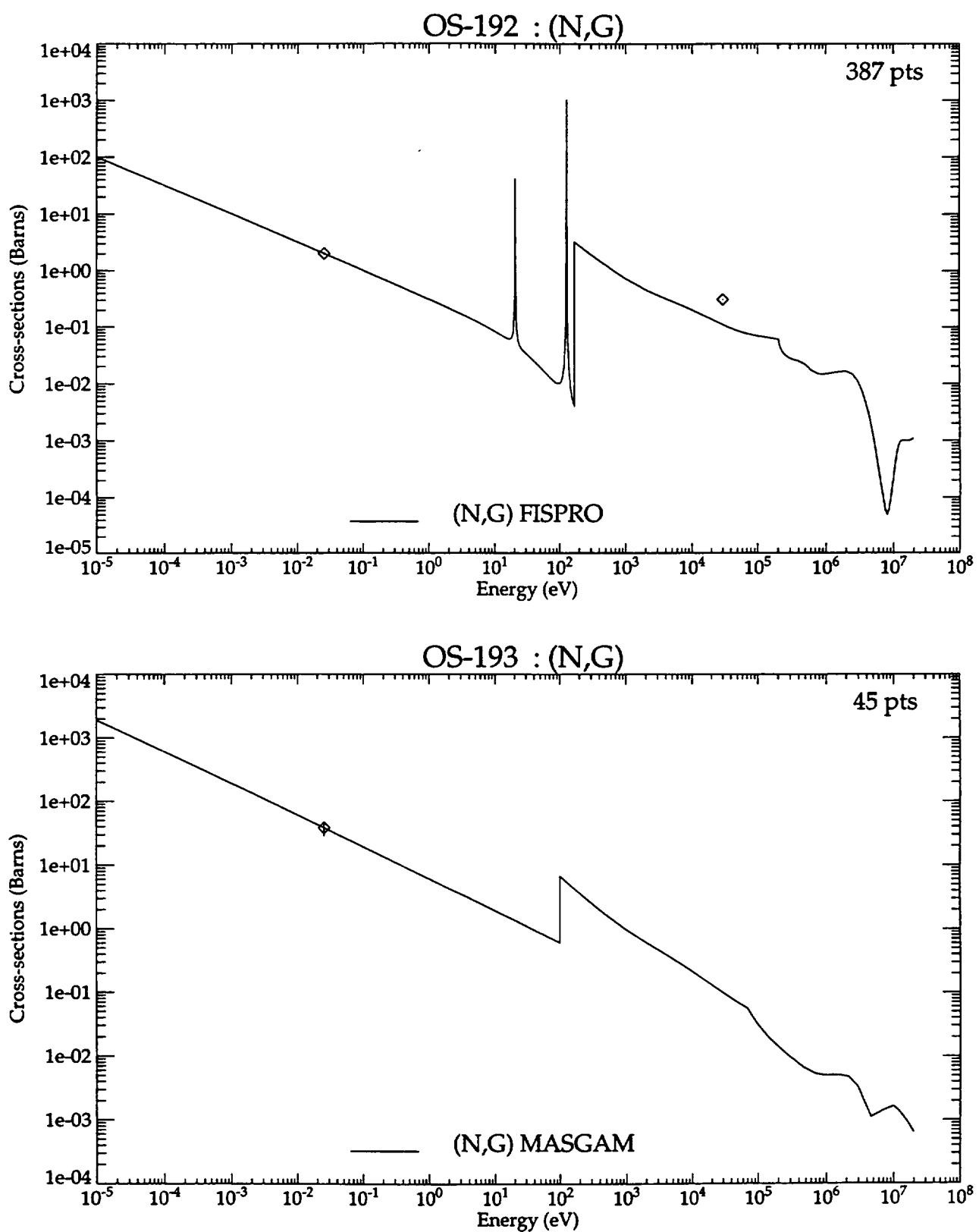


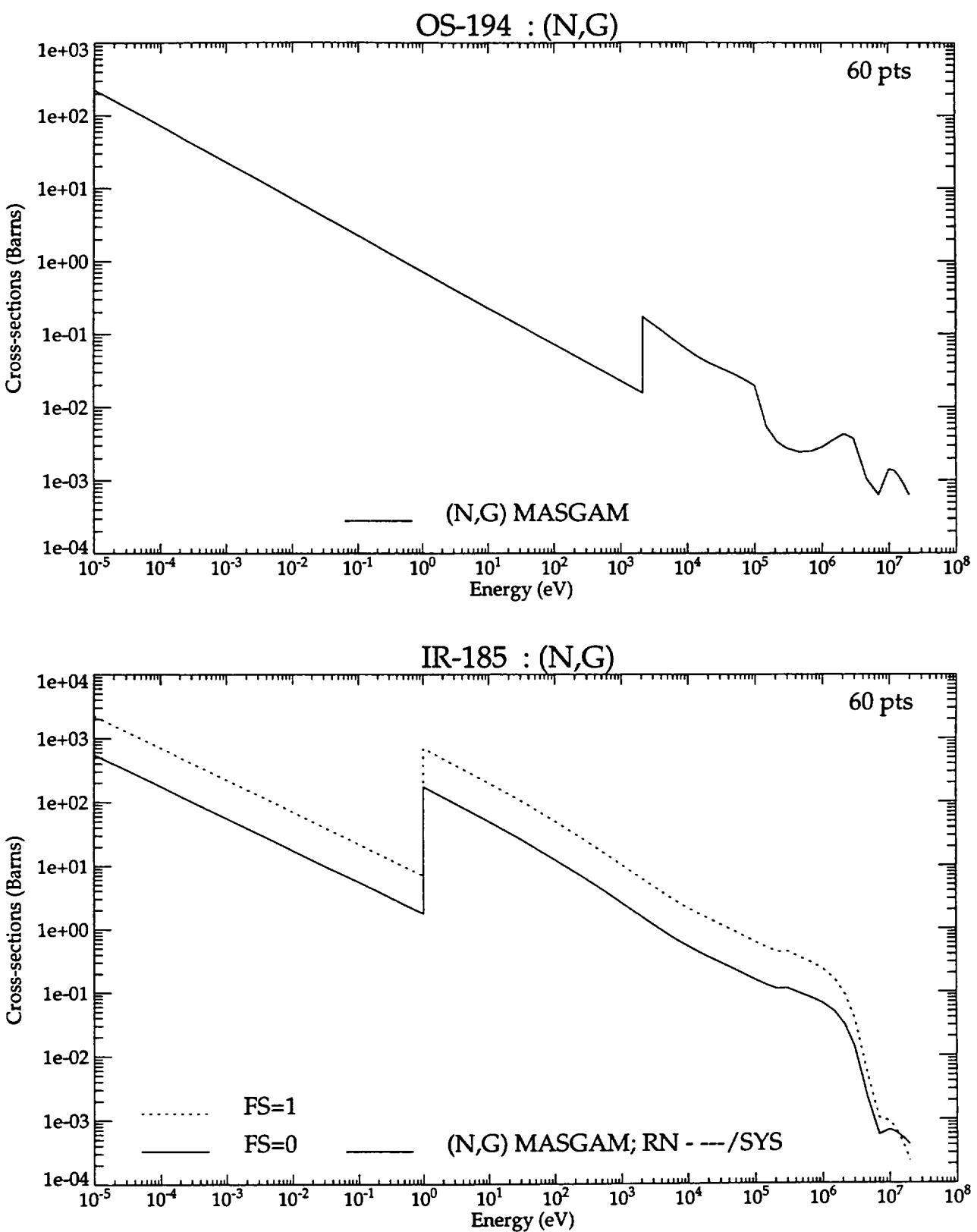


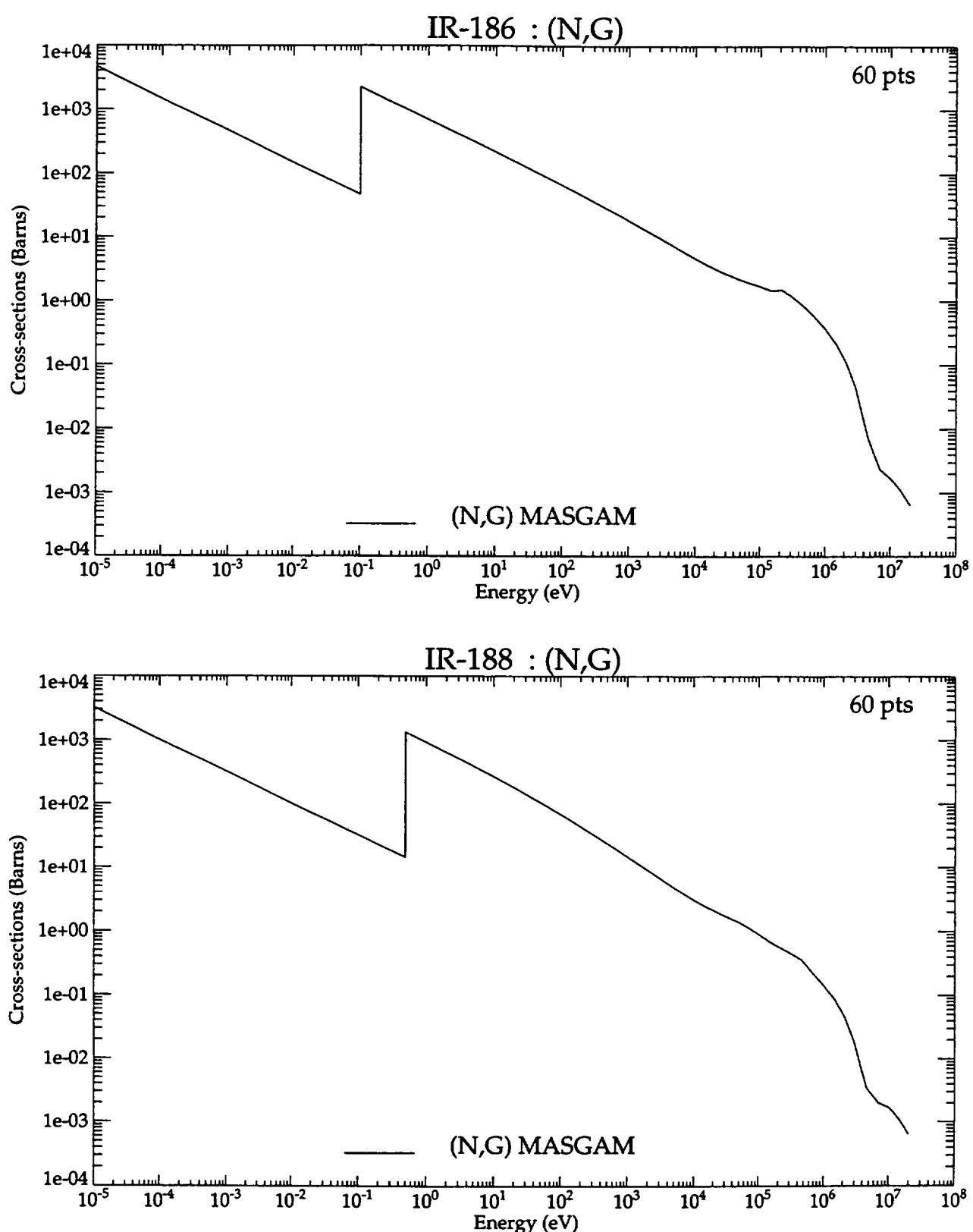


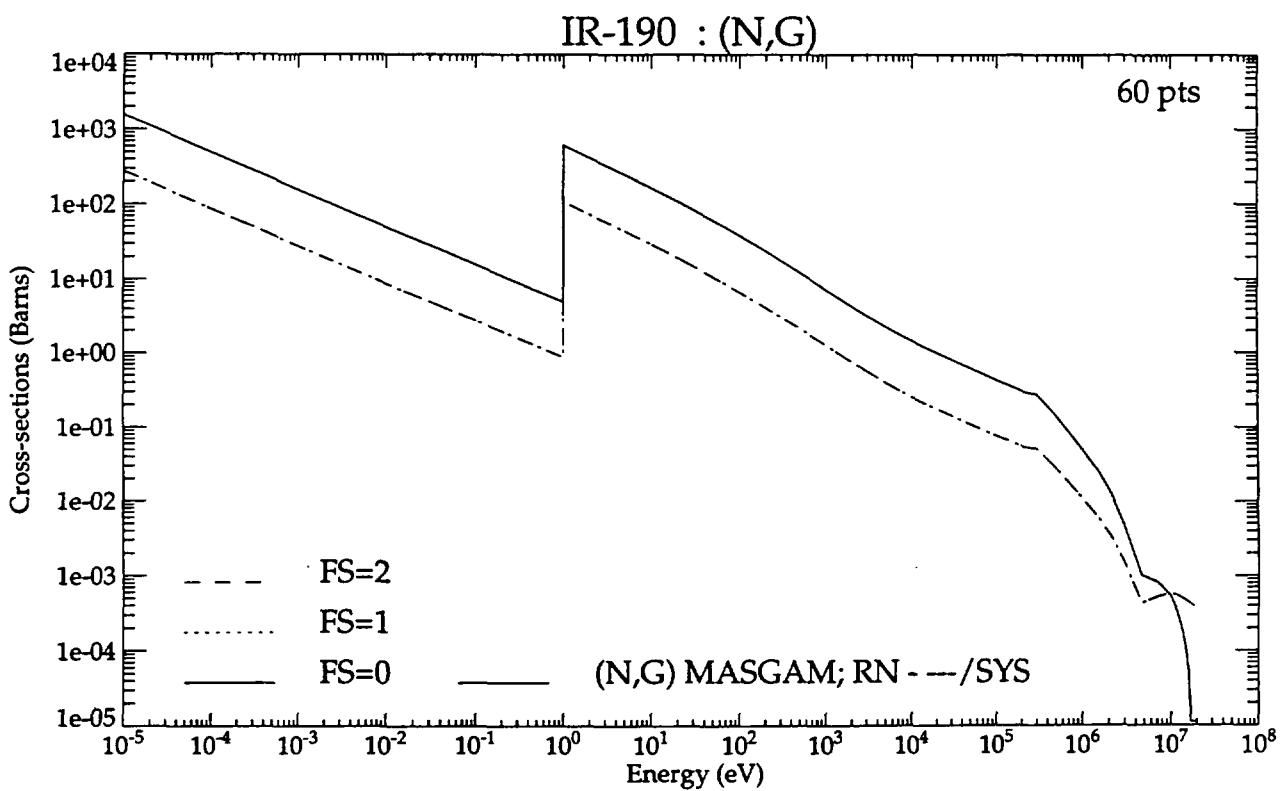
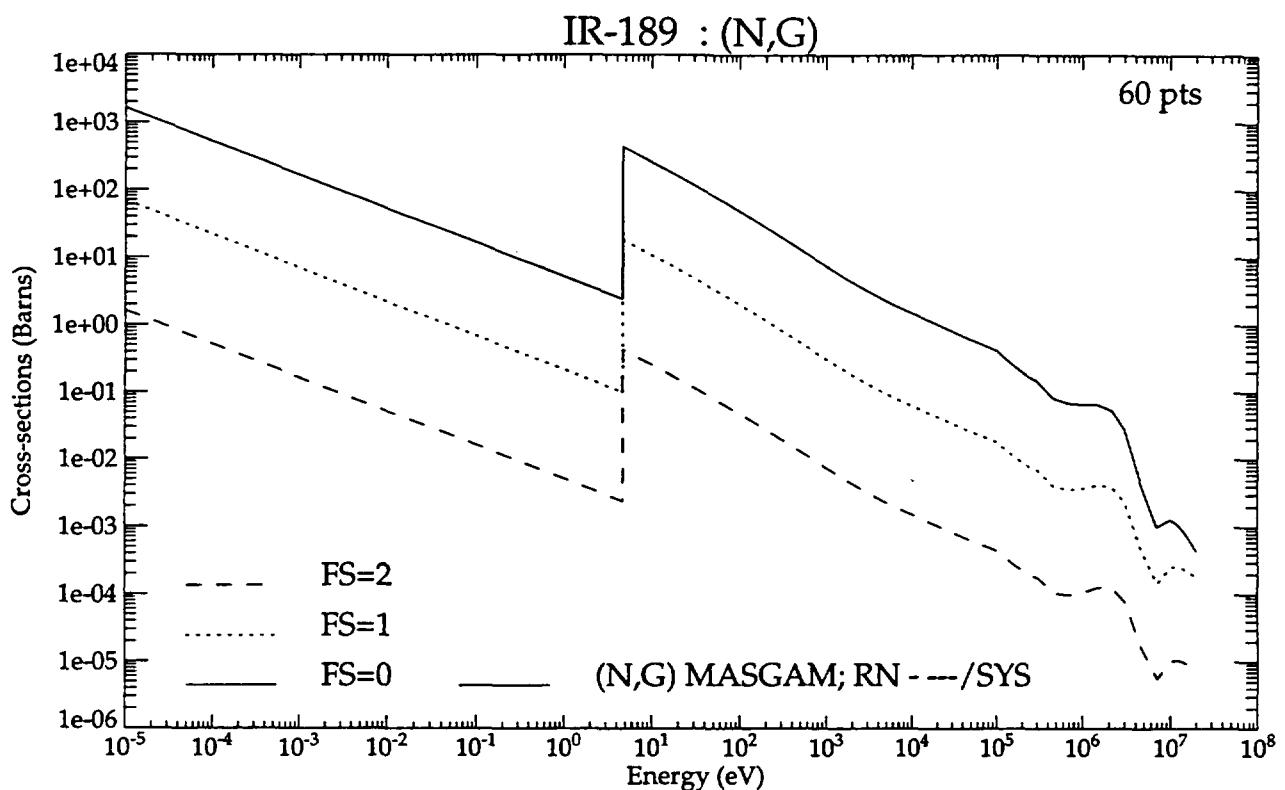


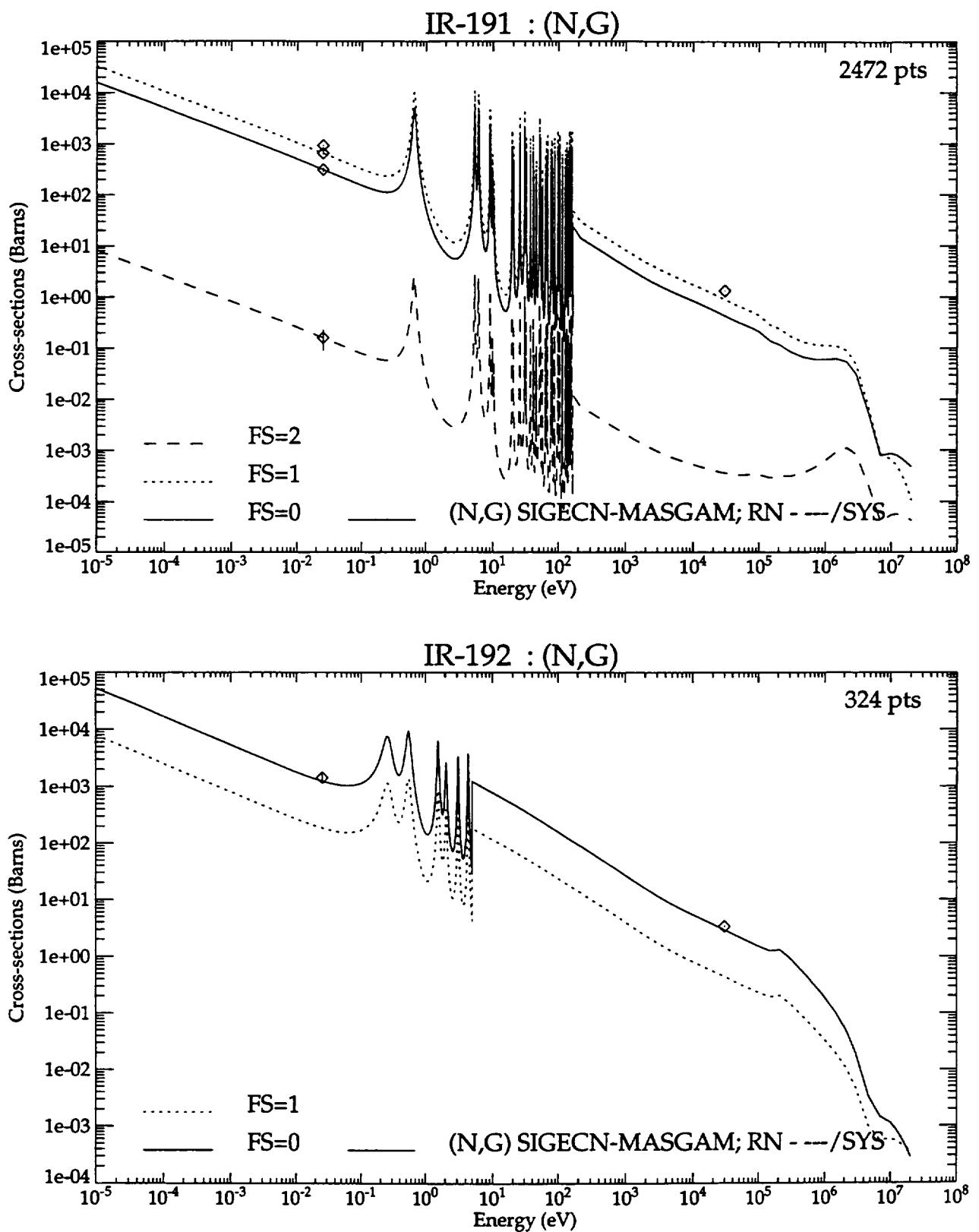


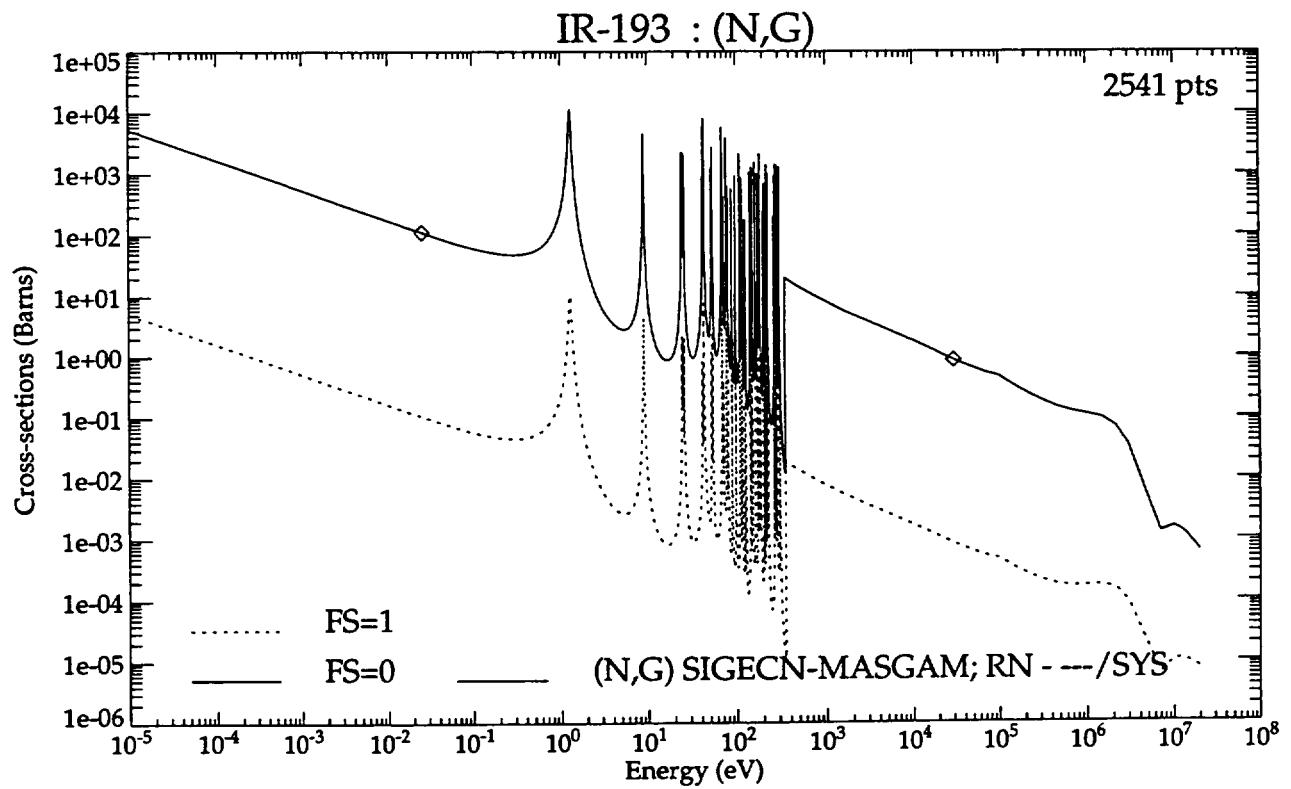
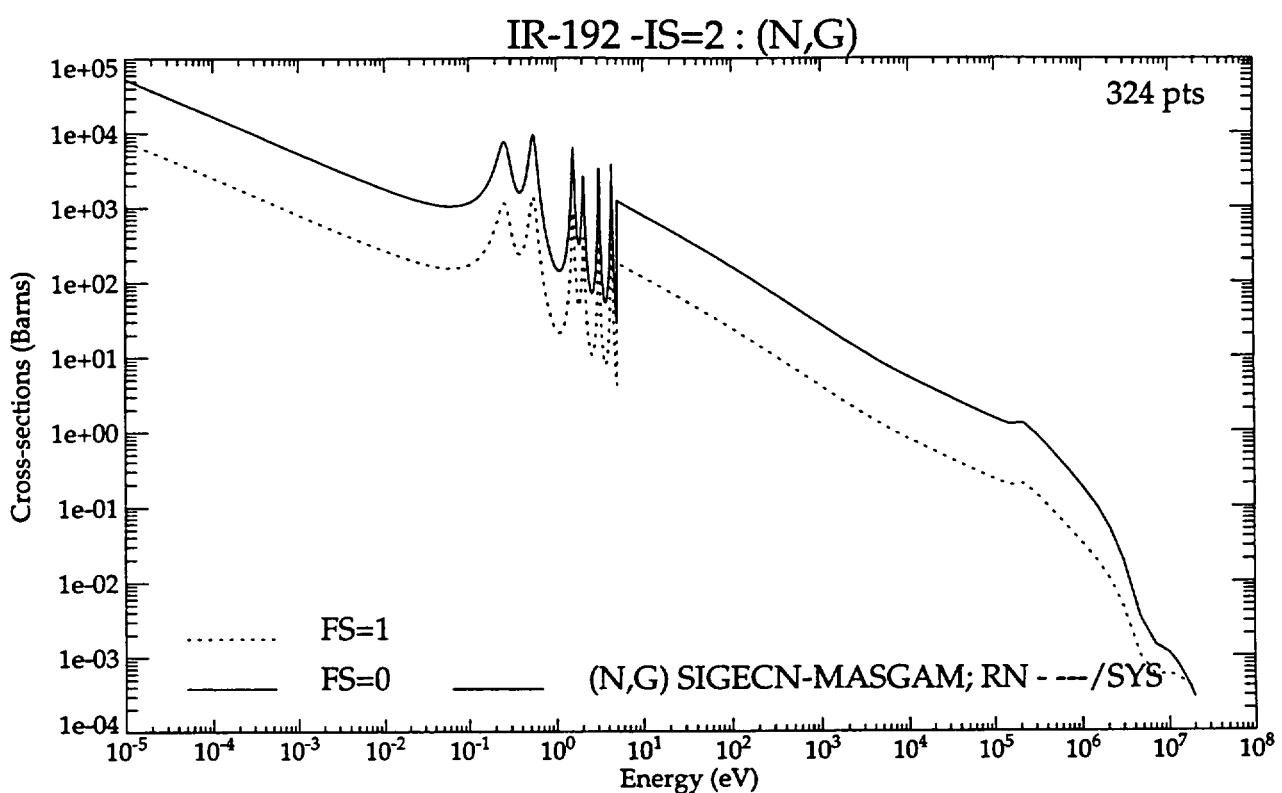


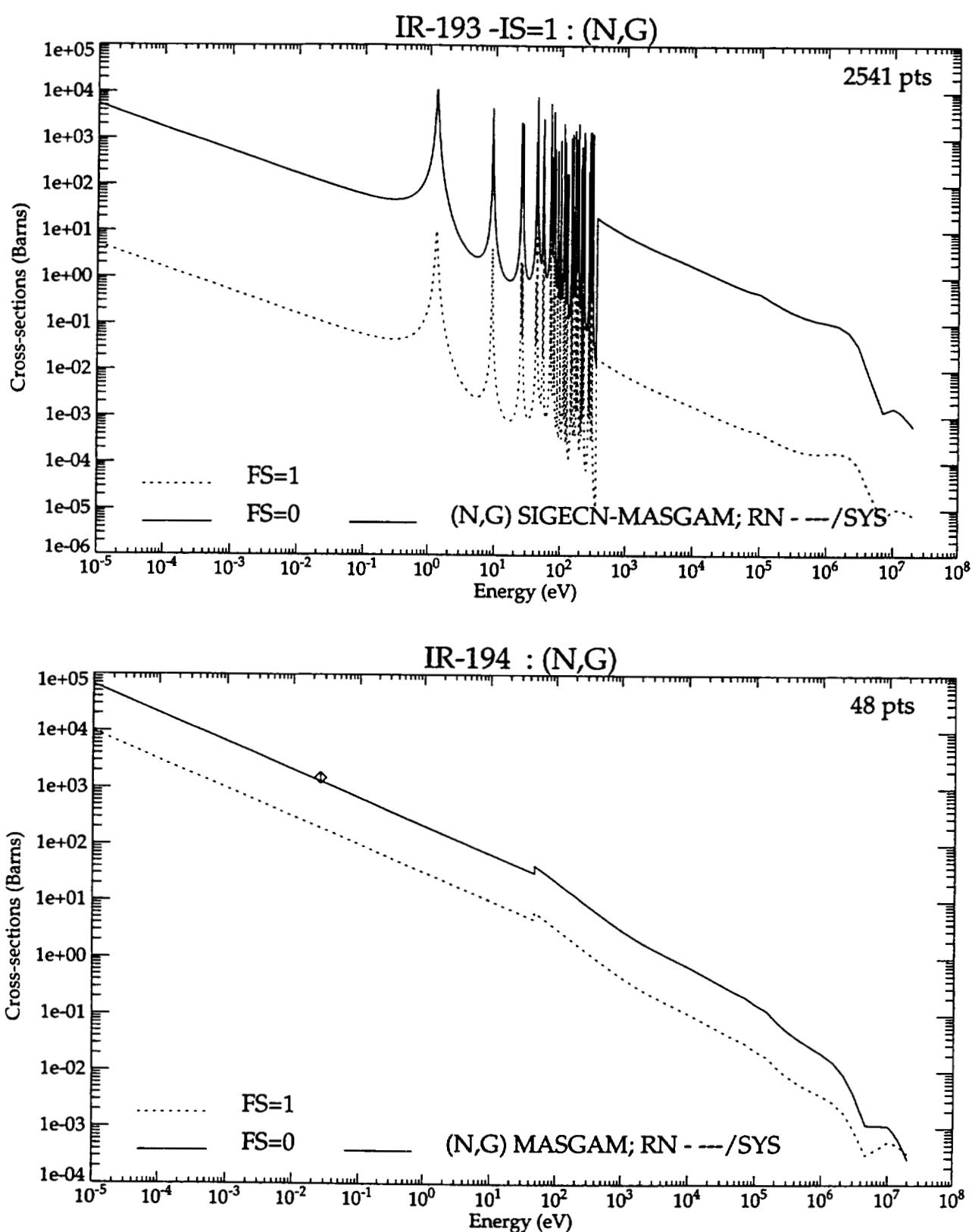


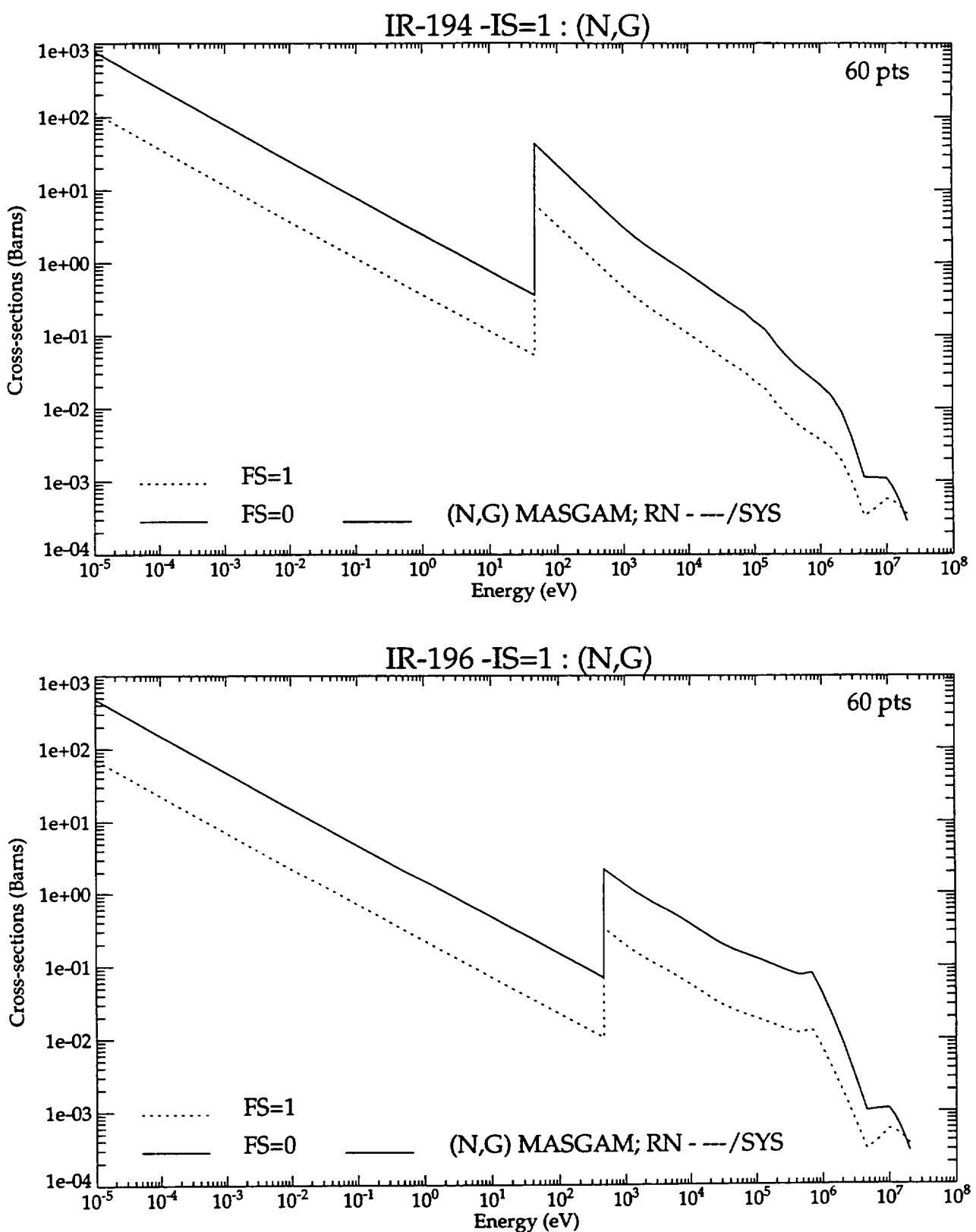


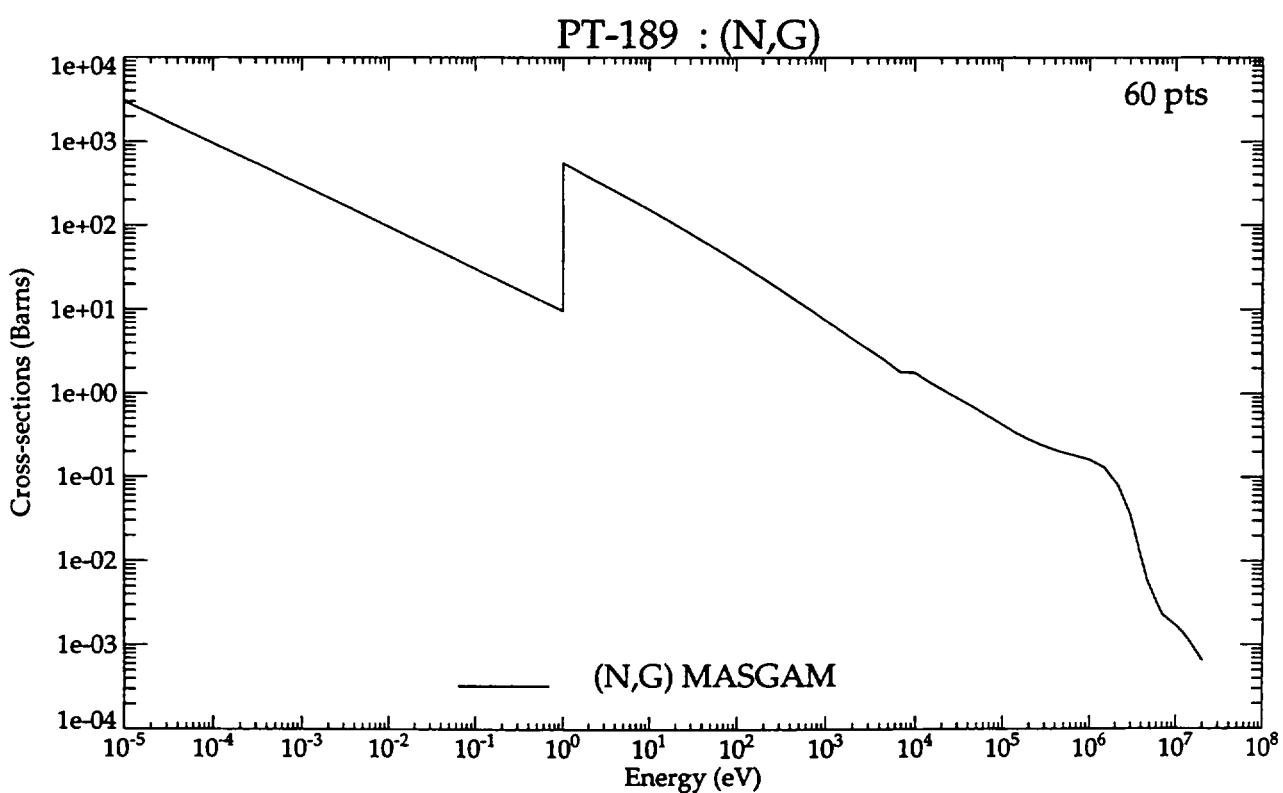
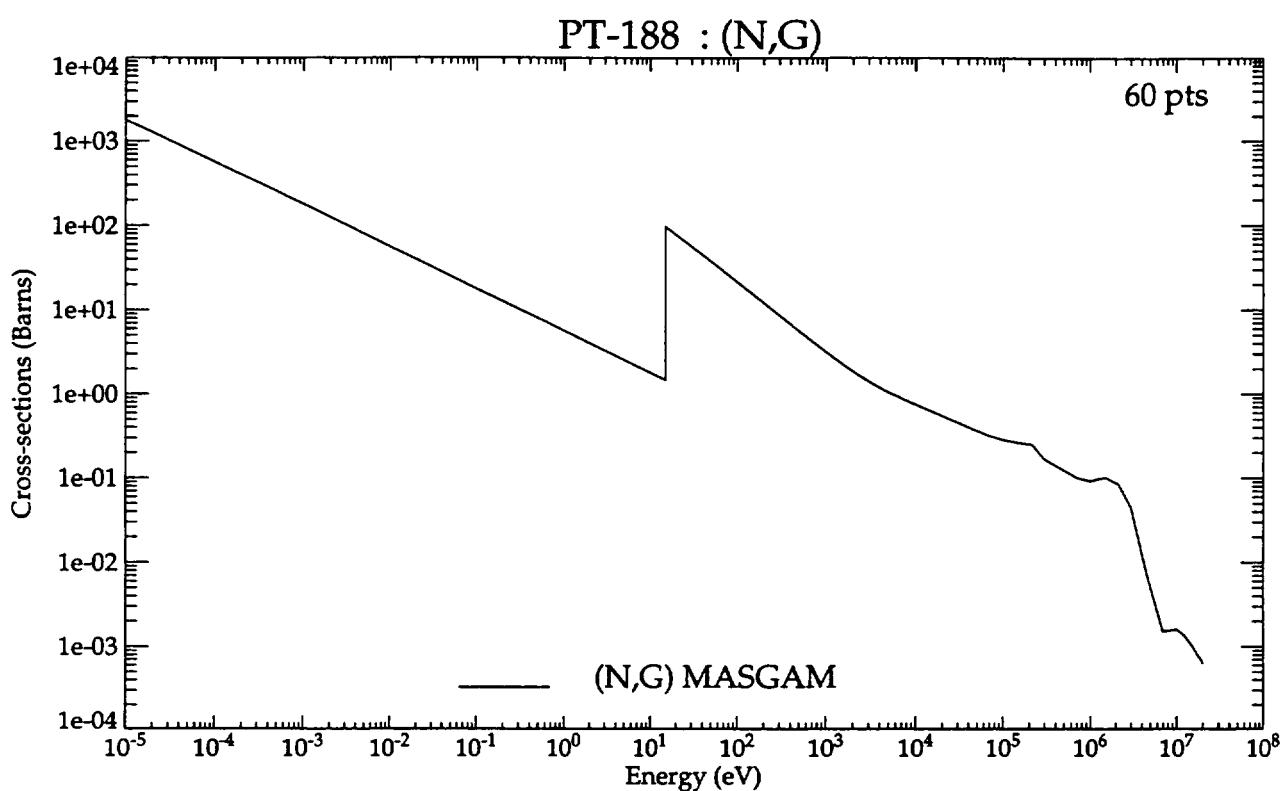


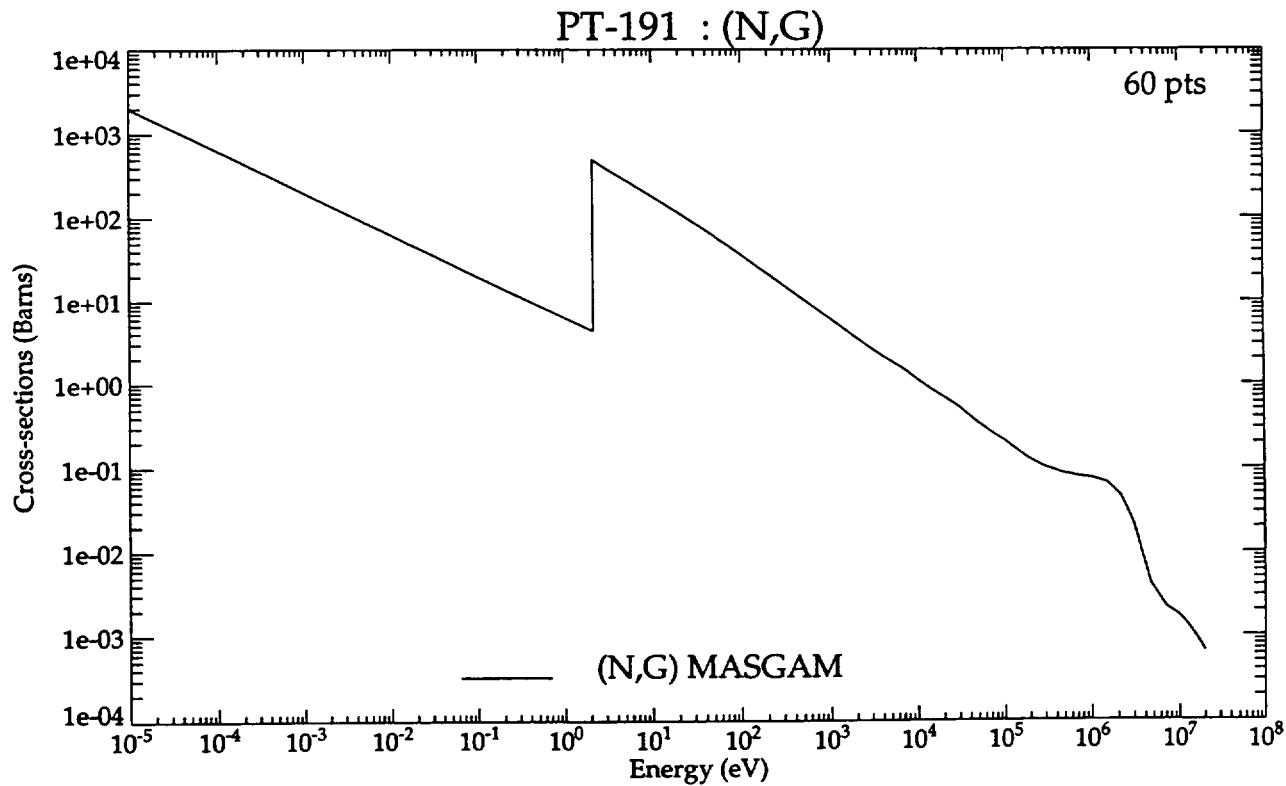
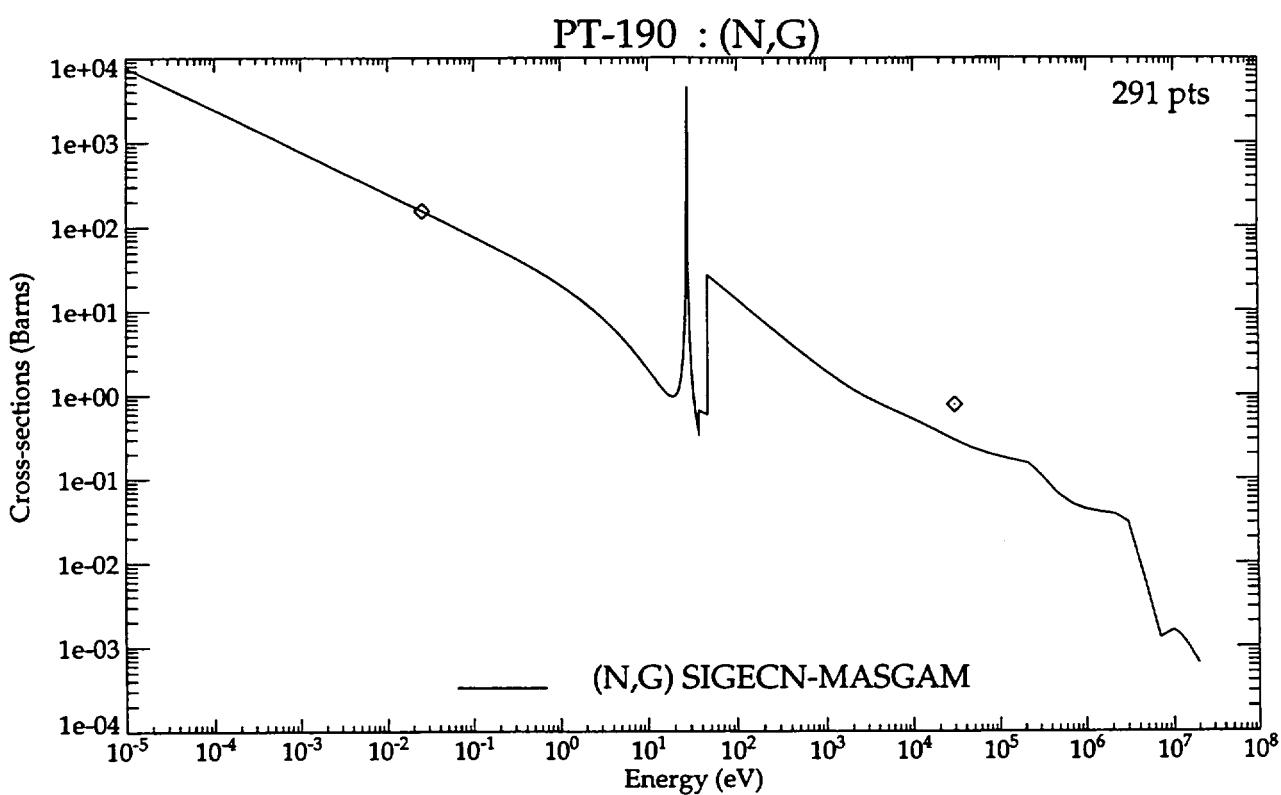


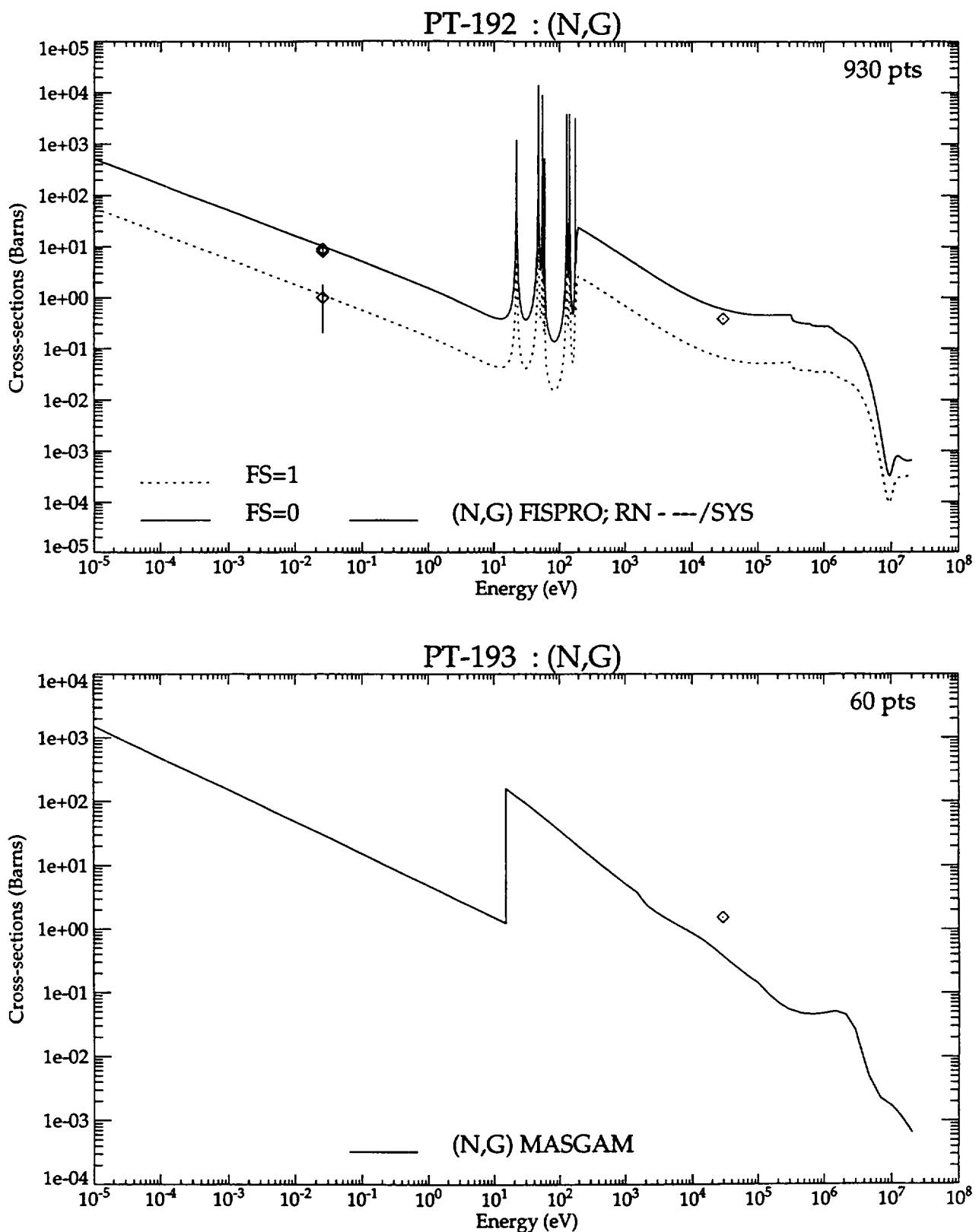


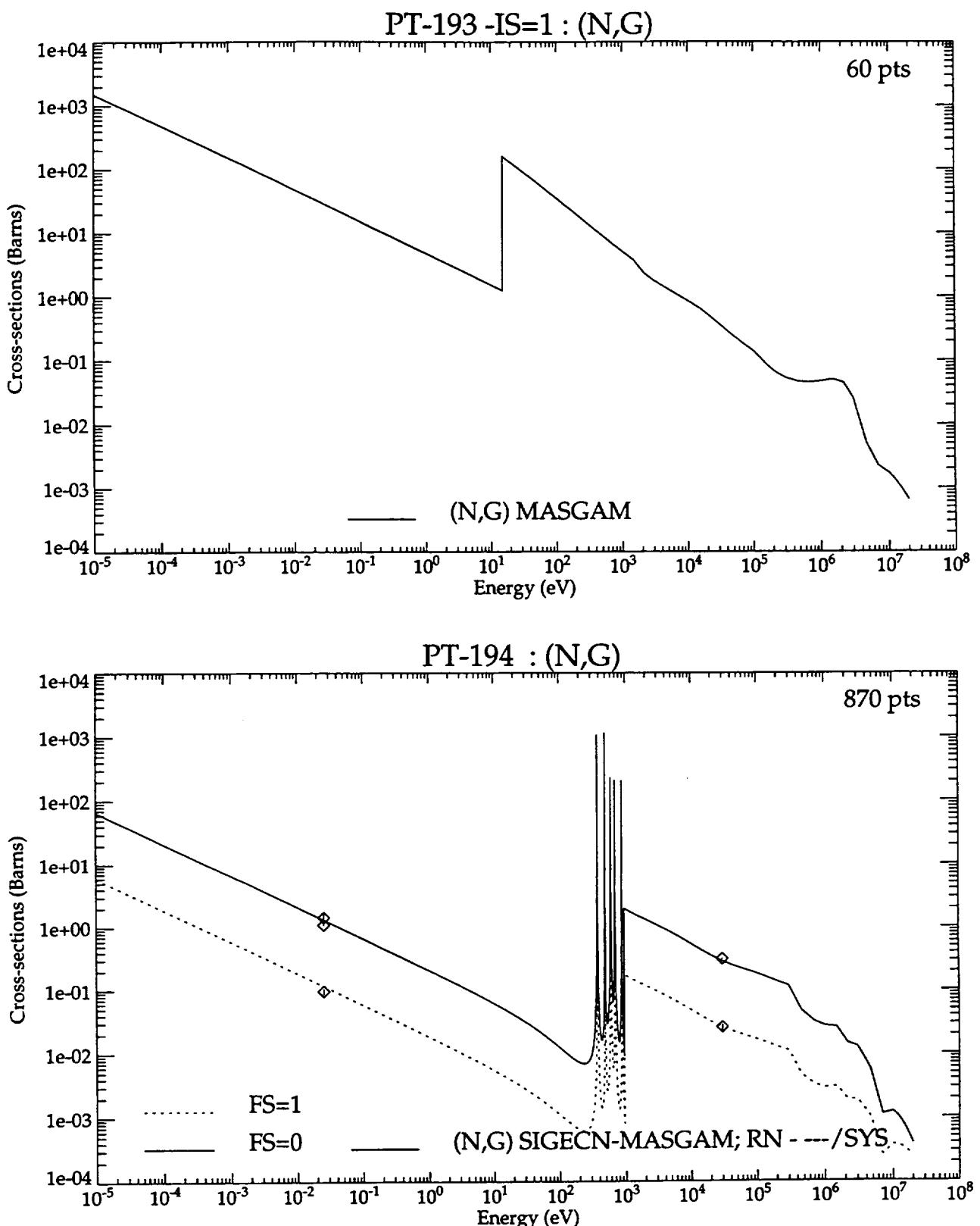


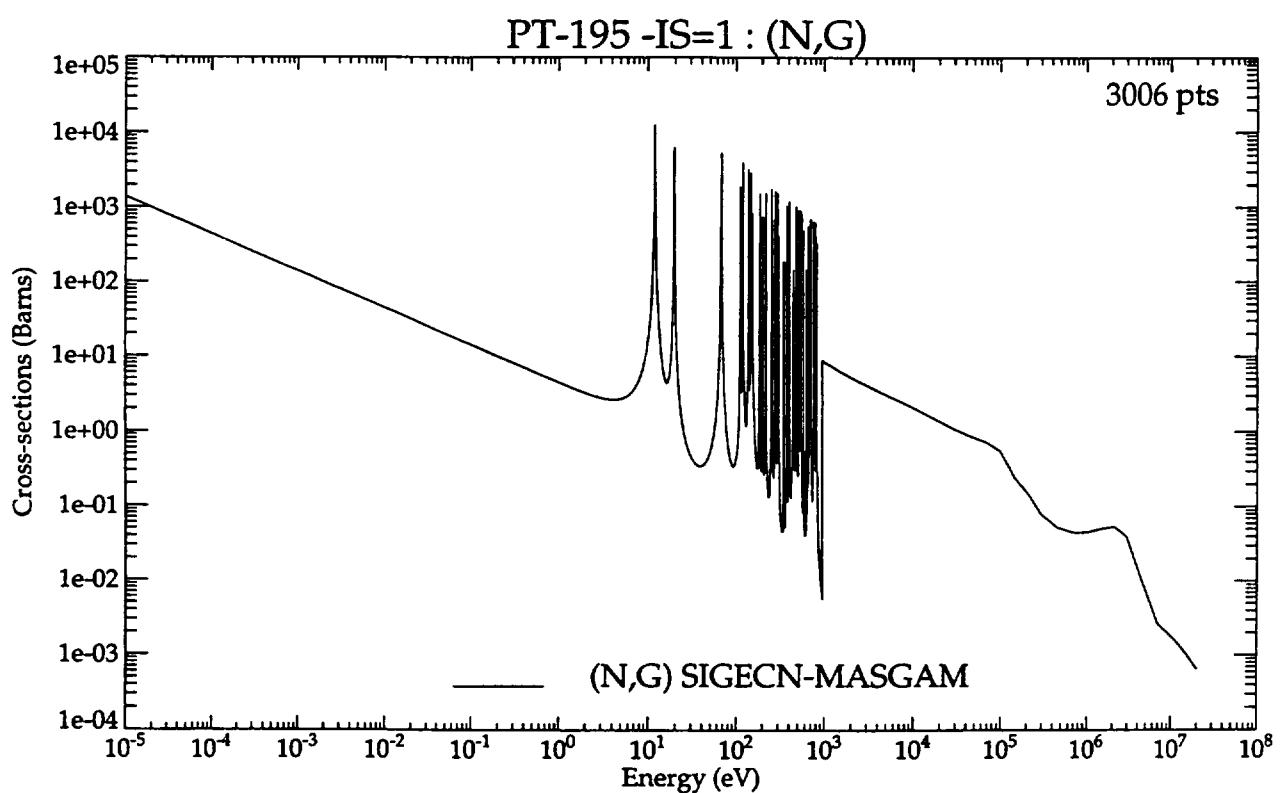
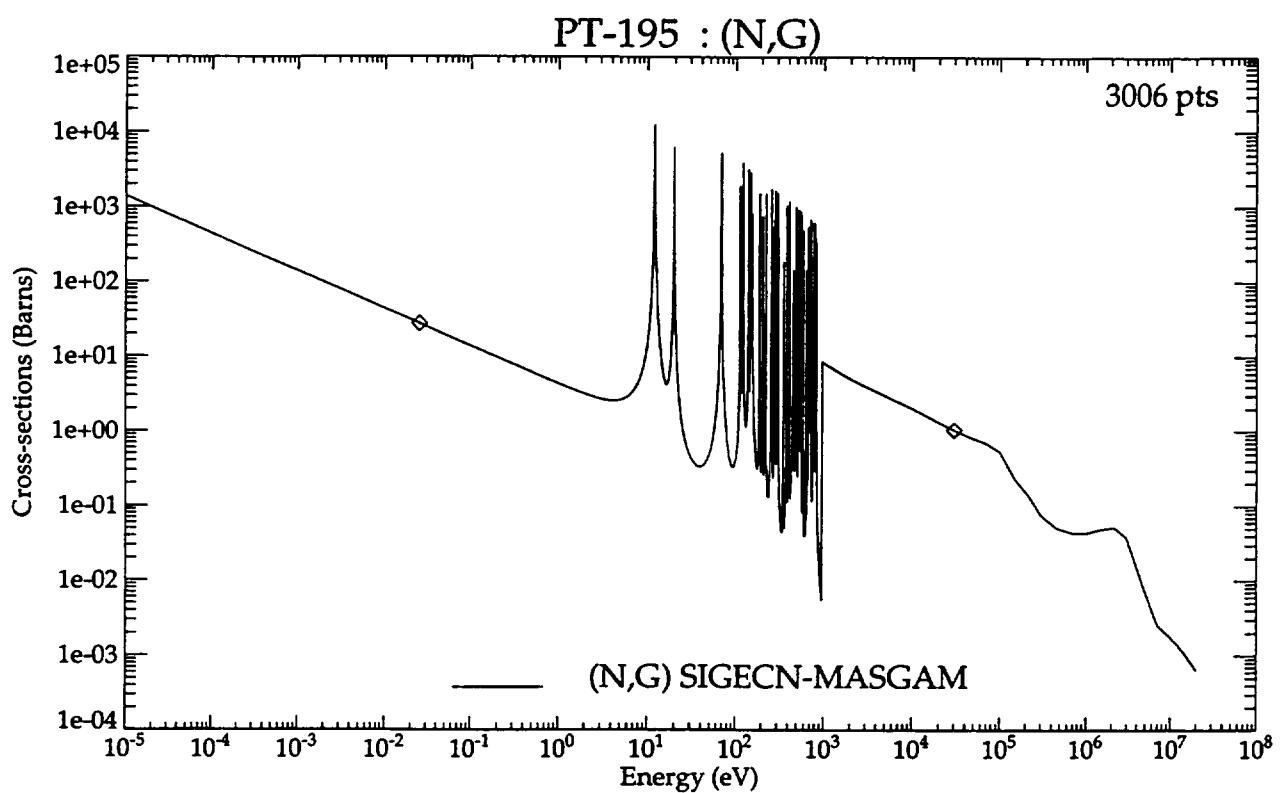


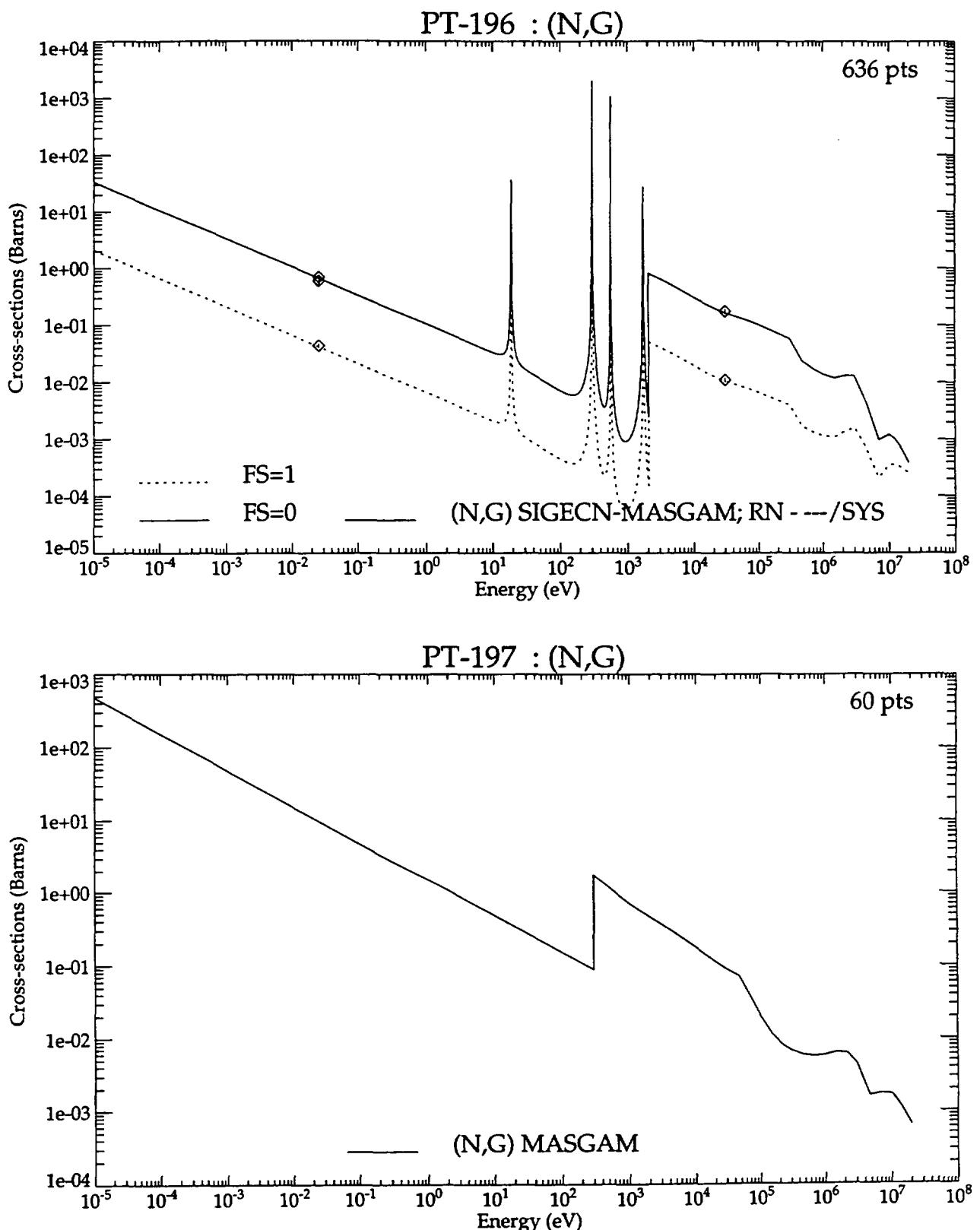


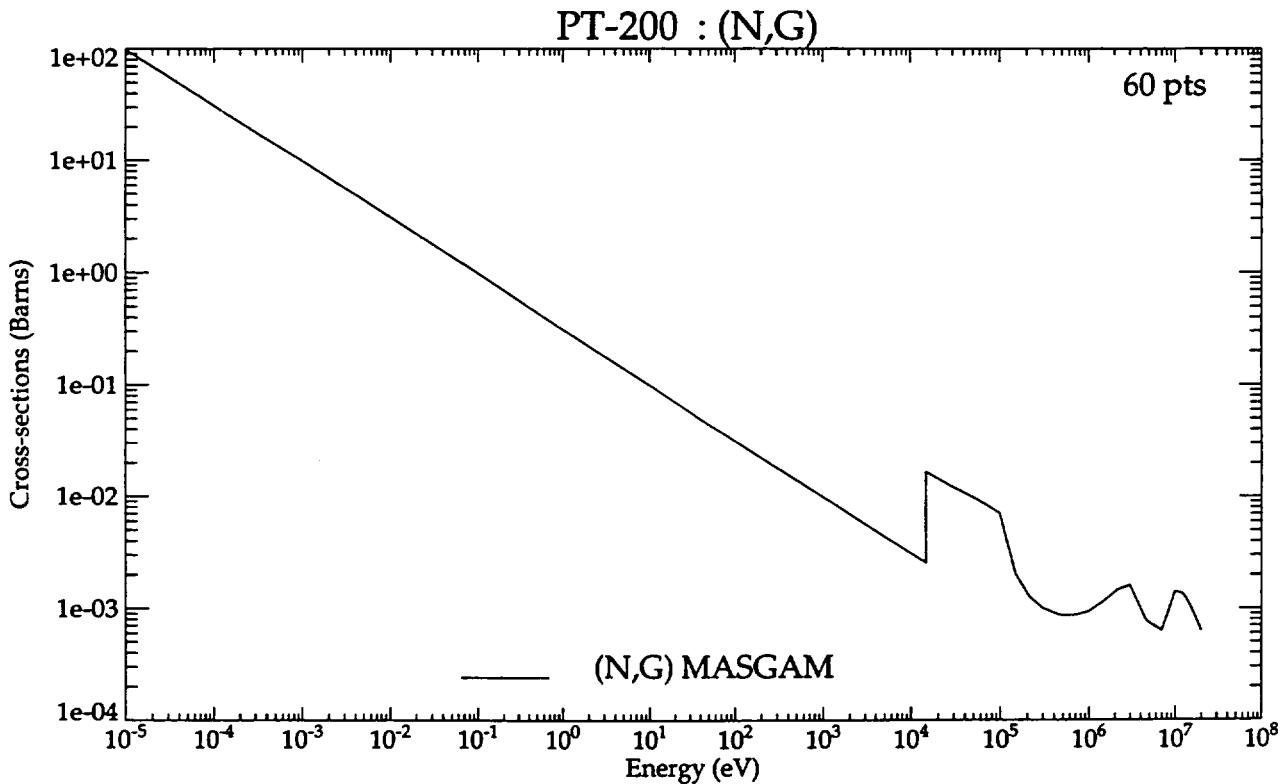
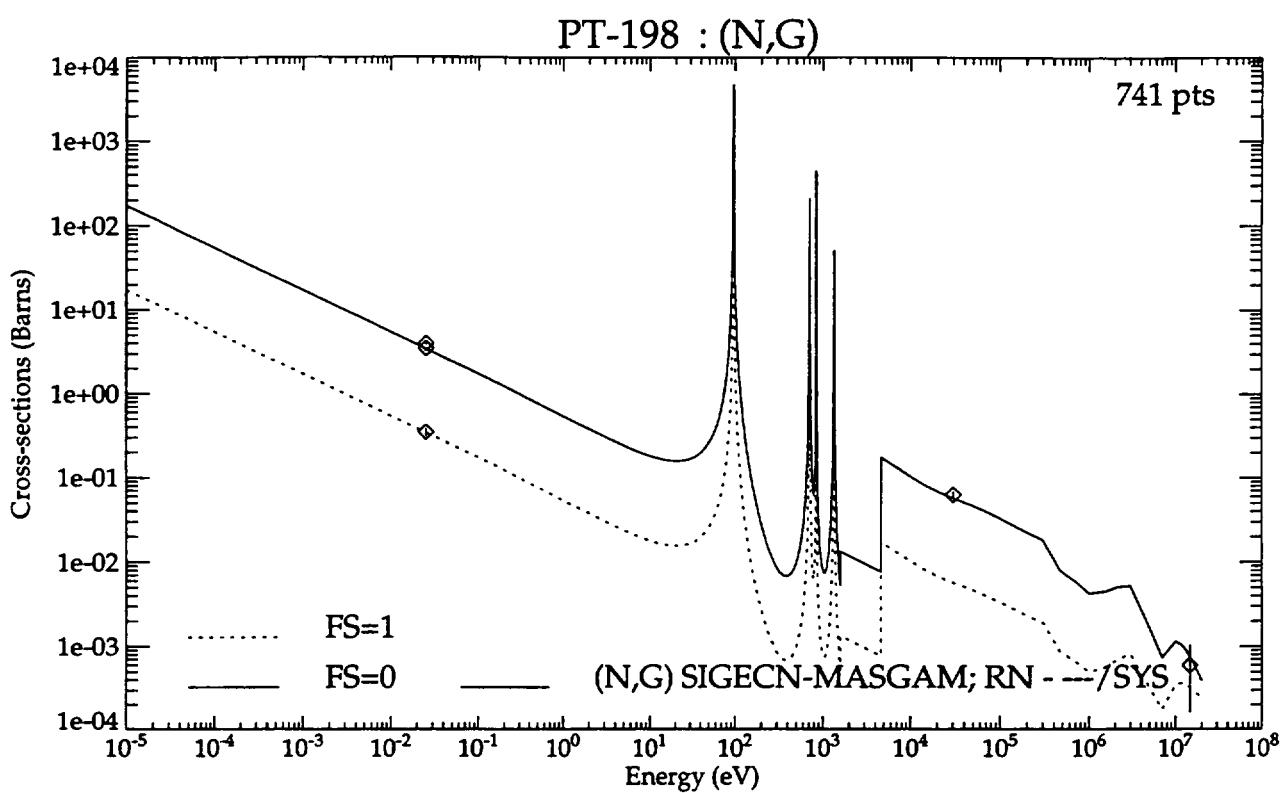




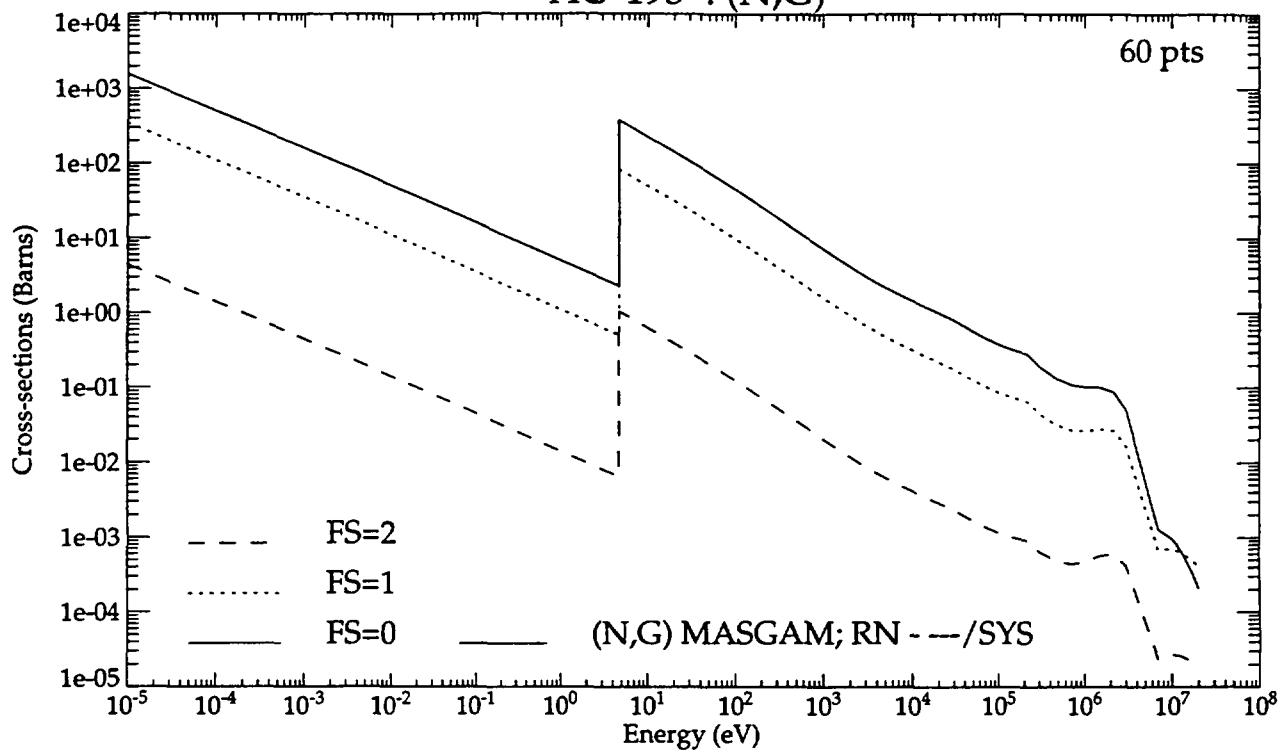




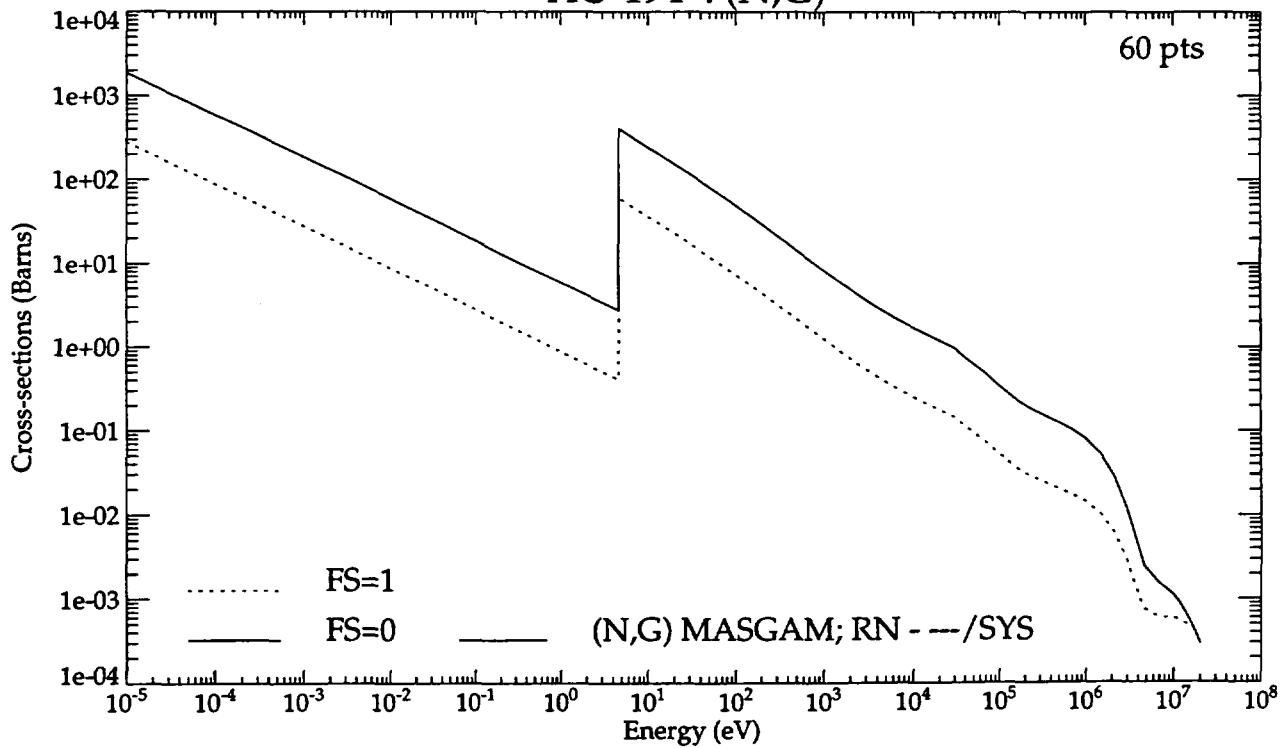


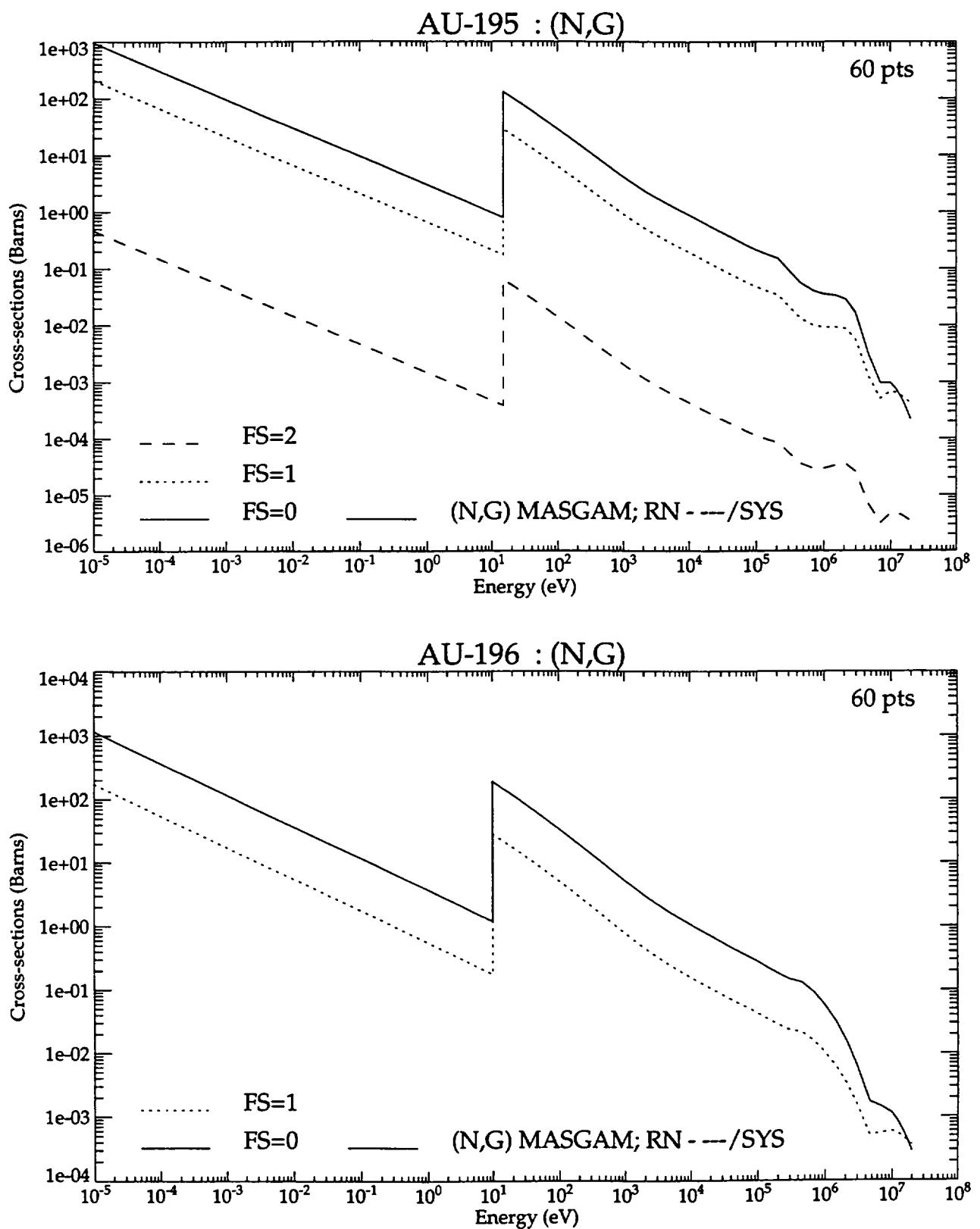


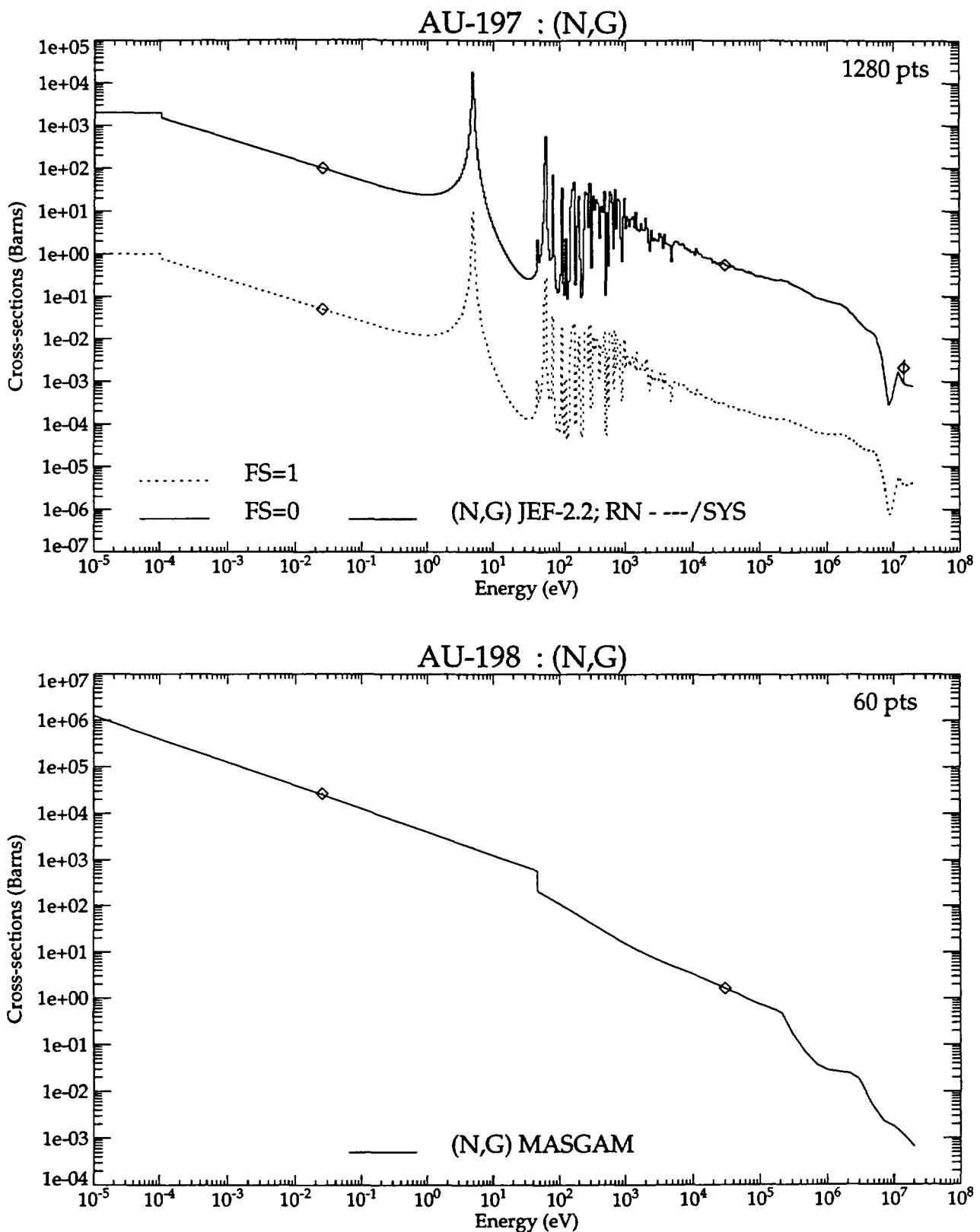
### AU-193 : (N,G)



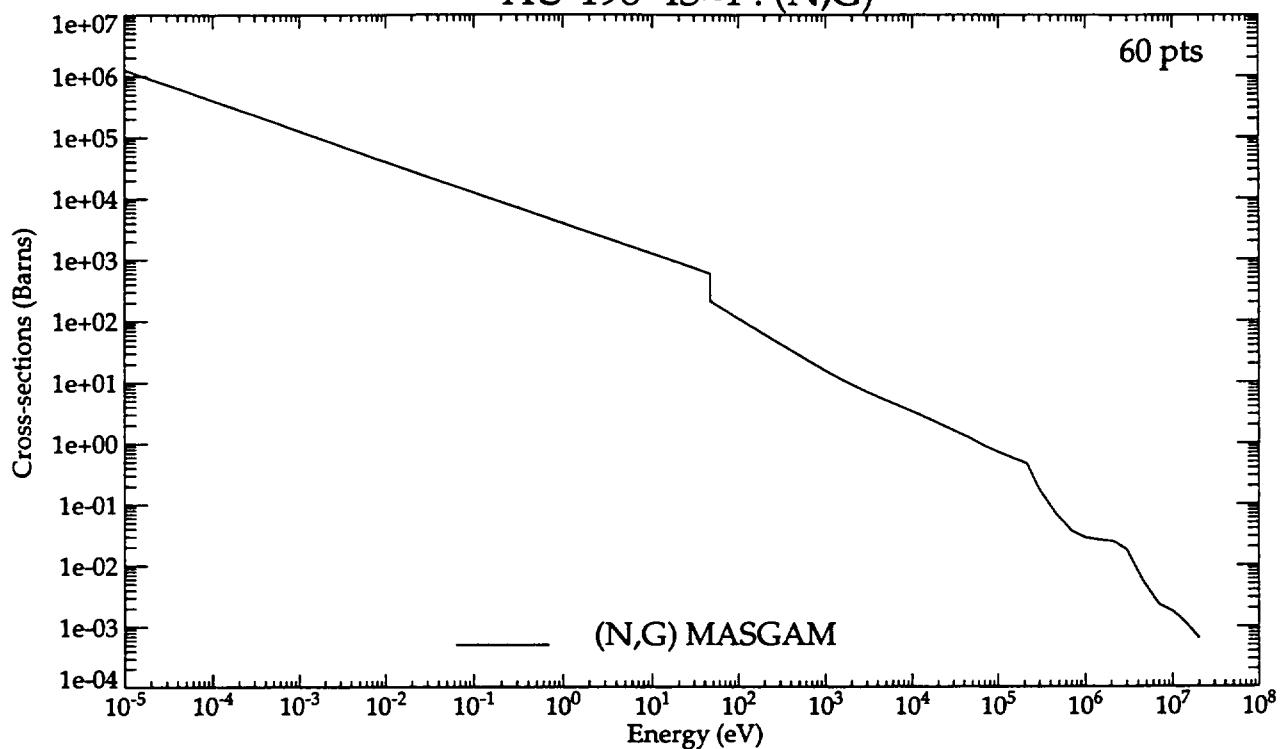
### AU-194 : (N,G)



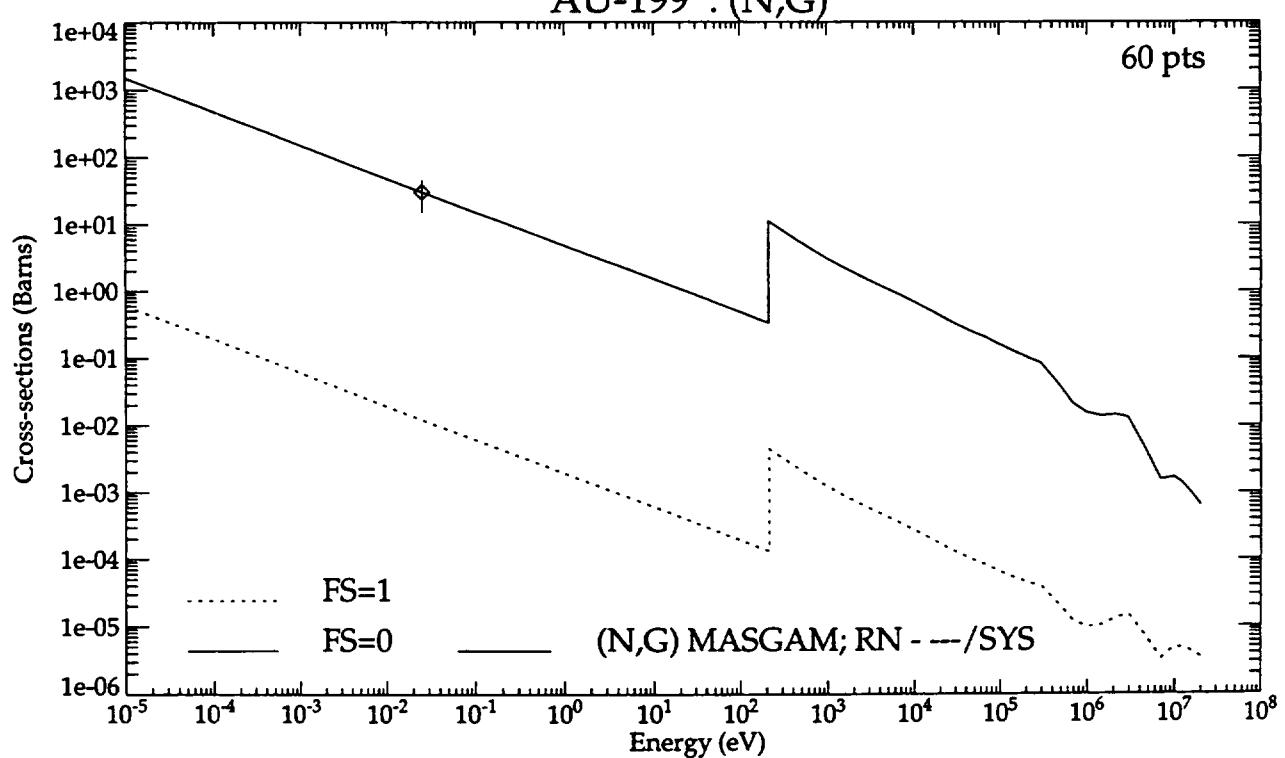


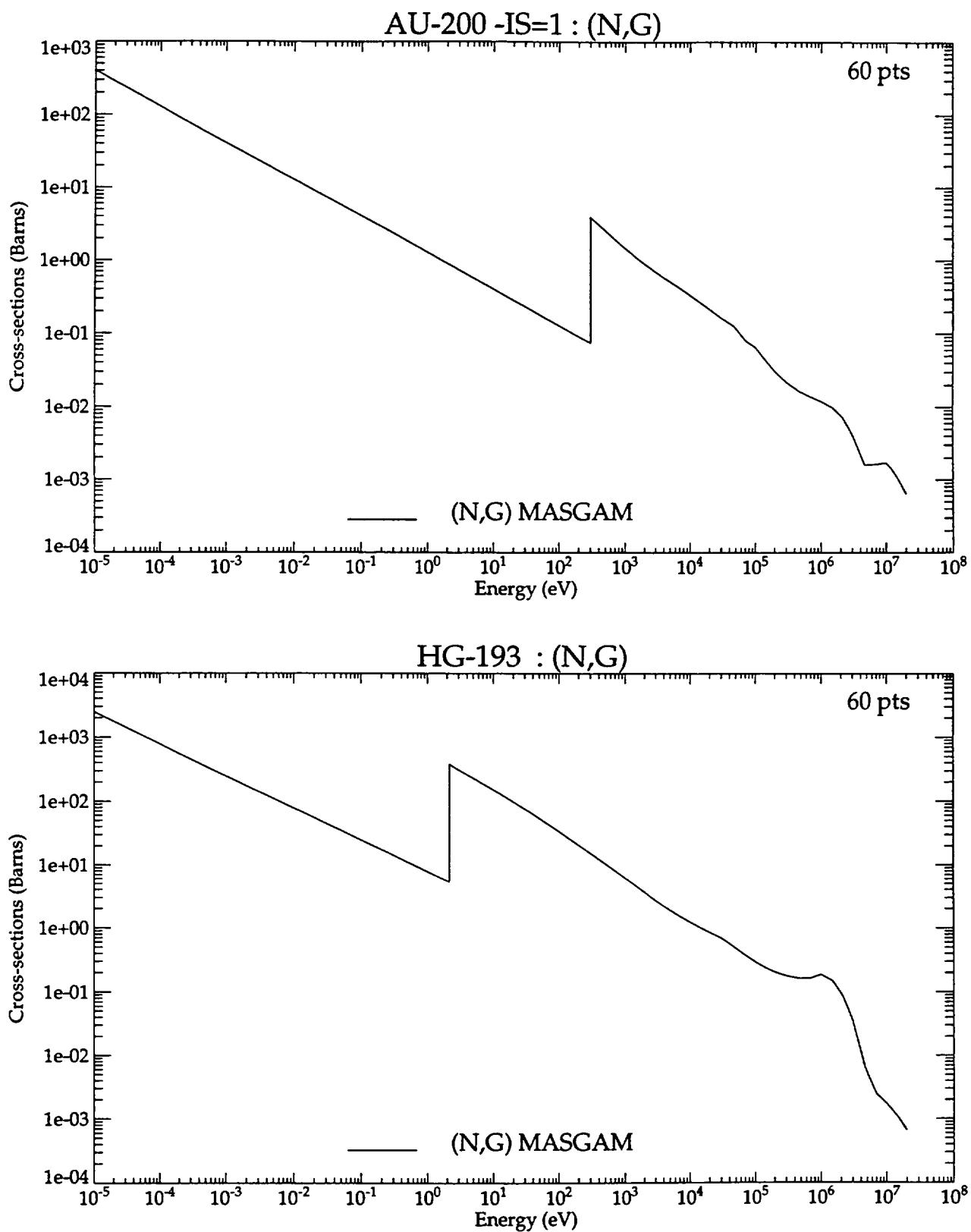


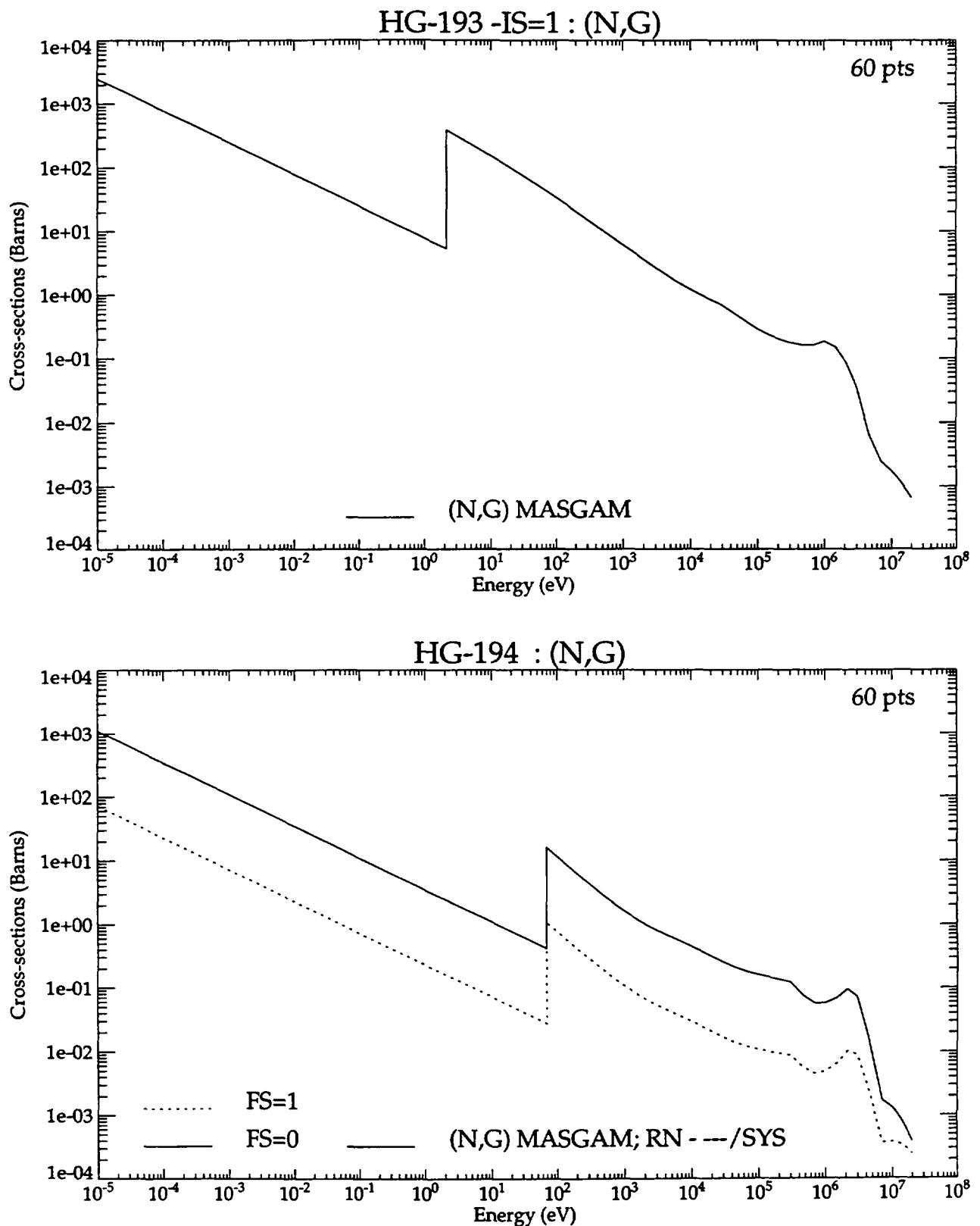
AU-198 -IS=1 : (N,G)

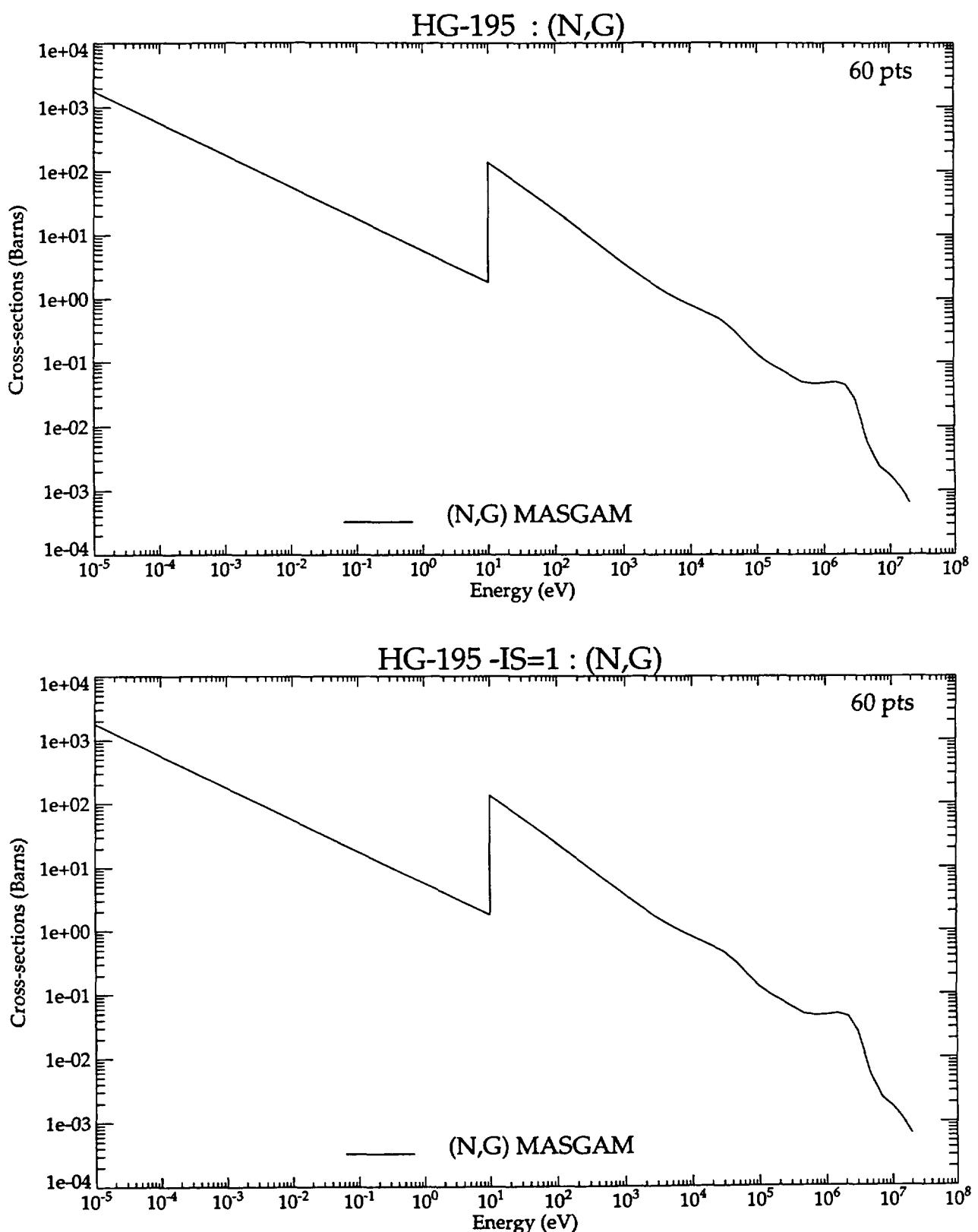


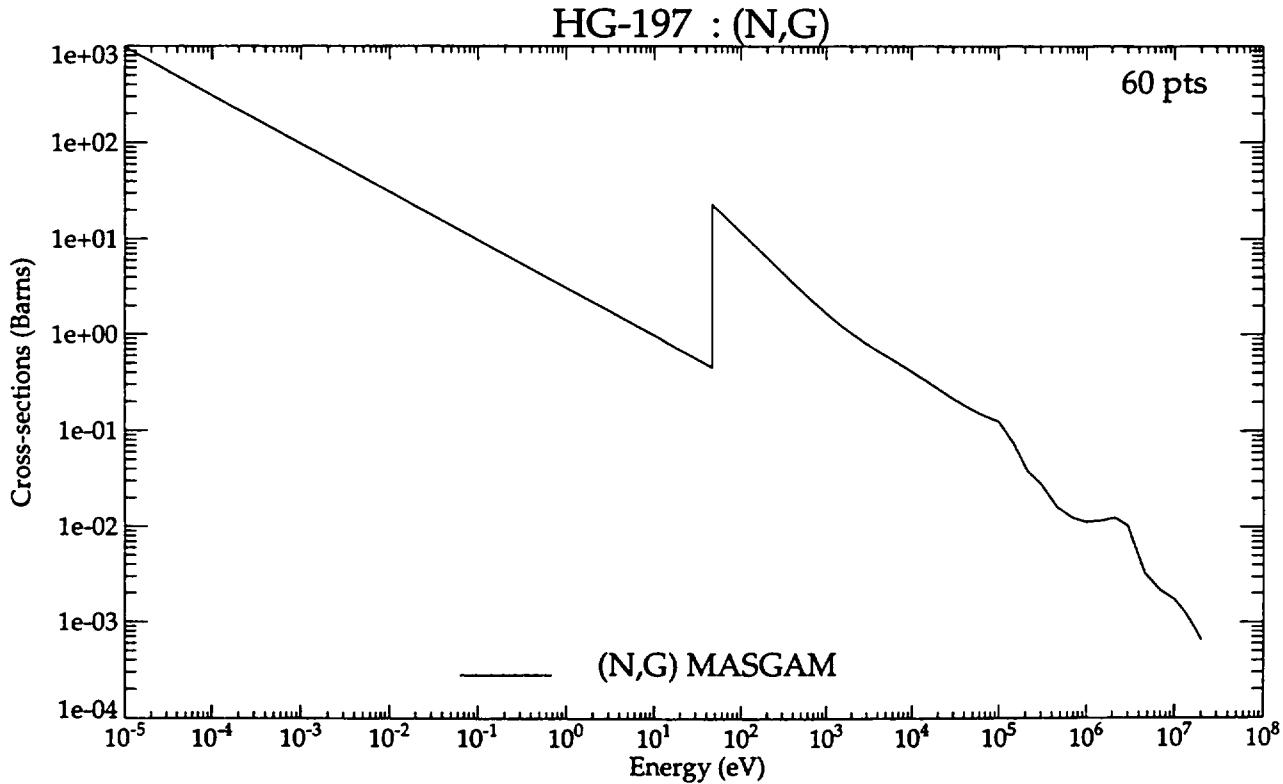
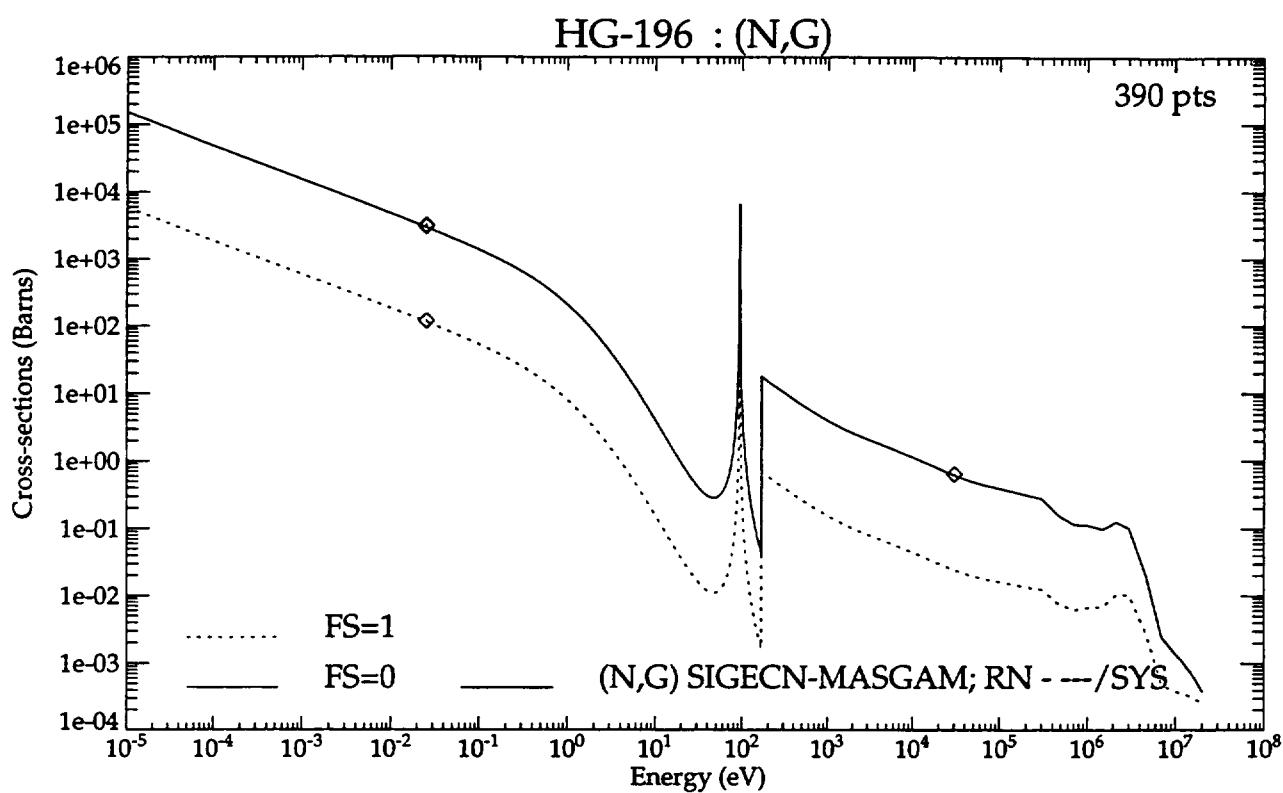
AU-199 : (N,G)

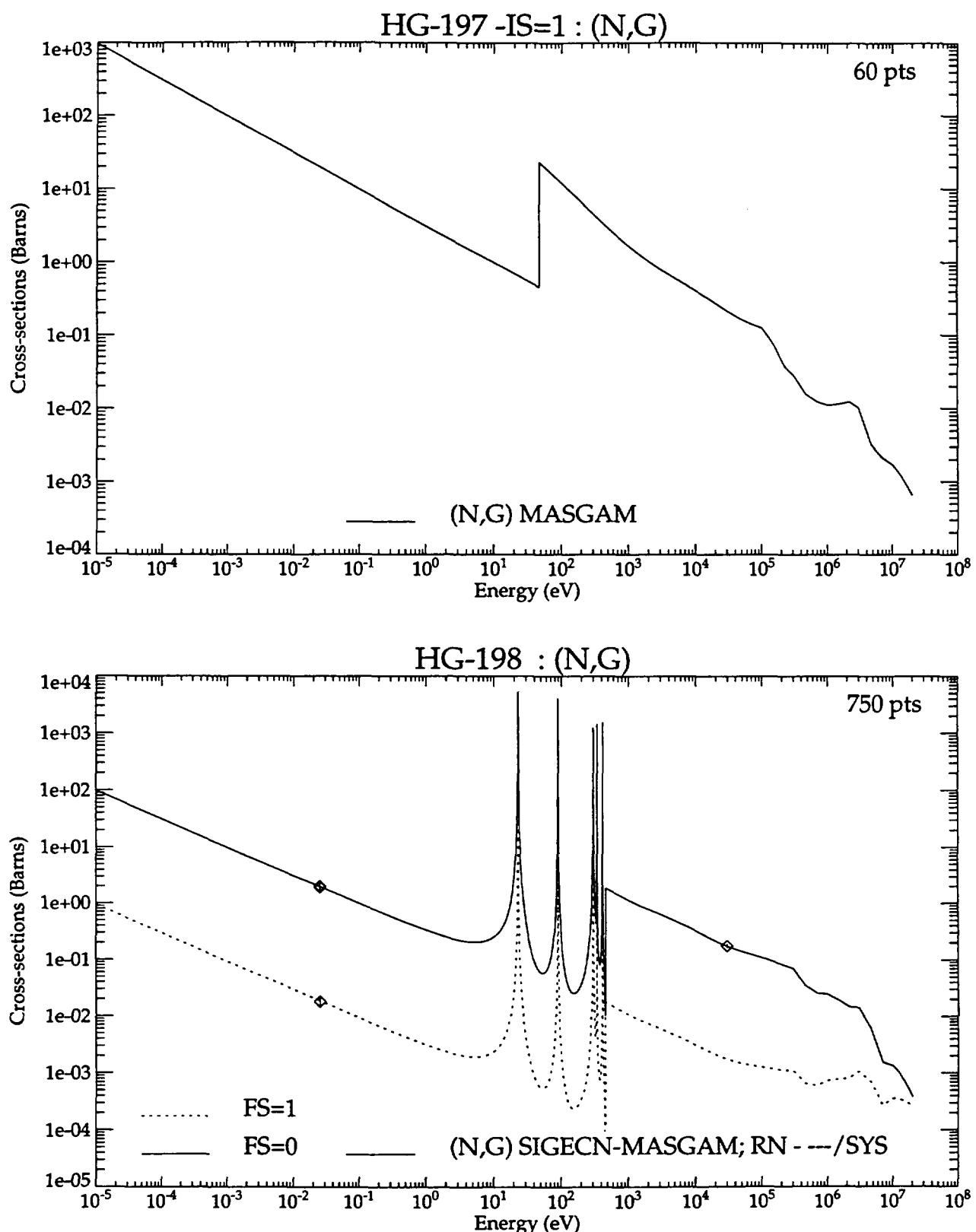


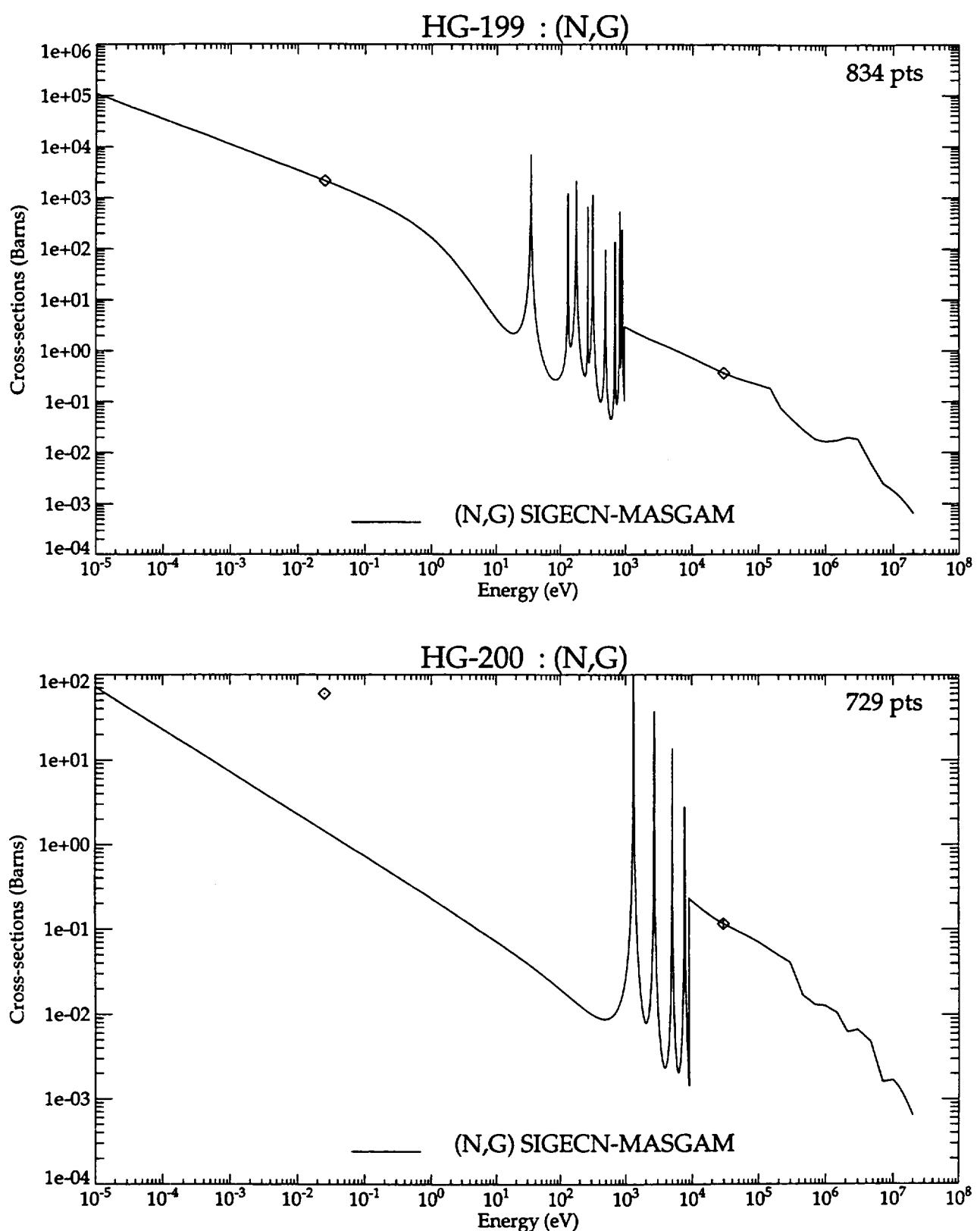


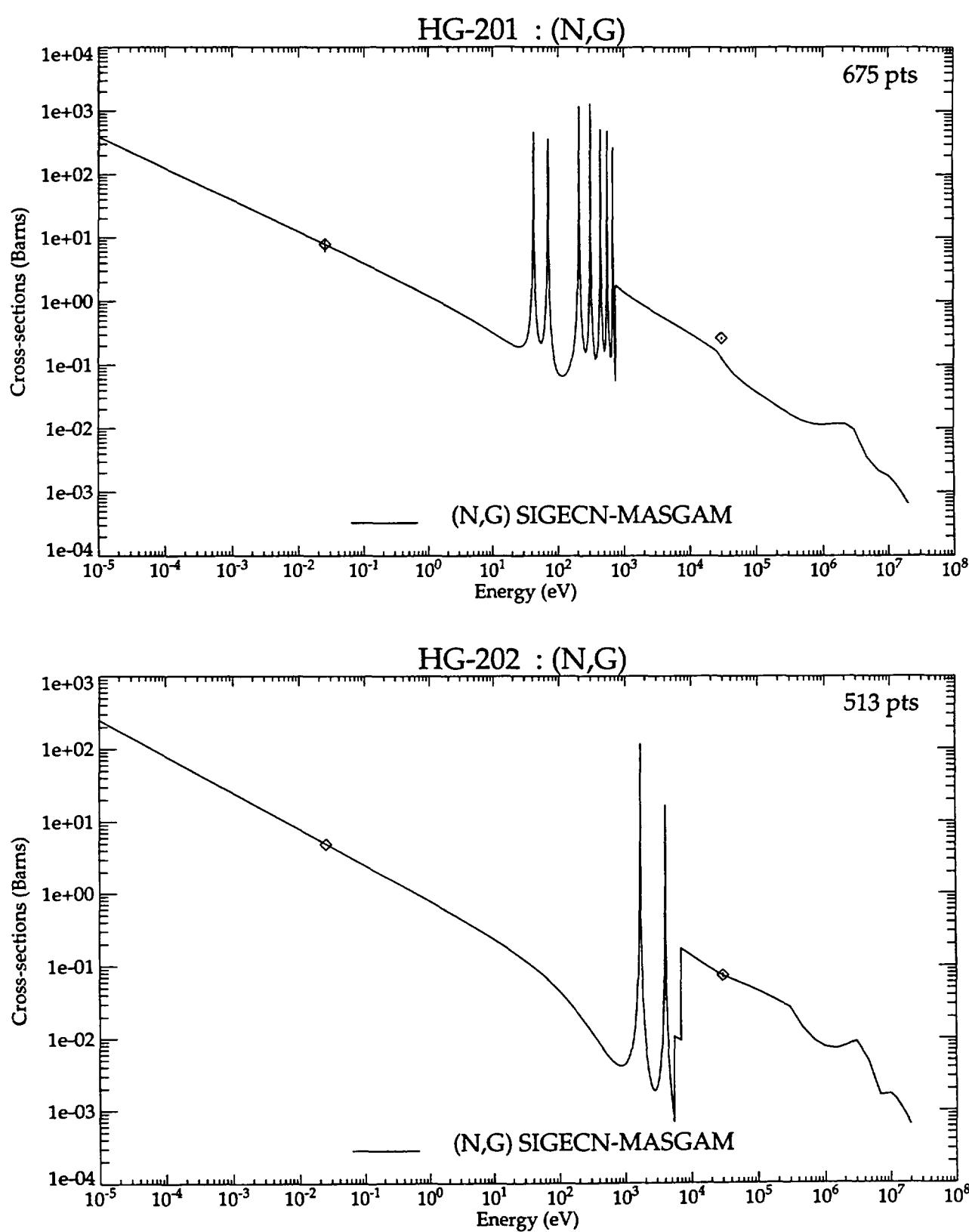


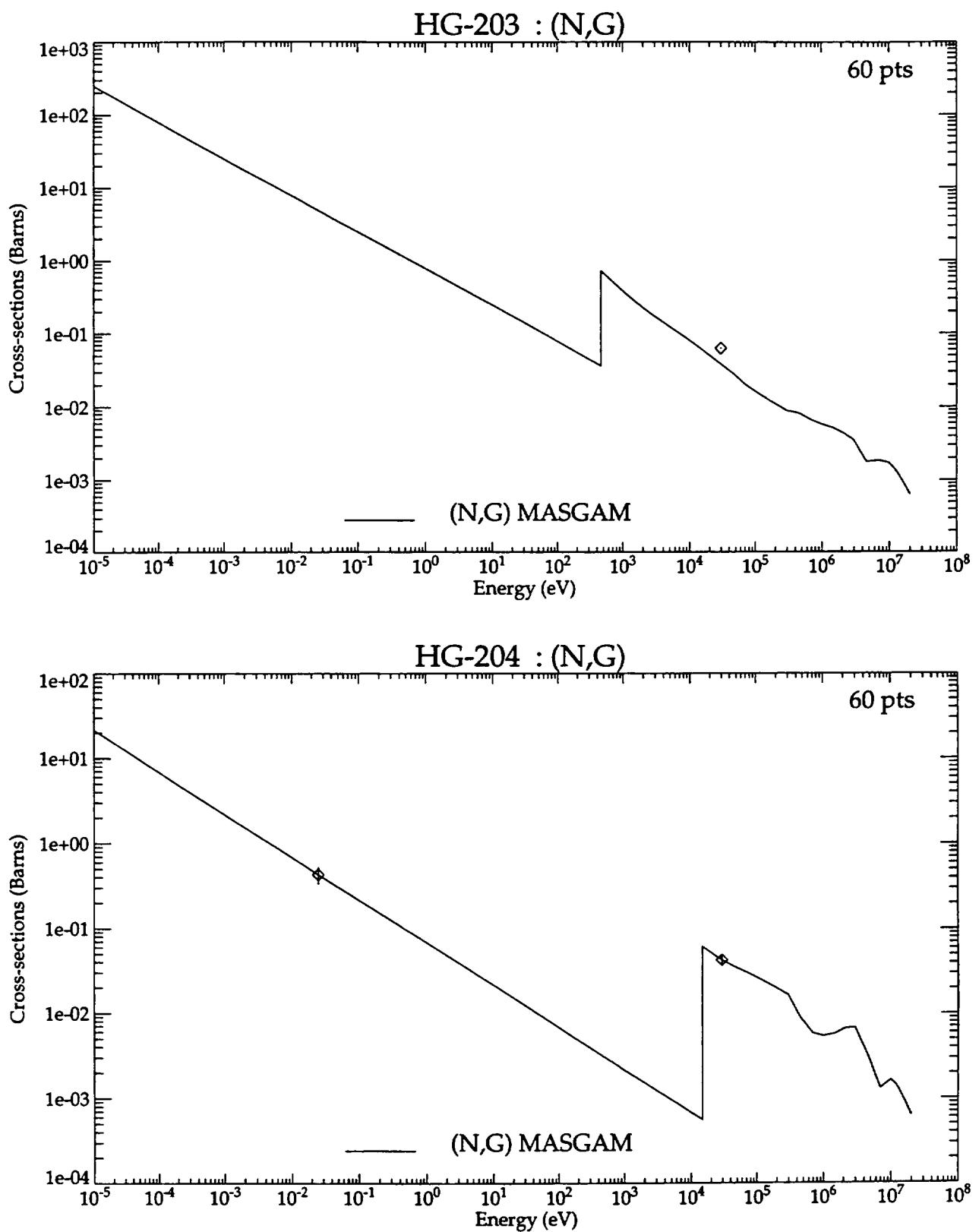






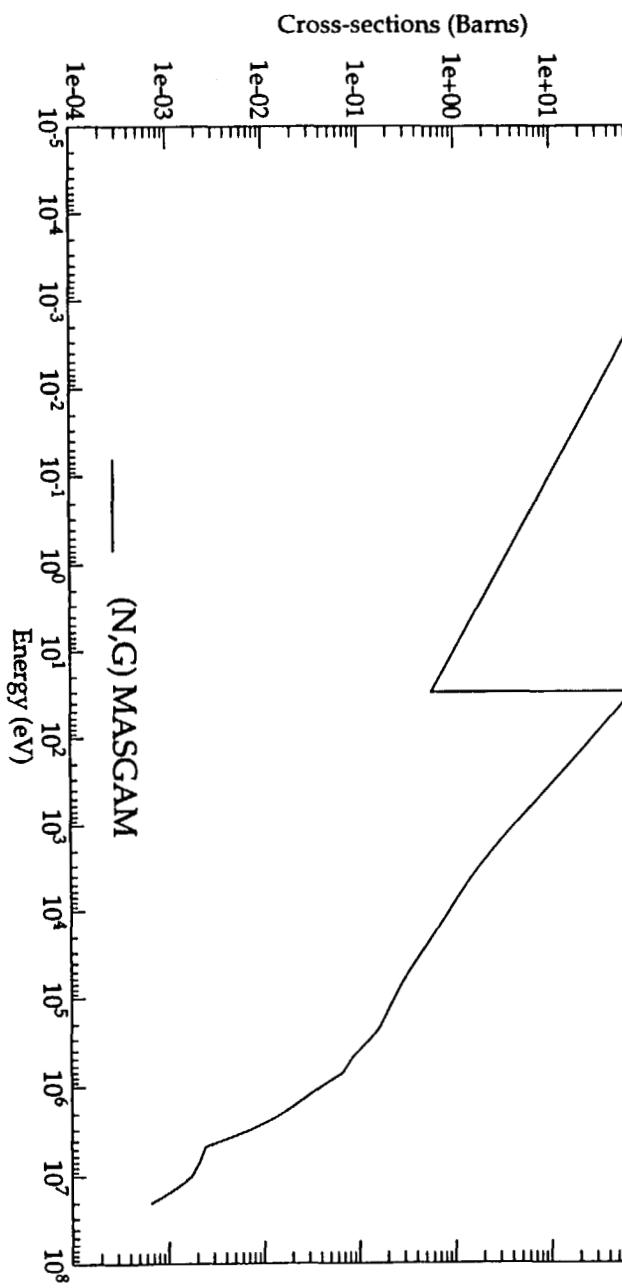






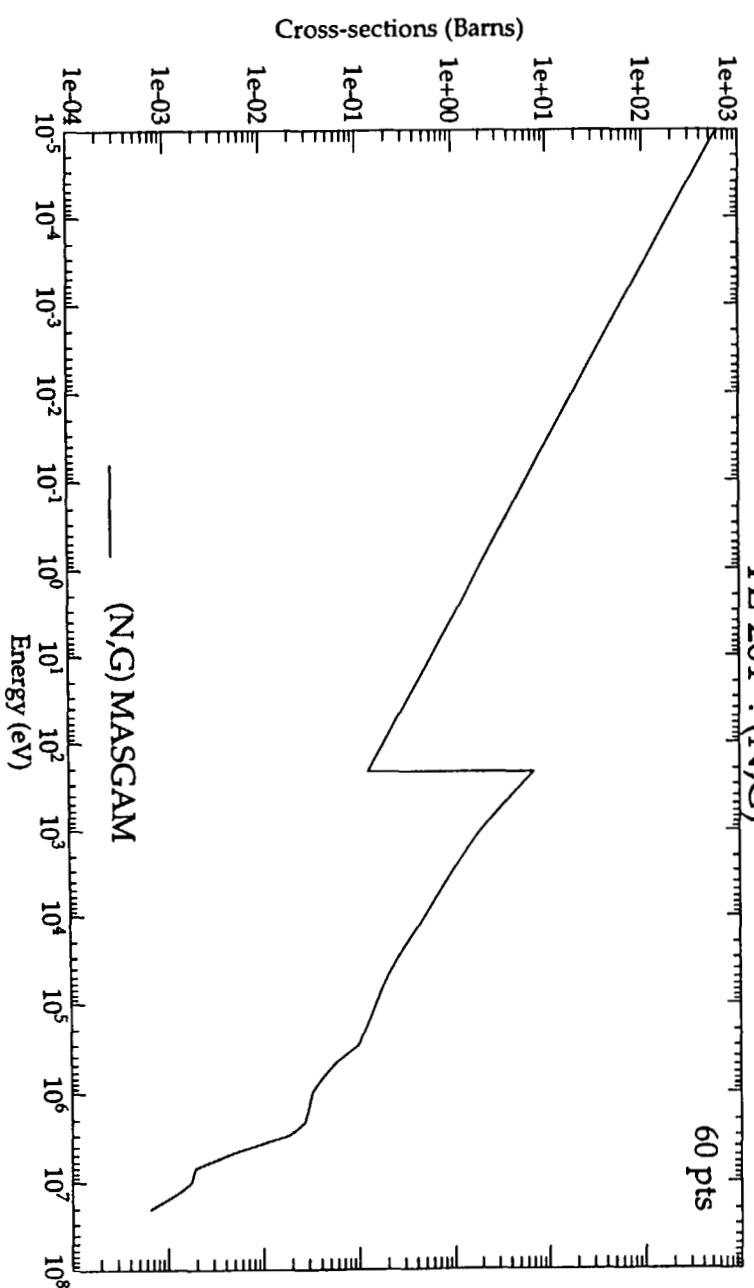
TL-200 : (N,G)

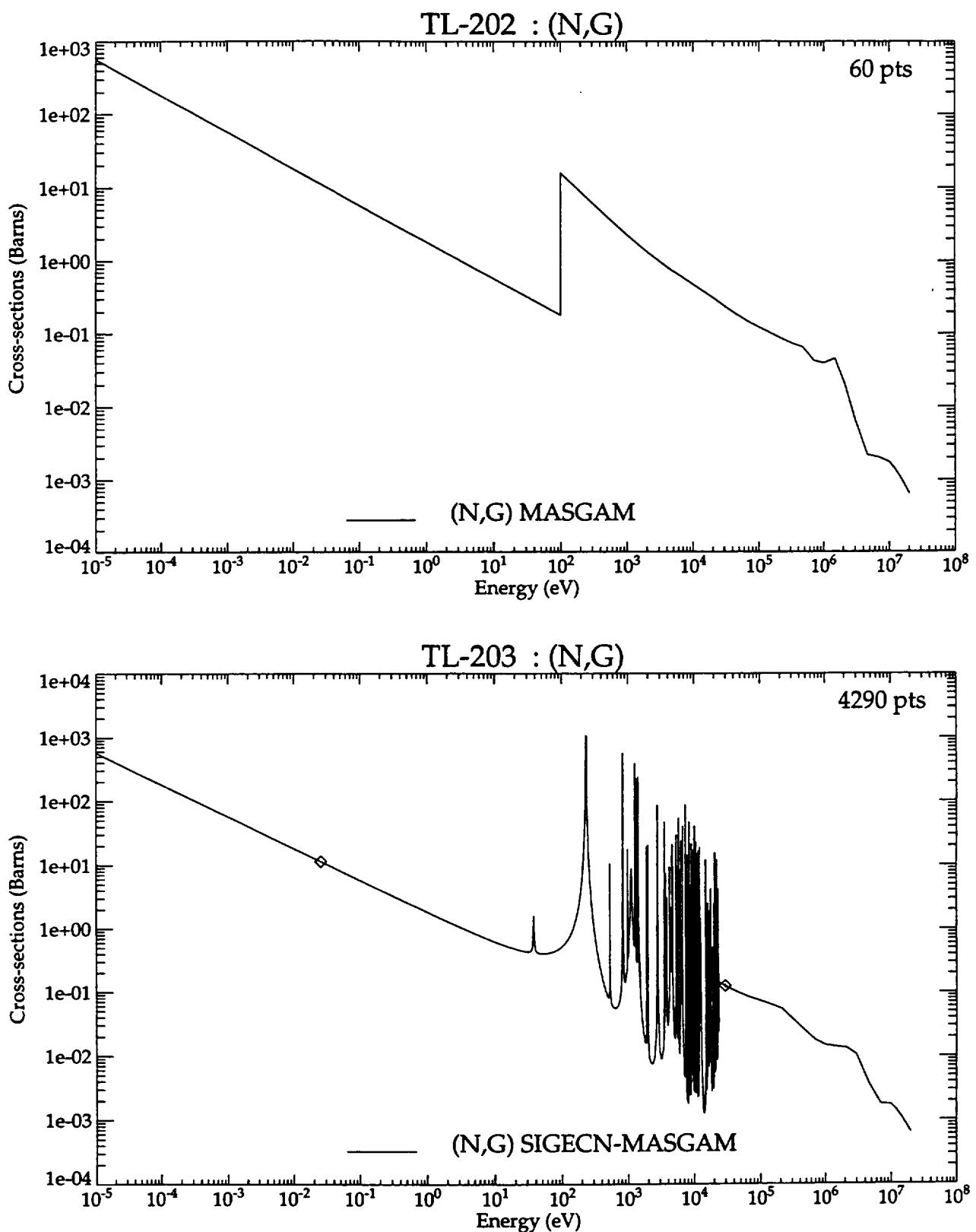
60 pts

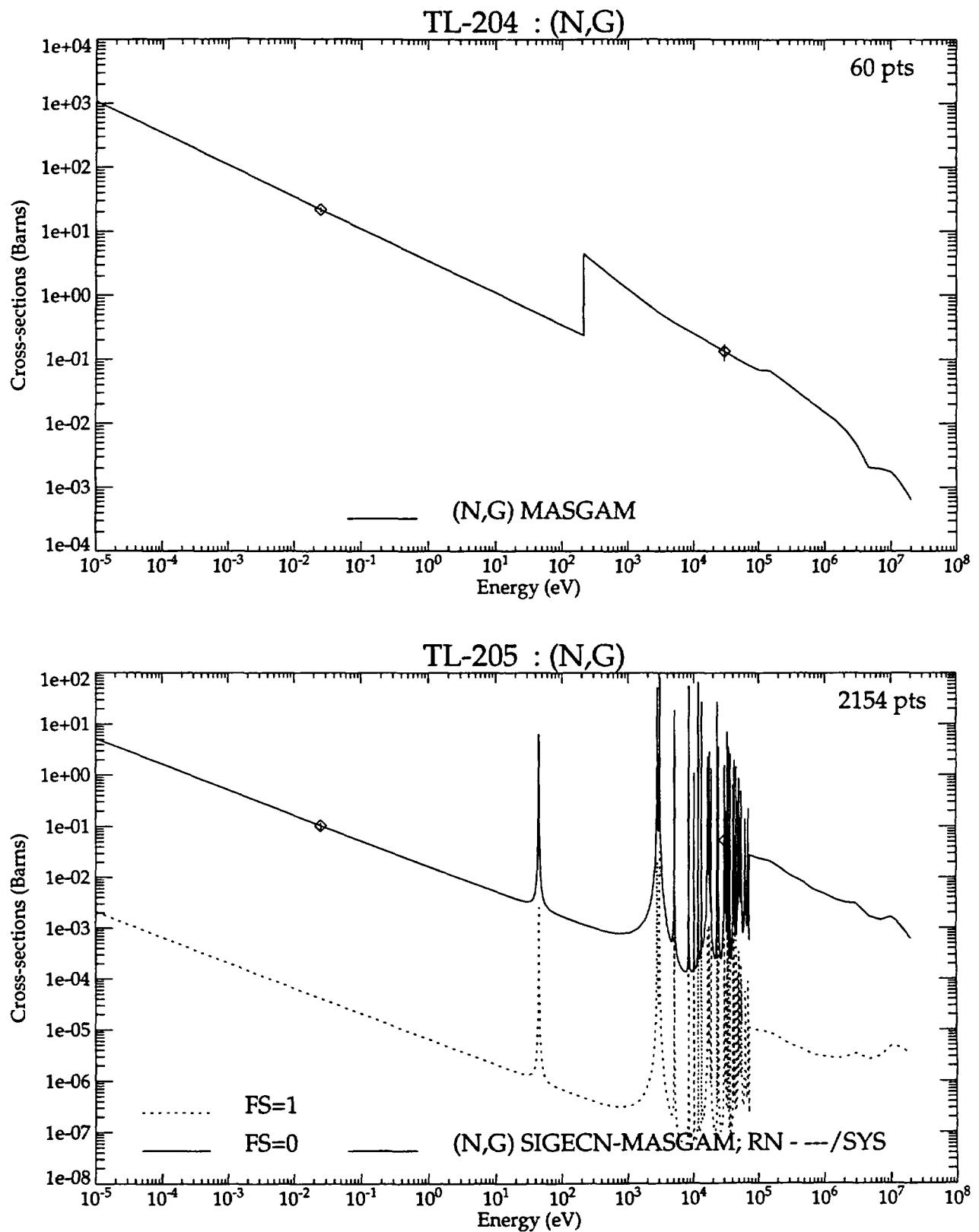


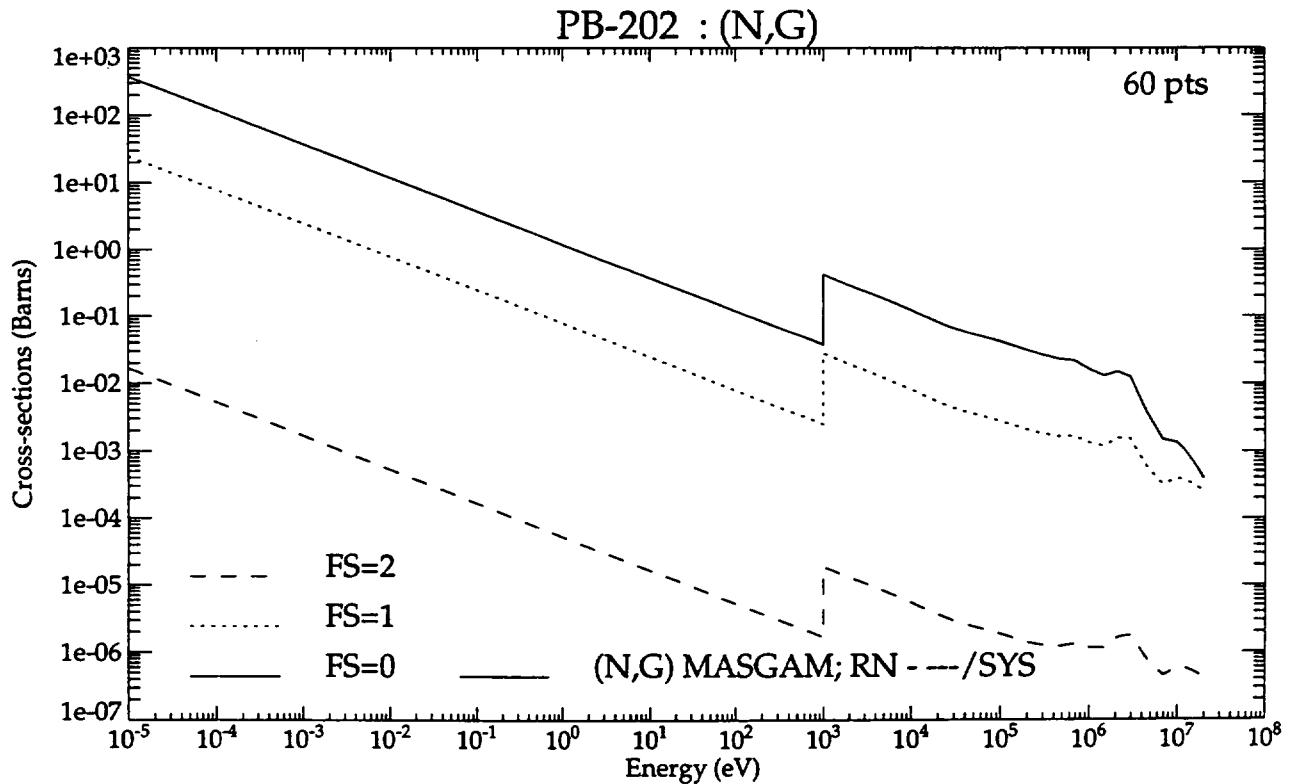
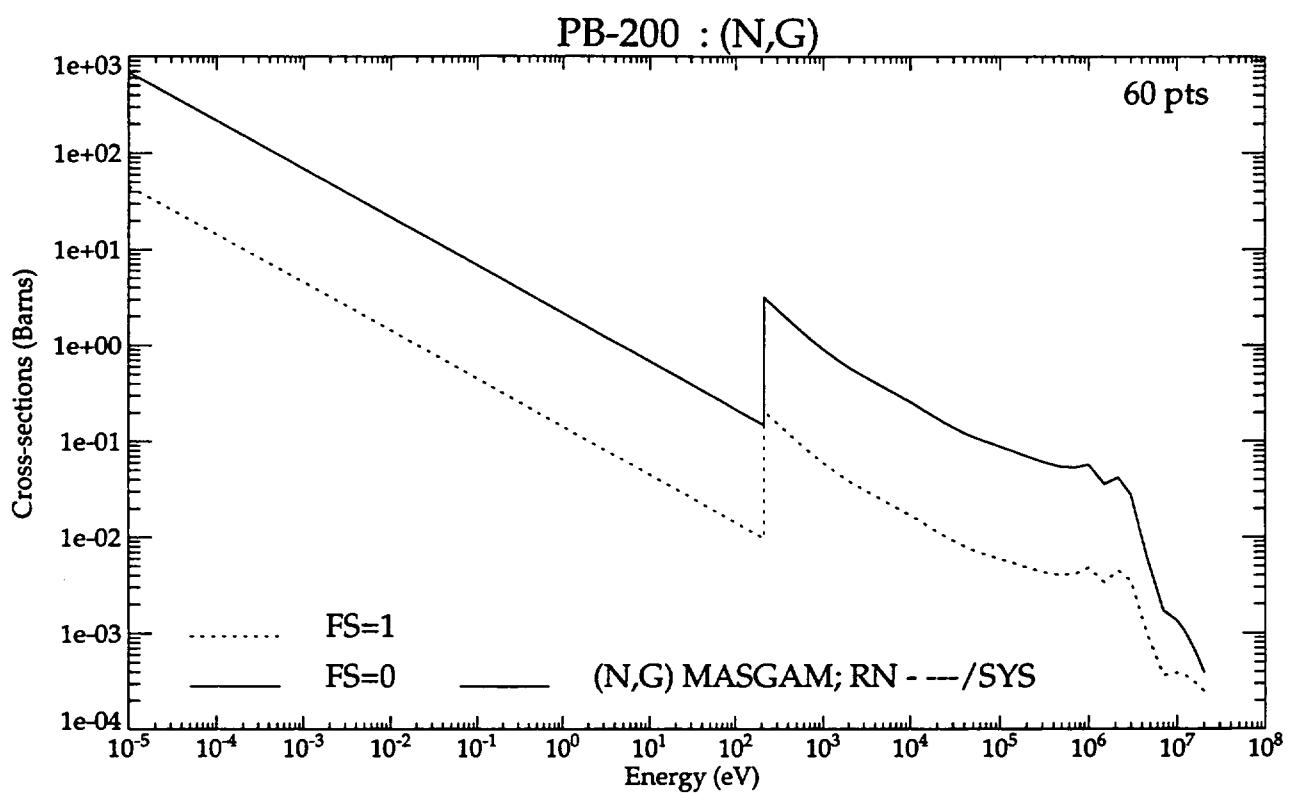
TL-201 : (N,G)

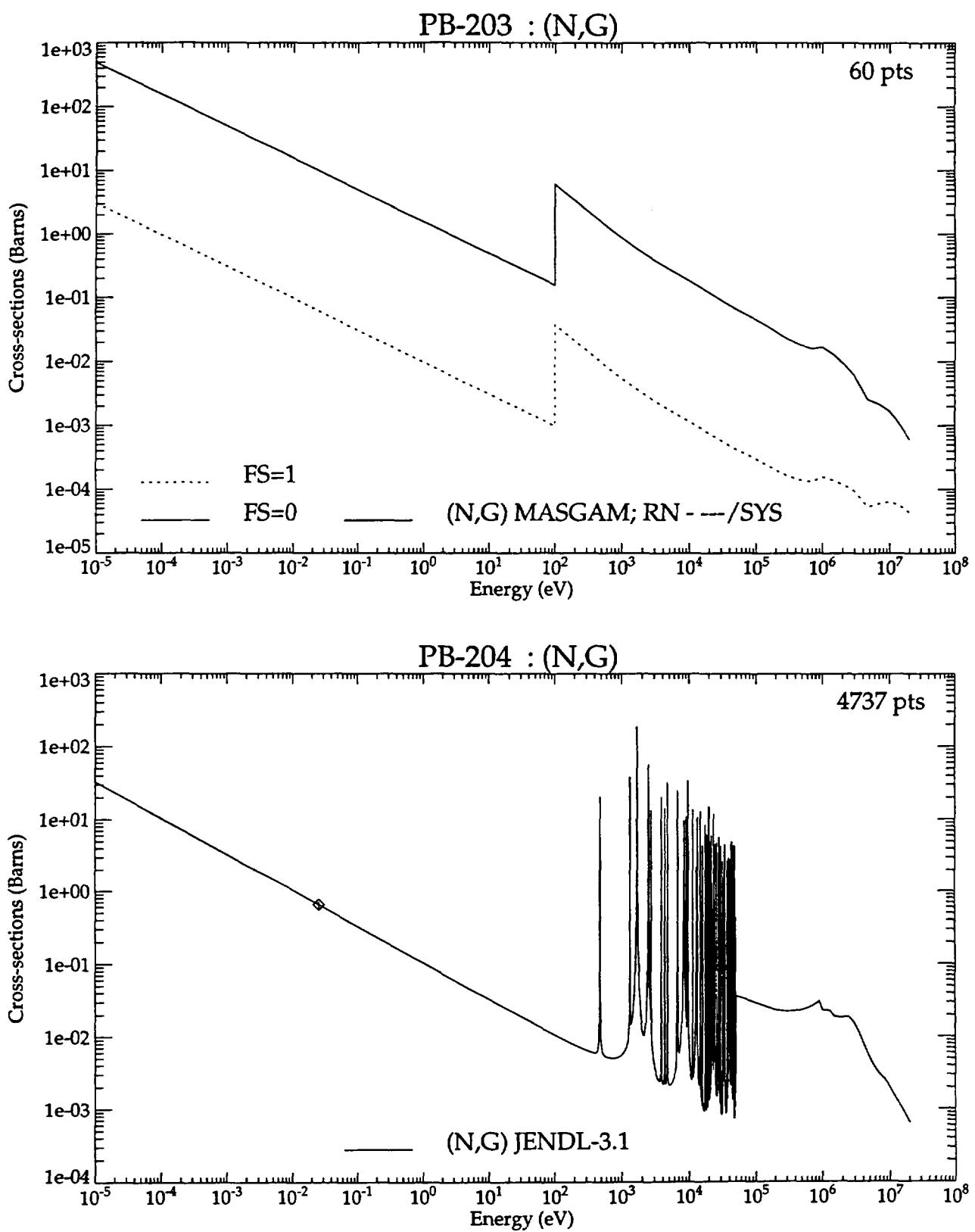
60 pts

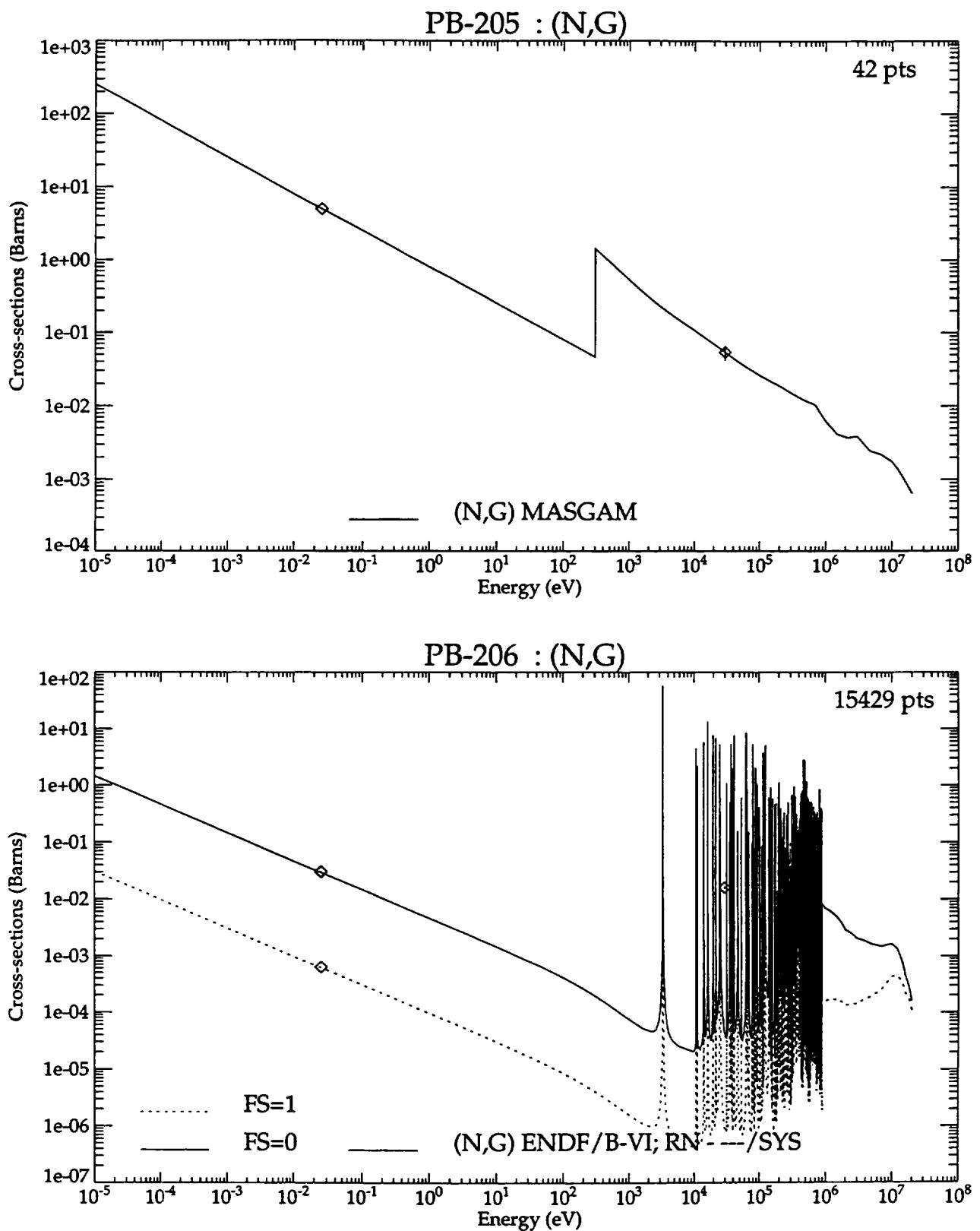


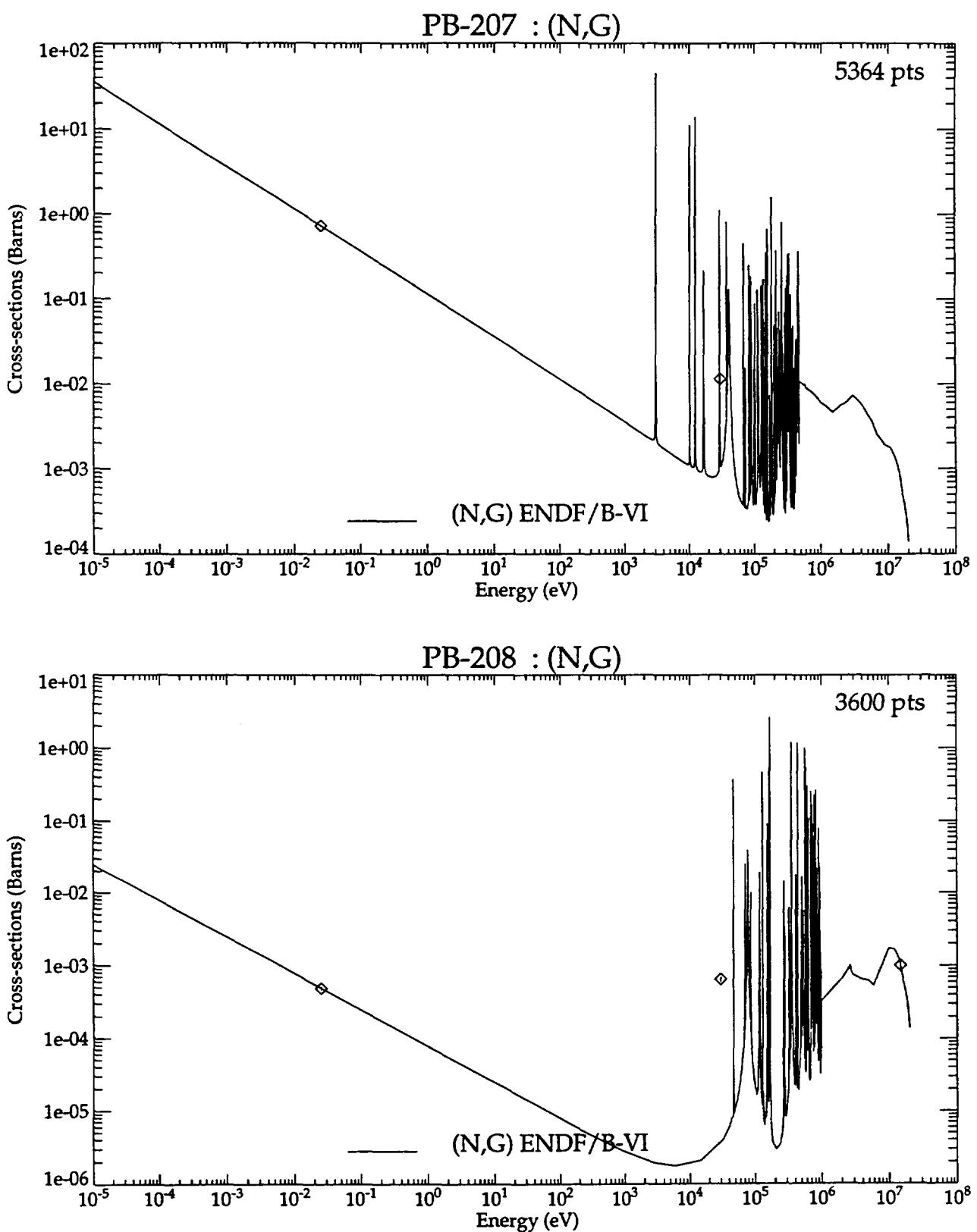


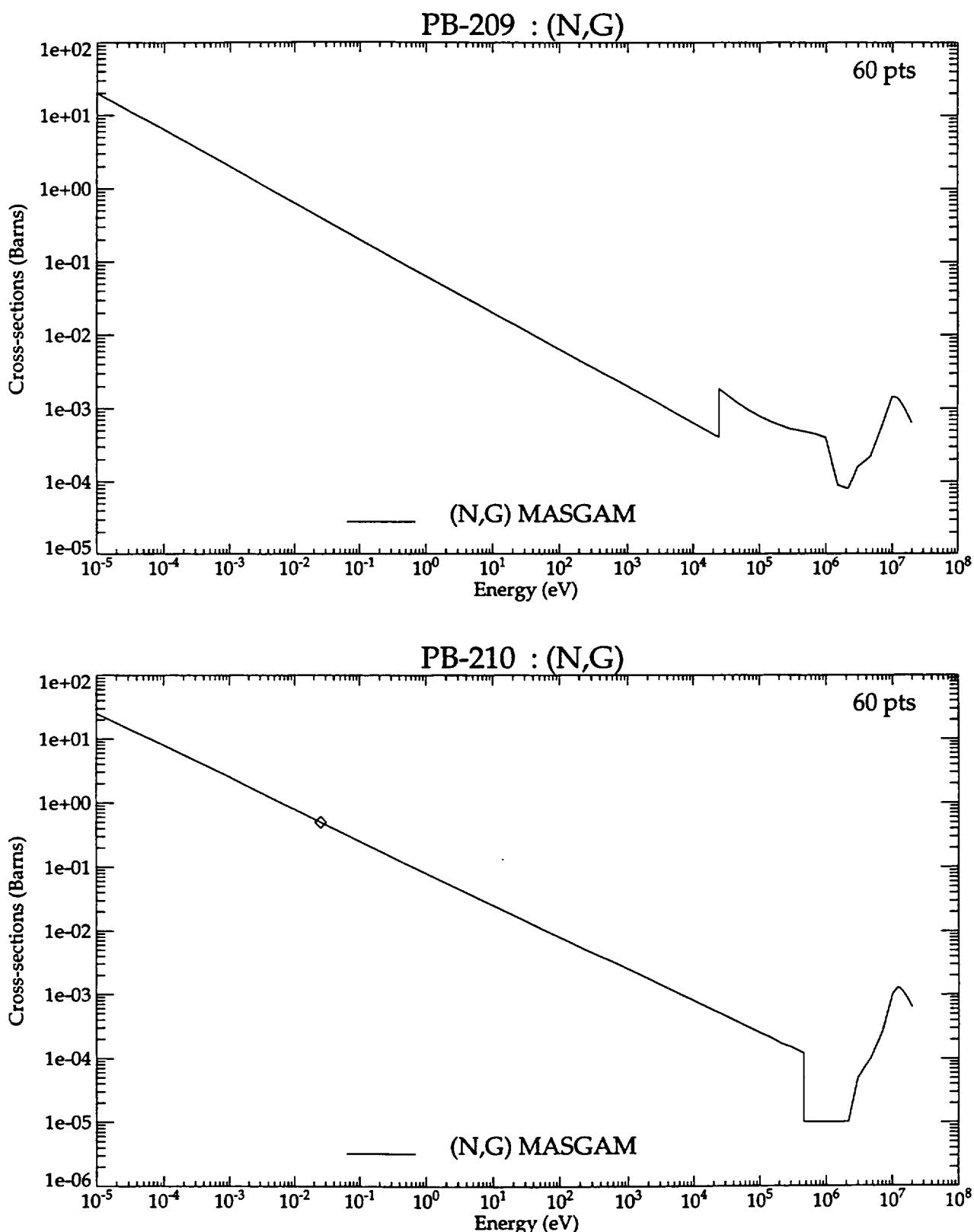


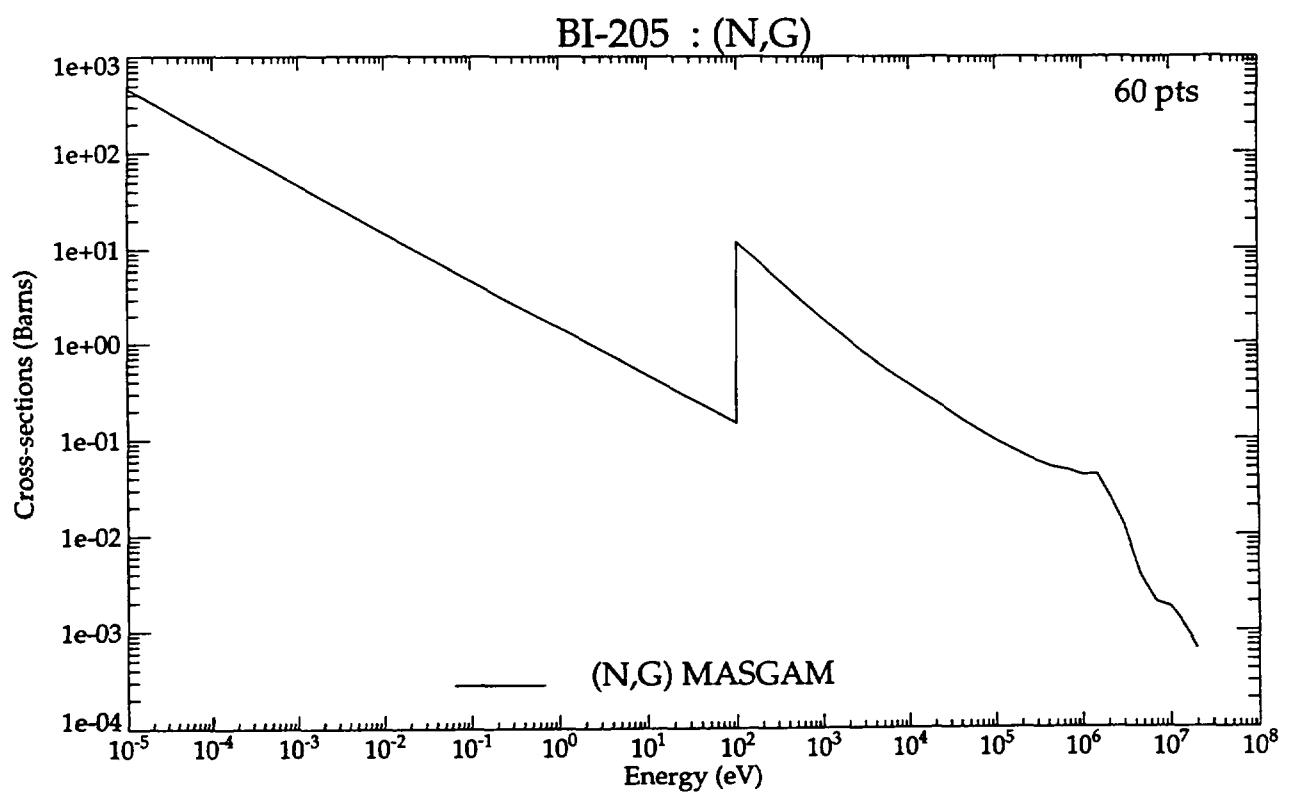
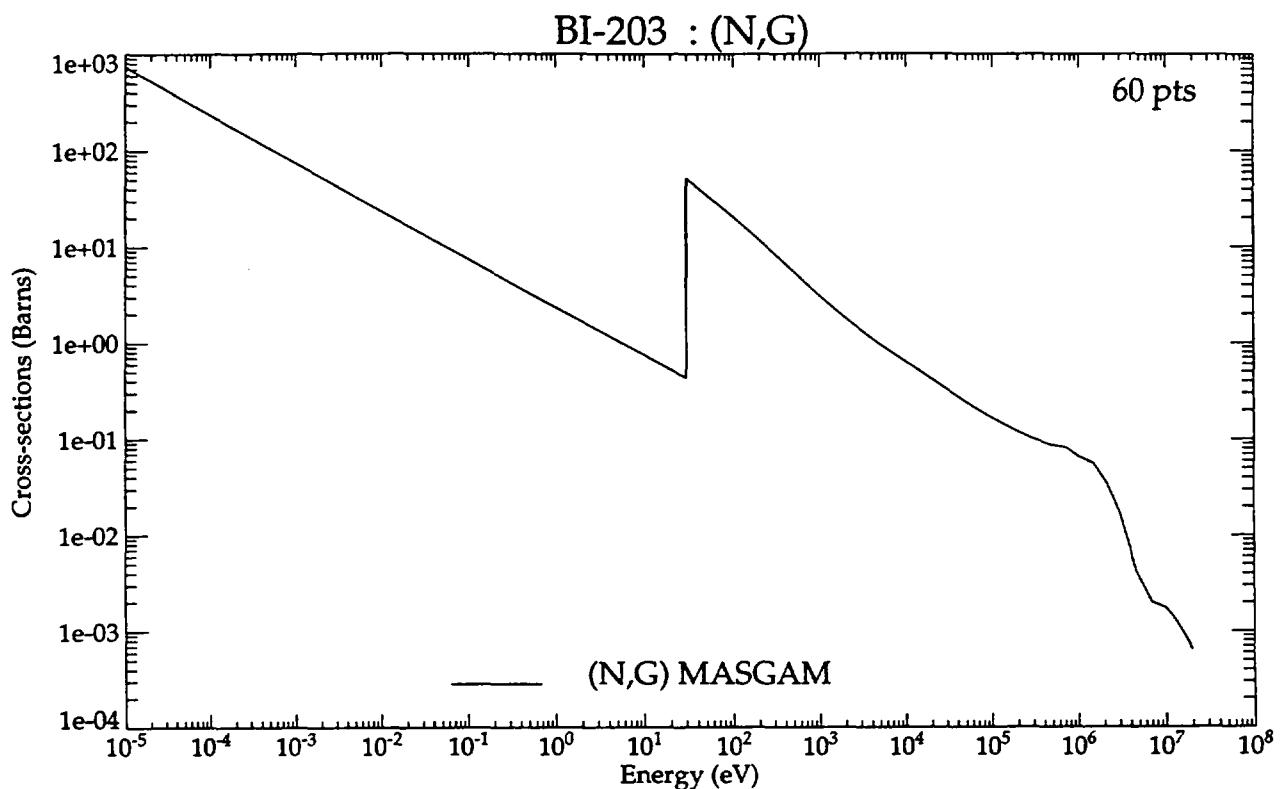


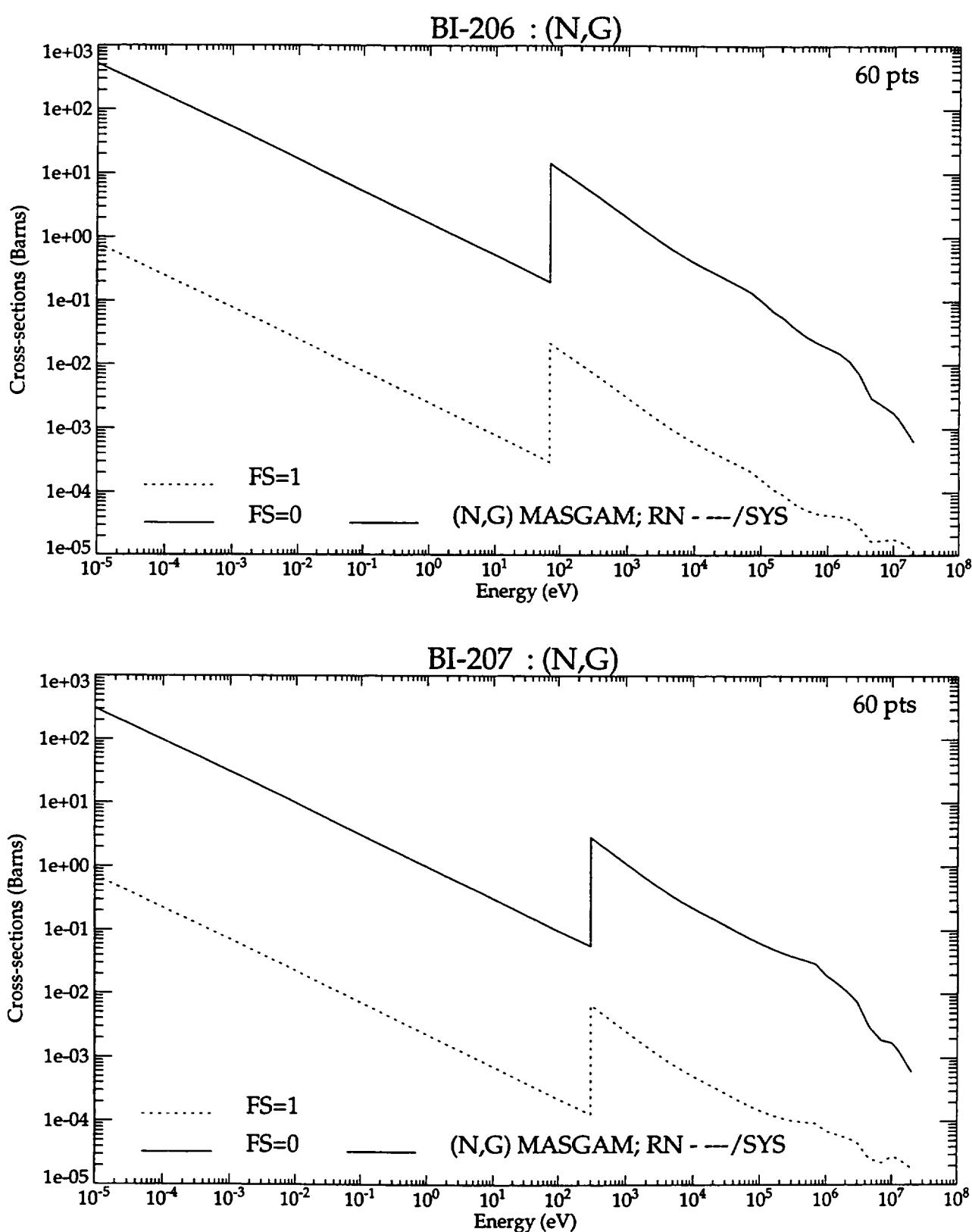


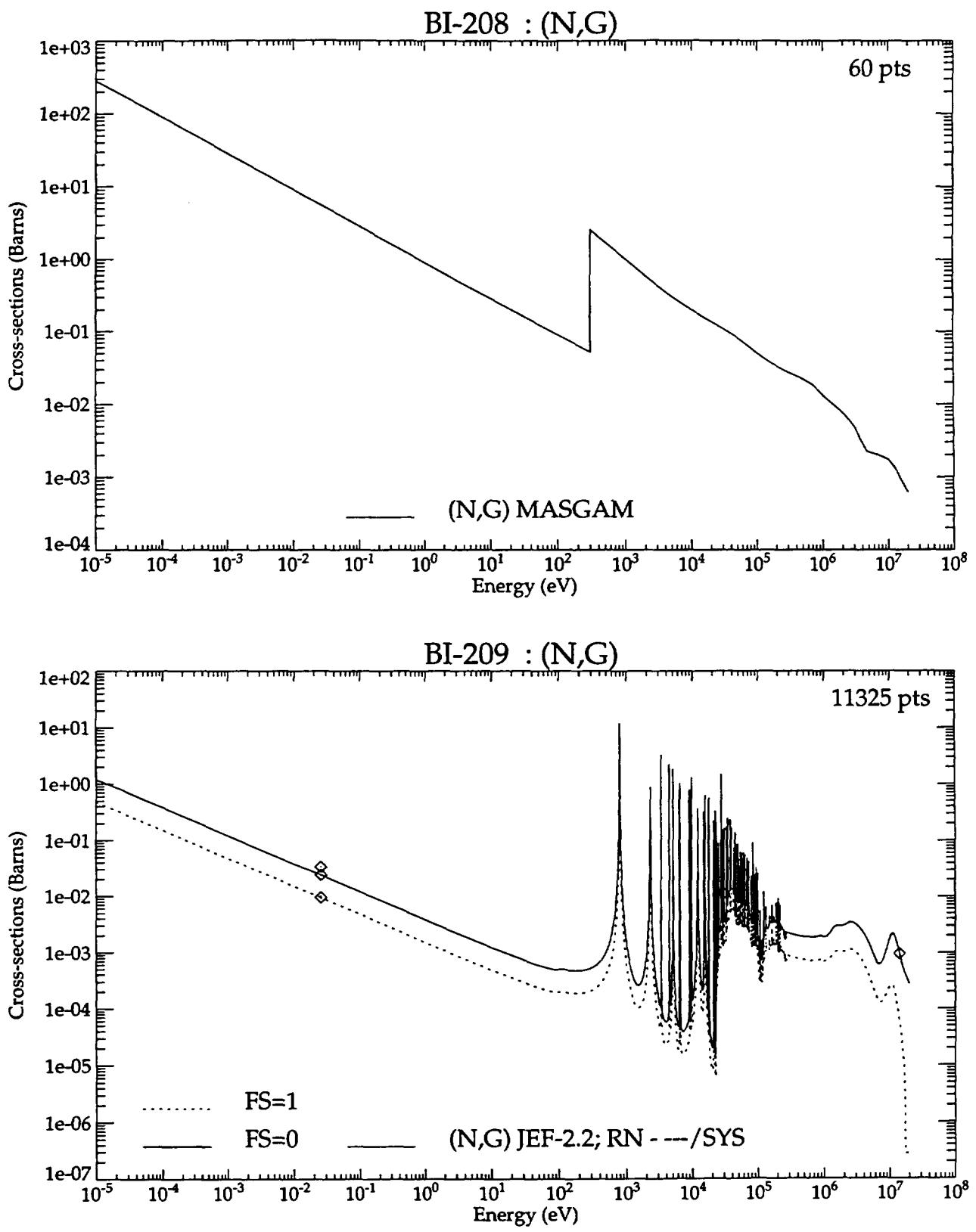


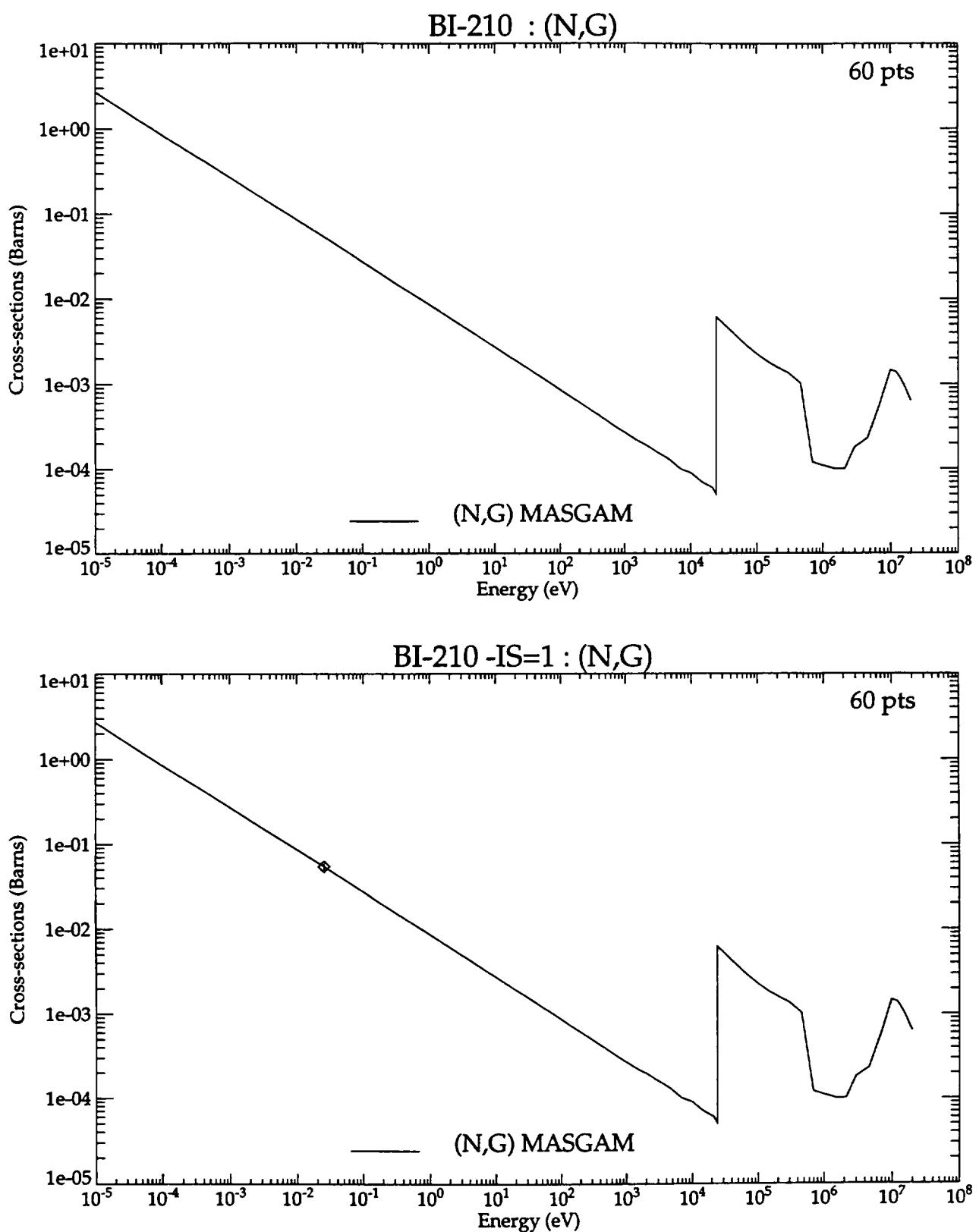


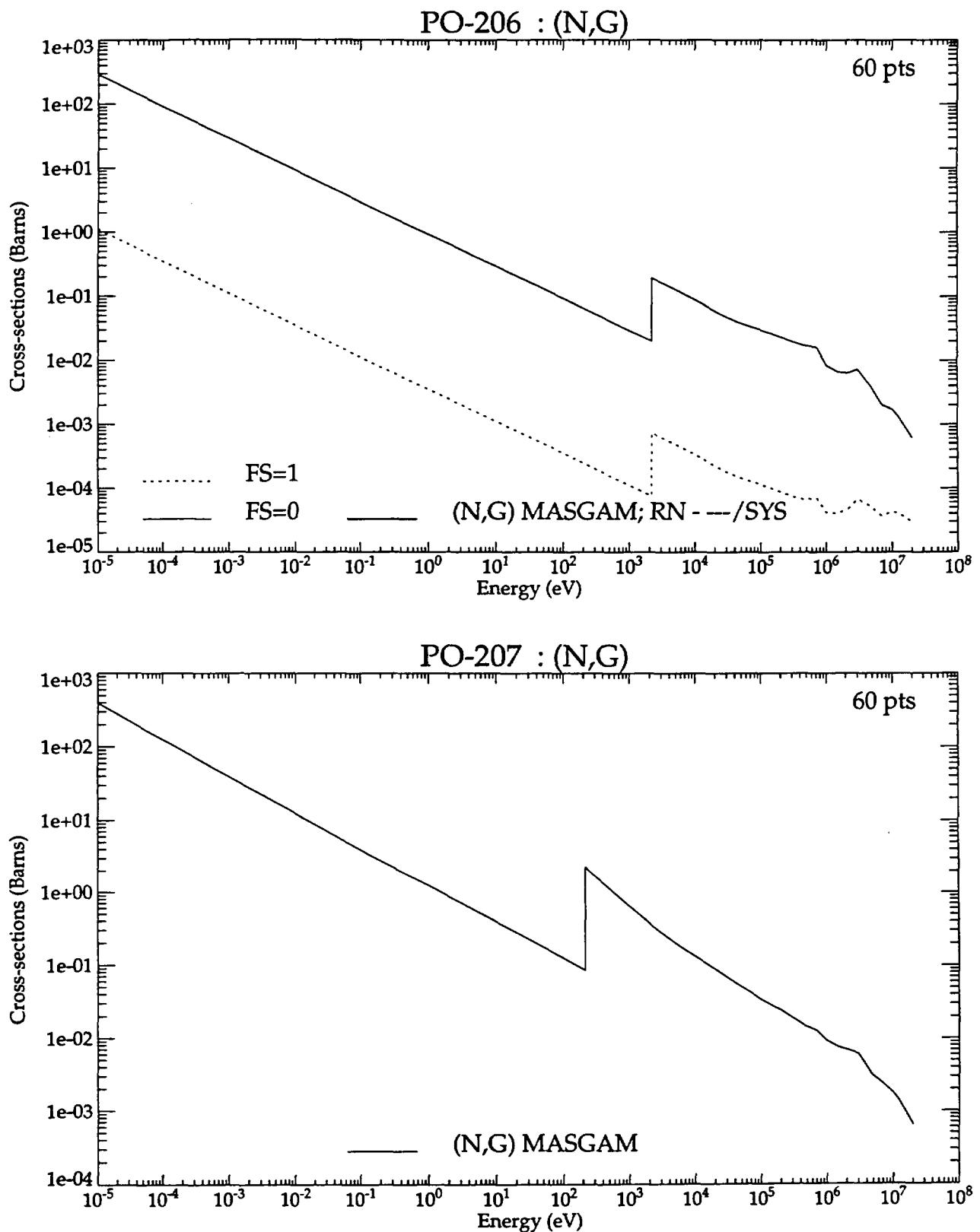


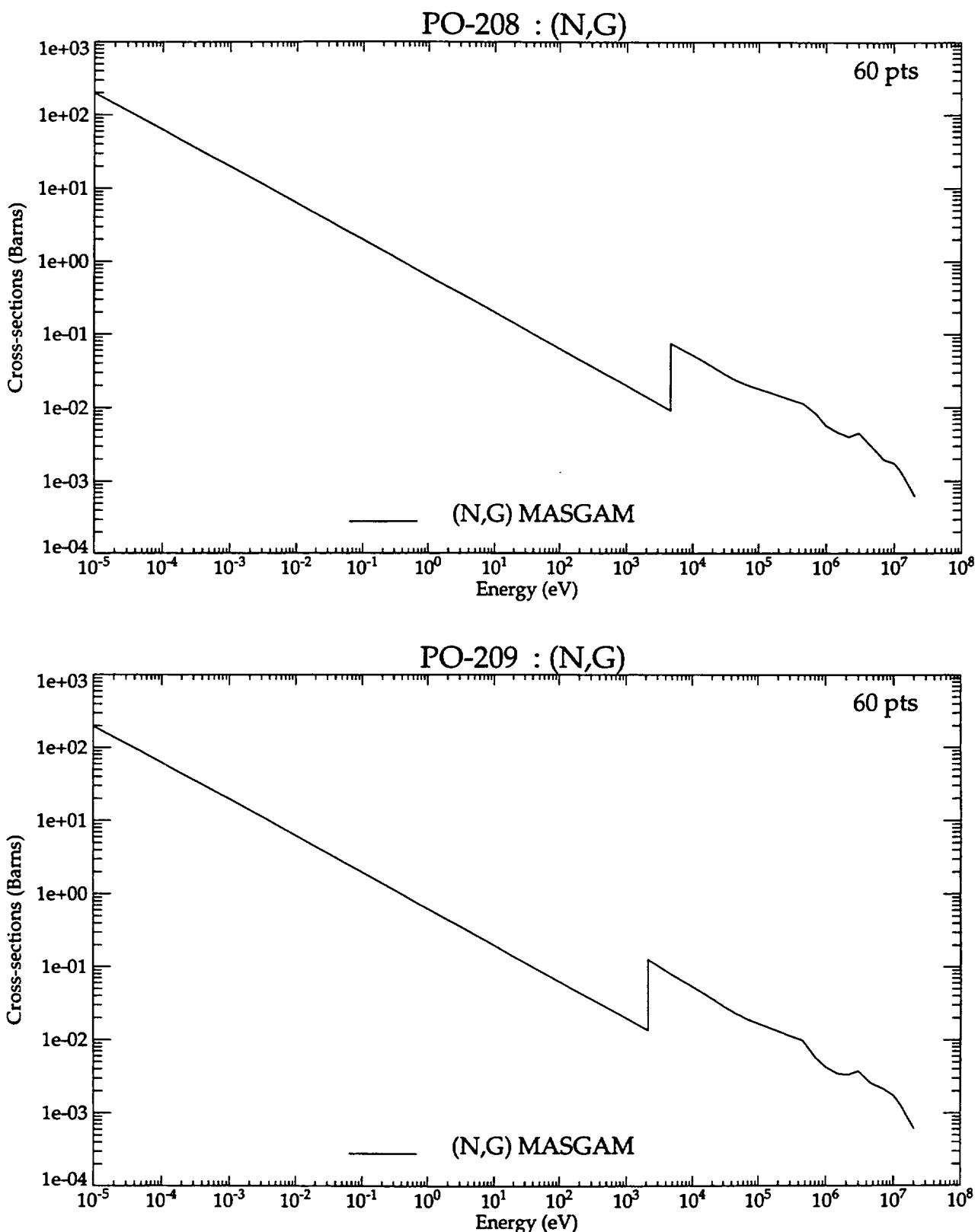


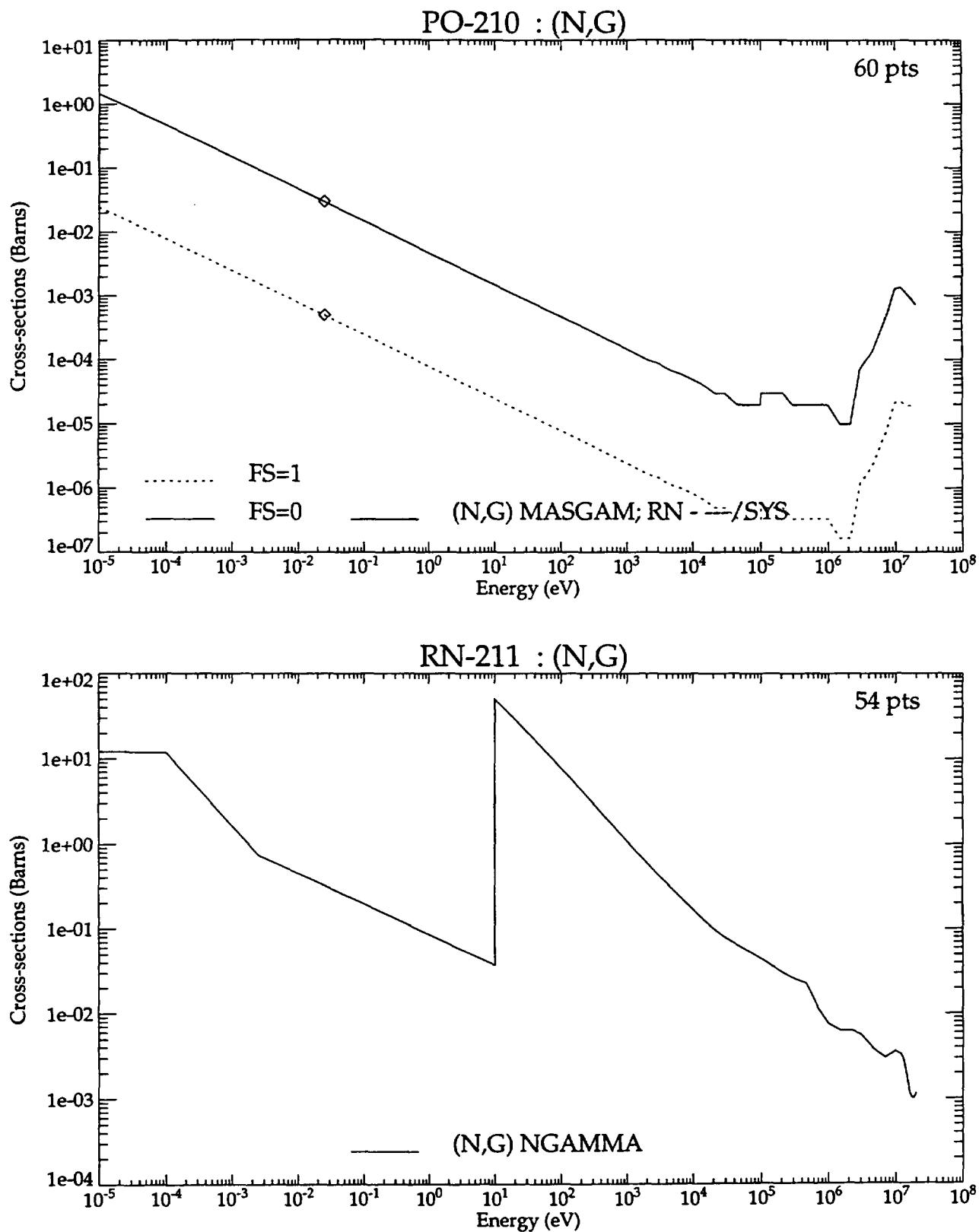


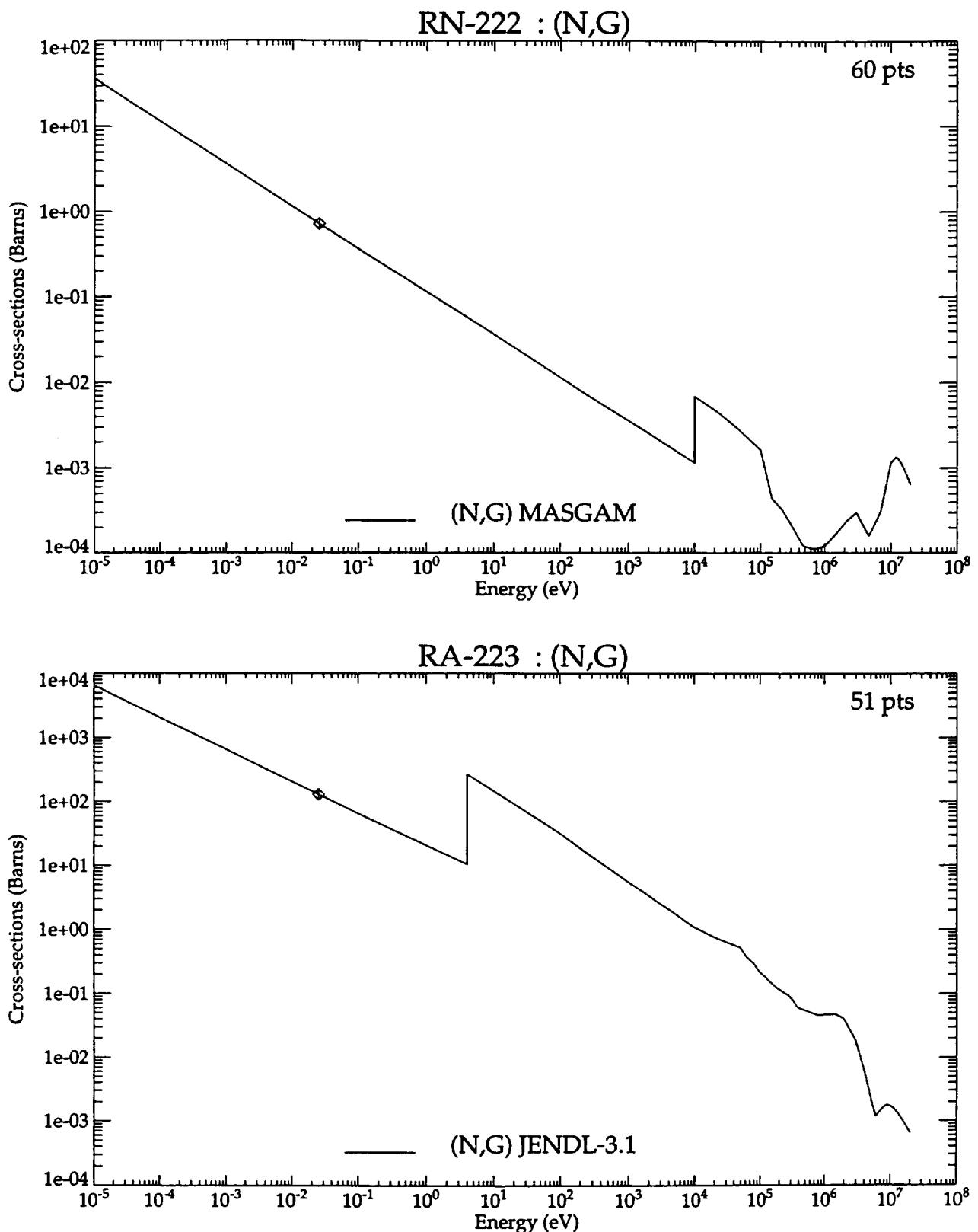


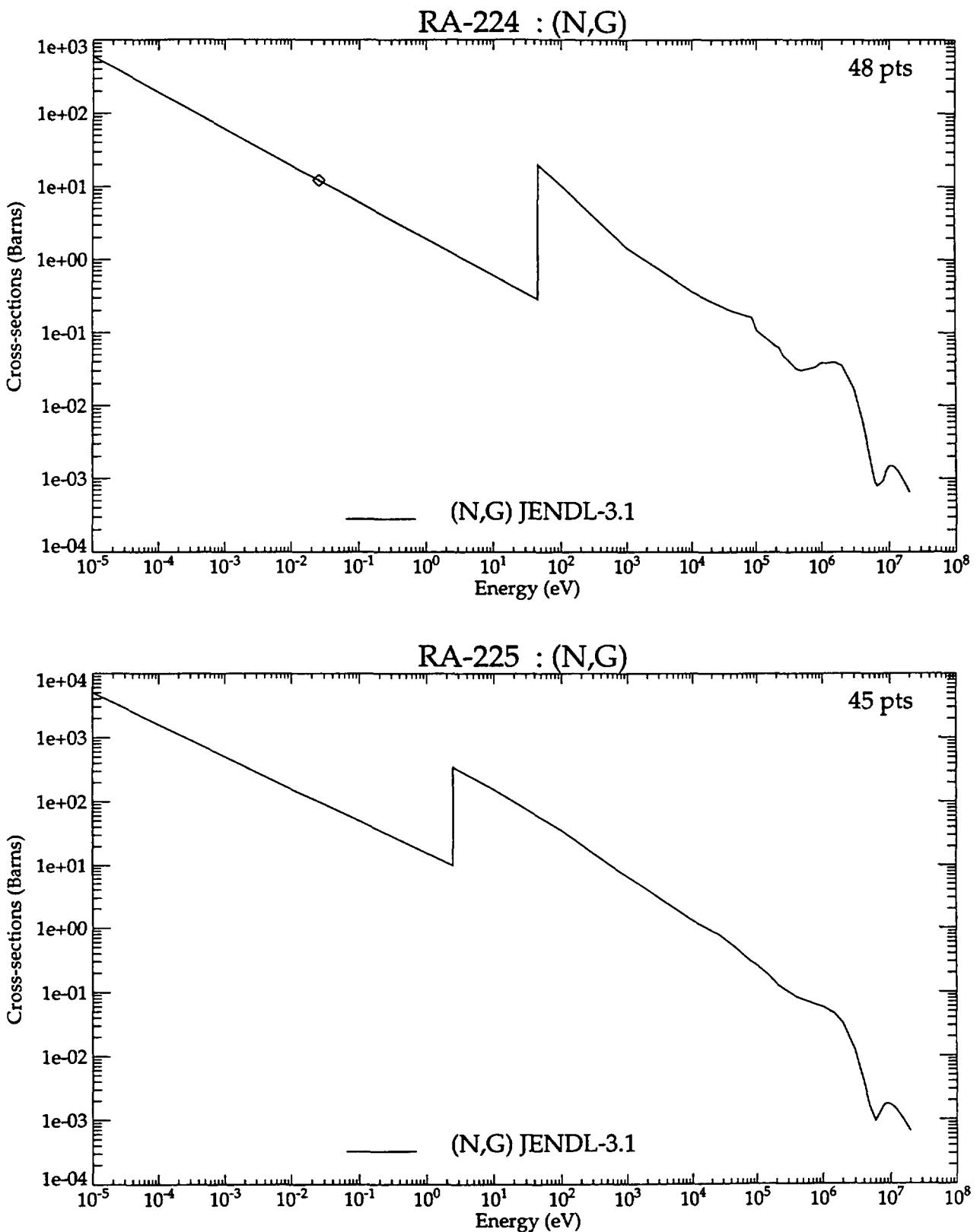


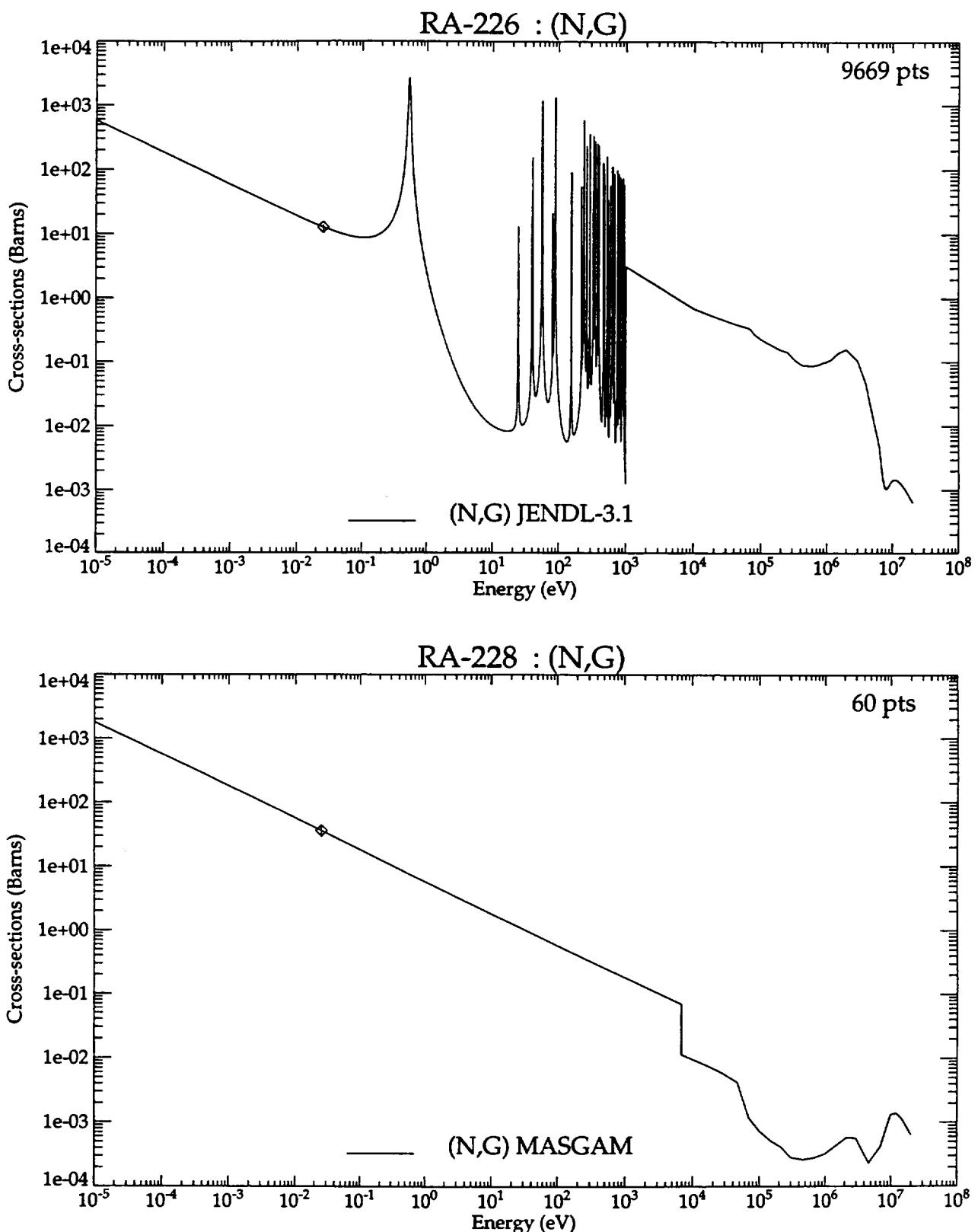


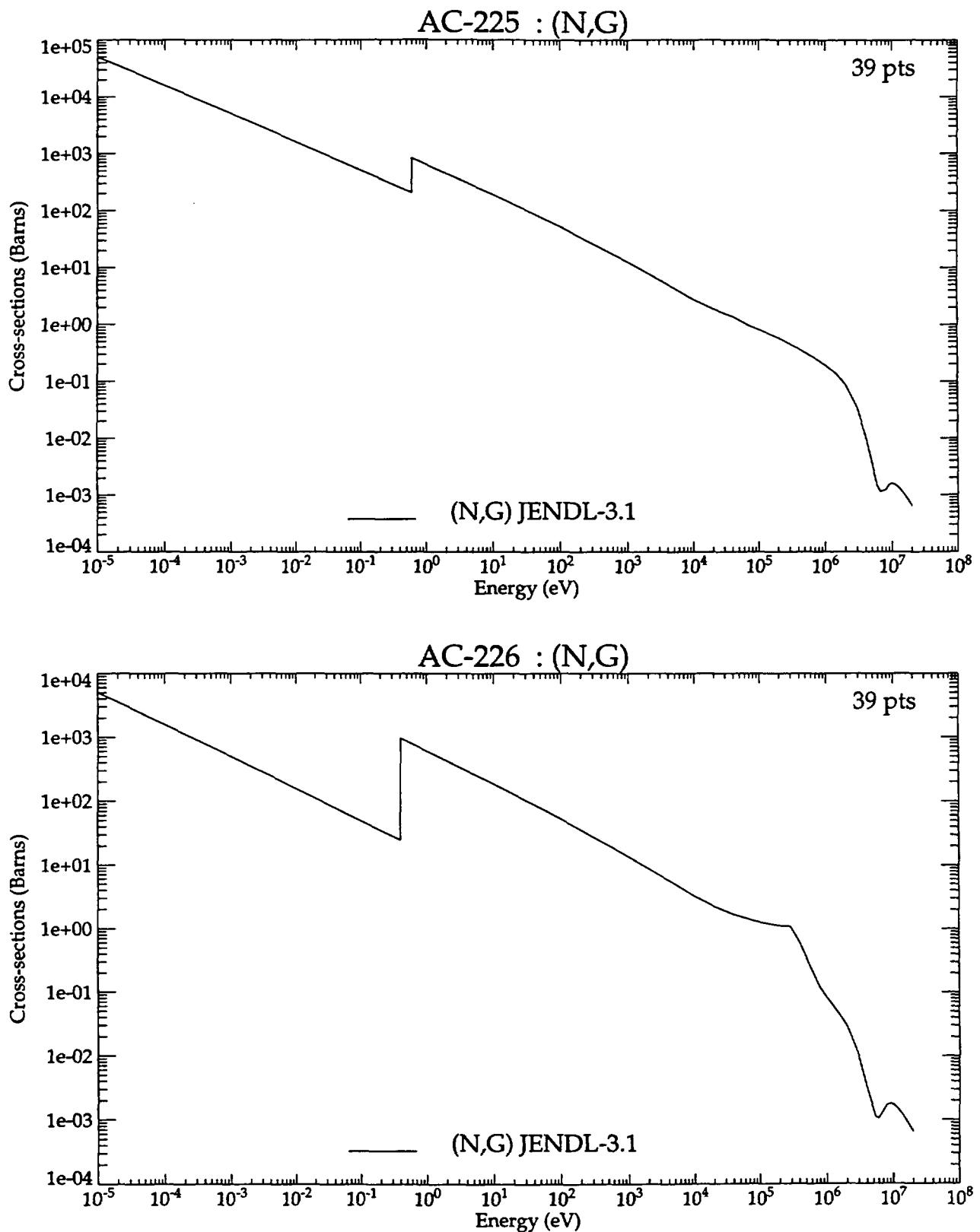


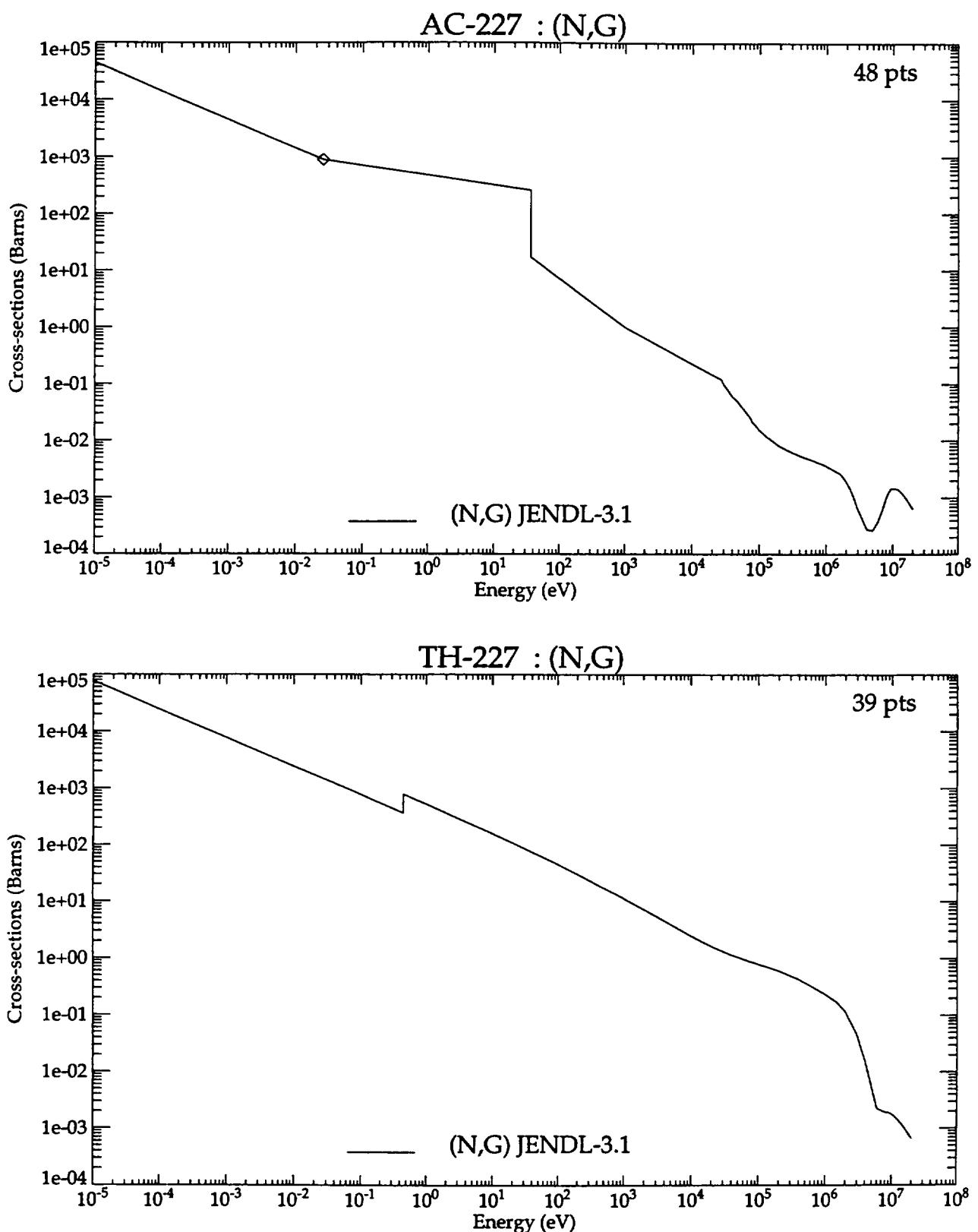


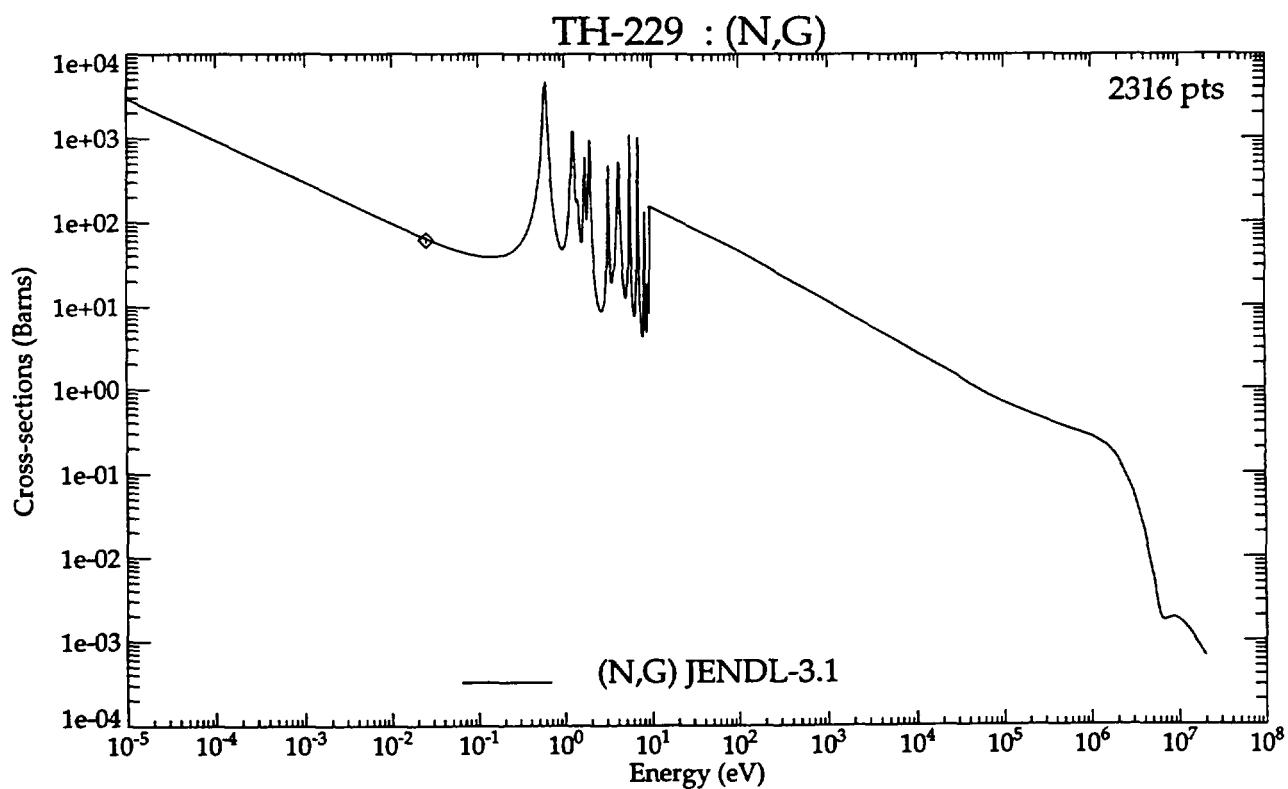
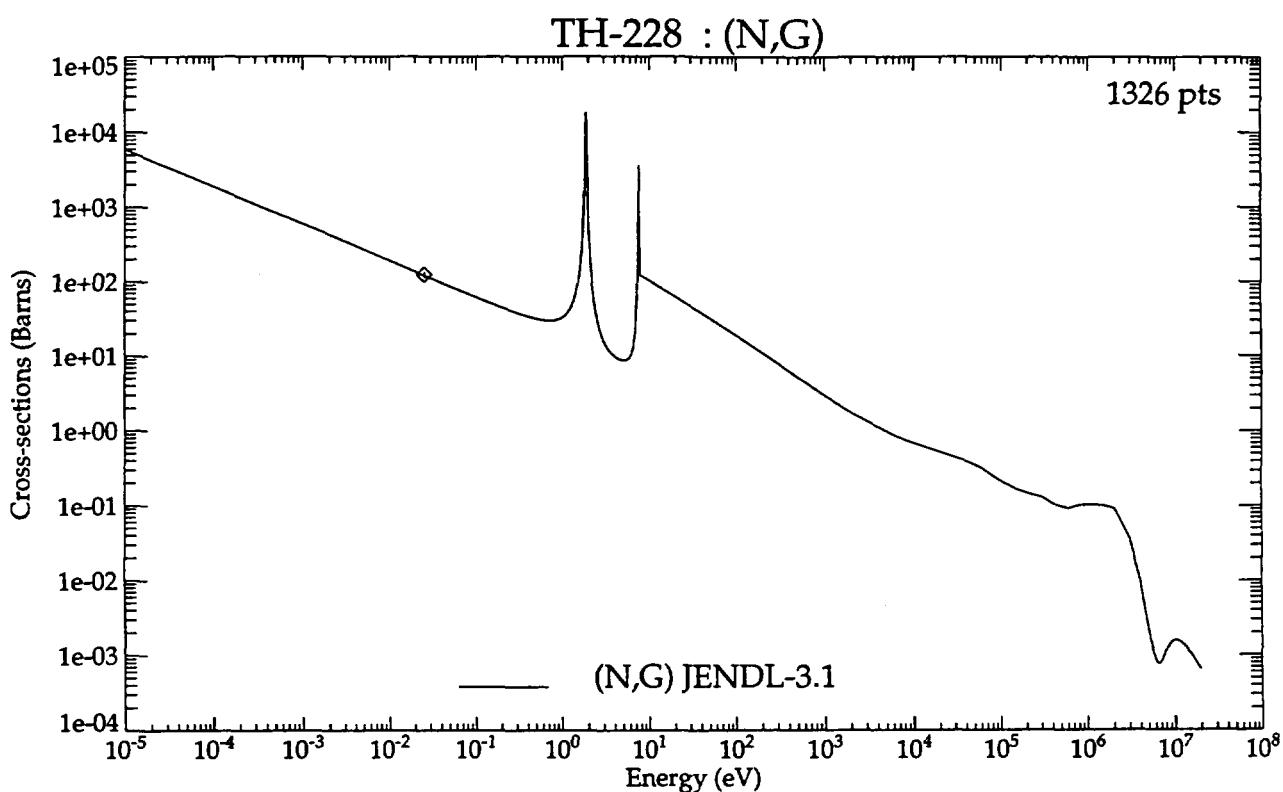


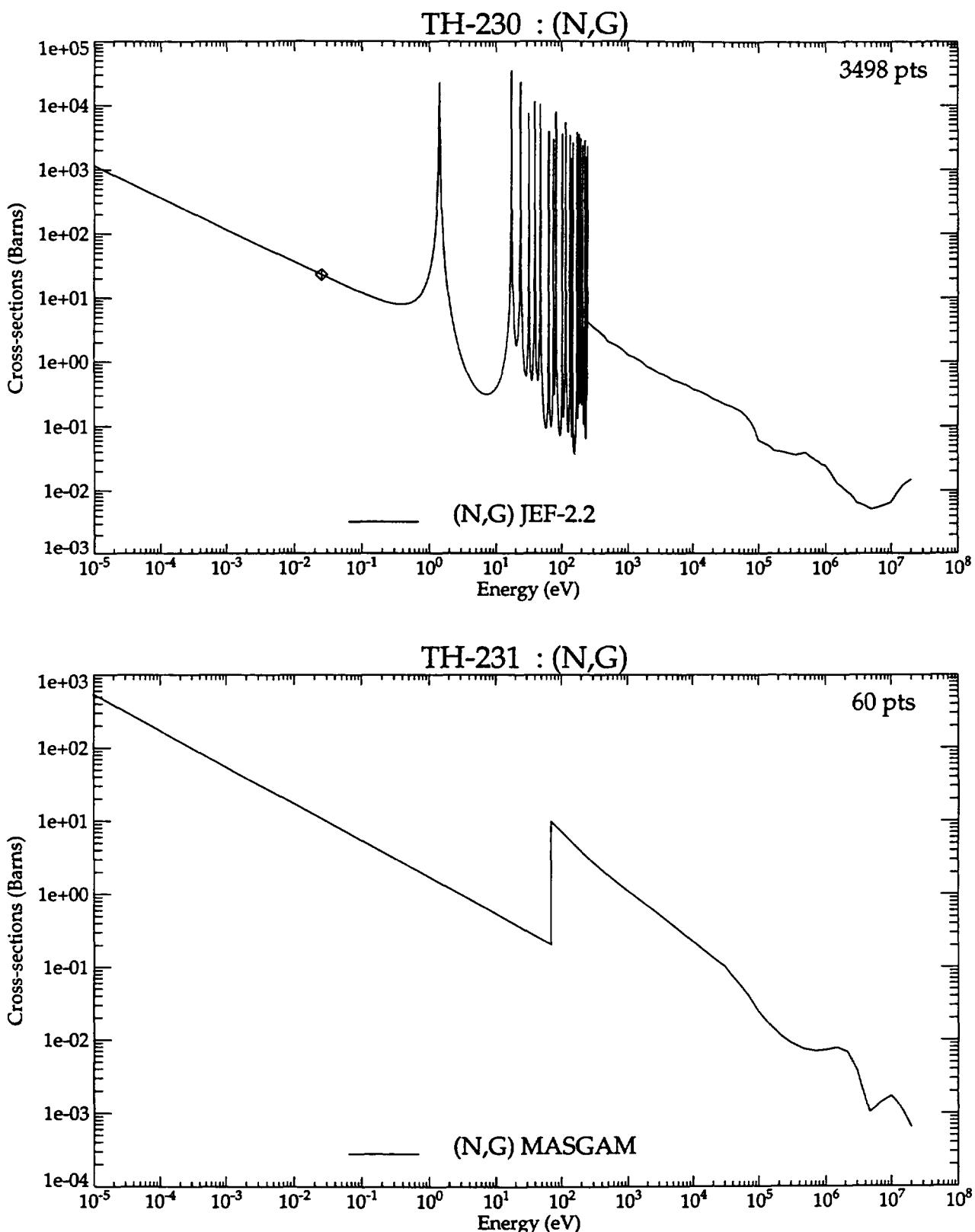


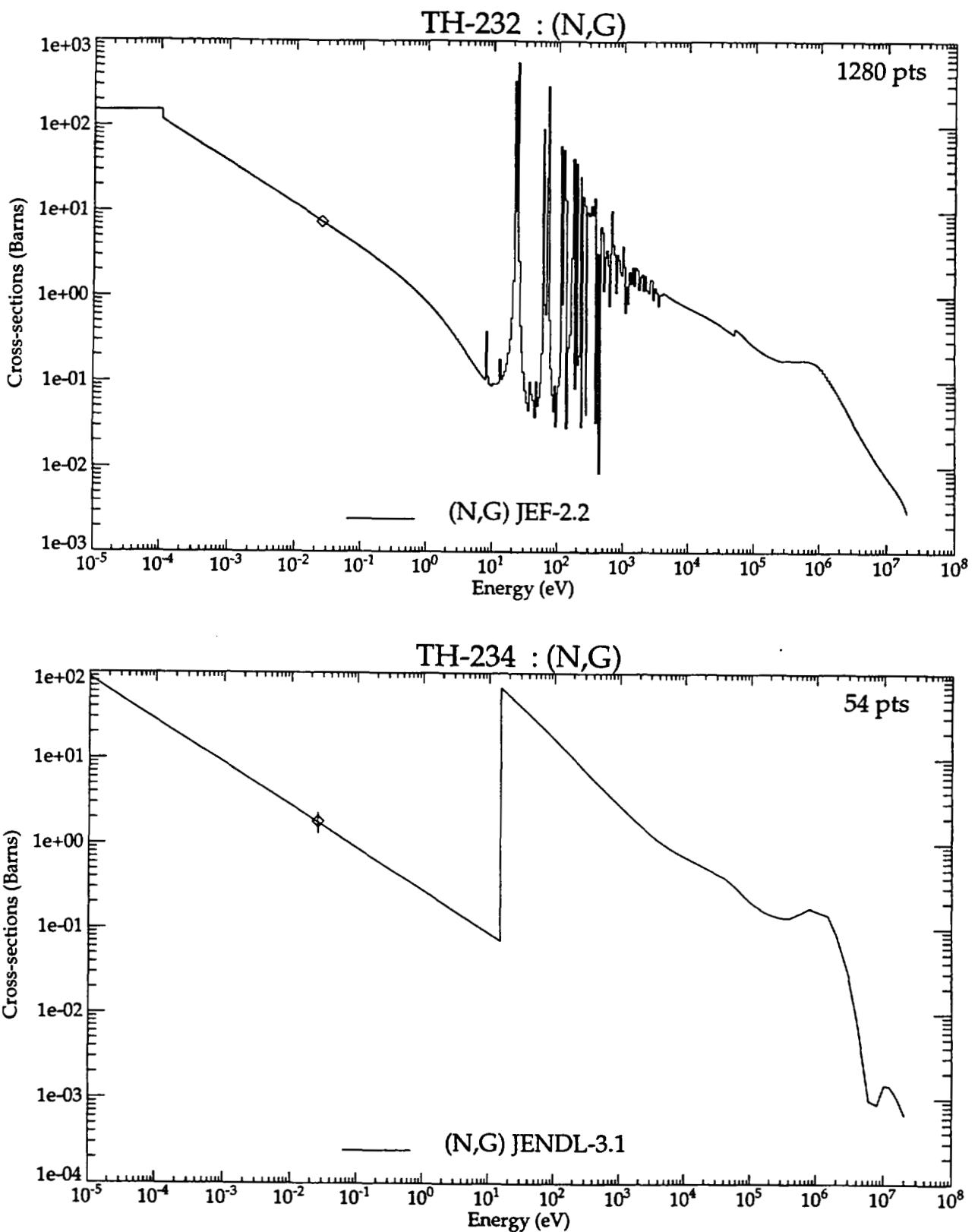


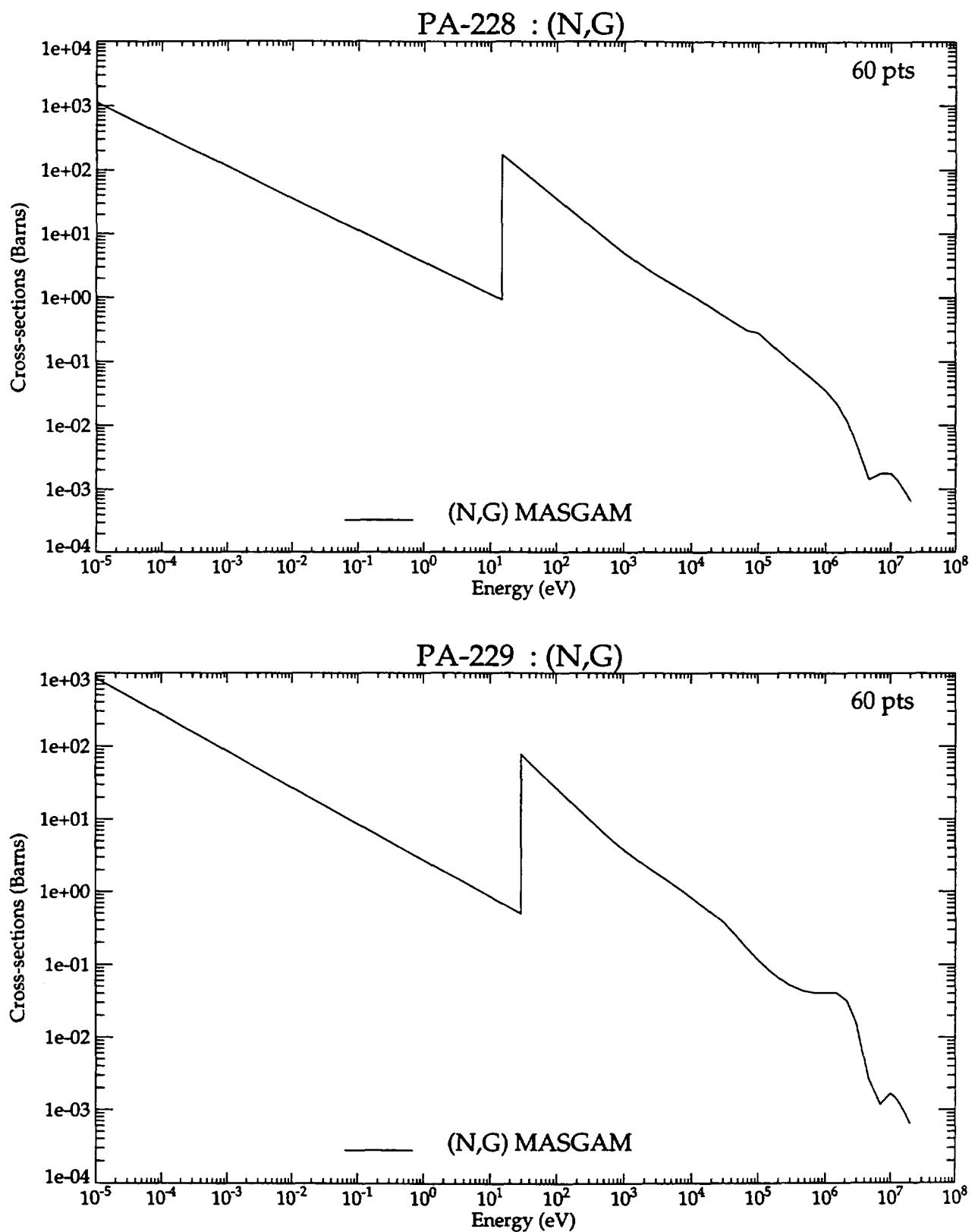


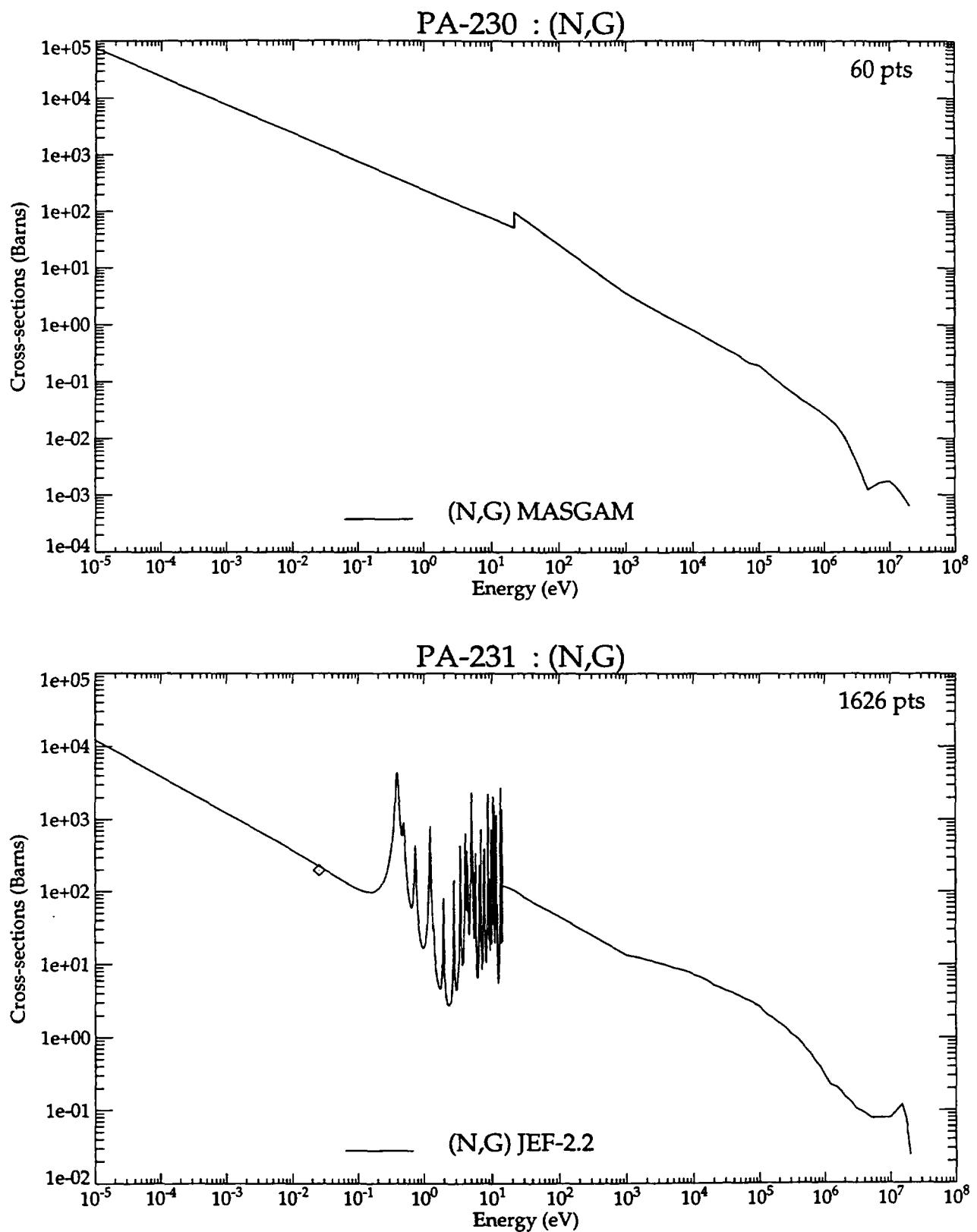


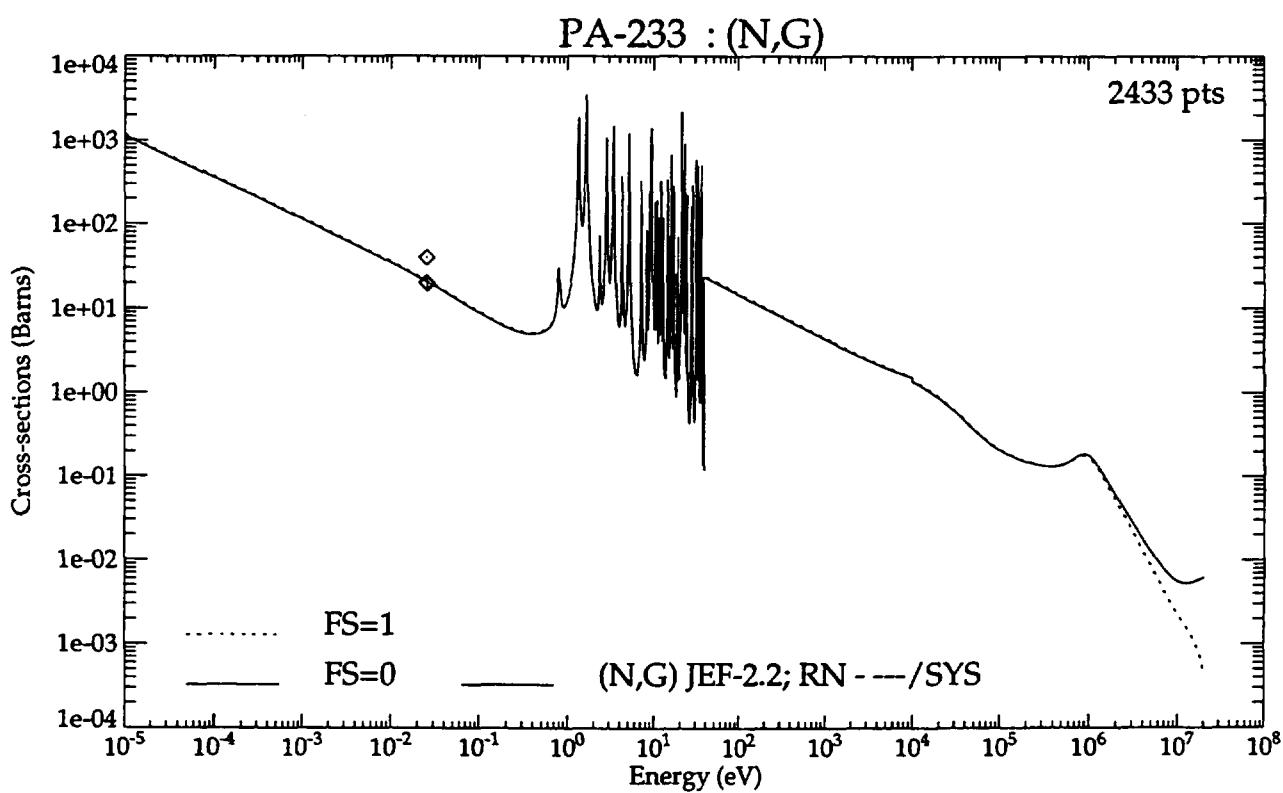
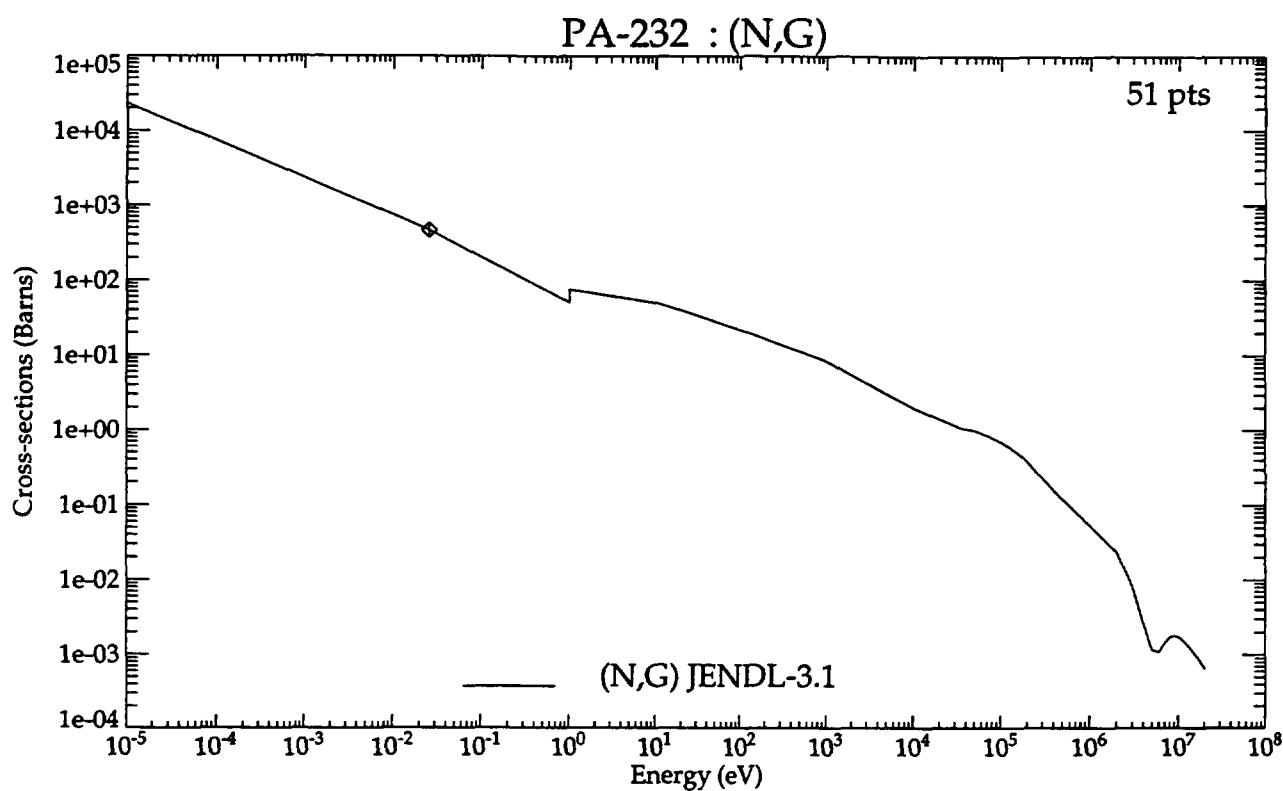


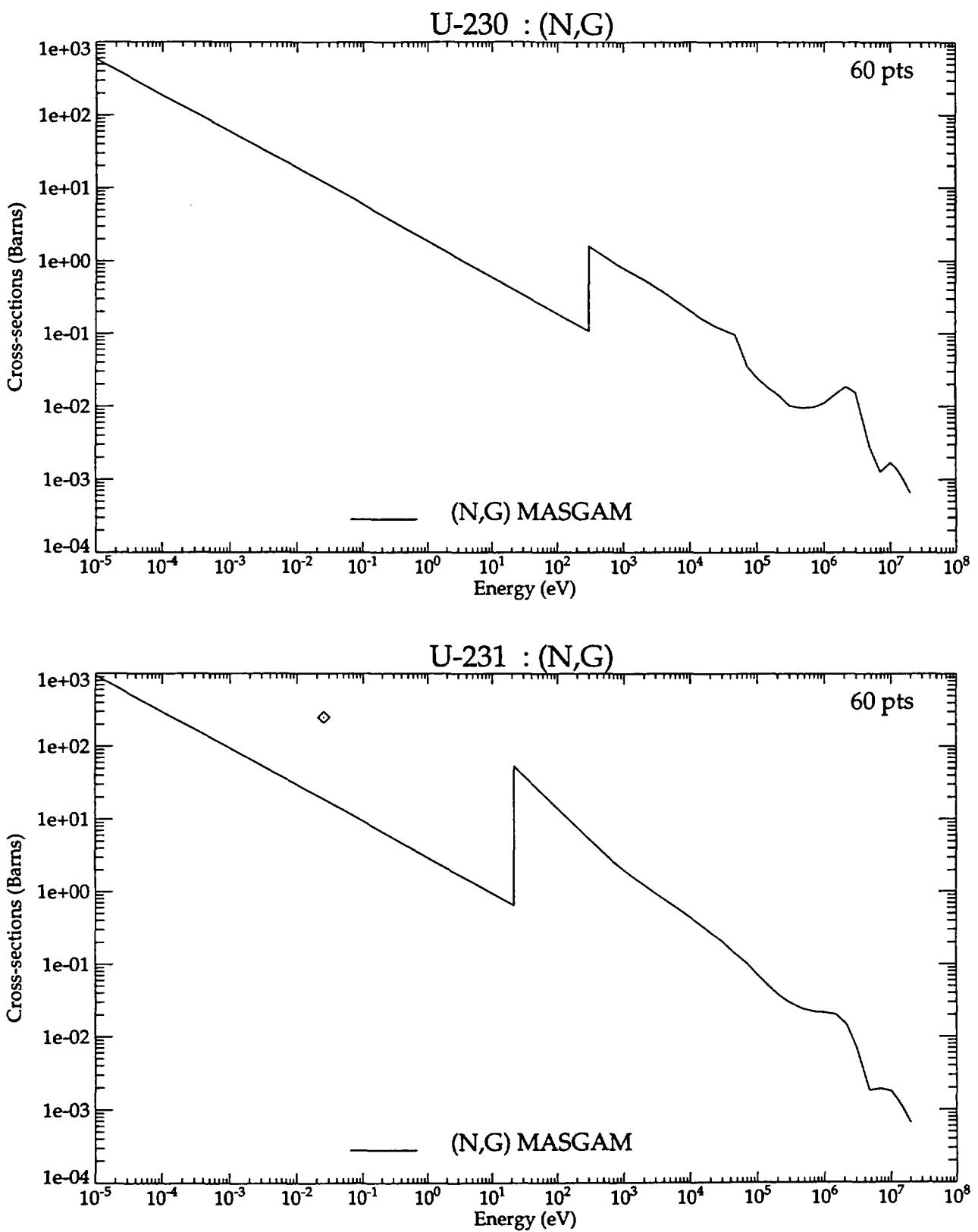


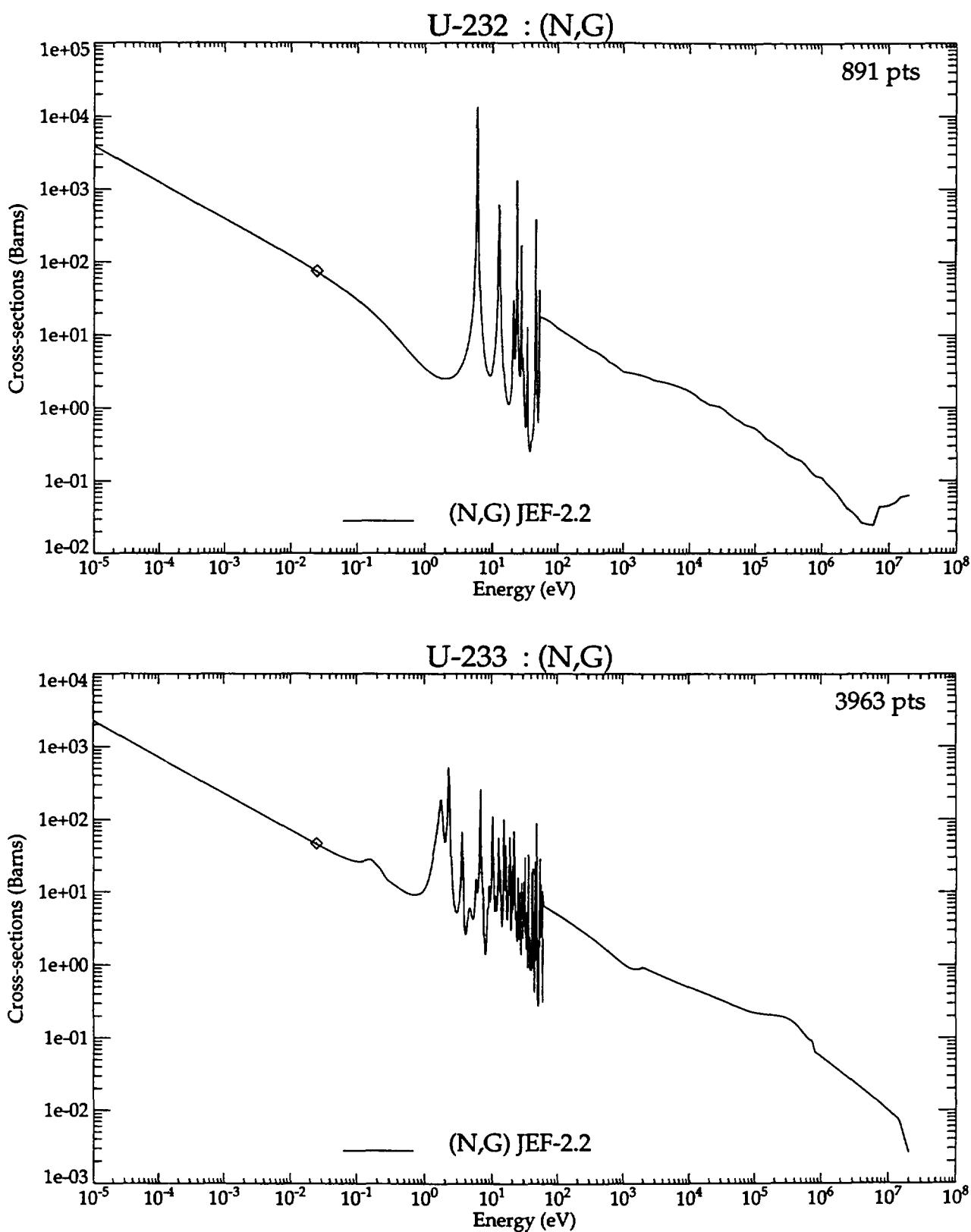


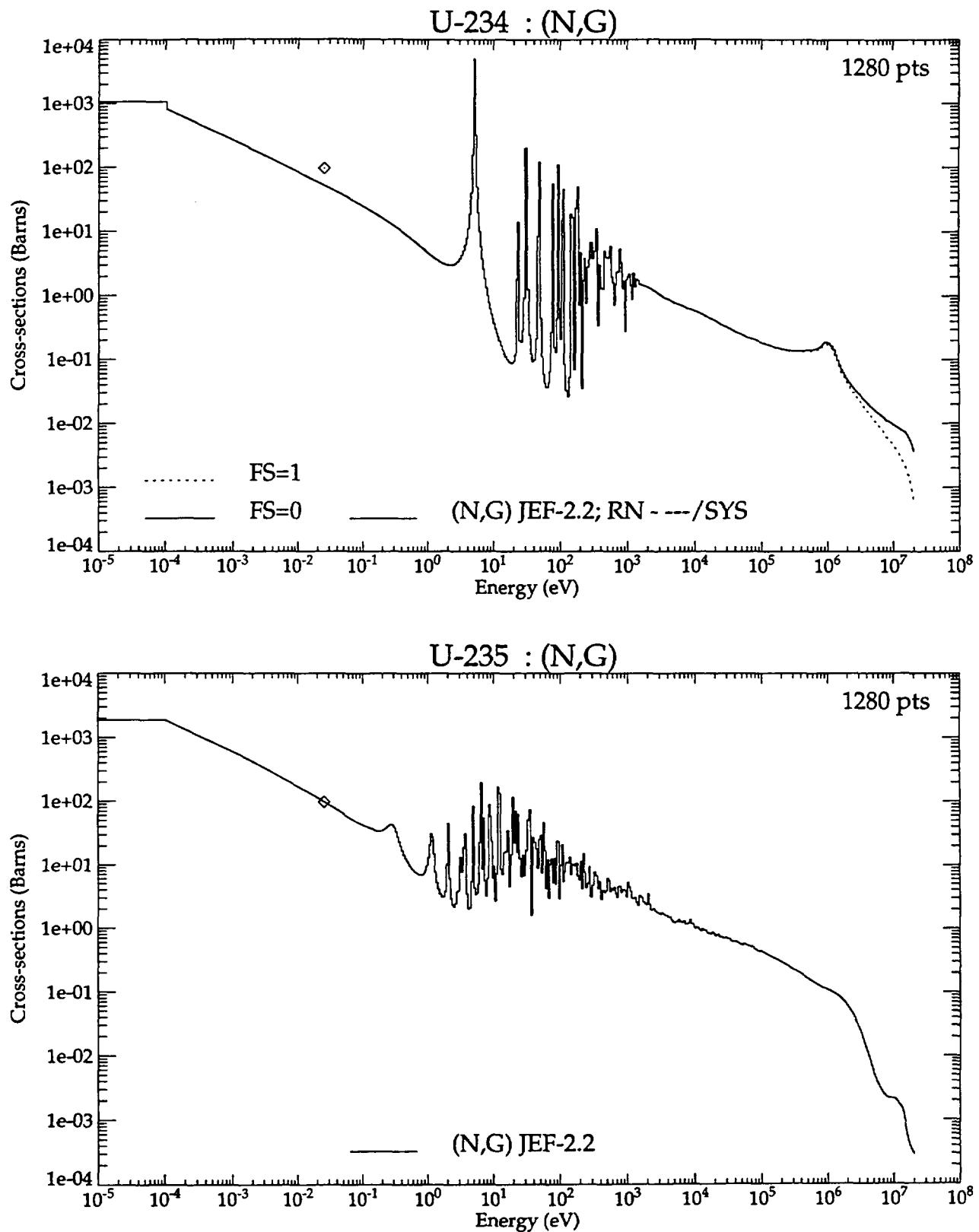


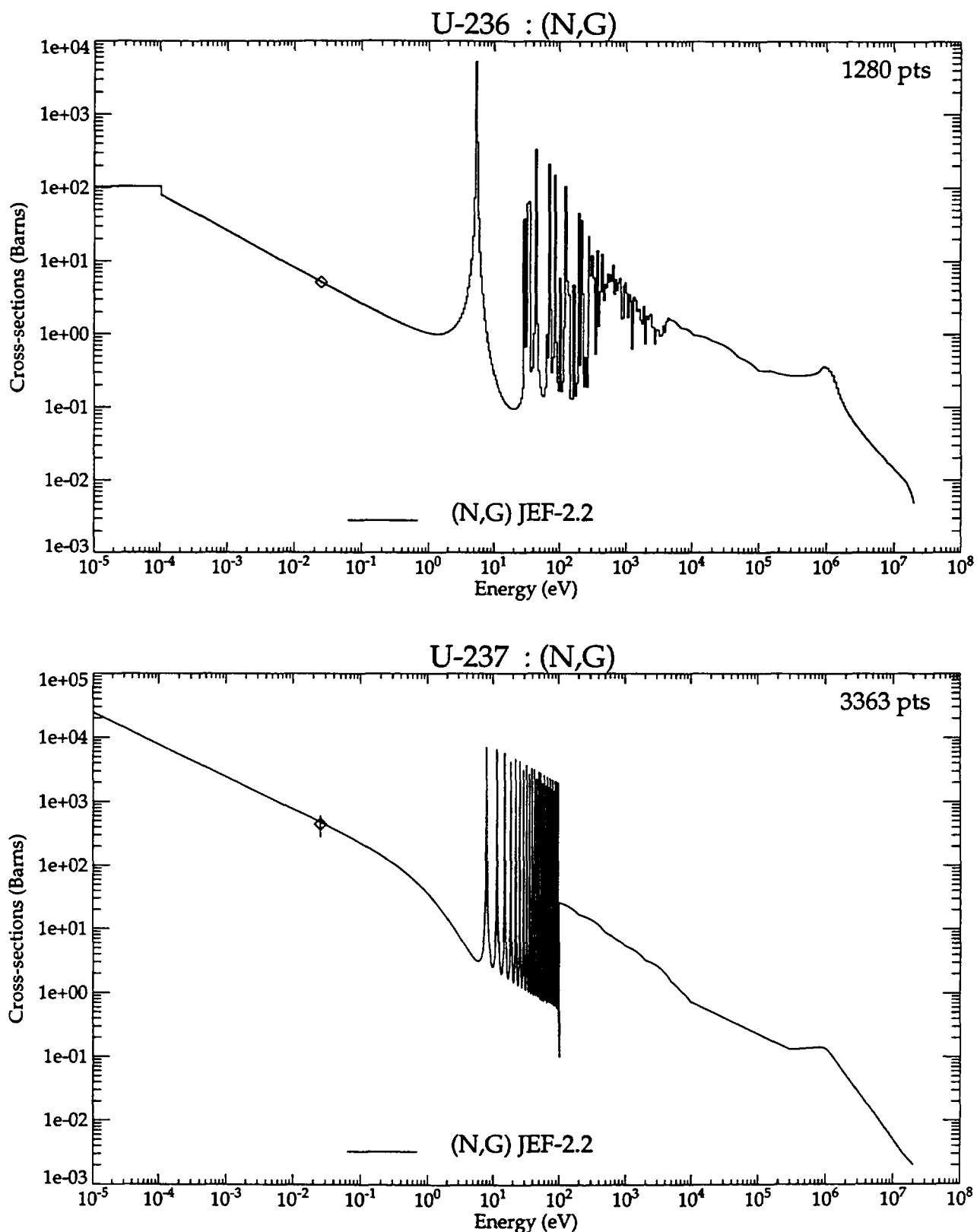


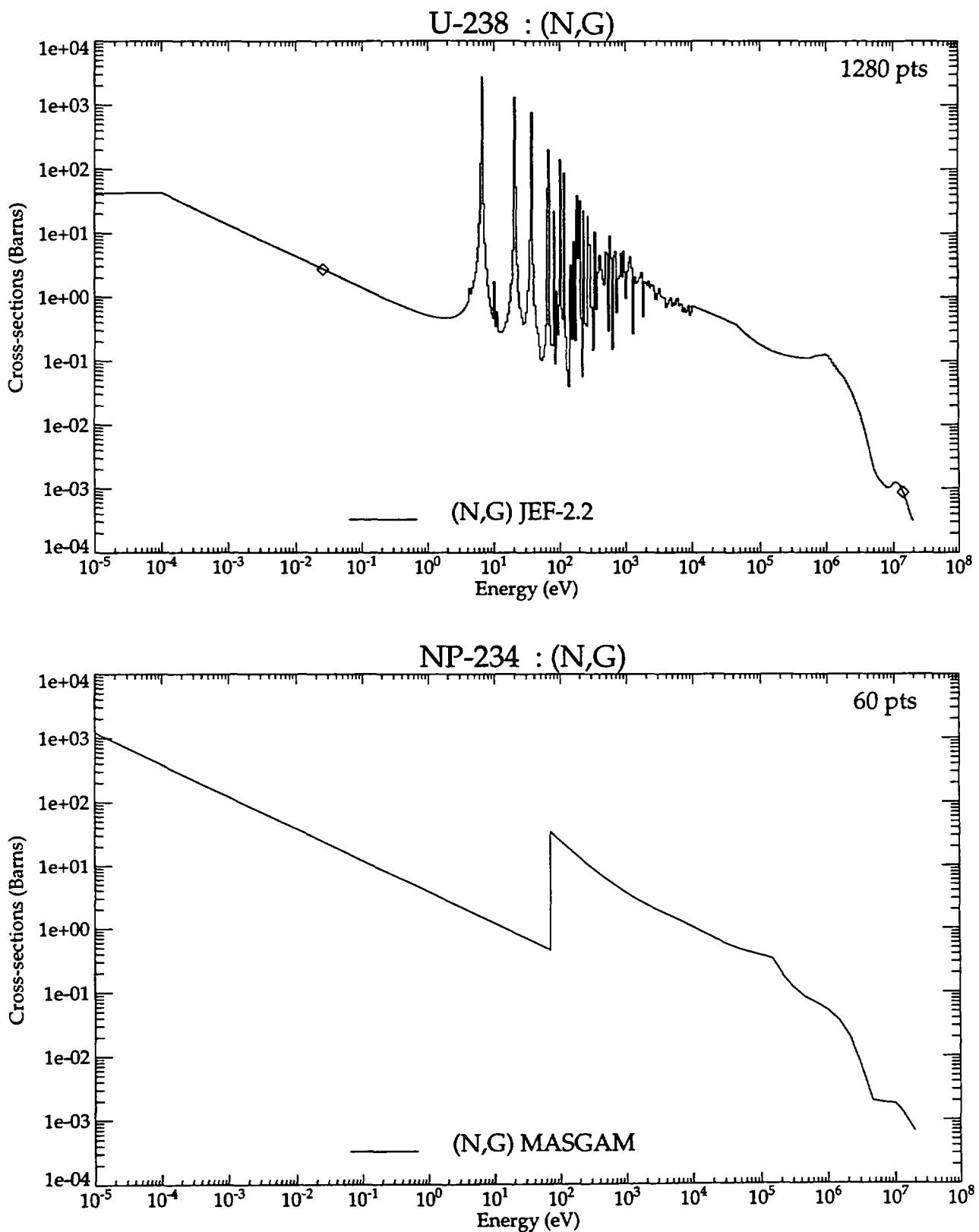


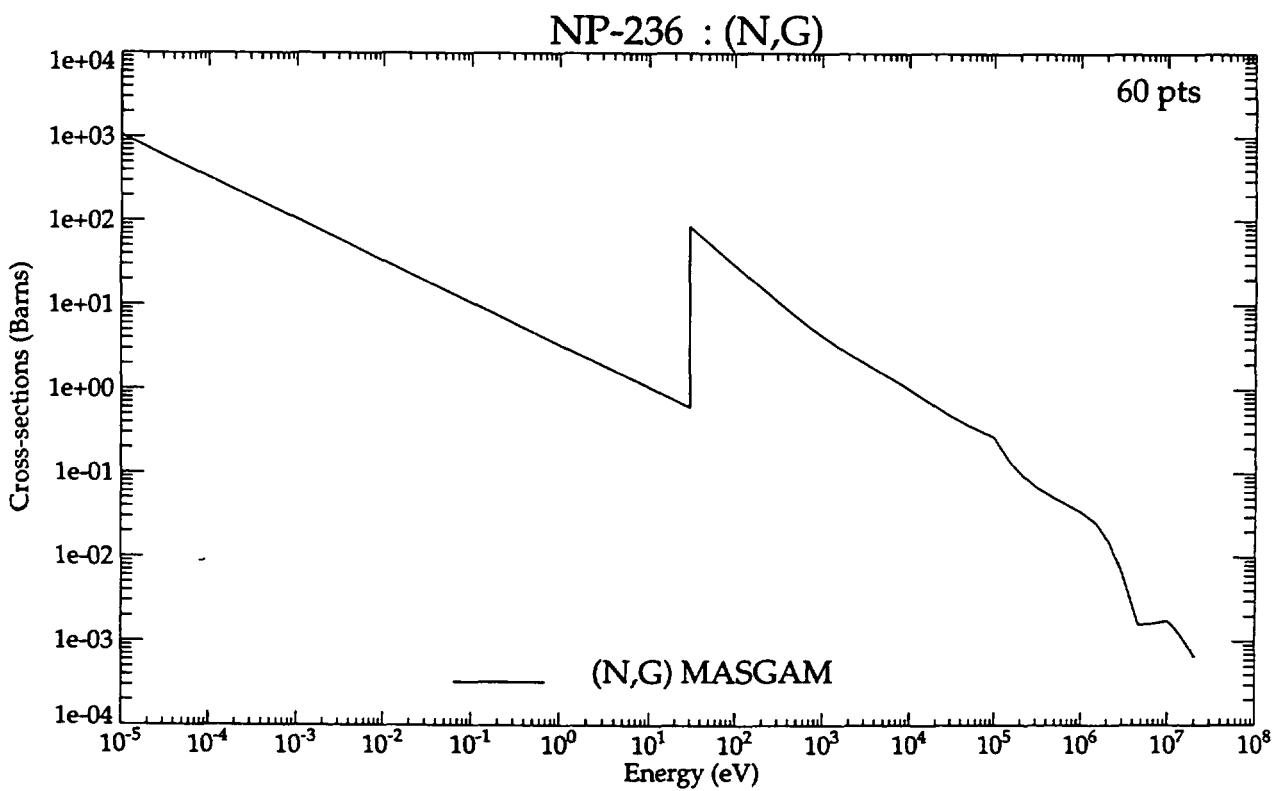
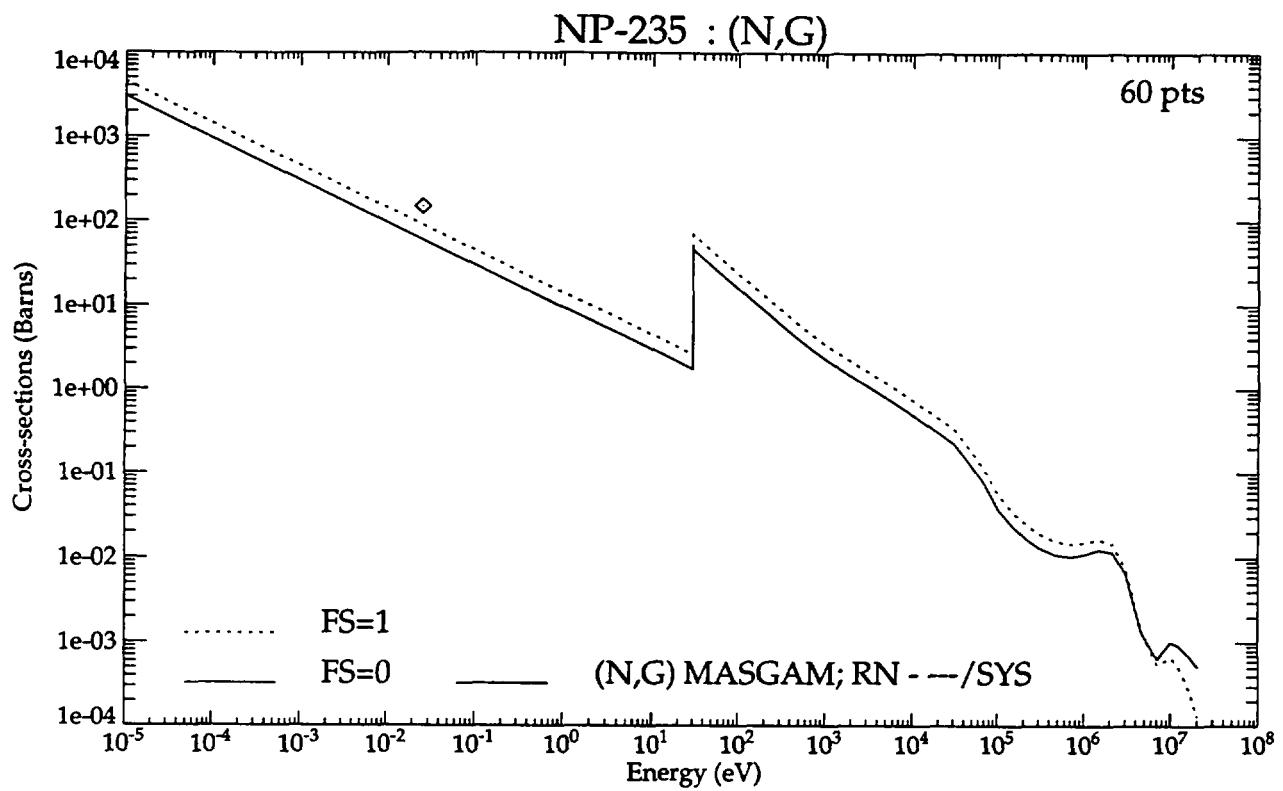




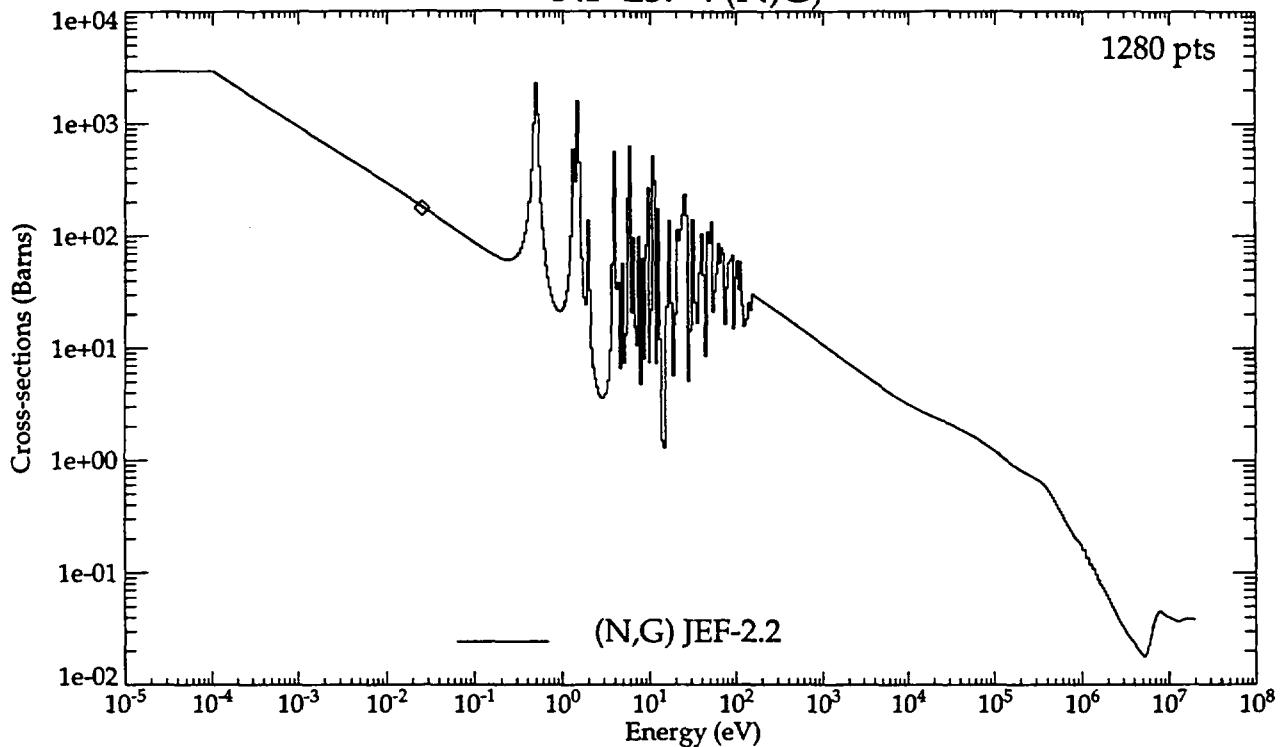




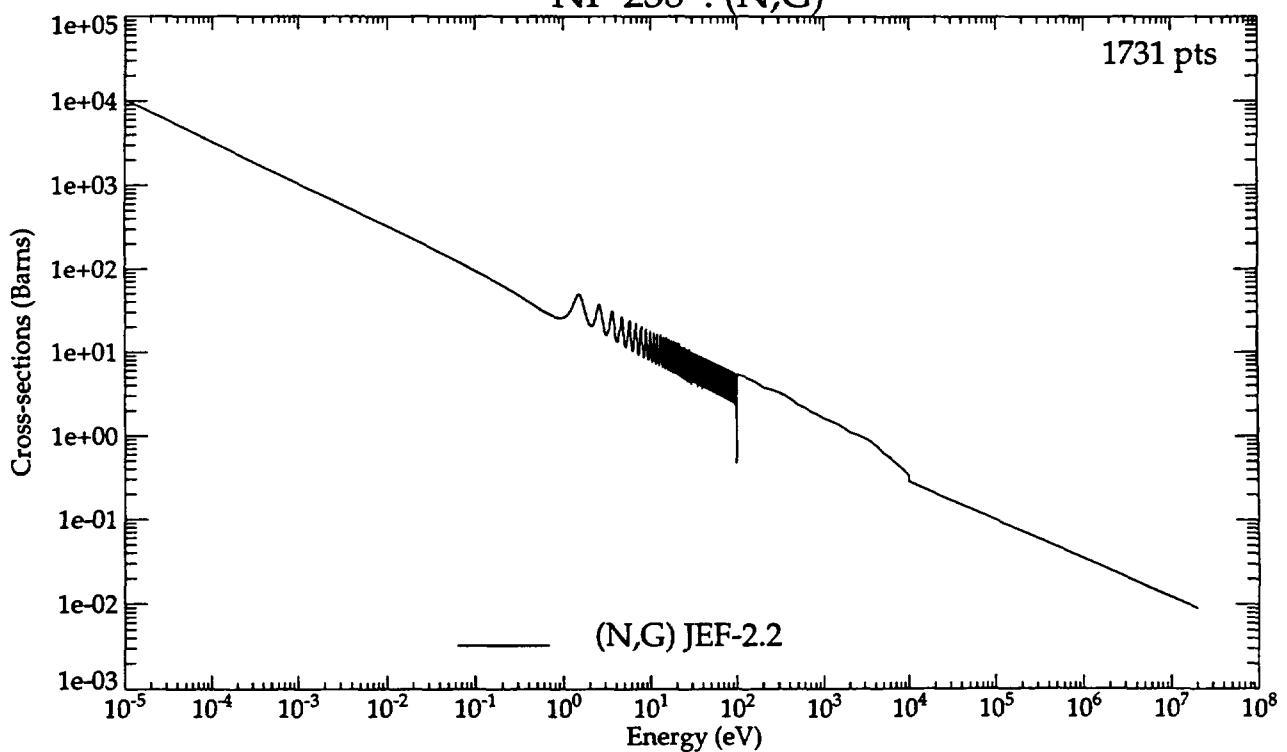


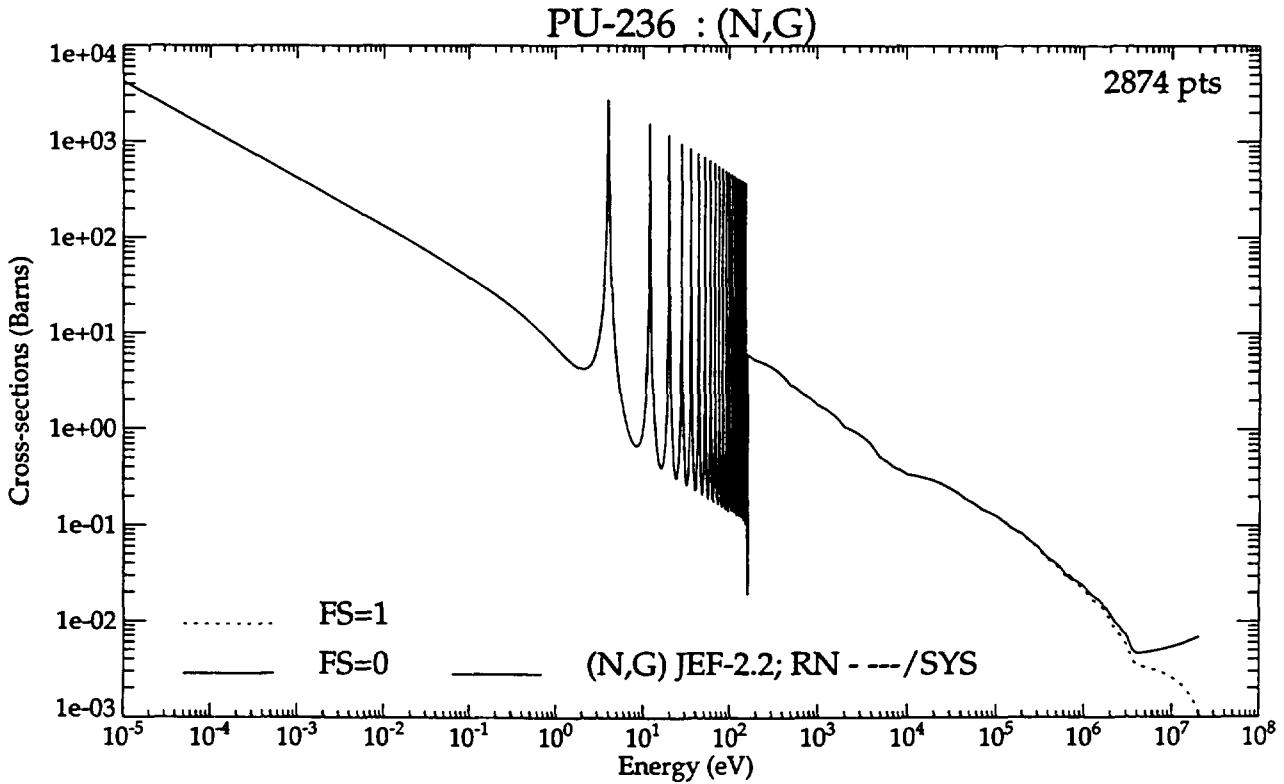
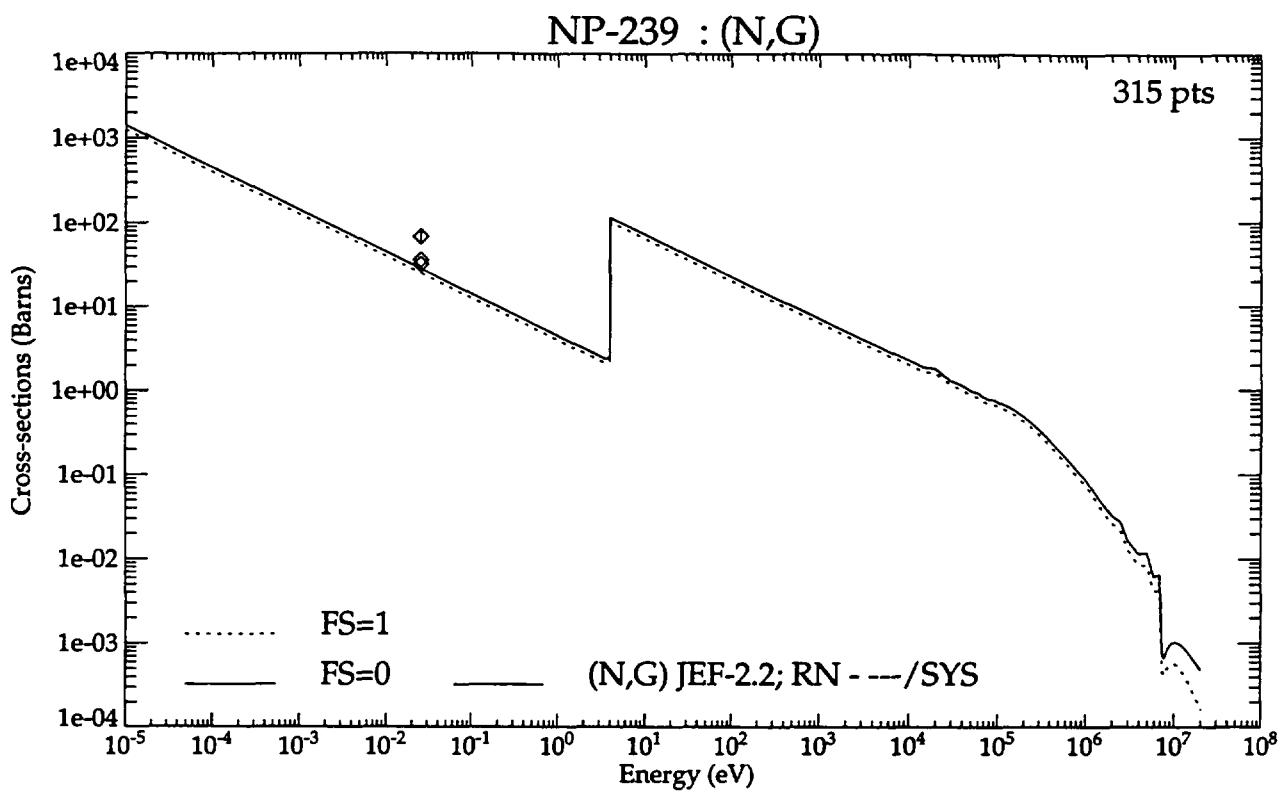


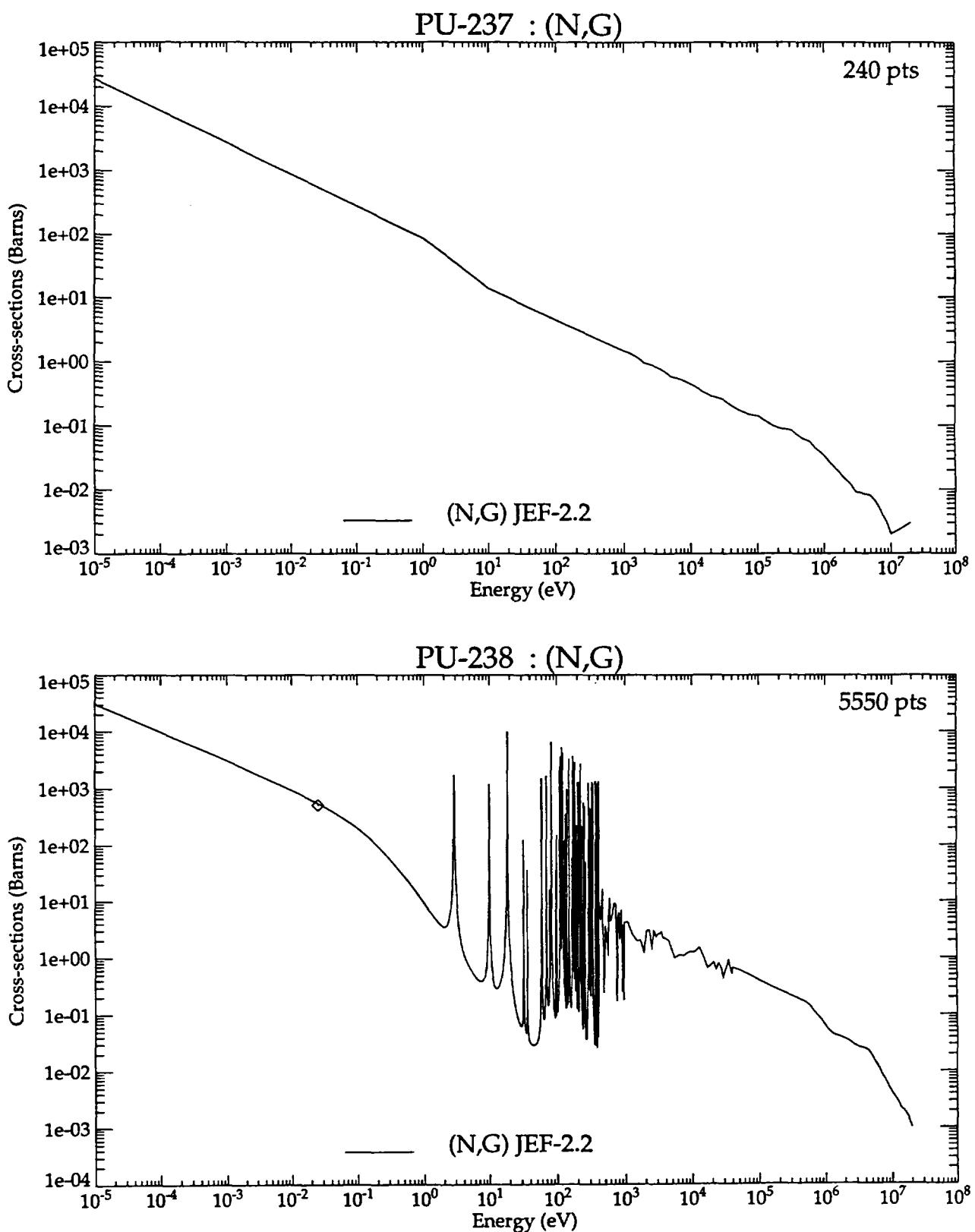
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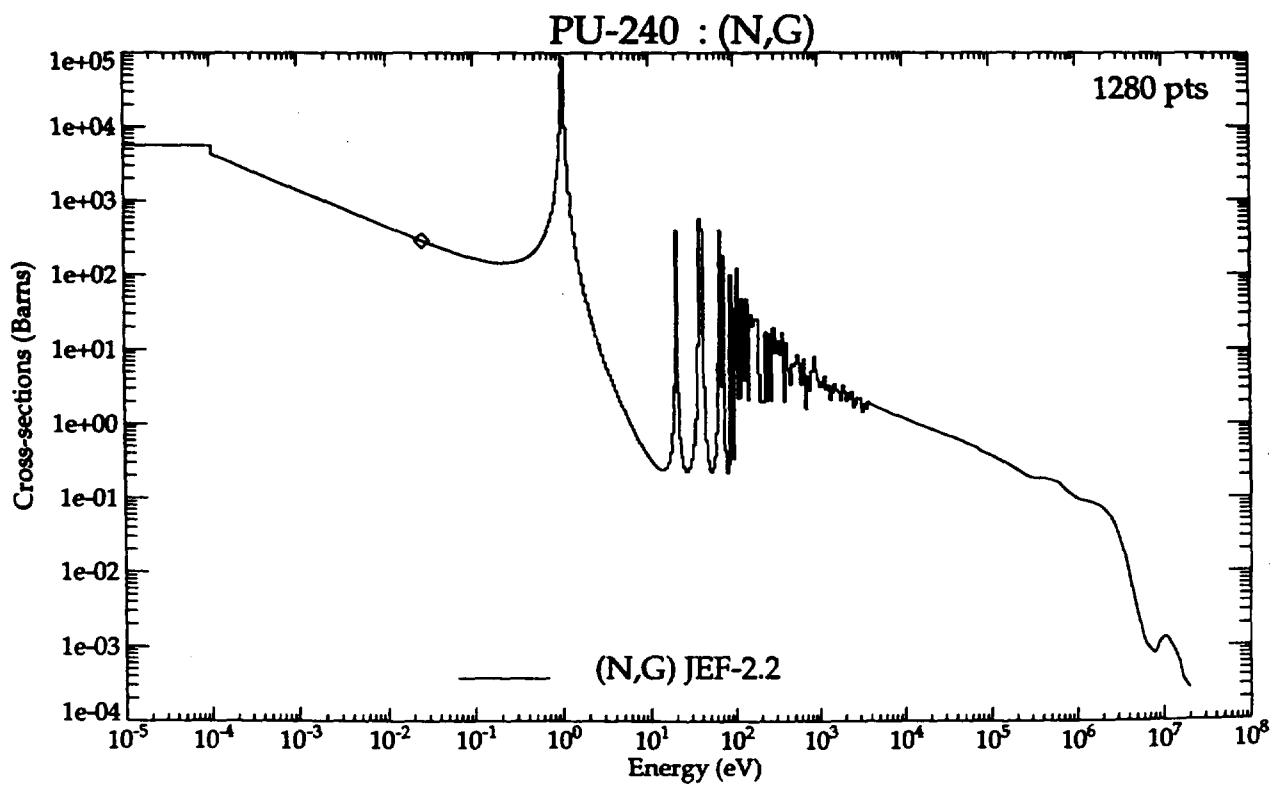
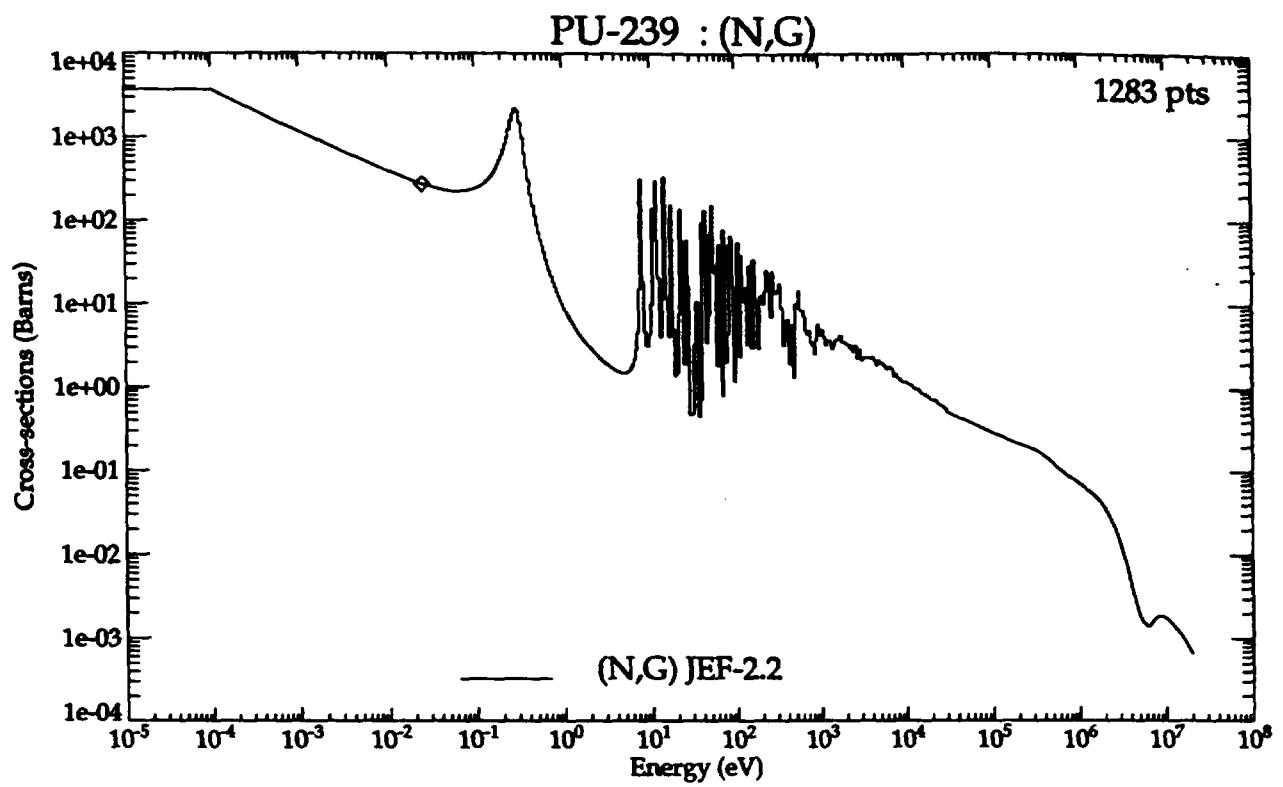


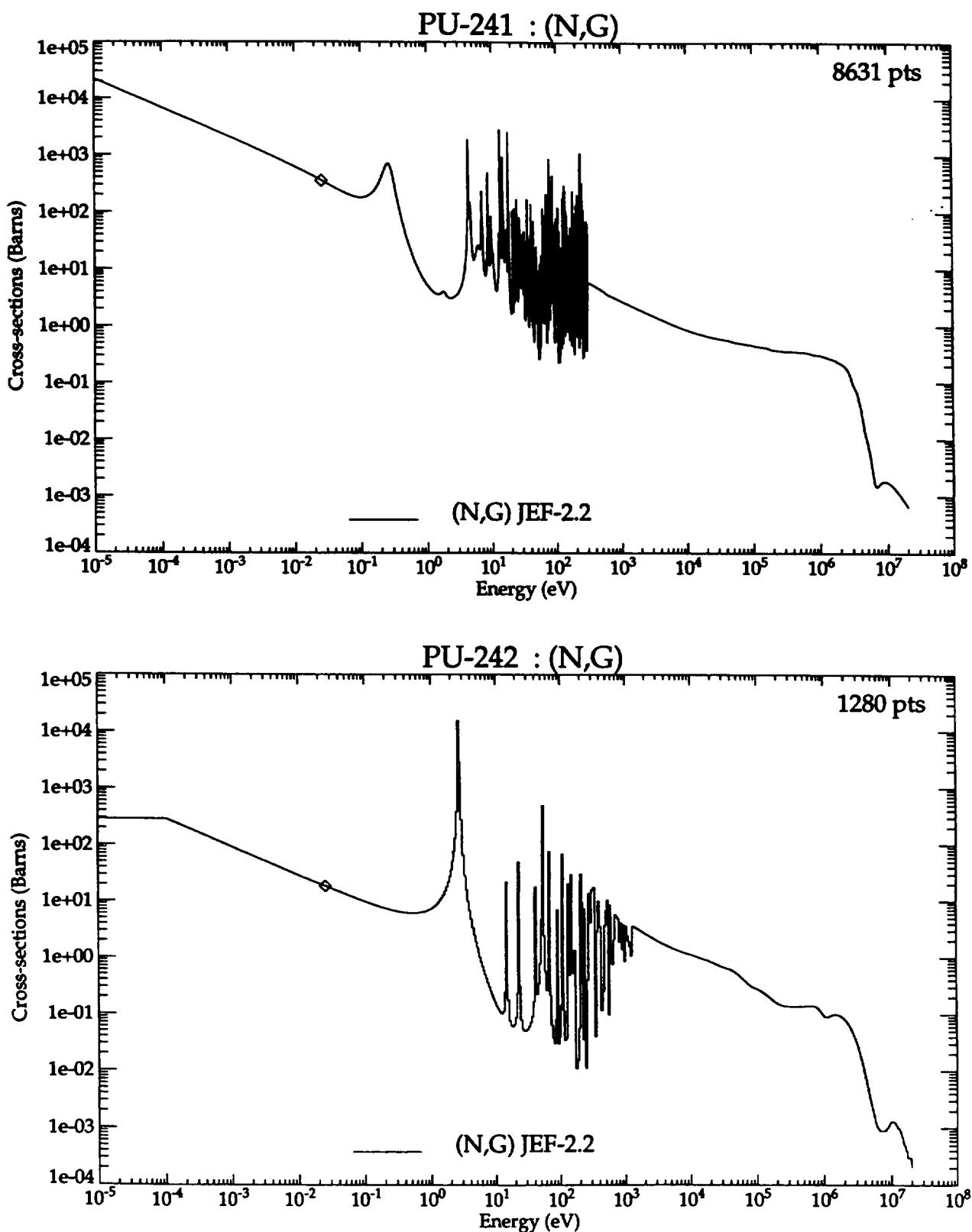
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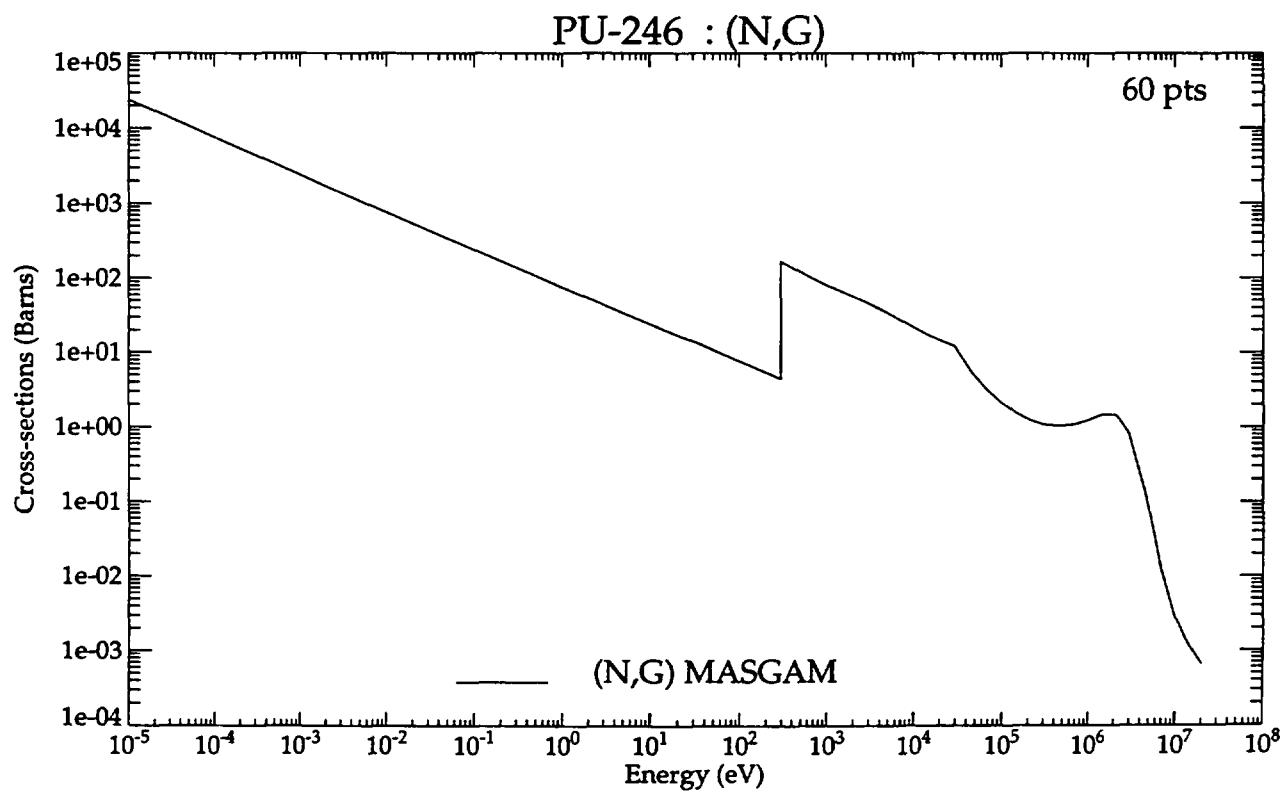
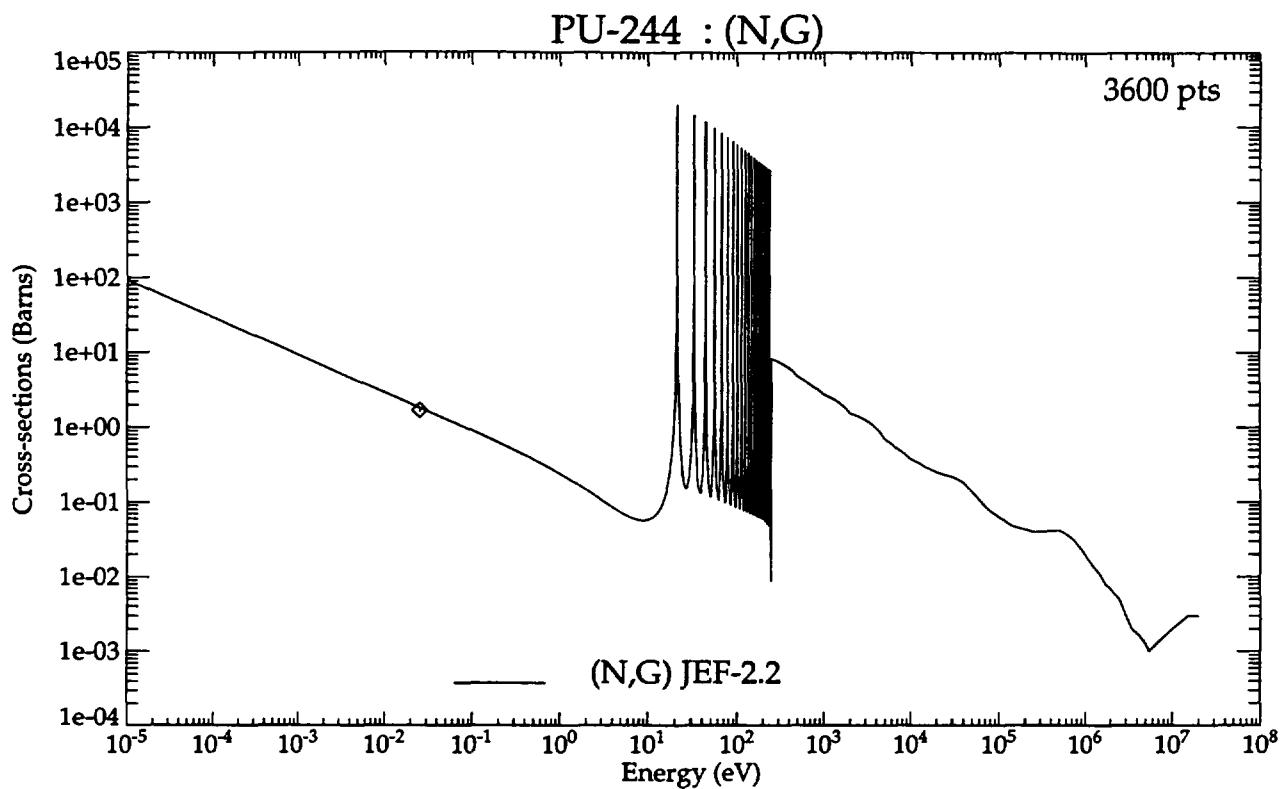


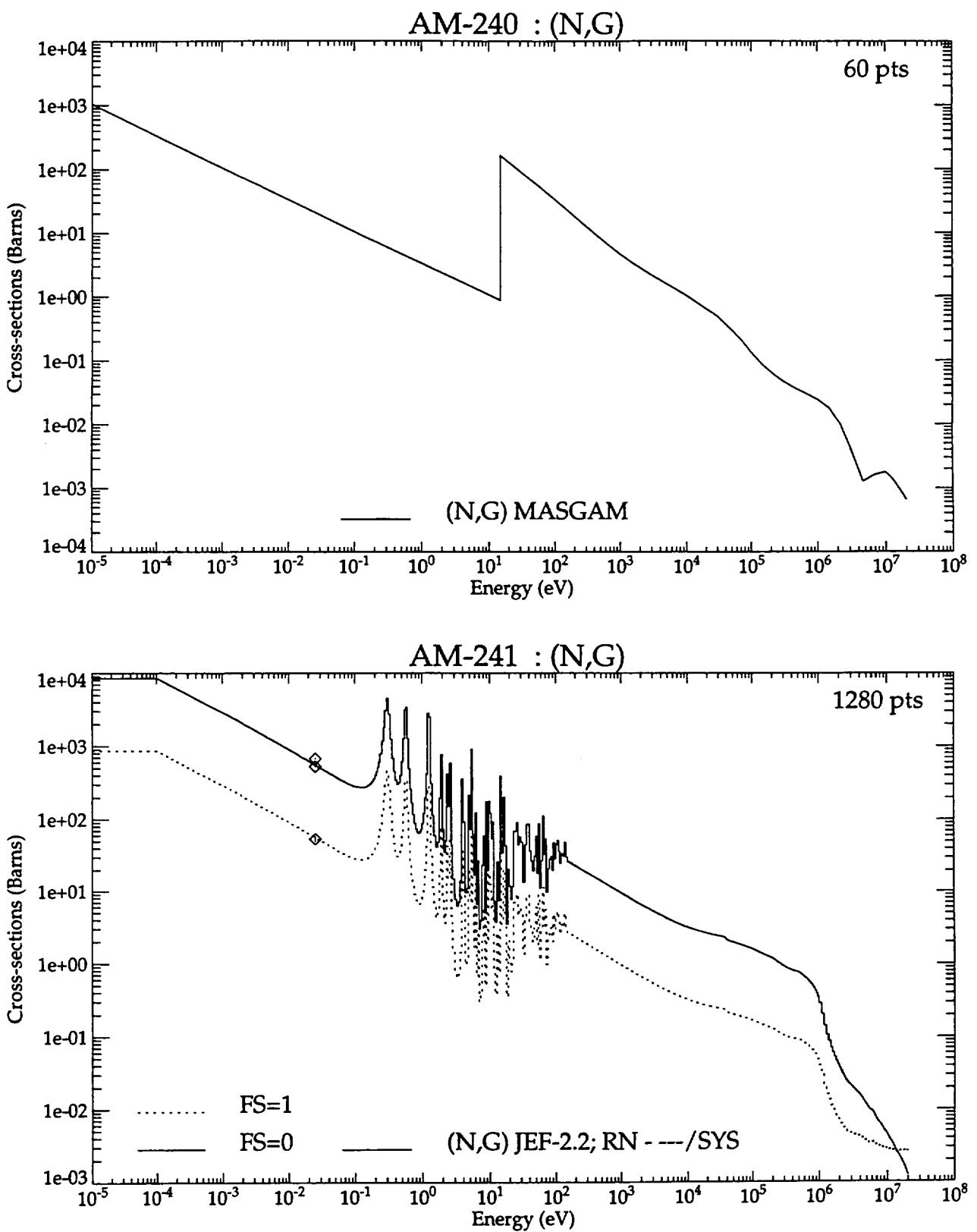


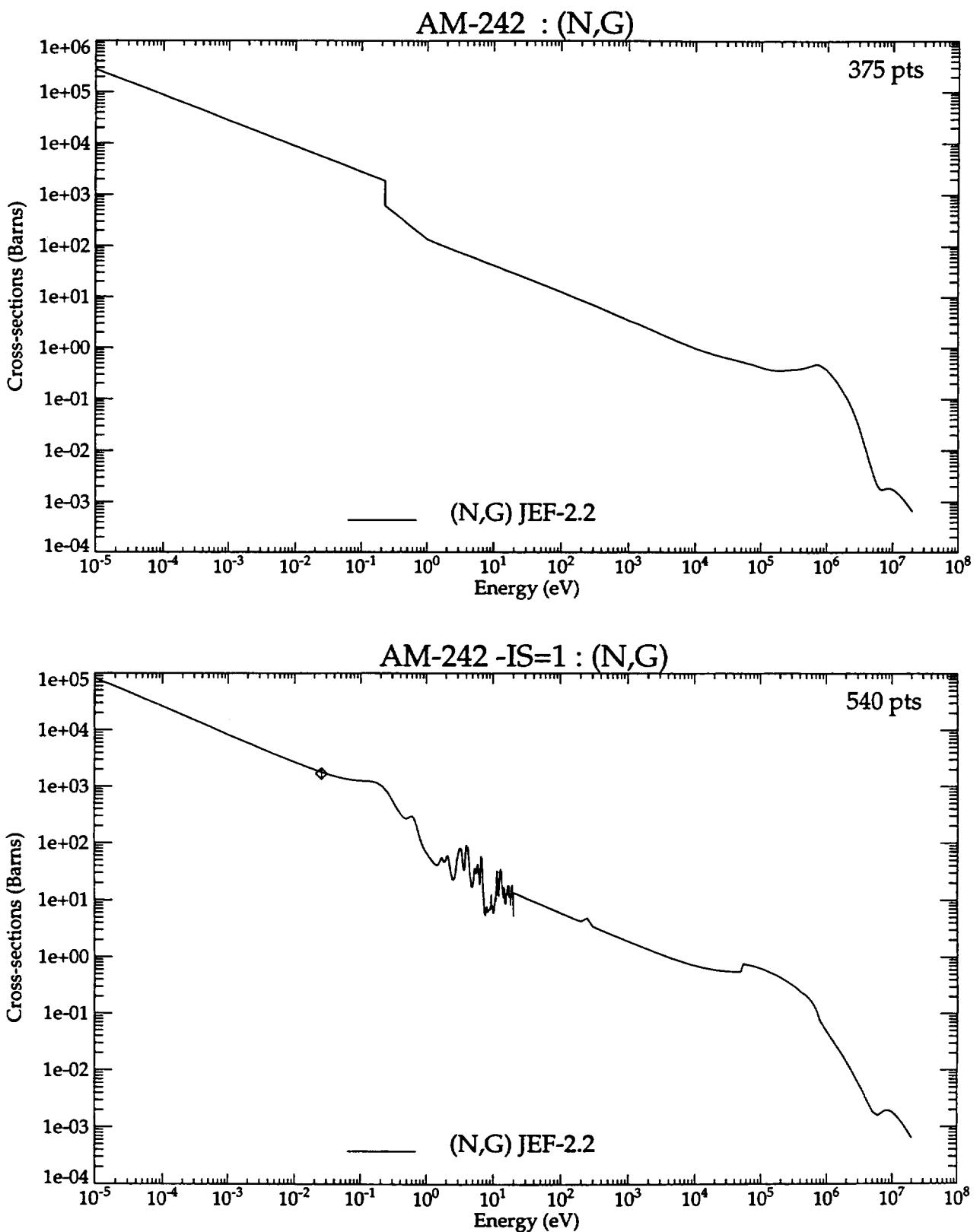


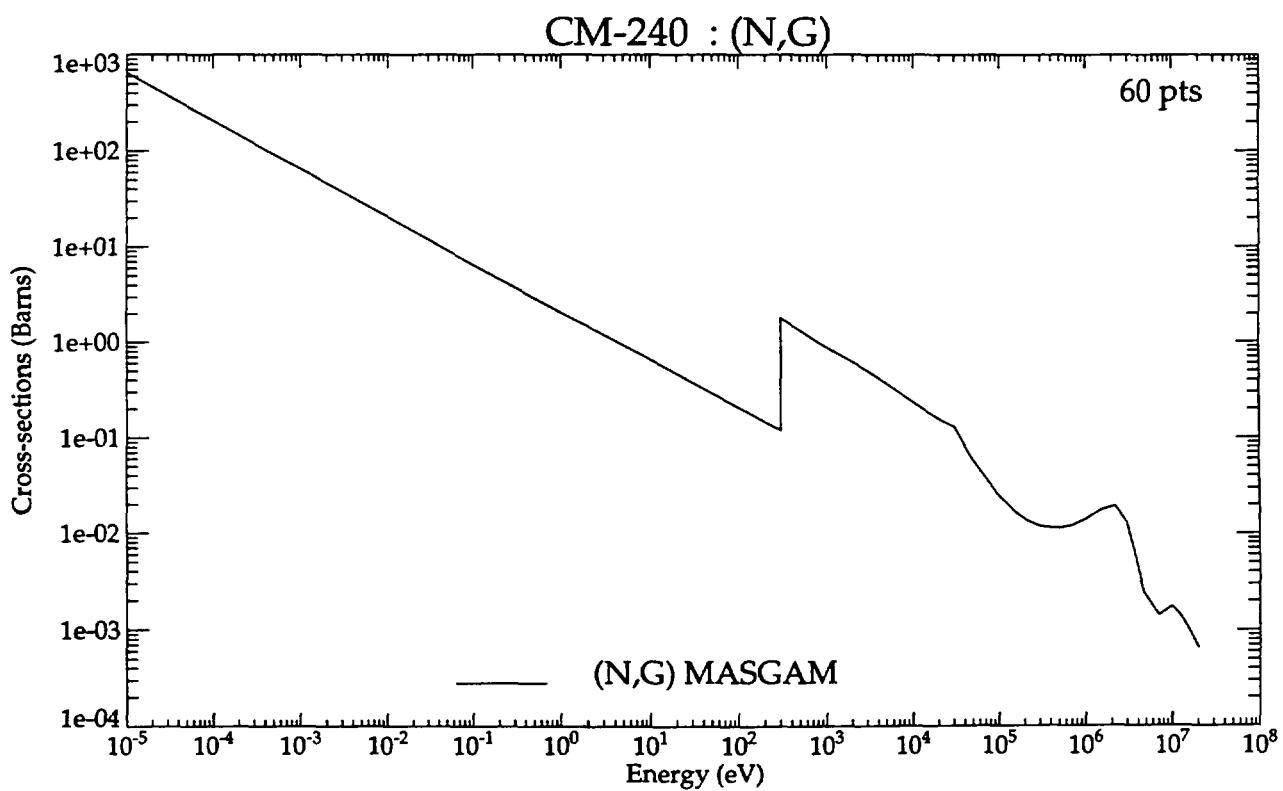
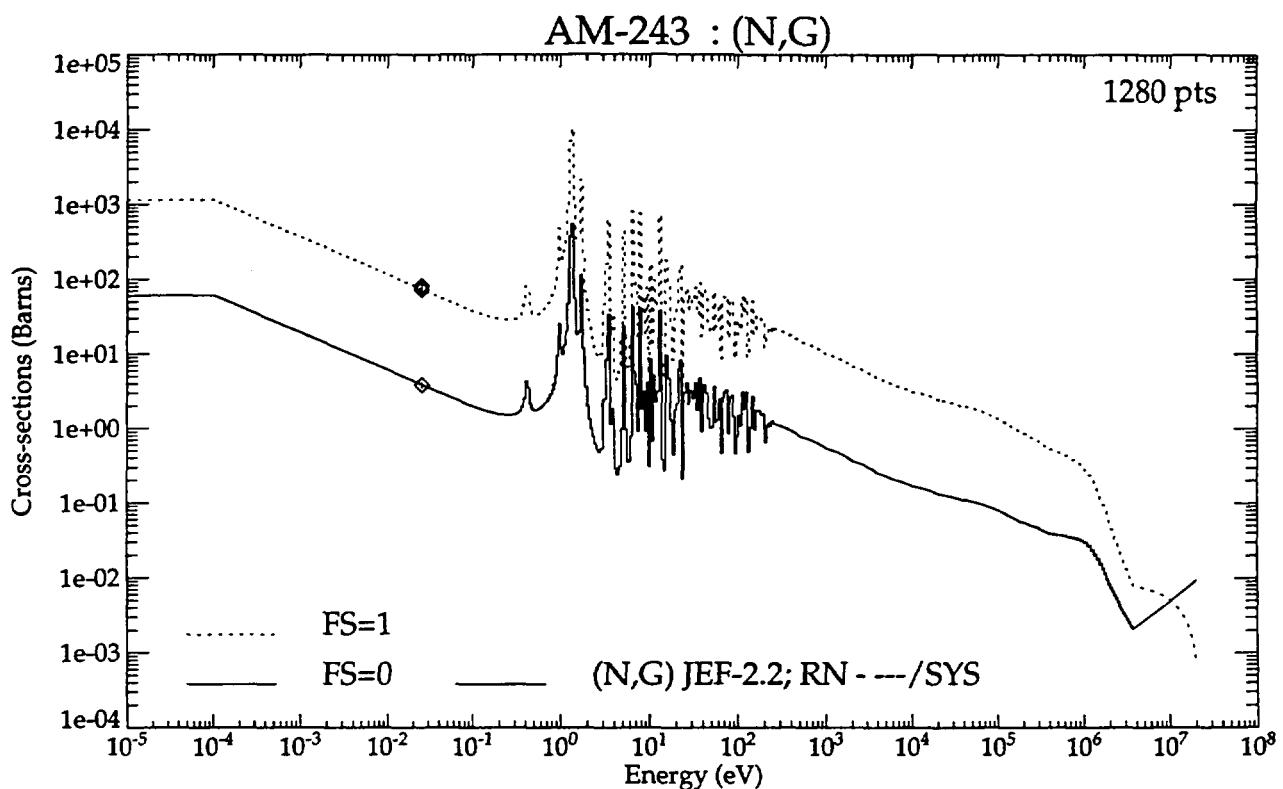


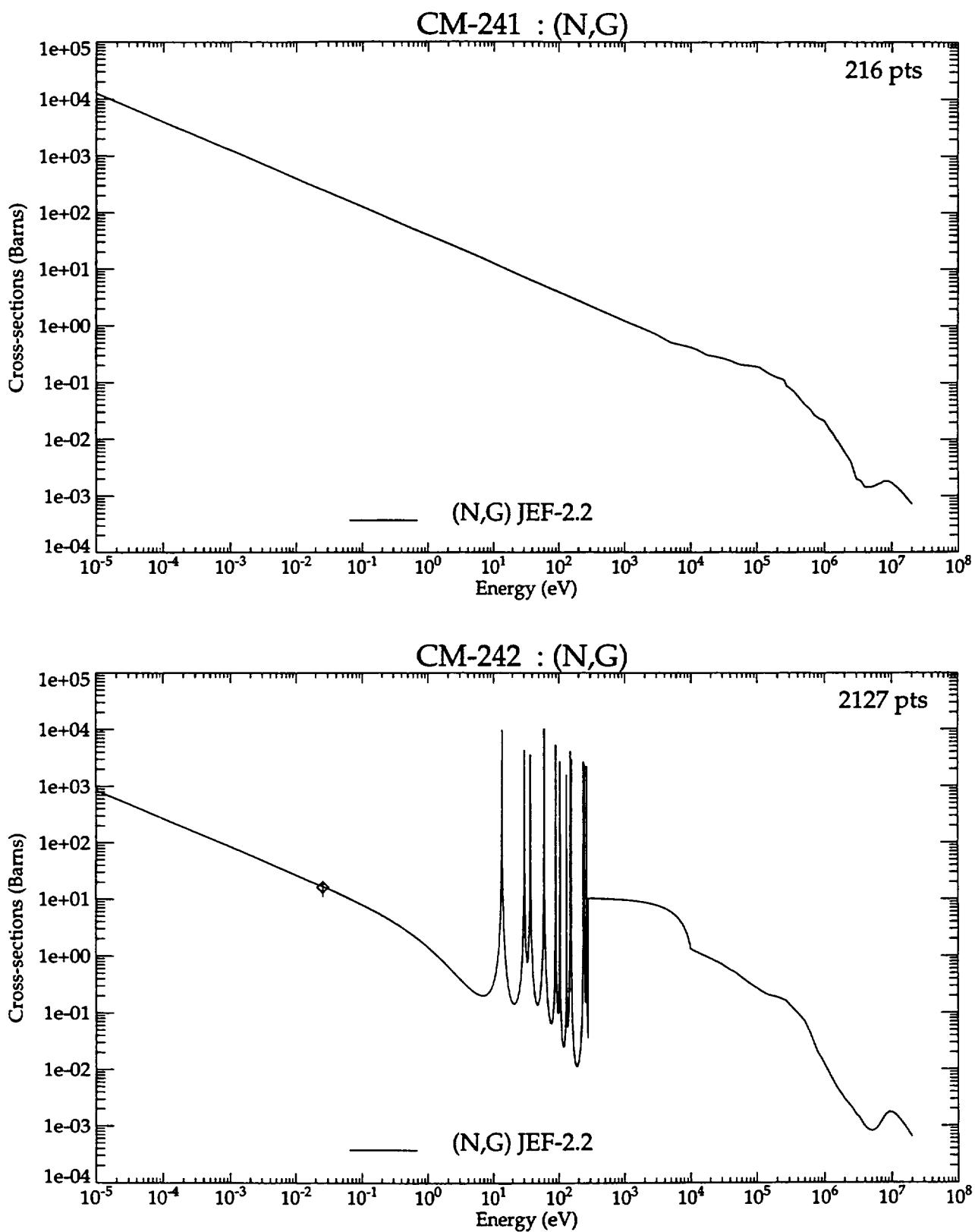


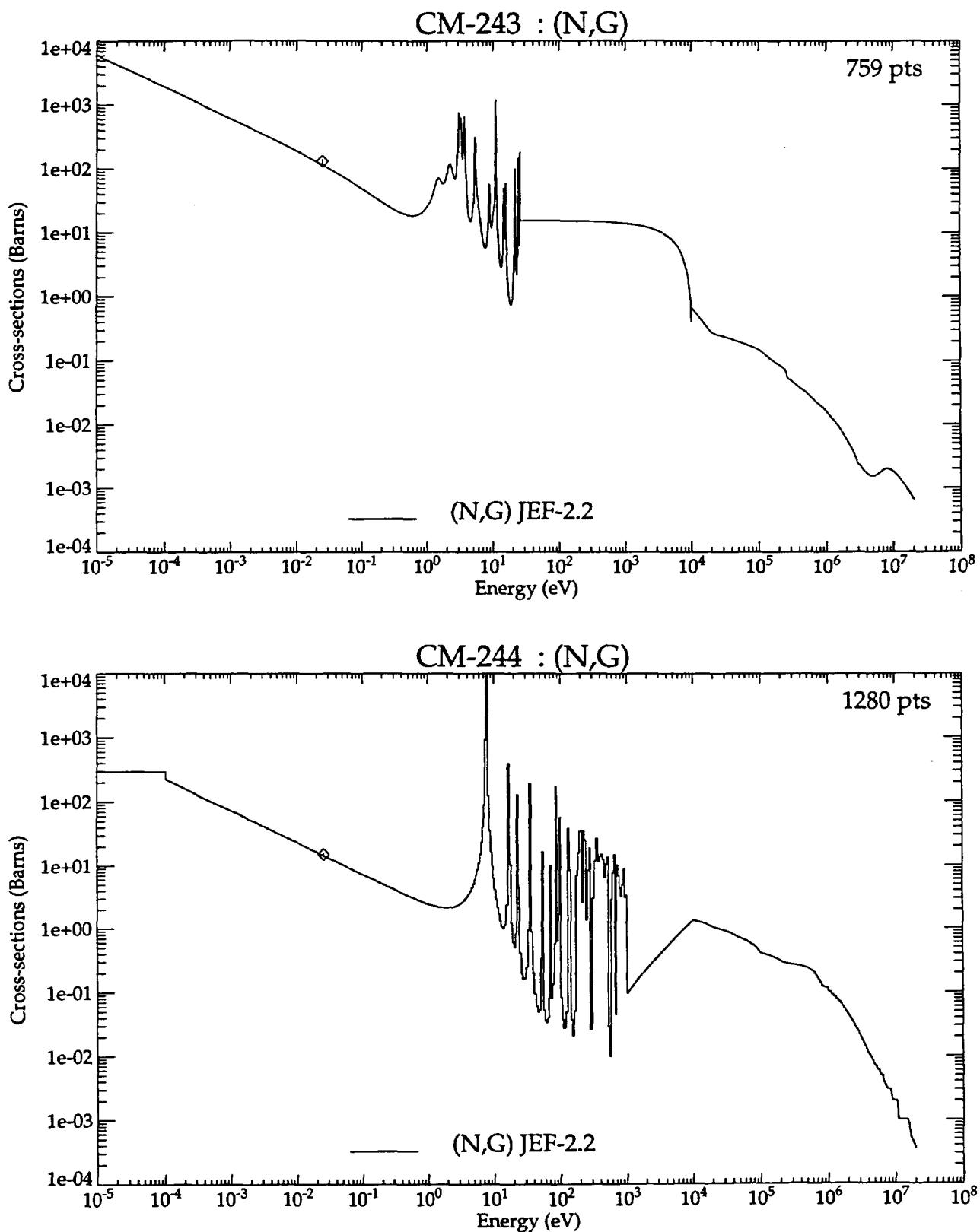


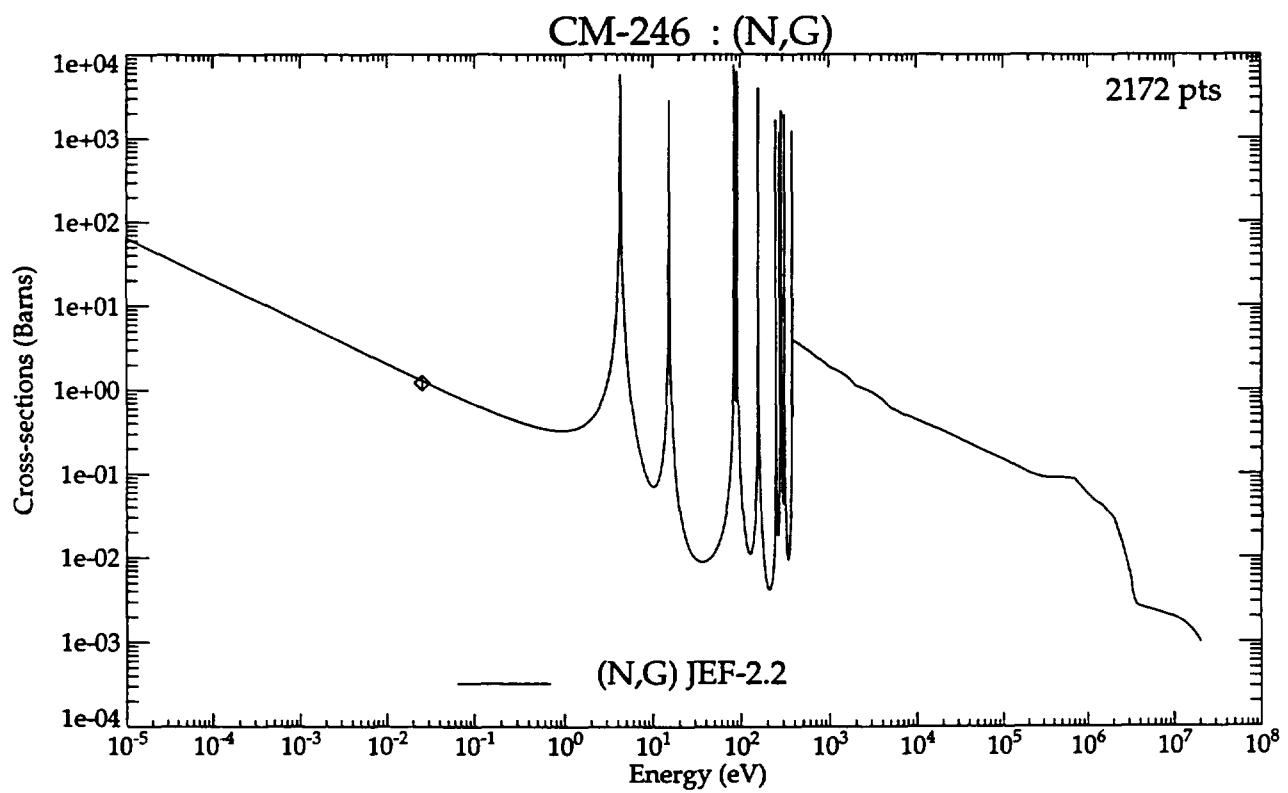
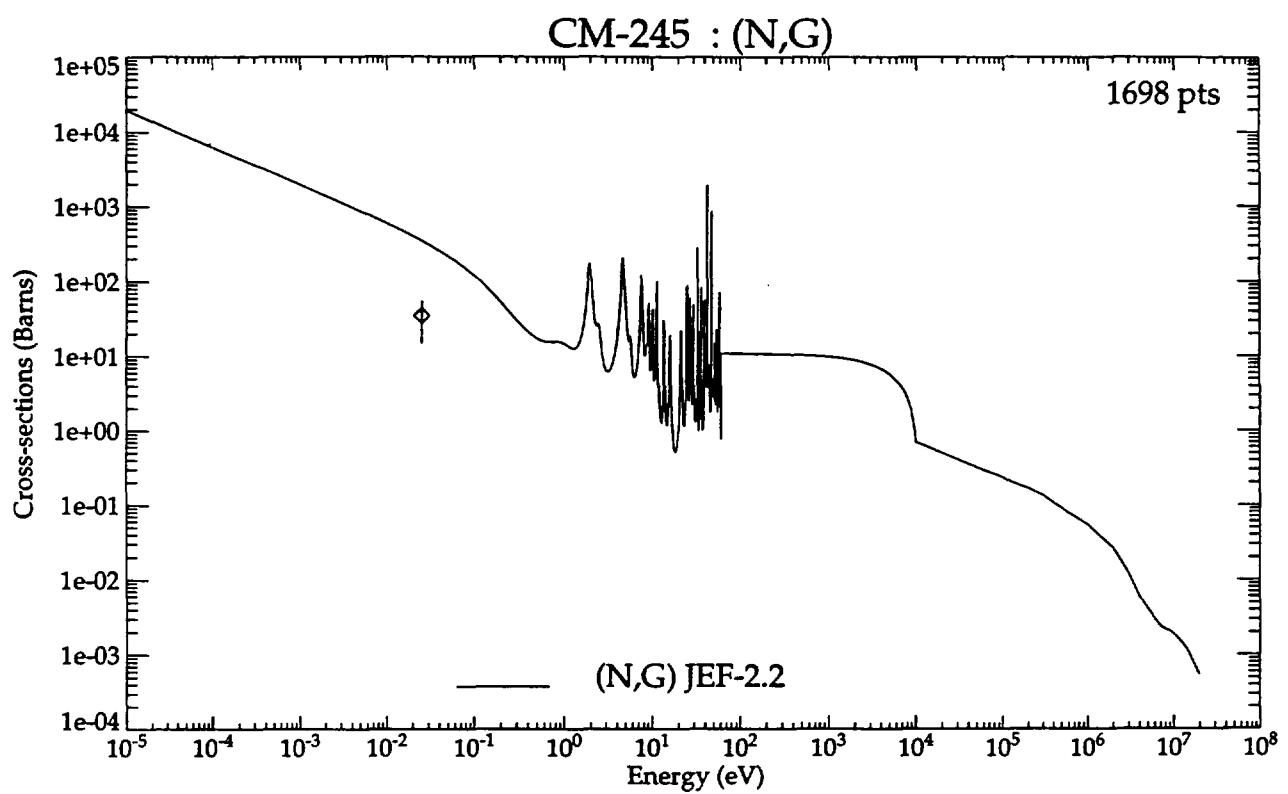


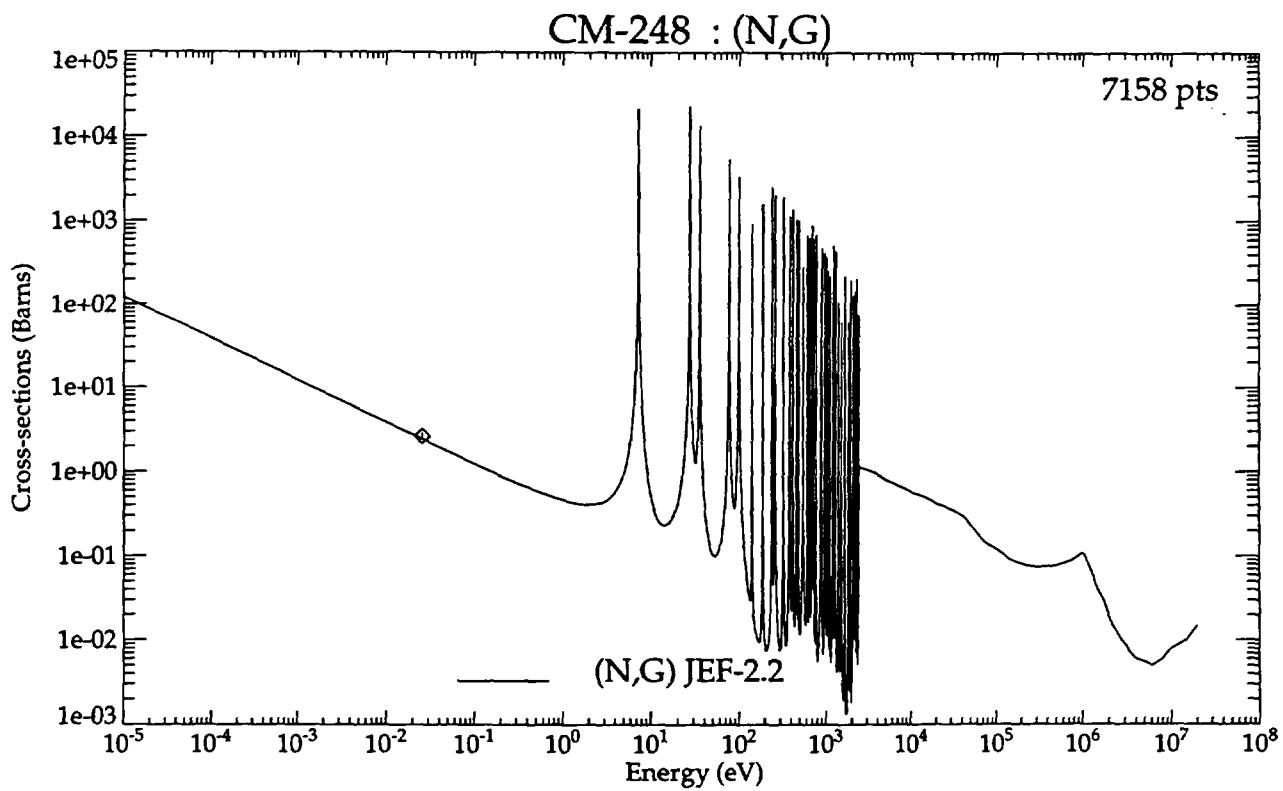
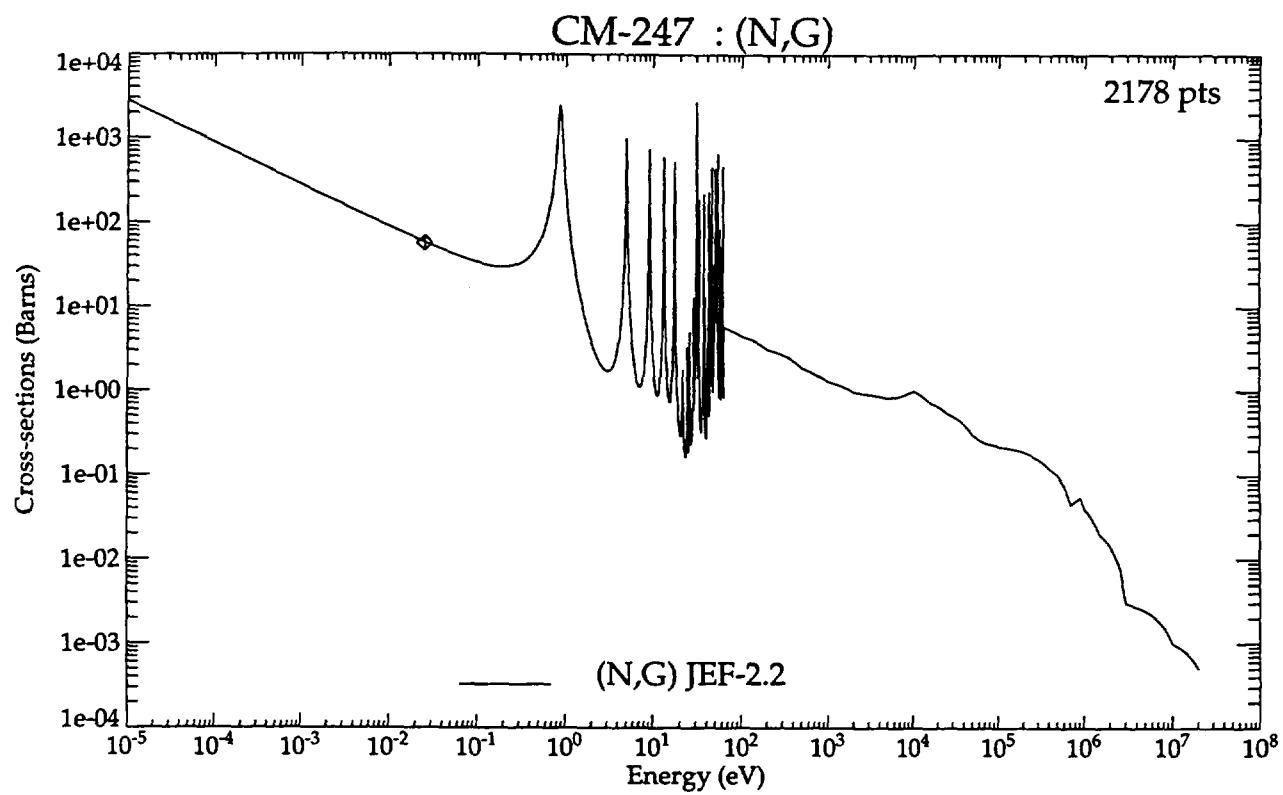












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