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Idaho Falls, Idaho — 83401

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ABSTRACT

An evaluation of the ^{239}Pu neutron cross sections has been completed from 1-300 eV. Total, fission and capture data were used in the evaluation to produce a set of single-level resonance parameters. Smooth files are included because the single-level parameters will not describe the cross sections of a fissile nucleus. Techniques used in the evaluation are discussed and figures showing the theoretical fits to the various sets of experimental data are shown.

TABLE OF CONTENTS

TABLES

INTRODUCTION

An extensive evaluation of ^{239}Pu in the resolved resonance region from 1-300 eV has been completed. Single-level resonance parameters E_o (neutron resonance energy), Γ_n (neutron scattering width), Γ_γ (capture width) and Γ_f (fission width) were obtained. Since single-level resonance parameters will not describe the cross sections of a fissile nucleus a smooth file was required and is included in the evaluation. The resonance files produced in this work have been submitted for inclusion in Version III of the ENDF/B data file. The approach used in this evaluation was to select a few sets of cross section data which we feel represents the cross sections of ^{239}Pu. These data were then reanalyzed simultaneously; thus, producing a single set of single-level resonance parameters which fit the selected data sets.

SELECTION OF DATA

The data selected for detail use are as follows:

1. Gwin's fission and capture cross sections[1] were deduced from data taken using the Rensselaer Polytechnic Institute (RPI) Electron Linear Accelerator. This simultaneous measurement of fission and capture data is good and permitted the energy dependent calculation of alpha. The statistical accuracy of his data is not as good as one would desire but is acceptable over the energy region of this evaluation. Gwin's data did add greatly to the evaluation in that it predicts alpha. The most severe problem with his data was in determining the appropriate width for the resolution function. In the energy regions where the resolution function was known to be much wider than the actual width of the level, it was found to be considerably narrower than that indicated by the experimental data. To correct for this effect, an additional term of 1.5 $\mu sec/\sqrt{E}$[2] was incorporated into the full width at half maximum of the resolution function. The original thinking behind this $1/\sqrt{E}$ term was to account for moderation time in the moderator. However, in the process of this evaluation, it was observed that this term was not needed in fitting the total cross section data. This tends

to indicate that the smearing out of the partial cross sections is associated with the capture and fission detectors.

2. The total cross section measurements of Derrien[3] were made using the Saclay Electron Linear Accelerator. The measurements were made under excellent operating conditions and using samples at liquid nitrogen temperature. The statistical accuracy of the data was very good. The data at first viewing appear to be of the highest caliber but as we progressed through the evaluation several difficulties appeared: (1) there seems to be a slight valley bias (meaning the cross sections between resonances) which changes as a function of neutron energy; (2) in the energy region over very broad resonance the total cross section appears to be normalized about 6% too high as compared to Gwin's fission and capture data that were normalized to the thermal energy region. One would think that the total data would make the best standard but in this case if we normalized Gwin's data to the totals we would miss the thermal region 6%. We accept Gwin's normalization and must question the total data; (3) there is also a peculiarity in the total data that the peak cross sections of the strong resonances cannot be described properly with resonance parameters that describe the other three sets of data. Derrien used the transmission data obtained from several different samples, having various thicknesses, to deduce the total cross section as a function of neutron energy. There seems to be an inconsistency among the cross sections obtained from the various samples. That is, the internormalization of the thin sample data to the thick sample data does not appear to be consistent. This evaluation would have been better had we included all sets of transmission data instead of the one composite total cross section data set.

3. The fission measurements of Blons[4] were also made using the Saclay Electron Linear Accelerator. These data had much better resolution than the fission data of Gwin's, particularly in the region above

100 eV. They were measured at liquid nitrogen temperature. It will be very difficult in future measurements to improve on these data. The parameters deduced by preserving alpha from Gwin's fission and capture data described these fission measurements very well. These data were of particular value in the region above 100 eV in that they had good resolution. As with Gwin's fission measurements an additional ad hoc term was combined with the width of the resolution function of 2.1 $\mu sec/\sqrt{E}$.

NORMALIZATION

The energy scale of Gwin's was accepted as the standard and the other sets of data were normalized by adding the value of ΔE to their energies as given in Table I. Gwin's energy scale was accepted because two of the four sets of data in the evaluation were measured by him.

The fission and capture data of Gwin's were normalized by him to the ENDF/B file[(5)] below 1 eV. This normalization was checked by us and found to be in excellent agreement. Blons' fission data were normalized to Gwin's fission data using the integrals of their fission cross sections over the energy region of 54-300 eV.

EVALUATION

The evaluation of these data represents a complete analysis of four sets of data with one set of resonance parameters being selected that best describes the cross sections of ^{239}Pu. The Automated Cross Section Analysis Program (ACSAP)[(6)] was used to accomplish this purpose. A potential scattering cross section of 10.2 barns was assumed throughout the analysis. The evaluation was carried out as follows: (1) after the experimental data were normalized they were stored on data discs associated with a 360/75 IBM computer. These data discs are accessible to the ACSAP code thus making possible easy display of the experimental data; (2) operating conditions of the experiment, such as, channel width, accelerator burst, detector thickness, sample temperature, flight path, etc. were determined for the different sets of experimental data (see Table II); (3) Gwin's alpha values as determined from his fission and capture data were preserved; (4) starting resonance parameters were those of

Derrien[3]; (5) ACSAP has the capability of shape or peak fitting the data. Shape fitting is done when the Doppler and resolution widths are small, and will determine the resonance parameters E_o, Γ_n^o, ($\Gamma_n^o = \Gamma_n/\sqrt{E_o}$), and Γ. Either Γ_γ or Γ_f can be adjusted with the other assumed to be constant. If the Doppler and resolution widths are much larger than Γ the program will adjust Γ_n^o for assumed values of E_o and Γ until the theoretical data pass through a specified peak point. Gwin's fission data were fit using the above techniques. The cross sections as predicted from these resonance parameters were then Doppler and resolution broadened and the theoretical curve displayed with Blons' fission data. A slight compromise was then made on the resonance parameters until a good fit was obtained among the sets of fission and capture data. The parameters best describing the fission and capture data were then used to calculate the broadened theoretical total cross sections which were compared to Derrien's experimental data. A slight variation in resonance parameters was again made until the resonance parameters of Table III were obtained. The fit to the experimental data using these Doppler and resolution broadened parameters is shown in the Figures of Appendix A. A subroutine MERGE automatically did most of the fine adjustments of the resonance parameters to produce the best fits. For each run made on the computer one can see the theoretical fit to the experimental total, fission, and capture data, thus giving a complete picture as to how the resonance parameters describe all sets of experimental data.

SMOOTH FILES

The resonance parameters were obtained in this evaluation by using the single-level Breit-Wigner equation. Since ^{239}Pu is a fissile material it was known that the data could not be described using single level parameters, Therefore, smooth files have been created and are listed in Tables IV-VII. The smooth files are internally consistent meaning that the partial cross sections add up to the total. The fission and capture smooth files were easily obtained from the ACSAP code by subtracting the theoretical data from the experimental data and drawing a smooth line through the points. The smooth file for the scattering data was obtained in a different manner. The theoretical scattering cross section was calculated at several energy points over the energy region of 1-300 eV using the -0.220, 0.296, and 7.813 eV resonance parameters. The scattering cross section was then calculated using all the resonances of Table III. The difference between these two theoretical curves then produced a set of data that can be described by the equation $\sigma = -0.01375\ E + 2.2$ barns. The scattering smooth file was obtained using this equation in the region of 5-300 eV. Slight modifications were made to this equation in the 1-5 eV region so that the smooth file above 1 eV could be blended into the smooth file[5] below 1 eV. Although no scattering data were used in the evaluation a smooth file is still required because the cross section tails from the resonance interference term of the single-level equation add up to such a size that they must be accounted for. If the scattering smooth file was neglected the scattering cross sections at 1 eV would be about 2 barns too small and about 2 barns too large at 300 eV. There would be only one place where the scattering cross sections would be correct and this would be in the neighborhood of 150 eV.

COMMENTS

Several peculiarities were found in the experimental data during the process of this evaluation. One of the most serious was the uncertainty to the fission and capture resolution functions. It seems to us that an extensive program of studying moderation times, resolution effects and backgrounds should be carried out on the Electron Linear Accelerators. Too much effort has been put into making quick measurements. It is important now that more time be spent in studying the machines and determine their characteristics with better precision.

Listed in Table VIII is a comparison between the experimentally measured cross sections and those calculated using the single-level Breit-Wigner resonance parameters obtained from this evaluation. Good agreement was obtained over the various energy regions between the integrals of the fission theoretical and experimental data. The variation over most regions was less than 3 or 4% with the different being insignificant when summed over the energy region below 300 eV. The agreement between the experimental and theoretical integrals was not as good for the capture data. Although it was the intent of this evaluation to preserve the experimental value of alpha as measured by Gwin there were several complications that disrupted this procedure. (1) Values of Γ_γ and Γ_f were varied to obtain a compromise in the fit to the total data. In the process of making this compromise the value of alpha was changed slightly. (2) It appears that the smooth file could be improved slightly particularly in the region above 150 eV. Because of the poor statistics in the valleys, it didn't seem justifiable to add a smooth file between 200-300 eV. However, after the completion of the evaluation and studying the fits to the data in the higher energy region it seems that better agreement could have been obtained had a small capture smooth file been used above 200 eV. (3) The contaminants of tungsten and ^{240}Pu in the capture data are also troublesome and were only accounted for where clean resonances could be observed. Very few corrections were made for these contaminants in the region above 150 eV. After weighing all of the above situations, it was decided that the present data, particularly with the uncertainties in the total cross sections, do not justify a re-evaluation to take into account the discrepancy between the theoretical and experimental capture data.

Listed in Table IX are the capture and fission integrals of σdE and $\sigma dE/E$ as a function of quarter lethargy groups. The data between 0.414 and 1.0 eV have been included for completeness of the table and were obtained from the smooth file of Version II of ENDF/B.

The value of alpha obtained from Table IX from the capture and fission integrals of $\sigma dE/E$ in the energy region of 61.4-275.4 eV, was found to be 0.71. From the data of Table VIII the capture experimental integrals over the region of 61-285 eV were found to be approximately 7% larger than that obtained for the theoretical data over the same energy region. Therefore, the value of 0.71 predicted could be considered as a lower limit and should be increased by approximately 7% giving an alpha value of 0.76. Calculating an alpha value from the Version II evaluation, as suggested by N. C. Paik[7] at the Knoxville Meeting and using the same integration technique as above gives a value of 0.47 from 61.4-275.4. The values of alpha from this present evaluation as given in Table IX seem to be more consistent with the alpha adjustment above 300 eV as recommended by Paik at the Knoxville Meeting.

ERROR DISCUSSION

When the cross sections of a fissile nucleus are analyzed using a single-level equation the error assignments to the individual resonance parameters E_o, Γ_n, Γ_γ, and Γ_f become very difficult to make. It is not possible at this time to apply absolute errors to the individual resonance parameter but general comments can be made as to the overall accuracy of the evaluation.

The conditions under which the various sets of data were normalized are given in Table I. There are several uncertainties which contribute to the error in E_o. The energy scale discrepancies can be the combined uncertainties of several affects, some of which might be flight path measurements, timing and shape of the neutron burst, moderation effects, channel width and variation in flight path as a function of neutron energy because of the energy dependency of the effective detector thickness. Also adding to the uncertainty of E_o is the fact that the fissile data were described using a single-level equation. In this case, the observed resonance energy is not the same for the total and partial cross sections. That is, E_o obtained from the fission data does not agree with those obtained from the total and capture data. This is expected because of the interference among neighboring levels in the fission cross section. The accuracy of the E_o values is estimated to be ± 0.1 to 0.2%.

There is sufficient disagreement between the partial and total cross sections (see the discussion under Selection of Data Item 2.), that a detailed error analysis cannot be carried out because of its' complexity and time involved. Indeed, such a study might be more time consuming than the evaluation. However, from the integral values of Table VIII and using the Figures in Appendix A it was estimated that the integral cross sections as predicted from the resonance parameters and smooth files of Tables III-VII have the following accuracies: (one standard deviation) 0-100 eV ± 5%, 100-200 eV ± 8%, and 200-300 eV ± 13%.

RECOMMENDATIONS

We have made comments throughout this report that the total cross section seems to be in error particularly over the strong peaks. While there well may be some problems with the partial cross sections, the most profitable approach to the resolution of the discrepancy would seem to be a remeasurement of the total cross section. Such a remeasurement should be made at low temperatures and with high resolution, using a set of well calibrated samples. The Oak Ridge Electron Linear Accelerator is well equipped to make this type of measurement. The total cross section of ^{242}Pu was recently measured there at liquid nitrogen temperatures using metallic samples. These facilities should be utilized in resolving the ^{239}Pu discrepancy.

There are currently two other sets of experimental data which were not included in this evaluation: (1) those of Gwin (ORNL), which will yield a simultaneous remeasurement of the capture and fission cross sections and; (2) those of Farrell (LASL), which were measured using the neutrons from an underground nuclear explosion. It is suggested that when the cross sections as a function of neutron energy have been obtained from the above experiments, and when the data from the new total measurements that we recommend became available, that these sets of data be incorporated with those used in this report and a new evaluation be done.

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5. B. R. Leonard Jr., "Thermal Cross Sections of the Fissile and Fertile Nuclei for ENDF/B-II," BNWL-1586, ENDF-153, (1971).

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7. N. C. Paik, et al., "Integral Testing of Modifications to ENDF/B Version II Data," The 3rd Neutron Cross Section Technology Conference, Knoxville Meeting, March (1971).

TABLE I

DATA NORMALIZATION

Data Set	Energy Range	ΔE(eV)	σ(multiplication)
Derrien Total	< 70	0.00141 E -0.005	X1
Derrien Total	70-151	+ 0.05	X1
Derrien Total	151-301	- 0.05	X1
Blons Fission	40-300	-0.001313 E + 0.084	X.94
Gwin Fission		No Changes	
Gwin Capture		No Changes	

TABLE II

CONDITIONS ASSUMED FOR RESOLUTION AND DOPPLER BROADENING

	Derrien Totals	Blons Fission	Gwin Fission and Capture
Machine	LINAC (Saclay)	LINAC (Saclay)	LINAC (RPI)
Effective Temperature (°K)	96	96	298
Thinnest inverse sample thickness (b/a)	3968	--	--
Flight path uncertainty (cm)	3.6	4.1	4.6
K * (μsec)	0	2.1	1.5
Resolution Shape	Gaussian	Gaussian	Gaussian

Energy (eV)	Flight Path (meters)	Accelerator Burst (nsec)	Channel Width (nsec)
		Derrien Total	
4-13	53.7	100	800
13-40	53.7	100	400
40-70	53.7	100	100
70-150	53.7	60	50
150-300	103.7	60	50
		Blons Fission	
40-70	50.05	50	200
70-192	50.05	50	100
192-300	50.05	50	50
		Gwin Fission & Capture	
5-22	25.45	100	640
22-67	25.45	100	320
67-163	25.45	100	160
163-300	25.45	100	80

* Where K is the uncertainty in moderation time at 1 eV. The term $K/\sqrt{E(eV)}$ was included as part of the resolution width.

TABLE III

^{239}Pu RESONANCE PARAMETERS

RESONANCE ENERGY (EV)	TOTAL WIDTH (EV)	GAMMA-N (EV)	GAMMA-N-NOUGHT (EV)	GAMMA-GAMMA (EV)	GAMMA-F (EV)
-2.2000E-01	5.4002E-01	2.3311E-05	4.9700E-05	4.0000E-02	5.0000E-01
2.9600E-01	9.9121E-02	1.2105E-04	2.2250E-04	3.9000E-02	6.0000E-02
7.8130E 00	8.7288E-02	1.2886E-03	4.6100E-04	4.1100E-02	4.4900E-02
1.0941E 01	2.0021E-01	2.9108E-03	8.8000E-04	4.6300E-02	1.5100E-01
1.1890E 01	6.6621E-02	1.6206E-03	4.7000E-04	4.0800E-02	2.4200E-02
1.4310E 01	1.0195E-01	9.4571E-04	2.5000E-04	3.7800E-02	6.3200E-02
1.4685E 01	6.9878E-02	2.8779E-03	7.5100E-04	3.7300E-02	2.9700E-02
1.5470E 01	7.2331E-01	1.0030E-03	2.5500E-04	3.9000E-02	6.8330E-01
1.7650E 01	7.4756E-02	2.7560E-03	6.5600E-04	3.9200E-02	3.2800E-02
2.2266E 01	1.2006E-01	4.0581E-03	8.6000E-04	4.9000E-02	6.7000E-02
2.3905E 01	7.0127E-02	1.2712E-04	2.6000E-05	3.3000E-02	3.7000E-02
2.6255E 01	8.3249E-02	2.2494E-03	4.3900E-04	4.0200E-02	4.0800E-02
2.7260E 01	4.1209E-02	2.0884E-04	4.0000E-05	3.9000E-02	2.0000E-03
3.2328E 01	1.6643E-01	4.2643E-04	7.5000E-05	4.6000E-02	1.2000E-01
3.5460E 01	4.7406E-02	4.0612E-04	6.8200E-05	4.1800E-02	5.2000E-03
4.1430E 01	5.2437E-02	6.4366E-03	1.0000E-03	4.2000E-02	4.0000E-03
4.1685E 01	1.0594E-01	1.9369E-03	3.0000E-04	6.0000E-02	4.4000E-02
4.4500E 01	5.3240E-02	1.0340E-02	1.5500E-03	3.9000E-02	3.9000E-03
4.7640E 01	2.6128E-01	2.2777E-03	3.3000E-04	3.9000E-02	2.2000E-01
4.9700E 01	8.0970E-01	1.9035E-03	2.7000E-04	6.1800E-02	7.4600E-01
5.0113E 01	5.9172E-02	4.6722E-03	6.6000E-04	4.3500E-02	1.1000E-02
5.2620E 01	6.8821E-02	1.6421E-02	2.2637E-03	4.5000E-02	7.4000E-03
5.5660E 01	5.7703E-02	2.2028E-03	2.9526E-04	3.7000E-02	1.8500E-02
5.7550E 01	6.3031E-01	5.3103E-03	7.0000E-04	4.5000E-02	5.8000E-01
5.7900E 01	9.9387E-01	4.8699E-03	6.4000E-04	3.9000E-02	9.5000E-01
5.9254E 01	1.4639E-01	7.3885E-03	9.5984E-04	3.9000E-02	1.0000E-01
6.0970E 01	6.8007E 00	1.1712E-02	1.5000E-03	5.2999E-02	6.7360E 00
6.3110E 01	1.5314E-01	1.1361E-03	1.4301E-04	6.0000E-02	9.2000E-02
6.5550E 01	1.3199E-01	1.9855E-03	2.4524E-04	3.0000E-02	1.0000E-01
6.5790E 01	1.3313E-01	1.7931E-02	2.2106E-03	6.1200E-02	5.4000E-02

TABLE III
(Cont'd)

RESONANCE ENERGY (EV)	TOTAL WIDTH (EV)	GAMMA-N (EV)	GAMMA-N-NOUGHT (EV)	GAMMA-GAMMA (EV)	GAMMA-F (EV)
7.4087E 01	7.5078E-02	5.0783E-03	5.9000E-04	4.0000E-02	3.0000E-02
7.5003E 01	1.4691E-01	3.2910E-02	3.8000E-03	3.7500E-02	7.6500E-02
8.1600E 01	1.2413E 00	2.2854E-03	2.5300E-04	3.9000E-02	1.2000E 00
8.2710E 01	3.9462E-02	4.6209E-04	5.0810E-05	3.9000E-02	0.0
8.2650E 01	1.2409E 00	1.9092E-03	2.1000E-04	3.9000E-02	1.2000E 00
8.5270E 01	2.3293E 00	2.5302E-02	2.7400E-03	3.9000E-02	2.2650E 00
8.5535E 01	6.4228E-02	1.2228E-02	1.3221E-03	4.1000E-02	1.1000E-02
9.0770E 01	6.8545E-02	2.1845E-02	2.2929E-03	3.9000E-02	7.7000E-03
9.2980E 01	5.8657E-02	1.1571E-03	1.2000E-04	4.9000E-02	8.5000E-03
9.5430E 01	5.1235E-02	2.7353E-03	2.8000E-04	3.5000E-02	1.3500E-02
9.6627E 01	1.8467E 00	7.6673E-03	7.8000E-04	3.9000E-02	1.8000E 00
1.0305E 02	4.8404E-02	2.4043E-03	2.3685E-04	3.8000E-02	8.0000E-03
1.0535E 02	4.8493E-02	7.4927E-03	7.3000E-04	3.7000E-02	4.0000E-03
1.0674E 02	7.3481E-02	1.4981E-02	1.4500E-03	3.8000E-02	2.0500E-02
1.1044E 02	4.3656E-02	6.5639E-04	6.2460E-05	3.3000E-02	1.0000E-02
1.1455E 02	1.1399E 00	8.9572E-04	8.3690E-05	3.9001E-02	1.1000E 00
1.1525E 02	6.9299E-02	2.9877E-04	2.7830E-05	3.9000E-02	3.0000E-02
1.1613E 02	2.4753E-01	5.5283E-03	5.1300E-04	4.7000E-02	1.9500E-01
1.1888E 02	9.6937E-02	2.8937E-02	2.6540E-03	3.7000E-02	3.1000E-02
1.2103E 02	8.3921E-02	3.9207E-03	3.5638E-04	4.4000E-02	3.6000E-02
1.2342E 02	6.3765E-02	7.6544E-04	6.8900E-05	3.2000E-02	3.1000E-02
1.2627E 02	4.9497E-02	2.6969E-03	2.4000E-04	3.9000E-02	7.8000E-03
1.2760E 02	5.2813E-02	8.1331E-04	7.2000E-05	3.5000E-02	1.7000E-02
1.3195E 02	3.7962E 00	1.7460E-02	1.5200E-03	3.8698E-02	3.7400E 00
1.3380E 02	5.7026E-02	9.0259E-03	7.8030E-04	4.3000E-02	5.0000E-03
1.3680E 02	1.2592E-01	4.9173E-03	4.2042E-04	3.5000E-02	8.6000E-02
1.3935E 02	3.9118E-02	1.1805E-04	1.0000E-05	3.9000E-02	0.0
1.4300E 02	1.4502E-01	5.0153E-03	4.1940E-04	5.5000E-02	8.5000E-02
1.4352E 02	7.2093E-02	6.0930E-03	5.0860E-04	4.2000E-02	2.4000E-02
1.4631E 02	7.0696E-02	1.2096E-02	1.0000E-03	4.9000E-02	9.6000E-03
1.4730E 02	1.0452E 00	1.2137E-03	1.0000E-04	4.4000E-02	1.0000E 00
1.4827E 02	1.4985E-01	8.5236E-04	7.0000E-05	3.9000E-02	1.1000E-01
1.4949E 02	1.0832E-01	2.3231E-03	1.9000E-04	6.0000E-02	4.6000E-02

TABLE III
(Cont'd)

RESONANCE ENERGY (EV)	TOTAL WIDTH (EV)	GAMMA-N (EV)	GAMMA-N-NOUGHT (EV)	GAMMA-GAMMA (EV)	GAMMA-F (EV)
1.5698E 02	4.0704E-02	1.7040E-03	1.3600E-04	3.9000E-02	0.0
1.5700E 02	8.0322E-01	1.3986E-02	1.1161E-03	3.9000E-02	7.5023E-01
1.6452E 02	1.0186E-01	5.5964E-02	4.3631E-03	3.8576E-02	7.3240E-03
1.6712E 02	1.0109E-01	9.0880E-03	7.0300E-04	4.0000E-02	5.2000E-02
1.7000E 02	4.9539E-02	5.3862E-04	4.1310E-05	3.9000E-02	1.0000E-02
1.7045E 02	1.7991E-01	9.1337E-04	6.9960E-05	6.0000E-02	1.1900E-01
1.7130E 02	1.0010E 00	1.0264E-03	7.8420E-05	4.4000E-02	9.5600E-01
1.7598E 02	7.3361E-02	3.3611E-03	2.5337E-04	4.5000E-02	2.5000E-02
1.7722E 02	5.1658E-02	5.6578E-03	4.2500E-04	3.9000E-02	7.0000E-03
1.7882E 02	5.7765E-02	1.7652E-03	1.3200E-04	3.9000E-02	1.7000E-02
1.8360E 02	5.6845E-02	2.8455E-03	2.1000E-04	3.9000E-02	1.5000E-02
1.8490E 02	1.7466E 00	7.6496E-03	5.6256E-04	3.9000E-02	1.7000E 00
1.8575E 02	3.9467E-02	4.6734E-04	3.4290E-05	3.9000E-02	0.0
1.8825E 02	4.9968E-02	9.6825E-04	7.0570E-05	3.9000E-02	1.0000E-02
1.9065E 02	6.7623E-02	2.6234E-03	1.9000E-04	5.2000E-02	1.3000E-02
1.9535E 02	4.7690E-01	2.5131E-02	1.7980E-03	3.9000E-02	4.1277E-01
1.9673E 02	1.0001E-01	7.0130E-03	5.0000E-04	6.0000E-02	3.3000E-02
1.9940E 02	1.4115E-01	1.5251E-02	1.0800E-03	5.5900E-02	7.0000E-02
2.0330E 02	7.1933E-02	2.9331E-03	2.0571E-04	3.9000E-02	3.0000E-02
2.0362E 02	1.8785E-01	7.8482E-03	5.5000E-04	3.0000E-02	1.5000E-01
2.0395E 02	2.5897E-01	1.3967E-02	9.7800E-04	3.0000E-02	2.1500E-01
2.0423E 02	1.9286E-01	2.8582E-03	2.0000E-04	3.0000E-02	1.6000E-01
2.0736E 02	6.2384E-02	1.2384E-02	8.6000E-04	4.4000E-02	6.0000E-03
2.1110E 02	1.1795E 00	2.7142E-03	1.8681E-04	3.9001E-02	1.1377E 00
2.1328E 02	1.6685E-01	5.5496E-04	3.8000E-05	3.6300E-02	1.3000E-01
2.1652E 02	6.8477E-02	1.1477E-02	7.8000E-04	5.0300E-02	6.7000E-03
2.1949E 02	7.0082E-02	5.4816E-03	3.7000E-04	4.5068E-02	1.9532E-02
2.2023E 02	5.5211E-02	1.2511E-02	8.4308E-04	3.2682E-02	1.0018E-02
2.2318E 02	6.0878E-02	5.3781E-03	3.6000E-04	4.7500E-02	8.0000E-03
2.2489E 02	8.6549E-02	2.8493E-03	1.9000E-04	6.8700E-02	1.5000E-02
2.2789E 02	6.6519E-02	3.0192E-03	2.0000E-04	4.4500E-02	1.9000E-02
2.3145E 02	5.6782E-02	2.0082E-02	1.3200E-03	3.2054E-02	4.6460E-03
2.3263E 02	9.9717E-02	7.1685E-04	4.7000E-05	3.9000E-02	6.0000E-02

TABLE III
(Cont'd)

RESONANCE ENERGY (EV)	TOTAL WIDTH (EV)	GAMMA-N (EV)	GAMMA-N-NOUGHT (EV)	GAMMA-GAMMA (EV)	GAMMA-F (EV)
2.3430E 02	6.7737E-02	1.6837E-02	1.1000E-03	4.1900E-02	9.0000E-03
2.3905E 02	7.3048E-02	8.1482E-03	5.2700E-04	5.1500E-02	1.3400E-02
2.4287E 02	9.8165E-02	1.1065E-02	7.1000E-04	4.0600E-02	4.6500E-02
2.4750E 02	9.0037E-02	1.0366E-03	6.5890E-05	3.9000E-02	5.0000E-02
2.4887E 02	6.7181E-02	2.8081E-02	1.7800E-03	3.4800E-02	4.3000E-03
2.5120E 02	9.6272E-02	5.5472E-02	3.5000E-03	3.1800E-02	9.0000E-03
2.5457E 02	5.9527E-02	4.6270E-03	2.9000E-04	3.3400E-02	2.1500E-02
2.5607E 02	9.0301E-02	8.8012E-03	5.5000E-04	5.7000E-02	2.4500E-02
2.5900E 02	4.0100E 00	6.6305E-03	4.1200E-04	3.9000E-02	3.9644E 00
2.5905E 02	3.9225E-02	2.2533E-04	1.4000E-05	3.9000E-02	0.0
2.6030E 02	3.9484E-02	4.8401E-04	3.0000E-05	3.9000E-02	0.0
2.6270E 02	4.5747E 00	3.5658E-02	2.2000E-03	3.9000E-02	4.5000E 00
2.6270E 02	4.9566E-02	3.5658E-03	2.2000E-04	3.9000E-02	7.0000E-03
2.6420E 02	4.4228E-02	2.2756E-04	1.4000E-05	3.9000E-02	5.0000E-03
2.6910E 02	1.3210E-01	2.0997E-03	1.2800E-04	5.5000E-02	7.5000E-02
2.6949E 02	6.8402E-02	6.4023E-03	3.9000E-04	3.6000E-02	2.6000E-02
2.7255E 02	1.1903E-01	4.9528E-02	3.0000E-03	3.6500E-02	3.3000E-02
2.7480E 02	7.1926E-01	1.3262E-02	8.0000E-04	5.6000E-02	6.5000E-01
2.7552E 02	1.4018E-01	3.8177E-02	2.3000E-03	4.3000E-02	5.9000E-02
2.7955E 02	1.1254E-01	1.2038E-02	7.2000E-04	6.1500E-02	3.9000E-02
2.8282E 02	1.0171E-01	5.4405E-02	3.2351E-03	4.1300E-02	6.0000E-03
2.8570E 02	3.9169E-02	1.6903E-04	1.0000E-05	3.9000E-02	0.0
2.8690E 02	4.0863E-02	1.8632E-03	1.1000E-04	3.9000E-02	0.0
2.8800E 02	7.0039E 00	1.4934E-02	8.8000E-04	3.9000E-02	6.9500E 00
2.9240E 02	1.1334E-01	5.6429E-03	3.3000E-04	5.6700E-02	5.1000E-02
2.9640E 02	8.4081E-02	5.6814E-03	3.3000E-04	5.4400E-02	2.4000E-02
2.9860E 02	7.5598E-02	1.7798E-02	1.0300E-03	4.0800E-02	1.7000E-02

TABLE IV

TOTAL NEUTRON CROSS SECTION SMOOTH FILE

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
1.0000E 00	3.0570E 01	1.1250E 00	2.7770E 01	1.2500E 00	2.5440E 01
1.3750E 00	2.3630E 01	1.5000E 00	2.2110E 01	1.7500E 00	1.9300E 01
2.0000E 00	1.6600E 01	2.2500E 00	1.4500E 01	2.5000E 00	1.3100E 01
3.0000E 00	1.1000E 01	3.5000E 00	9.8000E 00	4.0000E 00	8.9000E 00
5.5000E 00	6.9800E 00	6.8100E 00	5.8000E 00	7.0840E 00	7.2000E 00
7.2830E 00	9.6000E 00	7.4820E 00	1.6000E 01	7.5820E 00	2.4200E 01
7.6460E 00	2.5900E 01	7.7180E 00	1.5100E 01	7.7720E 00	2.1000E 00
7.8360E 00	-2.9000E 00	7.9540E 00	-1.9000E 00	8.1530E 00	-9.0000E-01
8.3430E 00	1.0000E 01	8.5520E 00	1.1000E 00	8.7870E 00	1.8000E 00
9.0000E 00	3.5000E 00	9.5540E 00	9.0000E-01	9.7600E 00	-8.0000E-01
9.9240E 00	-4.9000E 00	1.0114E 01	-5.9000E 00	1.0268E 01	-6.9000E 00
1.0386E 01	-8.9000E 00	1.0540E 01	-1.6900E 01	1.0640E 01	-2.1900E 01
1.0700E 01	-2.3000E 01	1.0794E 01	-1.7000E 01	1.0975E 01	2.0000E 00
1.1193E 01	2.4500E 01	1.1283E 01	2.7800E 01	1.1410E 01	3.2900E 01
1.1528E 01	3.6000E 01	1.1627E 01	4.4000E 01	1.1700E 01	5.2000E 01
1.1745E 01	5.8000E 01	1.1772E 01	4.5000E 01	1.1836E 01	2.0000E 00
1.1881E 01	-2.6800E 01	1.1917E 01	-4.7000E 01	1.1963E 01	-4.1200E 01
1.2008E 01	-3.2600E 01	1.2080E 01	-2.1800E 01	1.2171E 01	-1.0200E 01
1.2280E 01	-3.0000E 00	1.2407E 01	6.0000E-01	1.2678E 01	3.6000E 00
1.3000E 01	4.6000E 00	1.3380E 01	6.3000E 00	1.3670E 01	9.2000E 00
1.3852E 01	1.4200E 01	1.4015E 01	2.2900E 01	1.4106E 01	3.0800E 01
1.4169E 01	3.3000E 01	1.4214E 01	2.7600E 01	1.4277E 01	7.0000E 00
1.4350E 01	-1.2000E 01	1.4422E 01	-1.7000E 01	1.4477E 01	-6.0000E 00
1.4540E 01	8.0000E 00	1.4622E 01	3.1000E 01	1.4676E 01	4.4000E 01
1.4721E 01	1.8200E 01	1.4767E 01	3.5900E 01	1.4812E 01	3.5800E 01
1.4875E 01	3.2300E 01	1.4921E 01	2.7200E 01	1.4993E 01	1.9300E 01
1.5084E 01	1.3500E 01	1.5174E 01	9.2000E 00	1.5356E 01	4.2000E 00
1.5537E 01	2.7000E 00	1.5718E 01	2.0000E 00	1.7000E 01	7.9000E 00
1.7136E 01	9.2000E 00	1.7263E 01	1.2100E 01	1.7435E 01	1.7100E 01
1.7516E 01	1.6400E 01	1.7689E 01	9.2000E 00	1.7861E 01	3.4000E 00
1.7960E 01	2.0000E 00	1.8287E 01	2.0000E 00	1.8631E 01	3.7000E 00

TABLE IV
(Cont'd)

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
2.1000E 01	3.0000E 00	2.1200E 01	2.7000E 00	2.1350E 01	2.4000E 00
2.1540E 01	2.0000E 00	2.1720E 01	1.3000E 00	2.1900E 01	6.0000E-01
2.2080E 01	1.9000E 00	2.2570E 01	3.3000E 00	2.2990E 01	5.9000E 00
2.3350E 01	6.9000E 00	2.3530E 01	7.7000E 00	2.3710E 01	7.4000E 00
2.3840E 01	4.8000E 00	2.3930E 01	1.9000E 00	2.4140E 01	1.9000E 00
2.4390E 01	3.9000E 00	2.4610E 01	4.8000E 00	2.4790E 01	3.3000E 00
2.5000E 01	2.5000E 00	2.5360E 01	4.0000E 00	2.5610E 01	5.4000E 00
2.5780E 01	6.1000E 00	2.5920E 01	8.3000E 00	2.5990E 01	1.0400E 01
2.6080E 01	1.0100E 01	2.6630E 01	2.5000E 00	2.6990E 01	2.5000E 00
2.7220E 01	6.1000E 00	2.7380E 01	6.1000E 00	2.7560E 01	3.2000E 00
2.7910E 01	1.8000E 00	2.8250E 01	2.5000E 00	2.8520E 01	4.0000E 00
2.8790E 01	4.0000E 00	2.9000E 01	2.5000E 00	2.9100E 01	1.8000E 00
4.4900E 01	1.6000E 00	4.5000E 01	5.0000E-01	4.5330E 01	4.0000E-01
4.6060E 01	2.0000E-01	4.7030E 01	5.0000E-01	4.7890E 01	9.0000E-01
4.8460E 01	8.0000E-01	4.8770E 01	-3.0000E-01	4.9000E 01	-2.1000E 00
4.9320E 01	-3.5000E 00	4.9520E 01	-3.1000E 00	4.9680E 01	-1.0000E 00
4.9830E 01	1.5000E 00	5.0260E 01	1.5000E 00	5.0850E 01	1.0000E-01
5.1370E 01	-6.0000E-01	5.1820E 01	-1.7000E 00	5.2170E 01	-3.1000E 00
5.2280E 01	-3.1000E 00	5.2410E 01	-1.4000E 00	5.2590E 01	1.9000E 00
5.2680E 01	1.9000E 00	5.2800E 01	8.0000E-01	5.3000E 01	-1.7000E 00
5.3570E 01	-4.9000E 00	5.4180E 01	-6.7000E 00	5.4760E 01	-8.5000E 00
5.5220E 01	-8.6000E 00	5.5510E 01	-9.3000E 00	5.5690E 01	-1.1800E 01
5.5870E 01	-1.5700E 01	5.6050E 01	-1.7900E 01	5.6260E 01	-1.9000E 01
5.6480E 01	-1.8200E 01	5.6660E 01	-1.6500E 01	5.6770E 01	-1.3600E 01
5.6870E 01	-9.0000E 00	5.6980E 01	-3.6000E 00	5.7090E 01	-4.0000E-01
5.7340E 01	1.4000E 00	5.7700E 01	1.4000E 00	5.7950E 01	2.8000E 00
5.8130E 01	5.7000E 00	5.8310E 01	9.7000E 00	5.8450E 01	1.6000E 01
5.8600E 01	1.8500E 01	5.8810E 01	2.0300E 01	5.8990E 01	1.9600E 01
5.9130E 01	1.7100E 01	5.9420E 01	1.2800E 01	5.9670E 01	1.0000E 01
5.9960E 01	7.1000E 00	6.0280E 01	5.0000E 00	6.1000E 01	2.8000E 00
6.2720E 01	1.8000E 00	6.3040E 01	1.4000E 00	6.3510E 01	7.0000E-01
6.3830E 01	-1.6000E 00	6.4160E 01	-3.7000E 00	6.4520E 01	-5.8000E 00
6.4770E 01	-7.6000E 00	6.4980E 01	-7.3000E 00	6.5160E 01	-5.2000E 00
6.5340E 01	-1.6000E 00	6.5520E 01	2.0000E 00	6.5840E 01	1.2000E 01
6.6060E 01	1.7000E 01	6.6170E 01	1.9200E 01	6.6310E 01	2.0200E 01

TABLE IV
(Cont'd)

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
6.6490E 01	1.9900E 01	6.6700E 01	1.7400E 01	6.7100E 01	1.3800E 01
6.7490E 01	1.0600E 01	6.7920E 01	7.7000E 00	6.8320E 01	6.3000E 00
6.9000E 01	4.8000E 00	7.1330E 01	3.3000E 00	7.2050E 01	3.3000E 00
7.2520E 01	4.8000E 00	7.3050E 01	6.9000E 00	7.3480E 01	1.0100E 01
7.3700E 01	1.0800E 01	7.3990E 01	1.0100E 01	7.4100E 01	1.0200E 01
7.4200E 01	9.2000E 00	7.4300E 01	3.4000E 00	7.4350E 01	-3.5000E 00
7.4390E 01	-7.2000E 00	7.4460E 01	-8.8000E 00	7.4520E 01	-6.8000E 00
7.4600E 01	-1.8000E 00	7.4700E 01	4.2000E 00	7.4800E 01	6.8000E 00
7.4940E 01	8.6000E 00	7.5100E 01	8.8000E 00	7.5300E 01	8.2000E 00
7.5420E 01	7.6000E 00	7.5780E 01	6.6000E 00	7.6030E 01	5.5000E 00
7.6460E 01	2.5000E 00	7.7000E 01	-3.0000E-01	7.9370E 01	-4.6000E 00
7.9800E 01	-5.7000E 00	8.0120E 01	-5.3000E 00	8.0440E 01	-2.8000E 00
8.0870E 01	1.5000E 00	8.1200E 01	2.5000E 00	8.1520E 01	2.5000E 00
8.1900E 01	0.0	8.2540E 01	7.0000E-01	8.2760E 01	4.0000E-01
8.3030E 01	1.1000E 00	8.3350E 01	3.2000E 00	8.3620E 01	5.4000E 00
8.3830E 01	5.7000E 00	8.4050E 01	3.6000E 00	8.4430E 01	0.0
8.4690E 01	-1.1000E 00	8.4960E 01	-1.5000E 00	8.5290E 01	-1.0000E-01
8.5560E 01	1.7000E 00	8.5880E 01	3.1000E 00	8.6150E 01	3.1000E 00
8.6420E 01	2.1000E 00	8.6900E 01	3.0000E-01	8.7390E 01	-1.1000E 00
8.7980E 01	-1.9000E 00	8.9000E 01	-1.9000E 00	8.9870E 01	1.7000E 00
9.0580E 01	3.8000E 00	9.1290E 01	4.8000E 00	9.2050E 01	5.2000E 00
9.4560E 01	6.6000E 00	9.5050E 01	6.6000E 00	9.5600E 01	5.5000E 00
9.6200E 01	3.0000E 00	9.6750E 01	1.6000E 00	9.7130E 01	1.6000E 00
9.7510E 01	3.0000E 00	9.8110E 01	7.0000E 00	9.8820E 01	1.1300E 01
9.9640E 01	1.3300E 01	1.0040E 02	1.4000E 01	1.0100E 02	1.2900E 01
1.0200E 02	1.0800E 01	1.0500E 02	7.9000E 00	1.0610E 02	7.2000E 00
1.0680E 02	6.4000E 00	1.0790E 02	4.6000E 00	1.0850E 02	3.7000E 00
1.0900E 02	3.4000E 00	1.1100E 02	1.7000E 00	1.1150E 02	7.0000E-01
1.1250E 02	2.0000E-01	1.1350E 02	-4.0000E-01	1.1400E 02	1.0000E-01
1.1450E 02	1.1000E 00	1.1550E 02	6.0000E-01	1.1590E 02	1.1000E 00
1.1610E 02	1.8000E 00	1.1660E 02	5.4000E 00	1.1680E 02	6.3000E 00
1.1700E 02	6.8000E 00	1.1720E 02	7.7000E 00	1.1740E 02	8.3000E 00
1.1770E 02	8.3000E 00	1.1810E 02	7.7000E 00	1.1880E 02	6.3000E 00
1.1950E 02	5.0000E 00	1.1990E 02	4.2000E 00	1.2500E 02	4.1000E 00

TABLE IV
(Cont'd)

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
1.2610E 02	3.4000E 00	1.2680E 02	3.1000E 00	1.3100E 02	1.0000E 00
1.3350E 02	8.0000E-01	1.3450E 02	-1.8000E 00	1.3550E 02	-1.8000E 00
1.3650E 02	9.0000E-01	1.4900E 02	9.0000E-01	1.4940E 02	1.1000E 00
1.4970E 02	3.2000E 00	1.5050E 02	2.9000E 00	1.5120E 02	1.2000E 00
1.5920E 02	3.5000E 00	1.6280E 02	2.2000E 00	1.6350E 02	1.5000E 00
1.6500E 02	1.3000E 00	1.6540E 02	1.7000E 00	1.6570E 02	2.1000E 00
1.6610E 02	4.9000E 00	1.6650E 02	5.6000E 00	1.6680E 02	5.2000E 00
1.6720E 02	4.2000E 00	1.6750E 02	3.4000E 00	1.6790E 02	3.1000E 00
1.6940E 02	3.1000E 00	1.6970E 02	2.9000E 00	1.7050E 02	1.3000E 00
1.7300E 02	1.3000E 00	1.7450E 02	2.4000E 00	1.7880E 02	2.4000E 00
1.8100E 02	2.8000E 00	1.8170E 02	3.9000E 00	1.8250E 02	3.7000E 00
1.8280E 02	3.5000E 00	1.8320E 02	2.8000E 00	1.8390E 02	1.2000E 00
1.8680E 02	1.5000E 00	1.8720E 02	1.8000E 00	1.9590E 02	2.0000E-01
1.9610E 02	8.5000E 00	1.9620E 02	9.5000E 00	1.9630E 02	8.5000E 00
1.9660E 02	3.0000E 00	1.9674E 02	1.2000E 00	1.9690E 02	0.0
1.9730E 02	2.5000E 00	1.9762E 02	5.6000E 00	1.9823E 02	5.9000E 00
1.9867E 02	5.2000E 00	1.9896E 02	3.4000E 00	1.9925E 02	1.3000E 00
1.9947E 02	-1.0000E-01	1.9976E 02	2.0000E-01	1.9997E 02	1.3000E 00
2.0030E 02	3.1000E 00	2.0128E 02	6.3000E 00	2.0204E 02	8.4000E 00
2.0255E 02	1.0300E 01	2.0277E 02	1.1300E 01	2.0295E 02	1.0300E 01
2.0300E 02	1.0200E 01	2.0310E 02	7.9000E 00	2.0320E 02	3.4000E 00
2.0330E 02	4.0000E-01	2.0418E 02	-6.0000E-01	2.0451E 02	5.8000E 00
2.0469E 02	8.0000E 00	2.0480E 02	8.3000E 00	2.0500E 02	6.2000E 00
2.0578E 02	3.3000E 00	2.0654E 02	1.9000E 00	2.0733E 02	1.2000E 00
2.0800E 02	-6.0000E-01	2.1050E 02	-6.0000E-01	2.1100E 02	-1.0000E-01
2.1150E 02	1.5500E 00	2.1200E 02	2.8000E 00	2.1250E 02	3.6000E 00
2.1300E 02	3.8000E 00	2.1318E 02	2.5000E 00	2.1336E 02	2.2000E 00
2.1362E 02	2.4000E 00	2.1423E 02	3.5000E 00	2.1467E 02	3.8000E 00
2.1514E 02	3.5000E 00	2.1590E 02	3.1000E 00	2.1656E 02	2.8000E 00
2.1703E 02	2.4000E 00	2.1746E 02	2.8000E 00	2.1819E 02	3.1000E 00
2.1877E 02	3.1000E 00	2.1942E 02	2.4000E 00	2.2100E 02	1.3000E 00
2.2216E 02	1.7000E 00	2.2285E 02	2.1000E 00	2.2339E 02	2.1000E 00
2.2365E 02	2.3000E 00	2.2390E 02	3.0000E 00	2.2521E 02	6.2000E 00
2.2612E 02	7.7000E 00	2.2710E 02	9.1000E 00	2.2804E 02	9.1000E 00
2.2862E 02	8.7000E 00	2.2900E 02	8.7000E 00	2.2947E 02	8.4000E 00

TABLE IV
(Cont'd)

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
2.2998E 02	6.9000E 00	2.3129E 02	4.0000E 00	2.3190E 02	2.2000E 00
2.3230E 02	1.9000E 00	2.3263E 02	2.2000E 00	2.3328E 02	3.6000E 00
2.3401E 02	4.0000E 00	2.3528E 02	4.0000E 00	2.3626E 02	3.6000E 00
2.3700E 02	3.2000E 00	2.3783E 02	3.9000E 00	2.3857E 02	3.9000E 00
2.3929E 02	2.8000E 00	2.3983E 02	2.1000E 00	2.4037E 02	2.1000E 00
2.4114E 02	2.8000E 00	2.4201E 02	3.5000E 00	2.4259E 02	3.5000E 00
2.4320E 02	2.8000E 00	2.4375E 02	1.0000E 00	2.4440E 02	-6.0000E-01
2.4500E 02	-1.2000E 00	2.4573E 02	9.0000E-01	2.4638E 02	1.3000E 00
2.4700E 02	6.0000E-01	2.4783E 02	-1.0000E-01	2.4874E 02	-5.0000E-01
2.5055E 02	-9.0000E-01	2.5153E 02	-9.0000E-01	2.5300E 02	-9.0000E-01
2.5503E 02	4.0000E-01	2.5715E 02	4.0000E-01	2.5953E 02	0.0
2.6134E 02	-5.0000E-01	2.6243E 02	-1.4000E 00	2.6388E 02	-1.4000E 00
2.6417E 02	-8.0000E-01	2.6526E 02	1.0000E 00	2.6635E 02	1.0000E 00
2.6766E 02	6.0000E-01	2.6900E 02	-1.5000E 00	2.7031E 02	-4.0000E-01
2.7125E 02	2.3000E 00	2.7212E 02	3.4000E 00	2.7277E 02	3.0000E 00
2.7357E 02	2.3000E 00	2.7451E 02	1.3000E 00	2.7510E 02	5.0000E-01
2.7560E 02	1.6000E 00	2.7633E 02	4.8000E 00	2.7698E 02	7.3000E 00
2.7785E 02	8.0000E 00	2.7880E 02	8.4000E 00	2.7974E 02	7.3000E 00
2.8242E 02	4.4000E 00	2.8373E 02	2.6000E 00	2.8500E 02	4.0000E-01
2.8580E 02	-6.0000E-01	2.8660E 02	-1.3000E 00	2.8696E 02	-1.7000E 00
2.8812E 02	-1.8000E 00	2.8928E 02	0.0	2.9015E 02	1.1000E 00
2.9073E 02	1.4000E 00	2.9131E 02	7.0000E-01	2.9233E 02	-4.0000E-01
2.9298E 02	-1.2000E 00	2.9523E 02	-1.2000E 00	2.9661E 02	-1.0000E 00
2.9806E 02	-8.0000E-01	2.9929E 02	-1.8000E 00	3.0002E 02	-1.5000E 00
3.0045E 02	-1.4000E 00	3.0100E 02	1.0000E 00	0.0	0.0

TABLE V

FISSION NEUTRON CROSS SECTION SMOOTH FILE

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
1.0000E 00	1.9802E 01	1.1250E 00	1.8300E 01	1.2500E 00	1.7000E 01
1.3750E 00	1.6000E 01	1.5000E 00	1.5100E 01	1.7500E 00	1.3500E 01
2.0000E 00	1.2000E 01	2.2500E 00	1.0800E 01	2.5000E 00	9.9000E 00
3.0000E 00	8.3000E 00	3.5000E 00	7.2000E 00	4.0000E 00	6.3000E 00
5.5000E 00	4.3000E 00	6.8100E 00	3.0000E 00	7.0840E 00	3.6000E 00
7.2830E 00	4.5000E 00	7.4820E 00	6.1000E 00	7.5820E 00	7.3000E 00
7.6460E 00	6.5000E 00	7.7180E 00	0.0	7.7720E 00	-1.0000E 01
7.8360E 00	-1.3000E 01	7.9540E 00	-1.0000E 01	8.1530E 00	-8.0000E 00
8.3430E 00	-4.0000E 00	8.5520E 00	-2.0000E 00	8.7870E 00	-3.0000E-01
9.0000E 00	-7.0000E-01	9.5540E 00	-3.3000E 00	9.7600E 00	-5.0000E 00
9.9240E 00	-7.0000E 00	1.0114E 01	-8.0000E 00	1.0268E 01	-9.0000E 00
1.0386E 01	-1.1000E 01	1.0540E 01	-1.9000E 01	1.0640E 01	-2.4000E 01
1.0700E 01	-2.5000E 01	1.0794E 01	-1.9000E 01	1.0975E 01	0.0
1.1193E 01	2.2500E 01	1.1283E 01	2.5800E 01	1.1410E 01	3.0900E 01
1.1528E 01	3.4000E 01	1.1627E 01	4.2000E 01	1.1700E 01	5.0000E 01
1.1745E 01	5.6000E 01	1.1772E 01	4.3000E 01	1.1836E 01	0.0
1.1881E 01	-2.8800E 01	1.1917E 01	-4.9000E 01	1.1963E 01	-4.3200E 01
1.2008E 01	-3.4600E 01	1.2080E 01	-2.3800E 01	1.2171E 01	-1.2200E 01
1.2280E 01	-5.0000E 00	1.2407E 01	-1.4000E 00	1.2678E 01	1.6000E 00
1.3000E 01	2.6000E 00	1.3380E 01	4.3000E 00	1.3670E 01	7.2000E 00
1.3852E 01	1.2200E 01	1.4015E 01	2.0900E 01	1.4106E 01	2.7400E 01
1.4169E 01	2.8800E 01	1.4214E 01	2.2300E 01	1.4277E 01	0.0
1.4350E 01	-2.3000E 01	1.4422E 01	-3.9000E 01	1.4477E 01	-4.2000E 01
1.4540E 01	-3.5000E 01	1.4622E 01	-1.4000E 01	1.4676E 01	-1.0000E 00
1.4721E 01	1.2000E 00	1.4767E 01	2.5900E 01	1.4812E 01	2.8800E 01
1.4875E 01	2.8100E 01	1.4921E 01	2.5200E 01	1.4993E 01	1.7300E 01
1.5084E 01	1.1500E 01	1.5174E 01	7.2000E 00	1.5356E 01	2.2000E 00
1.5537E 01	7.0000E-01	1.5718E 01	0.0	1.7000E 01	5.9000E 00
1.7136E 01	7.2000E 00	1.7263E 01	1.0100E 01	1.7435E 01	1.5100E 01
1.7516E 01	1.4400E 01	1.7689E 01	7.2000E 00	1.7861E 01	1.4000E 00
1.7960E 01	0.0	1.8287E 01	0.0	1.8631E 01	1.7000E 00

TABLE V
(Cont'd)

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
2.1000E 01	1.0000E 00	2.1200E 01	7.0000E-01	2.1350E 01	4.0000E-01
2.1540E 01	0.0	2.1720E 01	-7.0000E-01	2.1900E 01	-1.4000E 00
2.2080E 01	0.0	2.2570E 01	1.4000E 00	2.2990E 01	4.0000E 00
2.3350E 01	5.0000E 00	2.3530E 01	5.8000E 00	2.3710E 01	5.5000E 00
2.3840E 01	2.9000E 00	2.3930E 01	0.0	2.4140E 01	0.0
2.4390E 01	2.0000E 00	2.4610E 01	2.9000E 00	2.4790E 01	1.4000E 00
2.5000E 01	7.0000E-01	2.5360E 01	2.2000E 00	2.5610E 01	3.6000E 00
2.5780E 01	4.3000E 00	2.5920E 01	6.5000E 00	2.5990E 01	8.6000E 00
2.6080E 01	8.3000E 00	2.6630E 01	7.0000E-01	2.6990E 01	7.0000E-01
2.7220E 01	4.3000E 00	2.7380E 01	4.3000E 00	2.7560E 01	1.4000E 00
2.7910E 01	0.0	2.8250E 01	7.0000E-01	2.8520E 01	2.2000E 00
2.8790E 01	2.2000E 00	2.9000E 01	7.0000E-01	2.9100E 01	0.0
4.4900E 01	0.0	4.5000E 01	-1.1000E 00	4.5330E 01	-1.2000E 00
4.6060E 01	-1.4000E 00	4.7030E 01	-1.1000E 00	4.7890E 01	-7.0000E-01
4.8460E 01	-7.0000E-01	4.8770E 01	-1.8000E 00	4.9000E 01	-3.6000E 00
4.9320E 01	-5.0000E 00	4.9520E 01	-4.6000E 00	4.9680E 01	-2.5000E 00
4.9830E 01	0.0	5.0260E 01	0.0	5.0850E 01	-1.4000E 00
5.1370E 01	-2.1000E 00	5.1820E 01	-3.2000E 00	5.2170E 01	-4.6000E 00
5.2280E 01	-4.6000E 00	5.2410E 01	-2.9000E 00	5.2590E 01	4.0000E-01
5.2680E 01	4.0000E-01	5.2800E 01	-7.0000E-01	5.3000E 01	-3.2000E 00
5.3570E 01	-6.4000E 00	5.4180E 01	-8.2000E 00	5.4760E 01	-1.0000E 01
5.5220E 01	-1.0000E 01	5.5510E 01	-1.0700E 01	5.5690E 01	-1.3200E 01
5.5870E 01	-1.7100E 01	5.6050E 01	-1.9300E 01	5.6260E 01	-2.0400E 01
5.6480E 01	-1.9600E 01	5.6660E 01	-1.7900E 01	5.6770E 01	-1.5000E 01
5.6870E 01	-1.0400E 01	5.6980E 01	-5.0000E 00	5.7090E 01	-1.8000E 00
5.7340E 01	0.0	5.7700E 01	0.0	5.7950E 01	1.4000E 00
5.8130E 01	4.3000E 00	5.8310E 01	8.3000E 00	5.8450E 01	1.4600E 01
5.8600E 01	1.7100E 01	5.8810E 01	1.8900E 01	5.8990E 01	1.8200E 01
5.9130E 01	1.5700E 01	5.9420E 01	1.1400E 01	5.9670E 01	8.6000E 00
5.9960E 01	5.7000E 00	6.0280E 01	3.6000E 00	6.1000E 01	1.4000E 00
6.2720E 01	4.0000E-01	6.3040E 01	0.0	6.3510E 01	-7.0000E-01
6.3830E 01	-2.9000E 00	6.4160E 01	-5.0000E 00	6.4520E 01	-7.1000E 00
6.4770E 01	-8.9000E 00	6.4980E 01	-8.6000E 00	6.5160E 01	-6.4000E 00
6.5340E 01	-2.9000E 00	6.5520E 01	7.0000E-01	6.5840E 01	1.0700E 01
6.5060E 01	1.5700E 01	6.6170E 01	1.7900E 01	6.6310E 01	1.8900E 01

TABLE V
(Cont'd)

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
6.6490E 01	1.8600E 01	6.6700E 01	1.6100E 01	6.7100E 01	1.2500E 01
6.7490E 01	9.3000E 00	6.7920E 01	6.4000E 00	6.8320E 01	5.0000E 00
6.9000E 01	3.6000E 00	7.1330E 01	2.1000E 00	7.2050E 01	2.1000E 00
7.2520E 01	3.6000E 00	7.3050E 01	5.7000E 00	7.3480E 01	8.9000E 00
7.3700E 01	9.6000E 00	7.3990E 01	8.9000E 00	7.4100E 01	9.0000E 00
7.4200E 01	8.0000E 00	7.4300E 01	2.2000E 00	7.4350E 01	-4.7000E 00
7.4390E 01	-8.4000E 00	7.4460E 01	-1.0000E 01	7.4520E 01	-8.0000E 00
7.4600E 01	-3.0000E 00	7.4700E 01	3.0000E 00	7.4800E 01	5.6000E 00
7.4940E 01	7.4000E 00	7.5100E 01	7.6000E 00	7.5300E 01	7.0000E 00
7.5420E 01	6.4000E 00	7.5780E 01	5.4000E 00	7.6030E 01	4.3000E 00
7.5460E 01	1.4000E 00	7.7000E 01	-1.4000E 00	7.9370E 01	-5.7000E 00
7.9800E 01	-6.8000E 00	8.0120E 01	-6.4000E 00	8.0440E 01	-3.9000E 00
8.0870E 01	4.0000E-01	8.1200E 01	1.4000E 00	8.1520E 01	1.4000E 00
8.1900E 01	1.1000E 00	8.2540E 01	-4.0000E-01	8.2760E 01	-7.0000E-01
8.3030E 01	0.0	8.3350E 01	2.1000E 00	8.3620E 01	4.3000E 00
8.3830E 01	4.6000E 00	8.4050E 01	2.5000E 00	8.4430E 01	-1.1000E 00
8.4690E 01	-2.1000E 00	8.4960E 01	-2.5000E 00	8.5290E 01	-1.1000E 00
8.5560E 01	7.0000E-01	8.5880E 01	2.1000E 00	8.6150E 01	2.1000E 00
8.6420E 01	1.1000E 00	8.6900E 01	-7.0000E-01	8.7390E 01	-2.1000E 00
8.7980E 01	-2.9000E 00	8.9000E 01	-2.9000E 00	8.9870E 01	7.0000E-01
9.0580E 01	2.9000E 00	9.1290E 01	3.9000E 00	9.2050E 01	4.3000E 00
9.4560E 01	5.7000E 00	9.5050E 01	5.7000E 00	9.5600E 01	4.6000E 00
9.6200E 01	2.1000E 00	9.6750E 01	7.0000E-01	9.7130E 01	7.0000E-01
9.7510E 01	2.1000E 00	9.8110E 01	6.1000E 00	9.8820E 01	1.0400E 01
9.9640E 01	1.2500E 01	1.0040E 02	1.3200E 01	1.0100E 02	1.2100E 01
1.0200E 02	1.0000E 01	1.0500E 02	7.1000E 00	1.0610E 02	6.4000E 00
1.0680E 02	5.7000E 00	1.0790E 02	3.9000E 00	1.0850E 02	3.0000E 00
1.0900E 02	2.7000E 00	1.1100E 02	1.0000E 00	1.1150E 02	0.0
1.1250E 02	-5.0000E-01	1.1350E 02	-1.0000E 00	1.1400E 02	-5.0000E-01
1.1450E 02	5.0000E-01	1.1550E 02	0.0	1.1590E 02	5.0000E-01
1.1610E 02	1.2000E 00	1.1660E 02	4.8000E 00	1.1680E 02	5.7000E 00
1.1700E 02	6.2000E 00	1.1720E 02	7.1000E 00	1.1740E 02	7.7000E 00
1.1770E 02	7.7000E 00	1.1810E 02	7.1000E 00	1.1880E 02	5.7000E 00
1.1950E 02	4.5000E 00	1.1990E 02	3.7000E 00	1.2500E 02	3.6000E 00
1.2610E 02	3.0000E 00	1.2680E 02	2.9000E 00	1.3100E 02	4.0000E-01
1.3350E 02	0.0	1.3450E 02	-2.0000E 00	1.3550E 02	-2.0000E 00

TABLE V
(Cont'd)

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
1.3650E 02	0.0	1.4900E 02	0.0	1.4940E 02	9.0000E-01
1.4970E 02	1.2000E 00	1.5050E 02	1.8000E 00	1.5120E 02	2.1000E 00
1.5920E 02	2.1000E 00	1.6280E 02	9.0000E-01	1.6350E 02	2.0000E-01
1.6500E 02	0.0	1.6540E 02	4.0000E-01	1.6570E 02	1.8000E 00
1.6610E 02	3.6000E 00	1.6650E 02	4.3000E 00	1.6680E 02	3.9000E 00
1.6720E 02	2.9000E 00	1.6750E 02	2.1000E 00	1.6790E 02	1.8000E 00
1.6940E 02	1.8000E 00	1.6970E 02	1.6000E 00	1.7050E 02	0.0
1.7300E 02	0.0	1.7450E 02	1.1000E 00	1.7880E 02	1.2000E 00
1.8100E 02	1.6000E 00	1.8170E 02	2.7000E 00	1.8250E 02	2.5000E 00
1.8280E 02	2.3000E 00	1.8320E 02	1.6000E 00	1.8390E 02	0.0
1.8680E 02	4.0000E-01	1.8720E 02	7.0000E-01	1.9590E 02	7.0000E-01
1.9610E 02	9.0000E 00	1.9620E 02	1.0000E 01	1.9630E 02	9.0000E 00
1.9660E 02	3.5000E 00	1.9674E 02	1.7000E 00	1.9690E 02	5.0000E-01
1.9730E 02	3.0000E 00	1.9762E 02	6.1000E 00	1.9823E 02	6.4000E 00
1.9867E 02	5.7000E 00	1.9896E 02	3.9000E 00	1.9925E 02	1.8000E 00
1.9947E 02	4.0000E-01	1.9976E 02	7.0000E-01	1.9997E 02	1.8000E 00
2.0030E 02	3.6000E 00	2.0128E 02	6.8000E 00	2.0204E 02	8.9000E 00
2.0255E 02	1.0900E 01	2.0277E 02	1.1900E 01	2.0295E 02	1.0900E 01
2.0300E 02	1.0800E 01	2.0310E 02	8.5000E 00	2.0320E 02	4.0000E 00
2.0330E 02	1.0000E 00	2.0418E 02	0.0	2.0451E 02	6.4000E 00
2.0469E 02	8.6000E 00	2.0480E 02	8.9000E 00	2.0500E 02	6.8000E 00
2.0578E 02	3.9000E 00	2.0654E 02	2.5000E 00	2.0733E 02	1.8000E 00
2.0800E 02	0.0	2.1050E 02	0.0	2.1100E 02	5.0000E-01
2.1150E 02	2.2500E 00	2.1200E 02	3.5000E 00	2.1250E 02	4.3000E 00
2.1300E 02	4.5000E 00	2.1318E 02	3.2000E 00	2.1336E 02	2.9000E 00
2.1362E 02	3.2000E 00	2.1423E 02	4.3000E 00	2.1467E 02	4.6000E 00
2.1514E 02	4.3000E 00	2.1590E 02	3.9000E 00	2.1656E 02	3.6000E 00
2.1703E 02	3.2000E 00	2.1746E 02	3.6000E 00	2.1819E 02	3.9000E 00
2.1877E 02	3.9000E 00	2.1942E 02	3.2000E 00	2.2100E 02	2.1000E 00
2.2216E 02	2.5000E 00	2.2285E 02	2.9000E 00	2.2339E 02	2.9000E 00
2.2365E 02	3.2000E 00	2.2390E 02	3.9000E 00	2.2521E 02	7.1000E 00
2.2612E 02	8.6000E 00	2.2710E 02	1.0000E 01	2.2804E 02	1.0000E 01
2.2862E 02	9.6000E 00	2.2900E 02	9.6000E 00	2.2947E 02	9.3000E 00
2.2998E 02	7.9000E 00	2.3129E 02	5.0000E 00	2.3190E 02	3.2000E 00
2.3230E 02	2.9000E 00	2.3263E 02	3.2000E 00	2.3328E 02	4.6000E 00
2.3401E 02	5.0000E 00	2.3528E 02	5.0000E 00	2.3626E 02	4.6000E 00

TABLE V
(Cont'd)

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
2.3700E 02	4.3000E 00	2.3783E 02	5.0000E 00	2.3867E 02	5.0000E 00
2.3929E 02	3.9000E 00	2.3983E 02	3.2000E 00	2.4037E 02	3.2000E 00
2.4114E 02	3.9000E 00	2.4201E 02	4.6000E 00	2.4259E 02	4.6000E 00
2.4320E 02	3.9000E 00	2.4375E 02	2.1000E 00	2.4440E 02	7.0000E-01
2.4500E 02	0.0	2.4573E 02	2.1000E 00	2.4638E 02	2.5000E 00
2.4700E 02	1.8000E 00	2.4783E 02	1.1000E 00	2.4874E 02	7.0000E-01
2.5055E 02	4.0000E-01	2.5153E 02	4.0000E-01	2.5300E 02	4.0000E-01
2.5503E 02	1.8000E 00	2.5715E 02	1.8000E 00	2.5953E 02	1.4000E 00
2.6134E 02	9.0000E-01	2.6243E 02	0.0	2.6388E 02	0.0
2.6417E 02	7.0000E-01	2.6526E 02	2.5000E 00	2.6635E 02	2.5000E 00
2.6766E 02	2.1000E 00	2.6900E 02	0.0	2.7031E 02	1.1000E 00
2.7125E 02	3.9000E 00	2.7212E 02	5.0000E 00	2.7277E 02	4.6000E 00
2.7357E 02	3.9000E 00	2.7451E 02	2.9000E 00	2.7510E 02	2.1000E 00
2.7560E 02	3.2000E 00	2.7633E 02	6.4000E 00	2.7698E 02	8.9000E 00
2.7785E 02	9.6000E 00	2.7880E 02	1.0000E 01	2.7974E 02	8.9000E 00
2.8242E 02	6.1000E 00	2.8373E 02	4.3000E 00	2.8500E 02	2.1000E 00
2.8580E 02	1.1000E 00	2.8660E 02	4.0000E-01	2.8696E 02	0.0
2.8812E 02	0.0	2.8928E 02	1.8000E 00	2.9015E 02	2.9000E 00
2.9073E 02	3.2000E 00	2.9131E 02	2.5000E 00	2.9233E 02	1.4000E 00
2.9298E 02	7.0000E-01	2.9523E 02	7.0000E-01	2.9661E 02	9.0000E-01
2.9806E 02	1.1000E 00	2.9929E 02	1.0000E-01	3.0002E 02	4.0000E-01
3.0045E 02	5.0000E-01	3.0100E 02	2.9000E 00	0.0	0.0

TABLE VI

CAPTURE NEUTRON CROSS SECTION SMOOTH FILE

E(eV)	σ(b)	E(eV)	σ(b)	E(eV)	σ(b)
1.0000E 00	7.7740E 00	1.1250E 00	6.5000E 00	1.2500E 00	5.5000E 00
1.3750E 00	4.7000E 00	1.5000E 00	4.1000E 00	1.7500E 00	2.9000E 00
2.0000E 00	1.8000E 00	2.2500E 00	9.0000E-01	2.5000E 00	4.0000E-01
3.0000E 00	0.0	3.5000E 00	0.0	4.0000E 00	0.0
5.5000E 00	3.8000E-01	6.8100E 00	7.0000E-01	7.0840E 00	1.5000E 00
7.2830E 00	3.0000E 00	7.4820E 00	7.8000E 00	7.5820E 00	1.4800E 01
7.6460E 00	1.7300E 01	7.7180E 00	1.3000E 01	7.7720E 00	1.0000E 01
7.8360E 00	8.0000E 00	7.9540E 00	6.0000E 00	8.1530E 00	5.0000E 00
8.3430E 00	2.0000E 00	8.5520E 00	1.0000E 00	8.7870E 00	0.0
1.3852E 01	0.0	1.4015E 01	0.0	1.4106E 01	1.4000E 00
1.4169E 01	2.2000E 00	1.4214E 01	3.3000E 00	1.4277E 01	5.0000E 00
1.4350E 01	9.0000E 00	1.4422E 01	1.9000E 01	1.4477E 01	3.4000E 01
1.4540E 01	4.1000E 01	1.4622E 01	4.3000E 01	1.4676E 01	4.3000E 01
1.4721E 01	1.5000E 01	1.4767E 01	8.0000E 00	1.4812E 01	5.0000E 00
1.4875E 01	2.2000E 00	1.4921E 01	0.0	1.4993E 01	0.0
1.0100E 02	0.0	1.2610E 02	0.0	1.2680E 02	5.0000E-02
1.3150E 02	2.0000E-01	1.4900E 02	8.0000E-01	1.5120E 02	1.1000E 00
1.5920E 02	1.3000E 00	1.7050E 02	1.4000E 00	1.8250E 02	1.5000E 00
1.8720E 02	1.5000E 00	1.9700E 02	0.0	3.0100E 02	0.0

TABLE VII

SCATTER NEUTRON CROSS SECTION SMOOTH FILE

1.0000E 00	2.9940E 00	1.1250E 00	2.9700E 00	1.2500E 00	2.9400E 00
1.3750E 00	2.9300E 00	1.5000E 00	2.9100E 00	1.7500E 00	2.9000E 00
2.0000E 00	2.8000E 00	2.2500E 00	2.8000E 00	2.5000E 00	2.8000E 00
3.0000E 00	2.7000E 00	3.5000E 00	2.6000E 00	4.0000E 00	2.6000E 00
5.5000E 00	2.3000E 00	6.8100E 00	2.1000E 00	7.0840E 00	2.1000E 00
3.0100E 02	-1.9000E 00	0.0	0.0	0.0	0.0

TABLE VIII

COMPARISON OF THEORY TO EXPERIMENTAL DATA

	$\int \sigma_{n\gamma}$ dE (b-eV)			$\int \sigma_{nf}$ dE (b-eV)				
E(eV)	Theory	Gwin*	Theory/Gwin	Theory	Gwin	Theory/Gwin	Blons	Theory/Blons
7-9	165.4	165.9	0.997	172.6	176.0	0.980	--	--
9-17	581.0	599.9	0.968	893.3	894.4	0.999	--	--
17-25	322.8	331.4	0.974	383.3	376.6	1.018	--	--
25-29	99.3	101.7	0.976	100.6	96.6	1.041	--	--
29-41	37.0	22.1	1.674	40.6	36.1	1.125	--	--
41-49	665.8	695.9	0.957	204.5	205.0	0.998	215.4	0.949
49-61	700.8	743.2	0.943	829.5	815.8	1.017	832.3	0.997
61-89	802.9	829.3	0.968	1724.1	1728.0	0.998	1747.1	0.987
89-109	644.7	659.4	0.978	501.0	487.9	1.027	511.4	0.980
109-125	262.9	290.4	0.905	356.8	361.8	0.986	354.5	1.006
125-149	379.0	415.1	0.913	441.2	439.2	1.005	416.7	1.059
149-181	492.2	517.2	0.952	397.4	392.4	1.013	414.4	0.959
181-213	334.9	356.2	0.940	746.8	731.1	1.021	710.9	1.050
213-237	451.4	484.2	0.932	237.0	241.5	0.981	245.6	0.965
237-253	359.0	434.3	0.827	173.7	187.2	0.928	187.4	0.927
253-285	542.6	597.8	0.908	849.1	869.1	0.977	837.8	1.013
285-301	126.2	153.4	0.823	146.1	162.3	0.900	150.6	0.970
Totals	6967.9	7397.4	0.942	8197.6	8201.0	1.000	8203.5**	0.999

* These experimental integrals have been corrected for contaminats of ^{240}Pu and W in as much as possible.

** Includes Gwin's integrals from 7-41 eV.

TABLE IX

QUARTER LETHARGY GROUP CROSS SECTION STRUCTURE FOR ^{239}Pu

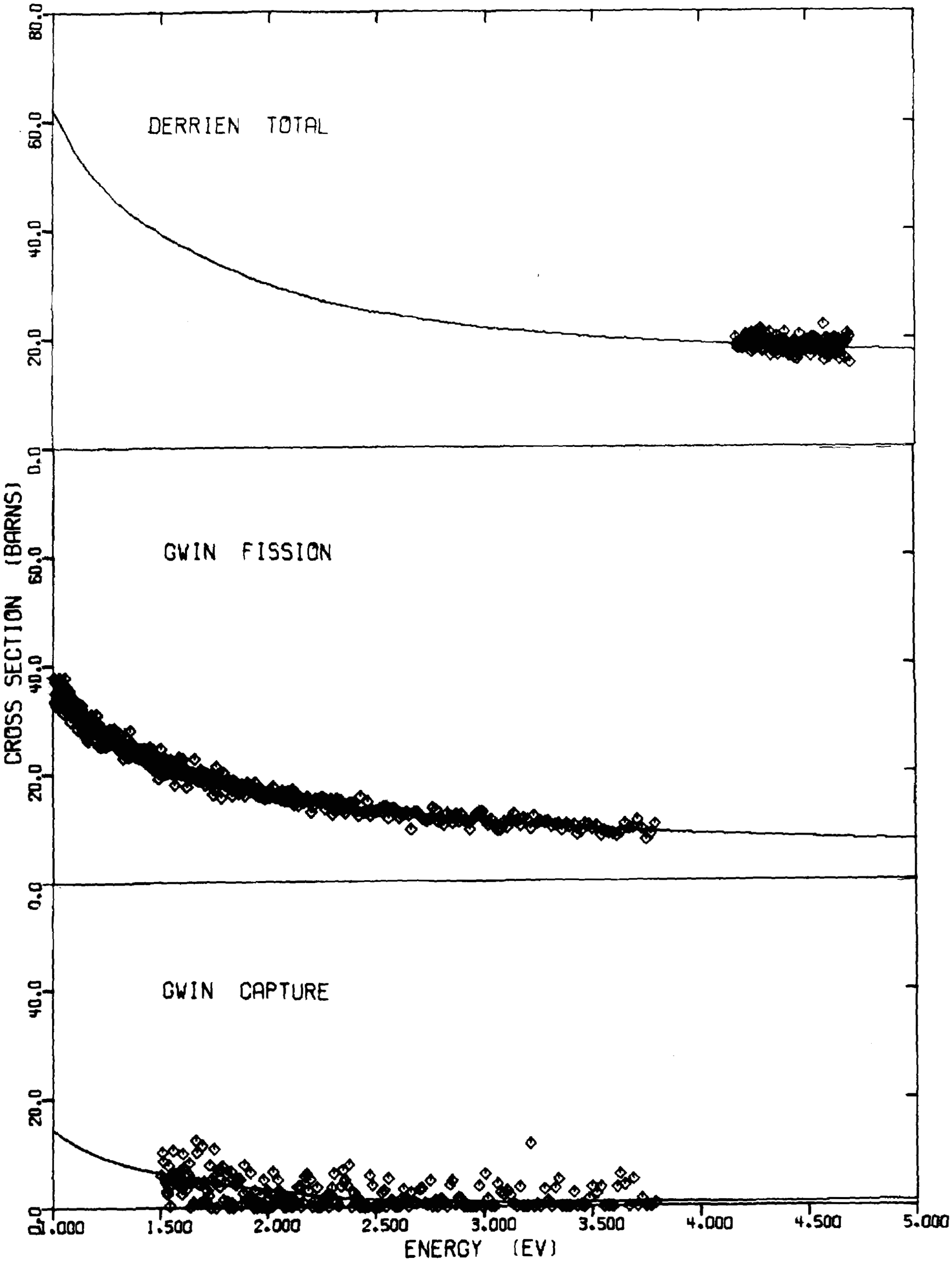
Group Number	Lower Lethargy	Lower Energy (eV)	$\int\sigma_{n\gamma}dE$ (b-eV)	$\int\sigma_{n\gamma}dE/E$ (b)	$\int\sigma_{nf}dE$ (b-eV)	$\int\sigma_{nf}dE/E$ (b)	Alpha*
42	10.50	275.4	--	--	--	--	--
43	10.75	214.5	1093.92	4.51	1008.81	3.99	1.130
44	11.00	167.0	483.02	2.54	868.95	4.47	0.568
45	11.25	130.1	679.65	4.53	656.02	4.50	1.007
46	11.50	101.3	604.46	5.38	595.58	5.16	1.043
47	11.75	78.9	557.57	6.26	979.82	11.15	0.561
48	12.00	61.4	588.57	8.41	1059.24	15.09	0.557
49	12.25	47.9	705.26	13.32	867.98	15.38	0.866
50	12.50	37.3	668.76	15.52	191.94	4.32	3.593
51	12.75	29.0	30.00	0.87	32.71	0.99	0.879
52	13.00	22.6	113.19	4.35	126.98	4.95	0.879
53	13.25	17.6	260.90	13.09	307.52	15.05	0.870
54	13.50	13.7	331.61	22.10	427.15	28.29	0.781
55	13.75	10.68	281.49	24.38	479.84	42.68	0.571
56	14.00	8.32	19.80	2.01	40.32	4.00	0.503
57	14.25	6.48	163.39	21.00	172.08	22.18	0.947
58	14.50	5.04	2.37	0.41	9.93	1.73	0.237
59	14.75	3.93	0.97	0.22	8.87	2.00	0.110
60	15.00	3.06	0.62	0.18	8.48	2.45	0.073
61	15.25	2.38	0.74	0.28	8.31	3.09	0.091
62	15.50	1.86	1.35	0.65	8.06	3.84	0.169
63	15.75	1.44	2.22	1.37	8.45	5.18	0.264
64	16.00	1.125	2.77	2.19	8.34	6.57	0.333
65	16.25	0.876	3.61	3.67	9.26	9.38	0.391
66	16.50	0.683	4.43	5.78	11.15	14.53	0.398
67	16.75	0.532	7.17	12.09	16.27	27.22	0.444
68	17.00	0.414	17.18	37.52	33.13	72.14	0.520

* Determined from the ratio of ($\int\sigma_{n\gamma}dE/E$) / ($\int\sigma_{nf}dE/E$)

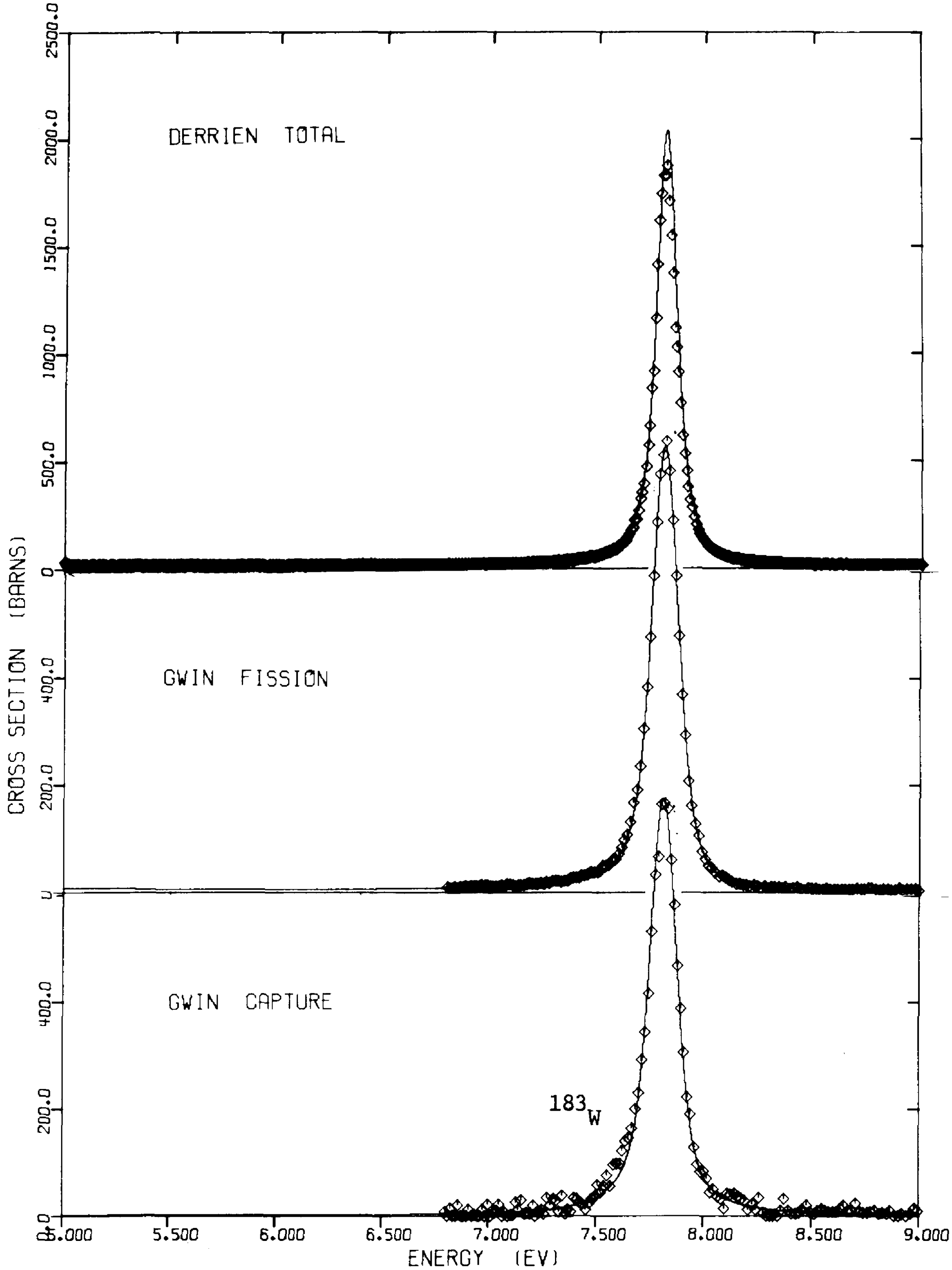
Note: This table was calculated using the ACSAP code and resonance parameters from this evaluation assuming room temperature and infinite dilution.

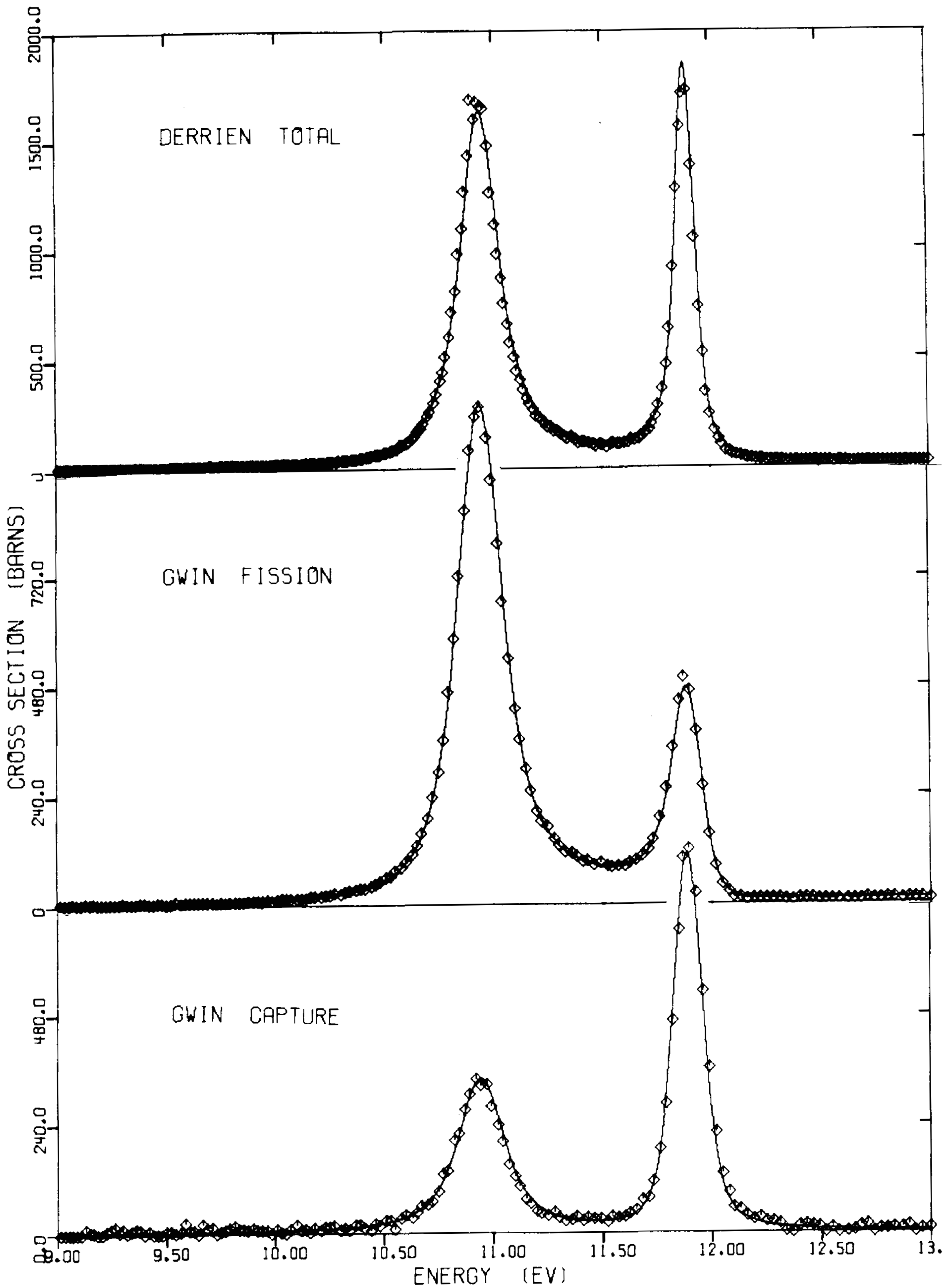
APPENDIX A

The total, fission and capture cross sections are shown as a function of neutron energy from 1-300 eV. The solid line is a theoretical fit to the data and was obtained by Doppler and resolution broadening the cross sections as predicted by the resonance parameters and smooth files of Tables III-VII.

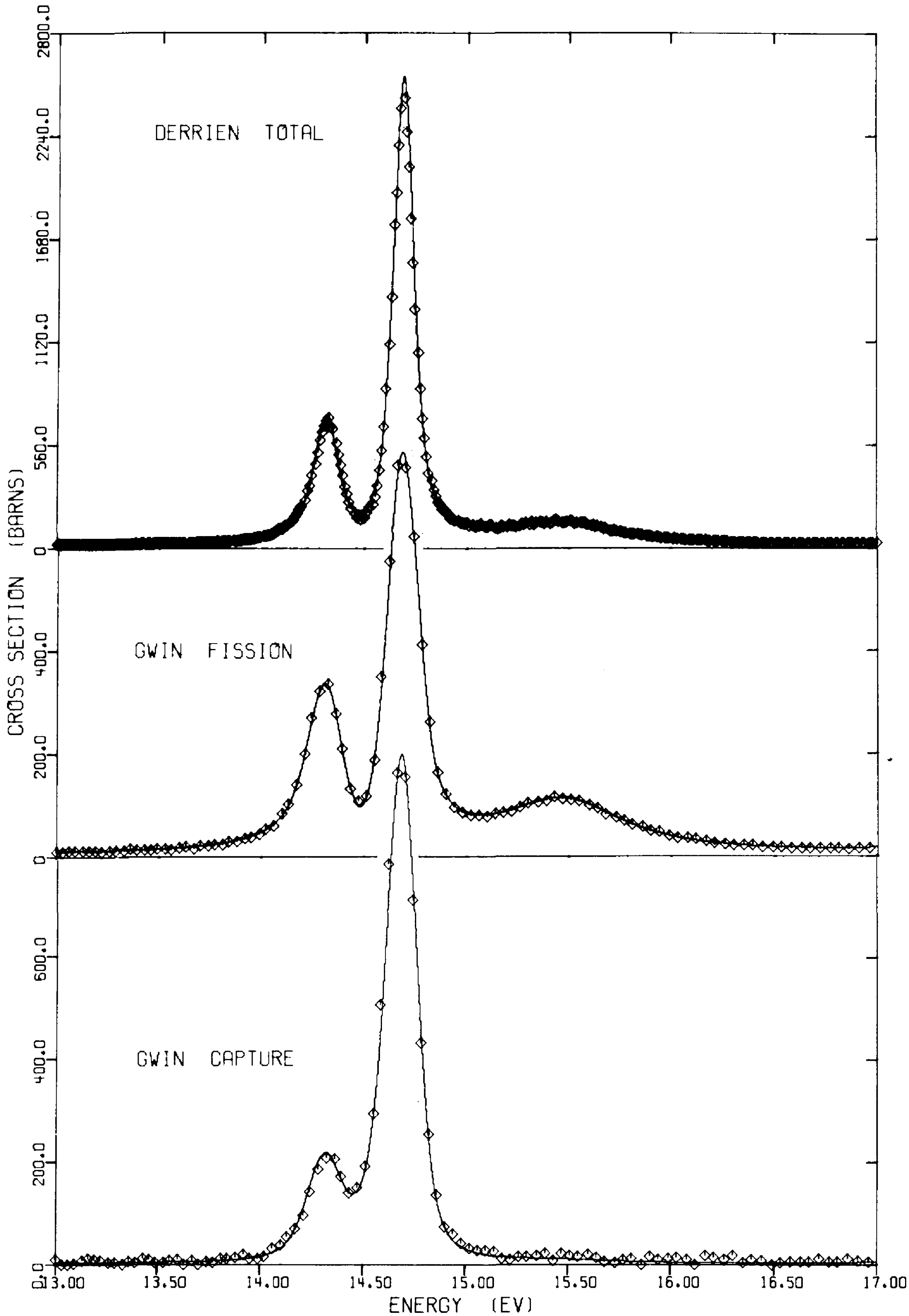


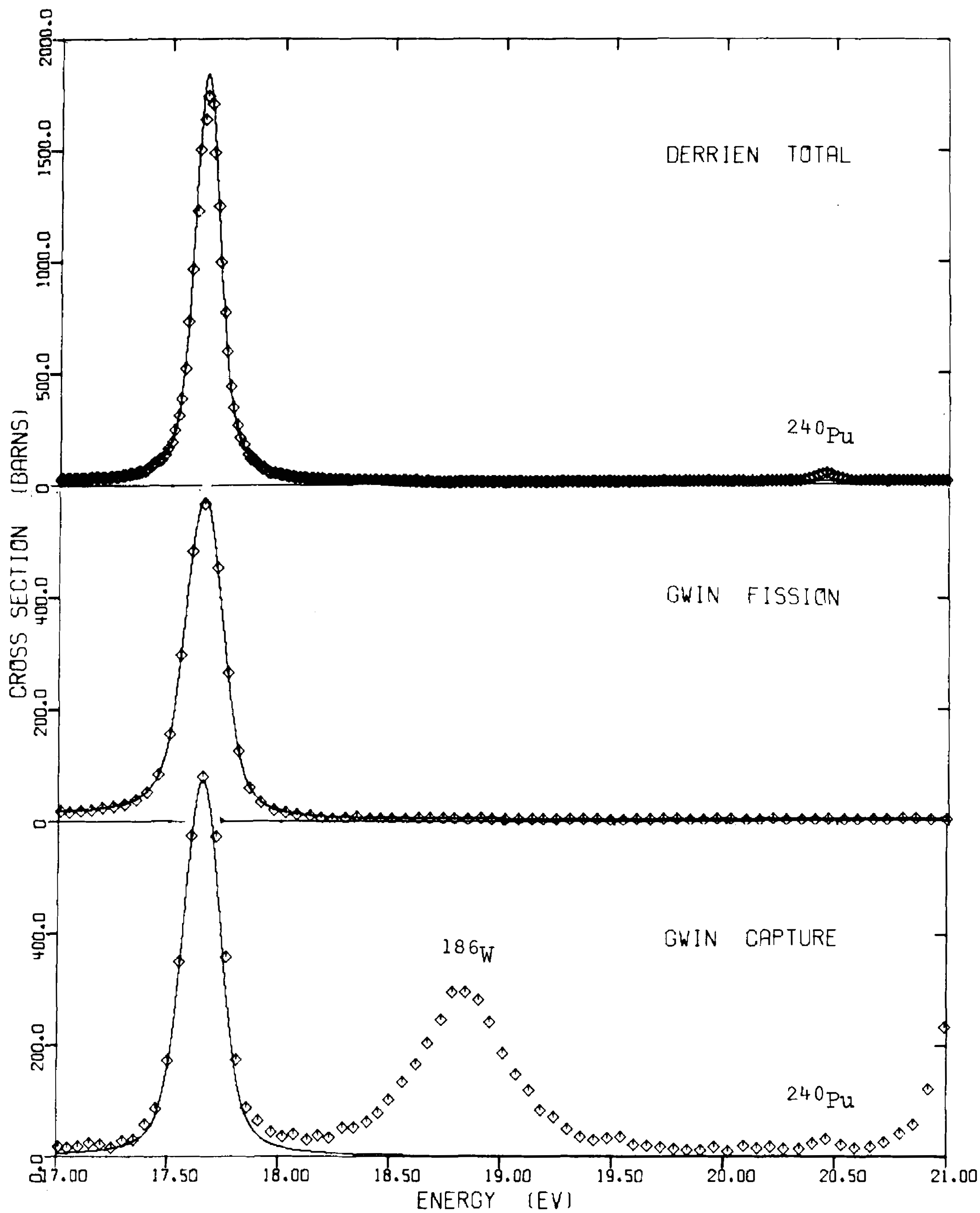
DERRIEN TOTAL
GWIN FISSION
GWIN CAPTURE
CROSS SECTION (BARNS)
80.0
60.0
40.0
20.0
0.0
1.000
1.500
2.000
2.500
3.000
3.500
4.000
4.500
5.000
ENERGY (EV)

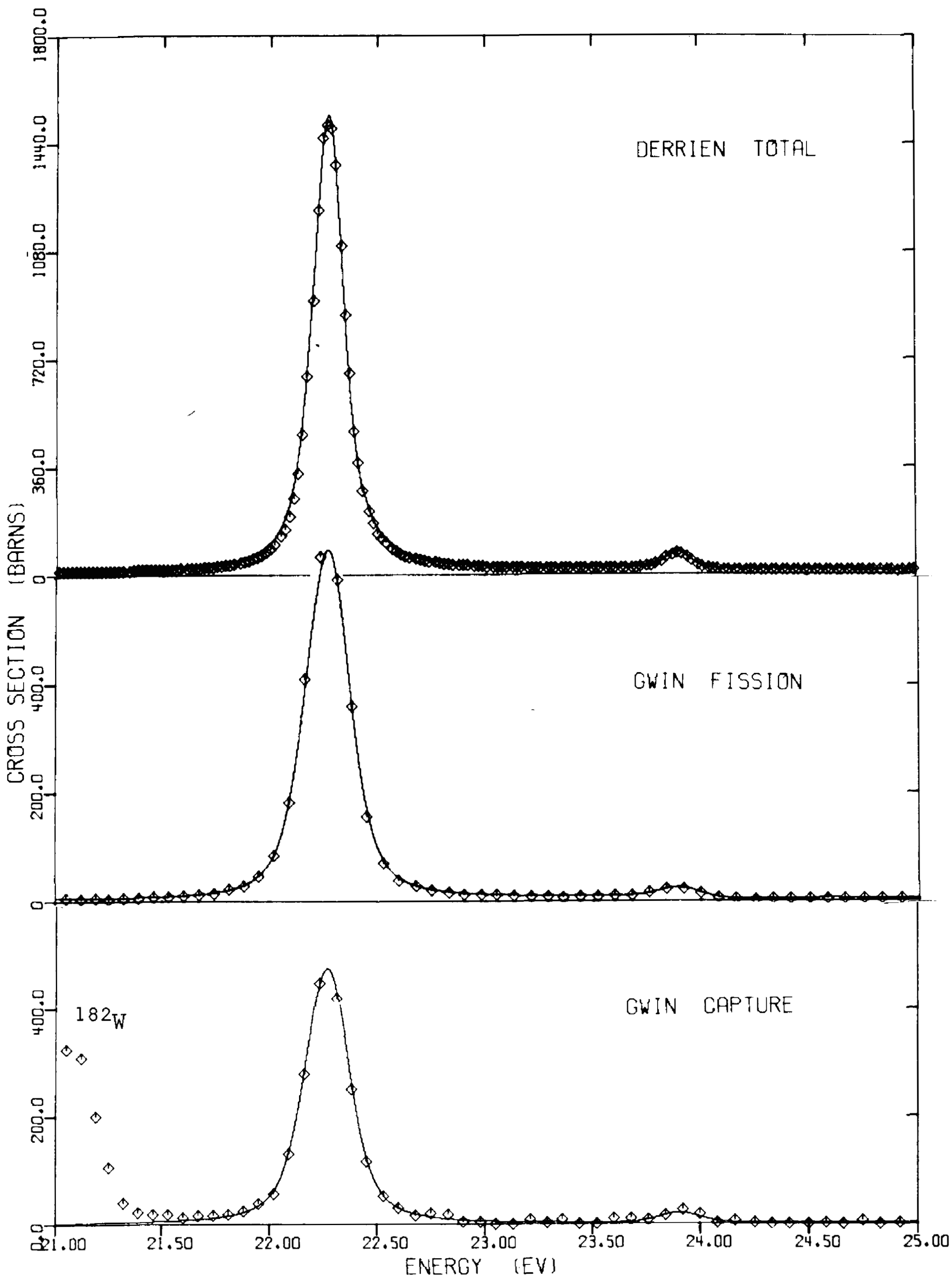

DERRIEN TOTAL
GWIN FISSION
GWIN CAPTURE
183W
CROSS SECTION (BARNS)
ENERGY (EV)
2500.0
2000.0
1500.0
1000.0
500.0
0
400.0
200.0
0
400.0
200.0
0
5.000
5.500
6.000
6.500
7.000
7.500
8.000
8.500
9.000

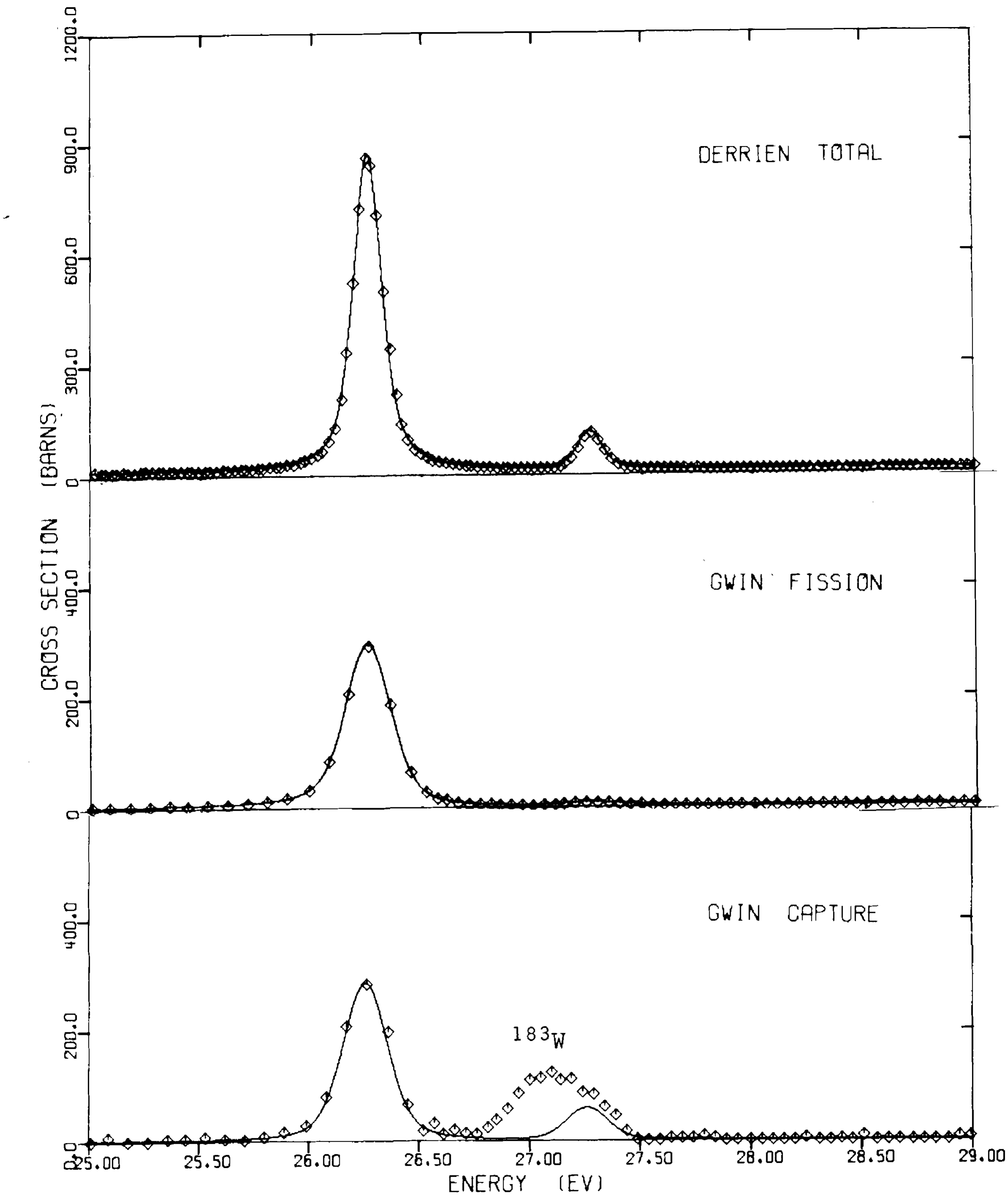


DERRIEN TOTAL
GWIN FISSION
GWIN CAPTURE
CROSS SECTION (BARNS)
2000.0
1500.0
1000.0
500.0
720.0
480.0
240.0
0
9.00
9.50
10.00
10.50
11.00
11.50
12.00
12.50
13.00
ENERGY (EV)

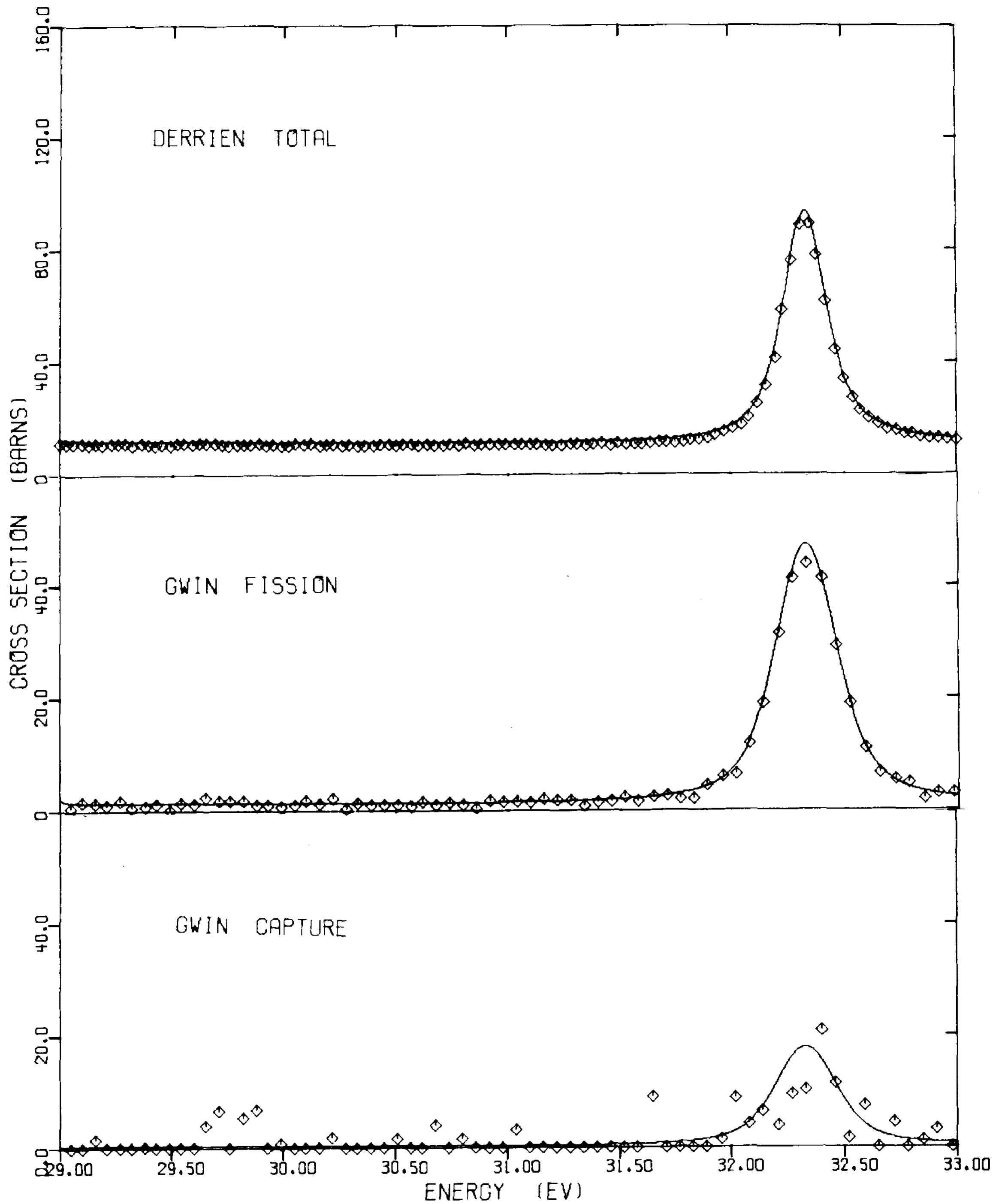

DERRIEN TOTAL
GWIN FISSION
GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)
2800.0
2240.0
1680.0
1120.0
560.0
400.0
200.0
600.0
0
13.00
13.50
14.00
14.50
15.00
15.50
16.00
16.50
17.00


DERRIEN TOTAL
GWIN FISSION
GWIN CAPTURE
^{240}Pu
^{186}W
^{240}Pu
CROSS SECTION (BARNS)
ENERGY (EV)
2000.0
1500.0
1000.0
500.0
0
400.0
200.0
0
400.0
200.0
0.0
17.00
17.50
18.00
18.50
19.00
19.50
20.00
20.50
21.00

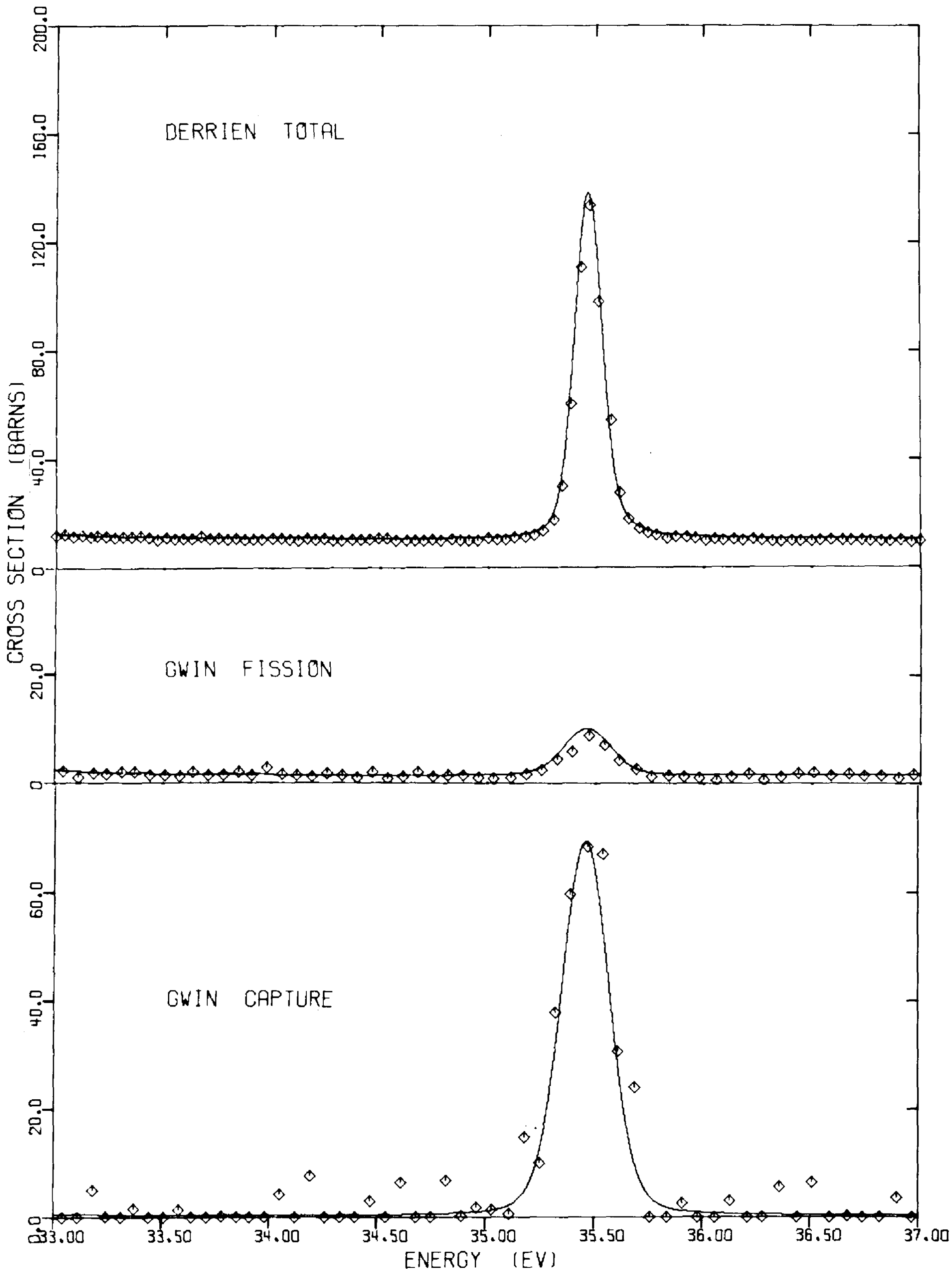

DERRIEN TOTAL
GWIN FISSION
GWIN CAPTURE
182W
CROSS SECTION (BARNS)
ENERGY (EV)
1800.0
1440.0
1080.0
720.0
360.0
400.0
200.0
0
21.00
21.50
22.00
22.50
23.00
23.50
24.00
24.50
25.00



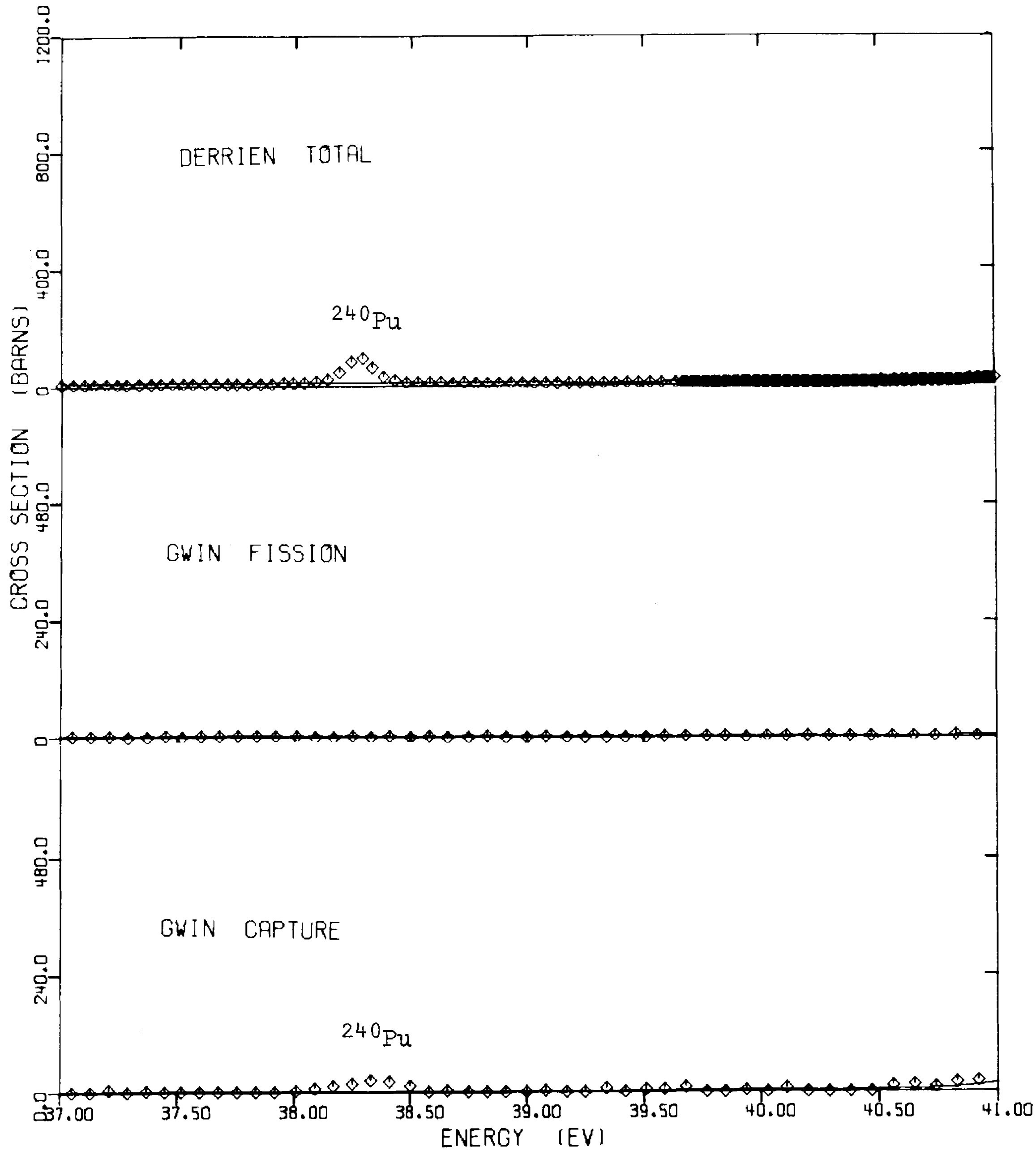
DERRIEN TOTAL
GWIN FISSION
GWIN CAPTURE
183W
CROSS SECTION (BARNS)
ENERGY (EV)



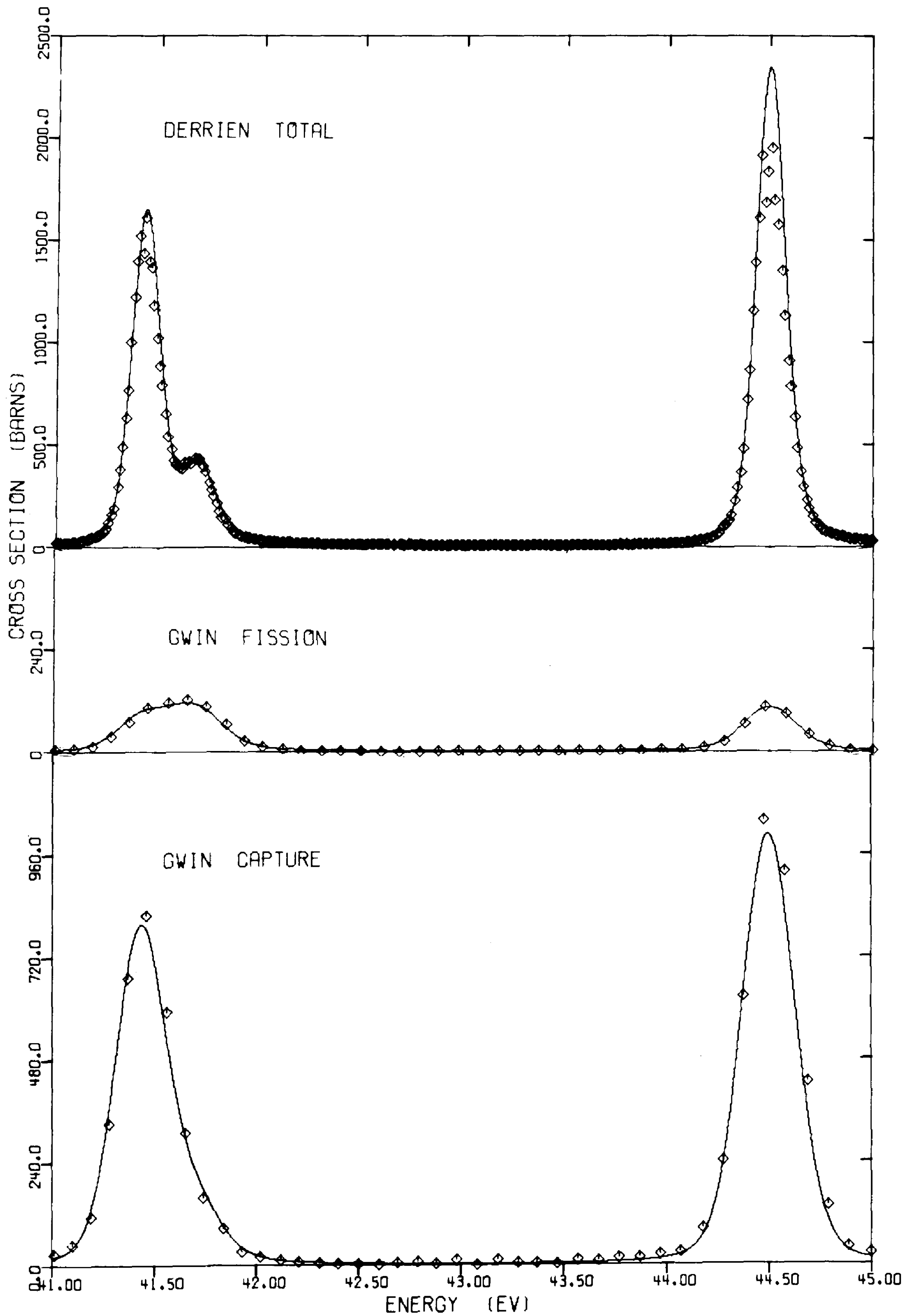
160.0
120.0
80.0
40.0
0
40.0
20.0
0
40.0
20.0
0
CROSS SECTION (BARNS)
DERRIEN TOTAL
GWIN FISSION
GWIN CAPTURE
29.00
29.50
30.00
30.50
31.00
31.50
32.00
32.50
33.00
ENERGY (EV)



DERRIEN TOTAL
GWIN FISSION
GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)
200.0
160.0
120.0
80.0
40.0
0
20.0
0
60.0
40.0
20.0
0.0
33.00
33.50
34.00
34.50
35.00
35.50
36.00
36.50
37.00

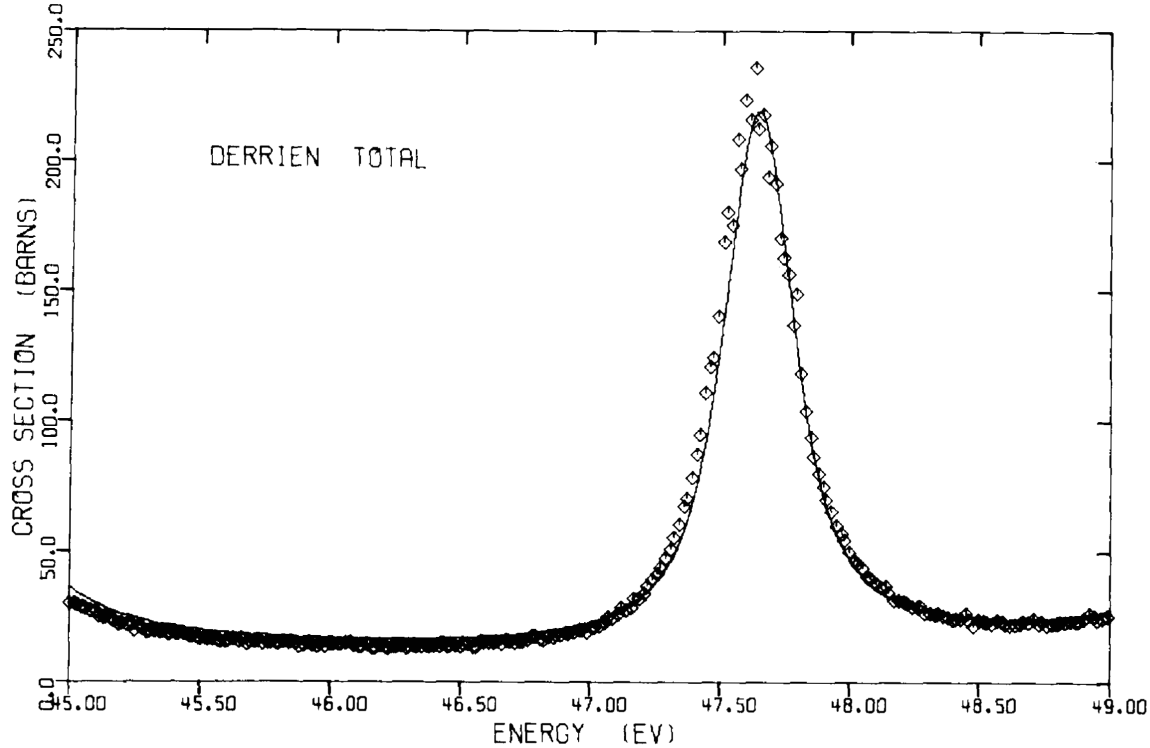


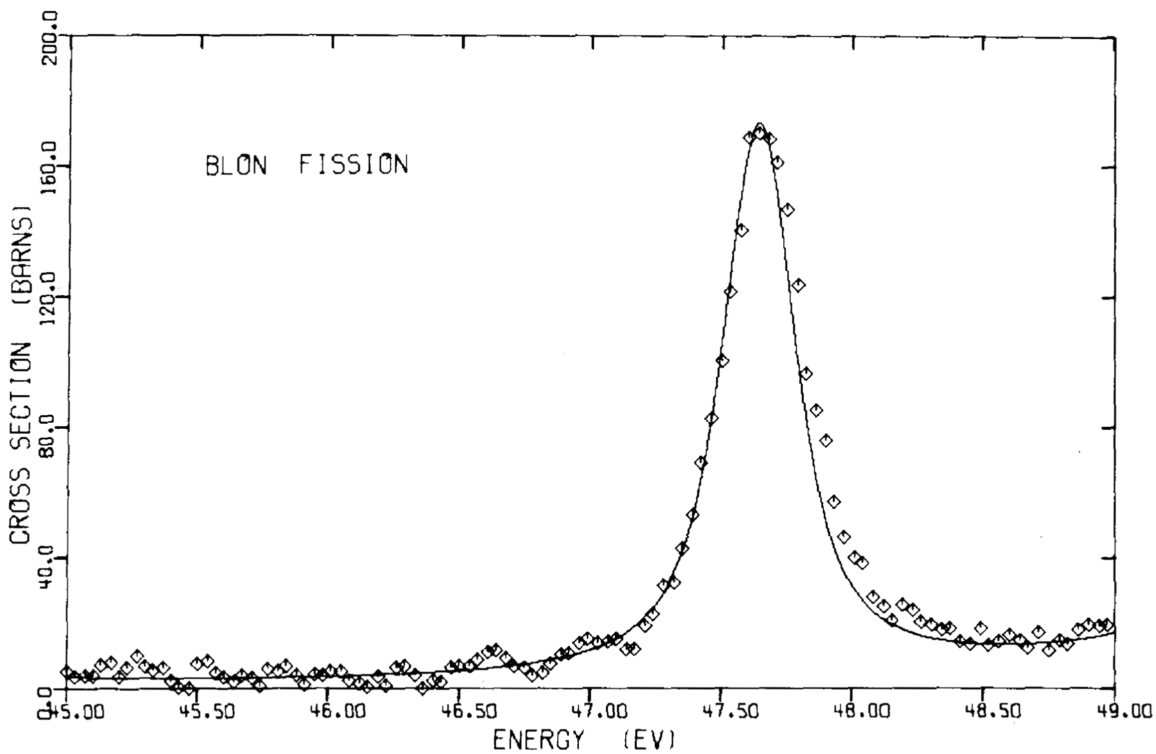
DERRIEN TOTAL
^{240}Pu
GWIN FISSION
GWIN CAPTURE
^{240}Pu
CROSS SECTION (BARNS)
ENERGY (EV)
1200.0
800.0
400.0
0
480.0
240.0
0
480.0
240.0
0.0
37.00
37.50
38.00
38.50
39.00
39.50
40.00
40.50
41.00

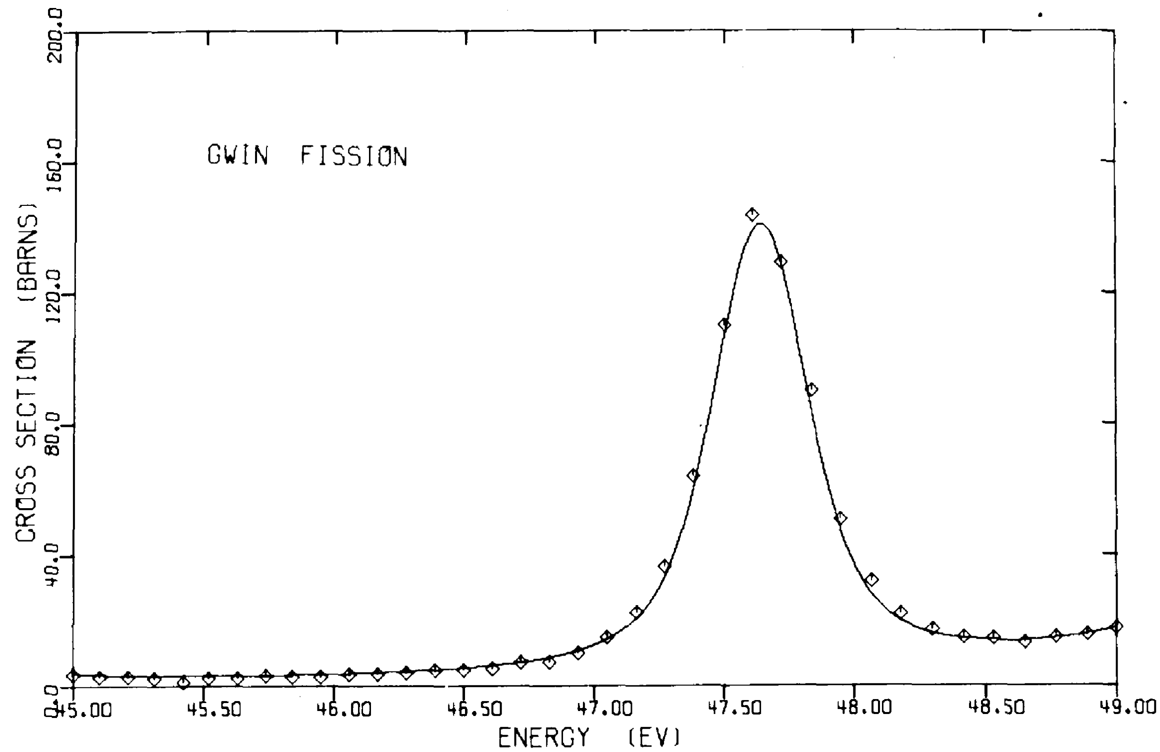


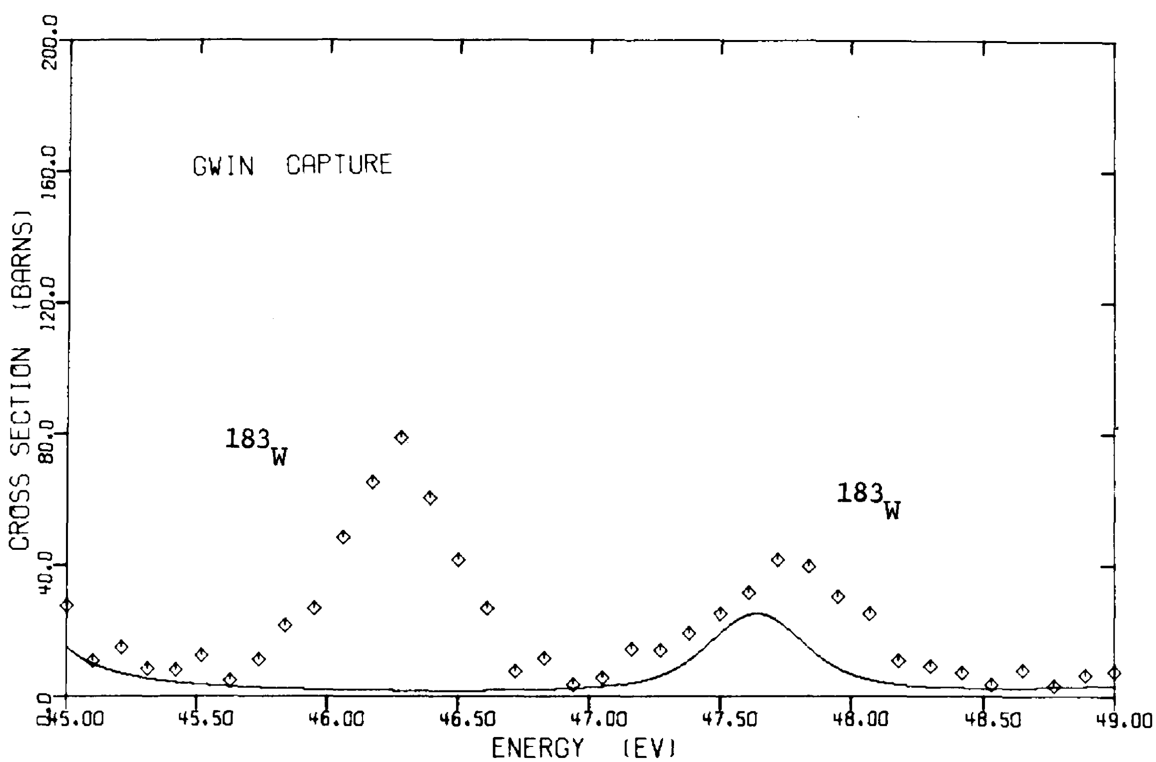
DERRIEN TOTAL
GWIN FISSION
GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)
0
500.0
1000.0
1500.0
2000.0
2500.0
240.0
480.0
720.0
960.0
41.00
41.50
42.00
42.50
43.00
43.50
44.00
44.50
45.00

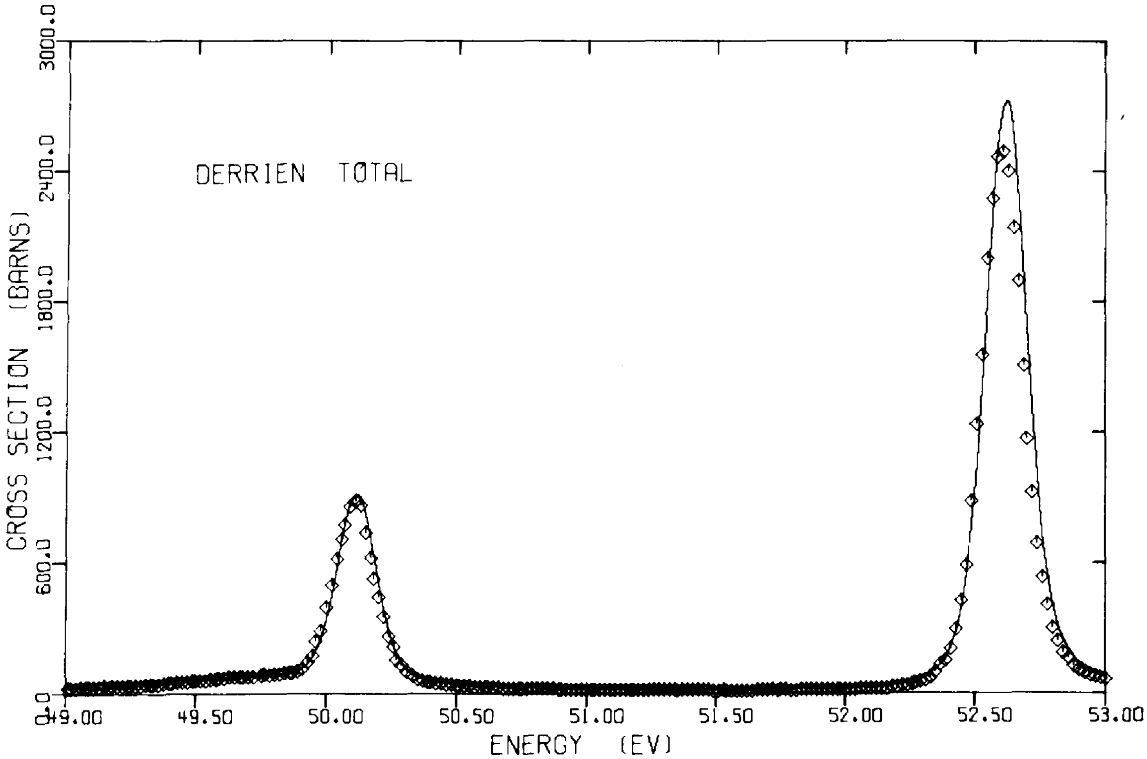
(Blank Page)

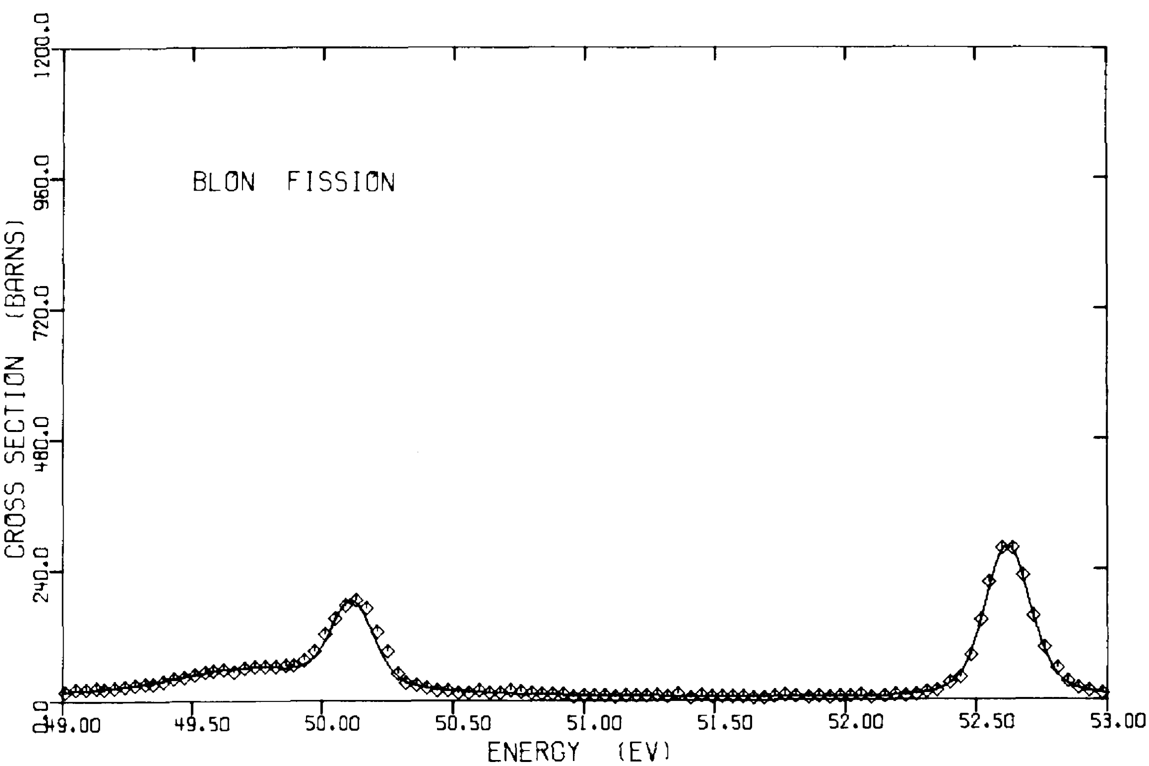

DERRIEN TOTAL
CROSS SECTION (BARNS)
0
50.0
100.0
150.0
200.0
250.0
45.00
45.50
46.00
46.50
47.00
47.50
48.00
48.50
49.00
ENERGY (EV)

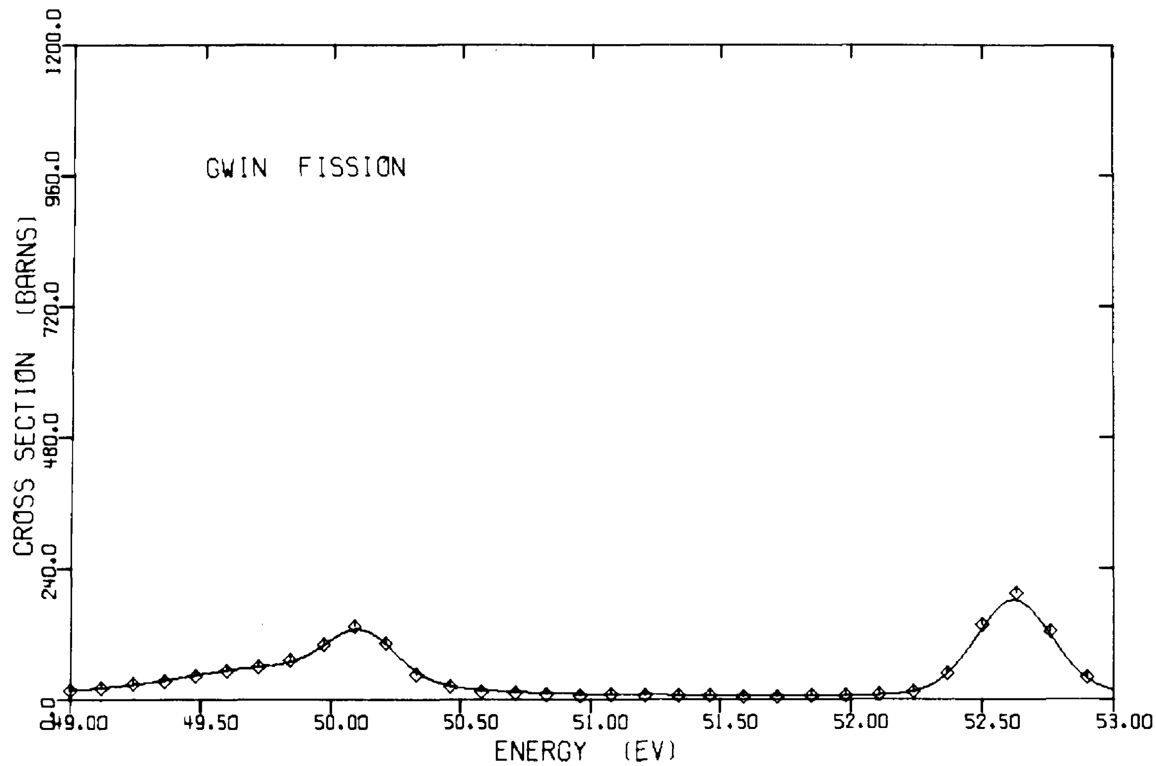

BLON FISSION
CROSS SECTION (BARNS)
0
40.0
80.0
120.0
160.0
200.0
45.00
45.50
46.00
46.50
47.00
47.50
48.00
48.50
49.00
ENERGY (EV)

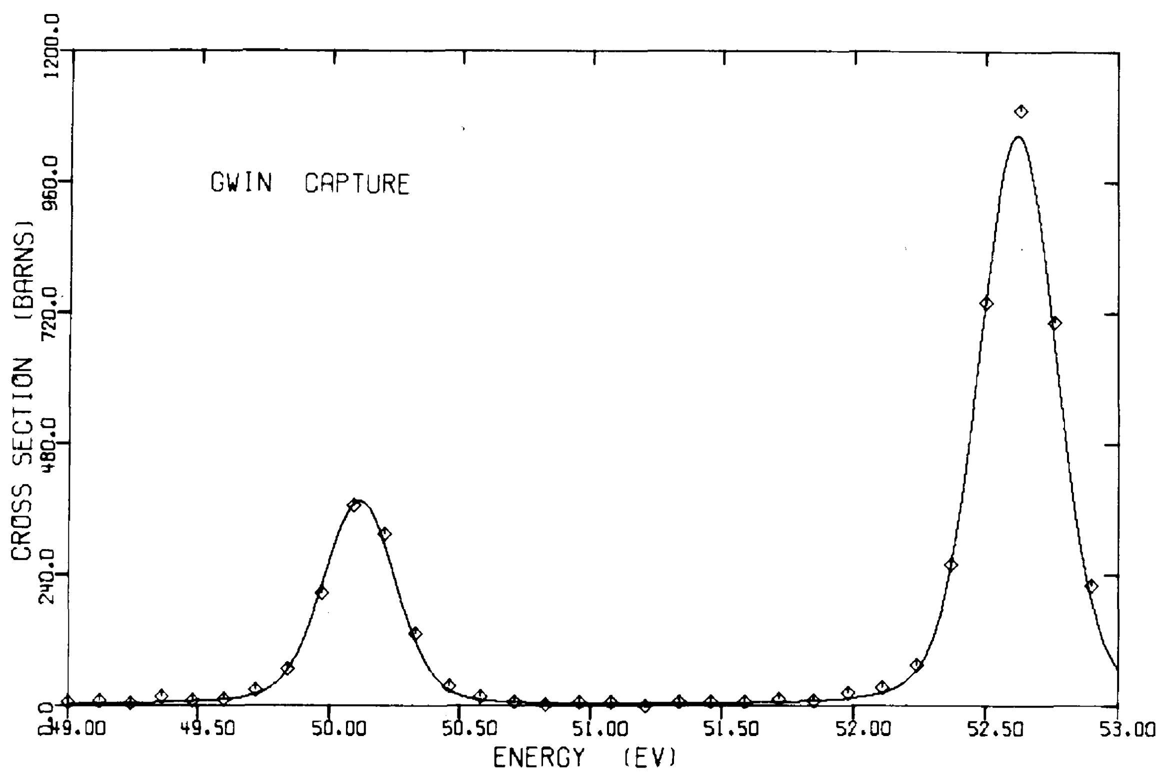

GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)

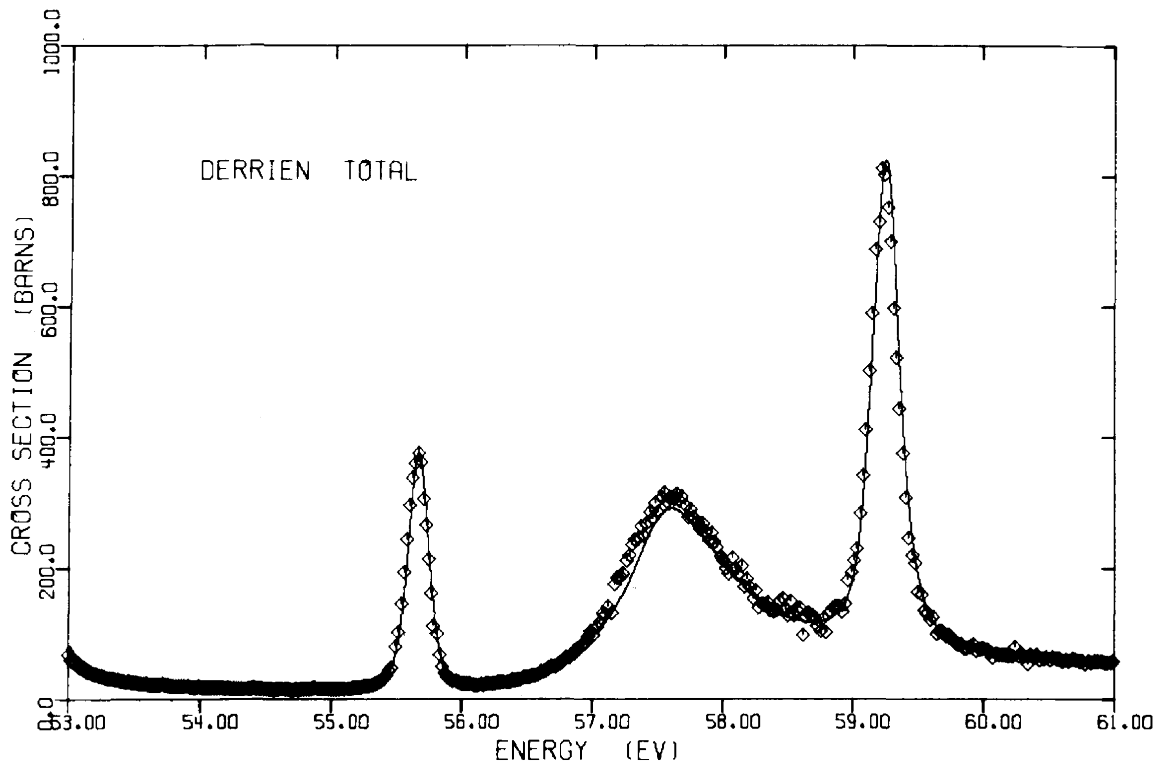

GWIN CAPTURE
183W
183W
CROSS SECTION (BARNS)
ENERGY (EV)

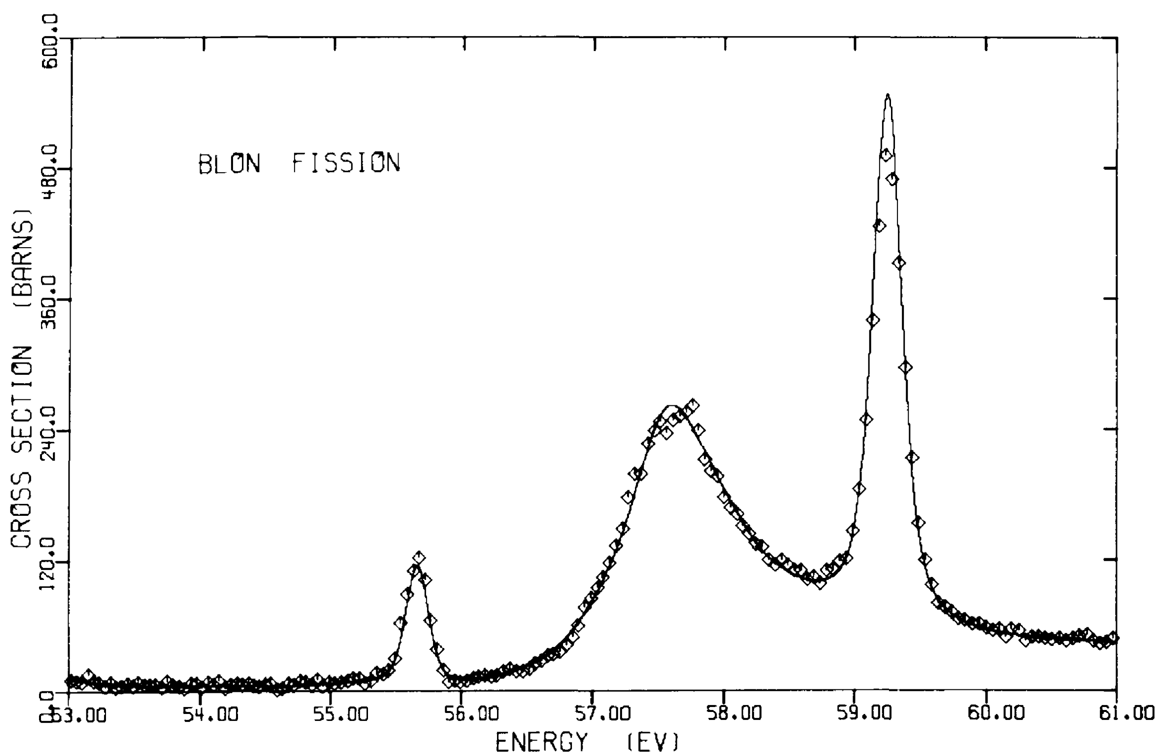

DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
600.0
1200.0
1800.0
2400.0
3000.0
49.00
49.50
50.00
50.50
51.00
51.50
52.00
52.50
53.00

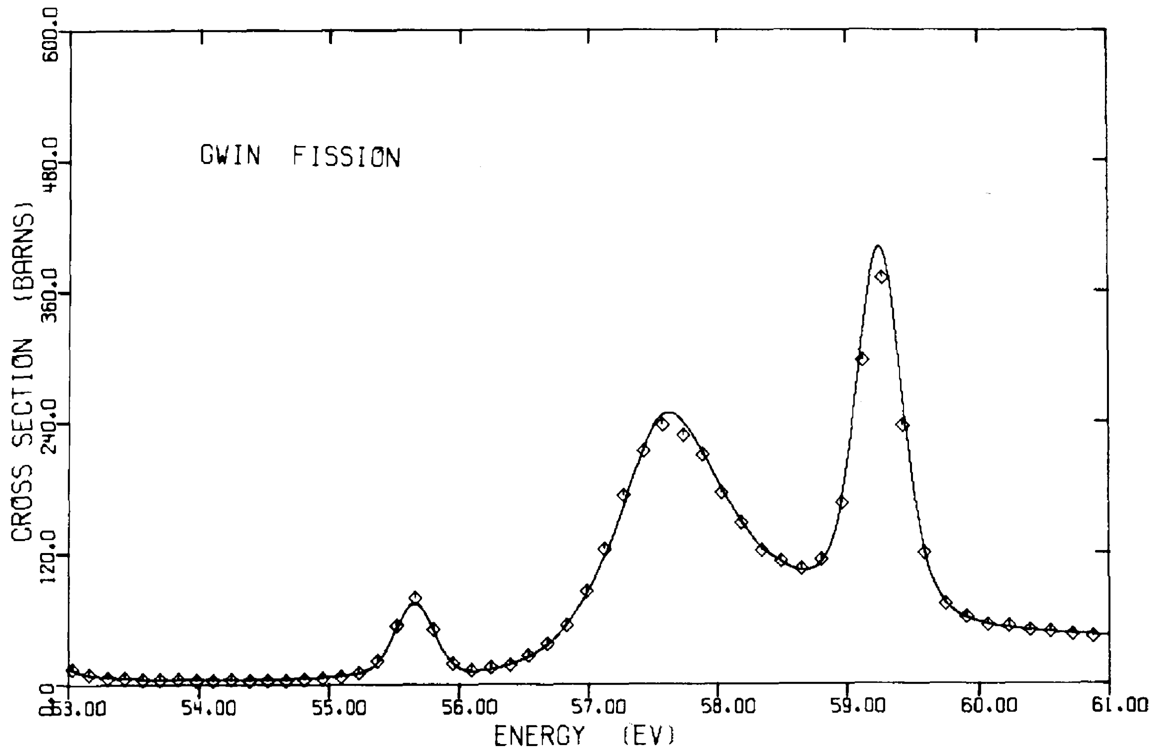

BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
240.0
480.0
720.0
960.0
1200.0
49.00
49.50
50.00
50.50
51.00
51.50
52.00
52.50
53.00

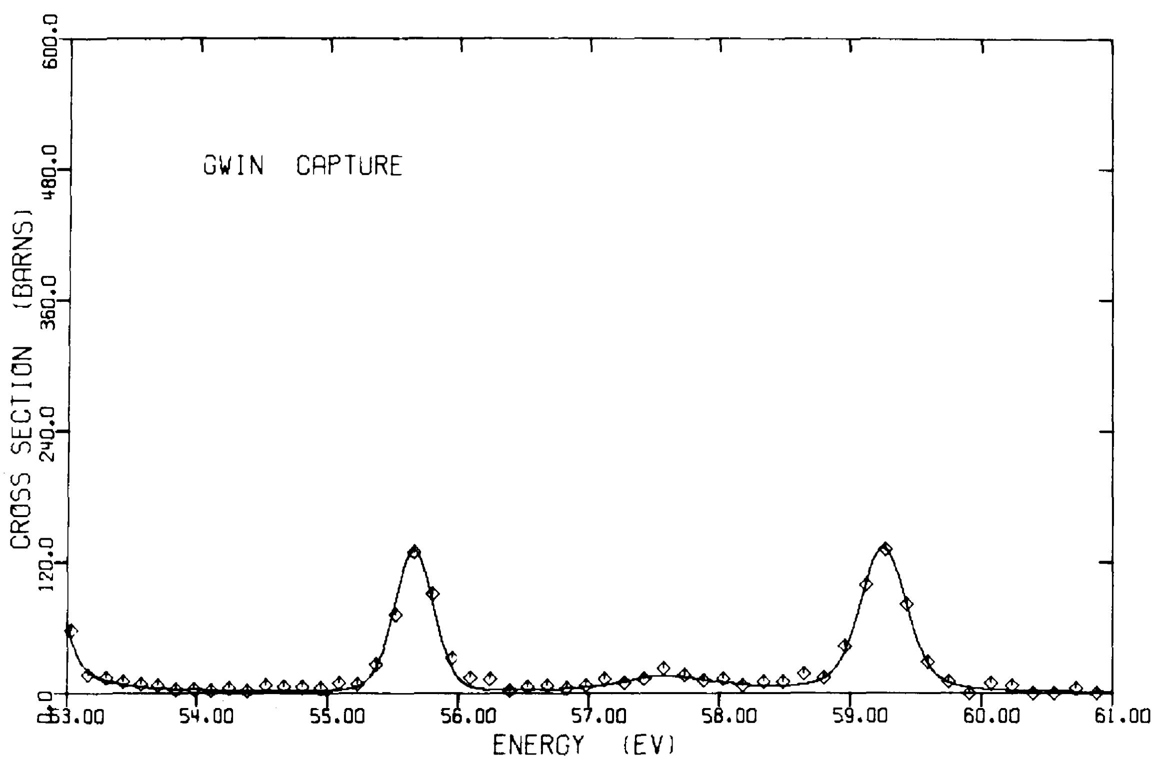

GWIN FISSION
CROSS SECTION (BARNS)
0
240.0
480.0
720.0
960.0
1200.0
49.00
49.50
50.00
50.50
51.00
51.50
52.00
52.50
53.00
ENERGY (EV)

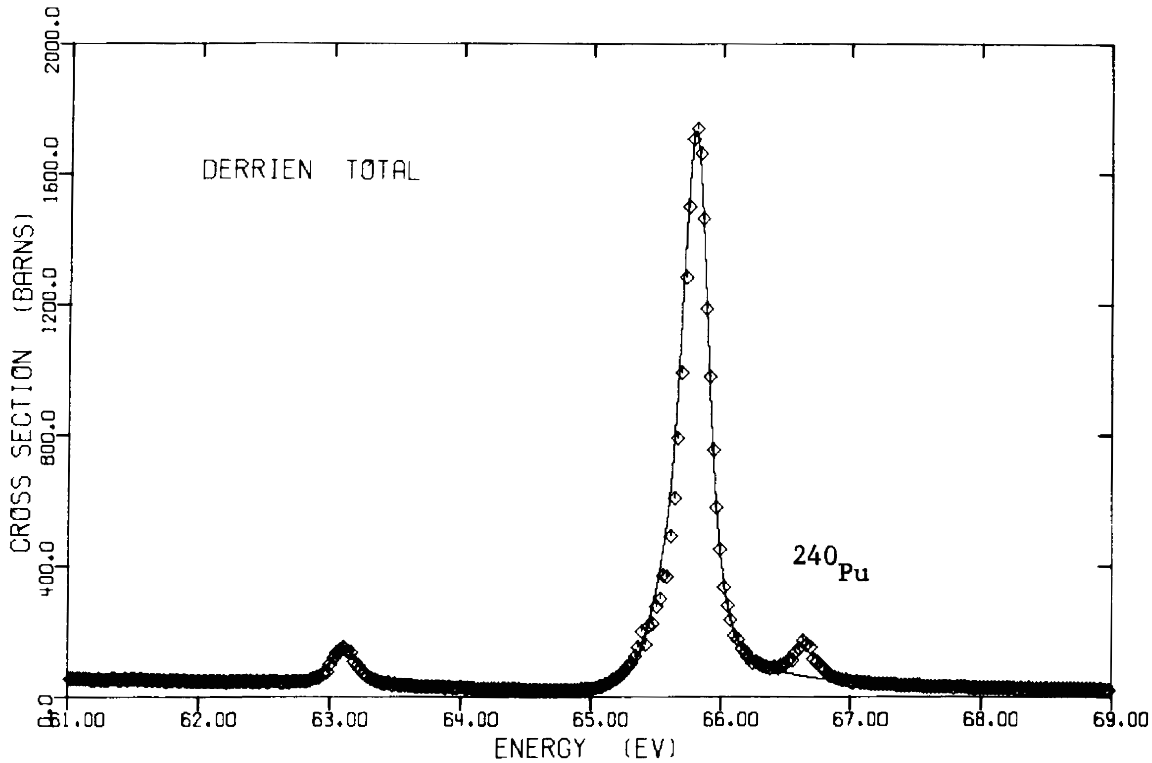

GWIN CAPTURE
CROSS SECTION (BARNS)
0
240.0
480.0
720.0
960.0
1200.0
49.00
49.50
50.00
50.50
51.00
51.50
52.00
52.50
53.00
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
0.0
200.0
400.0
600.0
800.0
1000.0
53.00
54.00
55.00
56.00
57.00
58.00
59.00
60.00
61.00
ENERGY (EV)

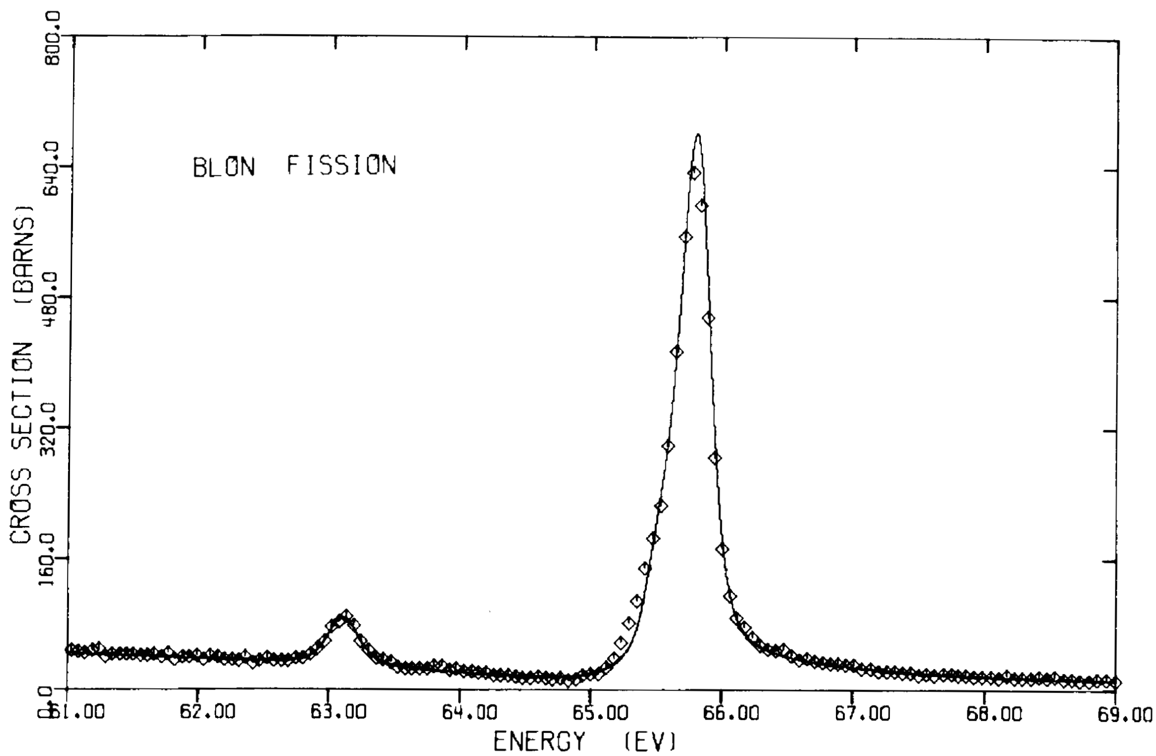

BLON FISSION
CROSS SECTION (BARNS)
0.0
120.0
240.0
360.0
480.0
600.0
53.00
54.00
55.00
56.00
57.00
58.00
59.00
60.00
61.00
ENERGY (EV)


GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
120.0
240.0
360.0
480.0
600.0
53.00
54.00
55.00
56.00
57.00
58.00
59.00
60.00
61.00

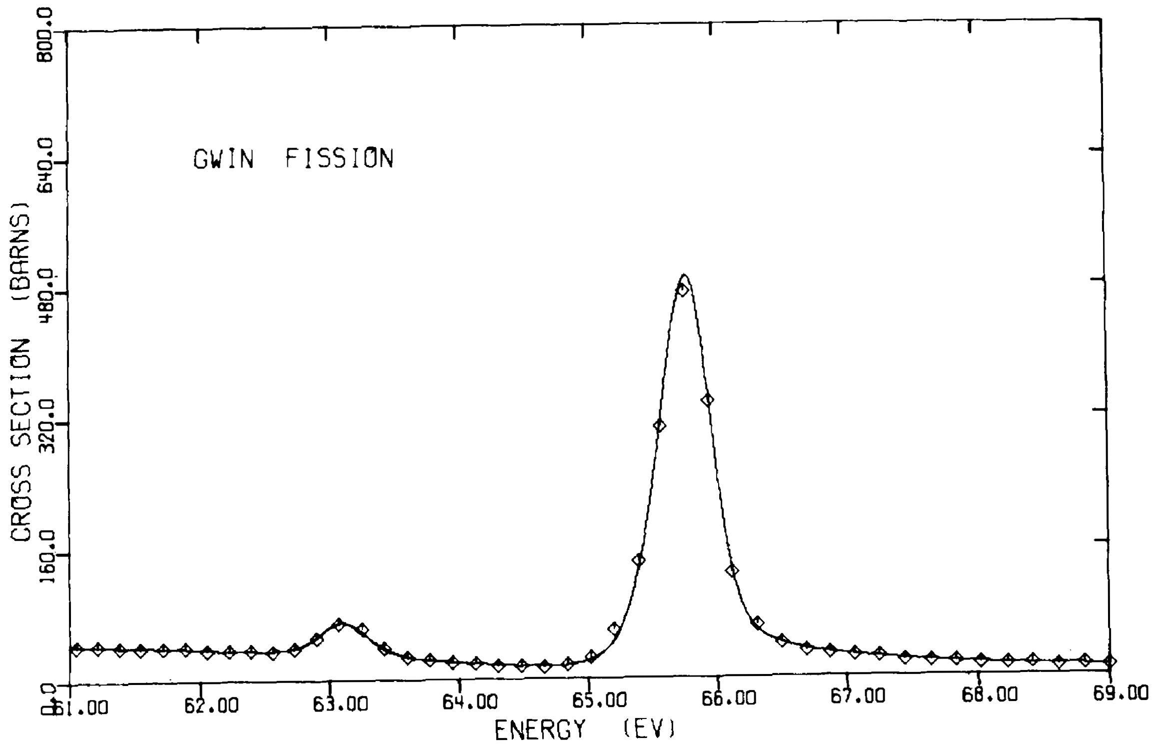

GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
120.0
240.0
360.0
480.0
600.0
53.00
54.00
55.00
56.00
57.00
58.00
59.00
60.00
61.00

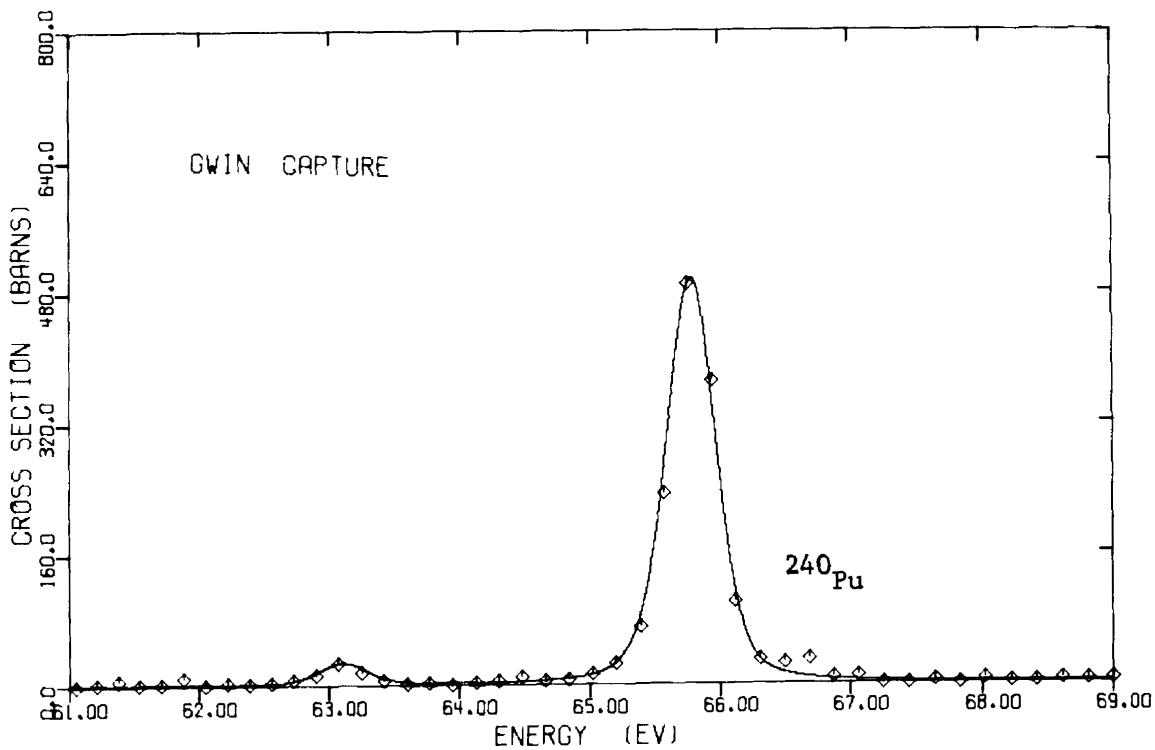


DERRIEN TOTAL
240Pu
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
400.0
800.0
1200.0
1600.0
2000.0
61.00
62.00
63.00
64.00
65.00
66.00
67.00
68.00
69.00



BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
160.0
320.0
480.0
640.0
800.0
61.00
62.00
63.00
64.00
65.00
66.00
67.00
68.00
69.00


GWIN FISSION
CROSS SECTION (BARNS)
0.0
160.0
320.0
480.0
640.0
800.0
61.00
62.00
63.00
64.00
65.00
66.00
67.00
68.00
69.00
ENERGY (EV)


GWIN CAPTURE
CROSS SECTION (BARNS)
0.0
160.0
320.0
480.0
640.0
800.0
240Pu
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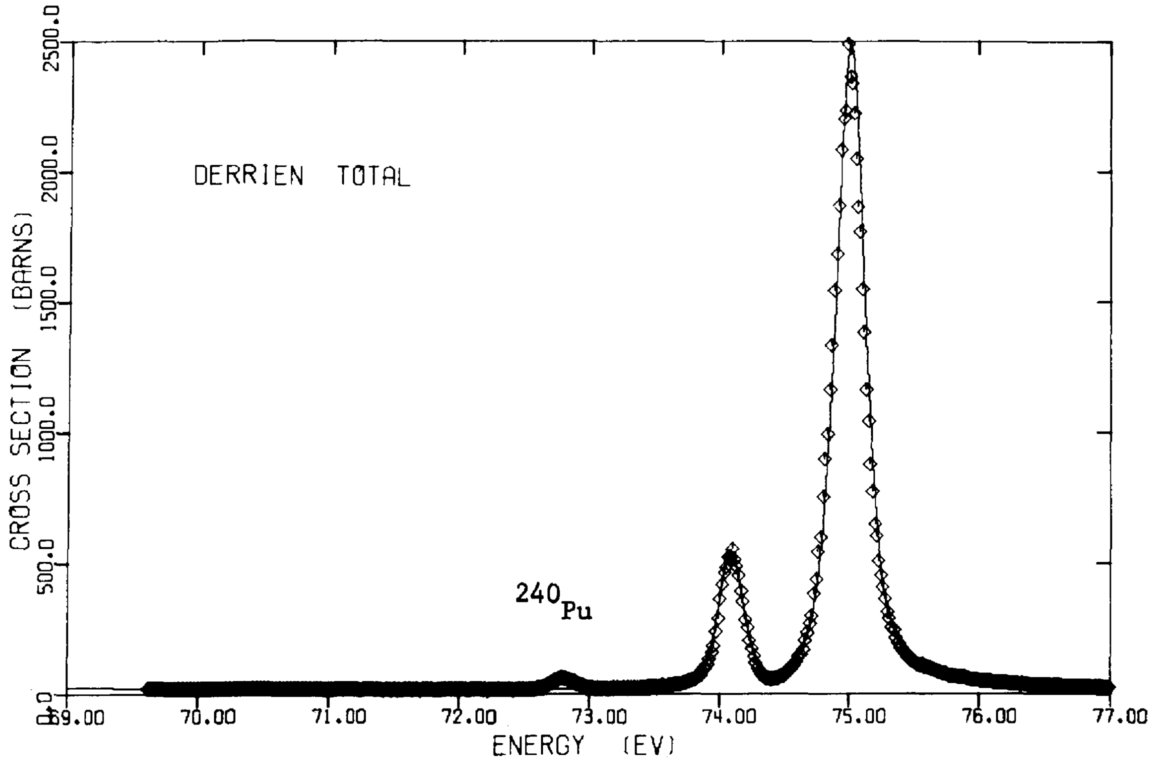
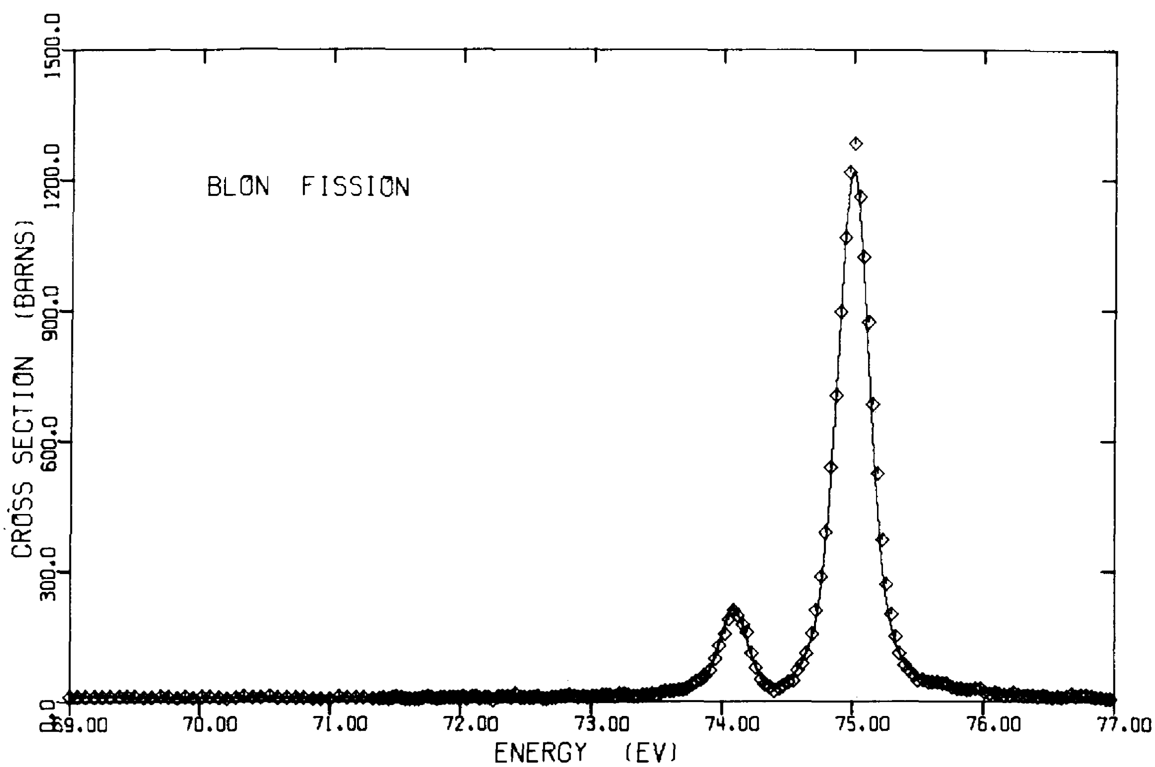
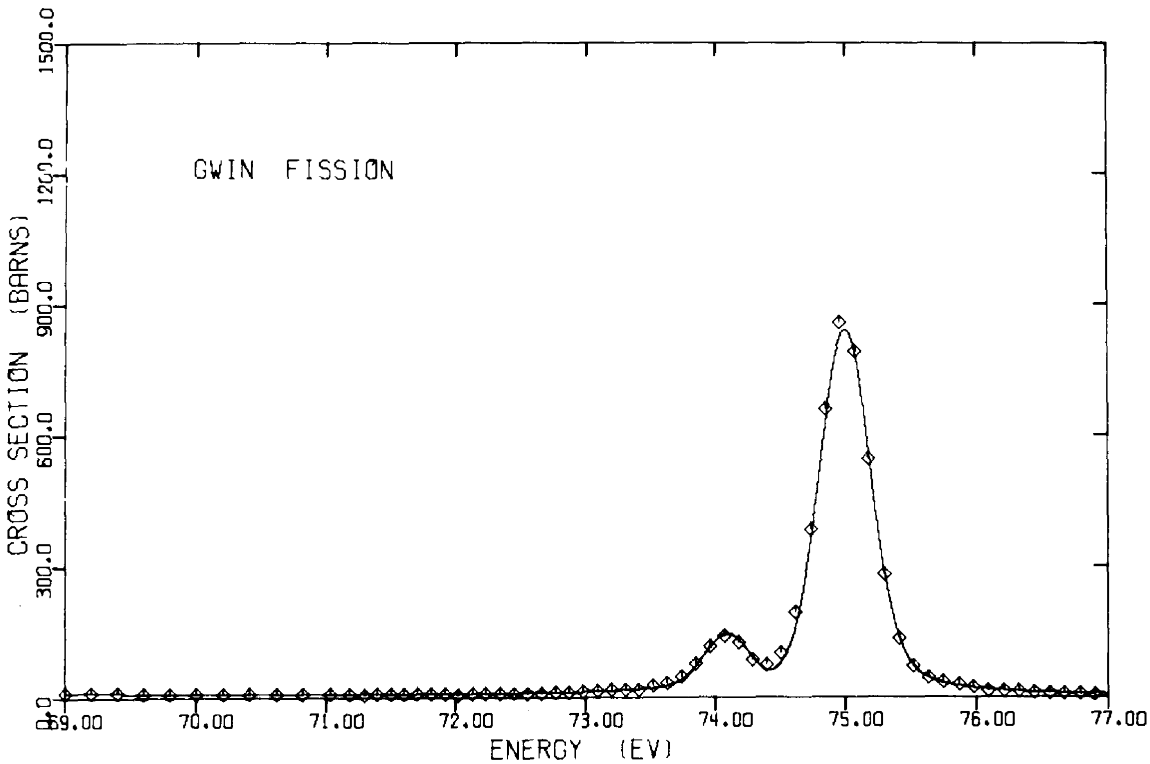
62.00
63.00
64.00
65.00
66.00
67.00
68.00
69.00
ENERGY (EV)


DERRIEN TOTAL
240Pu
CROSS SECTION (BARNS)
ENERGY (EV)


BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)


GWIN FISSION
CROSS SECTION (BARNS)
0.0
300.0
600.0
900.0
1200.0
1500.0
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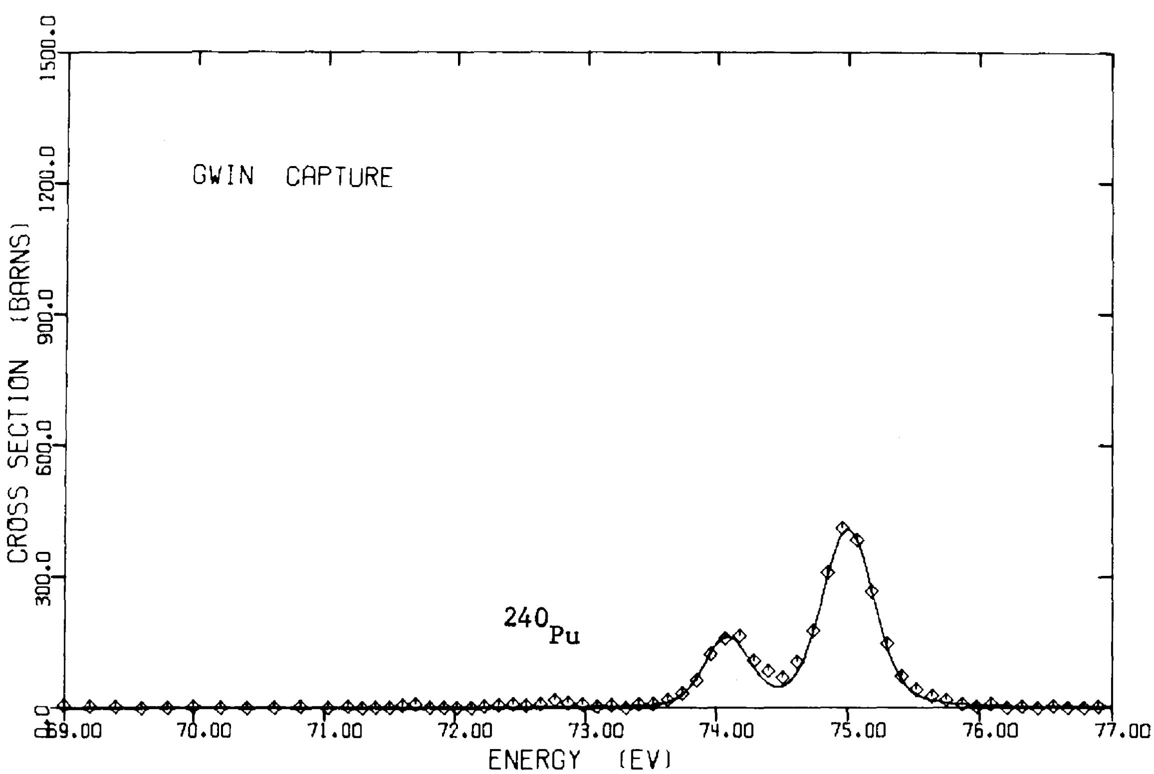
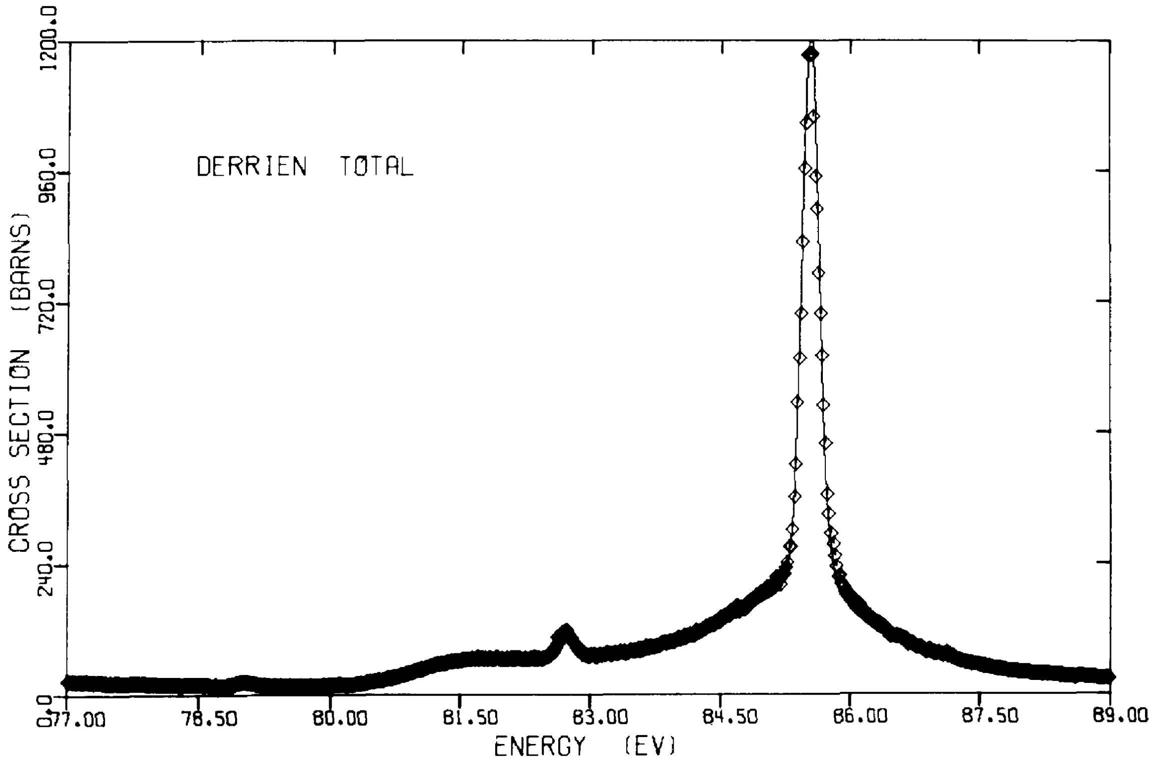
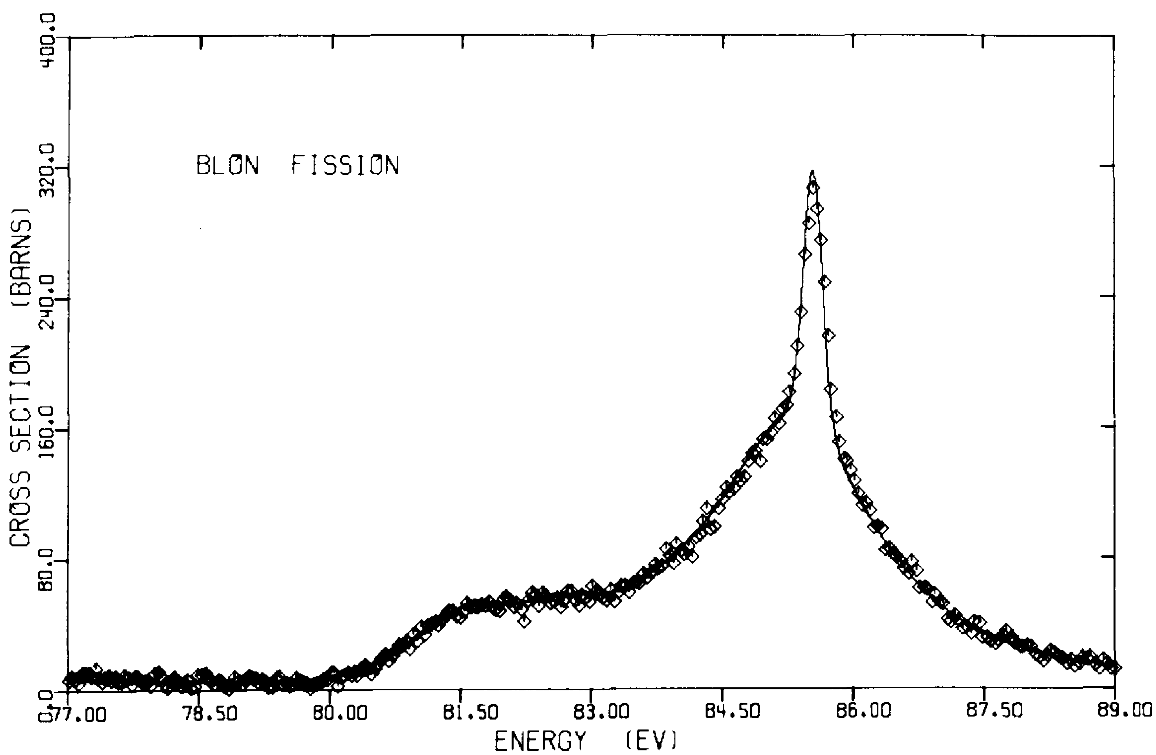
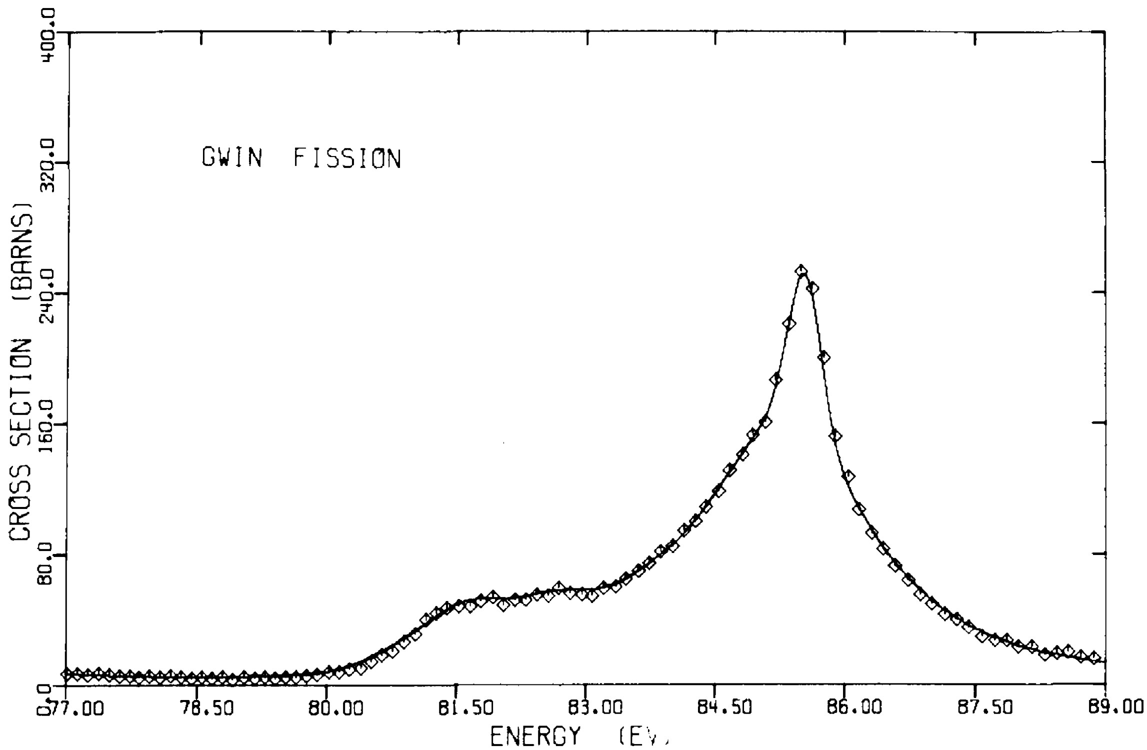
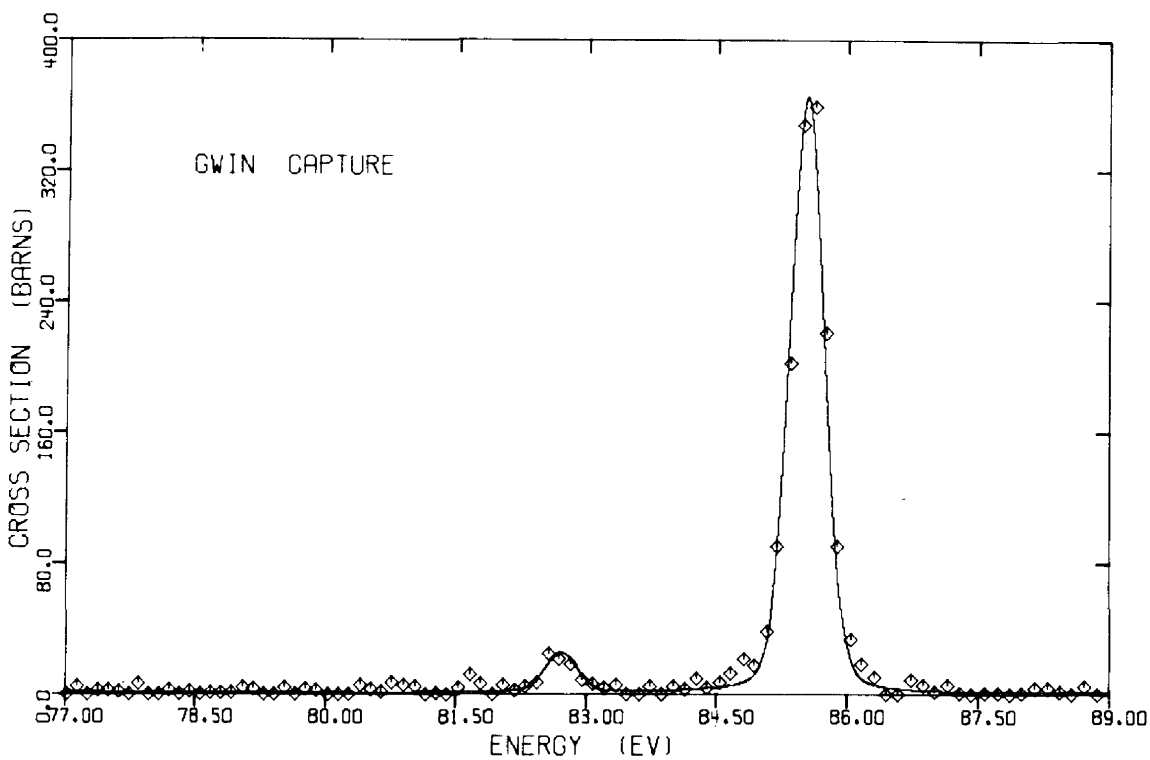
70.00
71.00
72.00
73.00
74.00
75.00
76.00
77.00
ENERGY (EV)


GWIN CAPTURE
240Pu
CROSS SECTION (BARNS)
0.0
300.0
600.0
900.0
1200.0
1500.0
69.00
70.00
71.00
72.00
73.00
74.00
75.00
76.00
77.00
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
0.0
240.0
480.0
720.0
960.0
1200.0
77.00
78.50
80.00
81.50
83.00
84.50
86.00
87.50
89.00
ENERGY (EV)


BLON FISSION
CROSS SECTION (BARNS)
0.0
80.0
160.0
240.0
320.0
400.0
77.00
78.50
80.00
81.50
83.00
84.50
86.00
87.50
89.00
ENERGY (EV)


GWIN FISSION
CROSS SECTION (BARNS)
0.0
80.0
160.0
240.0
320.0
400.0
77.00
78.50
80.00
81.50
83.00
84.50
86.00
87.50
89.00
ENERGY (EV)


GWIN CAPTURE
CROSS SECTION (BARNS)
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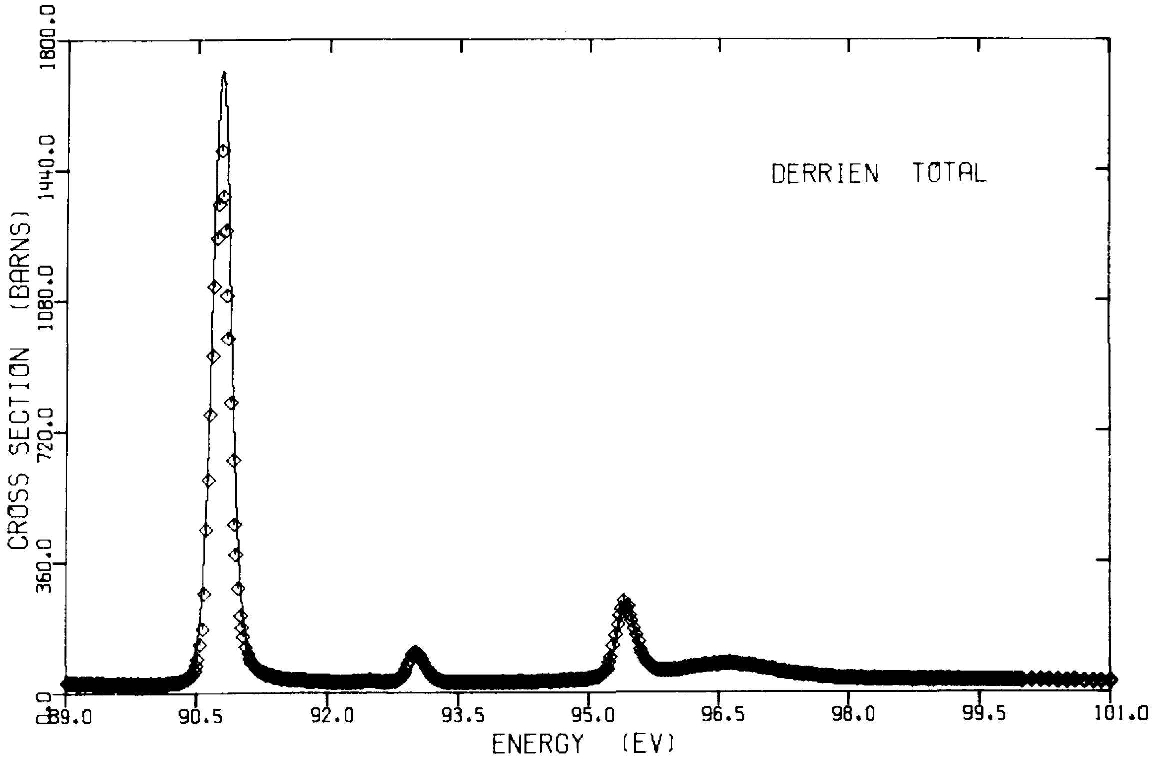
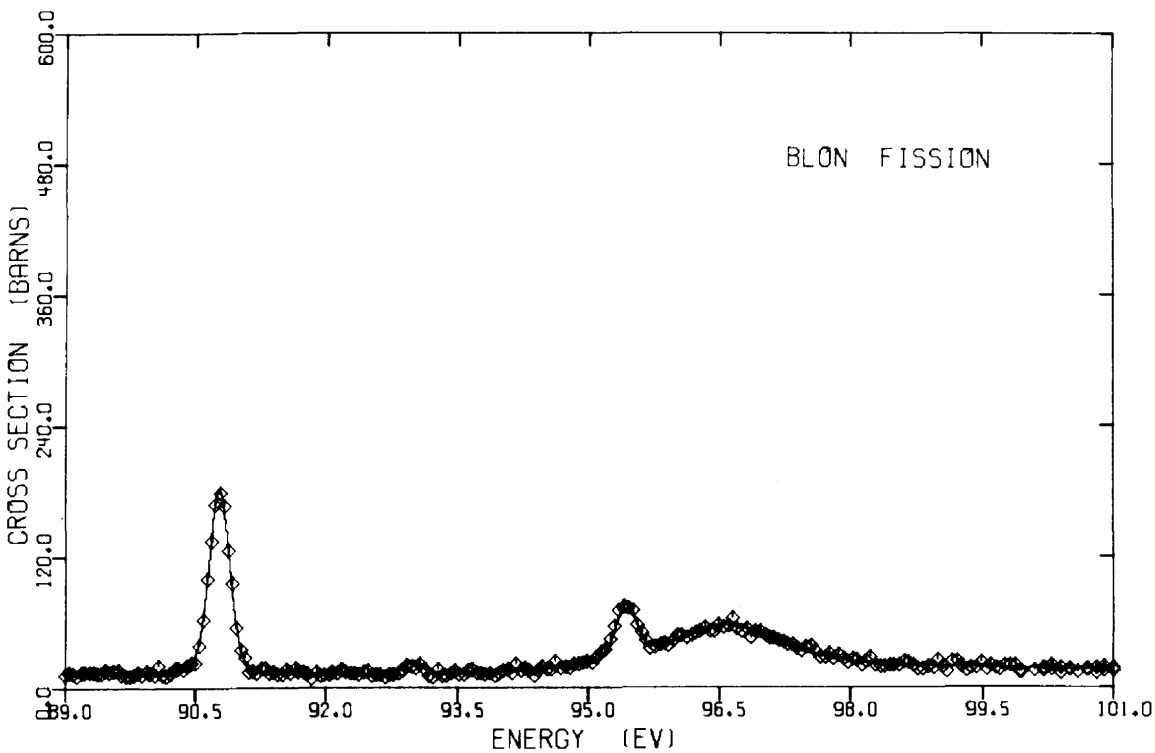
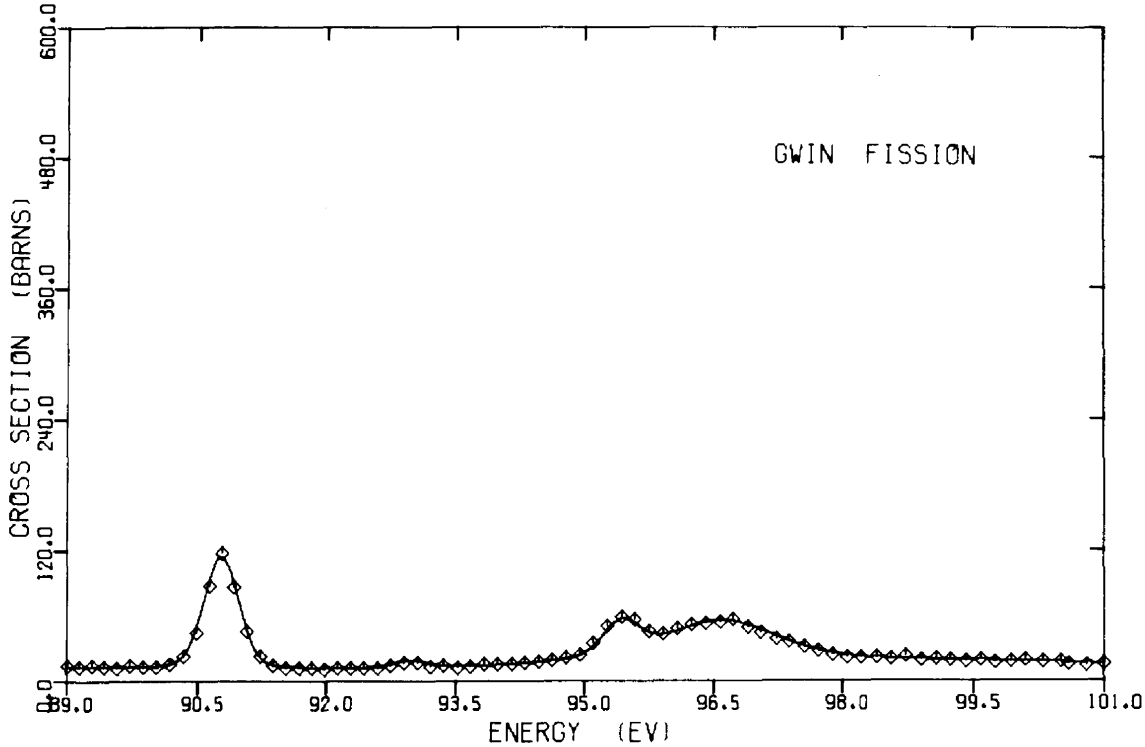
160.0
240.0
320.0
400.0
77.00
78.50
80.00
81.50
83.00
84.50
86.00
87.50
89.00
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
0.0
360.0
720.0
1080.0
1440.0
1800.0
89.0
90.5
92.0
93.5
95.0
96.5
98.0
99.5
101.0
ENERGY (EV)


BLON FISSION
CROSS SECTION (BARNS)
0.0
120.0
240.0
360.0
480.0
600.0
89.0
90.5
92.0
93.5
95.0
96.5
98.0
99.5
101.0
ENERGY (EV)


GWIN FISSION
CROSS SECTION (BARNS)
0.0
120.0
240.0
360.0
480.0
600.0
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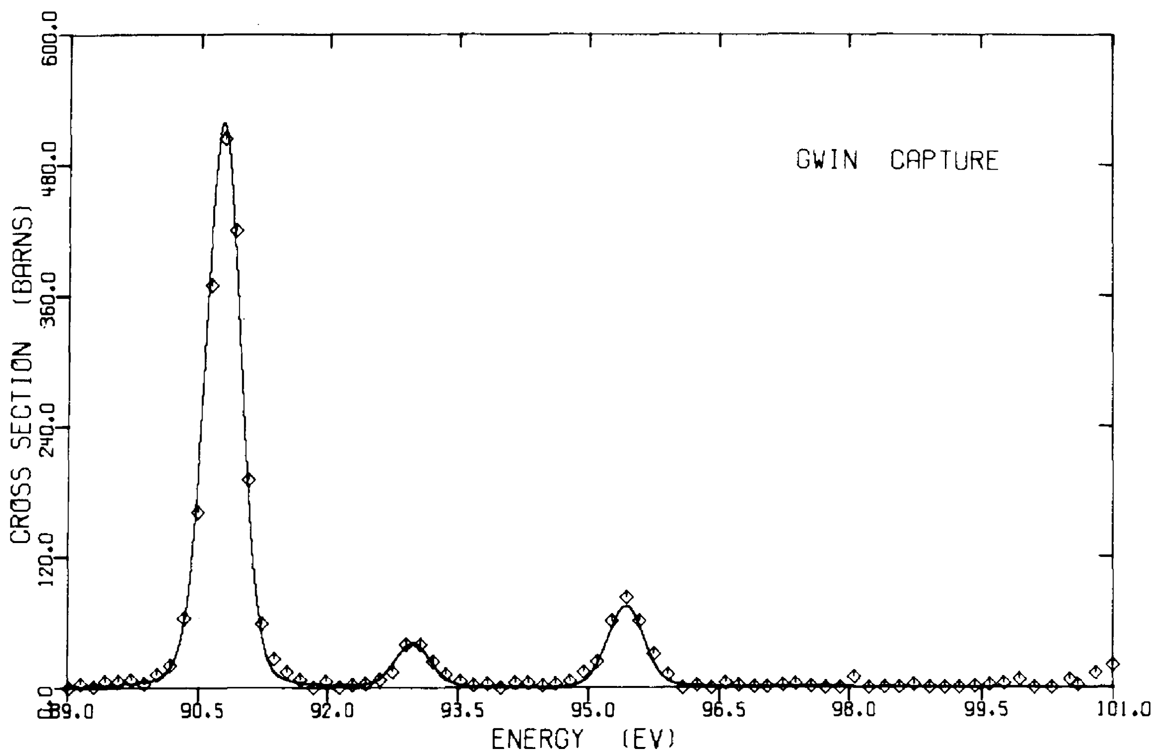
90.5
92.0
93.5
95.0
96.5
98.0
99.5
101.0
ENERGY (EV)


GWIN CAPTURE
CROSS SECTION (BARNS)
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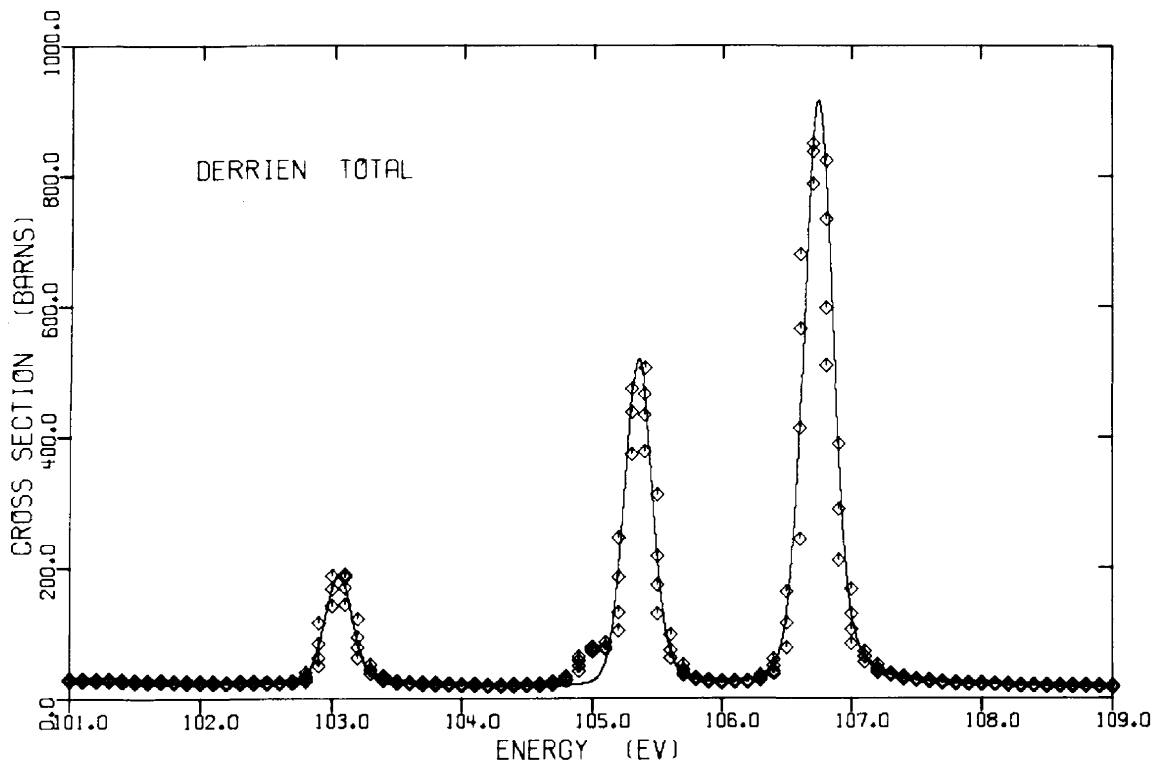
120.0
240.0
360.0
480.0
600.0
89.0
90.5
92.0
93.5
95.0
96.5
98.0
99.5
101.0
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
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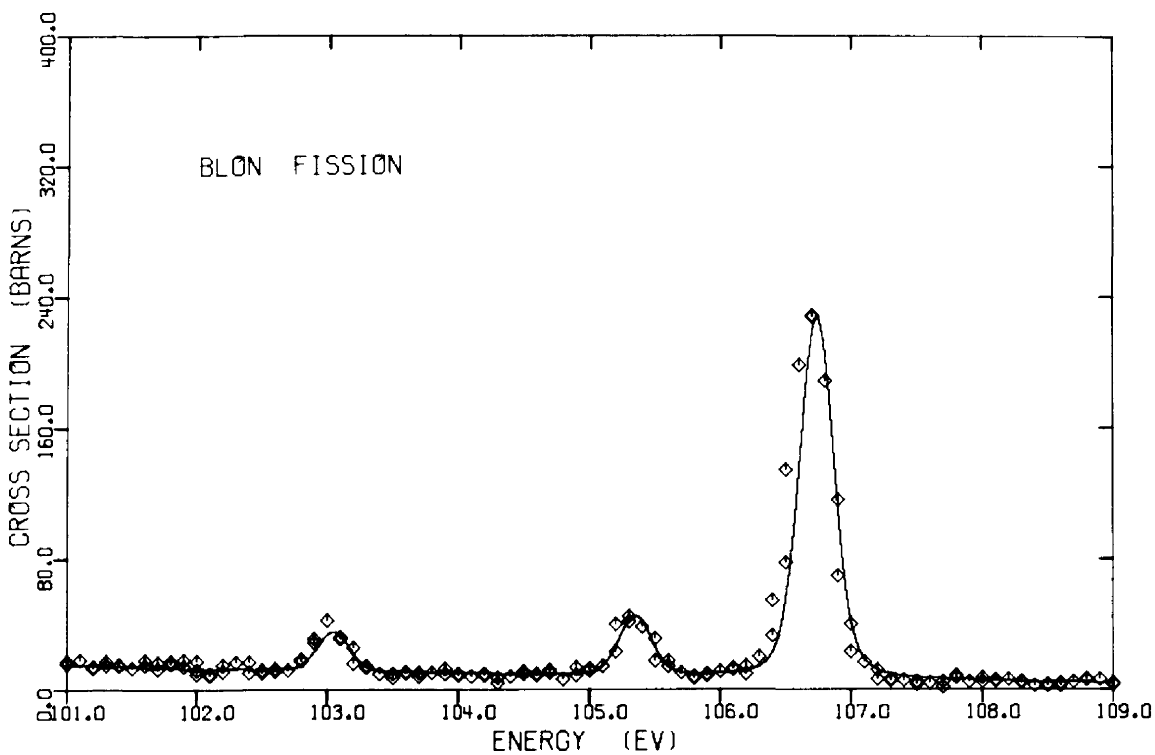
200.0
400.0
600.0
800.0
1000.0
101.0
102.0
103.0
104.0
105.0
106.0
107.0
108.0
109.0
ENERGY (EV)


BLON FISSION
CROSS SECTION (BARNS)
0.0
80.0
160.0
240.0
320.0
400.0
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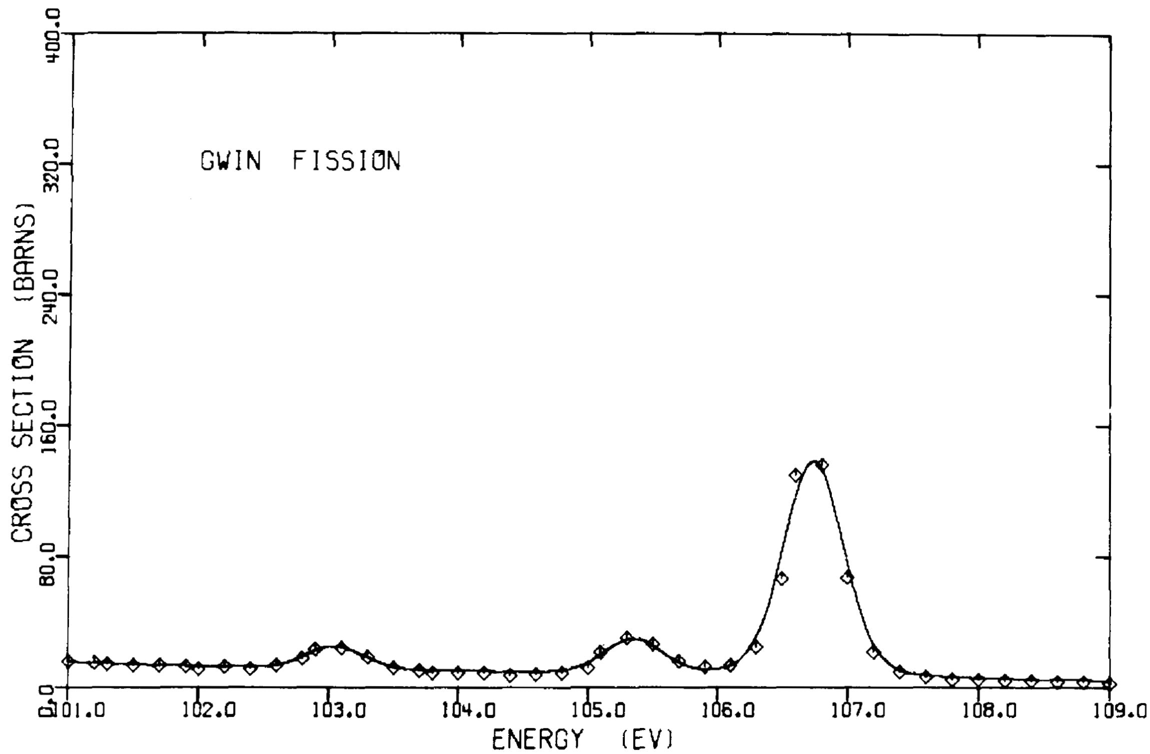
102.0
103.0
104.0
105.0
106.0
107.0
108.0
109.0
ENERGY (EV)


GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
80.0
160.0
240.0
320.0
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101.0
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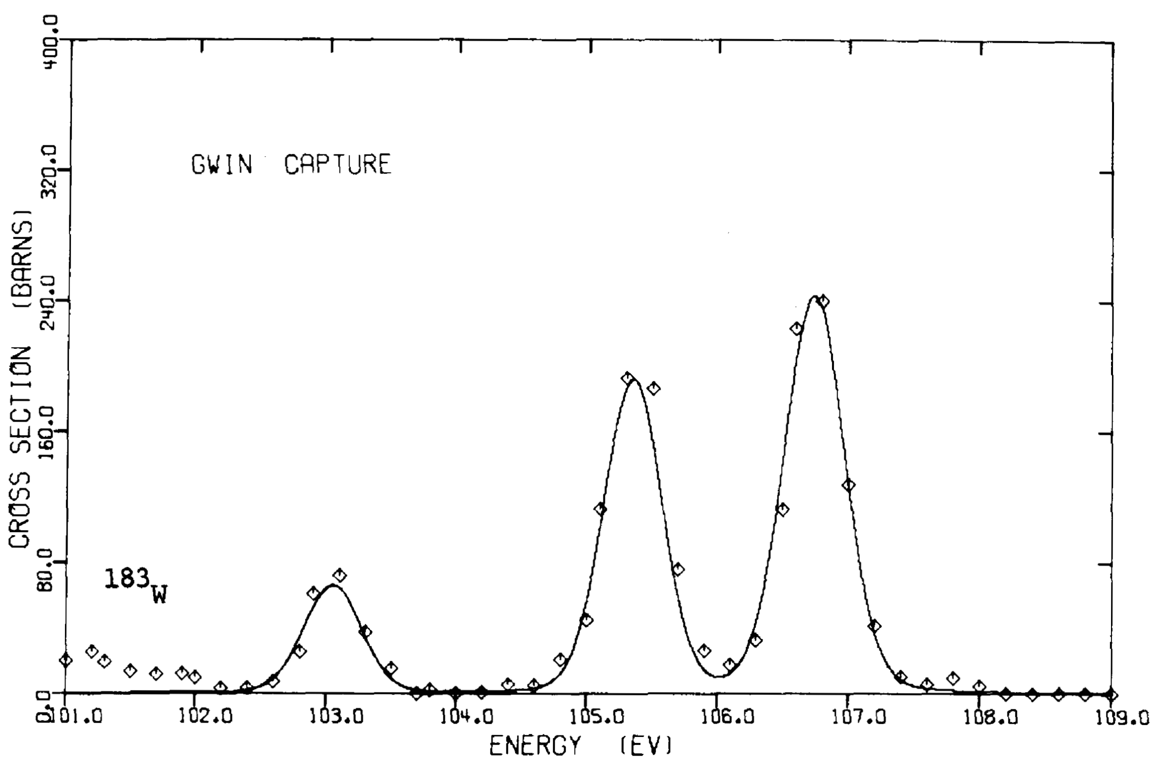
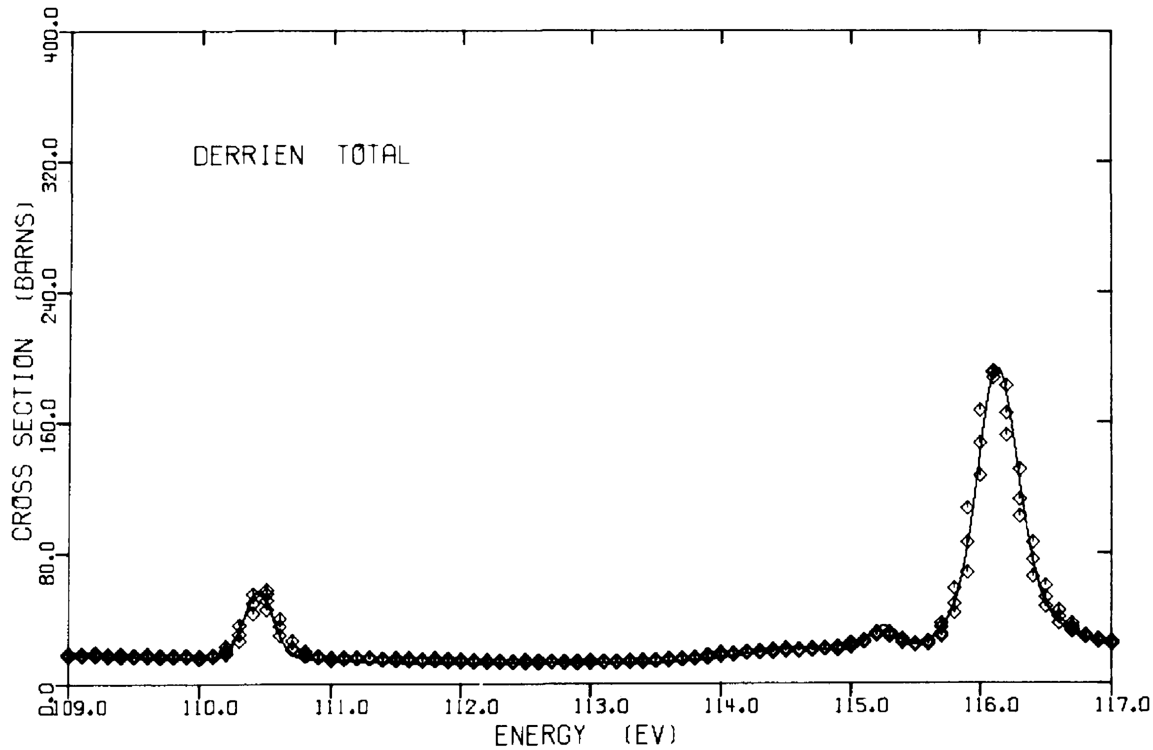

GWIN CAPTURE
^{183}W
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
80.0
160.0
240.0
320.0
400.0
101.0
102.0
103.0
104.0
105.0
106.0
107.0
108.0
109.0


DERRIEN TOTAL
CROSS SECTION (BARNS)
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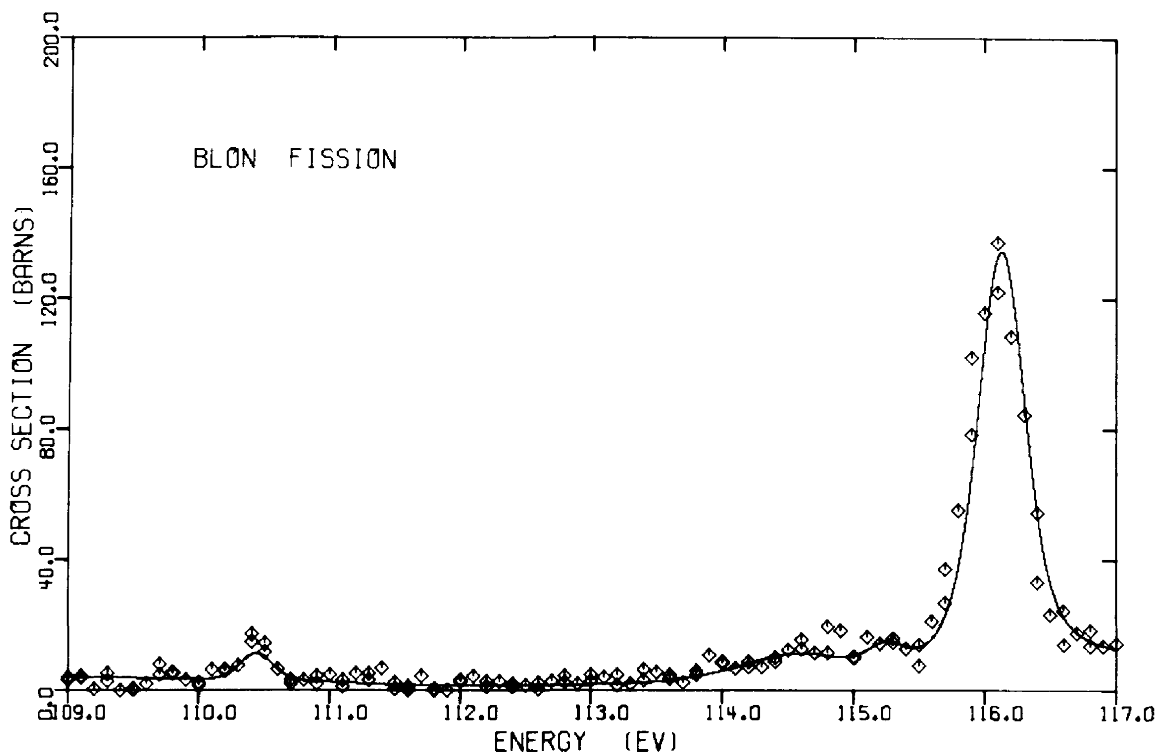
160.0
240.0
320.0
400.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
ENERGY (EV)


BLON FISSION
CROSS SECTION (BARNS)
0.0
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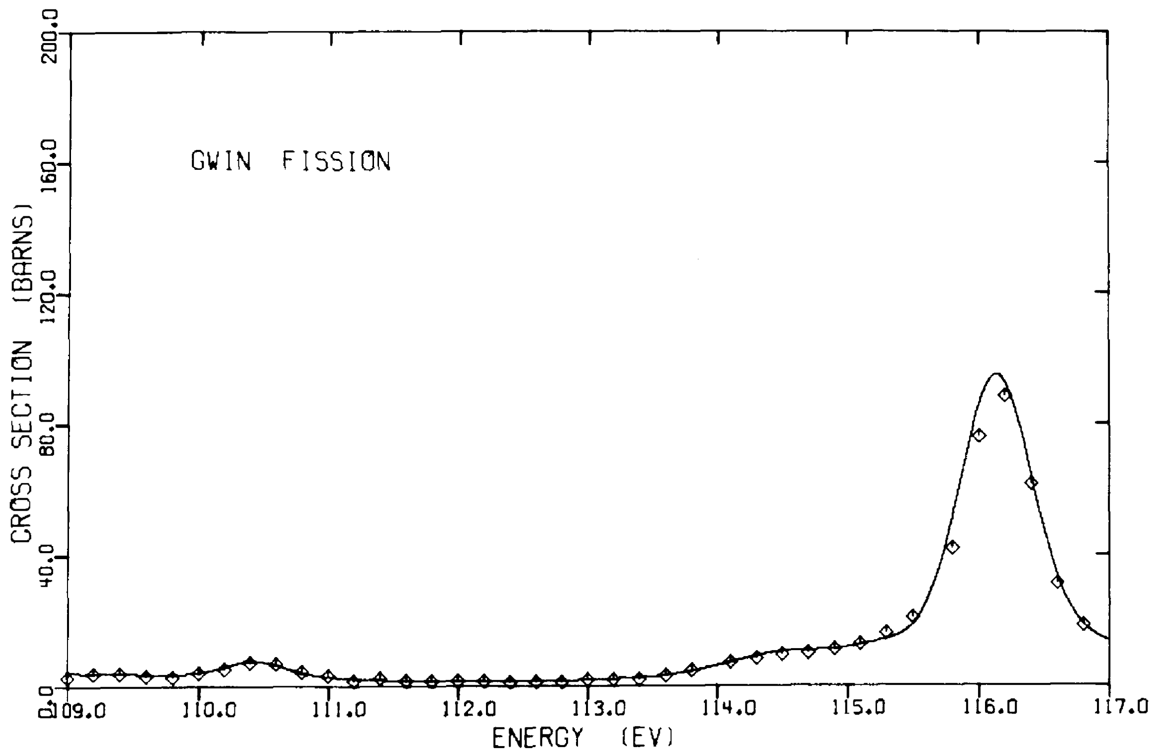
80.0
120.0
160.0
200.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
ENERGY (EV)


GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
40.0
80.0
120.0
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200.0
109.0
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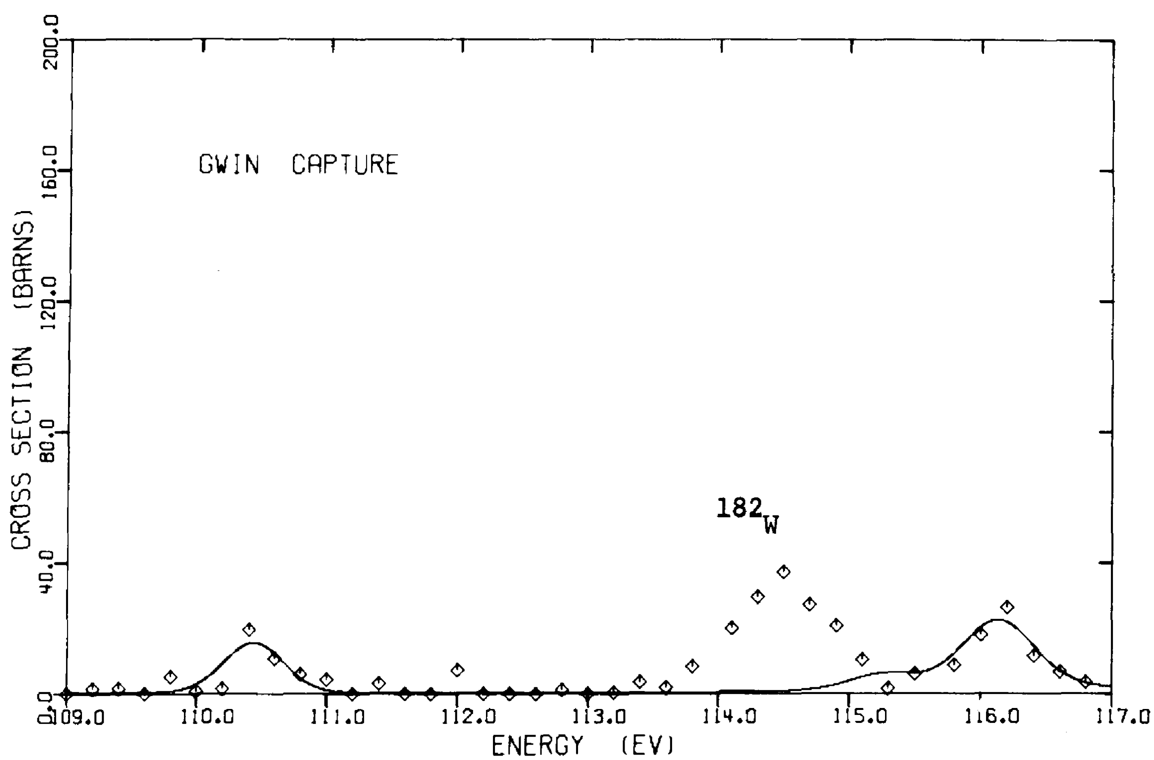
117.0


GWIN CAPTURE
182W
CROSS SECTION (BARNS)
ENERGY (EV)
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80.0
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200.0
109.0
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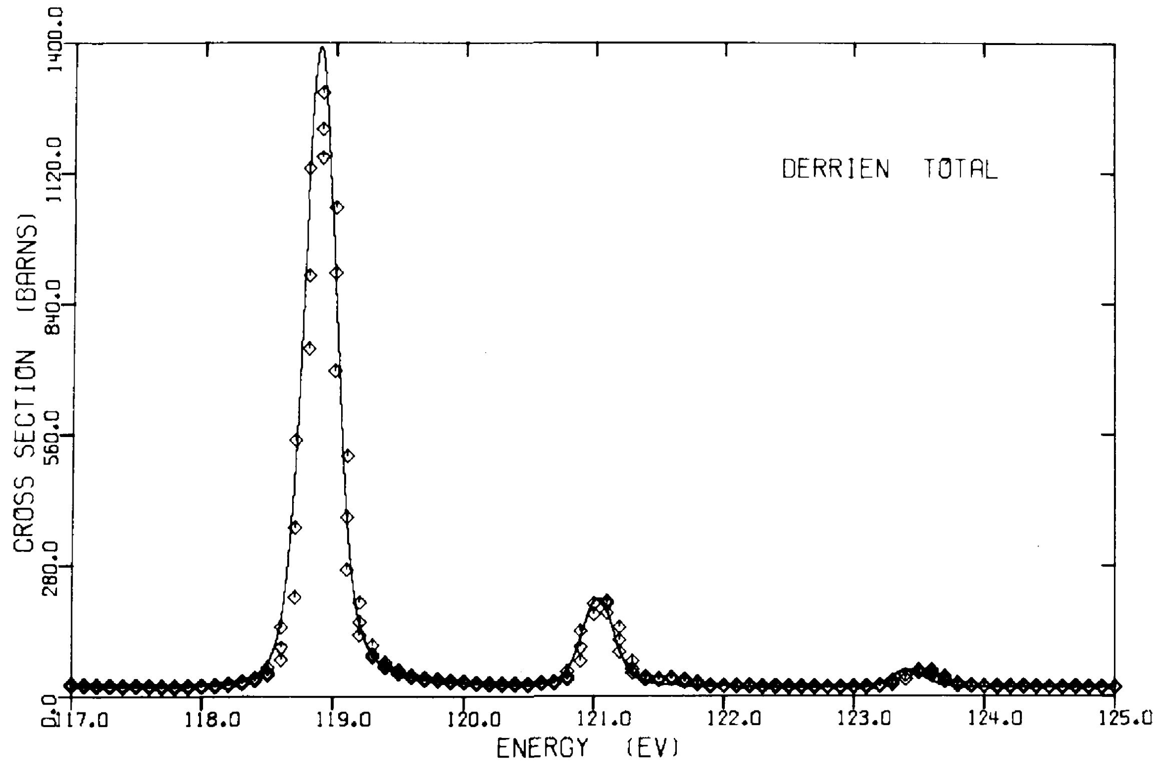
111.0
112.0
113.0
114.0
115.0
116.0
117.0


DERRIEN TOTAL
CROSS SECTION (BARNS)
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840.0
1120.0
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118.0
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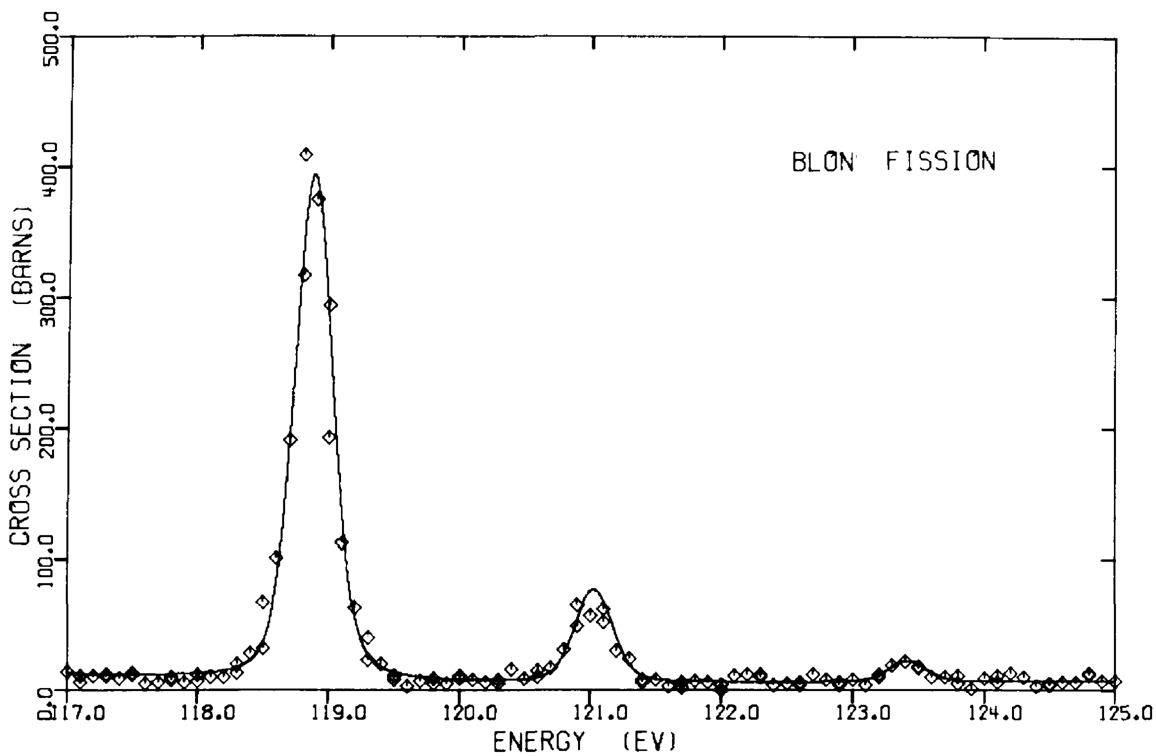
121.0
122.0
123.0
124.0
125.0
ENERGY (EV)


BLON FISSION
CROSS SECTION (BARNS)
0.0
100.0
200.0
300.0
400.0
500.0
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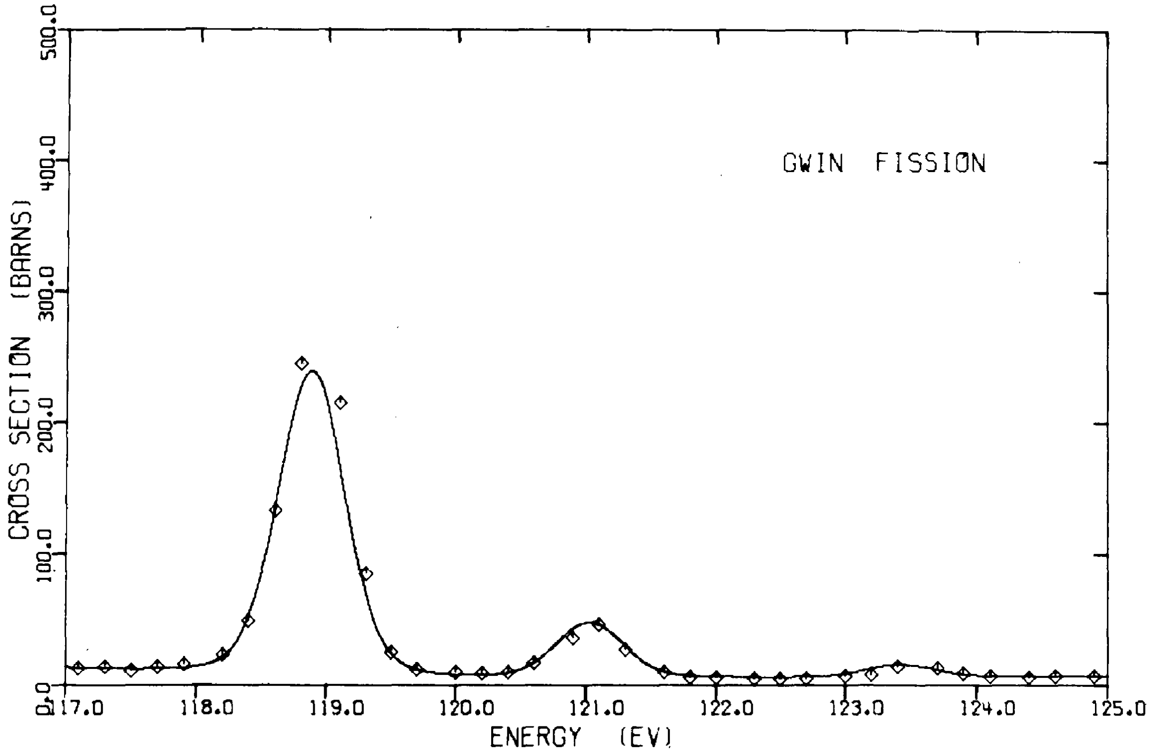
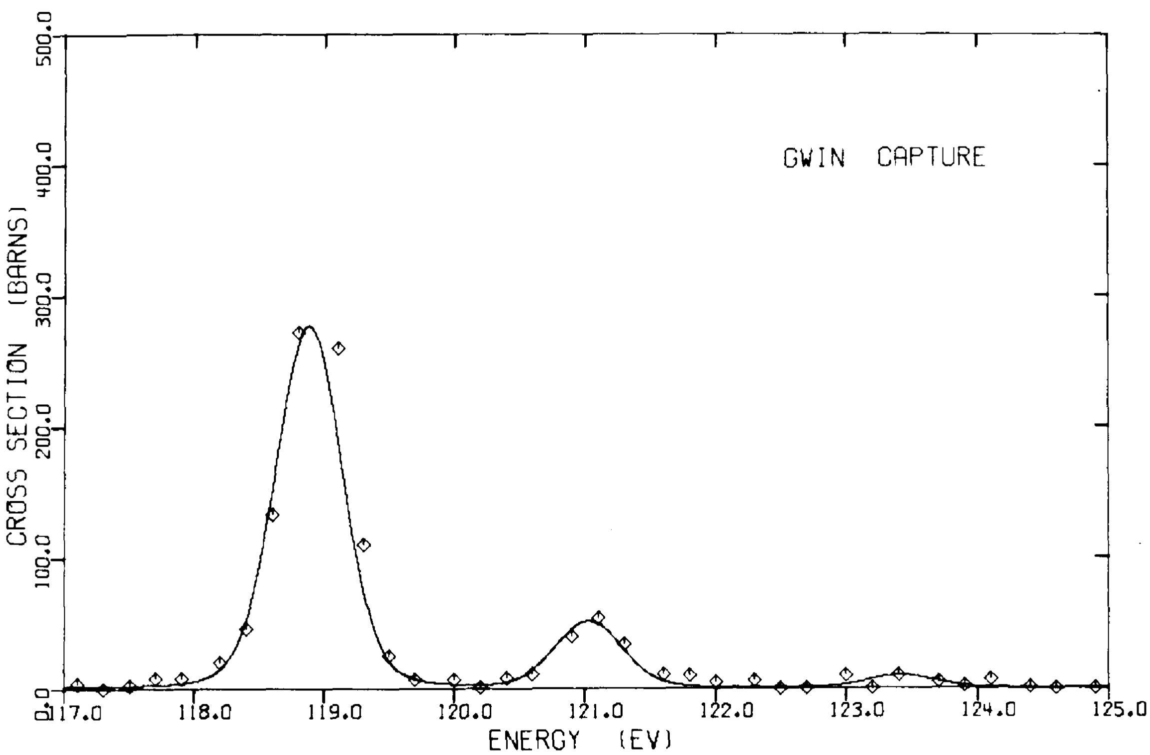
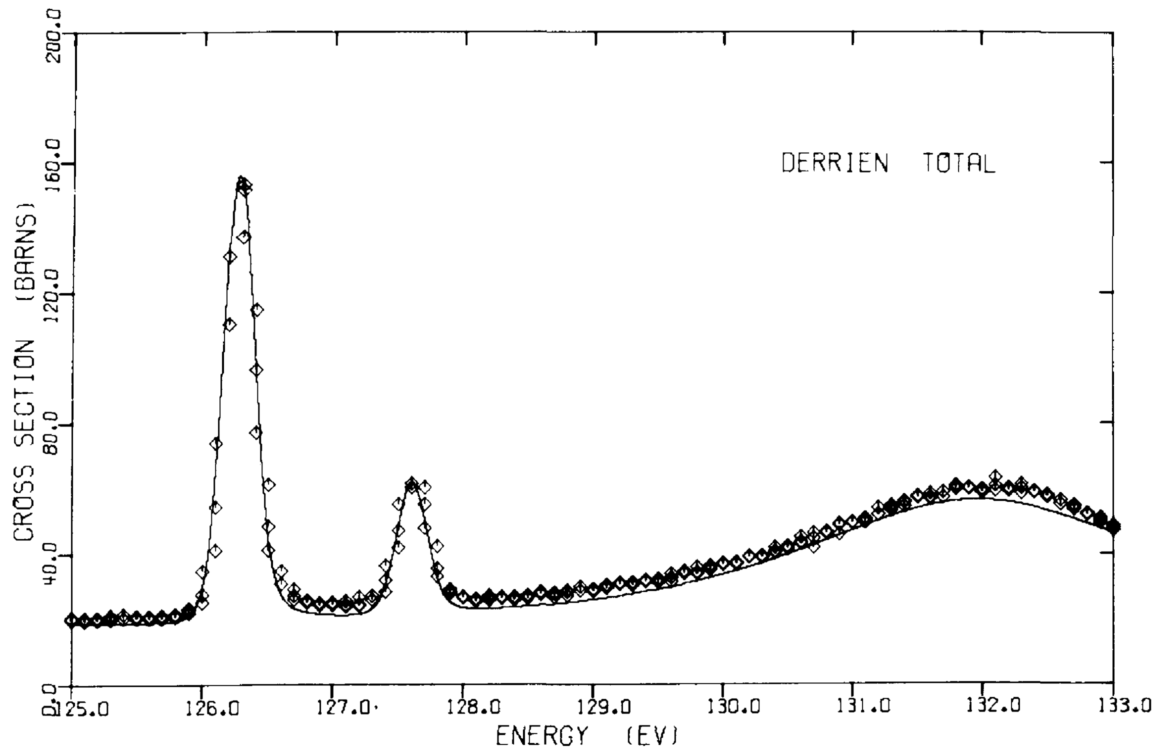
118.0
119.0
120.0
121.0
122.0
123.0
124.0
125.0
ENERGY (EV)



GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)



GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
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80.0
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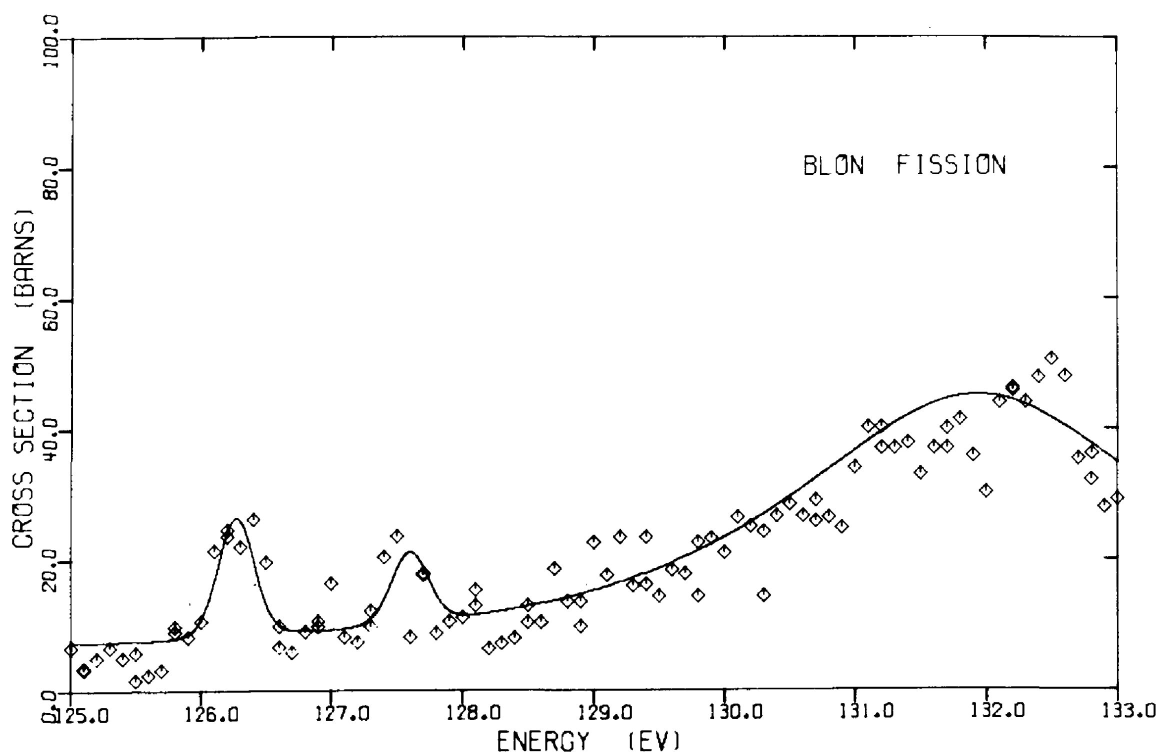
BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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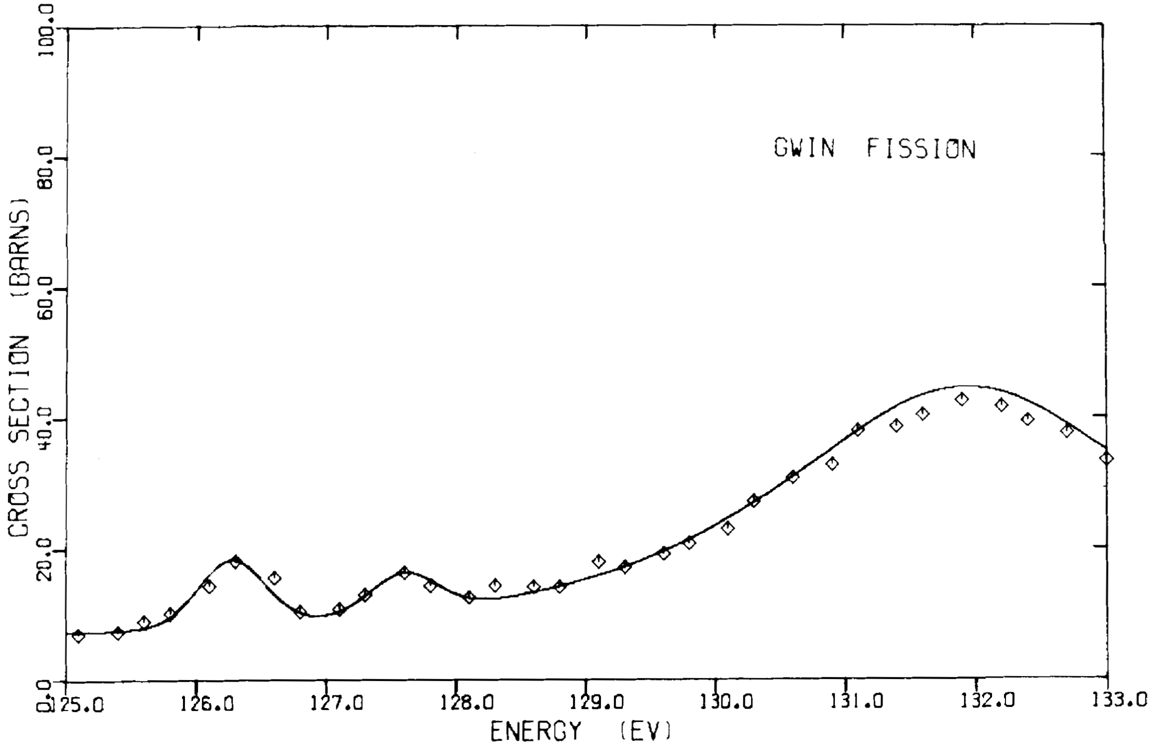
GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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20.0
40.0
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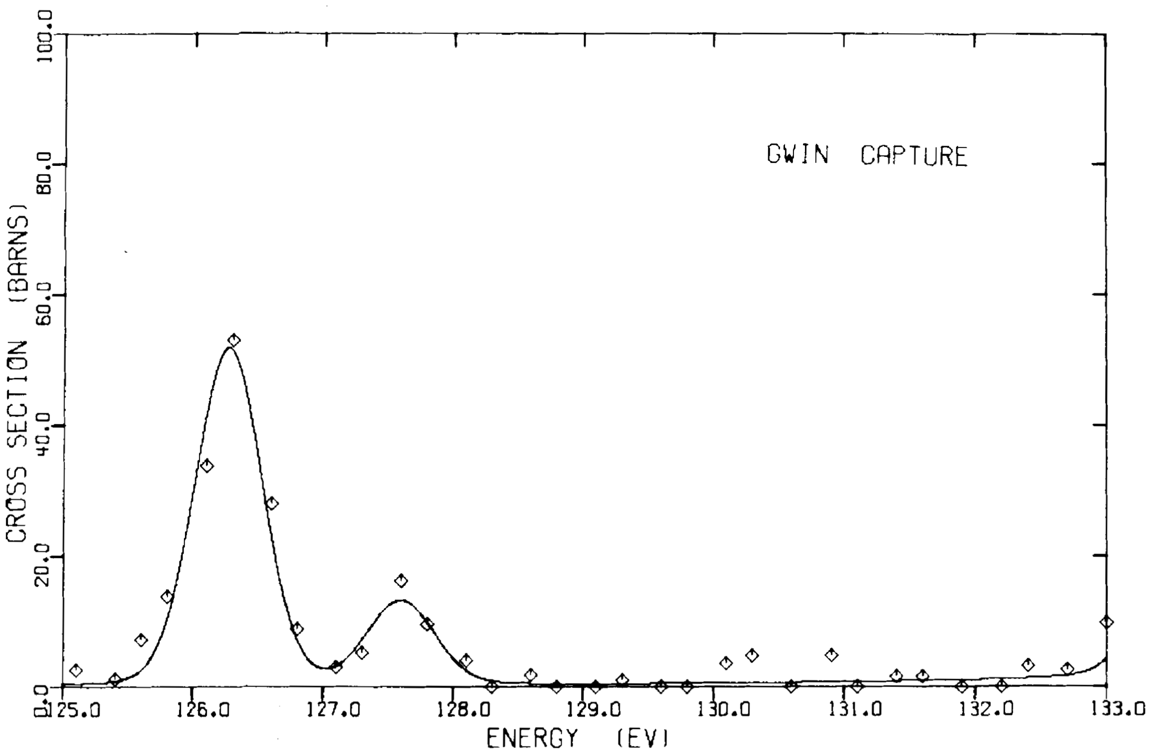
GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
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40.0
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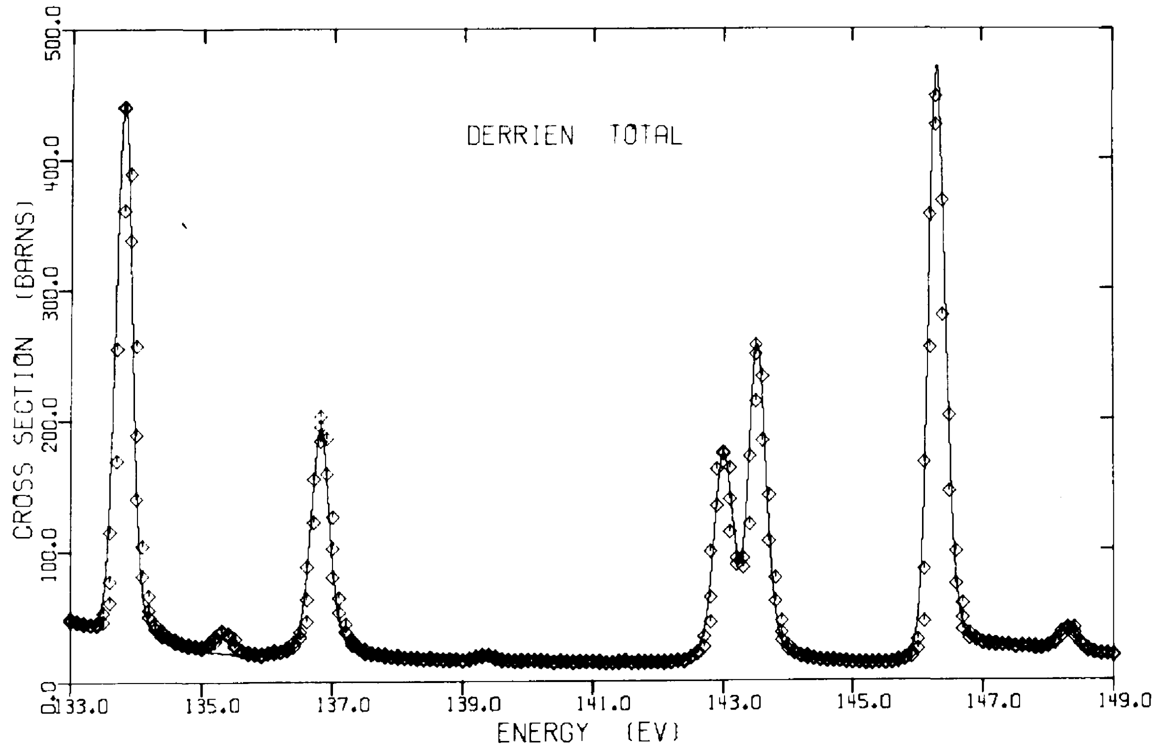
DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
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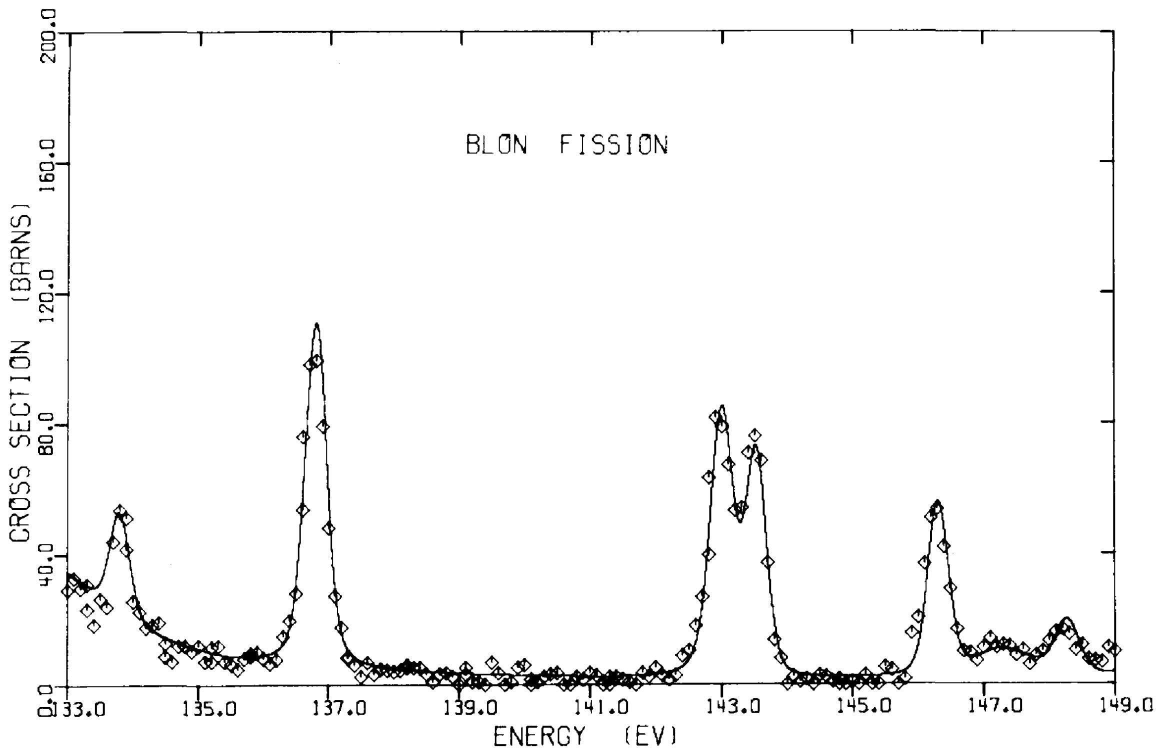
BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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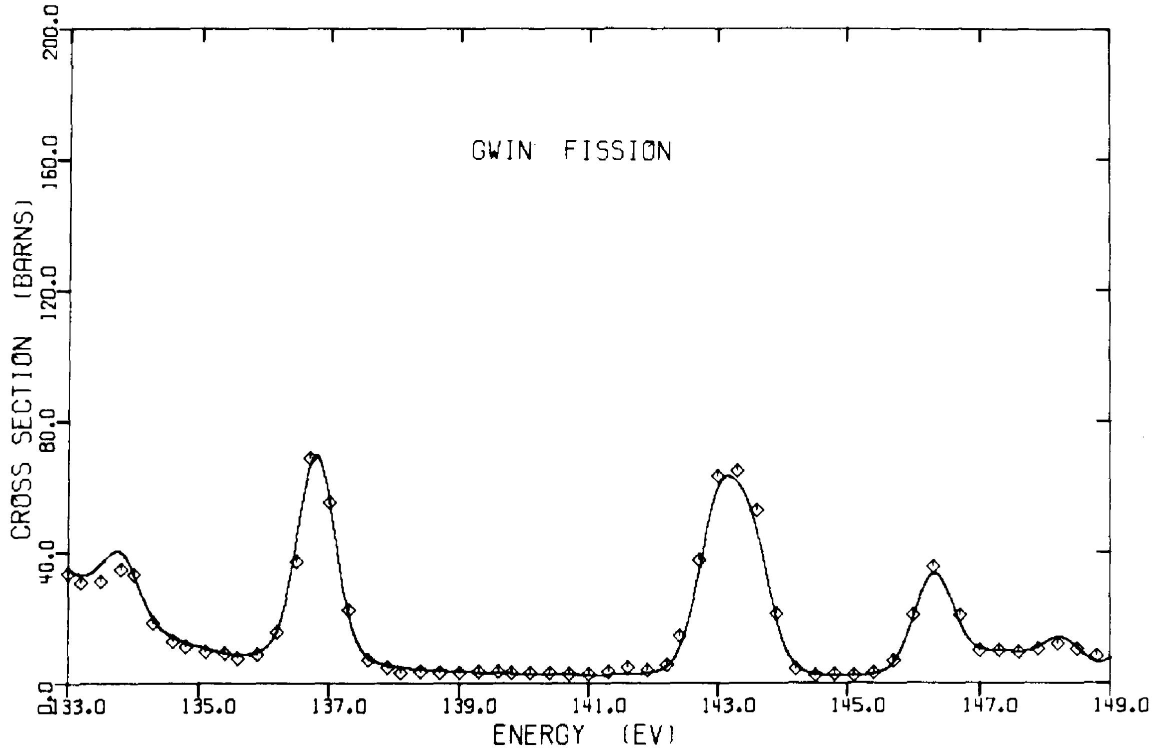

GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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80.0
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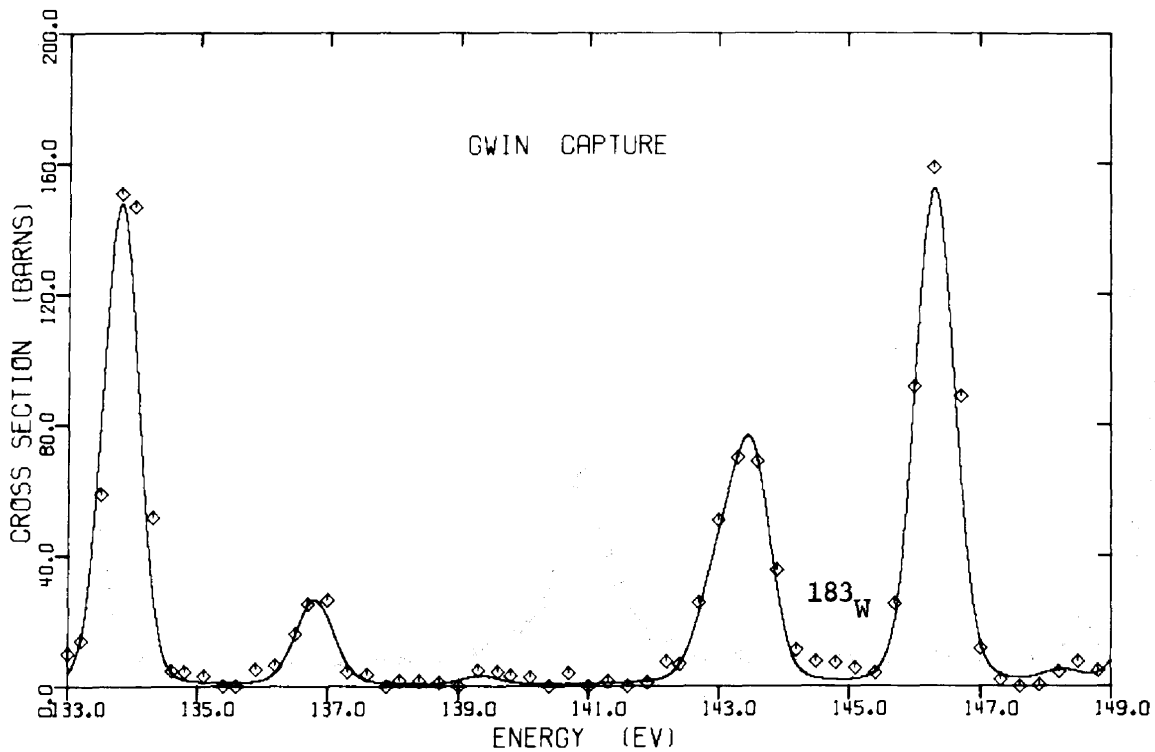

GWIN CAPTURE
183W
CROSS SECTION (BARNS)
ENERGY (EV)
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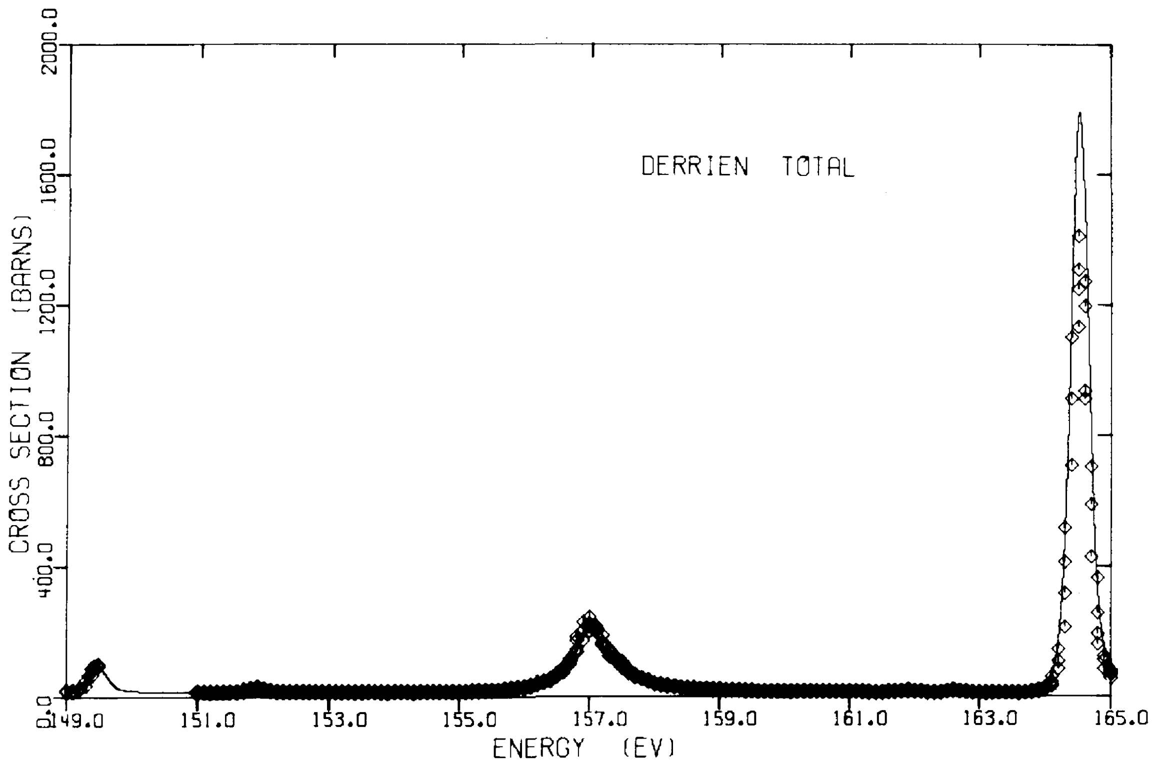
DERRIEN TOTAL
CROSS SECTION (BARNS)
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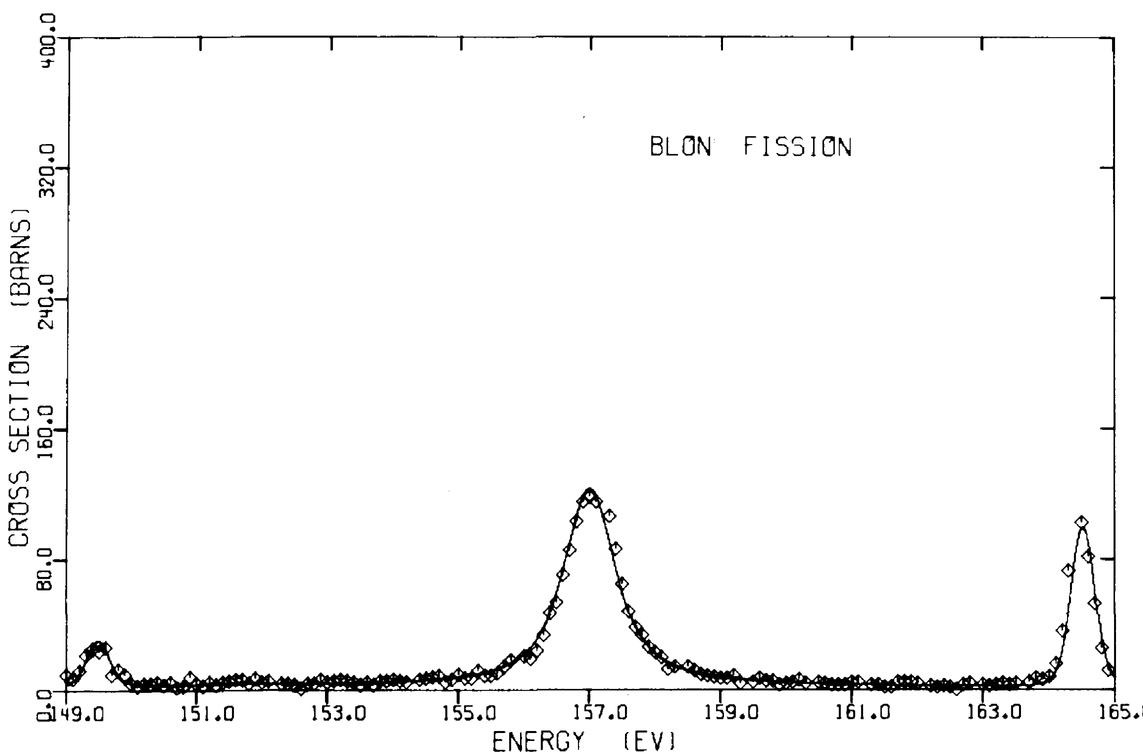
161.0
163.0
165.0
ENERGY (EV)


BLON FISSION
CROSS SECTION (BARNS)
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160.0
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157.0
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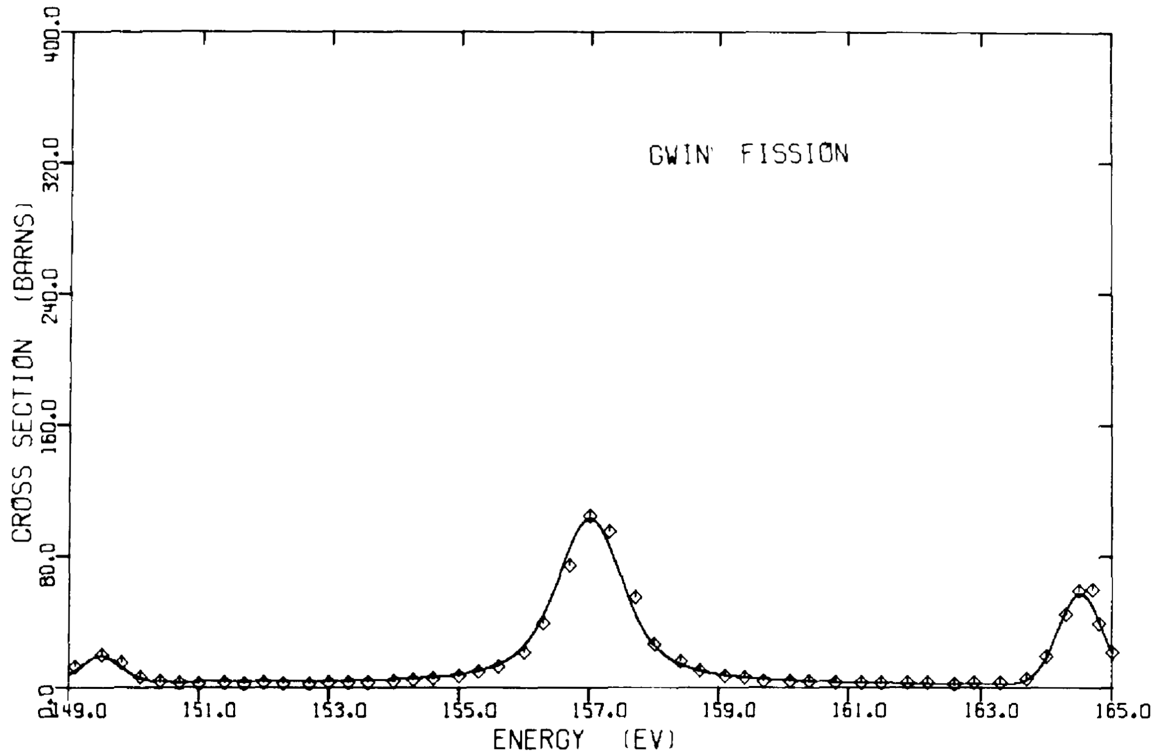
161.0
163.0
165.0
ENERGY (EV)


GWIN FISSION
CROSS SECTION (BARNS)
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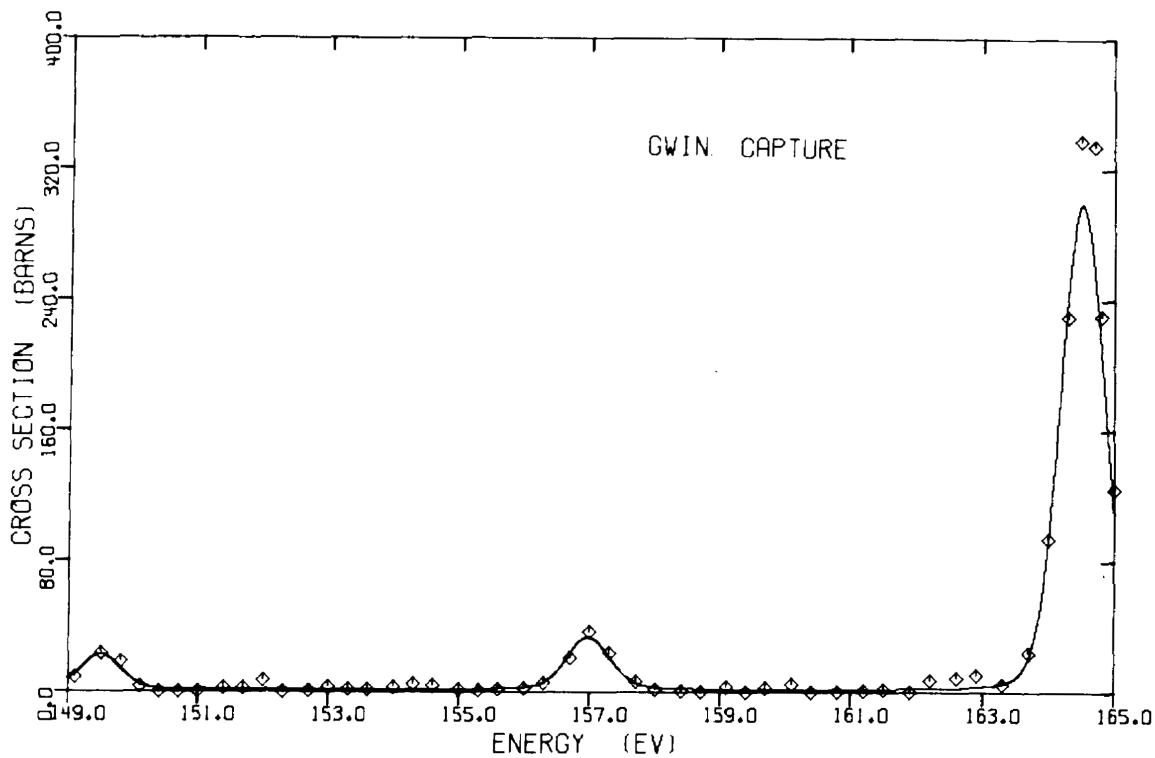
165.0
ENERGY (EV)


GWIN CAPTURE
CROSS SECTION (BARNS)
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240.0
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155.0
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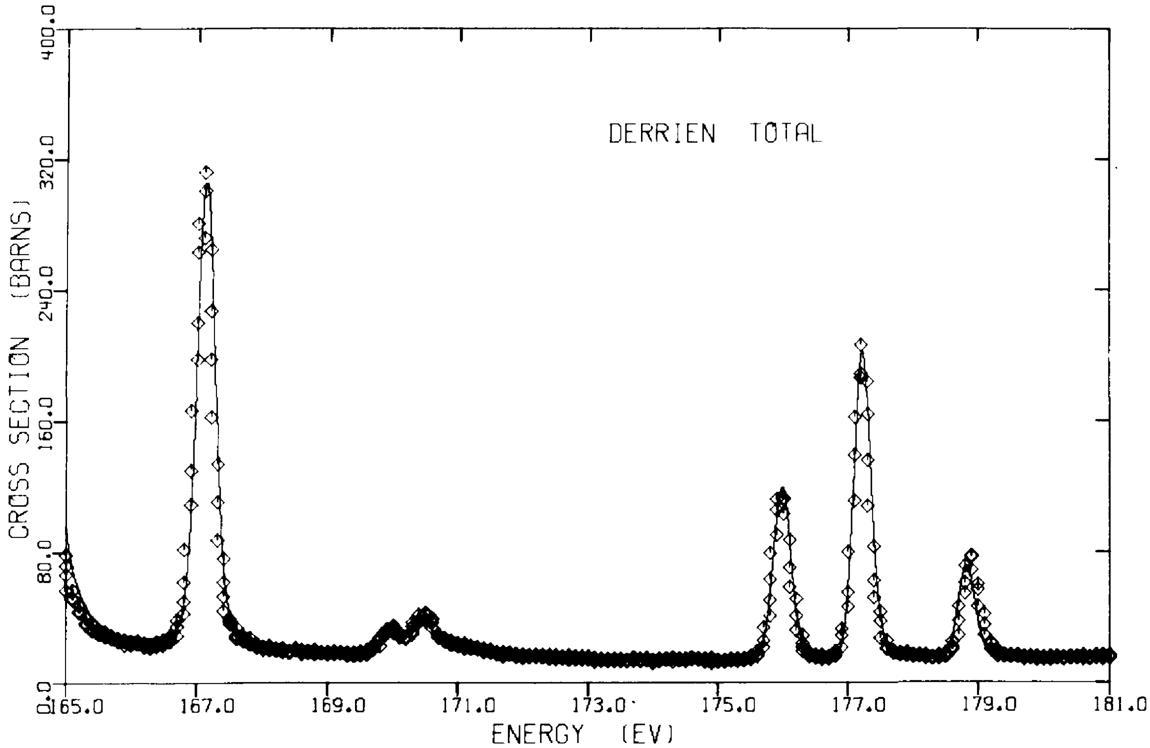
161.0
163.0
165.0
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
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160.0
240.0
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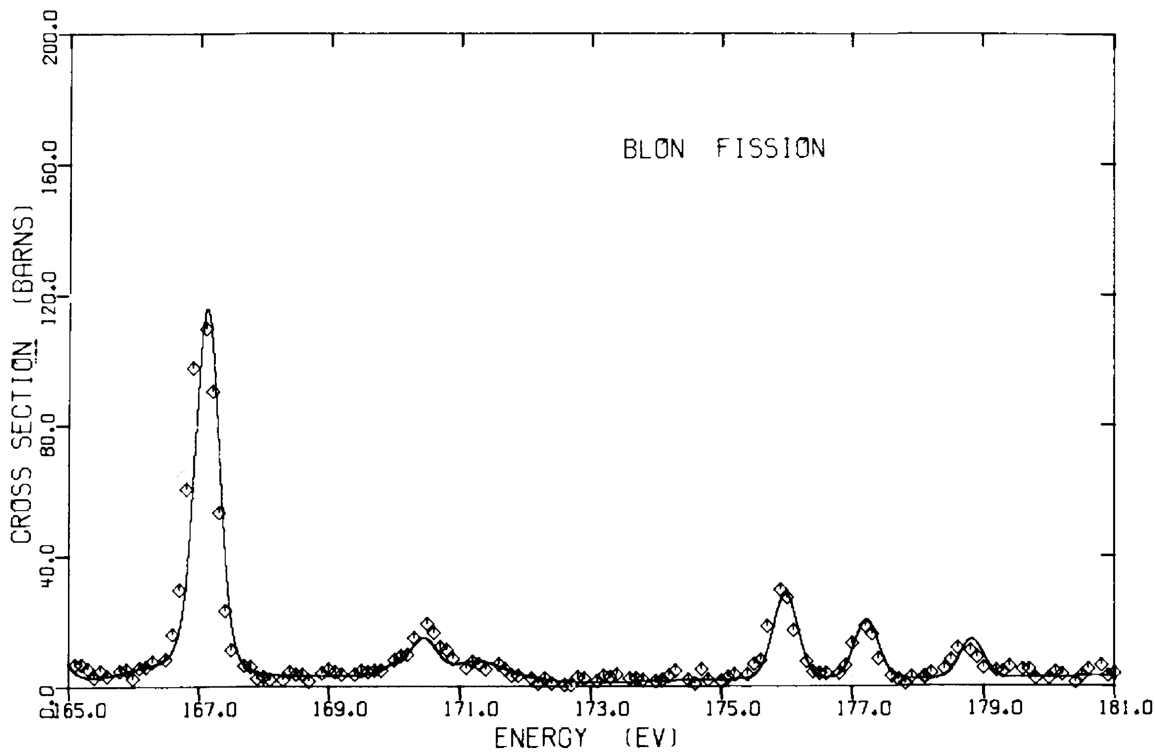
165.0
167.0
169.0
171.0
173.0
175.0
177.0
179.0
181.0


BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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80.0
120.0
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165.0
167.0
169.0
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173.0
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177.0
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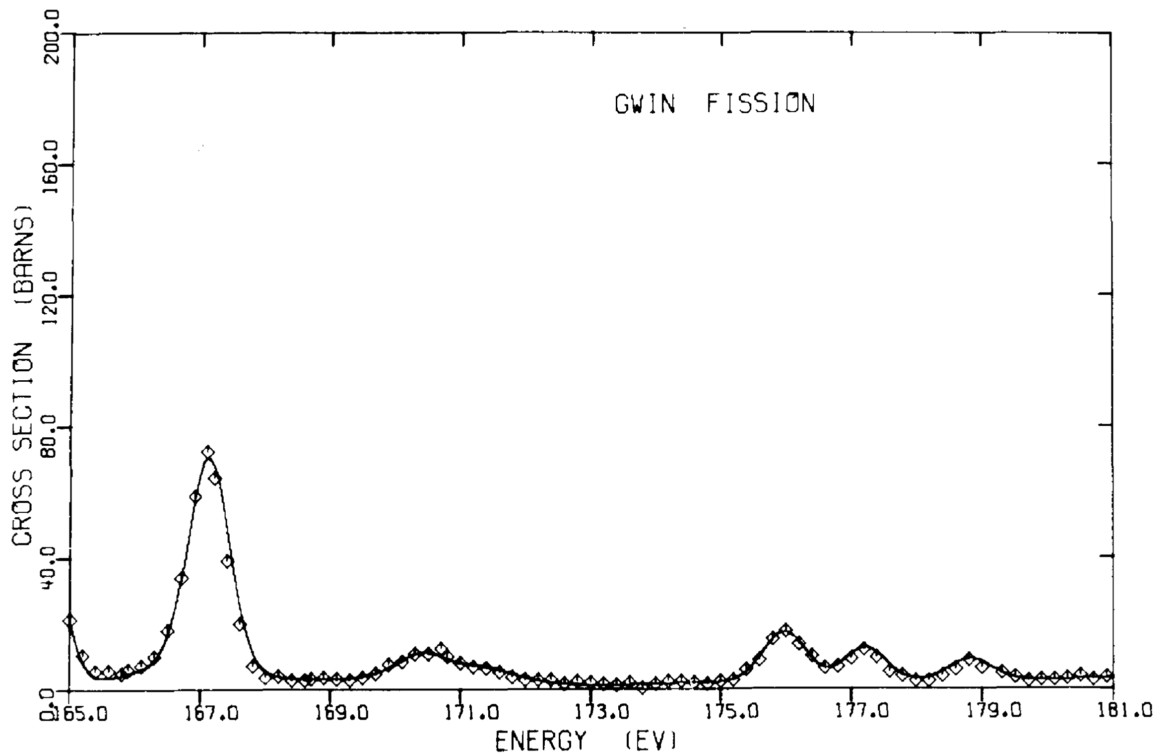
GWIN FISSION
CROSS SECTION (BARNS)
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80.0
120.0
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171.0
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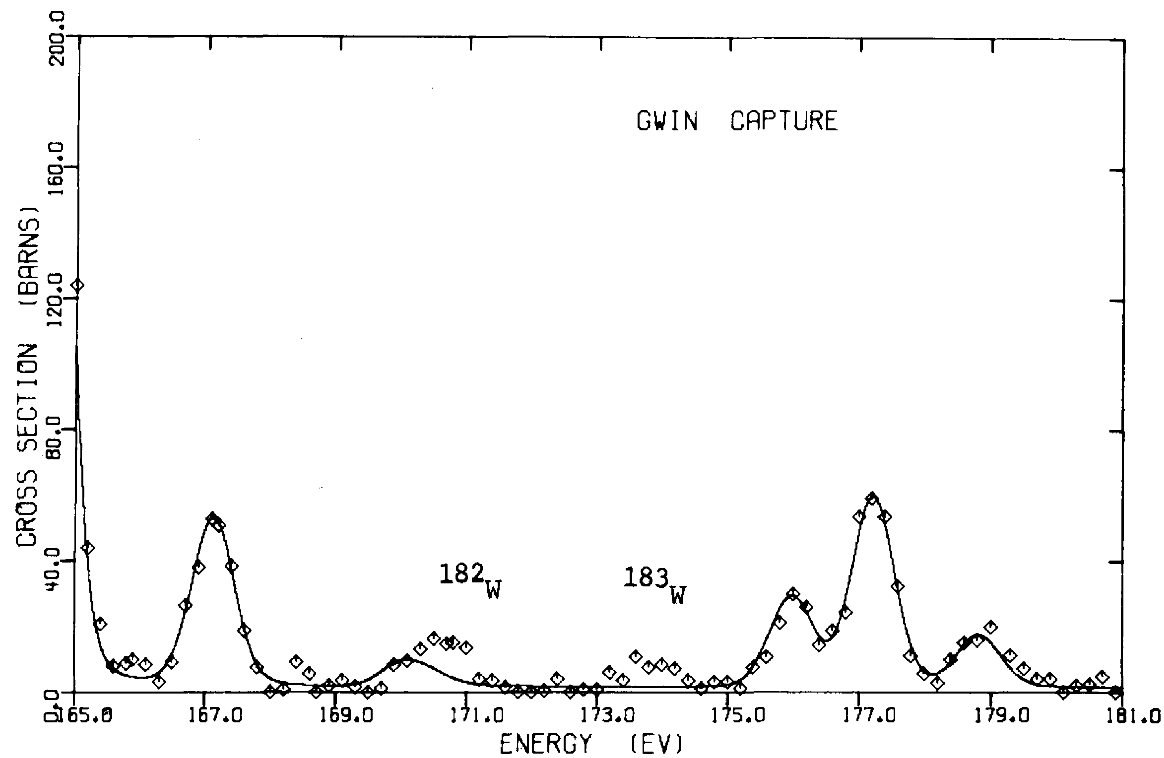
177.0
179.0
181.0
ENERGY (EV)


GWIN CAPTURE
CROSS SECTION (BARNS)
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80.0
120.0
160.0
200.0
^{182}W
^{183}W
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171.0
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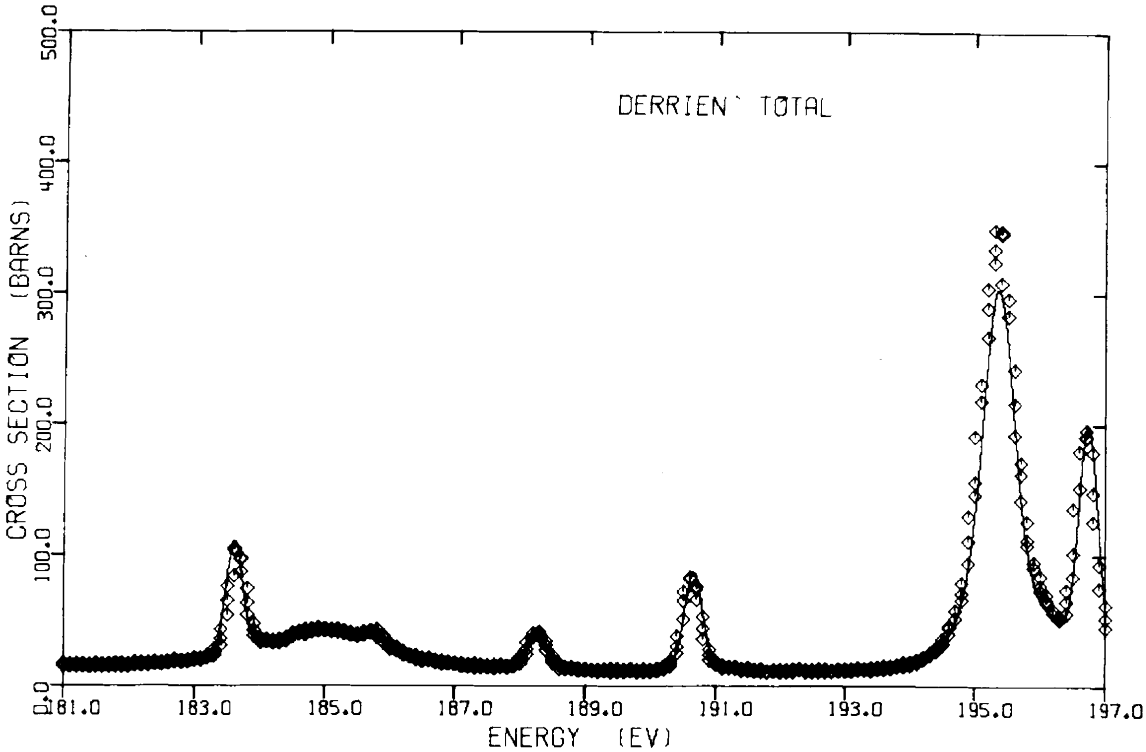
175.0
177.0
179.0
181.0
ENERGY (EV)


DERRIEN` TOTAL
CROSS SECTION (BARNS)
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100.0
200.0
300.0
400.0
500.0
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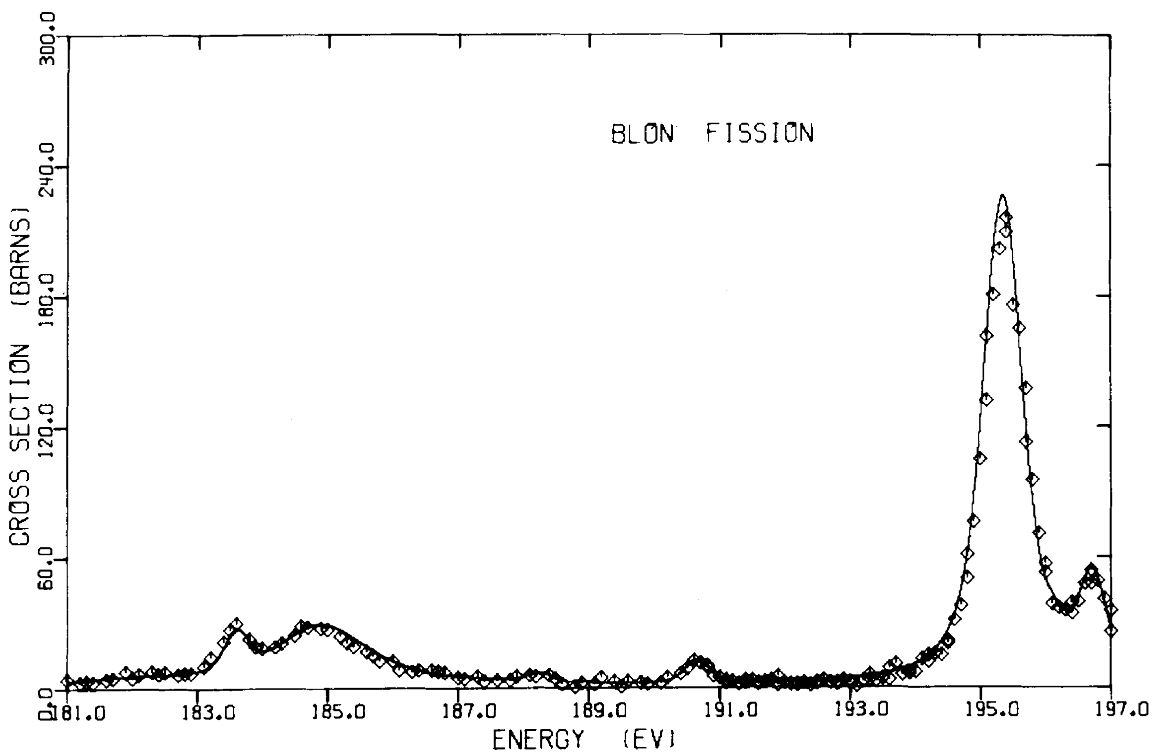
183.0
185.0
187.0
189.0
191.0
193.0
195.0
197.0
ENERGY (EV)


BLON FISSION
CROSS SECTION (BARNS)
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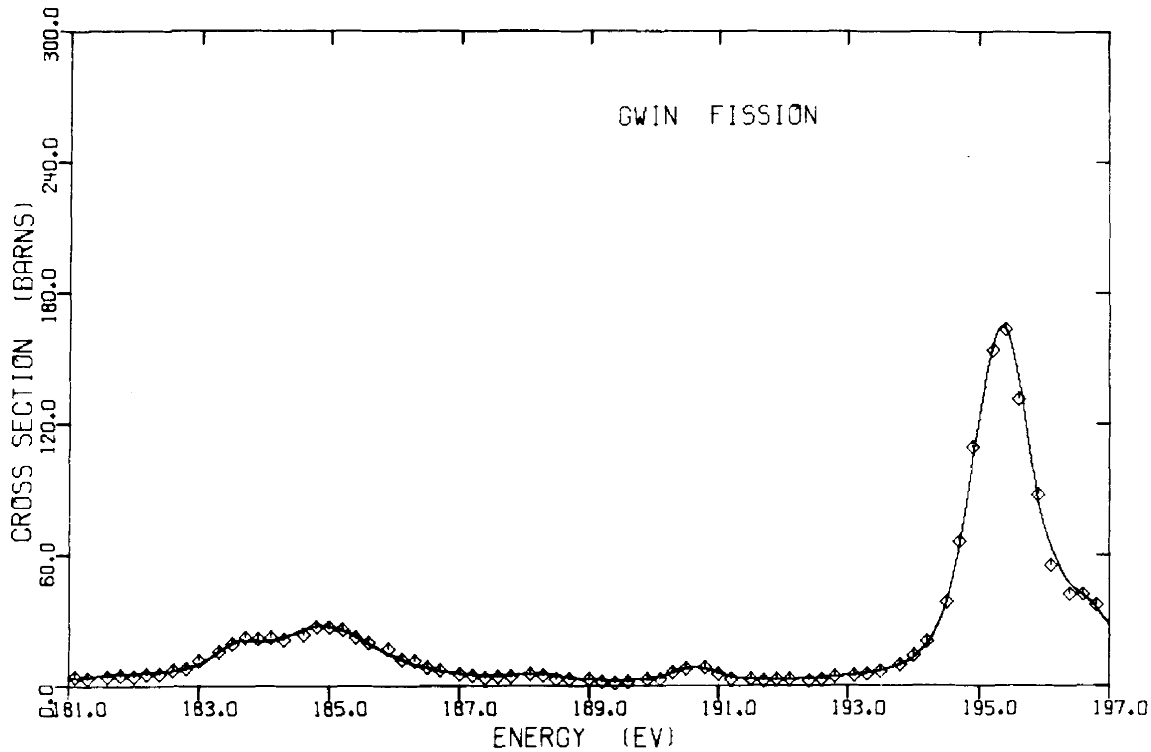
120.0
180.0
240.0
300.0
181.0
183.0
185.0
187.0
189.0
191.0
193.0
195.0
197.0
ENERGY (EV)


GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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120.0
180.0
240.0
300.0
181.0
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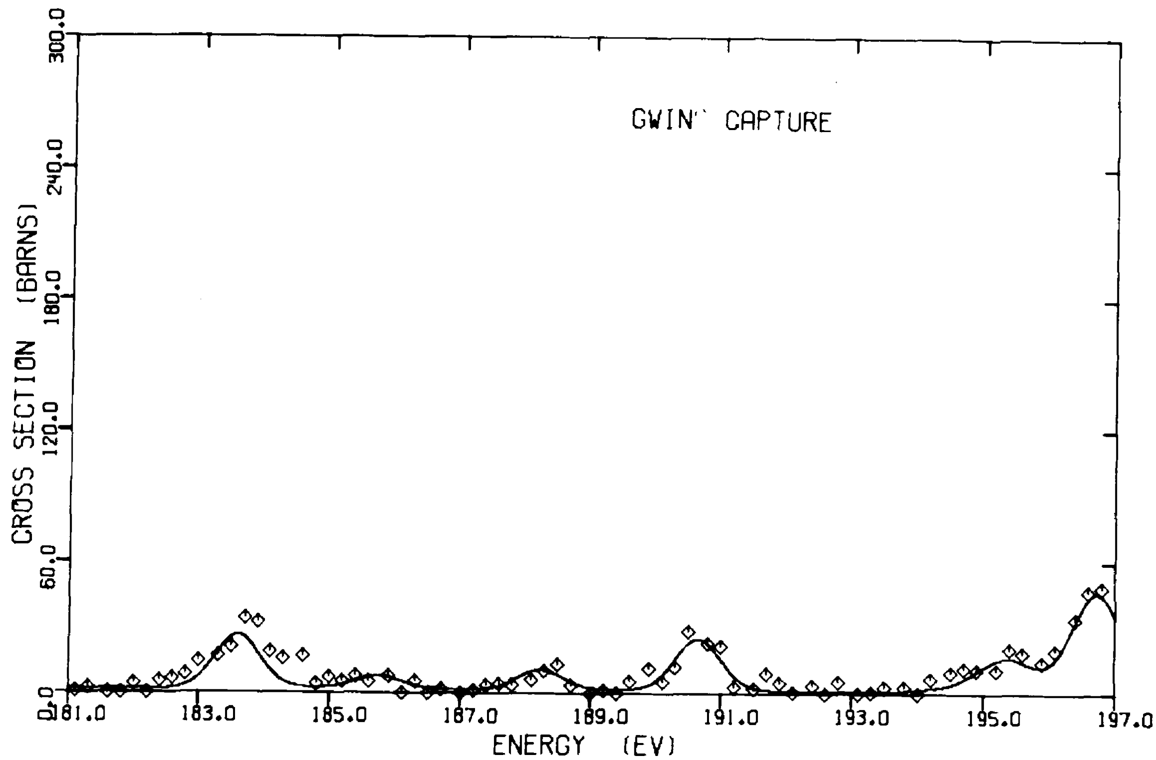
197.0


GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)
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60.0
120.0
180.0
240.0
300.0
181.0
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185.0
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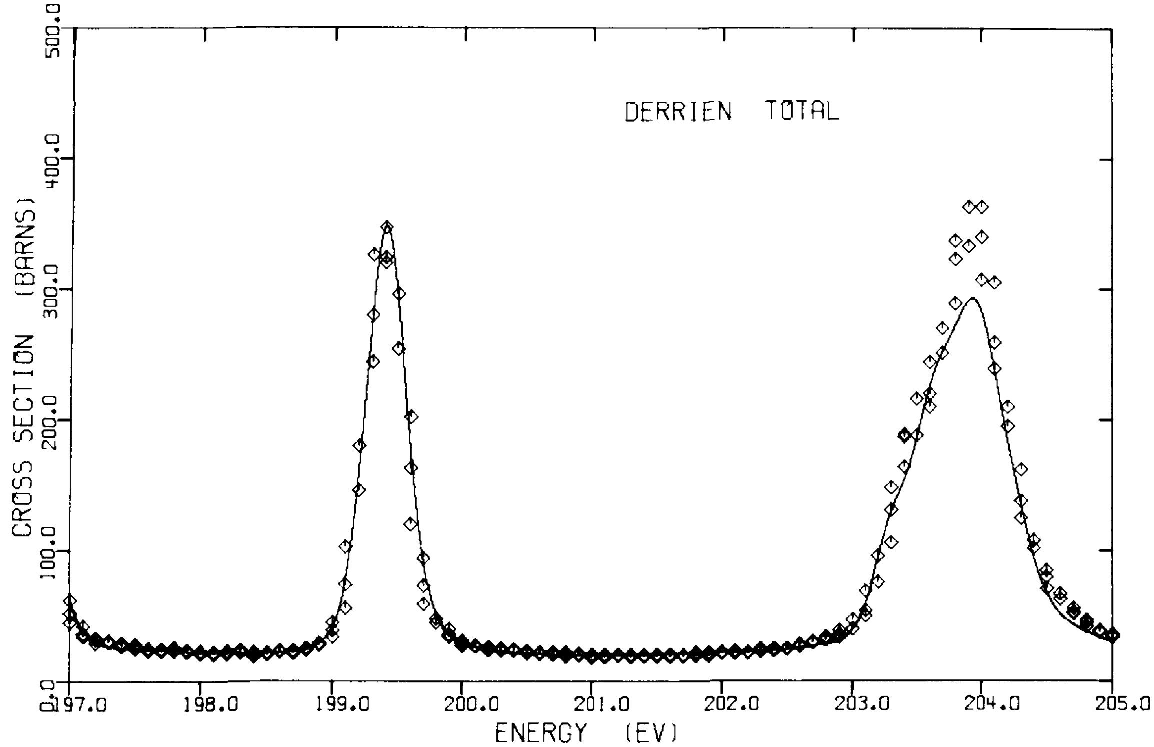
195.0
197.0


DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
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100.0
200.0
300.0
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500.0
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198.0
199.0
200.0
201.0
202.0
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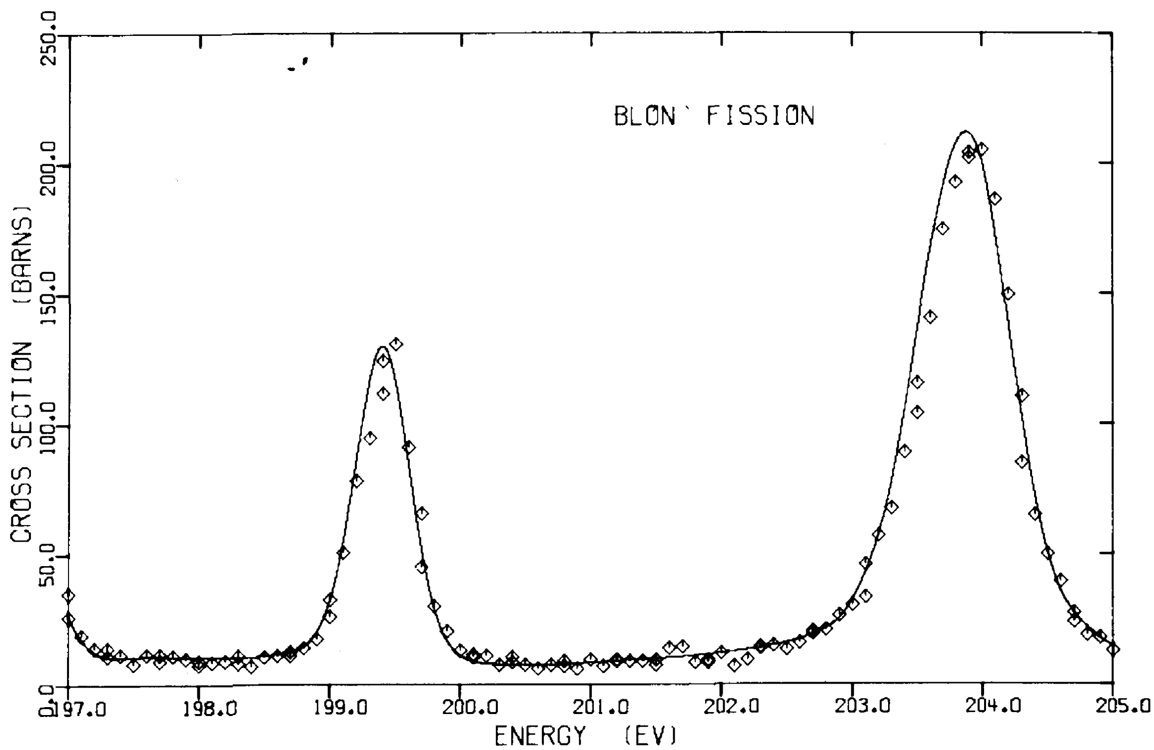
205.0


BLON` FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
50.0
100.0
150.0
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197.0
198.0
199.0
200.0
201.0
202.0
203.0
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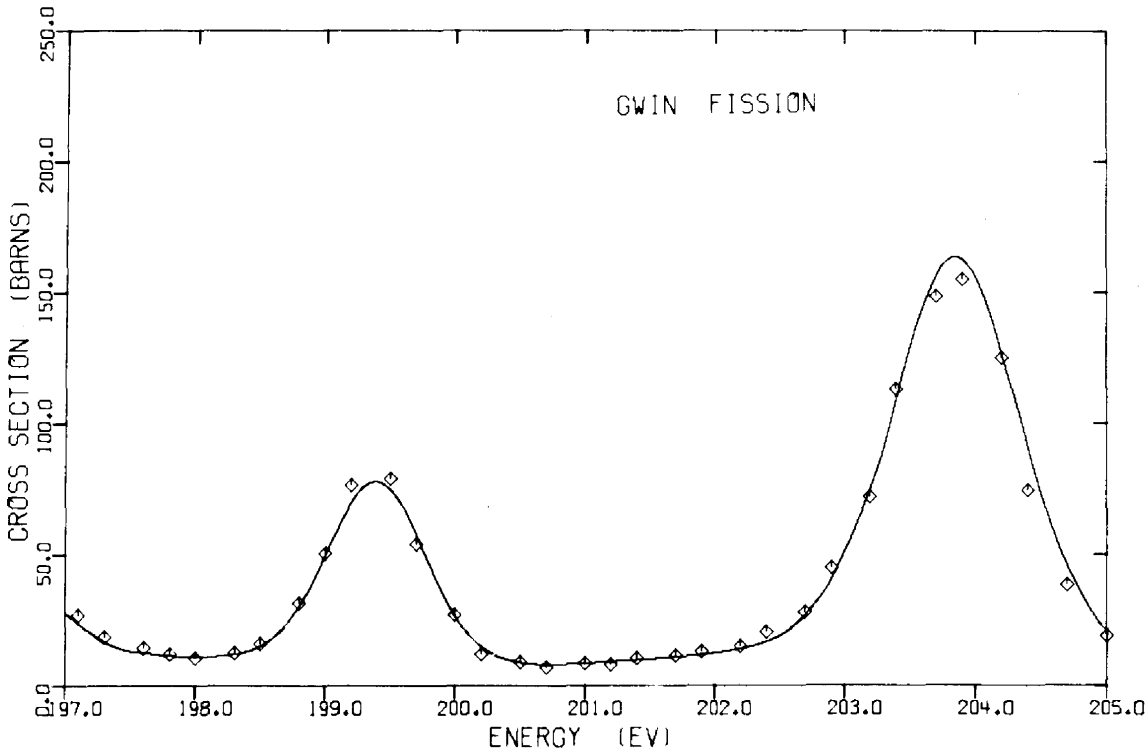
205.0


GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
50.0
100.0
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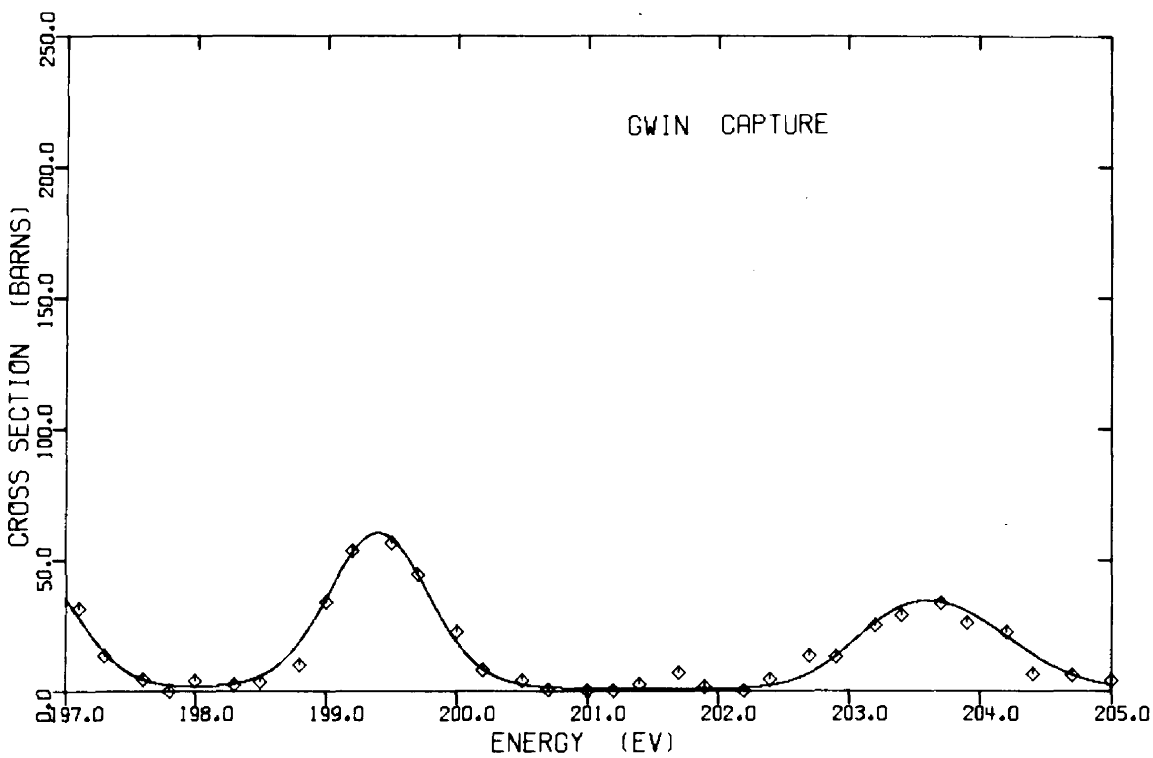
GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)
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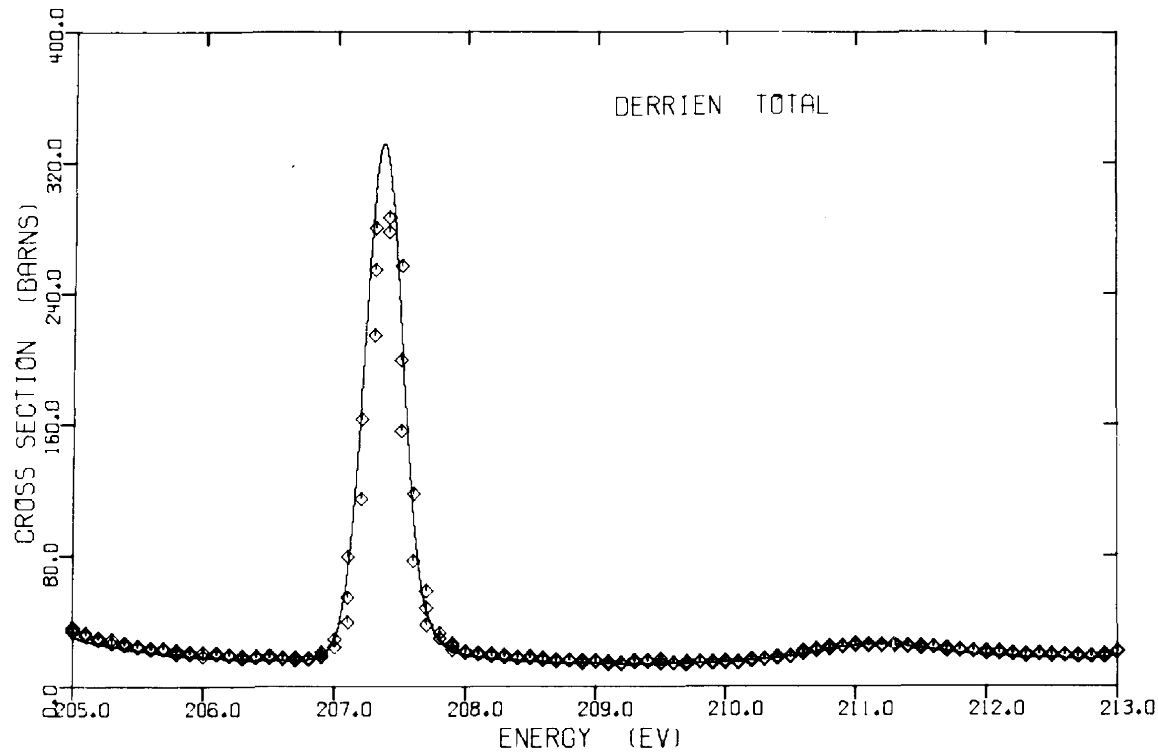
205.0


DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
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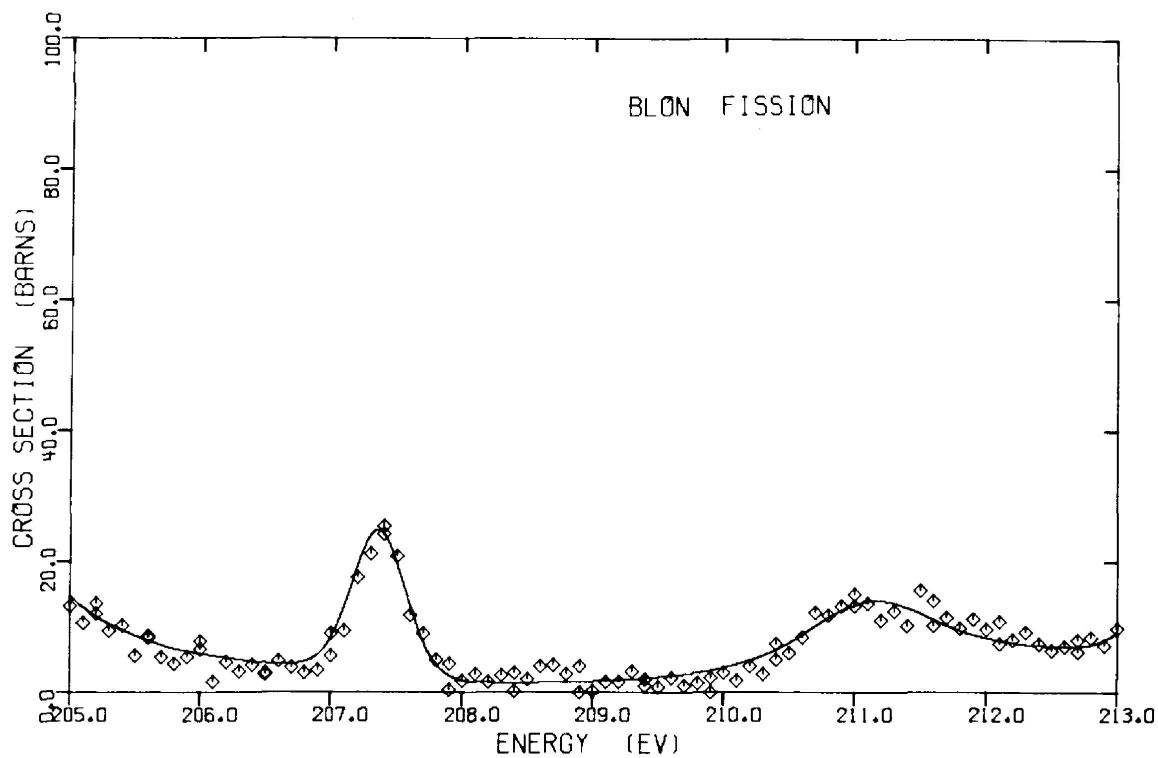
213.0


BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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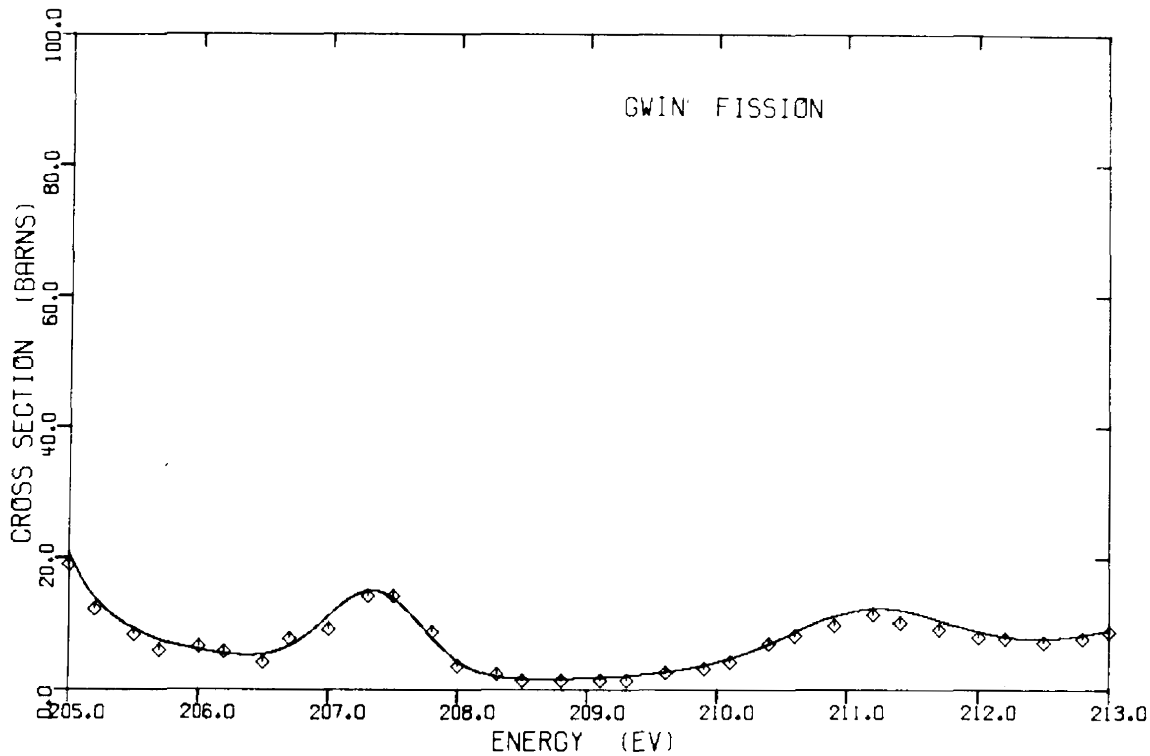
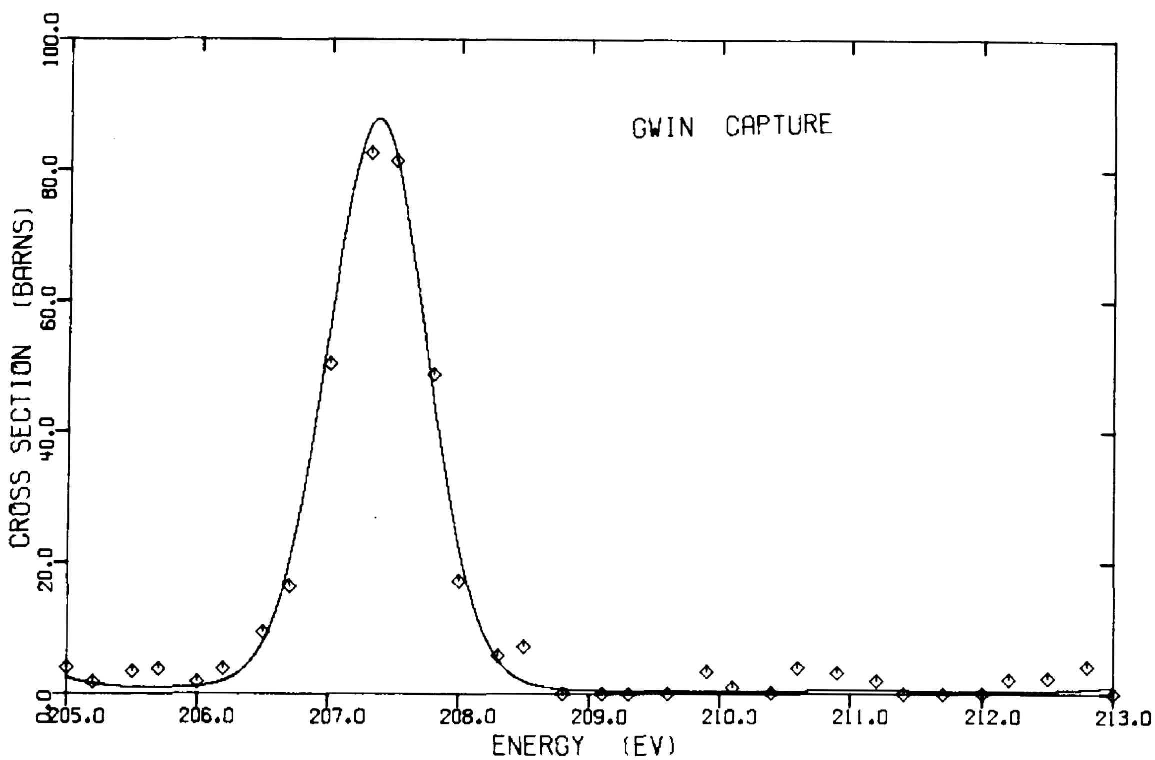
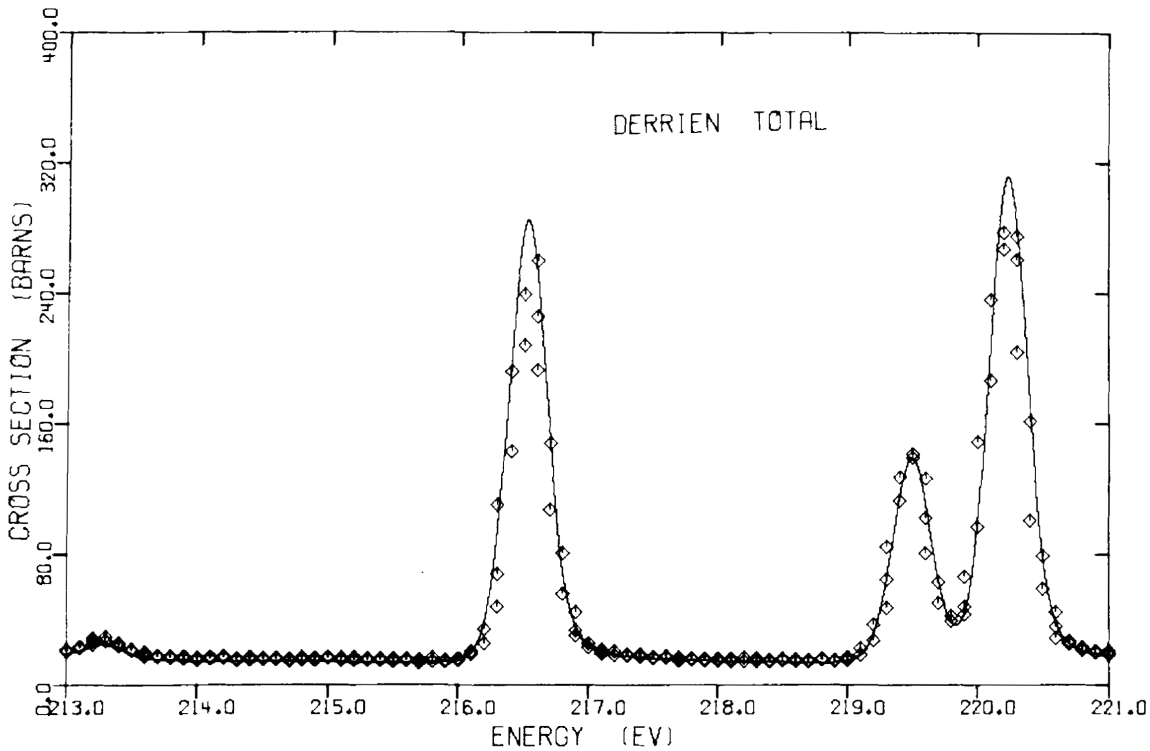
213.0



GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)



GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
80.0
160.0
240.0
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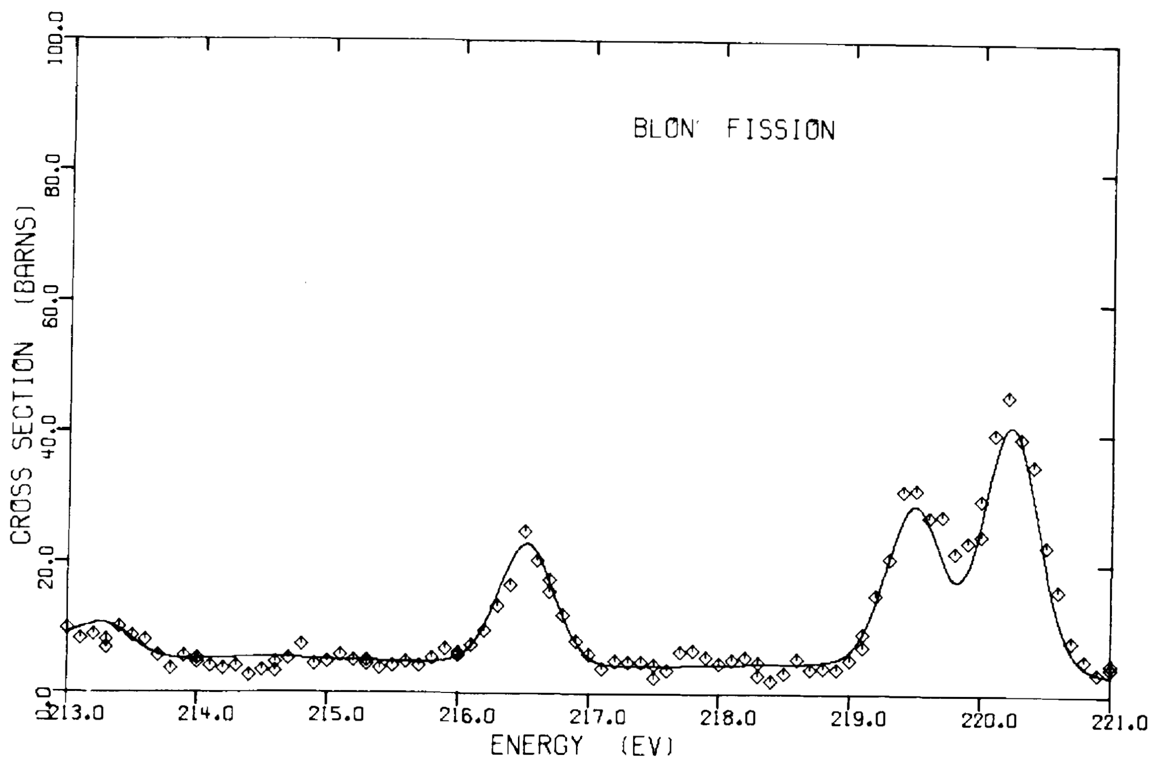
221.0


BLONS FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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20.0
40.0
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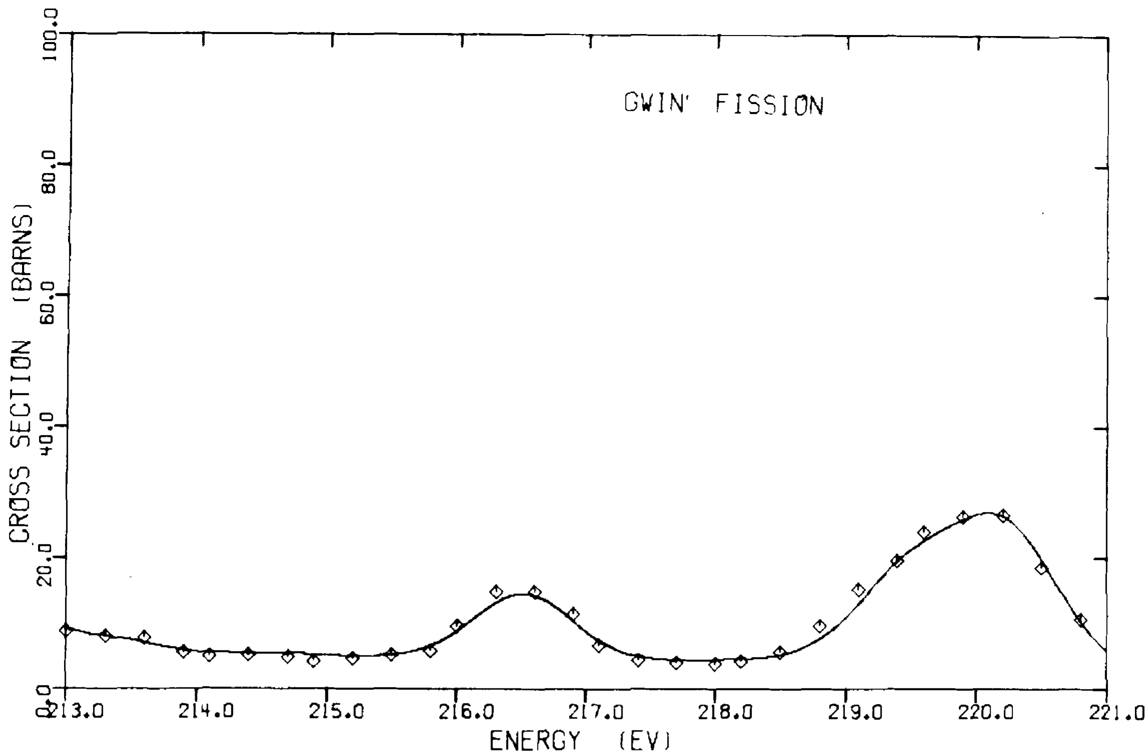
GWIN' FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
20.0
40.0
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213.0
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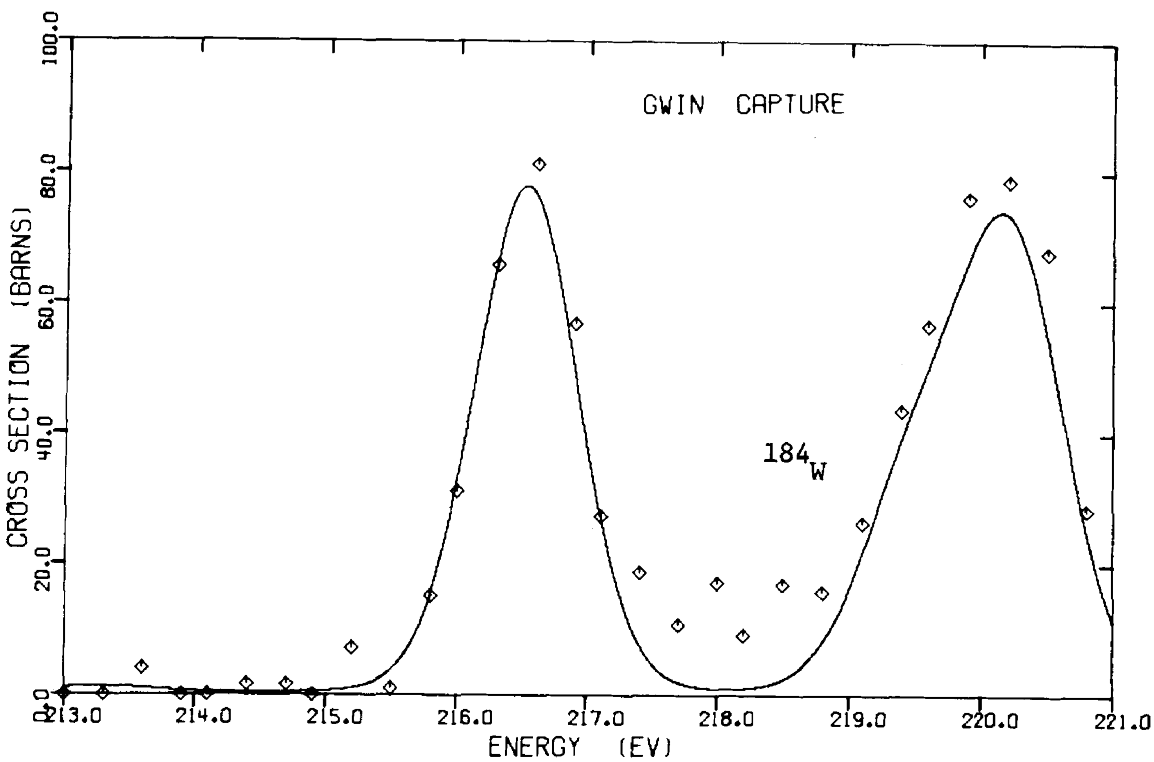
GWIN CAPTURE
184W
CROSS SECTION (BARNS)
ENERGY (EV)
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20.0
40.0
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100.0
213.0
214.0
215.0
216.0
217.0
218.0
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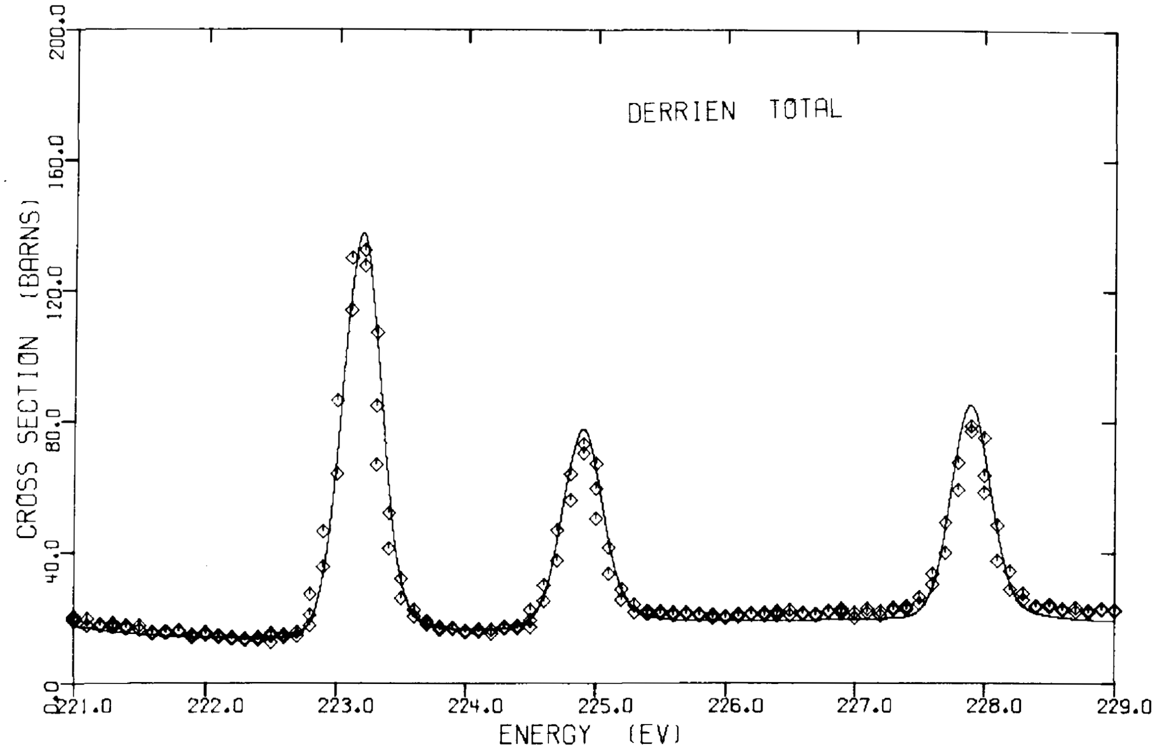
221.0



DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
40.0
80.0
120.0
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223.0
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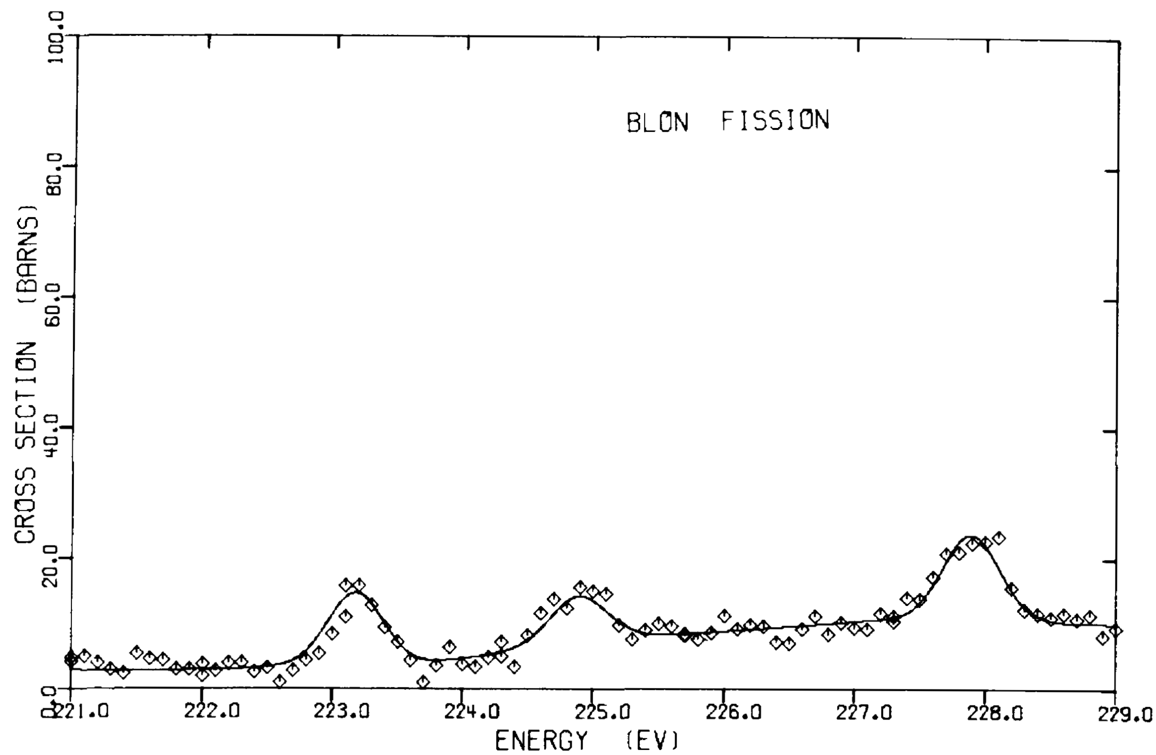

BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
20.0
40.0
60.0
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222.0
223.0
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225.0
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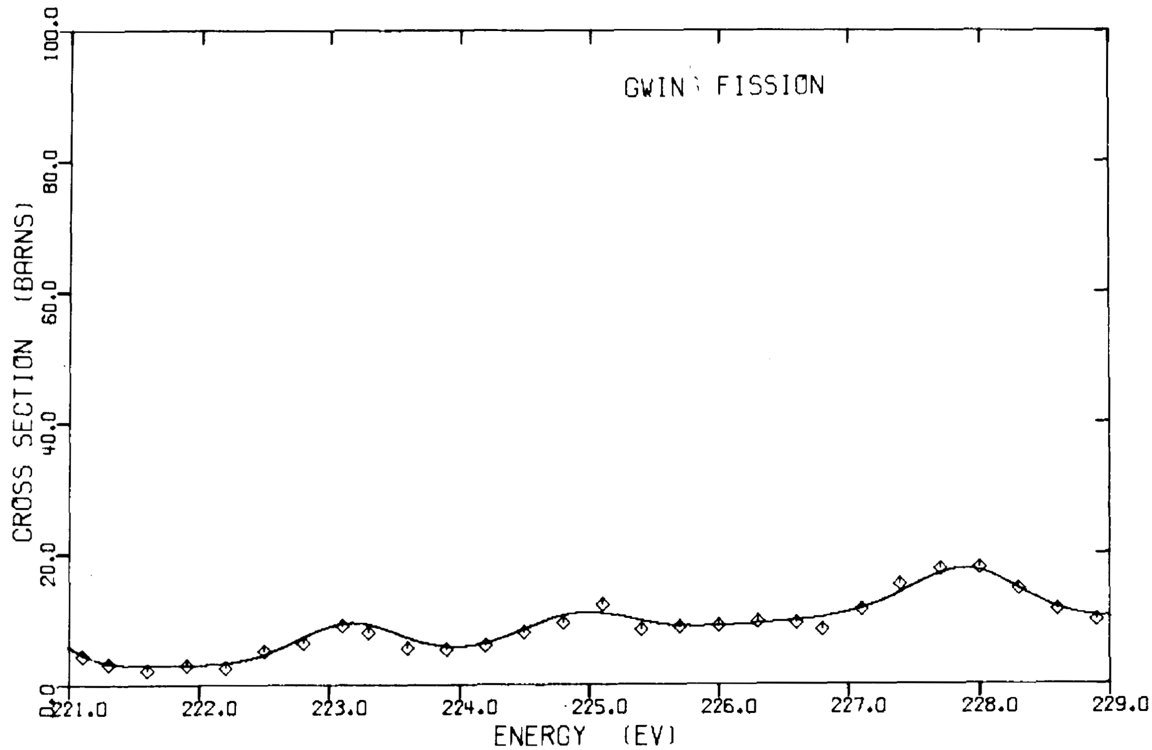
GWIN FISSION
CROSS SECTION (BARNS)
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60.0
40.0
20.0
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222.0
223.0
224.0
225.0
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227.0
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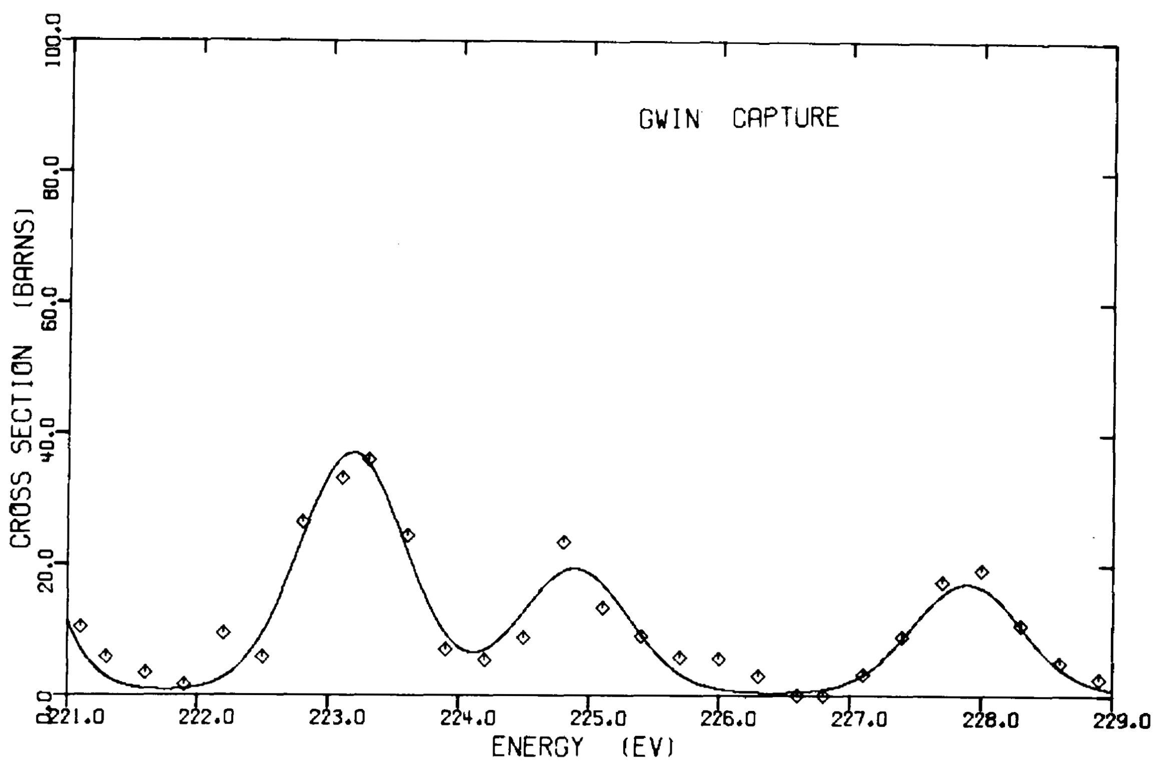
229.0
ENERGY (EV)


GWIN CAPTURE
CROSS SECTION (BARNS)
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40.0
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223.0
224.0
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227.0
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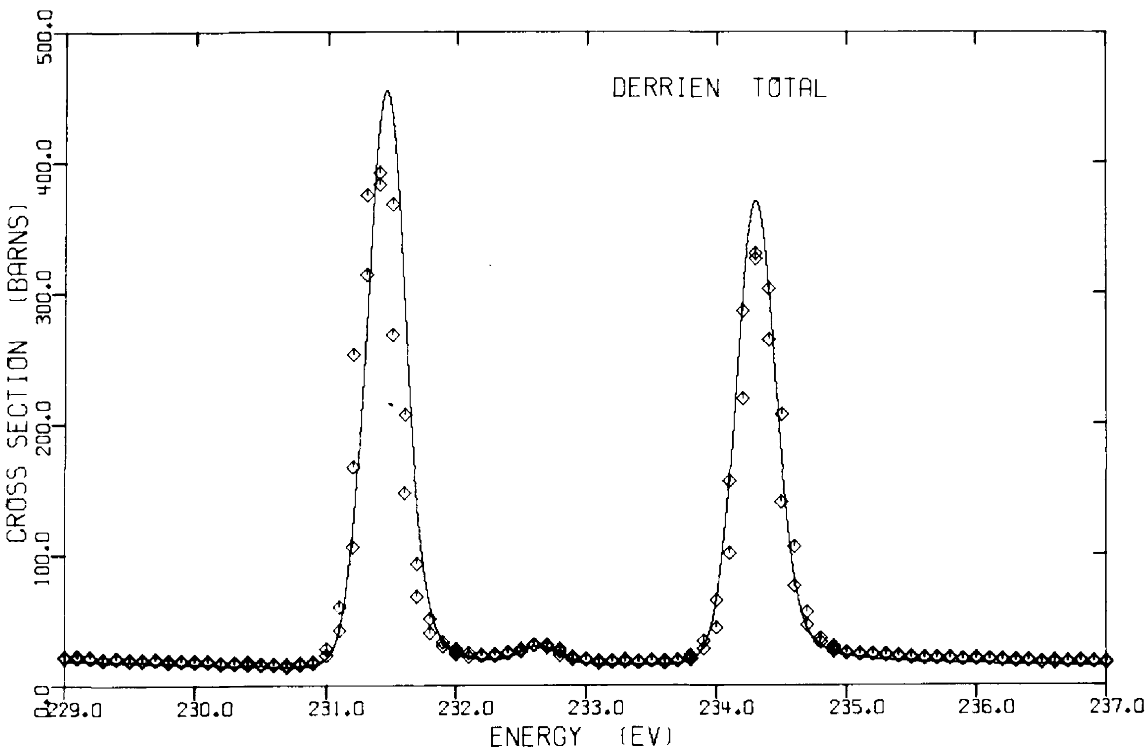
229.0
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
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200.0
300.0
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232.0
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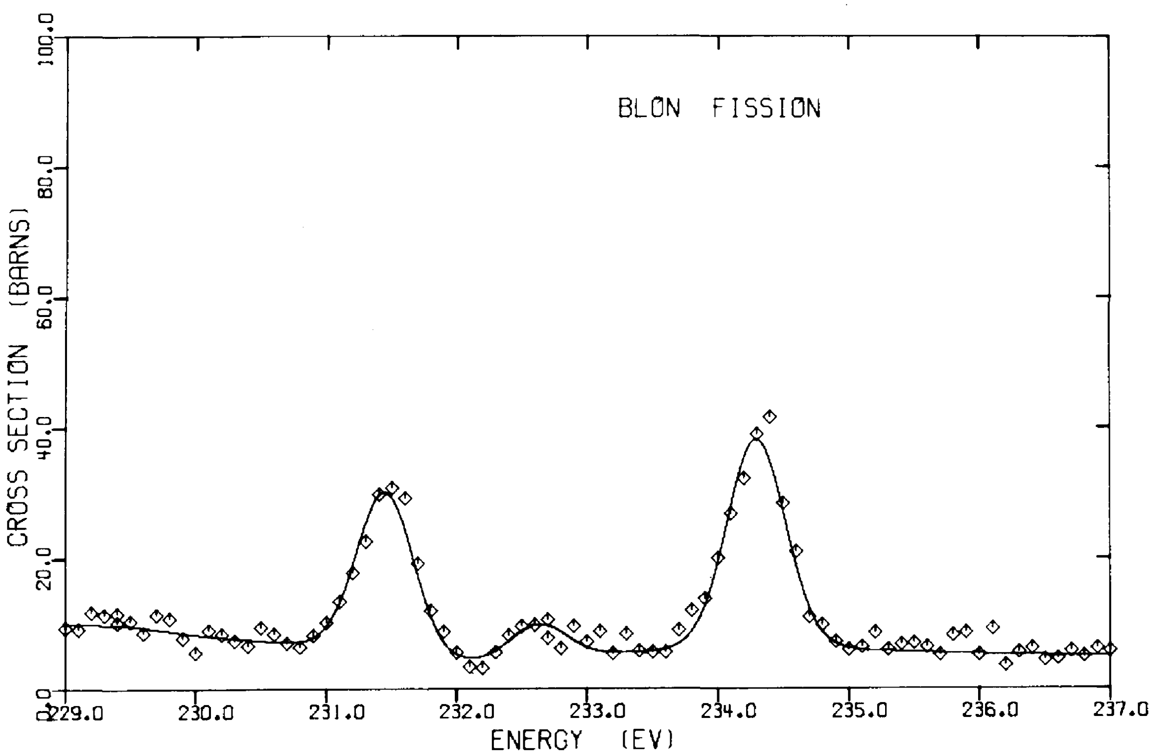
ENERGY (EV)


BLON FISSION
CROSS SECTION (BARNS)
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231.0
232.0
233.0
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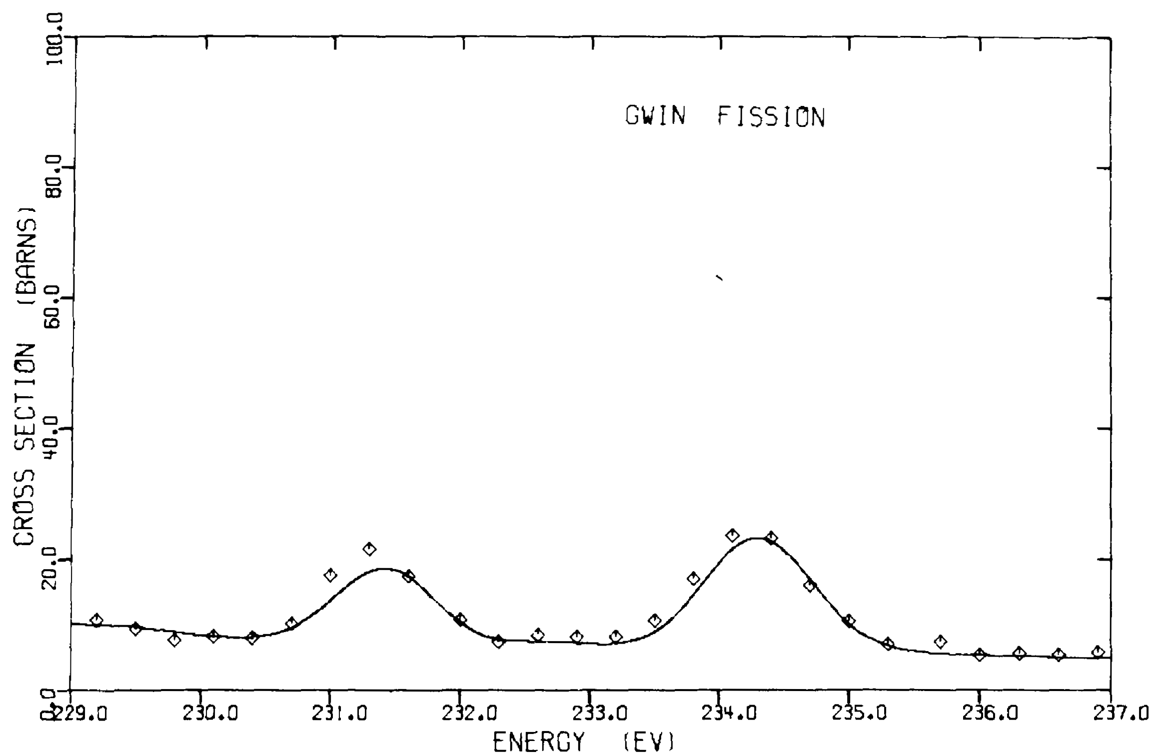
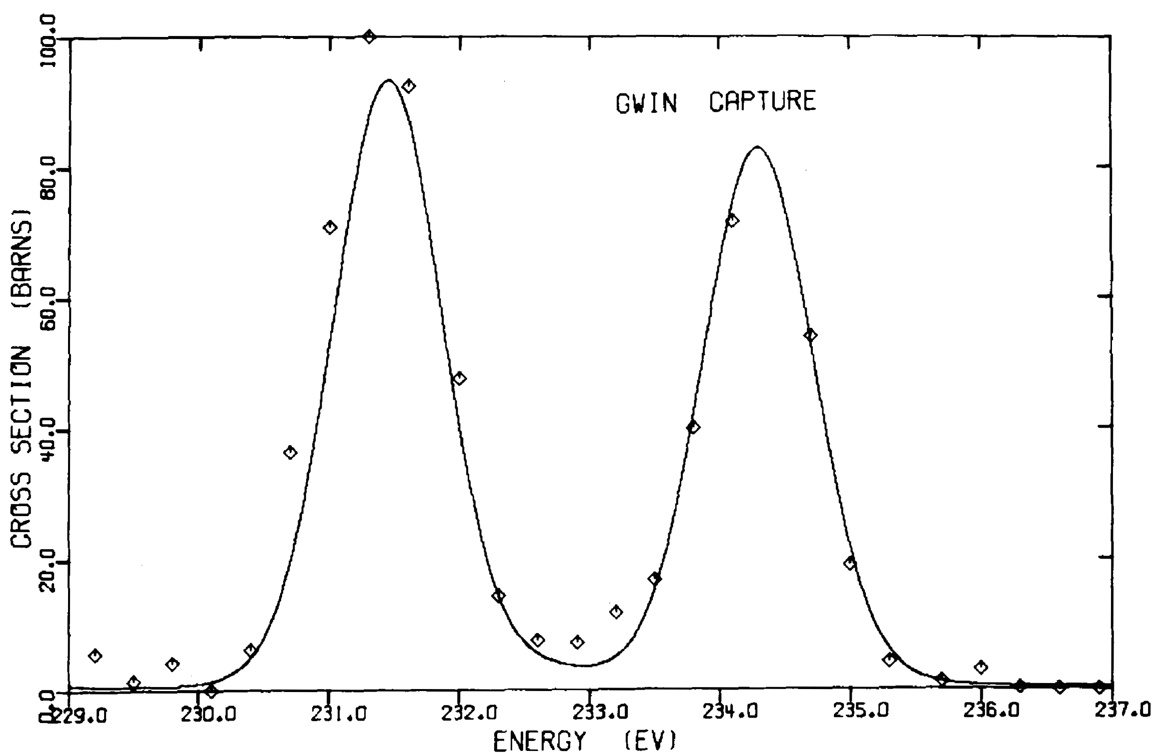
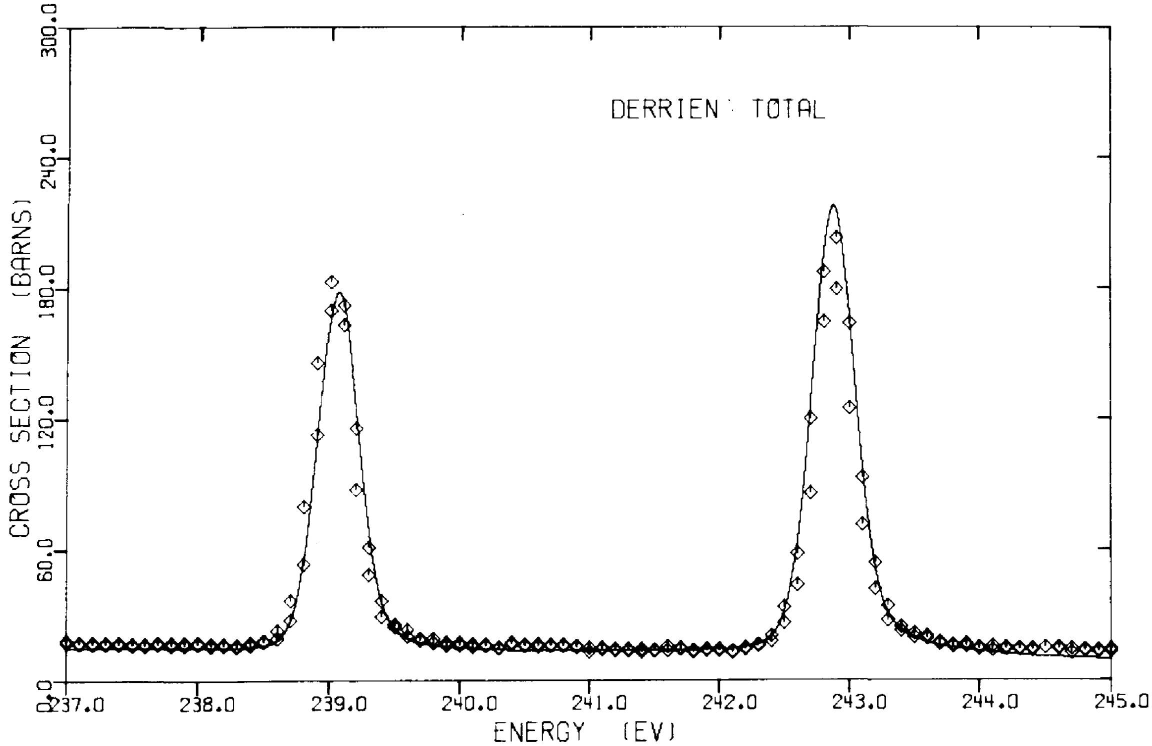
237.0
ENERGY (EV)


GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)


GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
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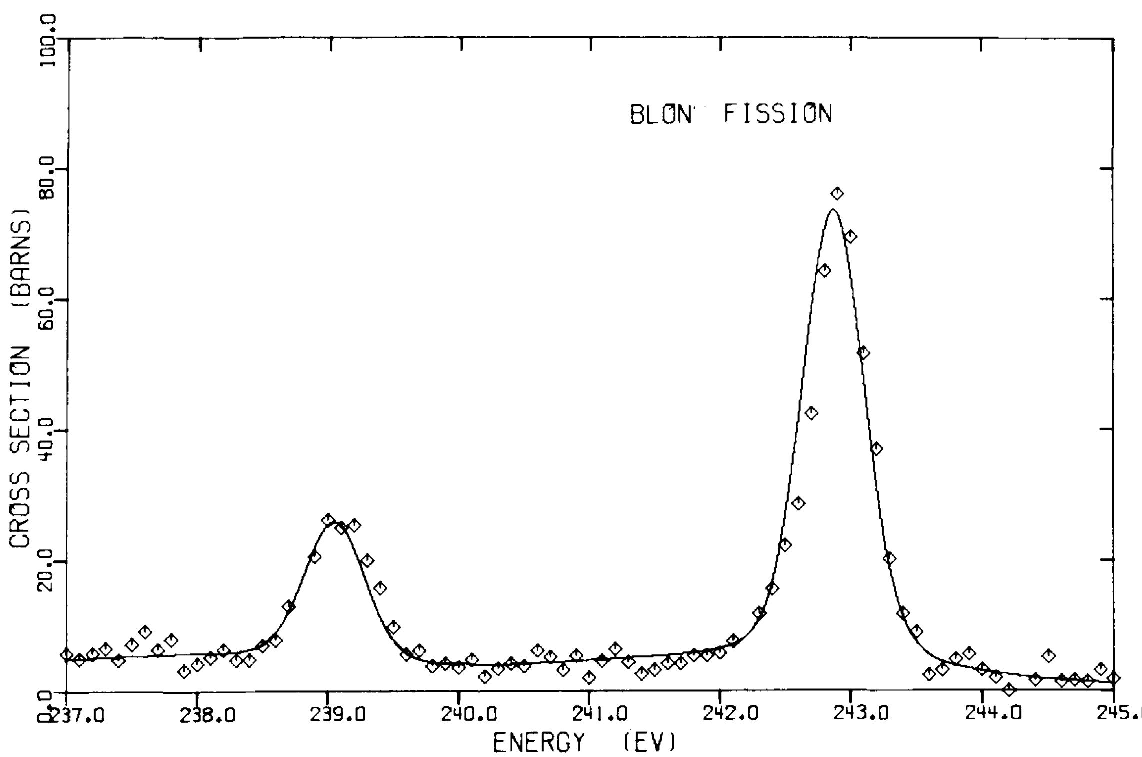
BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
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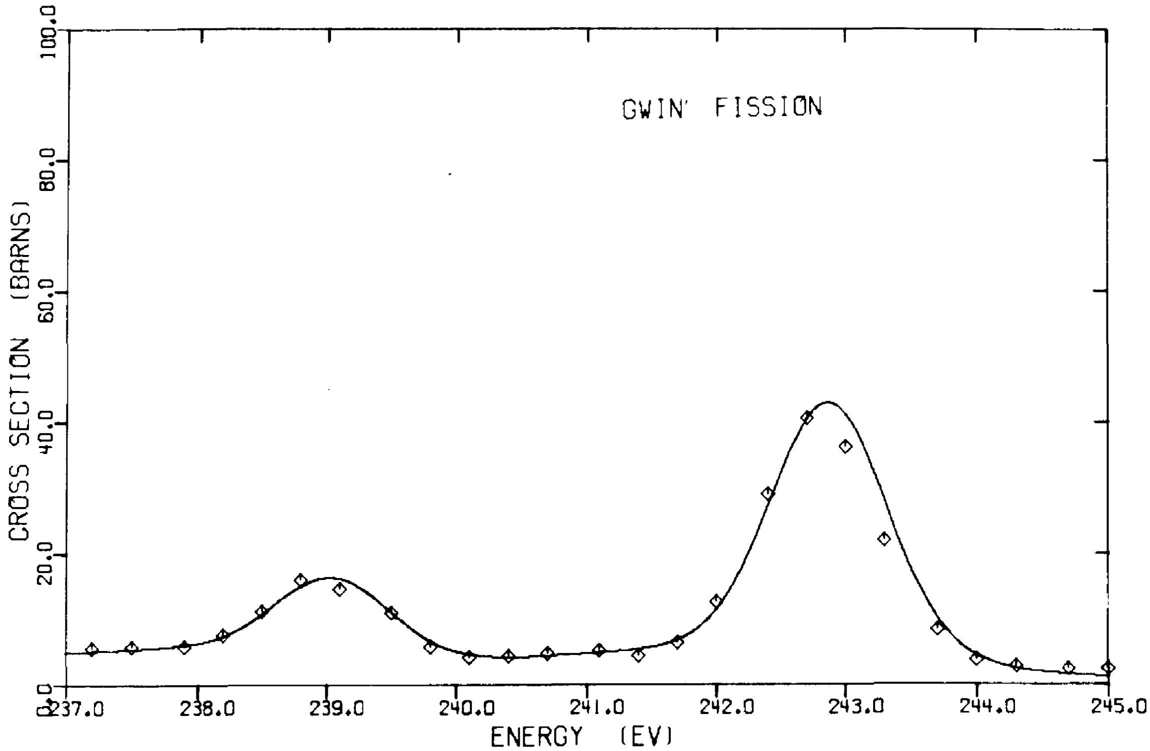
GWIN' FISSION
CROSS SECTION (BARNS)
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240.0
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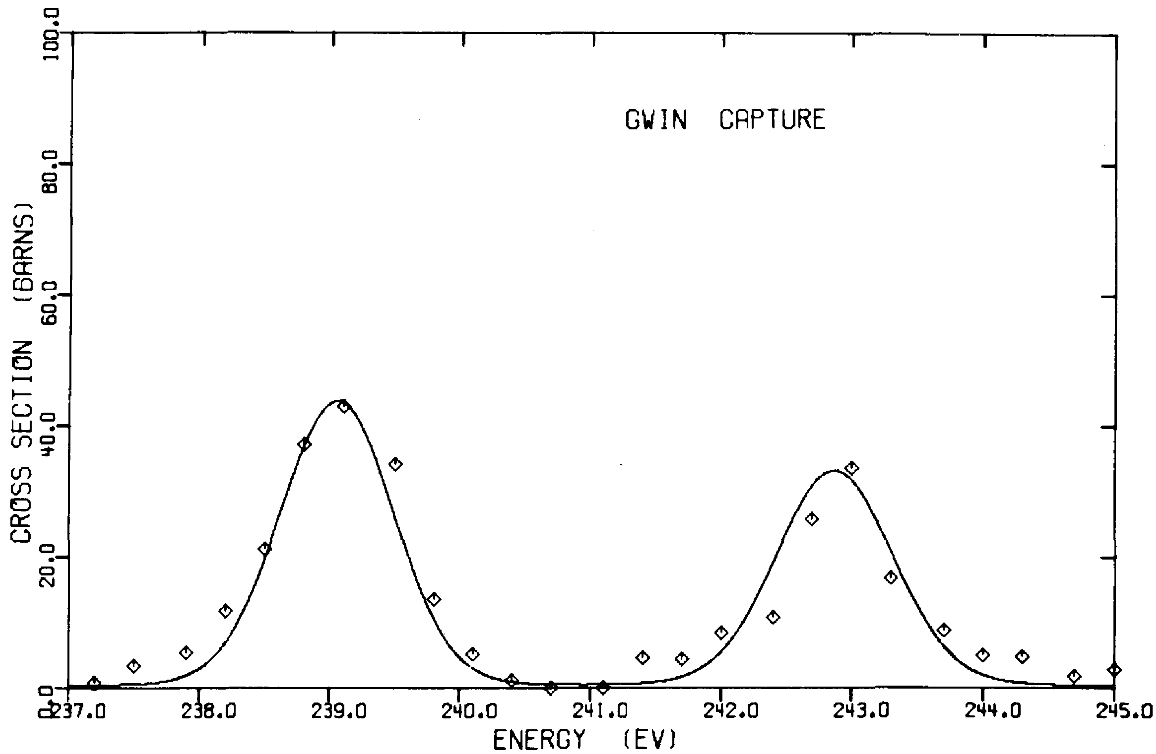
ENERGY (EV)


GWIN CAPTURE
CROSS SECTION (BARNS)
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240.0
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243.0
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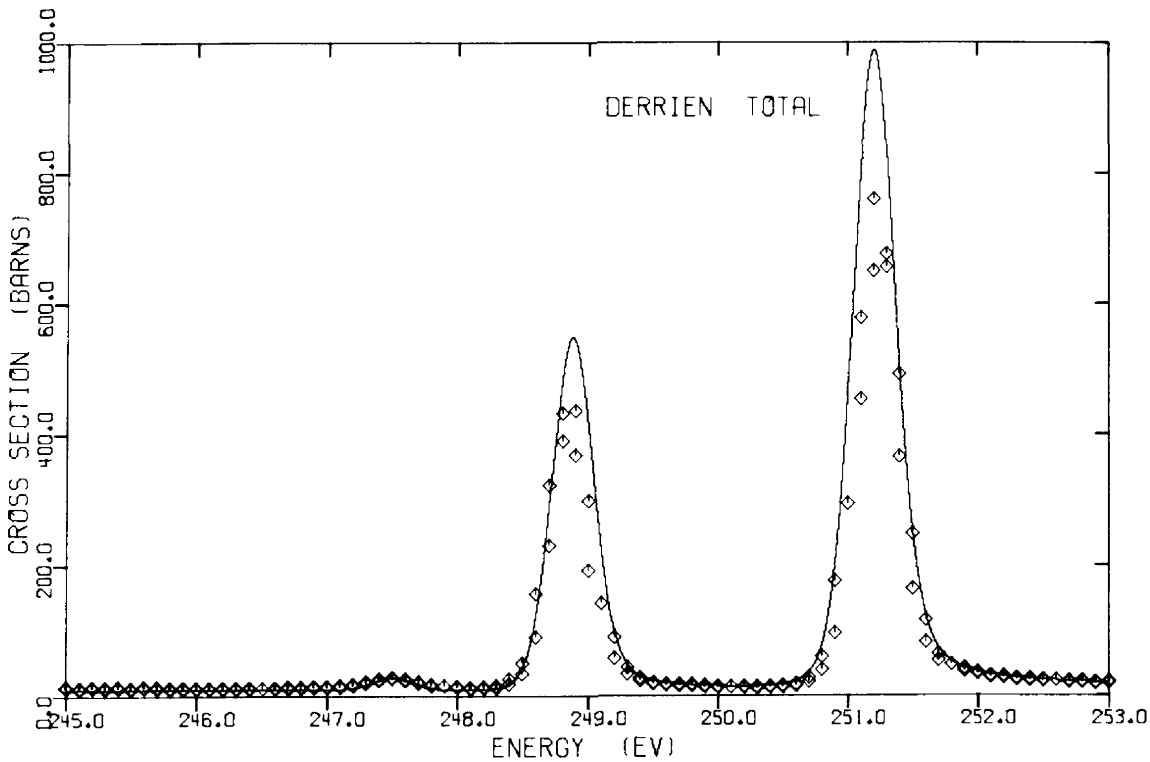
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
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600.0
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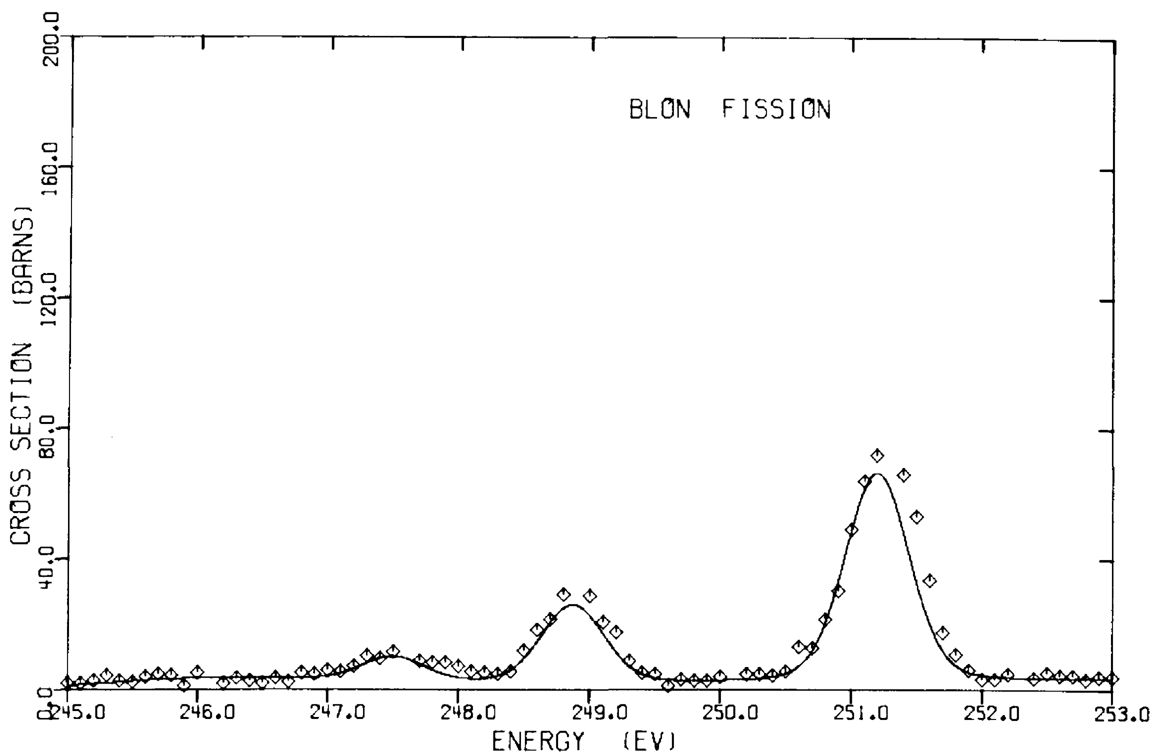
253.0
ENERGY (EV)


BLON FISSION
CROSS SECTION (BARNS)
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120.0
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248.0
249.0
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251.0
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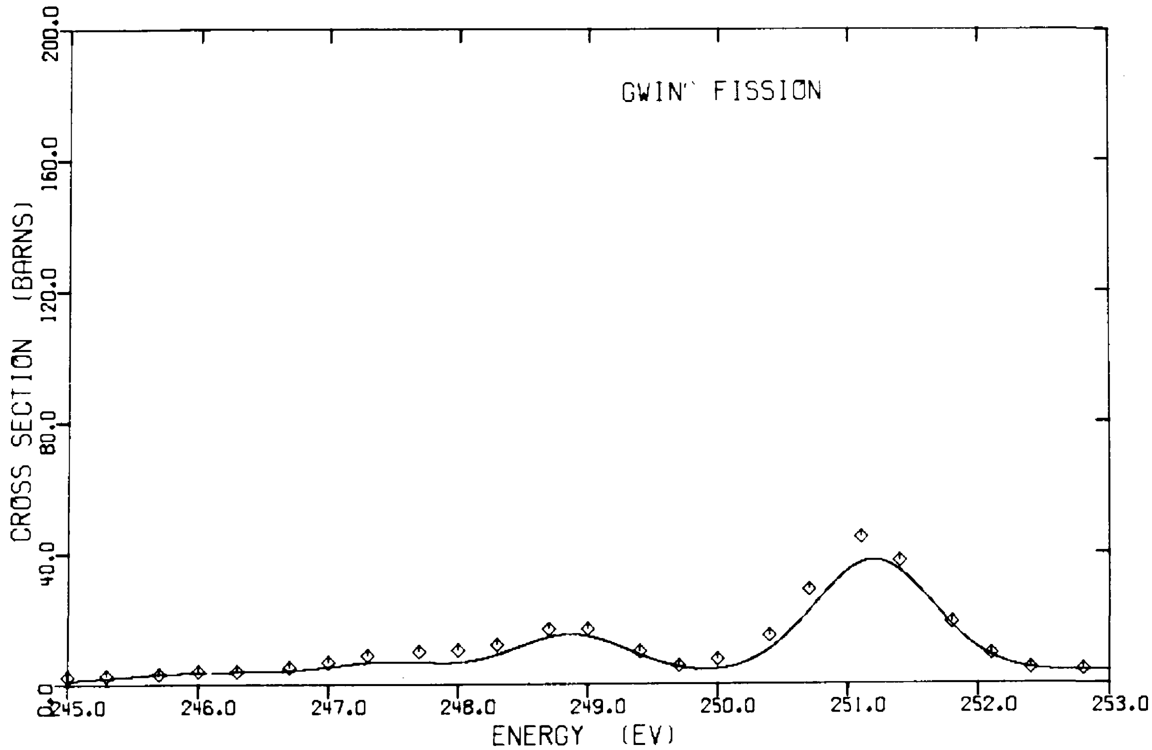
253.0
ENERGY (EV)


GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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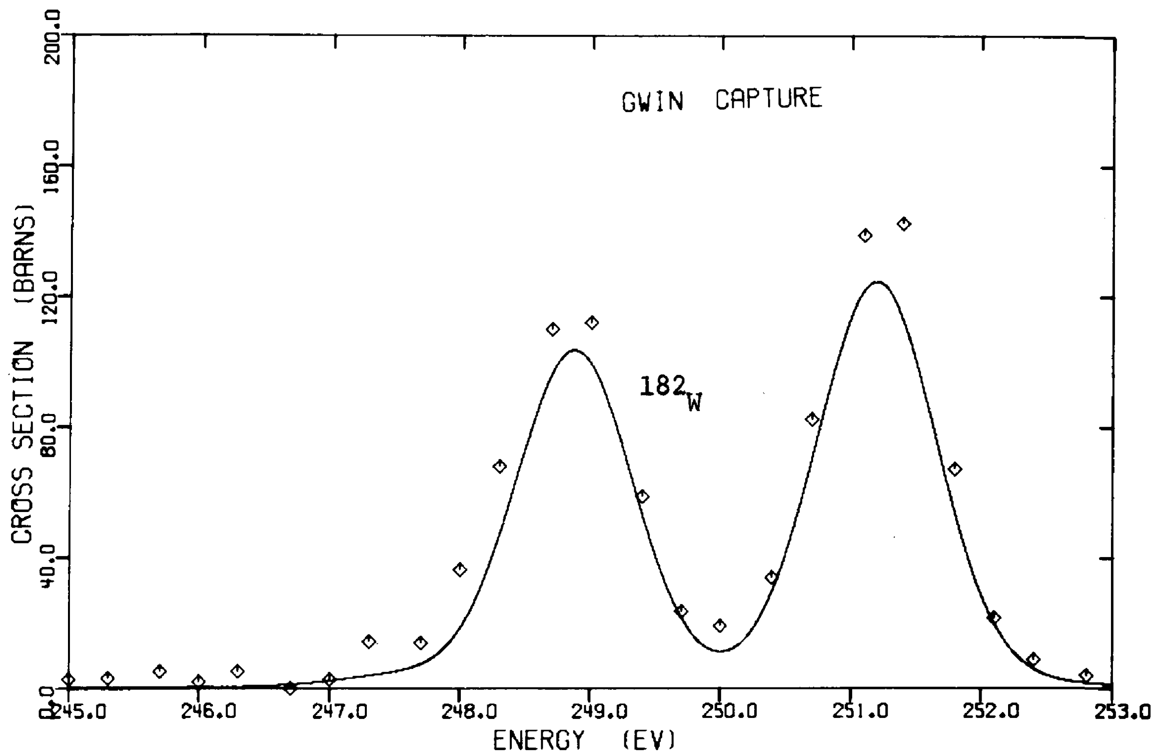
GWIN CAPTURE
182W
CROSS SECTION (BARNS)
ENERGY (EV)
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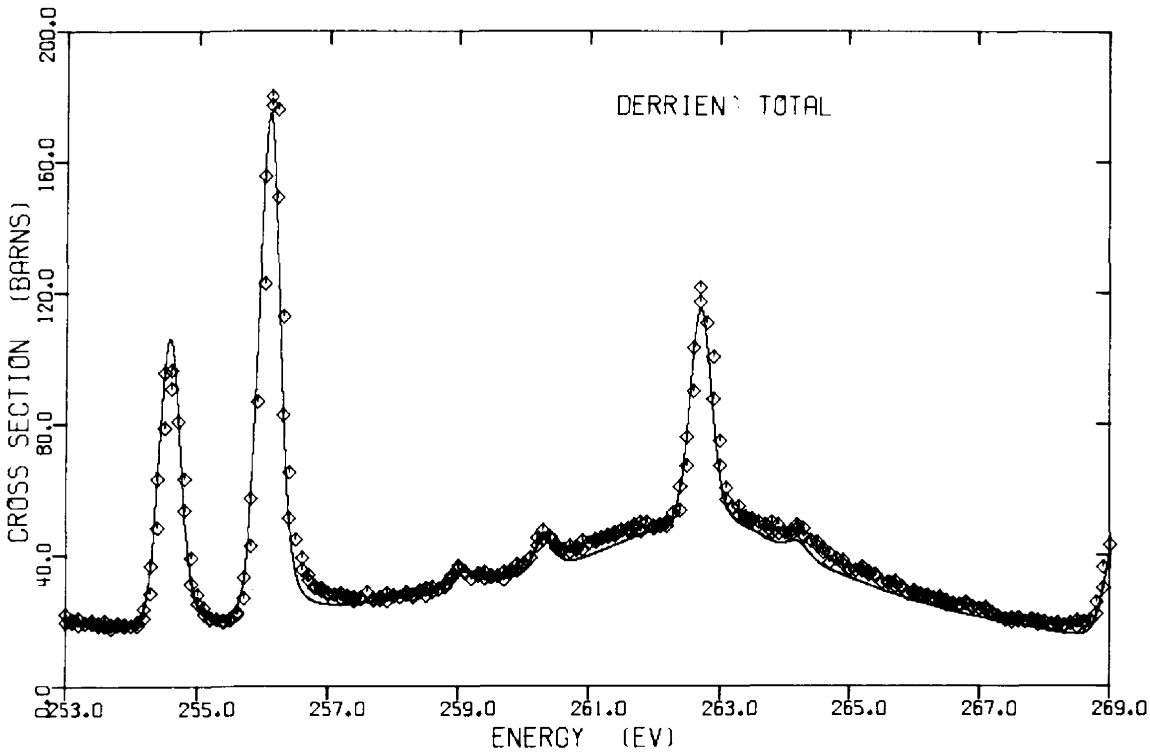
253.0


DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
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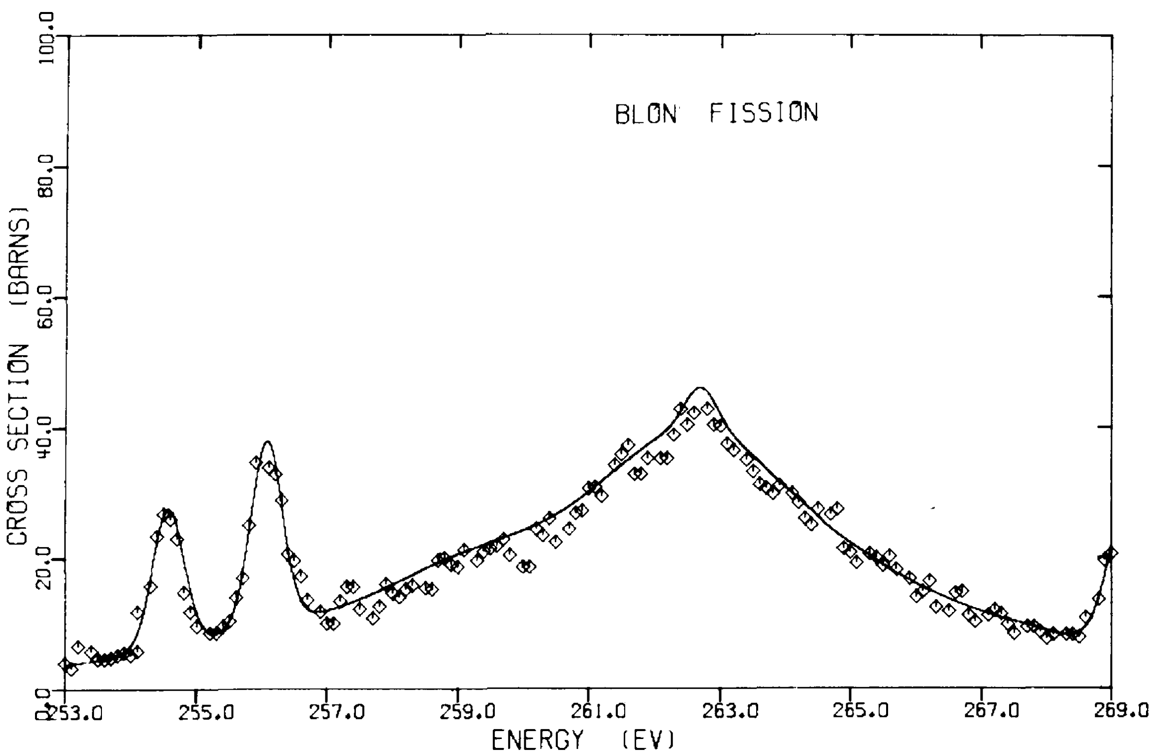
BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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40.0
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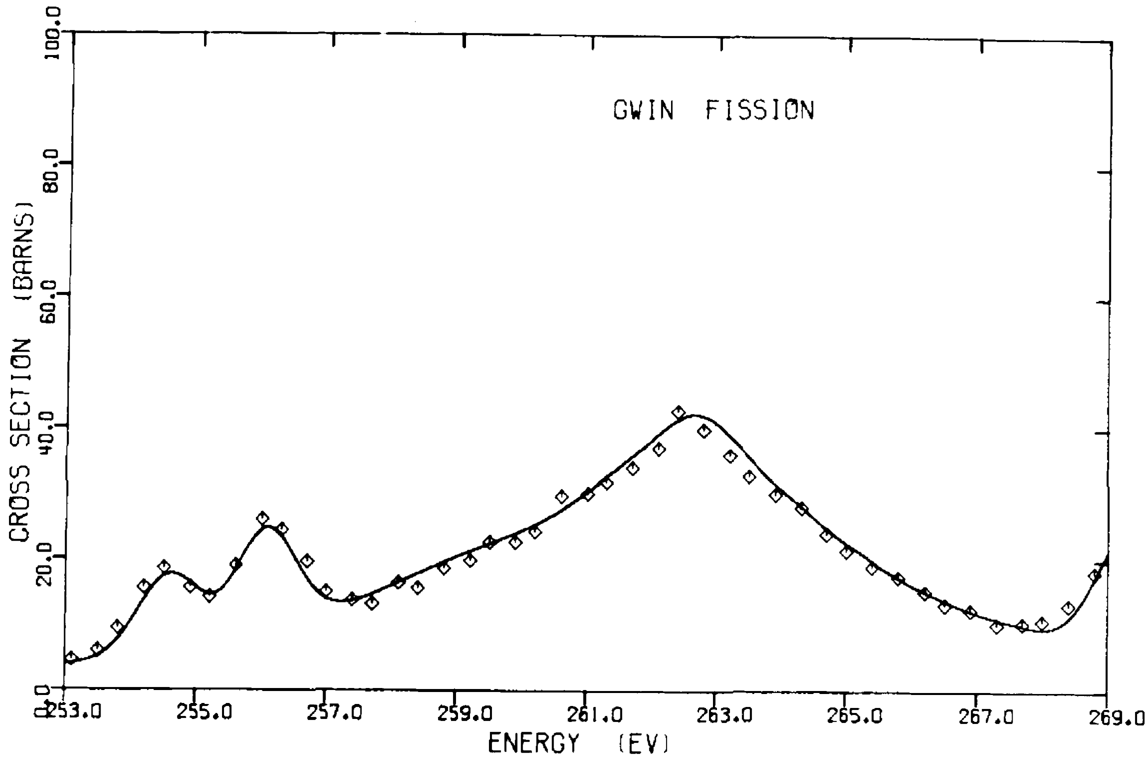
GWIN FISSION
CROSS SECTION (BARNS)
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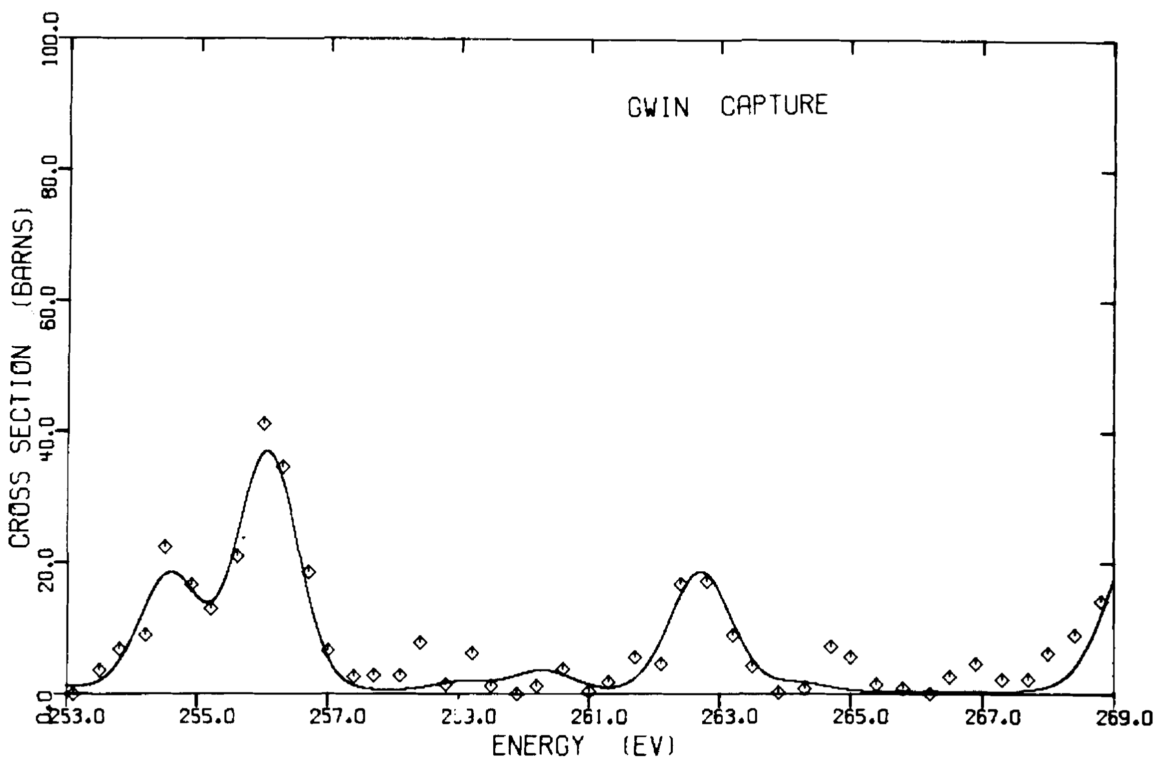
ENERGY (EV)


GWIN CAPTURE
CROSS SECTION (BARNS)
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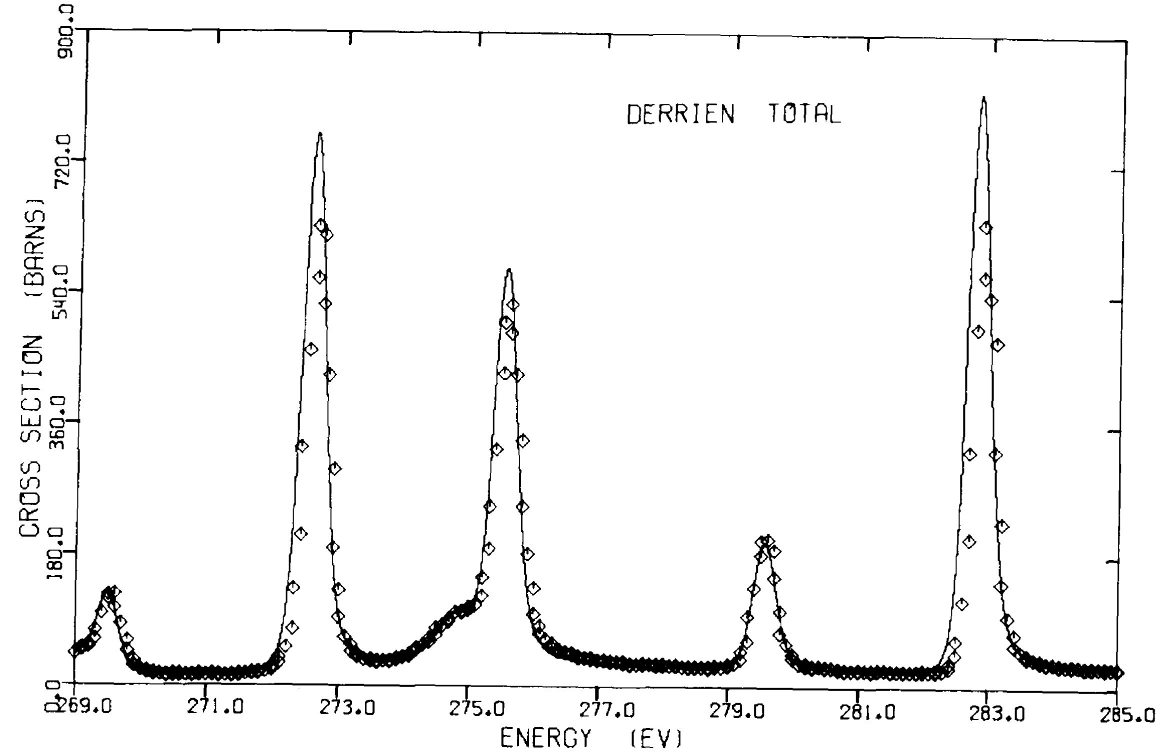
ENERGY (EV)


DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
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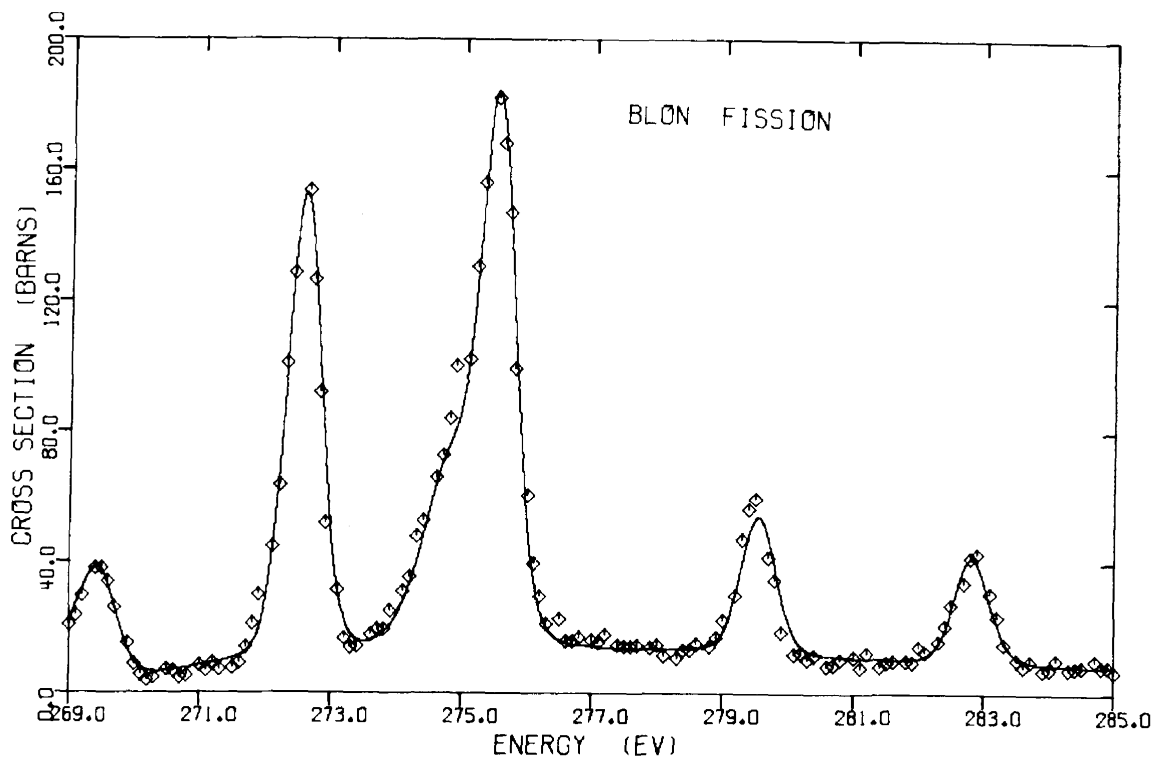
BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
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80.0
120.0
160.0
200.0
269.0
271.0
273.0
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277.0
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281.0
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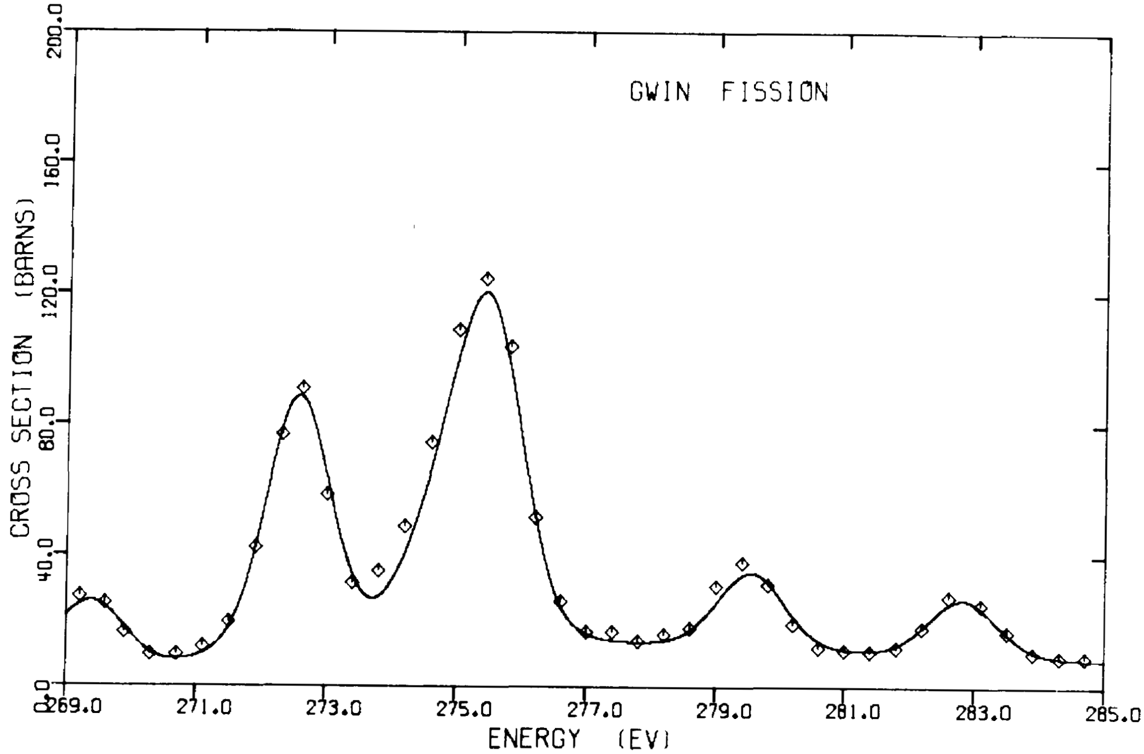
285.0


GWIN FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
40.0
80.0
120.0
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200.0
269.0
271.0
273.0
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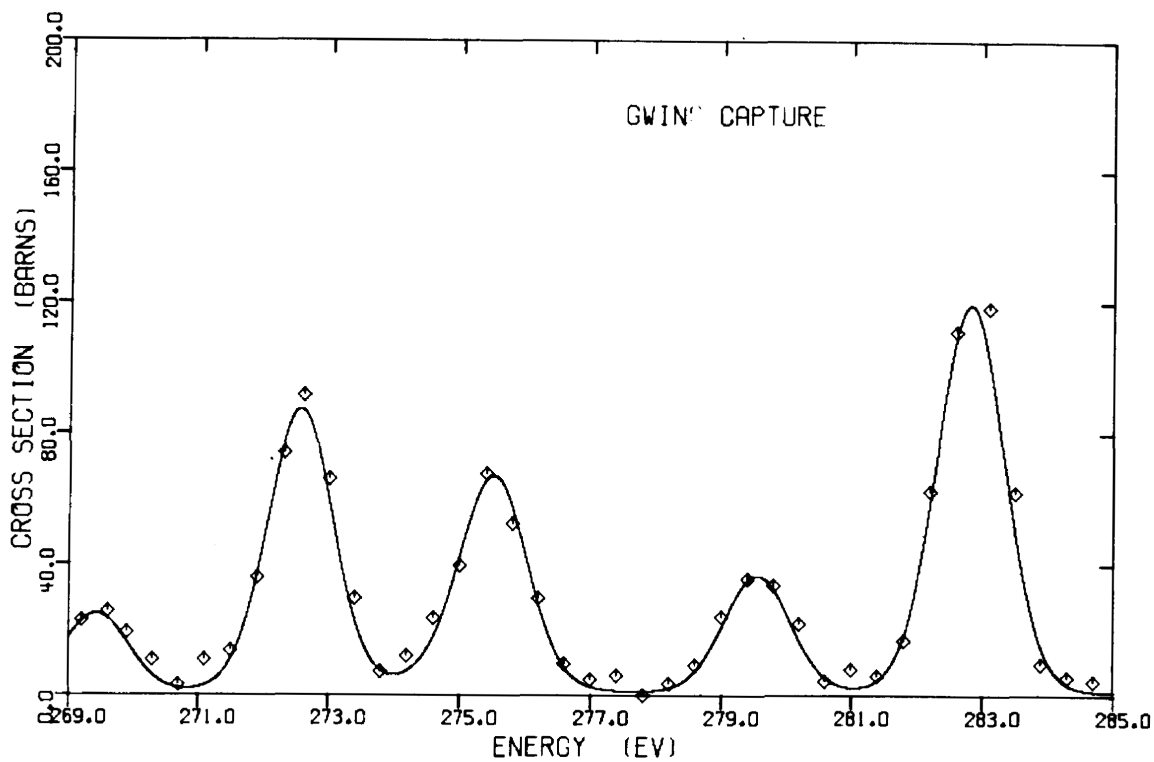
GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)
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80.0
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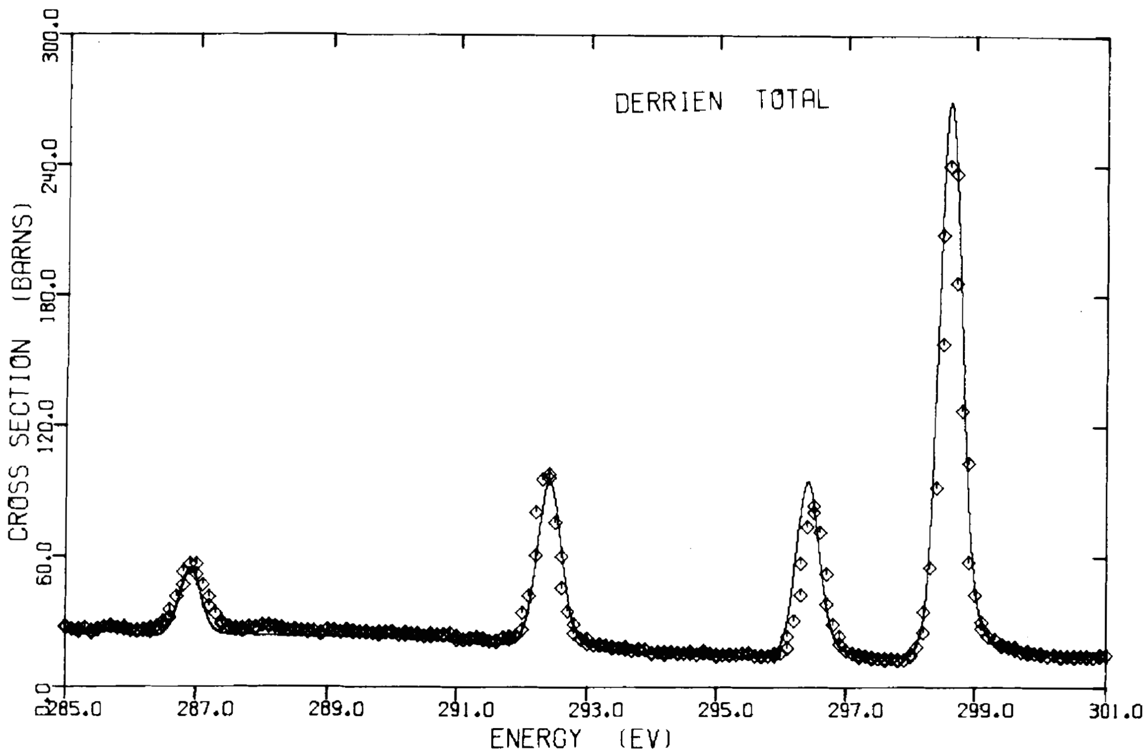
DERRIEN TOTAL
CROSS SECTION (BARNS)
ENERGY (EV)
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240.0
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289.0
291.0
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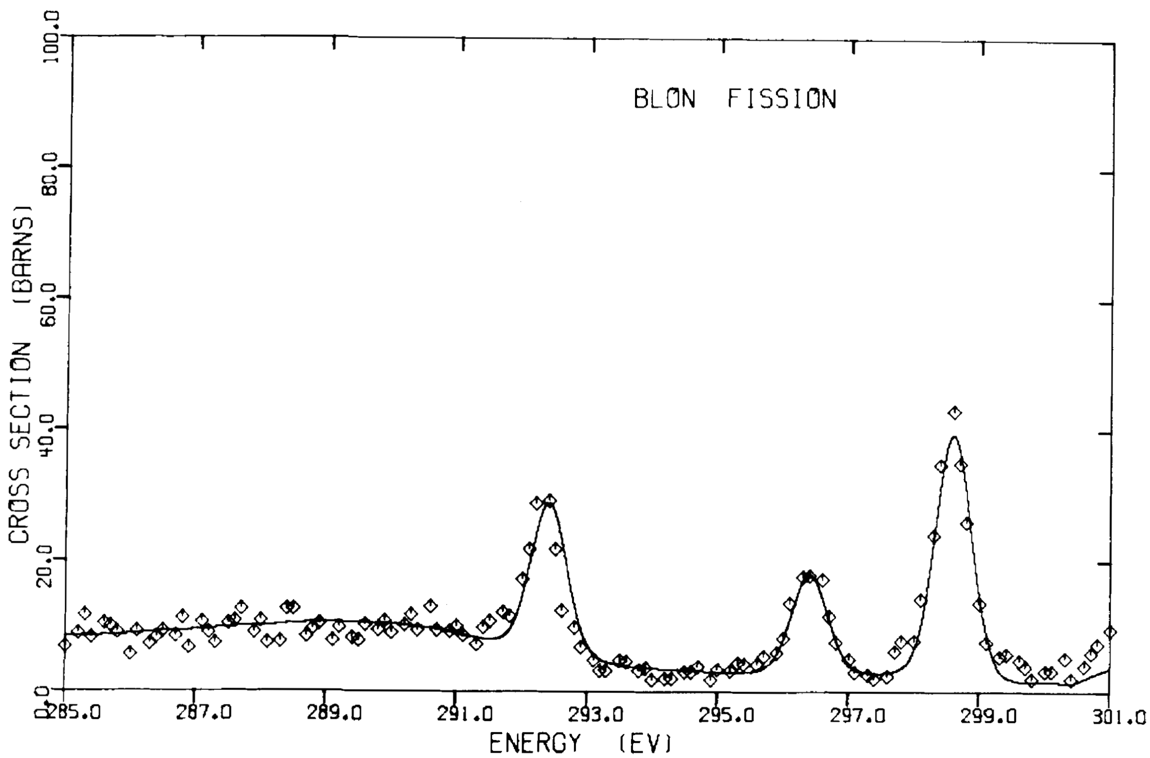
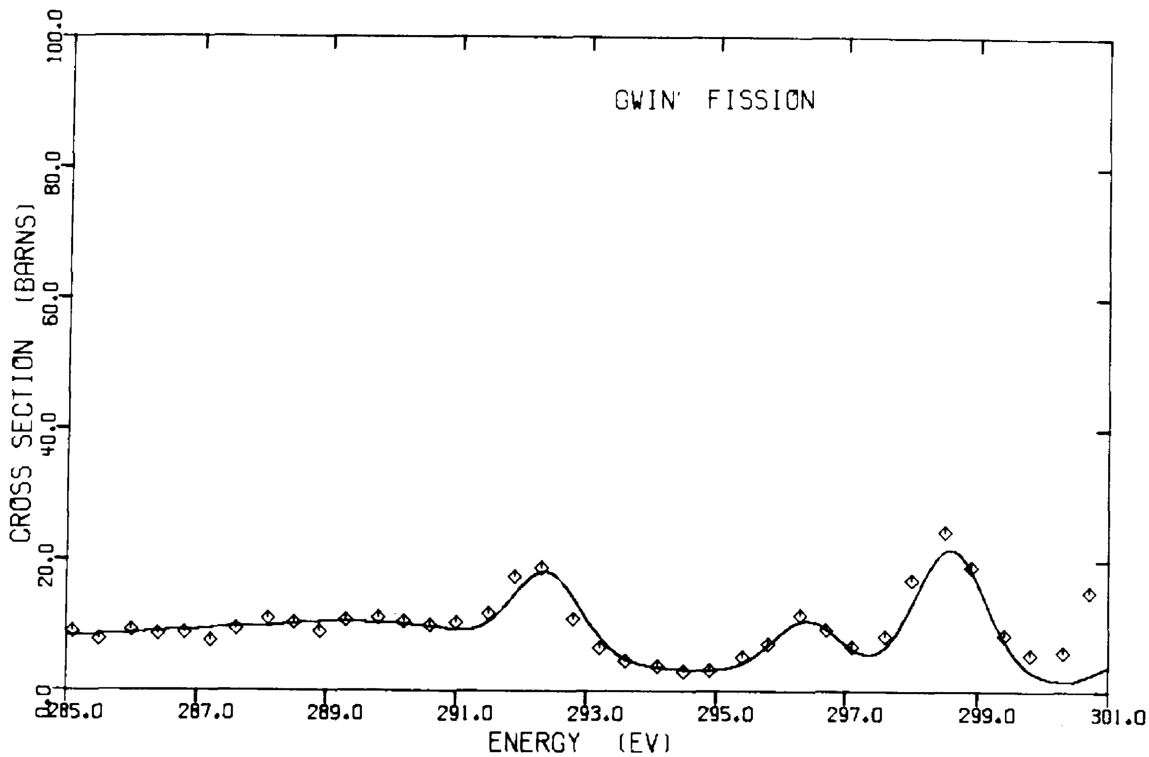
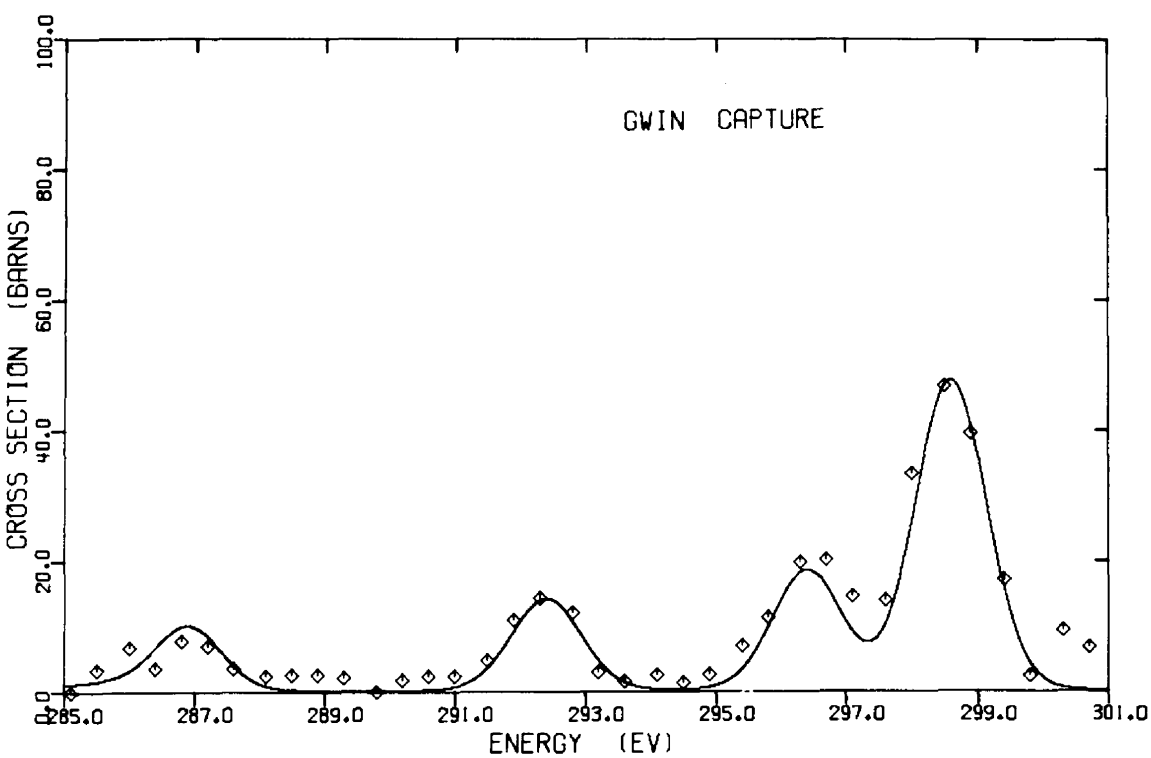
299.0
301.0


BLON FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
20.0
40.0
60.0
80.0
100.0
285.0
287.0
289.0
291.0
293.0
295.0
297.0
299.0
301.0



GWIN' FISSION
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
20.0
40.0
60.0
80.0
100.0
285.0
287.0
289.0
291.0
293.0
295.0
297.0
299.0
301.0



GWIN CAPTURE
CROSS SECTION (BARNS)
ENERGY (EV)
0.0
20.0
40.0
60.0
80.0
100.0
285.0
287.0
289.0
291.0
293.0
295.0
297.0
299.0
301.0