



INTERNATIONAL ATOMIC ENERGY AGENCY

# NUCLEAR DATA SERVICES

DOCUMENTATION SERIES OF THE IAEA NUCLEAR DATA SECTION

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IAEA-NDS- 57

(Rev. 0)

INDL/F-83

Evaluated neutron reaction data library for  
INTOR fusion neutronics calculations  
(1983 version)

by

V.G. Pronyaev, D.E. Cullen  
and P.K. McLaughlin

**Abstract**

The INDL/F-83 data library is a computerized library of evaluated neutron reaction data which has been assembled from a variety of other evaluated data files and is intended for use in fusion neutronics calculations of the International Tokamak Reactor (INTOR) Project. These data are available on magnetic tape from the IAEA Nuclear Data Section.

March 1983

INDL/F-83

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(1983 version)

Introduction

Because of the much faster neutron spectrum involved in fusion reactors, compared to fission reactors, the nuclear data requirements for calculations of fusion systems are quite different from the requirements for fission systems. For fusion systems cross sections and secondary angular and energy distributions up to approximately 16 MeV are important.

In an attempt to meet the needs for nuclear data to be used in INTOR calculations the IAEA Nuclear Data Section has assembled a single data file, INDL/F-83 by selecting evaluated neutron data from four different evaluated data libraries,

- (1) ENDF/B-V standards file
- (2) ENDF/B-V dosimetry file
- (3) ENDF/B-IV general purpose library
- (4) ENDL-78 Livermore evaluated data library

Summary of contents

The contents of this library were specifically selected to meet the need of the INTOR project; it is not a general purpose library designed to meet the need of all fusion design concepts. In addition it should be noted that in assembling this library no additional evaluation work was performed in order to improve evaluations for use in fusion systems; only existing evaluations were considered for inclusion. As such the current library must be considered only a first version which can be improved upon in the future. The materials contained in this library and their source are given in Table 1.

Two versions of INDL/F-83 available

The INDL/F-83 library is available from the IAEA Nuclear Data Section in two different forms,

- (1) 'INDL/F-83': The original evaluations in which cross sections may be represented by a combination of resonance parameters and/or a background cross sections. The background cross sections may be represented using any combination of the five ENDF/B interpolation laws between tabulated points.

- (2) 'INDL/F-83-R': Tabulated linearly interpolable cross sections which have been reconstructed by combining the resonance and background cross section contributions. This is a convenient starting point for many calculations. However, care must be exercised in using these data since in order to represent the cross sections in this form in most cases the ENDF/B convention of allowing only a maximum of 5000 energy - cross section pairs to represent each reaction is violated. Therefore, any computer program which is limited to 5000 points per reaction will not be able to use the data in this form.

#### Size and format of library

The library contains evaluations for 23 targets ("materials"), in ENDF/B-V format (compare IAEA-NDS-10/102).

The version 'INDL/F-83' has 75 549 records.

The version 'INDL/F-83-R' has 153 047 records.

#### Review of Data in FINE-83

In the framework of the INTOR project evaluated neutron cross section data are required for calculations of

- neutron transport
- displacement damage
- gas production
- nuclear heating
- transmutation

Although it is not possible, at this point, to give a detailed appraisal of the quality of the data included in INDL/F-83 library, the following general remarks can be made:

1. Some cross sections, important for fusion, which have been requested, are missing in the existing files (e.g. (n,n'd) and (n,n't) for  ${}^6\text{Li}$ , (n,n' $^3$ ) for  ${}^{12}\text{C}$ ).
2. The total and elastic cross sections, as well as the angular distributions for elastic scattering, satisfy the requirements for most currently considered isotopes.
3. Most of the threshold reaction evaluations are satisfactory. In some cases, especially in the absence of experimental data, there is a need to perform certain evaluations using recently developed theoretical models (like the model of direct reactions or more phenomenological pre-equilibrium models).
4. In many cases the capture cross sections at energies higher than several MeV have been evaluated with large uncertainties (up to 10 times their value). It is possible now to improve the accuracy of

capture cross sections using more recent experiments and theoretical models, such as the statistical model with adjusted level density parameters and the direct and semi-direct capture model.

5. The status of neutron emission spectra for some isotopes, which were taken from the ENDF/B-V library for inclusion in this library, was examined in the report ORNL/TM-6637, 1979 by D.M. Hetrick, D.C. Larson, C.Y. Fu. Conclusion in that report is that in most cases the quality of neutron emission spectra evaluations is not satisfactory. The differential cross sections in the hard part of the spectrum are underestimated sometimes by one order of magnitude. From our point of view it would be very useful to have the secondary energy-angular distributions re-evaluated using the model of direct multistep reactions.
6.  $\gamma$ -emission spectra are missing completely for some isotopes. Using existing theoretical approaches (such as statistical and pre-equilibrium models) it should be possible to calculate an adequate description of the existing experimental data and use it for the evaluation of the  $\gamma$ -emission spectra of the missing isotopes.
7. Because the evaluations contained in INDL/F-83 originated from different evaluated data libraries, not all of these evaluations are necessarily internally consistent.

The above comments could serve as a starting point toward improving the available evaluated data for fusion (i.e. future versions of the INDL/F library). Any additional suggestions would be appreciated.

Table 1 : Contents of INDL/F-83

<u>ZA</u>	<u>MAT</u>	<u>SOURCE</u>
3-Li-6	1303	ENDF/B-V standards file
3-Li-7	1272	ENDF/B-IV general purpose file
4-Be-9	1289	ENDF/B-IV general purpose file
5-B-10	1305	ENDF/B-V standards file
5-B-11	7811	ENDL-78
C-C-0	1306	ENDF/B-V standards file
8-O-16	1276	ENDF/B-IV general purpose file
13-Al-27	1193	ENDF/B-IV general purpose file
22-Ti-47	6428	ENDF/B-V dosimetry file
22-Ti-48	6429	ENDF/B-V dosimetry file
23-V-0	1196	ENDF/B-IV general purpose file
24-Cr-0	1191	ENDF/B-IV general purpose file
25-Mn-55	1197	ENDF/B-IV general purpose file
26-Fe-0	1192	ENDF/B-IV general purpose file
28-Ni-0	1190	ENDF/B-IV general purpose file
28-Ni-58	7837	ENDL-78
28-Ni-60	6434	ENDF/B-V dosimetry file
29-Cu-0	1295	ENDF/B-IV general purpose file
29-Cu-63	6435	ENDF/B-V dosimetry file
41-Nb-93	1189	ENDF/B-IV general purpose file
42-Mo-0	1287	ENDF/B-IV general purpose file
74-W-0	7856	ENDL-78
82-Pb-0	1288	ENDF/B-IV general purpose file

Note: The materials from the ENDF/B-V dosimetry library contain only evaluations of some partial cross sections.

Details of Contents

The following sections of this report include detailed tables described what data is available in the INDL/F-83 library and plots of all cross sections.



3-LI- 6g Mat.No: 1303  
Date: SEP77  
Ref:

Lab: LASL  
Author: G.HALE, L.STEWART, P.G.YOUNG  
Card images: 2484

File type	Reaction Type	C-Value
General information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	Total inelastic cross section(sum of MT=51to91)	-1.50000+ E
	(n,n'2na) cross section	-3.69800+ E
	1.50000+ E Ev (n,n') Level	-1.50000+ E
	2.00000+ E Ev (n,n') Level	-2.00000+ E
	2.18500+ E Ev (n,n') Level	-2.18500+ E
	2.50000+ E Ev (n,n') Level	-2.50000+ E
	3.00000+ E Ev (n,n') Level	-3.00000+ E
	3.50000+ E Ev (n,n') Level	-3.50000+ E
	3.56200+ E Ev (n,n') Level	-3.56200+ E
	4.00000+ E Ev (n,n') Level	-4.00000+ E
	4.50000+ E Ev (n,n') Level	-4.50000+ E
	5.00000+ E Ev (n,n') Level	-5.00000+ E
	5.50000+ E Ev (n,n') Level	-5.50000+ E
	6.00000+ E Ev (n,n') Level	-6.00000+ E
	6.50000+ E Ev (n,n') Level	-6.50000+ E
	7.00000+ E Ev (n,n') Level	-7.00000+ E
	7.50000+ E Ev (n,n') Level	-7.50000+ E
	8.00000+ E Ev (n,n') Level	-8.00000+ E
	8.50000+ E Ev (n,n') Level	-8.50000+ E
	9.00000+ E Ev (n,n') Level	-9.00000+ E
	9.50000+ E Ev (n,n') Level	-9.50000+ E
	1.00000+ 7 Ev (n,n') Level	-1.00000+ 7
	1.05000+ 7 Ev (n,n') Level	-1.05000+ 7
	1.10000+ 7 Ev (n,n') Level	-1.10000+ 7
	1.15000+ 7 Ev (n,n') Level	-1.15000+ 7
	1.20000+ 7 Ev (n,n') Level	-1.20000+ 7
	1.25000+ 7 Ev (n,n') Level	-1.25000+ 7
	1.30000+ 7 Ev (n,n') Level	-1.30000+ 7
	1.35000+ 7 Ev (n,n') Level	-1.35000+ 7
	1.40000+ 7 Ev (n,n') Level	-1.40000+ 7
	1.45000+ 7 Ev (n,n') Level	-1.45000+ 7
	1.50000+ 7 Ev (n,n') Level	-1.50000+ 7
	1.55000+ 7 Ev (n,n') Level	-1.55000+ 7
	(n,γ) radiative capture cross section	7.25000+ E
	(n,p) cross section	-2.72730+ E
	(n,t) cross section	4.78380+ E
	<μ> lat:average elastic scattering cosine.	
	<E>:average log energy decrement for elastic scat.	
	<η> : <E'>/<2E>	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	(n,n'2na) cross section	-3.69800+ E
	1.50000+ E Ev (n,n') Level	-1.50000+ E
	2.00000+ E Ev (n,n') Level	-2.00000+ E
	2.18500+ E Ev (n,n') Level	-2.18500+ E
	2.50000+ E Ev (n,n') Level	-2.50000+ E
	3.00000+ E Ev (n,n') Level	-3.00000+ E

Continued



	3.56200+ 6 Ev (n,n') Level	-3.56200+ 6
	4.00000+ 6 Ev (n,n') Level	-4.00000+ 6
	4.50000+ 6 Ev (n,n') Level	-4.50000+ 6
	5.00000+ 6 Ev (n,n') Level	-5.00000+ 6
	5.50000+ 6 Ev (n,n') Level	-5.50000+ 6
	6.00000+ 6 Ev (n,n') Level	-6.00000+ 6
	6.50000+ 6 Ev (n,n') Level	-6.50000+ 6
	7.00000+ 6 Ev (n,n') Level	-7.00000+ 6
	7.50000+ 6 Ev (n,n') Level	-7.50000+ 6
	8.00000+ 6 Ev (n,n') Level	-8.00000+ 6
	8.50000+ 6 Ev (n,n') Level	-8.50000+ 6
	9.00000+ 6 Ev (n,n') Level	-9.00000+ 6
	9.50000+ 6 Ev (n,n') Level	-9.50000+ 6
	1.00000+ 7 Ev (n,n') Level	-1.00000+ 7
	1.05000+ 7 Ev (n,n') Level	-1.05000+ 7
	1.10000+ 7 Ev (n,n') Level	-1.10000+ 7
	1.15000+ 7 Ev (n,n') Level	-1.15000+ 7
	1.20000+ 7 Ev (n,n') Level	-1.20000+ 7
	1.25000+ 7 Ev (n,n') Level	-1.25000+ 7
	1.30000+ 7 Ev (n,n') Level	-1.30000+ 7
	1.35000+ 7 Ev (n,n') Level	-1.35000+ 7
	1.40000+ 7 Ev (n,n') Level	-1.40000+ 7
	1.45000+ 7 Ev (n,n') Level	-1.45000+ 7
	1.50000+ 7 Ev (n,n') Level	-1.50000+ 7
	1.55000+ 7 Ev (n,n') Level	-1.55000+ 7
	(n,t) cross section	4.78380+ 6
Energy dist. of secondary neutrons	(n,n' <sup>2</sup> na) cross section	-3.69800+ 6
Radioactive decay and fiss.prod. yield data	(n,p) cross section	-2.72730+ 6
	(n,t) cross section	4.78380+ 6
Multiplicities for prod. of radioactive nuc.	(n,p) cross section	-2.72730+ 6
	(n,t) cross section	4.78380+ 6
Photon prod.Multiplicities(from neut.reactions)	3.56200+ 6 Ev (n,n') Level	-3.56200+ 6
	(n, $\gamma$ ) radiative capture cross section	7.25060+ 6
Angular dist. of Photons (from neut.reactions)	3.56200+ 6 Ev (n,n') Level	-3.56200+ 6
	(n, $\gamma$ ) radiative capture cross section	7.25060+ 6
Data covariance matrices for neutron X-sections	Total cross section (sum of partials)	
	Elastic scattering cross section	
	(n,t) cross section	4.78380+ 6

3-11- 7g

Mat.No: 1272  
 Date: OCT72  
 Ref:

Lab: LASL  
 Author: R.J.LAFEAUVE, L.STEWART, M.BATTAT  
 Card images: 645

File type	Reaction Type	Q-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section(sum of partials) Elastic scattering cross section Total inelastic cross section(sum of MT=51to91) direct (n,2n) cross section (n,n'2nn) cross section 4.77600+ 5 Ev (n,n') Level (n,n') to the continuum (n, $\gamma$ ) radiative capture cross section (n,d) cross section	-4.78000+ 5 -7.25200+ 6 -8.72300+ 6 -4.77600+ 5 -2.46600+ 6 2.03270+ 6 -7.76000+ 6
	< $\mu$ > Lab average elastic scattering cosine. < $\Sigma$ > average log energy decrement for elastic scat. < $\tau$ > : < $\Sigma^2$ >/< $2\Sigma$ >	
Angular dist. of secondary neutrons	Elastic scattering cross section direct (n,2n) cross section (n,n'2nn) cross section 4.77600+ 5 Ev (n,n') Level (n,n') to the continuum	-7.25200+ 6 -8.72300+ 6 -4.77600+ 5 -2.46600+ 6
Energy dist. of secondary neutrons	direct (n,2n) cross section (n,n'2nn) cross section (n,n') to the continuum	-7.25200+ 6 -8.72300+ 6 -2.46600+ 6
Photon prod.Multiplicities(from neut.reactions)	4.77600+ 5 Ev (n,n') Level (n, $\gamma$ ) radiative capture cross section	-4.77600+ 5 2.03270+ 6
Angular dist. of Photons (from neut.reactions)	4.77600+ 5 Ev (n,n') Level (n, $\gamma$ ) radiative capture cross section	-4.77600+ 5 2.03270+ 6

4-Re- 9g

Mat.No: 1289  
Date: DEC71  
Ref:Lab: LLL  
Author: HOWERTON, PERKINS  
Card Images: 2667

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	1.68000+ 6 Ev (n,2n) level - first neutron	-1.68000+ 6
	2.43000+ 6 Ev (n,2n) level - first neutron	-2.43000+ 6
	6.76000+ 6 Ev (n,2n) level - first neutron	-6.76000+ 6
	1.12800+ 7 Ev (n,2n) level - first neutron	-1.12800+ 7
	1.68000+ 6 Ev (n,2n) level - second neutron	-1.68000+ 6
	2.43000+ 6 Ev (n,2n) level - second neutron	-2.43000+ 6
	6.76000+ 6 Ev (n,2n) level - second neutron	-6.76000+ 6
	1.12800+ 7 Ev (n,2n) level - second neutron	-1.12800+ 7
	(n, $\gamma$ ) radiative capture cross section	6.82000+ 6
	(n,p) cross section	-1.28300+ 7
	(n,d) cross section	-1.46600+ 7
	(n,t) cross section	-1.04400+ 7
	(n, $\alpha$ ) cross section	-6.90000+ 6
	<math>\langle\mu\rangle</math> Lab: average elastic scattering cosine.	
	<math>\langle\Sigma\rangle</math> average log energy decrement for elastic scat.	
	<math>\langle\gamma\rangle \leq \langle E^2 \rangle / \langle 2E \rangle</math>	
	(n, $t_0$ ) ground state	-1.04400+ 7
	1.09170+ 7 Ev (n,t) Level	-1.09170+ 7
Angular dist. of secondary neutrons	Elastic scattering cross section	
	1.68000+ 6 Ev (n,2n) level - first neutron	-1.68000+ 6
	2.43000+ 6 Ev (n,2n) level - first neutron	-2.43000+ 6
	6.76000+ 6 Ev (n,2n) level - first neutron	-6.76000+ 6
	1.12800+ 7 Ev (n,2n) level - first neutron	-1.12800+ 7
	1.68000+ 6 Ev (n,2n) level - second neutron	-1.68000+ 6
	2.43000+ 6 Ev (n,2n) level - second neutron	-2.43000+ 6
	6.76000+ 6 Ev (n,2n) level - second neutron	-6.76000+ 6
	1.12800+ 7 Ev (n,2n) level - second neutron	-1.12800+ 7
Energy dist. of secondary neutrons	1.68000+ 6 Ev (n,2n) level - second neutron	-1.68000+ 6
	2.43000+ 6 Ev (n,2n) level - second neutron	-2.43000+ 6
	6.76000+ 6 Ev (n,2n) level - second neutron	-6.76000+ 6
	1.12800+ 7 Ev (n,2n) level - second neutron	-1.12800+ 7
Photon prod.Multiplicities(from neut.reactions)	(n, $\gamma$ ) radiative capture cross section	6.82000+ 6
	1.09170+ 7 Ev (n,t) Level	-1.09170+ 7
Angular dist. of Photons (from neut.reactions)	(n, $\gamma$ ) radiative capture cross section	6.82000+ 6
	1.09170+ 7 Ev (n,t) Level	-1.09170+ 7
Energy dist. of Photons (from neut.reactions)	(n, $\gamma$ ) radiative capture cross section	6.82000+ 6
	1.09170+ 7 Ev (n,t) Level	-1.09170+ 7

5-E - 10g

Mat.No: 1305  
Date: DEC76  
Ref:Lab: LASL  
Author: G.HALE, L.STEWART, P.YUNG  
Card Images: 3427

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section (sum of partials)	
	Elastic scattering cross section	
	Total inelastic cross section (sum of MT=51 to 91)	-7.17000+ E
	7.17000+ E Ev (n,n') Level	-7.17000+ E
	1.74000+ E Ev (n,n') Level	-1.74000+ E
	2.15400+ E Ev (n,n') Level	-2.15400+ E
	3.58500+ E Ev (n,n') Level	-3.58500+ E
	4.77400+ E Ev (n,n') Level	-4.77400+ E
	5.11400+ E Ev (n,n') Level	-5.11400+ E
	5.16600+ E Ev (n,n') Level	-5.16600+ E
	5.18300+ E Ev (n,n') Level	-5.18300+ E
	5.92300+ E Ev (n,n') Level	-5.92300+ E
	6.02900+ E Ev (n,n') Level	-6.02900+ E
	6.13300+ E Ev (n,n') Level	-6.13300+ E
	6.50000+ E Ev (n,n') Level	-6.50000+ E
	7.00000+ E Ev (n,n') Level	-7.00000+ E
	7.50000+ E Ev (n,n') Level	-7.50000+ E
	8.00000+ E Ev (n,n') Level	-8.00000+ E
	8.50000+ E Ev (n,n') Level	-8.50000+ E
	9.00000+ E Ev (n,n') Level	-9.00000+ E
	9.50000+ E Ev (n,n') Level	-9.50000+ E
	1.00000+ 7 Ev (n,n') Level	-1.00000+ 7
	1.05000+ 7 Ev (n,n') Level	-1.05000+ 7
	1.10000+ 7 Ev (n,n') Level	-1.10000+ 7
	1.15000+ 7 Ev (n,n') Level	-1.15000+ 7
	1.20000+ 7 Ev (n,n') Level	-1.20000+ 7
	1.25000+ 7 Ev (n,n') Level	-1.25000+ 7
	1.30000+ 7 Ev (n,n') Level	-1.30000+ 7
	1.35000+ 7 Ev (n,n') Level	-1.35000+ 7
	1.40000+ 7 Ev (n,n') Level	-1.40000+ 7
	1.45000+ 7 Ev (n,n') Level	-1.45000+ 7
	1.50000+ 7 Ev (n,n') Level	-1.50000+ 7
	1.55000+ 7 Ev (n,n') Level	-1.55000+ 7
	1.60000+ 7 Ev (n,n') Level	-1.60000+ 7
	1.65000+ 7 Ev (n,n') Level	-1.65000+ 7
	1.70000+ 7 Ev (n,n') Level	-1.70000+ 7
	1.75000+ 7 Ev (n,n') Level	-1.75000+ 7
	1.80000+ 7 Ev (n,n') Level	-1.80000+ 7
	(n,γ) radiative capture cross section	1.14560+ 7
	(n,p) cross section	2.26700+ E
	(n,d) cross section	-4.36100+ E
	(n,α) cross section	2.79000+ E
	(n,t2α) cross section	3.24000+ E
	<μ> lat: average elastic scattering cosine.	
	<Σ>: average log energy decrement for elastic scat.	
	<γ> : <Σ<sup>2</sup>/<2Σ>	
	(n,p <sub>0</sub> ) ground state	2.26700+ E
	3.13900+ E Ev (n,p) Level	-3.13900+ E
	5.73200+ E Ev (n,p) Level	-5.73200+ E

(continued)

	E.5E100+ 6 Ev (n,p) Level	-E.95100+ 6
	(n,α) ground state	
	0.00000+ 0 Ev (n,α) Level	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	7.17000+ 6 Ev (n,n') Level	-7.17000+ 6
	1.74000+ 6 Ev (n,n') Level	-1.74000+ 6
	2.15400+ 6 Ev (n,n') Level	-2.15400+ 6
	3.58600+ 6 Ev (n,n') Level	-3.58500+ 6
	4.77400+ 6 Ev (n,n') Level	-4.77400+ 6
	5.11400+ 6 Ev (n,n') Level	-5.11400+ 6
	E.16600+ 6 Ev (n,n') Level	-E.16600+ 6
	E.18300+ 6 Ev (n,n') Level	-E.18300+ 6
	5.92300+ 6 Ev (n,n') Level	-5.92300+ 6
	6.02900+ 6 Ev (n,n') Level	-6.02900+ 6
	6.13300+ 6 Ev (n,n') Level	-6.13300+ 6
	6.50000+ 6 Ev (n,n') Level	-6.50000+ 6
	7.00000+ 6 Ev (n,n') Level	-7.00000+ 6
	7.50000+ 6 Ev (n,n') Level	-7.50000+ 6
	8.00000+ 6 Ev (n,n') Level	-8.00000+ 6
	8.50000+ 6 Ev (n,n') Level	-8.50000+ 6
	9.00000+ 6 Ev (n,n') Level	-9.00000+ 6
	9.50000+ 6 Ev (n,n') Level	-9.50000+ 6
	1.00000+ 7 Ev (n,n') Level	-1.00000+ 7
	1.05000+ 7 Ev (n,n') Level	-1.05000+ 7
	1.10000+ 7 Ev (n,n') Level	-1.10000+ 7
	1.15000+ 7 Ev (n,n') Level	-1.15000+ 7
	1.20000+ 7 Ev (n,n') Level	-1.20000+ 7
	1.25000+ 7 Ev (n,n') Level	-1.25000+ 7
	1.30000+ 7 Ev (n,n') Level	-1.30000+ 7
	1.35000+ 7 Ev (n,n') Level	-1.35000+ 7
	1.40000+ 7 Ev (n,n') Level	-1.40000+ 7
	1.45000+ 7 Ev (n,n') Level	-1.45000+ 7
	1.50000+ 7 Ev (n,n') Level	-1.50000+ 7
	1.55000+ 7 Ev (n,n') Level	-1.55000+ 7
	1.60000+ 7 Ev (n,n') Level	-1.60000+ 7
	1.65000+ 7 Ev (n,n') Level	-1.65000+ 7
	1.70000+ 7 Ev (n,n') Level	-1.70000+ 7
	1.75000+ 7 Ev (n,n') Level	-1.75000+ 7
	1.80000+ 7 Ev (n,n') Level	-1.80000+ 7
Photon prod.Multiplicities(from neut.reactions)	(n,γ) radiative capture cross section	1.14560+ 7
	0.00000+ 0 Ev (n,α) Level	
Photon prod.cross sections(from neut.reactions)	Total inelastic cross section(sum of MT=51to91)	-7.17000+ 5
	(n,p) cross section	2.26700+ 5
Angular dist. of Photons (from neut.reactions)	Total inelastic cross section(sum of MT=51to91)	-7.17000+ 5
	(n,γ) radiative capture cross section	1.14560+ 7
	(n,p) cross section	2.26700+ 5
	0.00000+ 0 Ev (n,α) Level	
Data covariance matrices for neutron X-sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	(n,α) cross section	2.79000+ 6
	(n,α) ground state	
	0.00000+ 0 Ev (n,α) Level	

5-B - 11g

Mat.No: 7811  
Date: MAY78  
Ref: UCRL-50400, VOL. 15Lab: LLL  
Author: R.J.HGWERTON  
Card Images: 570

File type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance Information	
Neutron cross sections	Total cross section (sum of partials)	0. + 0
	Elastic scattering cross section	0. + 0
	Total inelastic cross section (sum of MT=51 to 91)	-2.14000+ 6
	direct (n,2n) cross section	-1.14600+ 7
	2.14000+ 6 Ev (n,n') Level	-2.14000+ 6
	4.46000+ 6 Ev (n,n') Level	-4.46000+ 6
	5.03000+ 6 Ev (n,n') Level	-5.03000+ 6
	(n,n') to the continuum	0. + 0
	(n, $\gamma$ ) radiative capture cross section	3.37000+ 6
	(n,p) cross section	-1.07200+ 7
	(n,t) cross section	-9.56000+ 6
	(n, $\alpha$ ) cross section	-6.64000+ 6
	< $\mu$ > lat: average elastic scattering cosine.	0. + 0
	<I>: average log energy decrement for elastic scat.	0. + 0
	< $\gamma$ > : <I <sup>2</sup> >/<2I>	0. + 0
Angular dist. of secondary neutrons	Elastic scattering cross section	0. + 0
	2.14000+ 6 Ev (n,n') Level	-2.14000+ 6
	4.46000+ 6 Ev (n,n') Level	-4.46000+ 6
	5.03000+ 6 Ev (n,n') Level	-5.03000+ 6
Energy dist. of secondary neutrons	direct (n,2n) cross section	-1.14600+ 7
	(n,n') to the continuum	0. + 0
Photon prod. Multiplicities (from neut. reactions)	direct (n,2n) cross section	*1.14600+ 7
	2.14000+ 6 Ev (n,n') Level	-2.14000+ 6
	4.46000+ 6 Ev (n,n') Level	-4.46000+ 6
	5.03000+ 6 Ev (n,n') Level	-5.03000+ 6
	(n,n') to the continuum	0. + 0
	(n, $\gamma$ ) radiative capture cross section	3.37000+ 6
	(n,p) cross section	-1.07200+ 7
	(n, $\alpha$ ) cross section	-6.64000+ 6
Angular dist. of Photons (from neut. reactions)	direct (n,2n) cross section	-1.14600+ 7
	2.14000+ 6 Ev (n,n') Level	-2.14000+ 6
	4.46000+ 6 Ev (n,n') Level	-4.46000+ 6
	5.03000+ 6 Ev (n,n') Level	-5.03000+ 6
	(n,n') to the continuum	0. + 0
	(n, $\gamma$ ) radiative capture cross section	3.37000+ 6
	(n,p) cross section	-1.07200+ 7
	(n, $\alpha$ ) cross section	-6.64000+ 6
Energy dist. of Photons (from neut. reactions)	direct (n,2n) cross section	-1.14600+ 7
	2.14000+ 6 Ev (n,n') Level	-2.14000+ 6
	4.46000+ 6 Ev (n,n') Level	-4.46000+ 6
	5.03000+ 6 Ev (n,n') level	-5.03000+ 6
	(n,n') to the continuum	0. + 0
	(n, $\gamma$ ) radiative capture cross section	3.37000+ 6

(n, a) cross section

-f. f4000+ f

6-C - 0g

Mat.No: 1306  
Date: DEC73  
Ref: INDC(F/R)-7/LLab: CRNL  
Author: C.Y.FU AND F.G.PEREY  
Card images: 2537

File Type	Reaction Type	G-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	Non elastic cross section(total-elastic)	
	Total inelastic cross section(sum of M1=51to91)	-4.43900+ 6
	4.43900+ 6 Ev (n,n') Level	-4.43900+ 6
	7.65300+ 6 Ev (n,n') Level	-7.65300+ 6
	9.63800+ 6 Ev (n,n') Level	-9.63800+ 6
	1.03000+ 7 Ev (n,n') Level	-1.03000+ 7
	1.08400+ 7 Ev (n,n') Level	-1.08400+ 7
	1.12500+ 7 Ev (n,n') Level	-1.12500+ 7
	1.17500+ 7 Ev (n,n') Level	-1.17500+ 7
	1.22500+ 7 Ev (n,n') Level	-1.22500+ 7
	1.27500+ 7 Ev (n,n') Level	-1.27500+ 7
	1.32500+ 7 Ev (n,n') Level	-1.32500+ 7
	1.37500+ 7 Ev (n,n') Level	-1.37500+ 7
	1.42500+ 7 Ev (n,n') Level	-1.42500+ 7
	1.47500+ 7 Ev (n,n') Level	-1.47500+ 7
	1.52500+ 7 Ev (n,n') Level	-1.52500+ 7
	1.57500+ 7 Ev (n,n') Level	-1.57500+ 7
	1.62500+ 7 Ev (n,n') Level	-1.62500+ 7
	1.67500+ 7 Ev (n,n') Level	-1.67500+ 7
	1.72500+ 7 Ev (n,n') Level	-1.72500+ 7
	(n,n') to the continuum	-7.27500+ 6
	(n, $\gamma$ ) radiative capture cross section	4.94700+ 6
	(n,p) cross section	-1.25880+ 7
	(n,d) cross section	-1.37330+ 7
	(n, $\alpha$ ) cross section	-5.69500+ 6
	Total hydrogen production	-1.25880+ 7
	Total deuterium production	-1.37330+ 7
	Total $^4\text{He}$ production	-5.69500+ 6
	< $\mu$ > Lab:average elastic scattering cosine.	
	<E>:average log energy decrement for elastic scat.	
	< $\gamma$ > : <E $^2$ >/<E>	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	4.43900+ 6 Ev (n,n') Level	-4.43900+ 6
	7.65300+ 6 Ev (n,n') Level	-7.65300+ 6
	9.63800+ 6 Ev (n,n') Level	-9.63800+ 6
	1.03000+ 7 Ev (n,n') Level	-1.03000+ 7
	1.08400+ 7 Ev (n,n') Level	-1.08400+ 7
	1.12500+ 7 Ev (n,n') Level	-1.12500+ 7
	1.17500+ 7 Ev (n,n') Level	-1.17500+ 7
	1.22500+ 7 Ev (n,n') Level	-1.22500+ 7
	1.27500+ 7 Ev (n,n') Level	-1.27500+ 7
	1.32500+ 7 Ev (n,n') Level	-1.32500+ 7
	1.37500+ 7 Ev (n,n') Level	-1.37500+ 7
	1.42500+ 7 Ev (n,n') Level	-1.42500+ 7
	1.47500+ 7 Ev (n,n') Level	-1.47500+ 7
	1.52500+ 7 Ev (n,n') Level	-1.52500+ 7

Continued



	1.57500+ 7 Ev (n,n') Level	-1.57500+ 7
	1.62500+ 7 Ev (n,n') Level	-1.62500+ 7
	1.67500+ 7 Ev (n,n') Level	-1.67500+ 7
	1.72500+ 7 Ev (n,n') Level	-1.72500+ 7
	(n,n') to the continuum	-7.27500+ 6
Energy dist. of secondary neutrons	(n,n') to the continuum	-7.27500+ 6
Photon prod. Multiplicities (from neut. reactions)	(n,γ) radiative capture cross section	4.94700+ 6
Photon prod. cross sections (from neut. reactions)	4.43900+ 6 Ev (n,n') Level	-4.43900+ 6
Angular dist. of Photons (from neut. reactions)	4.43900+ 6 Ev (n,n') Level	-4.43900+ 6
	(n,γ) radiative capture cross section	4.94700+ 6
Data covariance matrices for neutron X-sections	Total cross section (sum of partials)	
	Elastic scattering cross section	
	Non elastic cross section (total-elastic)	
	Total inelastic cross section (sum of MT=51 to 91)	-4.43900+ 6
	4.43900+ 6 Ev (n,n') Level	-4.43900+ 6
	7.65300+ 6 Ev (n,n') Level	-7.65300+ 6
	9.63800+ 6 Ev (n,n') Level	-9.63800+ 6
	1.03000+ 7 Ev (n,n') Level	-1.03000+ 7
	1.08400+ 7 Ev (n,n') Level	-1.08400+ 7
	1.12500+ 7 Ev (n,n') Level	-1.12500+ 7
	1.17500+ 7 Ev (n,n') Level	-1.17500+ 7
	1.22500+ 7 Ev (n,n') Level	-1.22500+ 7
	1.27500+ 7 Ev (n,n') Level	-1.27500+ 7
	1.32500+ 7 Ev (n,n') Level	-1.32500+ 7
	1.37500+ 7 Ev (n,n') Level	-1.37500+ 7
	1.42500+ 7 Ev (n,n') Level	-1.42500+ 7
	1.47500+ 7 Ev (n,n') Level	-1.47500+ 7
	1.52500+ 7 Ev (n,n') Level	-1.52500+ 7
	1.57500+ 7 Ev (n,n') Level	-1.57500+ 7
	1.62500+ 7 Ev (n,n') Level	-1.62500+ 7
	1.67500+ 7 Ev (n,n') Level	-1.67500+ 7
	1.72500+ 7 Ev (n,n') Level	-1.72500+ 7
	(n,n') to the continuum	-7.27500+ 6
	(n,γ) radiative capture cross section	4.94700+ 6
	(n,p) cross section	-1.25880+ 7
	(n,d) cross section	-1.37330+ 7
	(n,d) cross section	-1.69500+ 6

8-0 - 16g

Mat.No: 1276

Date: AUG73

Ref:

Lab: LASL

Author: P.YOUNG, D.FOSTER, JR, G.HALE

Card images: 5988

File Type	Reaction Type	C-Value
General information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	Total inelastic cross section(sum of MT=E1to91)	-6.05200+ E
	6.05200+ E Ev (n,n') Level	-6.05200+ E
	6.13100+ E Ev (r,n') Level	-6.13100+ E
	5.91700+ E Ev (n,n') Level	-6.51700+ E
	7.11900+ E Ev (n,n') Level	-7.11900+ E
	8.87200+ E Ev (n,n') Level	-8.87200+ E
	9.59700+ E Ev (n,n') Level	-9.59700+ E
	9.84700+ E Ev (n,n') Level	-9.84700+ E
	1.03540+ 7 Ev (n,n') Level	-1.03540+ 7
	1.09520+ 7 Ev (n,n') Level	-1.09520+ 7
	1.10800+ 7 Ev (n,n') Level	-1.10800+ 7
	1.10960+ 7 Ev (n,n') Level	-1.10960+ 7
	1.12600+ 7 Ev (n,n') Level	-1.12600+ 7
	1.14400+ 7 Ev (n,n') Level	-1.14400+ 7
	1.15210+ 7 Ev (n,n') Level	-1.15210+ 7
	1.16300+ 7 Ev (n,n') Level	-1.16300+ 7
	1.20530+ 7 Ev (n,n') Level	-1.20530+ 7
	1.24420+ 7 Ev (n,n') Level	-1.24420+ 7
	1.25280+ 7 Ev (n,n') Level	-1.25280+ 7
	1.27950+ 7 Ev (n,n') Level	-1.27950+ 7
	1.29670+ 7 Ev (n,n') Level	-1.29670+ 7
	1.31500+ 7 Ev (n,n') Level	-1.31500+ 7
	1.34500+ 7 Ev (n,n') Level	-1.34500+ 7
	1.37500+ 7 Ev (n,n') Level	-1.37500+ 7
	1.40500+ 7 Ev (n,n') Level	-1.40500+ 7
	1.43500+ 7 Ev (n,n') Level	-1.43500+ 7
	1.46500+ 7 Ev (n,n') Level	-1.46500+ 7
	1.49500+ 7 Ev (n,n') Level	-1.49500+ 7
	1.62500+ 7 Ev (n,n') Level	-1.62500+ 7
	1.65500+ 7 Ev (n,n') Level	-1.65500+ 7
	1.68500+ 7 Ev (n,n') Level	-1.68500+ 7
	1.61500+ 7 Ev (n,n') Level	-1.61500+ 7
	1.64500+ 7 Ev (n,n') Level	-1.64500+ 7
	1.67500+ 7 Ev (n,n') Level	-1.67500+ 7
	1.70500+ 7 Ev (n,n') Level	-1.70500+ 7
	1.73500+ 7 Ev (n,n') Level	-1.73500+ 7
	1.76500+ 7 Ev (n,n') Level	-1.76500+ 7
	1.79500+ 7 Ev (n,n') Level	-1.79500+ 7
	1.82500+ 7 Ev (n,n') Level	-1.82500+ 7
	1.85500+ 7 Ev (n,n') Level	-1.85500+ 7
	(n,γ) radiative capture cross section	4.14300+ E
	(n,p) cross section	-5.63900+ E
	(n,d) cross section	-5.90100+ E
	(n,a) cross section	-2.21390+ E
	<μ> lab:average elastic scattering cosine.	
	<E>:average log energy decrement for elastic scat.	
	<σ> : <σ²>/<σ>	

Continued

	(n,α) ground state	-2.21390+ 6
	E.30100+ 6 Ev (n,α) Level	-5.30100+ 6
	E.89900+ 6 Ev (n,α) Level	-5.89900+ 6
	E.06800+ 6 Ev (n,α) Level	-6.06800+ 6
Angular dist. of secondary neutrons	Elastic scattering cross section	
	E.05200+ 6 Ev (n,n') Level	-6.05200+ 6
	E.13100+ 6 Ev (n,n') Level	-6.13100+ 6
	E.91700+ 6 Ev (n,n') Level	-6.91700+ 6
	7.11900+ 6 Ev (n,n') Level	-7.11900+ 6
	8.87200+ 6 Ev (n,n') Level	-8.87200+ 6
	9.59700+ 6 Ev (n,n') Level	-9.59700+ 6
	9.84700+ 6 Ev (n,n') Level	-9.84700+ 6
	1.03540+ 7 Ev (n,n') Level	-1.03540+ 7
	1.09520+ 7 Ev (n,n') Level	-1.09520+ 7
	1.10800+ 7 Ev (n,n') Level	-1.10800+ 7
	1.10960+ 7 Ev (n,n') Level	-1.10960+ 7
	1.12600+ 7 Ev (n,n') Level	-1.12600+ 7
	1.14400+ 7 Ev (n,n') Level	-1.14400+ 7
	1.15210+ 7 Ev (n,n') Level	-1.15210+ 7
	1.16300+ 7 Ev (n,n') Level	-1.16300+ 7
	1.20530+ 7 Ev (n,n') Level	-1.20530+ 7
	1.24420+ 7 Ev (n,n') Level	-1.24420+ 7
	1.25280+ 7 Ev (n,n') Level	-1.25280+ 7
	1.27950+ 7 Ev (n,n') Level	-1.27950+ 7
	1.29670+ 7 Ev (n,n') Level	-1.29670+ 7
	1.31500+ 7 Ev (n,n') Level	-1.31500+ 7
	1.34500+ 7 Ev (n,n') Level	-1.34500+ 7
	1.37500+ 7 Ev (n,n') Level	-1.37500+ 7
	1.40500+ 7 Ev (n,n') Level	-1.40500+ 7
	1.43500+ 7 Ev (n,n') Level	-1.43500+ 7
	1.46500+ 7 Ev (n,n') Level	-1.46500+ 7
	1.49500+ 7 Ev (n,n') Level	-1.49500+ 7
	1.52500+ 7 Ev (n,n') Level	-1.52500+ 7
	1.55500+ 7 Ev (n,n') Level	-1.55500+ 7
	1.58500+ 7 Ev (n,n') Level	-1.58500+ 7
	1.61500+ 7 Ev (n,n') Level	-1.61500+ 7
	1.64500+ 7 Ev (n,n') Level	-1.64500+ 7
	1.67500+ 7 Ev (n,n') Level	-1.67500+ 7
	1.70500+ 7 Ev (n,n') Level	-1.70500+ 7
	1.73500+ 7 Ev (n,n') Level	-1.73500+ 7
	1.76500+ 7 Ev (n,n') Level	-1.76500+ 7
	1.79500+ 7 Ev (n,n') Level	-1.79500+ 7
	1.82500+ 7 Ev (n,n') Level	-1.82500+ 7
	1.85500+ 7 Ev (n,n') Level	-1.85500+ 7
Thermal neutron scattering law data	Total inelastic cross section(sum of MI=51to91)	-6.05200+ 6
Photon prod.Multiplicities(from neut.reactions)	(n,γ) radiative capture cross section	4.14300+ 6
Photon prod.cross sections(from neut.reactions)	Total inelastic cross section(sum of MI=51to91)	-6.05200+ 6
	(n,n'α) cross section	-5.63900+ 6
	(n,p) cross section	-2.21390+ 6
	(n,α) cross section	
Angular dist. of Photons (from neut.reactions)	Total inelastic cross section(sum of MI=51to91)	-6.05200+ 6
	(n,n'α) cross section	
	(n,γ) radiative capture cross section	4.14300+ 6
	(n,p) cross section	-5.63900+ 6
	(n,α) cross section	-2.21390+ 6
Data covariance matrices for neutron X-sections	Total cross section(sum of partials)	

Continued

Elastic scattering cross section	
Total Inelastic cross section(sum of MT=51to91)	-6.05200+ 6
(n,p) cross section	-9.63900+ 6
(n, $\alpha$ ) cross section	-2.21390+ 6

13-A1- 27g

Pat.No: 1193

Date: DEC73

Ref:

Lab: IASL

Author: P.G-YOUNG, D.G-FESTER, JR.

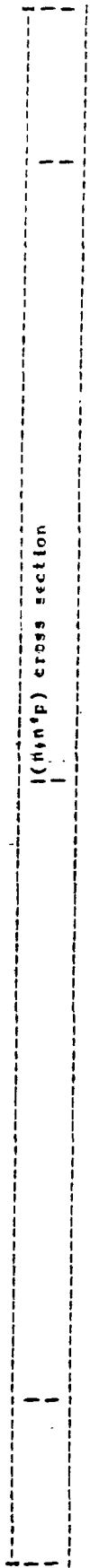
Card Images: 58E3

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	Total inelastic cross section(sum of MT=51to91)	-8.43000+ E
	direct (n,2n) cross section	-1.30570+ 7
	8.43000+ E Ev (n,n') Level	-8.43000+ E
	1.01300+ E Ev (n,n') Level	-1.01300+ E
	2.21000+ E Ev (n,n') Level	-2.21000+ E
	2.73200+ E Ev (n,n') Level	-2.73200+ E
	2.98000+ E Ev (n,n') Level	-2.98000+ E
	3.00100+ E Ev (n,n') Level	-3.00100+ E
	3.67800+ E Ev (n,n') Level	-3.67800+ E
	3.95600+ E Ev (n,n') Level	-3.95600+ E
	4.05500+ E Ev (n,n') Level	-4.05500+ E
	4.40900+ E Ev (n,n') Level	-4.40900+ E
	4.50800+ E Ev (n,n') Level	-4.50800+ E
	4.58000+ E Ev (n,n') Level	-4.58000+ E
	4.81100+ E Ev (n,n') Level	-4.81100+ E
	5.25000+ E Ev (n,n') Level	-5.25000+ E
	5.75000+ E Ev (n,n') Level	-5.75000+ E
	6.25000+ E Ev (n,n') Level	-6.25000+ E
	6.75000+ E Ev (n,n') Level	-6.75000+ E
	7.25000+ E Ev (n,n') Level	-7.25000+ E
	7.75000+ E Ev (n,n') Level	-7.75000+ E
	8.25000+ E Ev (n,n') Level	-8.25000+ E
	8.75000+ E Ev (n,n') Level	-8.75000+ E
	9.25000+ E Ev (n,n') Level	-9.25000+ E
	9.75000+ E Ev (n,n') Level	-9.75000+ E
	1.02500+ 7 Ev (n,n') Level	-1.02500+ 7
	1.07500+ 7 Ev (n,n') Level	-1.07500+ 7
	1.12500+ 7 Ev (n,n') Level	-1.12500+ 7
	1.17500+ 7 Ev (n,n') Level	-1.17500+ 7
	1.22500+ 7 Ev (n,n') Level	-1.22500+ 7
	1.27500+ 7 Ev (n,n') Level	-1.27500+ 7
	1.32500+ 7 Ev (n,n') Level	-1.32500+ 7
	1.37500+ 7 Ev (n,n') Level	-1.37500+ 7
	1.42500+ 7 Ev (n,n') Level	-1.42500+ 7
	1.47500+ 7 Ev (n,n') Level	-1.47500+ 7
	1.52500+ 7 Ev (n,n') Level	-1.52500+ 7
	1.57500+ 7 Ev (n,n') Level	-1.57500+ 7
	1.62500+ 7 Ev (n,n') Level	-1.62500+ 7
	1.67500+ 7 Ev (n,n') Level	-1.67500+ 7
	1.73750+ 7 Ev (n,n') Level	-1.73750+ 7
	1.81250+ 7 Ev (n,n') Level	-1.81250+ 7
	1.88750+ 7 Ev (n,n') Level	-1.88750+ 7
	(n,γ) radiative capture cross section	7.72400+ E
	(n,p) cross section	-1.82780+ E
	(n,d) cross section	-6.04600+ E
	(n,t) cross section	-1.08840+ 7
	(n,α) cross section	-3.13160+ E

Continued

	<μ> Lab: average elastic scattering cosine. <Σ>: average log energy decrement for elastic scat. <γ> : <Σ²>/<2Σ>	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	direct (n,2n) cross section	-1.30570+ 7
	8.43000+ E Ev (n,n') Level	-8.43000+ E
	1.01300+ E Ev (n,n') Level	-1.01300+ E
	2.21000+ E Ev (n,n') Level	-2.21000+ E
	2.73200+ E Ev (n,n') Level	-2.73200+ E
	2.98000+ E Ev (n,n') Level	-2.98000+ E
	3.00100+ E Ev (n,n') Level	-3.00100+ E
	3.67800+ E Ev (n,n') Level	-3.67800+ E
	3.65800+ E Ev (n,n') Level	-3.65800+ E
	4.05800+ E Ev (n,n') Level	-4.05800+ E
	4.40900+ E Ev (n,n') Level	-4.40900+ E
	4.50800+ E Ev (n,n') Level	-4.50800+ E
	4.58000+ E Ev (n,n') Level	-4.58000+ E
	4.81100+ E Ev (n,n') Level	-4.81100+ E
	5.25000+ E Ev (n,n') Level	-5.25000+ E
	5.75000+ E Ev (n,n') Level	-5.75000+ E
	6.25000+ E Ev (n,n') Level	-6.25000+ E
	6.75000+ E Ev (n,n') Level	-6.75000+ E
	7.25000+ E Ev (n,n') Level	-7.25000+ E
	7.75000+ E Ev (n,n') Level	-7.75000+ E
	8.25000+ E Ev (n,n') Level	-8.25000+ E
	8.75000+ E Ev (n,n') Level	-8.75000+ E
	9.25000+ E Ev (n,n') Level	-9.25000+ E
	9.75000+ E Ev (n,n') Level	-9.75000+ E
	1.02500+ 7 Ev (n,n') Level	-1.02500+ 7
	1.07500+ 7 Ev (n,n') Level	-1.07500+ 7
	1.12500+ 7 Ev (n,n') Level	-1.12500+ 7
	1.17500+ 7 Ev (n,n') Level	-1.17500+ 7
	1.22500+ 7 Ev (n,n') Level	-1.22500+ 7
	1.27500+ 7 Ev (n,n') Level	-1.27500+ 7
	1.32500+ 7 Ev (n,n') Level	-1.32500+ 7
	1.37500+ 7 Ev (n,n') Level	-1.37500+ 7
	1.42500+ 7 Ev (n,n') Level	-1.42500+ 7
	1.47500+ 7 Ev (n,n') Level	-1.47500+ 7
	1.52500+ 7 Ev (n,n') Level	-1.52500+ 7
	1.57500+ 7 Ev (n,n') Level	-1.57500+ 7
	1.62500+ 7 Ev (n,n') Level	-1.62500+ 7
	1.67500+ 7 Ev (n,n') Level	-1.67500+ 7
	1.72500+ 7 Ev (n,n') Level	-1.72500+ 7
	1.77500+ 7 Ev (n,n') Level	-1.77500+ 7
	1.81250+ 7 Ev (n,n') Level	-1.81250+ 7
	1.88750+ 7 Ev (n,n') Level	-1.88750+ 7
Energy dist. of secondary neutrons	direct (n,2n) cross section	-1.30570+ 7
Photon prod.Multiplicities(from neut.reactions)	(n,γ) radiative capture cross section	7.72400+ E
Photon prod.cross sections(from neut.reactions)	Total inelastic cross section(sum of MT=51to9?)	-8.43000+ E
	(n,n'p) cross section	
	(n,p) cross section	-1.82780+ E
Angular dist. of Photons (from neut.reactions)	Total inelastic cross section(sum of MT=51to9)	-8.43000+ E
	(n,n'p) cross section	
	(n,γ) radiative capture cross section	7.72400+ E
	(n,p) cross section	-1.82780+ E
Energy dist. of Photons (from neut.reactions)	Total inelastic cross section(sum of MT=51to9)	-8.43000+ E

(continued)



22-TI- 47g

Mat.No: 6428  
Date: JAN77  
Ref:Lab: ANL  
Author: C.PHILIS, O.BERSILLON, D.SMITH, ETC  
Card Images: 76

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	(n,n' $\gamma$ ) cross section	-1.04600+ 7
	(n,p) cross section	3.18710+ 5
Data covariance matrices for neutron X-sections	(n,n' $\gamma$ ) cross section	-1.04600+ 7
	(n,p) cross section	3.18710+ 5

22-TI- 48g

Mat.No: 6429  
Date: JAN77  
Ref:Lab: ANL  
Author: C.PHILIS, O.BERSILLON, D.SMITH ETC.  
Card Images: 75

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	(n,n' $\gamma$ ) cross section	-1.14460+ 7
	(n,p) cross section	-3.20800+ 6
Data covariance matrices for neutron X-sections	(n,n' $\gamma$ ) cross section	-1.14460+ 7
	(n,p) cross section	-3.20800+ 6



23-V - 0g

Mat.No: 1156  
 Date: SEF72  
 Ref: CRNL-TM-4007(ACV72)

Lab: ORNL  
 Author: S.K.PENNY, L.W.OWEN  
 Card Images: 4658

File Type	Reaction Type	Q-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance Information	
Neutron cross sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	Non elastic cross section(total-elastic)	
	Total inelastic cross section(sum of MT=51to91)	-3.19000+ E
	direct (n,2n) cross section	-1.10550+ 7
	(n,n' $\alpha$ ) cross section	-1.02970+ 7
	(n,n'p) cross section	-8.05720+ E
	3.19000+ E Ev (n,n') Level	-3.19000+ 5
	9.29000+ E Ev (n,n') Level	-9.29000+ 5
	1.60800+ E Ev (n,n') Level	-1.60800+ 6
	1.81200+ E Ev (n,n') Level	-1.81200+ 6
	(n,n') to the continuum	-7.40900+ 6
	(n, $\gamma$ ) radiative capture cross section	7.30400+ E
	(n, $\gamma$ ) cross section	-1.67850+ 6
	(n,d) cross section	-5.83270+ 6
	(n,t) cross section	-1.05200+ 7
	(n, $\theta$ ) cross section	-2.04720+ 6
	<p> Lab:average elastic scattering cosine.	
	<E>:average log energy decrement for elastic scat.	
	<g> : <E <sup>2</sup> >/<2E>	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	direct (n,2n) cross section	-1.10550+ 7
	(n,n' $\alpha$ ) cross section	-1.02970+ 7
	(n,n'p) cross section	-8.05720+ E
	3.19000+ E Ev (n,n') Level	-3.19000+ 5
	9.29000+ E Ev (n,n') Level	-9.29000+ 5
	1.60800+ E Ev (n,n') Level	-1.60800+ 6
	1.81200+ E Ev (n,n') Level	-1.81200+ 6
	(n,n') to the continuum	-2.40900+ 6
Energy dist. of secondary neutrons	direct (n,2n) cross section	-1.10550+ 7
	(n,n' $\alpha$ ) cross section	-1.02970+ 7
	(n,n'p) cross section	-8.05720+ E
	(n,n') to the continuum	-2.40900+ 6
Photon prod.Multiplicities(from neut.reactions)	Non elastic cross section(total-elastic)	
	direct (n,2n) cross section	-1.10550+ 7
	(n,n' $\alpha$ ) cross section	-1.02970+ 7
	(n,n'p) cross section	-8.05720+ E
	(n, $\gamma$ ) radiative capture cross section	7.30400+ E
Angular dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	direct (n,2n) cross section	-1.10550+ 7
	(n,n' $\alpha$ ) cross section	-1.02970+ 7
	(n,n'p) cross section	-8.05720+ E
	(n, $\gamma$ ) radiative capture cross section	7.30400+ E
Energy dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	

Continued

	direct (n,2n) cross section	-1.10550+ 7
	(n,n'a) cross section	-1.02970+ 7
	(n,n'p) cross section	-8.05720+ 6
	(n,γ) radiative capture cross section	7.30400+ 6

24-Cr- 0g Mat.No: 1191 Lab: BAL (NNCSC)  
 Date: APR74 Author: A.PRINCE  
 Ref: Card images: 8198

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section (sum of partials)	
	Elastic scattering cross section	
	Non elastic cross section (total-elastic)	
	Total inelastic cross section (sum of MT=51to91)	-5.64000+ E
	direct (n,2n) cross section	-7.54000+ E
	(n,n' $\alpha$ ) cross section	-7.92700+ E
	(n,n' $p$ ) cross section	-9.58830+ E
	5.64000+ E Ev (n,n') Level	-5.64000+ E
	7.83100+ E Ev (n,n') Level	-7.83100+ E
	8.34800+ E Ev (n,n') Level	-8.34800+ E
	1.00600+ E Ev (n,n') Level	-1.00600+ E
	1.28700+ E Ev (n,n') Level	-1.28700+ E
	1.43400+ E Ev (n,n') Level	-1.43400+ E
	1.53900+ E Ev (n,n') Level	-1.53900+ E
	1.97300+ E Ev (n,n') Level	-1.97300+ E
	2.17300+ E Ev (n,n') Level	-2.17300+ E
	2.23300+ E Ev (n,n') Level	-2.23300+ E
	2.32100+ E Ev (n,n') Level	-2.32100+ E
	2.37000+ E Ev (n,n') Level	-2.37000+ E
	2.64700+ E Ev (n,n') Level	-2.64700+ E
	2.66100+ E Ev (n,n') Level	-2.66100+ E
	2.76800+ E Ev (n,n') Level	-2.76800+ E
	2.82700+ E Ev (n,n') Level	-2.82700+ E
	2.96500+ E Ev (n,n') Level	-2.96500+ E
	3.08400+ E Ev (n,n') Level	-3.08400+ E
	3.11400+ E Ev (n,n') Level	-3.11400+ E
	3.16200+ E Ev (n,n') Level	-3.16200+ E
	3.35200+ E Ev (n,n') Level	-3.35200+ E
	3.41400+ E Ev (n,n') Level	-3.41400+ E
	3.59300+ E Ev (n,n') Level	-3.59300+ E
	3.61700+ E Ev (n,n') Level	-3.61700+ E
	3.71300+ E Ev (n,n') Level	-3.71300+ E
	3.77100+ E Ev (n,n') Level	-3.77100+ E
	3.98200+ E Ev (n,n') Level	-3.98200+ E
	4.03900+ E Ev (n,n') Level	-4.03900+ E
	4.56300+ E Ev (n,n') Level	-4.56300+ E
	4.63000+ E Ev (n,n') Level	-4.63000+ E
	4.83700+ E Ev (n,n') Level	-4.83700+ E
	5.09700+ E Ev (n,n') Level	-5.09700+ E
	5.25200+ E Ev (n,n') Level	-5.25200+ E
	5.58500+ E Ev (n,n') Level	-5.58500+ E
	5.73700+ E Ev (n,n') Level	-5.73700+ E
	6.07000+ E Ev (n,n') Level	-6.07000+ E
	6.15400+ E Ev (n,n') Level	-6.15400+ E
	6.49000+ E Ev (n,n') Level	-6.49000+ E
	6.82000+ E Ev (n,n') Level	-6.82000+ E
	7.07000+ E Ev (n,n') Level	-7.07000+ E
	(n,n') to the continuum	-1.82460+ E
	(n, $\gamma$ ) radiative capture cross section	5.23710+ E
	(n,p) cross section	-2.56860+ E

Continued

	(n,d) cross section	-7.36370+ E
	(n,t) cross section	-5.56500+ E
	(n, <sup>3</sup> He) cross section	-8.62810+ E
	(n,α) cross section	1.79400+ E
	<μ> lab: average elastic scattering cosine.	
	<E>: average log energy decrement for elastic scat.	
	<γ> : <E <sup>2</sup> >/<2E>	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	direct (n,2n) cross section	-7.94000+ E
	(n,n'α) cross section	-7.92700+ E
	(n,n'p) cross section	-9.58830+ E
	5.64000+ E Ev (n,n') Level	-5.64000+ E
	7.83100+ E Ev (n,n') Level	-7.83100+ E
	8.34800+ E Ev (n,n') Level	-8.34800+ E
	1.00600+ E Ev (n,n') Level	-1.00600+ E
	1.28700+ E Ev (n,n') Level	-1.28700+ E
	1.43400+ E Ev (n,n') Level	-1.43400+ E
	1.63500+ E Ev (n,n') Level	-1.63500+ E
	1.97300+ E Ev (n,n') Level	-1.97300+ E
	2.17300+ E Ev (n,n') Level	-2.17300+ E
	2.23300+ E Ev (n,n') Level	-2.23300+ E
	2.32100+ E Ev (n,n') Level	-2.32100+ E
	2.37000+ E Ev (n,n') Level	-2.37000+ E
	2.64700+ E Ev (n,n') Level	-2.64700+ E
	2.66100+ E Ev (n,n') Level	-2.66100+ E
	2.76800+ E Ev (n,n') Level	-2.76800+ E
	2.82700+ E Ev (n,n') Level	-2.82700+ E
	2.96800+ E Ev (n,n') Level	-2.96800+ E
	3.08400+ E Ev (n,n') Level	-3.08400+ E
	3.11400+ E Ev (n,n') Level	-3.11400+ E
	3.16200+ E Ev (n,n') Level	-3.16200+ E
	3.35200+ E Ev (n,n') Level	-3.35200+ E
	3.41400+ E Ev (n,n') Level	-3.41400+ E
	3.59300+ E Ev (n,n') Level	-3.59300+ E
	3.61700+ E Ev (n,n') Level	-3.61700+ E
	3.71300+ E Ev (n,n') Level	-3.71300+ E
	3.77100+ E Ev (n,n') Level	-3.77100+ E
	3.98200+ E Ev (n,n') Level	-3.98200+ E
	4.03900+ E Ev (n,n') Level	-4.03900+ E
	4.66300+ E Ev (n,n') Level	-4.66300+ E
	4.63000+ E Ev (n,n') Level	-4.63000+ E
	4.83700+ E Ev (n,n') Level	-4.83700+ E
	5.09700+ E Ev (n,n') Level	-5.09700+ E
	5.29200+ E Ev (n,n') Level	-5.29200+ E
	5.58500+ E Ev (n,n') Level	-5.58500+ E
	5.73700+ E Ev (n,n') Level	-5.73700+ E
	6.07000+ E Ev (n,n') Level	-6.07000+ E
	6.15400+ E Ev (n,n') Level	-6.15400+ E
	6.49000+ E Ev (n,n') Level	-6.49000+ E
	6.82000+ E Ev (n,n') Level	-6.82000+ E
	7.07000+ E Ev (n,n') Level	-7.07000+ E
	(n,n') to the continuum	-1.82460+ E
Energy dist. of secondary neutrons	direct (n,2n) cross section	-7.94000+ E
	(n,n'α) cross section	-7.92700+ E
	(n,n'p) cross section	-9.58830+ E
	(n,n') to the continuum	-1.82460+ E
Photon prod. Multiplicities (from neut. reactions)	(n,γ) radiative capture cross section	9.23710+ E

Continued

Photon prod.cross sections(from neut.reactions)	Non elastic cross section(total-elastic)	
Angular dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	9.23710+ E
Energy dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	9.23710+ E

2E-Mn- 55g

Mat.No: 1197

Date: FEB74

Ref:

Lab: BNL

Author: H.TAKAHASHI

Card Images: 4586

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary Radioactive nuclide production	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section(sum of partials) Elastic scattering cross section Non elastic cross section(total-elastic) Total inelastic cross section(sum of MT=51to91) direct (n,2n) cross section (n,3n) cross section (n,n'a) cross section (n,n'p) cross section 1.25800+ E Ev (n,n') Level 9.84000+ E Ev (n,n') Level 1.29200+ E Ev (n,n') Level 1.52800+ E Ev (n,n') Level 1.88300+ E Ev (n,n') Level (n,n') to the continuum (n,γ) radiative capture cross section (n,p) cross section (n,d) cross section (n, <sup>3</sup> He) cross section (n,α) cross section  <μ> lat: average elastic scattering cosine. <ε>: average log energy decrement for elastic scat. <γ> : <ε'>/<2ε>	-1.25800+ E -1.02250+ 7 -1.51690+ 7 -7.53060+ 6 -8.06330+ 6 -1.25800+ E -9.84000+ E -1.29200+ E -1.52800+ E -1.88300+ E -1.88300+ E 7.27040+ E -1.80970+ E -5.83880+ 6 -1.23800+ 7 -6.21600+ 5
Angular dist. of secondary neutrons	Elastic scattering cross section direct (n,2n) cross section (n,3n) cross section (n,n'a) cross section (n,n'p) cross section 1.25800+ E Ev (n,n') Level 9.84000+ E Ev (n,n') Level 1.29200+ E Ev (n,n') Level 1.52800+ E Ev (n,n') Level 1.88300+ E Ev (n,n') Level (n,n') to the continuum	-1.02250+ 7 -1.51690+ 7 -7.53060+ 6 -8.06330+ 6 -1.25800+ E -9.84000+ E -1.29200+ E -1.52800+ E -1.88300+ E -1.88300+ E
Energy dist. of secondary neutrons	direct (n,2n) cross section (n,3n) cross section (n,n'a) cross section (n,n'p) cross section (n,n') to the continuum	-1.02250+ 7 -1.51690+ 7 -7.53060+ 6 -8.06330+ 6 -1.88300+ E
Photon prod.Multiplicities(frcw neut.reactions)	Non elastic cross section(total-elastic) 1.25800+ E Ev (n,n') Level 9.84000+ E Ev (n,n') Level 1.29200+ E Ev (n,n') Level 1.52800+ E Ev (n,n') Level 1.88300+ E Ev (n,n') Level (n,γ) radiative capture cross section	-1.25800+ E -9.84000+ E -1.29200+ E -1.52800+ E -1.88300+ E 7.27040+ E

Angular dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	-1.25800+ E
	1.25800+ E Ev (n,n') Level	-5.84000+ E
	9.84000+ E Ev (n,n') Level	-1.29200+ E
	1.29200+ E Ev (n,n') Level	-1.52800+ E
	1.52800+ E Ev (n,n') Level	-1.88300+ E
	1.88300+ E Ev (n,n') Level	7.27040+ E
Energy dist. of Photons (from neut.reactions)	(n,γ) radiative capture cross section	
	Non elastic cross section(total-elastic)	7.27040+ E
	(n,γ) radiative capture cross section	

26-Fe- 0g

Met.No: 1192  
Date: JAN74  
Ref: ORNL-4617(1970)Lab: ORNL  
Author: PEREY,FU,PENNY,KINNEY,WRIGHT  
Card images: 8187

File Type	Reaction Type	C-Value
General Information	Descriptive Data and Dictionary	
Resonance parameter data	Resonance Information	
Neutron cross sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	Non elastic cross section(total-elastic)	
	Total inelastic cross section(sum of M1=51to91)	-8.46000+ 5
	direct (n,2n) cross section	-1.12040+ 7
	(n,n'a) cross section	-7.61940+ 6
	(n,n'p) cross section	-1.01900+ 7
	8.46000+ E Ev (n,n') Level	-8.46000+ 5
	1.40800+ E Ev (n,n') Level	-1.40800+ 6
	2.08400+ E Ev (n,n') Level	-2.08400+ 6
	2.65400+ E Ev (n,n') Level	-2.65400+ 6
	2.93900+ E Ev (n,n') Level	-2.93900+ 6
	2.95700+ E Ev (n,n') Level	-2.95700+ 6
	3.11900+ E Ev (n,n') Level	-3.11900+ 6
	3.12200+ E Ev (n,n') Level	-3.12200+ 6
	3.36800+ E Ev (n,n') Level	-3.36800+ 6
	3.38800+ E Ev (n,n') Level	-3.38800+ 6
	3.44500+ E Ev (n,n') Level	-3.44500+ 6
	3.45000+ E Ev (n,n') Level	-3.45000+ 6
	3.60000+ E Ev (n,n') Level	-3.60000+ 6
	3.60500+ E Ev (n,n') Level	-3.60500+ 6
	3.74700+ E Ev (n,n') Level	-3.74700+ 6
	3.82900+ E Ev (n,n') Level	-3.82900+ 6
	3.85600+ E Ev (n,n') Level	-3.85600+ 6
	4.04600+ E Ev (n,n') Level	-4.04600+ 6
	4.09900+ E Ev (n,n') Level	-4.09900+ 6
	4.11600+ E Ev (n,n') Level	-4.11600+ 6
	4.29800+ E Ev (n,n') Level	-4.29800+ 6
	4.30000+ E Ev (n,n') Level	-4.30000+ 6
	4.38500+ E Ev (n,n') Level	-4.38500+ 6
	4.39500+ E Ev (n,n') Level	-4.39500+ 6
	4.45300+ E Ev (n,n') Level	-4.45300+ 6
	4.50500+ E Ev (n,n') Level	-4.50500+ 6
	(n,n') to the continuum	-4.53100+ 6
	(n, $\gamma$ ) radiative capture cross section	7.80300+ 6
	(n,p) cross section	8.90000+ 4
	(n,d) cross section	-7.56510+ 6
	(n,t) cross section	-1.19320+ 7
	(n, $^3\text{He}$ ) cross section	-1.05350+ 7
	(n, $\alpha$ ) cross section	8.48400+ 5
	<p> lat:average elastic scattering cosine.	
	<f>Average log energy decrement for elastic scat.	
	<g> : <E <sup>2</sup> >/<E>	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	direct (n,2n) cross section	-1.12040+ 7
	(n,n'a) cross section	-7.61940+ 6
	(n,n'p) cross section	-1.01900+ 7
	8.46000+ E Ev (n,n') Level	-8.46000+ 5

Continued



	1.40800+ e Ev (n,n') Level	-1.40800+ e
	2.08400+ e Ev (n,n') Level	-2.08400+ e
	2.66400+ e Ev (n,n') Level	-2.66400+ e
	2.93900+ e Ev (n,n') Level	-2.93900+ e
	2.95700+ e Ev (n,n') Level	-2.95700+ e
	3.11900+ e Ev (n,n') Level	-3.11900+ e
	3.12200+ e Ev (n,n') Level	-3.12200+ e
	3.36800+ e Ev (n,n') Level	-3.36800+ e
	3.38800+ e Ev (n,n') Level	-3.38800+ e
	3.44800+ e Ev (n,n') Level	-3.44800+ e
	3.45000+ e Ev (n,n') Level	-3.45000+ e
	3.60000+ e Ev (n,n') Level	-3.60000+ e
	3.60800+ e Ev (n,n') Level	-3.60800+ e
	3.74700+ e Ev (n,n') Level	-3.74700+ e
	3.82900+ e Ev (n,n') Level	-3.82900+ e
	3.85600+ e Ev (n,n') Level	-3.85600+ e
	4.04600+ e Ev (n,n') Level	-4.04600+ e
	4.09500+ e Ev (n,n') Level	-4.09500+ e
	4.11600+ e Ev (n,n') Level	-4.11600+ e
	4.29800+ e Ev (n,n') Level	-4.29800+ e
	4.30000+ e Ev (n,n') Level	-4.30000+ e
	4.38900+ e Ev (n,n') Level	-4.38900+ e
	4.39800+ e Ev (n,n') Level	-4.39800+ e
	4.45300+ e Ev (n,n') Level	-4.45300+ e
	4.50800+ e Ev (n,n') Level	-4.50800+ e
	(n,n') to the continuum	-4.53100+ e
Energy dist. of secondary neutrons	direct (h,2n) cross section	-1.12040+ 7
	(n,n' $\alpha$ ) cross section	-7.61940+ e
	(n,n' $\beta$ ) cross section	-1.01900+ 7
	(n,n') to the continuum	-4.53100+ e
Photon prod. Multiplicities (from neut. reactions)	Non elastic cross section (total-elastic)	
	8.46000+ e Ev (n,n') Level	-8.46000+ e
	1.40800+ e Ev (n,n') Level	-1.40800+ e
	(n, $\gamma$ ) radiative capture cross section	7.80300+ e
Angular dist. of Photons (From neut. reactions)	Non elastic cross section (total-elastic)	
	8.46000+ e Ev (n,n') Level	-8.46000+ e
	1.40800+ e Ev (n,n') Level	-1.40800+ e
	(n, $\gamma$ ) radiative capture cross section	7.80300+ e
Energy dist. of Photons (from neut. reactions)	Non elastic cross section (total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	7.80300+ e

28-AI- 0g

Mat.No: 1190  
Date: DEC73  
Ref:Lab: BNL (NNCSC)  
Author: M.R.BHAT  
Card Images: 5533

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance Information	
Neutron cross sections	Total cross section (sum of partials)	
	Elastic scattering cross section	
	Total inelastic cross section (sum of M1=51 to 91)	-1.17200+ E
	direct (n,2n) cross section	-7.81950+ E
	(n,n'p) cross section	-8.17720+ E
	1.17200+ E Ev (n,n') Level	-1.17200+ E
	1.33200+ E Ev (n,n') Level	-1.33200+ E
	1.45400+ E Ev (n,n') Level	-1.45400+ E
	2.15800+ E Ev (n,n') Level	-2.15800+ E
	2.28600+ E Ev (n,n') Level	-2.28600+ E
	2.45900+ E Ev (n,n') Level	-2.45900+ E
	2.50600+ E Ev (n,n') Level	-2.50600+ E
	2.62500+ E Ev (n,n') Level	-2.62500+ E
	2.77500+ E Ev (n,n') Level	-2.77500+ E
	2.90200+ E Ev (n,n') Level	-2.90200+ E
	2.94200+ E Ev (n,n') Level	-2.94200+ E
	3.03800+ E Ev (n,n') Level	-3.03800+ E
	3.12300+ E Ev (n,n') Level	-3.12300+ E
	3.26400+ E Ev (n,n') Level	-3.26400+ E
	3.42000+ E Ev (n,n') Level	-3.42000+ E
	(n,n') to the continuum	-3.44090+ E
	(n,γ) radiative capture cross section	8.60000+ E
	(n,p) cross section	3.94700+ E
	(n,α) cross section	2.89020+ E
	<μ> Lab: average elastic scattering cosine.	
	<Σ>: average log energy decrement for elastic scat.	
	<γ> : <Σ>/<2Σ>	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	direct (n,2n) cross section	-7.81950+ E
	(n,n'p) cross section	-8.17720+ E
	1.17200+ E Ev (n,n') Level	-1.17200+ E
	1.33200+ E Ev (n,n') Level	-1.33200+ E
	1.45400+ E Ev (n,n') Level	-1.45400+ E
	2.15800+ E Ev (n,n') Level	-2.15800+ E
	2.28600+ E Ev (n,n') Level	-2.28600+ E
	2.45900+ E Ev (n,n') Level	-2.45900+ E
	2.50600+ E Ev (n,n') Level	-2.50600+ E
	2.62500+ E Ev (n,n') Level	-2.62500+ E
	2.77500+ E Ev (n,n') Level	-2.77500+ E
	2.90200+ E Ev (n,n') Level	-2.90200+ E
	2.94200+ E Ev (n,n') Level	-2.94200+ E
	3.03800+ E Ev (n,n') Level	-3.03800+ E
	3.12300+ E Ev (n,n') Level	-3.12300+ E
	3.26400+ E Ev (n,n') Level	-3.26400+ E
	3.42000+ E Ev (n,n') Level	-3.42000+ E
	(n,n') to the continuum	-3.44090+ E
Energy dist. of secondary neutrons	direct (n,2n) cross section	-7.81950+ E

Continued

	(h,n'p) cross section	-8.17720+ e
	(n,n') to the continuum	-3.44090+ e
Photon prod.Multiplicities(from neut.reactions)	(h, $\gamma$ ) radiative capture cross section	8.60000+ e
Photon prod.cross sections(from neut.reactions)	Non elastic cross section(total-elastic)	
Angular dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	8.60000+ e
Energy dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	(h, $\gamma$ ) radiative capture cross section	8.60000+ e

28-NI- 88g

Mat.No: 7837

Lab: LLL

Date: MAY78

Author: R.J.HOWERTON

Ref: UCRL-50400, Vol. 15

Card Images: 4368

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance Information	
Neutron cross sections	Total cross section (sum of partials)	0. + 0
	Elastic scattering cross section	0. + 0
	Total inelastic cross section (sum of MT=51 to 91)	0. + 0
	direct (n,2n) cross section	-1.21800+ 7
	(n,n'p) cross section	-8.18000+ 6
	(n,n') to the continuum	0. + 0
	(n, $\gamma$ ) radiative capture cross section	8.52000+ 6
	(n,p) cross section	4.00000+ 5
	(n,d) cross section	-5.95000+ 6
	(n,h) cross section	2.89000+ 6
	<math>\langle\mu\rangle</math>: average elastic scattering cosine.	0. + 0
	<math>\langle\Sigma\rangle</math>: average log energy decrement for elastic scat.	0. + 0
	<math>\langle\gamma\rangle</math> : <math>\langle I^2 \rangle / \langle 2I \rangle</math>	0. + 0
Angular dist. of secondary neutrons	Elastic scattering cross section	0. + 0
Energy dist. of secondary neutrons	direct (n,2n) cross section	-1.21800+ 7
	(n,n'p) cross section	-8.18000+ 6
	(n,n') to the continuum	0. + 0
Photon prod. Multiplicities (from neut. reactions)	(n, $\gamma$ ) radiative capture cross section	8.52000+ 6
Photon prod. cross sections (from neut. reactions)	Non elastic cross section (total-elastic)	
Angular dist. of Photons (from neut. reactions)	Non elastic cross section (total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	8.52000+ 6
Energy dist. of Photons (from neut. reactions)	Non elastic cross section (total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	8.52000+ 6

28-NI- E0g	Pat.No: 6434	Lab: ENL	
	Date: MAR77	Author: M.DIVADEENAM	
	Ref:	Card Images: 61	
	<u>File Type</u>	<u>Reaction Type</u>	<u>Q-Value</u>
	General Information	Descriptive data and Dictionary	
	Resonance parameter data	Resonance Information	
	Neutron cross sections	(n,p) cross section	-2.04110+ 6
	Data covariance matrices for neutron X-sections	(n,p) cross section	-2.04110+ 6

25-Cu- 0g Mat.No: 1255  
 Date: NOV73  
 Ref:

Lab: SFI  
 Author: M.K. ERAKE AND W.P. FRICKE  
 Card images: 32E2

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	Non elastic cross section(total-elastic)	
	Total inelastic cross section(sum of MT=51to91)	-6.70000+ 5
	direct (n,2n) cross section	-9.90000+ 6
	(n,3n) cross section	-1.78100+ 7
	(n,n'a) cross section	-5.77700+ 6
	(n,n'p) cross section	-6.12000+ 6
	6.70000+ E Ev (n,n') Level	-6.70000+ 5
	7.70000+ E Ev (n,n') Level	-7.70000+ 5
	9.62000+ E Ev (n,n') Level	-9.62000+ 5
	1.11500+ E Ev (n,n') Level	-1.11500+ 6
	1.32600+ E Ev (n,n') Level	-1.32600+ 6
	1.41200+ E Ev (n,n') Level	-1.41200+ 6
	1.48200+ E Ev (n,n') Level	-1.48200+ 6
	1.54700+ E Ev (n,n') Level	-1.54700+ 6
	1.62300+ E Ev (n,n') Level	-1.62300+ 6
	1.72500+ 6 E Ev (n,n') Level	-1.72500+ 6
	1.86600+ E Ev (n,n') Level	-1.86500+ 6
	(n,n') to the continuum	-1.50000+ 6
	(n,+) radiative capture cross section	7.75000+ 6
	(n,p) cross section	7.08600+ 6
	(n,d) cross section	-3.89700+ 6
	(n,3He) cross section	-9.51700+ 6
	(n,a) cross section	1.69300+ 6
	<μ> lat:average elastic scattering cosine.	
	<Σ>:average log energy decrement for elastic scat.	
	<γ> : <E²>/<2E>	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	direct (n,2n) cross section	-9.90000+ 6
	(n,3n) cross section	-1.78100+ 7
	(n,n'a) cross section	-5.77700+ 6
	(n,n'p) cross section	-6.12000+ 6
	6.70000+ E Ev (n,n') Level	-6.70000+ 5
	7.70000+ E Ev (n,n') Level	-7.70000+ 5
	9.62000+ E Ev (n,n') Level	-9.62000+ 5
	1.11500+ E Ev (n,n') Level	-1.11500+ 6
	1.32600+ E Ev (n,n') Level	-1.32600+ 6
	1.41200+ E Ev (n,n') Level	-1.41200+ 6
	1.48200+ E Ev (n,n') Level	-1.48200+ 6
	1.54700+ E Ev (n,n') Level	-1.54700+ 6
	1.62300+ E Ev (n,n') Level	-1.62300+ 6
	1.72500+ E Ev (n,n') Level	-1.72500+ 6
	1.86500+ E Ev (n,n') Level	-1.86500+ 6
	(n,n') to the continuum	-1.50000+ 6
Energy dist. of secondary neutrons	direct (n,2n) cross section	-9.90000+ 6
	(n,3n) cross section	-1.78100+ 7

(continued)

	(n,n' $\alpha$ ) cross section	-5.77700+ 6
	(n,n' $\beta$ ) cross section	-6.12000+ 6
	(n,n') to the continuum	-1.90000+ 6
Photon prod.Multiplicities(from neut.reactions)	(n, $\gamma$ ) radiative capture cross section	7.75000+ 6
Photon prod.cross sections(from neut.reactions)	Non elastic cross section(total-elastic)	
Angular dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	7.75000+ 6
Energy dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	7.75000+ 6

25-Cu- 63g

Mat.No: 6435  
Date: JUL78  
Ref:

Lab: ORNL  
Author: C.Y.FU  
Card Images: 282

<u>File Type</u>	<u>Reaction Type</u>	<u>G-Value</u>
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	((n, $\gamma$ ) radiative capture cross section (n, $\alpha$ ) cross section	7.91590+ 6 1.71490+ 6
Data covariance matrices for resonance parameters	Resonance information	
Data covariance matrices for neutron X-sections	((n, $\gamma$ ) radiative capture cross section (n, $\alpha$ ) cross section	7.91590+ 6 1.71490+ 6



41-Nb- 93g

Mat. No: 1129  
Date: MAY74  
Ref:Lab: ANL,LLL  
Author: R.HOWERTON(LLL) AND A.SMITH  
Card images: 2079

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance Information	
Neutron cross sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	Total inelastic cross section(sum of MT=51to91)	-2.90000+ 4
	direct (n,2n) cross section	-8.82600+ 6
	(n,3n) cross section	-1.67180+ 7
	(n,n' $\alpha$ ) cross section	-1.94600+ 6
	2.90000+ 4 Ev (n,n') Level	-2.90000+ 4
	7.40000+ 5 Ev (n,n') Level	-7.40000+ 5
	8.10000+ 5 Ev (n,n') Level	-8.10000+ 5
	9.59000+ 5 Ev (n,n') Level	-9.59000+ 5
	1.07000+ 6 Ev (n,n') Level	-1.07000+ 6
	1.31500+ 6 Ev (n,n') Level	-1.31500+ 6
	1.48840+ 6 Ev (n,n') Level	-1.48840+ 6
	1.67400+ 6 Ev (n,n') Level	-1.67400+ 6
	1.94700+ 6 Ev (n,n') Level	-1.94700+ 6
	2.15900+ 6 Ev (n,n') Level	-2.15900+ 6
	2.33500+ 6 Ev (n,n') Level	-2.33500+ 6
	2.51900+ 6 Ev (n,n') Level	-2.51900+ 6
	(n,n') to the continuum	-2.54950+ 6
	(n, $\gamma$ ) radiative capture cross section	7.21390+ 6
	(n,p) cross section	7.19000+ 5
	(n, $\alpha$ ) cross section	4.91400+ 6
	<U> Lab: average elastic scattering cosine.	
	<E>: average log energy decrement for elastic scat.	
	<Y> : <E <sup>2</sup> >/<E>	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	direct (n,2n) cross section	-8.82600+ 6
	(n,3n) cross section	-1.67180+ 7
	(n,n' $\alpha$ ) cross section	-1.94600+ 6
	2.90000+ 4 Ev (n,n') Level	-2.90000+ 4
	7.40000+ 5 Ev (n,n') Level	-7.40000+ 5
	8.10000+ 5 Ev (n,n') Level	-8.10000+ 5
	9.59000+ 5 Ev (n,n') Level	-9.59000+ 5
	1.07000+ 6 Ev (n,n') Level	-1.07000+ 6
	1.31500+ 6 Ev (n,n') Level	-1.31500+ 6
	1.48840+ 6 Ev (n,n') Level	-1.48840+ 6
	1.67400+ 6 Ev (n,n') Level	-1.67400+ 6
	1.94700+ 6 Ev (n,n') Level	-1.94700+ 6
	2.15900+ 6 Ev (n,n') Level	-2.15900+ 6
	2.33500+ 6 Ev (n,n') Level	-2.33500+ 6
	2.51900+ 6 Ev (n,n') Level	-2.51900+ 6
	(n,n') to the continuum	-2.54950+ 6
Energy dist. of secondary neutrons	direct (n,2n) cross section	-8.82600+ 6
	(n,3n) cross section	-1.67180+ 7
	(n,n' $\alpha$ ) cross section	-1.94600+ 6
	(n,n') to the continuum	-2.54950+ 6

Continued

Photon prod. Multiplicities (from neut. reactions)	(n,γ) radiative capture cross section	7.21390+ e
Photon prod. cross sections (from neut. reactions)	Non elastic cross section (total-elastic)	
Angular dist. of Photons (from neut. reactions)	Non elastic cross section (total-elastic) (n,γ) radiative capture cross section	7.21390+ e
Energy dist. of Photons (from neut. reactions)	Non elastic cross section (total-elastic) (n,γ) radiative capture cross section	7.21390+ e

42-Mo- 0g

Mat.No: 1287

Date: APR74

Ref:

Lab: LLL

Author: R.J.HOWEFTON

Card Images: 1346

File Type	Reaction Type	Q-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section(sum of partials)	
	Elastic scattering cross section	
	Total inelastic cross section(sum of MT=51to91)	-2.47000+ 5
	direct (n,2n) cross section	-7.80000+ 6
	(n,3n) cross section	-1.48000+ 7
	(n,n') to the ccntinum	
	(n, $\gamma$ ) radiative capture cross section	7.25000+ 6
	$\langle\mu\rangle$ (ab:average elastic scattering cosine.	
	$\langle\Sigma\rangle$ :average log energy decrement for elastic scat.	
	$\langle\tau\rangle = \langle\Sigma^2\rangle/\langle\Sigma\rangle$	
Angular dist. of secondary neutrons	Elastic scattering cross section	
	direct (n,2n) cross section	-7.80000+ 6
	(n,3n) cross section	-1.48000+ 7
	(n,n') to the ccntinum	
Energy dist. of secondary neutrons	direct (n,2n) cross section	-7.80000+ 6
	(n,3n) cross section	-1.48000+ 7
	(n,n') to the ccntinum	
Photon prod.Multiplicities(from neut.reactions)	(n, $\gamma$ ) radiative capture cross section	7.25000+ 6
Photon prod.cross sections(from neut.reactions)	Non elastic cross section(total-elastic)	
Angular dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	7.25000+ 6
Energy dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	7.25000+ 6

74-W - 0g

Pat.No: 7856

Lab: LLL

Date: MAY78

Author: R.J.HOWERTON

Ref: UCRL-50400,VLL. 15

Card Images: 3066

File Type	Reaction Type	C-Value
General Information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	Total cross section(sum of partials)	0. + 0
	Elastic scattering cross section	0. + 0
	Total inelastic cross section(sum of MT=51to91)	0. + 0
	direct (n,2n) cross section	-7.46000+ 6
	(n,3n) cross section	-1.30900+ 7
	(n,n') to the continuum	0. + 0
	(n, $\gamma$ ) radiative capture cross section	5.83000+ 6
	<math>\langle\mu\rangle</math> Lab: average elastic scattering cosine.	0. + 0
	<math>\langle\Sigma\rangle</math>: average log energy decrement for elastic scat.	0. + 0
	<math>\langle\gamma\rangle = \langle\Sigma^2\rangle/\langle 2\Sigma\rangle</math>	0. + 0
Angular dist. of secondary neutrons	Elastic scattering cross section	0. + 0
Energy dist. of secondary neutrons	direct (n,2n) cross section	-7.46000+ 6
	(n,3n) cross section	-1.30900+ 7
	(n,n') to the continuum	0. + 0
Photon prod.Multiplicities(from neut.reactions)	(n, $\gamma$ ) radiative capture cross section	5.83000+ 6
Photon prod.cross sections(from neut.reactions)	Non elastic cross section(total-elastic)	
Angular dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	5.83000+ 6
Energy dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	
	(n, $\gamma$ ) radiative capture cross section	5.83000+ 6

R2-fb- 0q

Mat.No: 1288

Date: JUL71

Ref:

Lab: ORNL

Author: C.Y.FU AND F.G.PEREY

Card images: 4098

File Type	Reaction Type	C-Value
General information	Descriptive data and Dictionary	
Resonance parameter data	Resonance information	
Neutron cross sections	total cross section(sum of partials)	0.0000E+00
	Elastic scattering cross section	0.0000E+00
	Non elastic cross section(total-elastic)	0.0000E+00
	Total inelastic cross section(sum of MT=51to91)	-5.7000E+0E
	direct (n,2n) cross section	-6.7330E+0E
	(n, $\gamma$ ) cross section	-1.4110E+07
	6.70000+ E Ev (n,n') Level	-5.70000+ E
	8.03000+ E Ev (n,n') Level	-8.03000+ E
	8.98000+ E Ev (n,n') Level	-8.98000+ E
	1.17500+ E Ev (n,n') Level	-1.17500+ E
	1.34100+ E Ev (n,n') Level	-1.34100+ E
	1.46200+ E Ev (n,n') Level	-1.46200+ E
	1.63300+ E Ev (n,n') Level	-1.63300+ E
	1.68200+ E Ev (n,n') Level	-1.68200+ E
	1.76200+ E Ev (n,n') Level	-1.76200+ E
	1.99800+ E Ev (n,n') Level	-1.99800+ E
	2.16000+ E Ev (n,n') Level	-2.16000+ E
	2.34000+ E Ev (n,n') Level	-2.34000+ E
	2.38500+ E Ev (n,n') Level	-2.38500+ E
	2.61500+ E Ev (n,n') Level	-2.61500+ E
	2.62400+ E Ev (n,n') Level	-2.62400+ E
	2.63400+ E Ev (n,n') Level	-2.63400+ E
	2.78300+ E Ev (n,n') Level	-2.78300+ E
	3.01700+ E Ev (n,n') Level	-3.01700+ E
	3.05700+ E Ev (n,n') Level	-3.05700+ E
	3.19800+ E Ev (n,n') Level	-3.19800+ E
	3.25000+ E Ev (n,n') Level	-3.25000+ E
	3.38200+ E Ev (n,n') Level	-3.38200+ E
	3.45300+ E Ev (n,n') Level	-3.45300+ E
	3.47500+ E Ev (n,n') Level	-3.47500+ E
	3.56000+ E Ev (n,n') Level	-3.56000+ E
	3.70800+ E Ev (n,n') Level	-3.70800+ E
	3.75000+ E Ev (n,n') Level	-3.75000+ E
	3.85400+ E Ev (n,n') Level	-3.85400+ E
	3.92000+ E Ev (n,n') Level	-3.92000+ E
	3.98900+ E Ev (n,n') Level	-3.98900+ E
	4.07600+ E Ev (n,n') Level	-4.07600+ E
	4.12500+ E Ev (n,n') Level	-4.12500+ E
	4.20000+ E Ev (n,n') Level	-4.20000+ E
	4.28800+ E Ev (n,n') Level	-4.28800+ E
	4.33500+ E Ev (n,n') Level	-4.33500+ E
	(n,n') to the continuum	-4.40000+ E
	(n, $\gamma$ ) radiative capture cross section	5.4150E+0E
	< $\mu$ > lat:average elastic scattering cosine.	
	< $\xi$ >:average log energy decrement for elastic scat.	
	< $\gamma$ > : < $\Sigma^2$ >/<2 $\Sigma$ >	
Angular dist. of secondary neutrons	Elastic scattering cross section	0.0000E+00
	direct (n,2n) cross section	-6.7330E+0E

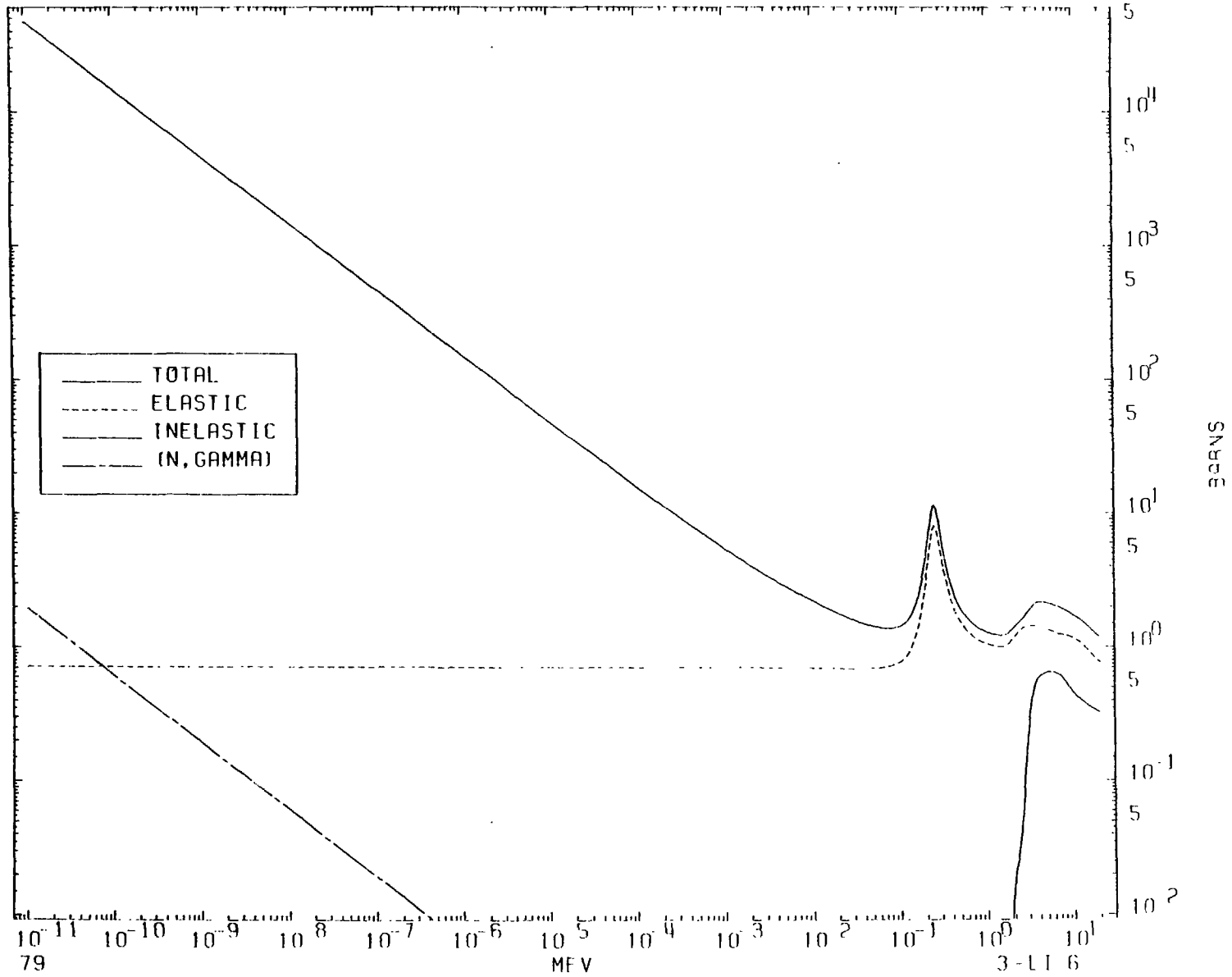
continued

	(n,3n) cross section	-1.4110E+07
	5.70000+ E Ev (n,n') Level	-5.70000+ E
	6.03000+ E Ev (n,n') Level	-6.03000+ E
	8.98000+ E Ev (n,n') Level	-8.98000+ E
	1.17E00+ E Ev (n,n') Level	-1.17500+ E
	1.34100+ E Ev (n,n') Level	-1.34100+ E
	1.46200+ E Ev (n,n') Level	-1.46200+ E
	1.63300+ E Ev (n,n') Level	-1.63300+ E
	1.68200+ E Ev (n,n') Level	-1.68200+ E
	1.76200+ E Ev (n,n') Level	-1.76200+ E
	1.99800+ E Ev (n,n') Level	-1.99800+ E
	2.16000+ E Ev (n,n') Level	-2.16000+ E
	2.34000+ E Ev (n,n') Level	-2.34000+ E
	2.38500+ E Ev (n,n') Level	-2.38500+ E
	2.61E00+ E Ev (n,n') Level	-2.61500+ E
	2.62400+ E Ev (n,n') Level	-2.62400+ E
	2.63400+ E Ev (n,n') Level	-2.63400+ E
	2.78300+ E Ev (n,n') Level	-2.78300+ E
	3.01700+ E Ev (n,n') Level	-3.01700+ E
	3.05700+ E Ev (n,n') Level	-3.05700+ E
	3.19800+ E Ev (n,n') Level	-3.19800+ E
	3.26000+ E Ev (n,n') Level	-3.26000+ E
	3.38200+ E Ev (n,n') Level	-3.38200+ E
	3.45300+ E Ev (n,n') Level	-3.45300+ E
	3.47500+ E Ev (n,n') Level	-3.47500+ E
	3.56000+ E Ev (n,n') Level	-3.56000+ E
	3.70800+ E Ev (n,n') Level	-3.70800+ E
	3.75000+ E Ev (n,n') Level	-3.75000+ E
	3.85400+ E Ev (n,n') Level	-3.85400+ E
	3.92000+ E Ev (n,n') Level	-3.92000+ E
	3.98900+ E Ev (n,n') Level	-3.98900+ E
	4.07600+ E Ev (n,n') Level	-4.07600+ E
	4.12500+ E Ev (n,n') Level	-4.12500+ E
	4.20000+ E Ev (n,n') Level	-4.20000+ E
	4.28800+ E Ev (n,n') Level	-4.28800+ E
	4.33900+ E Ev (n,n') Level	-4.33900+ E
	(n,n') to the continuum	-4.40000+ E
Energy dist. of secondary neutrons	direct (n,2n) cross section	-6.7330E+06
	(n,3n) cross section	-1.4110E+07
	(n,n') to the continuum	-4.40000+ E
Photon prod.Multiplicities(from neut.reactions)	Non elastic cross section(total-elastic)	0.0000E+00
Angular dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	0.0000E+00
Energy dist. of Photons (from neut.reactions)	Non elastic cross section(total-elastic)	0.0000E+00

MAT 1303

CROSS SECTIONS

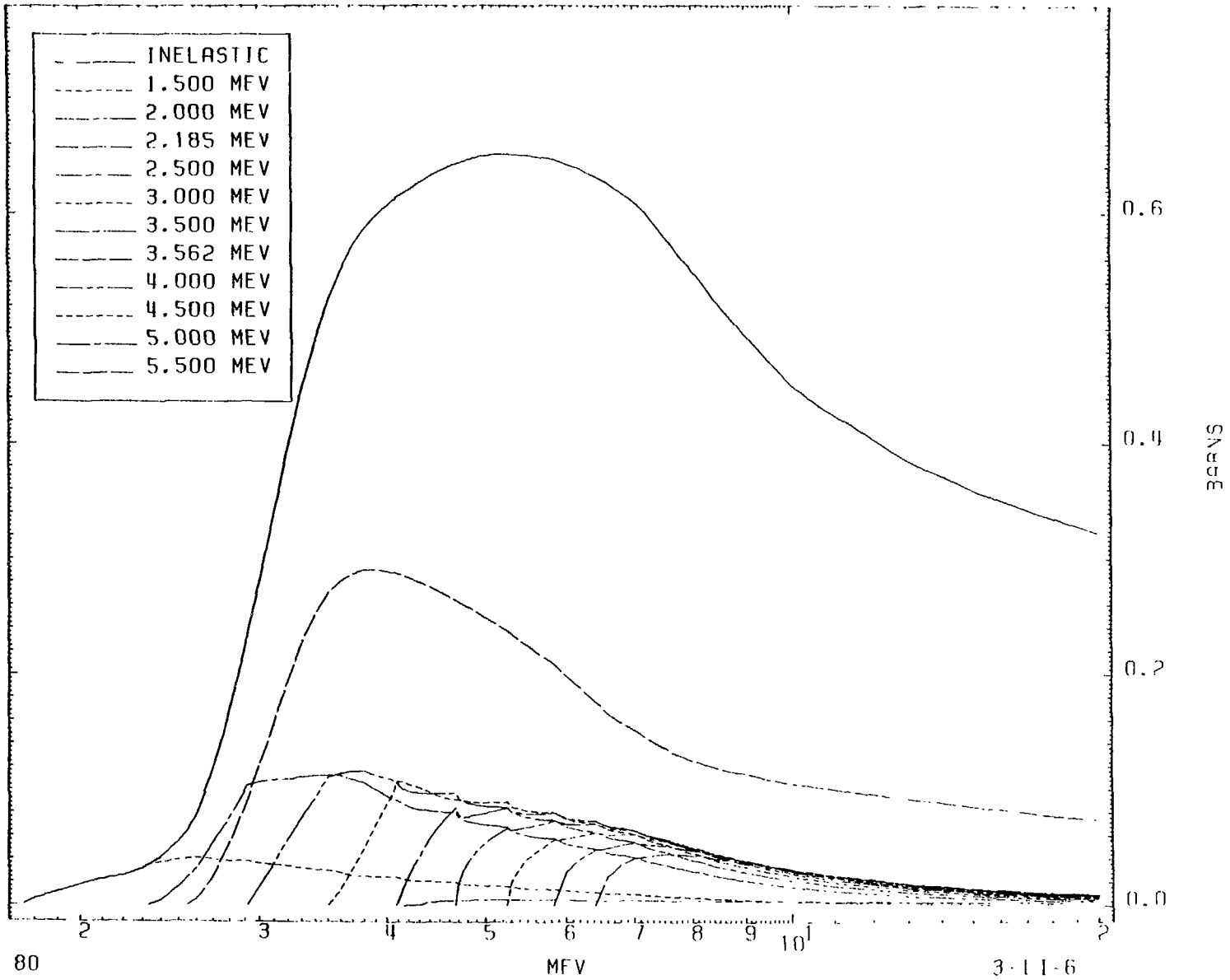
3-11-6



MAT 1303

(N,N') CROSS SECTION

3-11-6

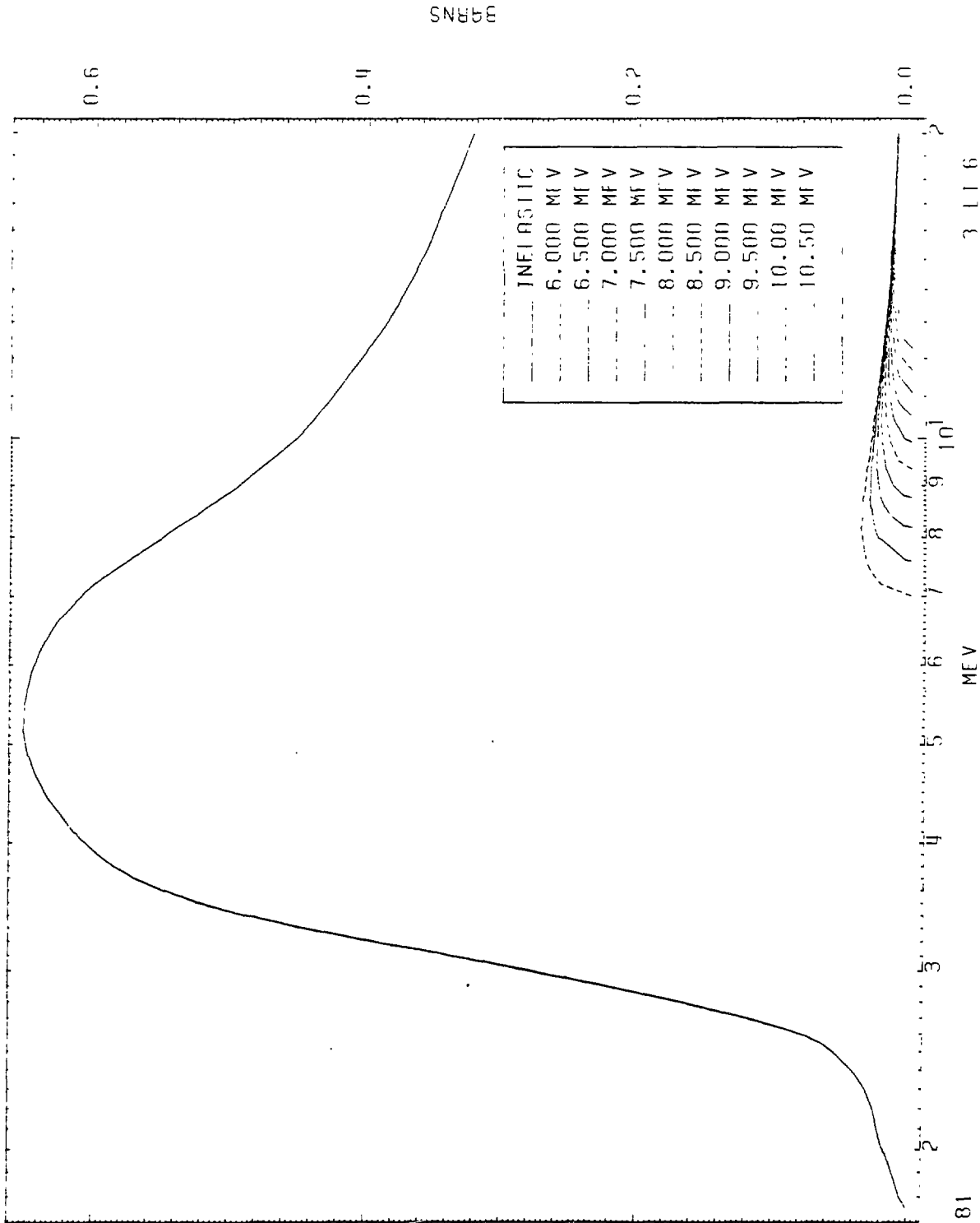


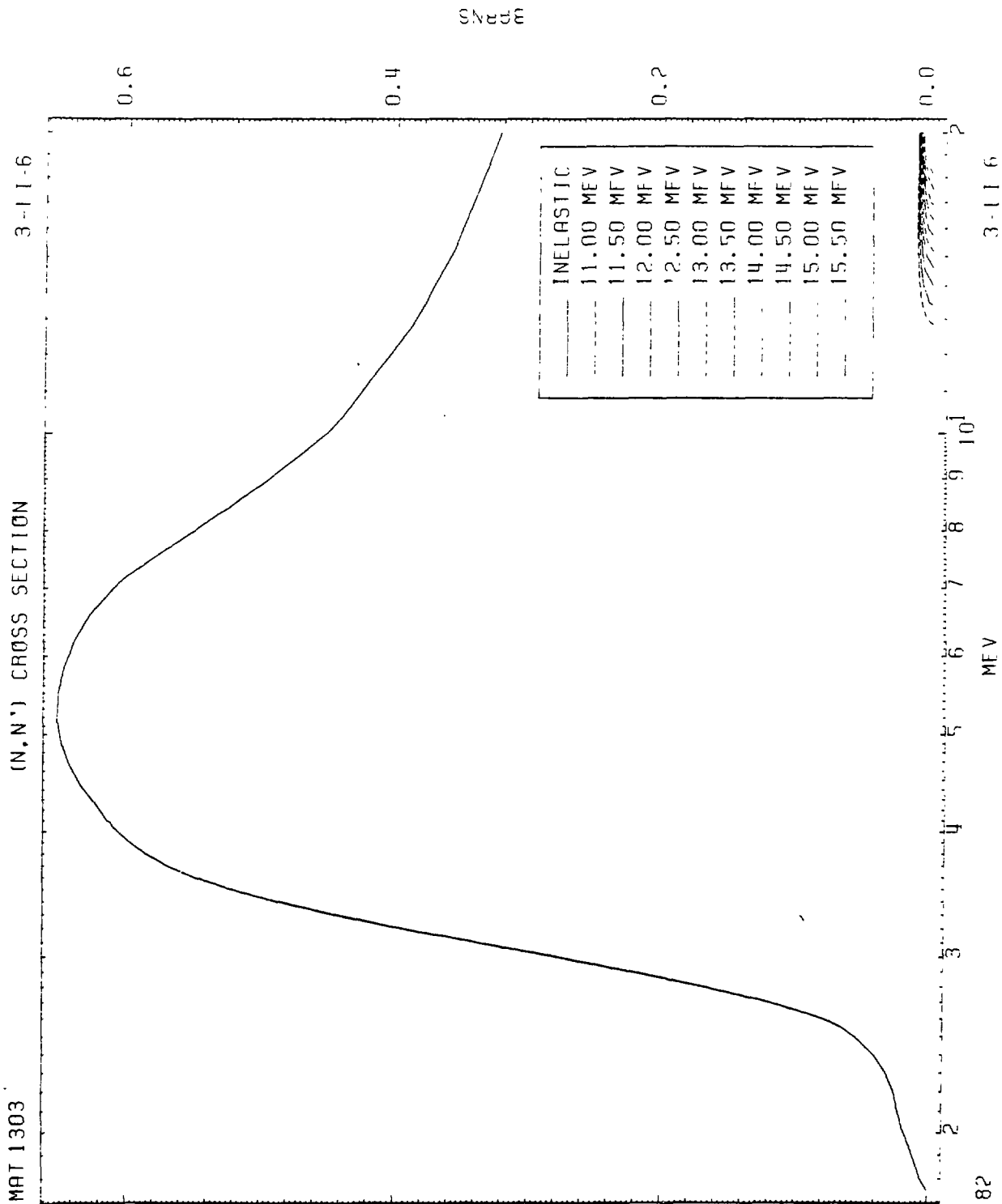


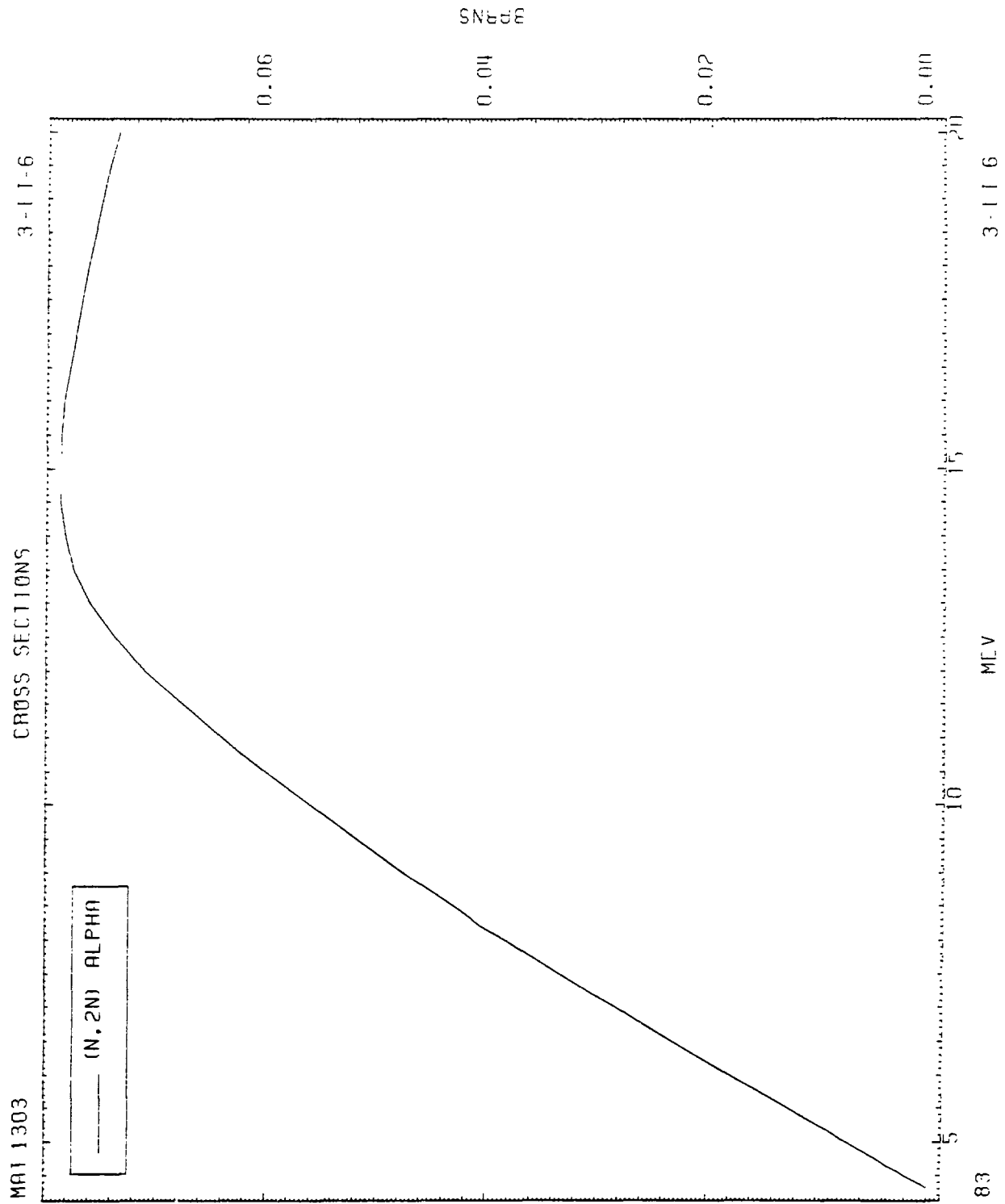
MAT 1303

(N,N') CROSS SECTION

3-11-6



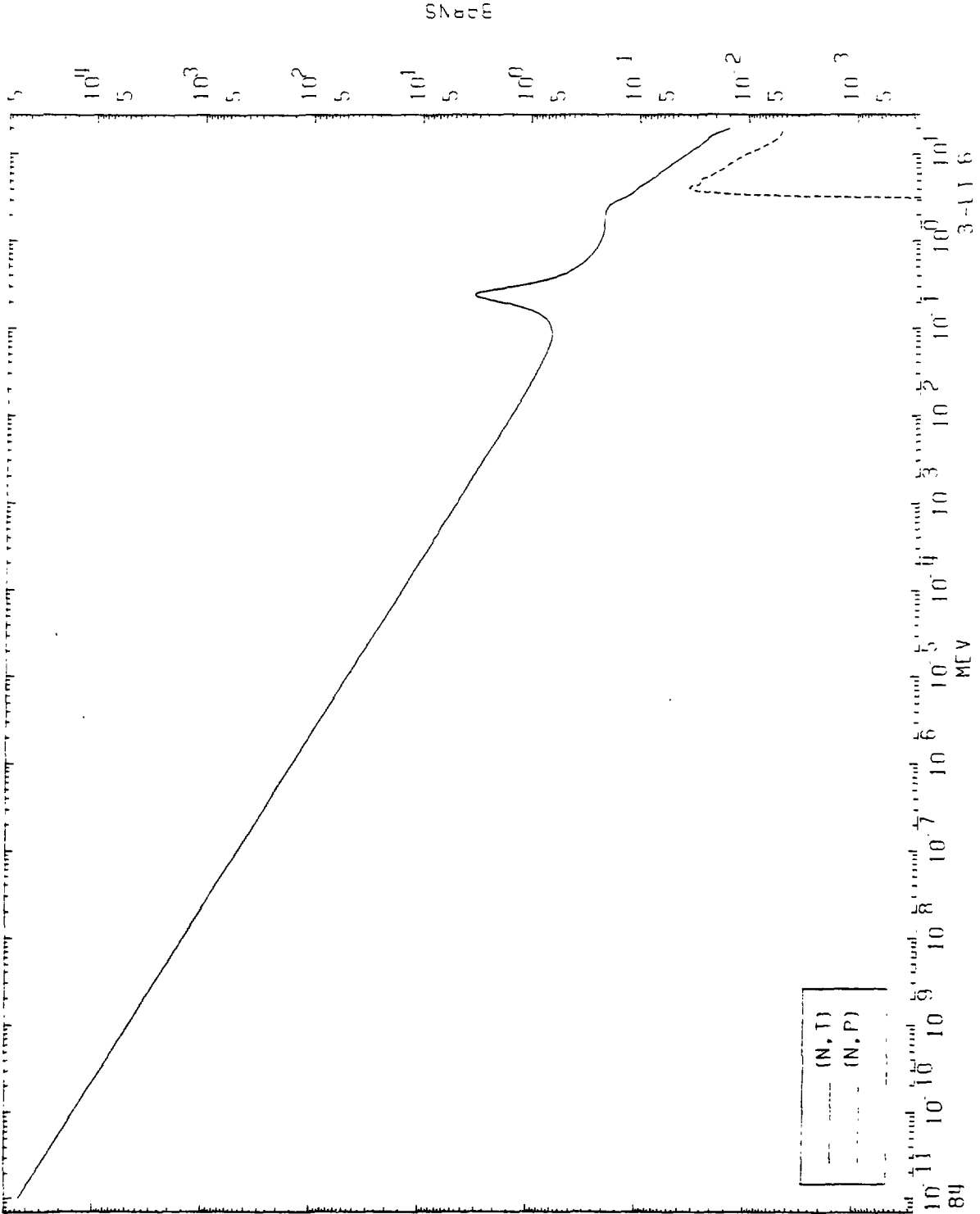


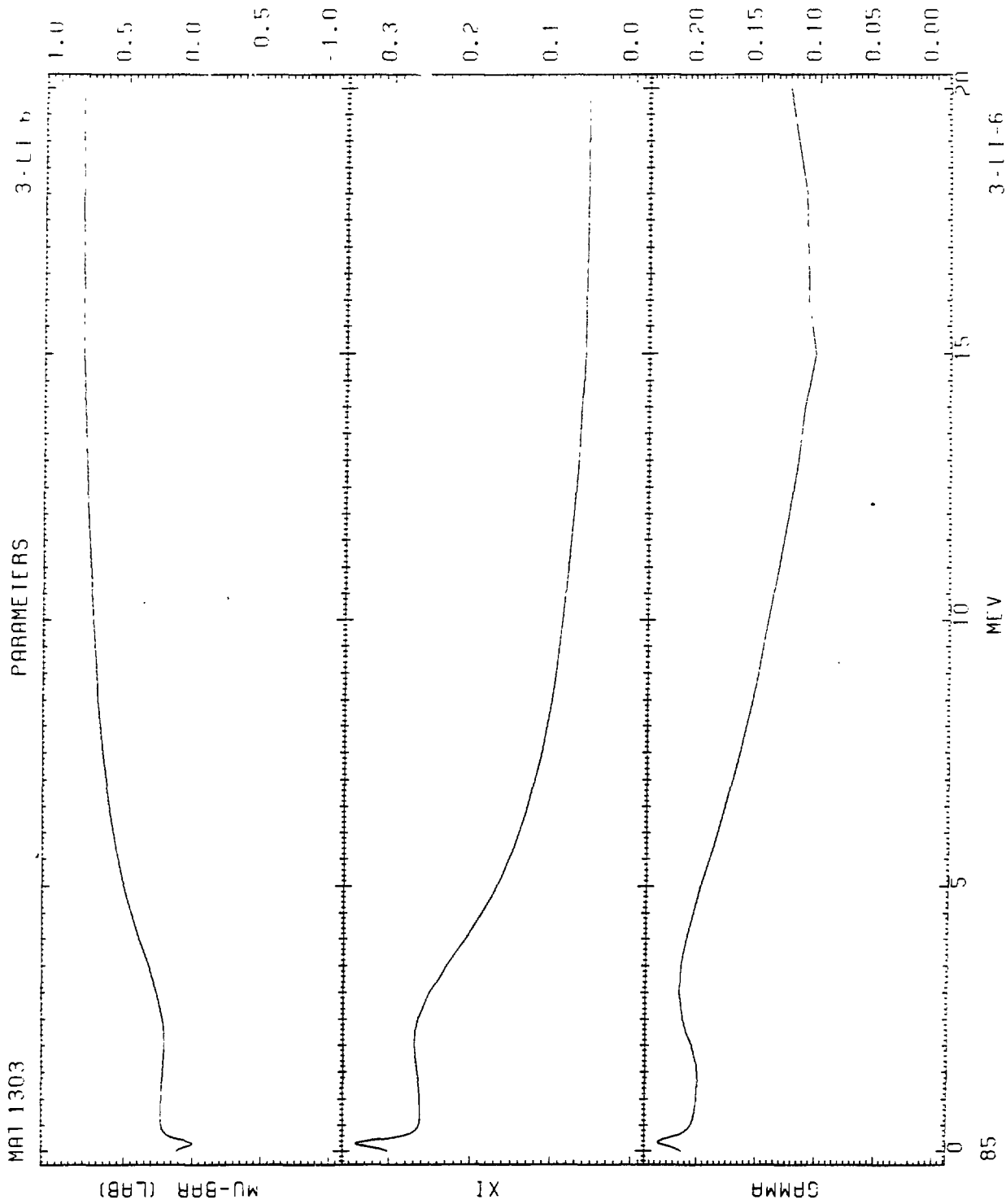


MA1 1303

CROSS SECTIONS

3-11-6

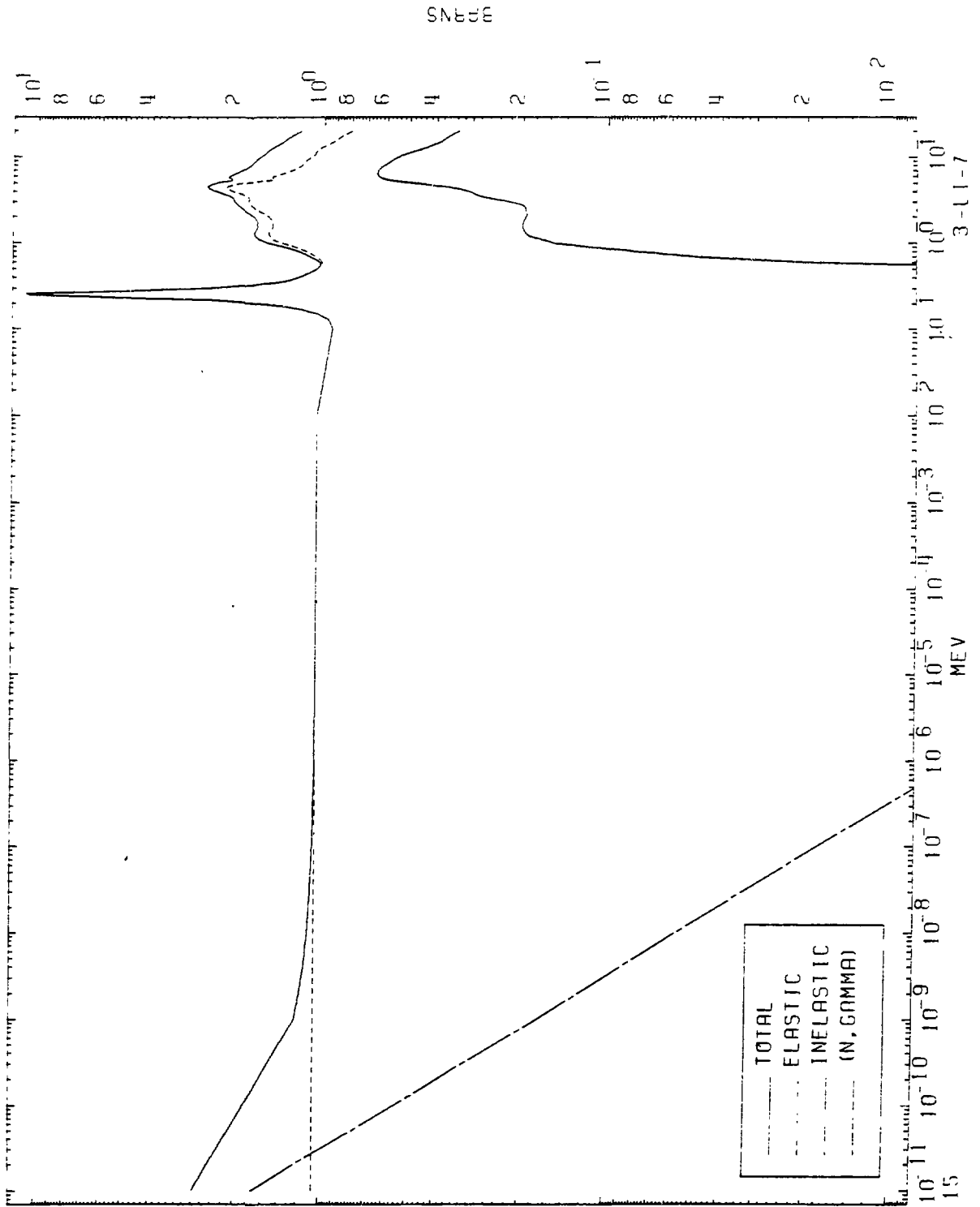




MAT 1272

CROSS SECTIONS

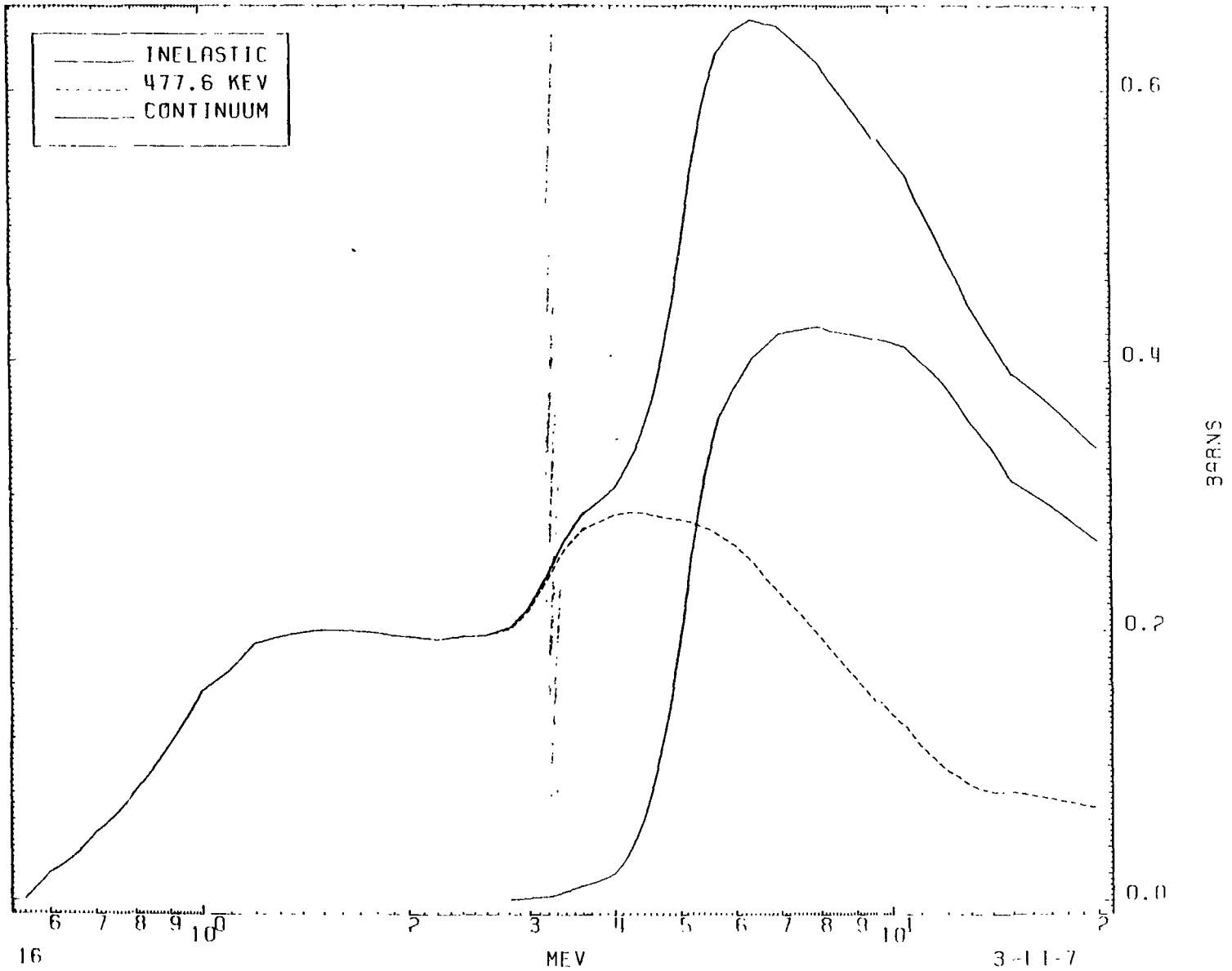
3-11-7

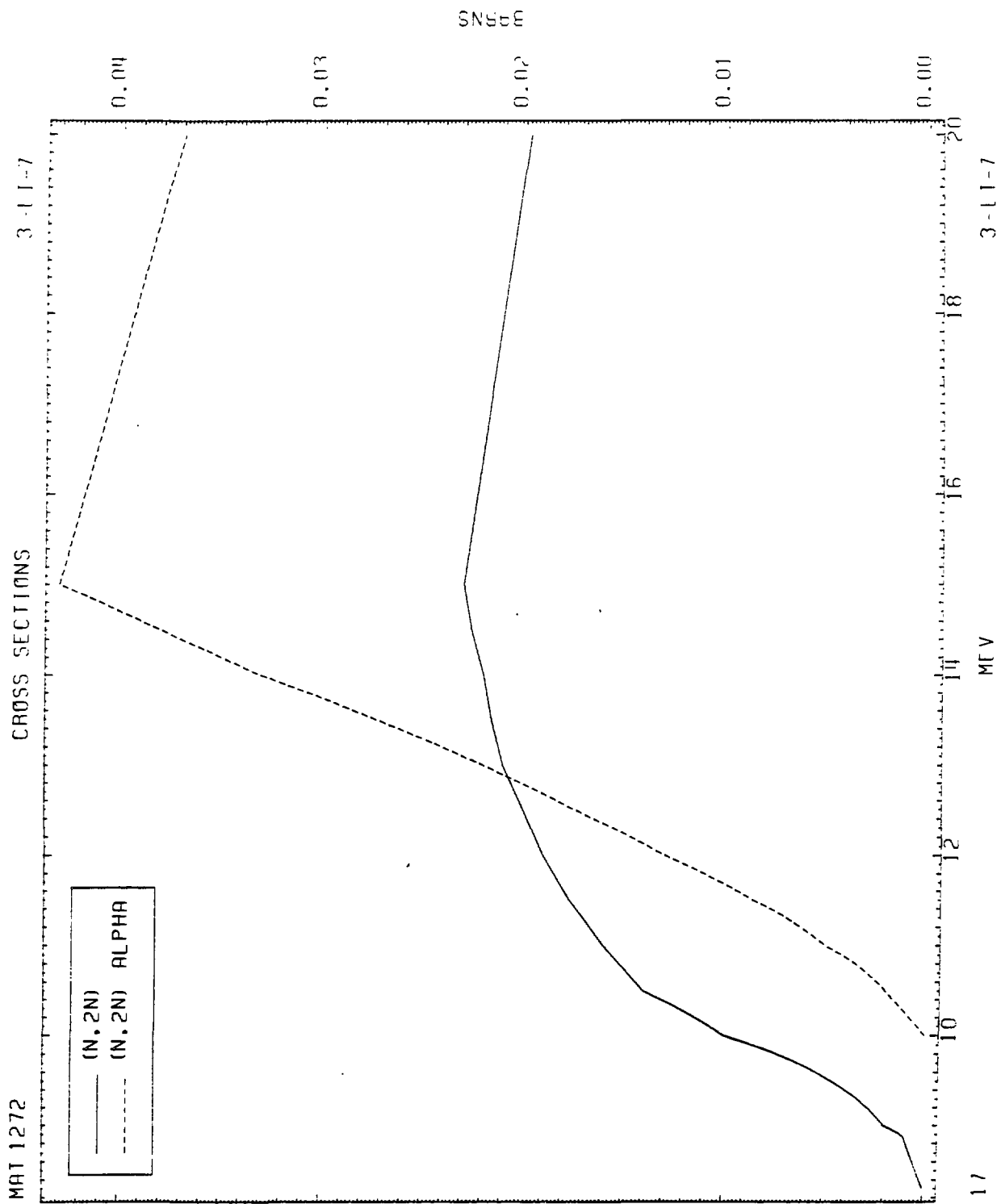


MAT 1272

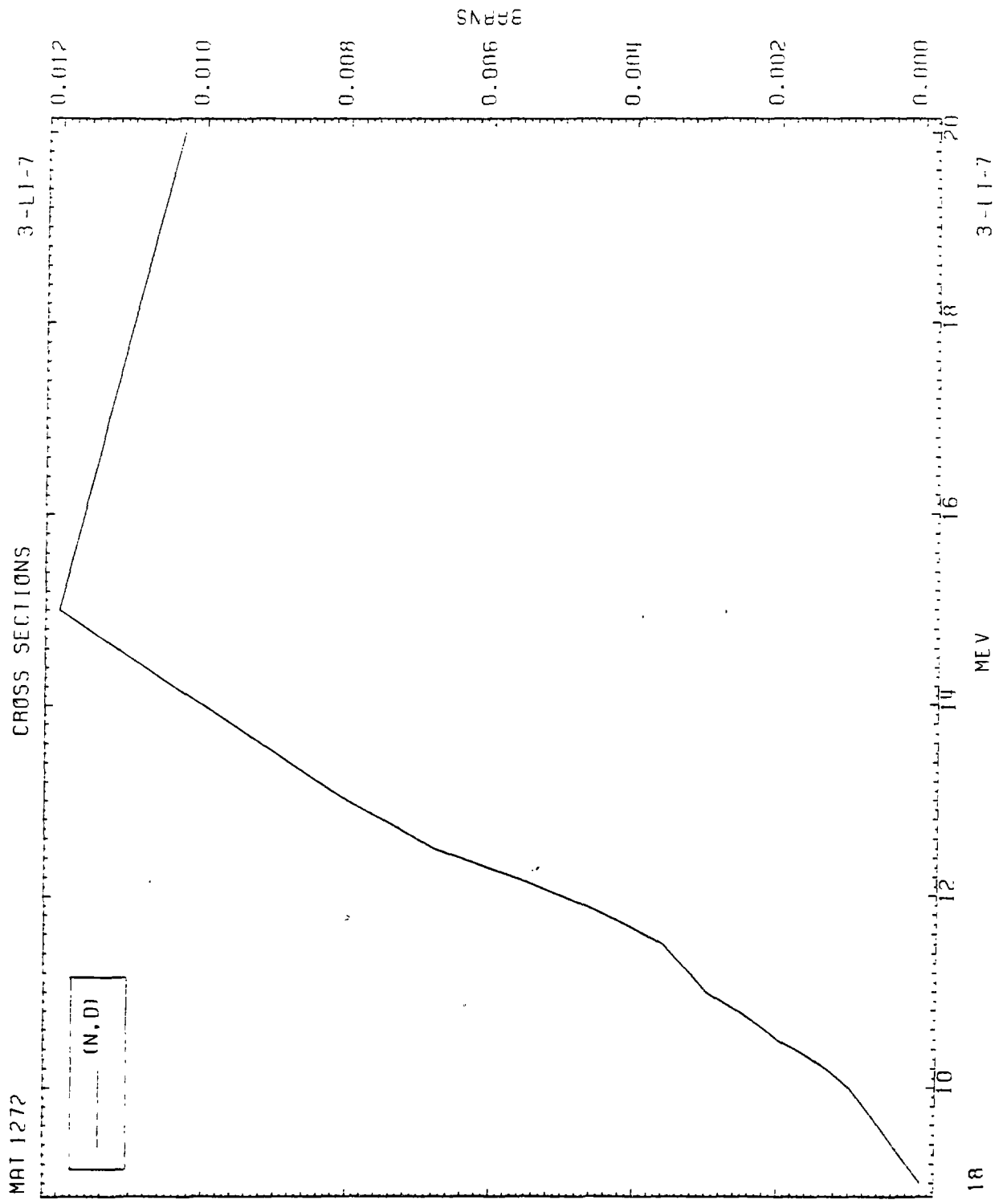
(N,N') CROSS SECTION

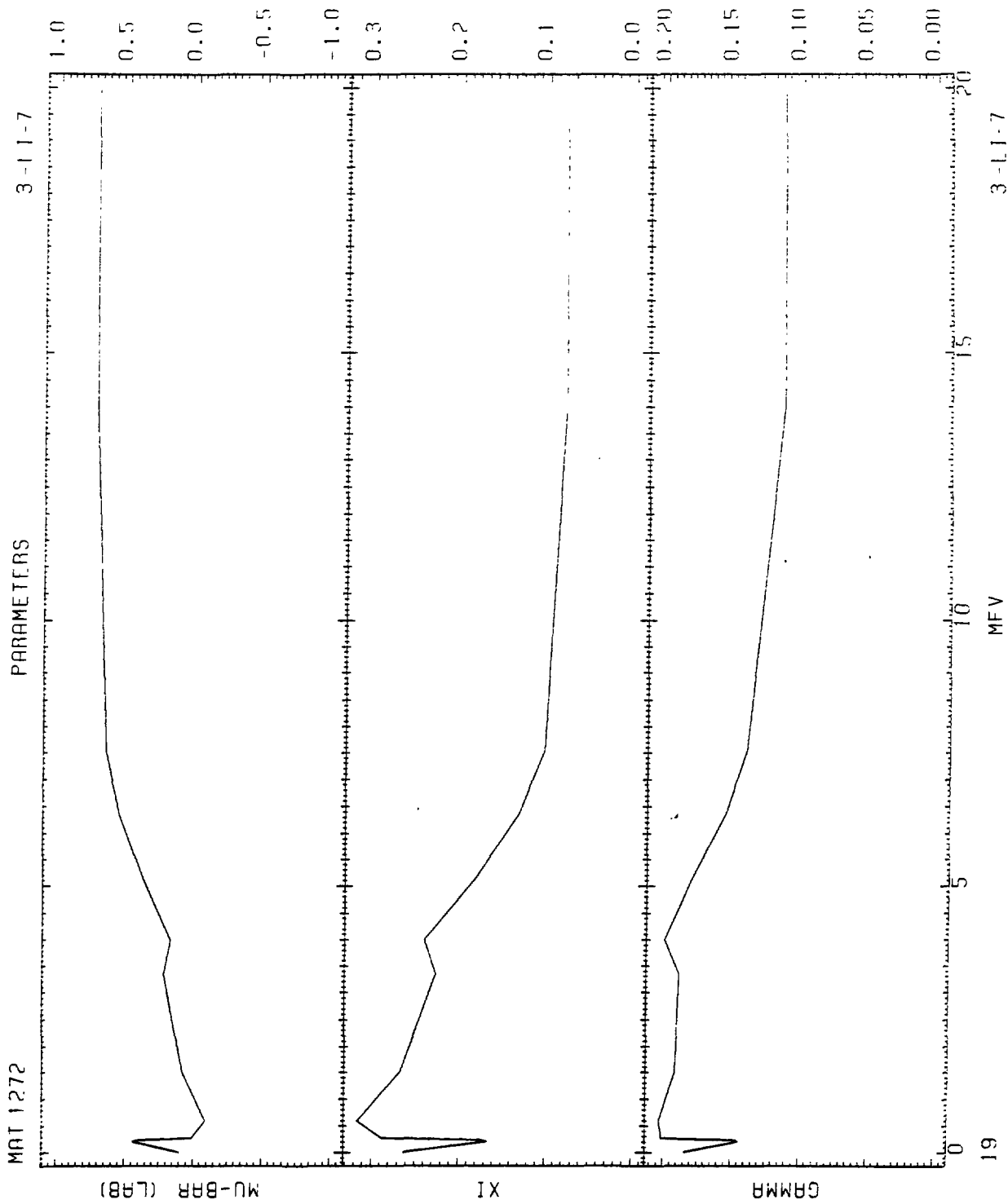
3-LI-7

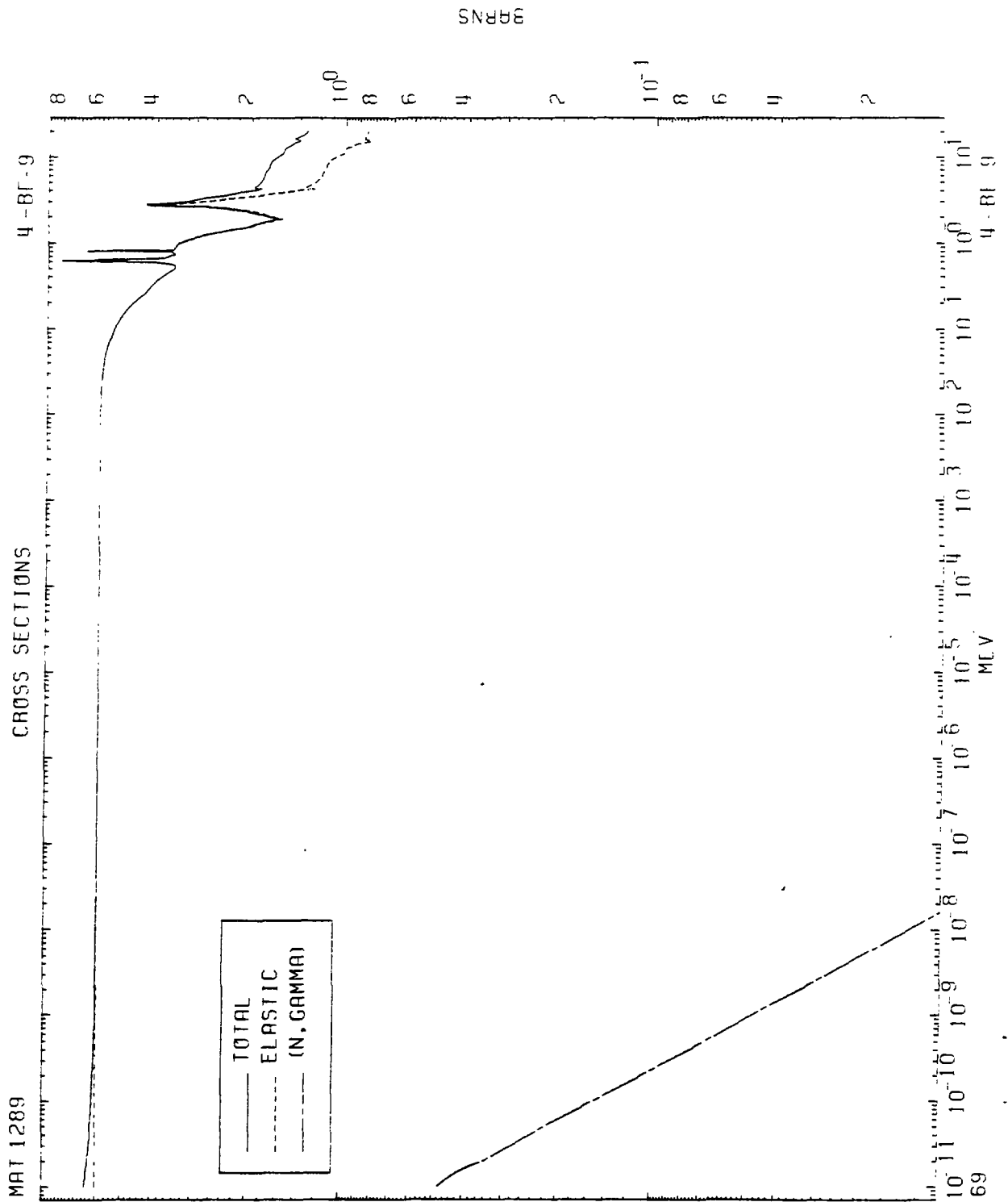


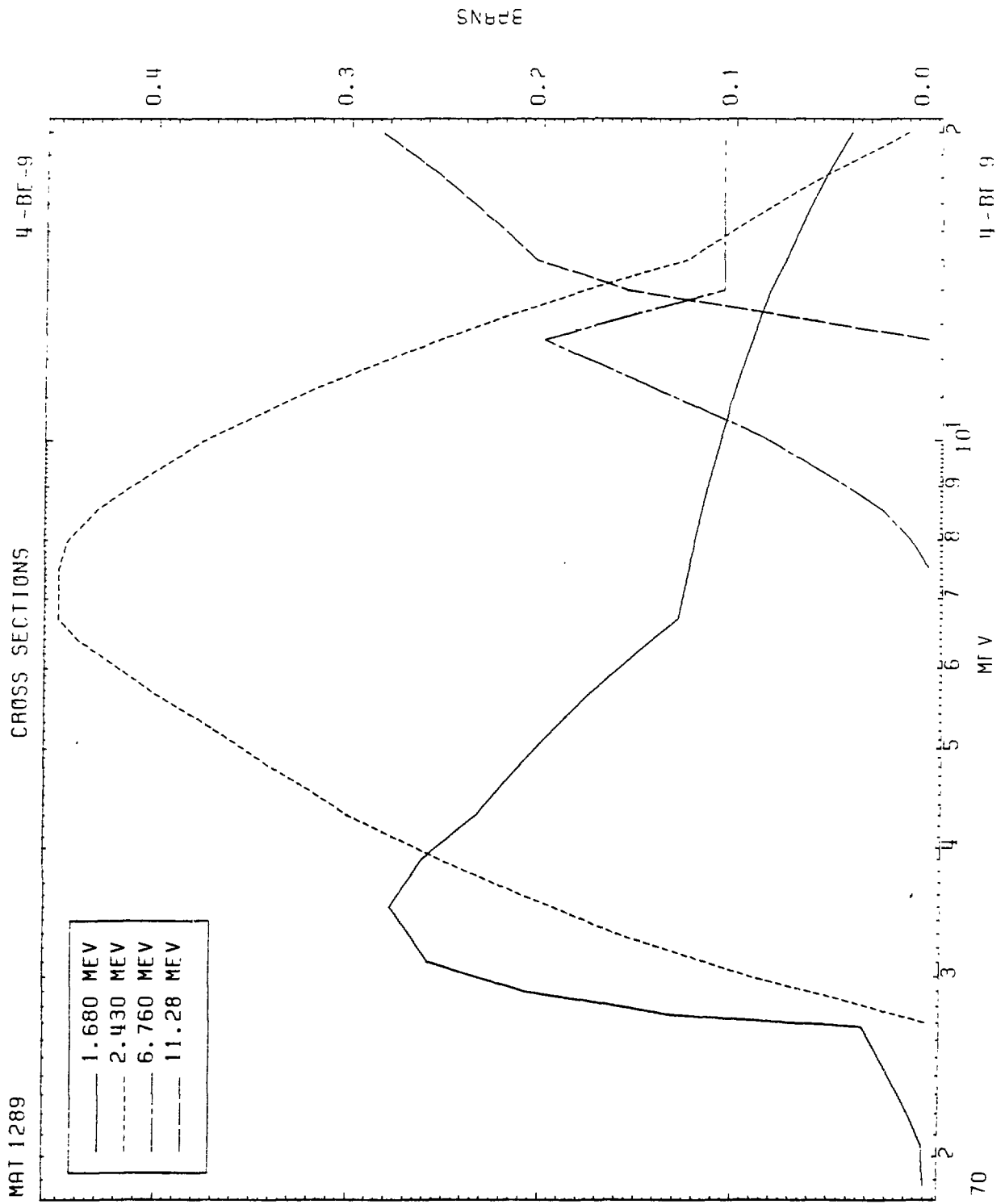


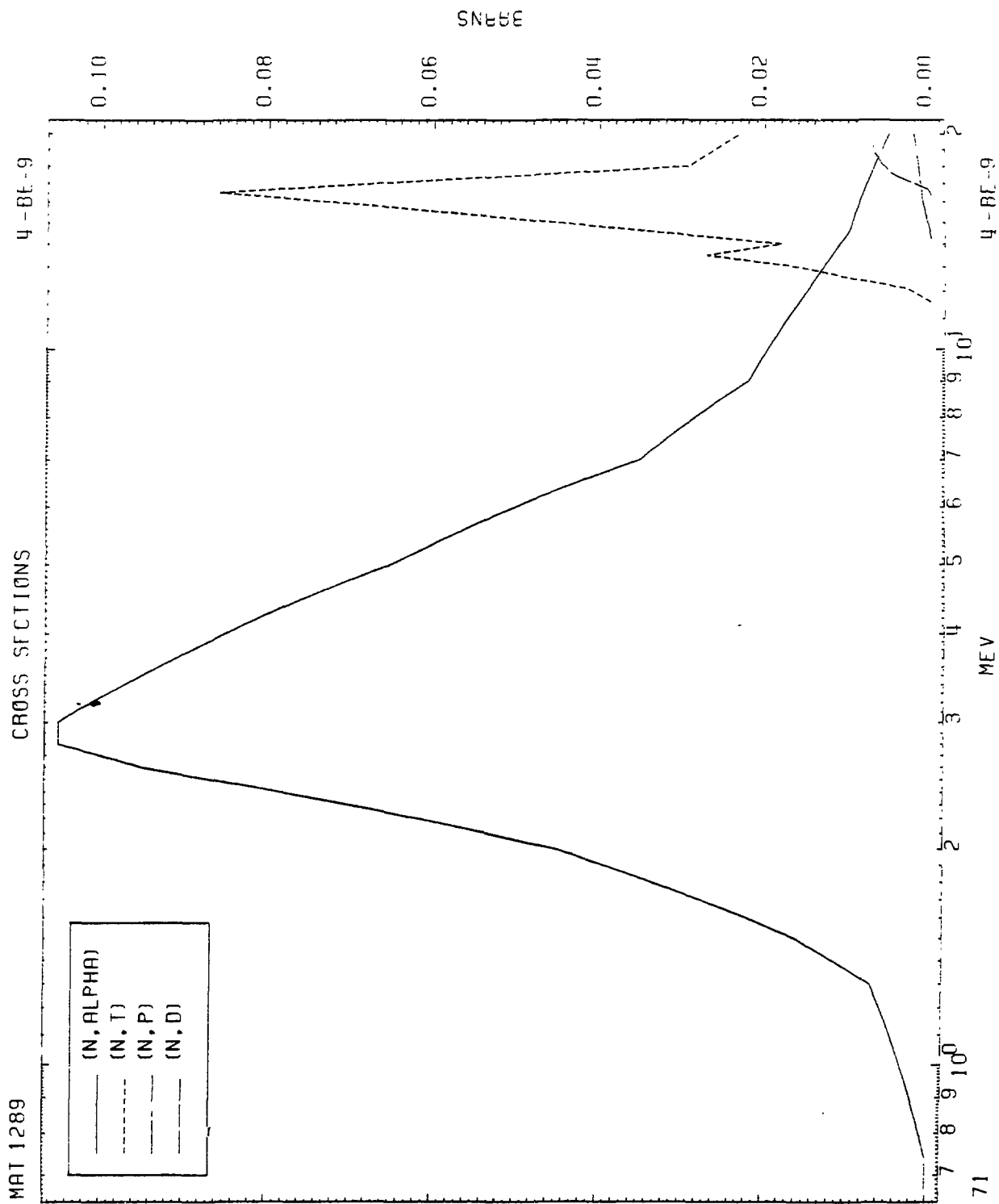


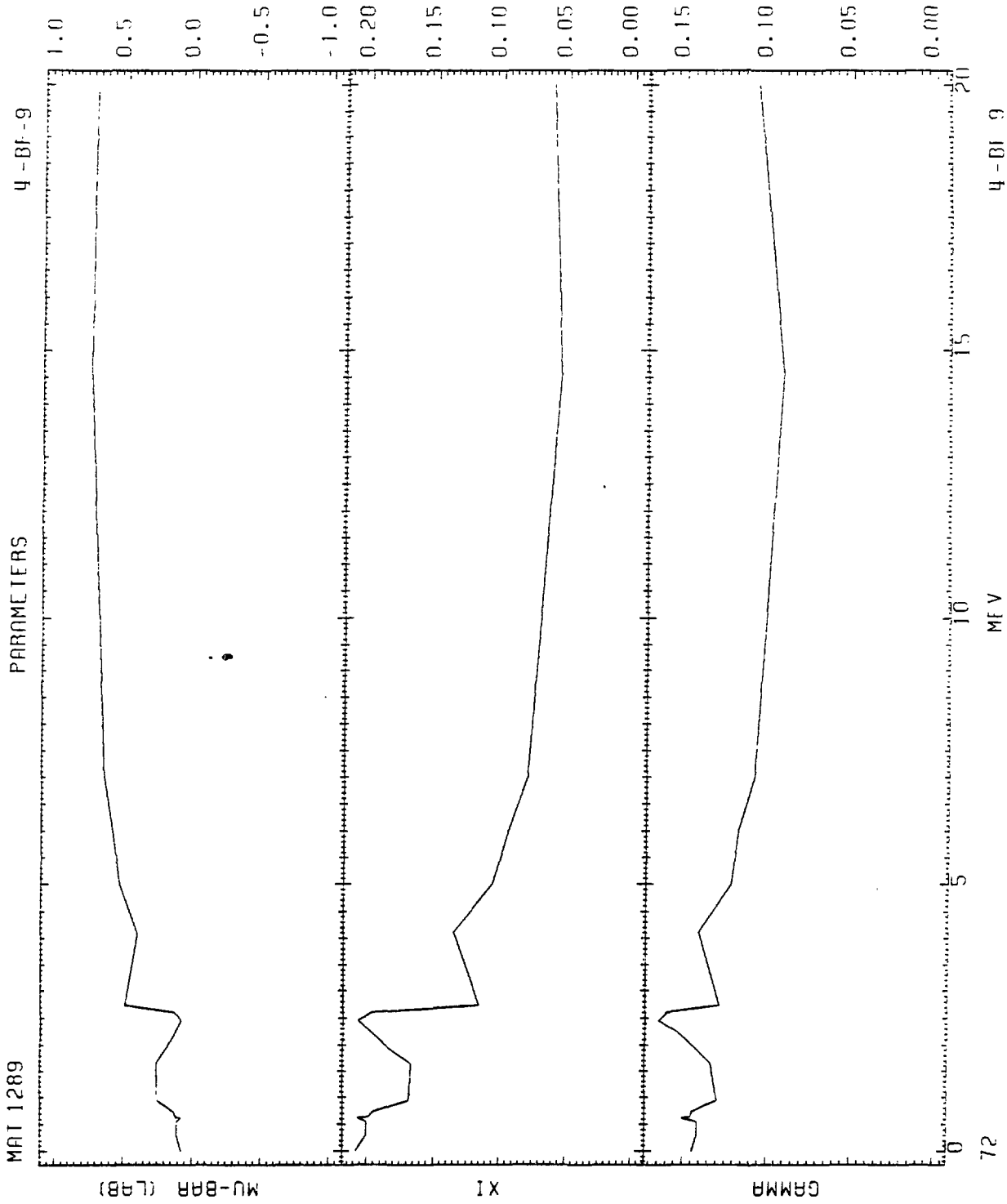


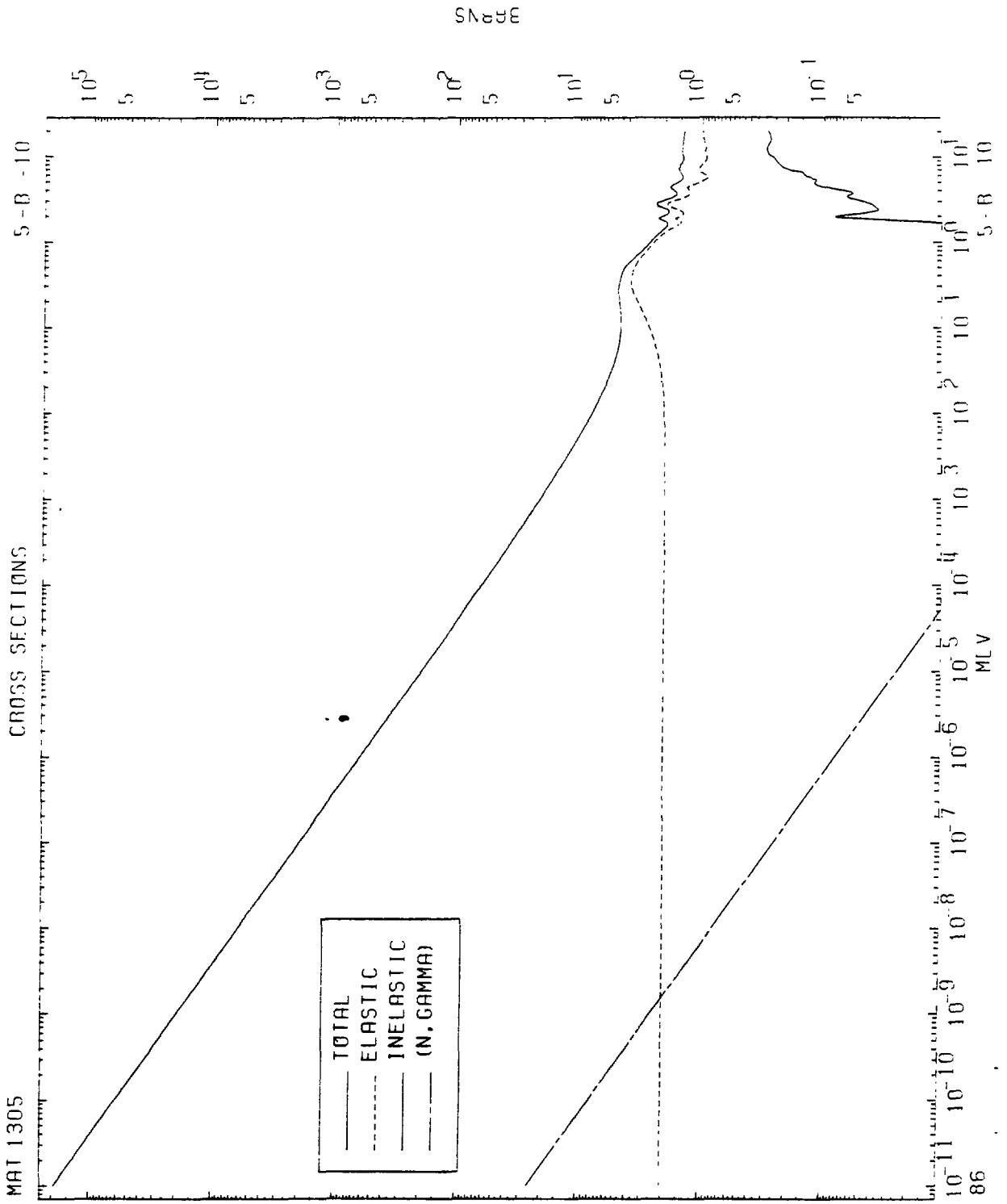


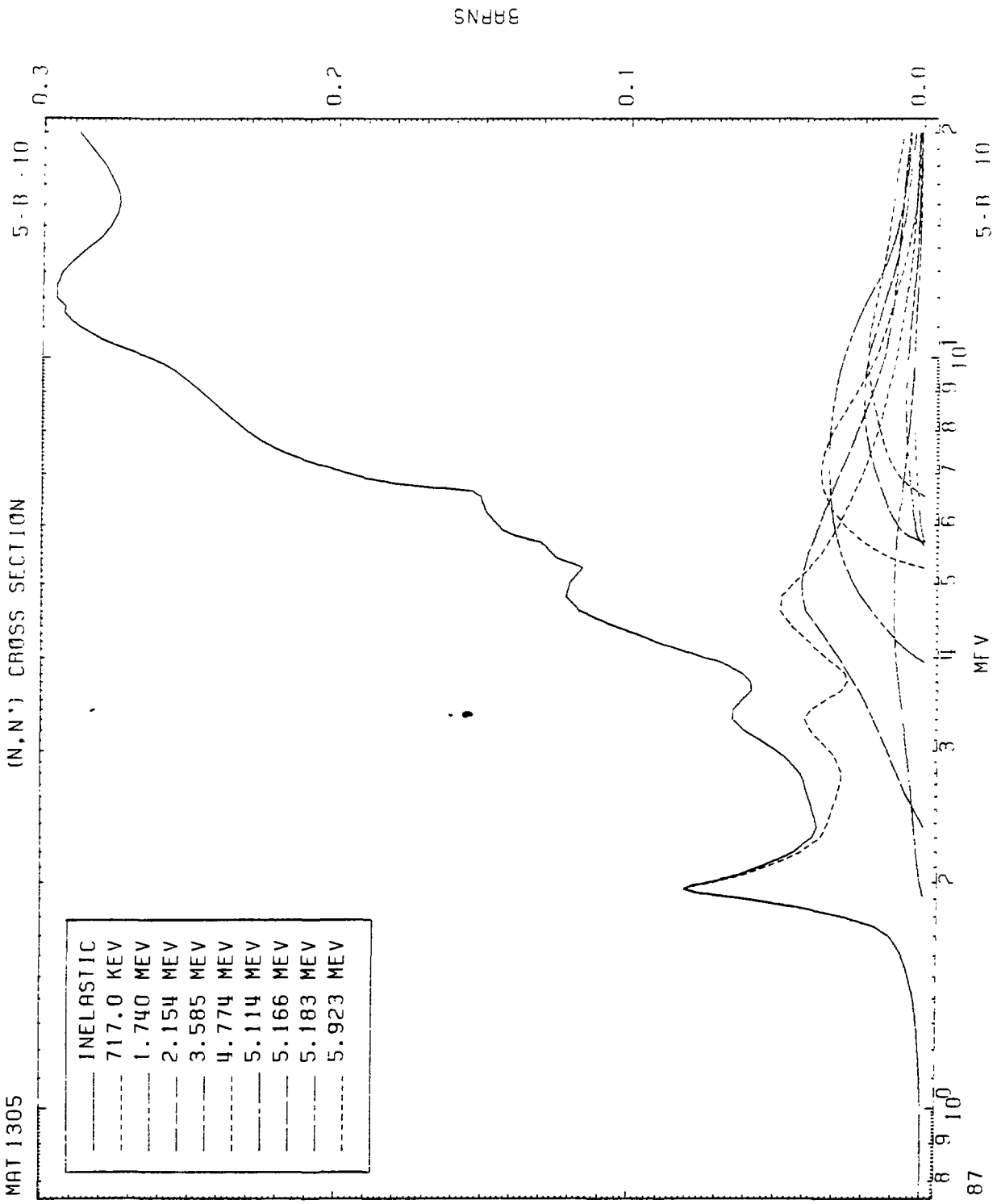










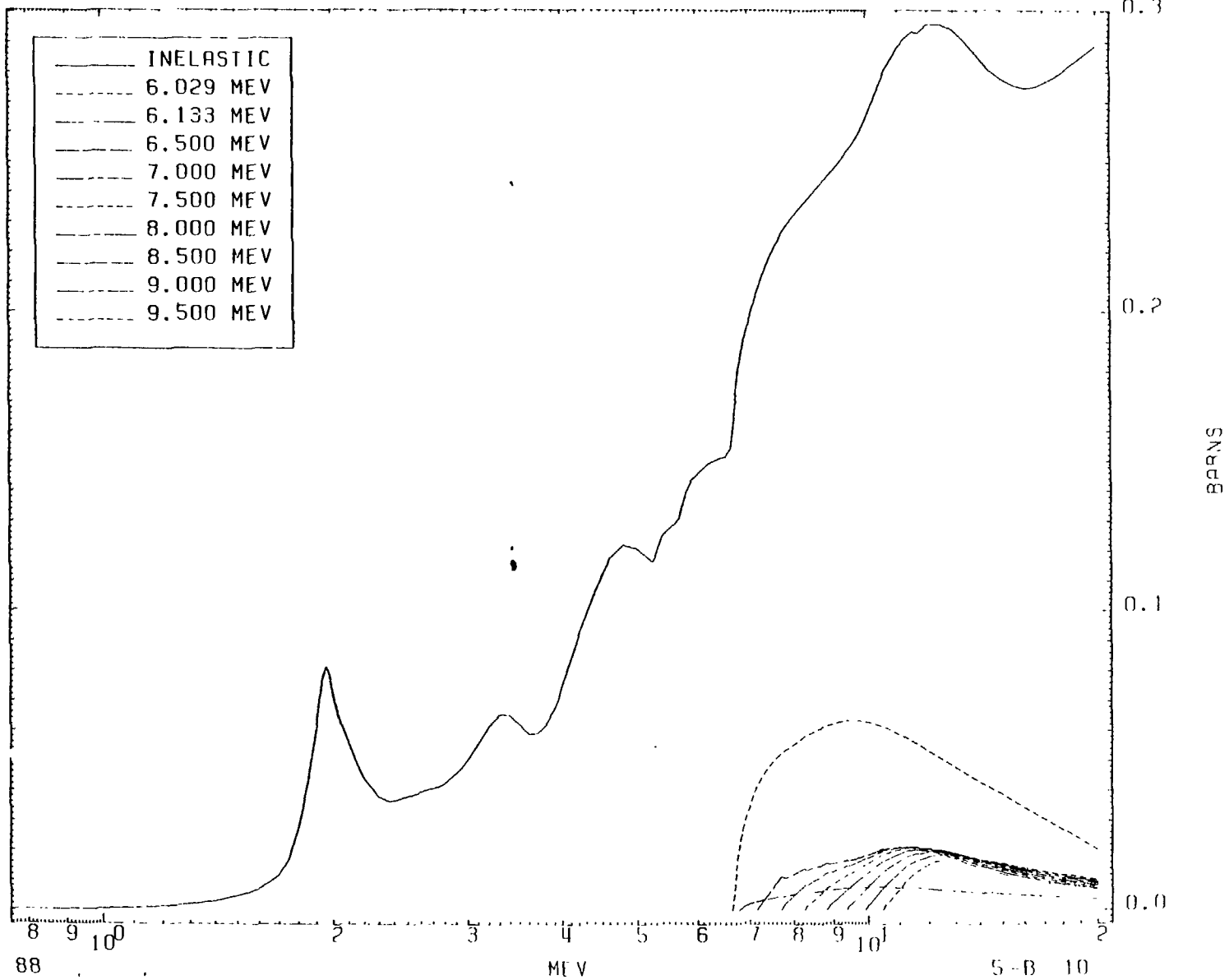


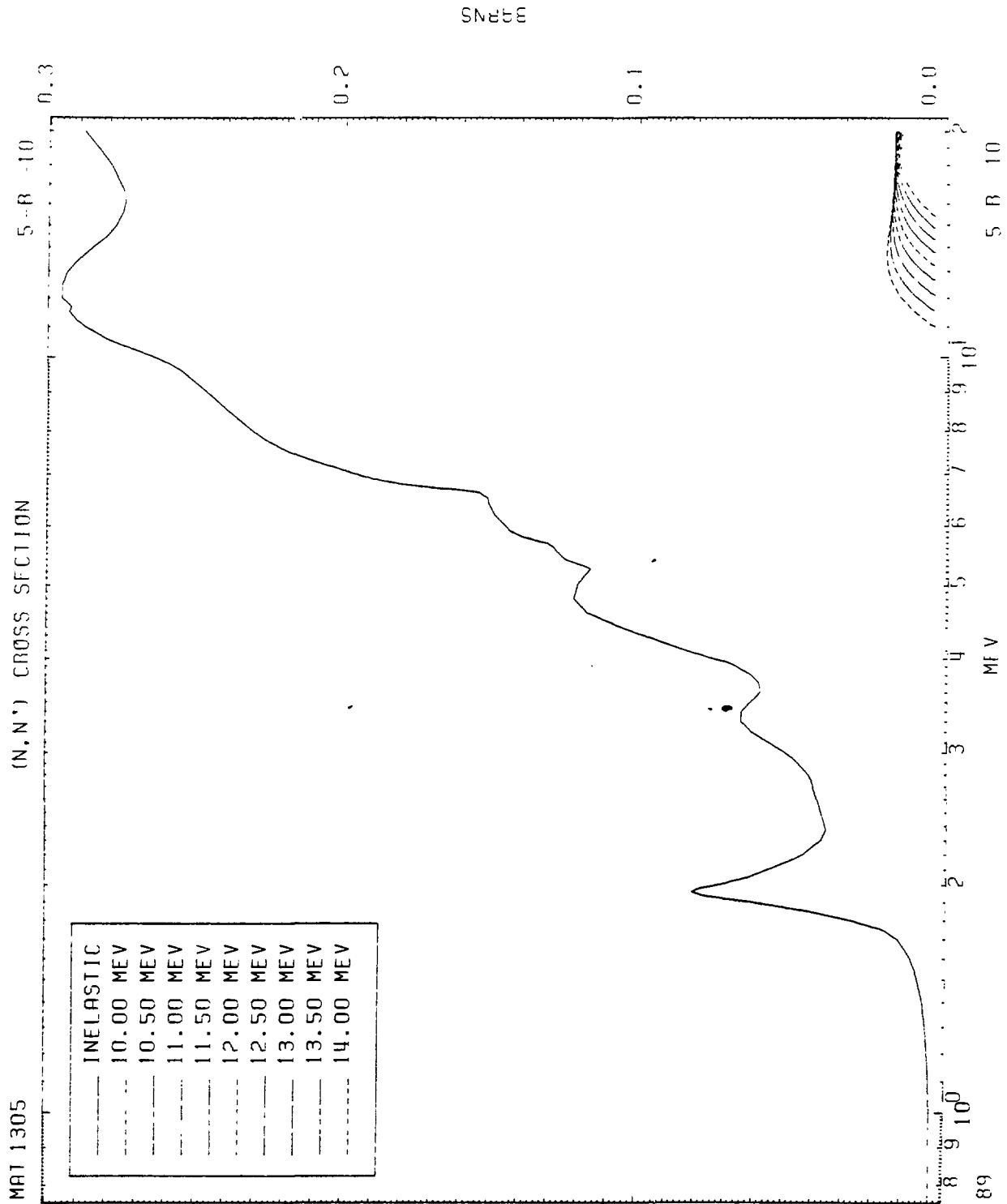


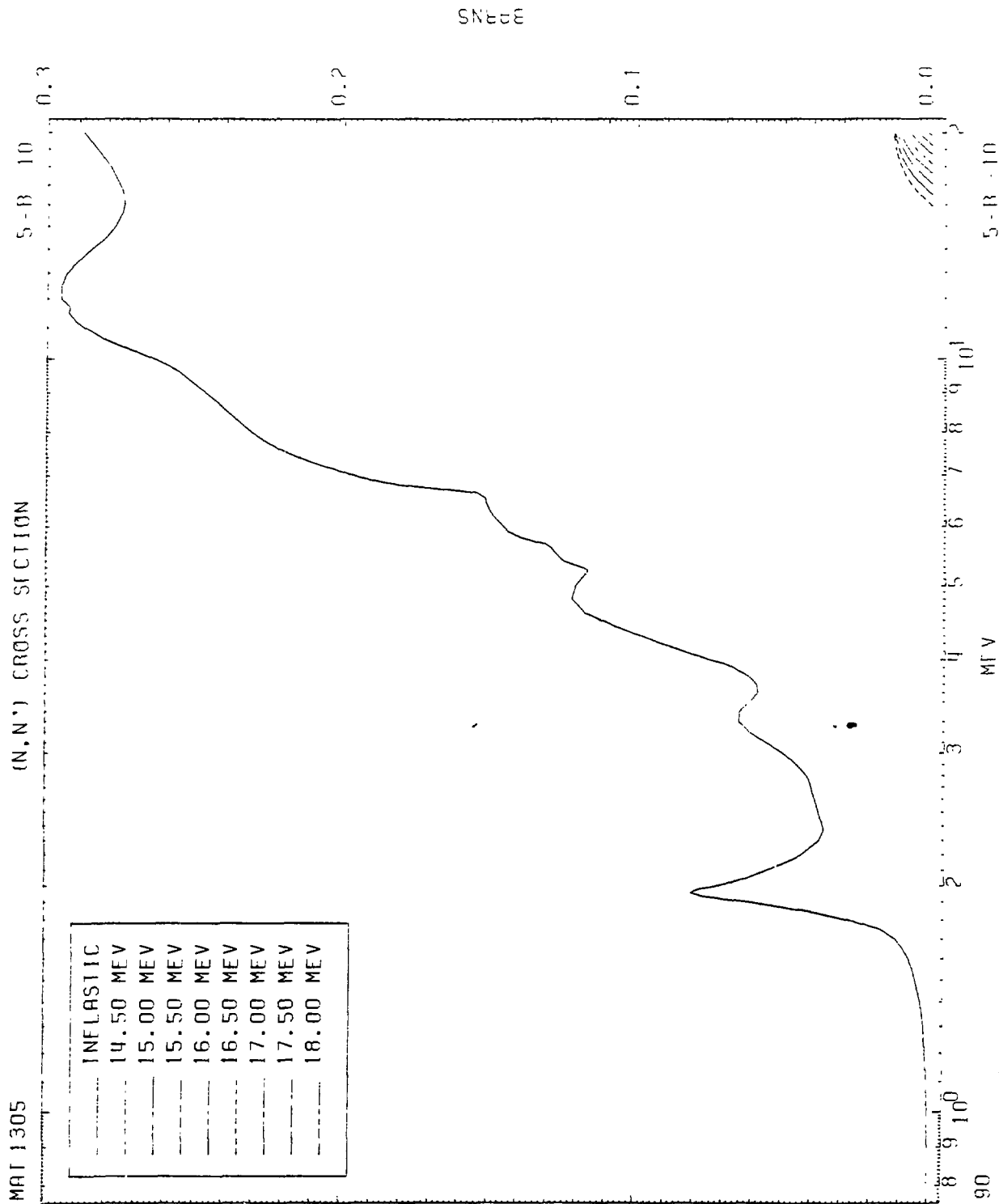
MAT 1305

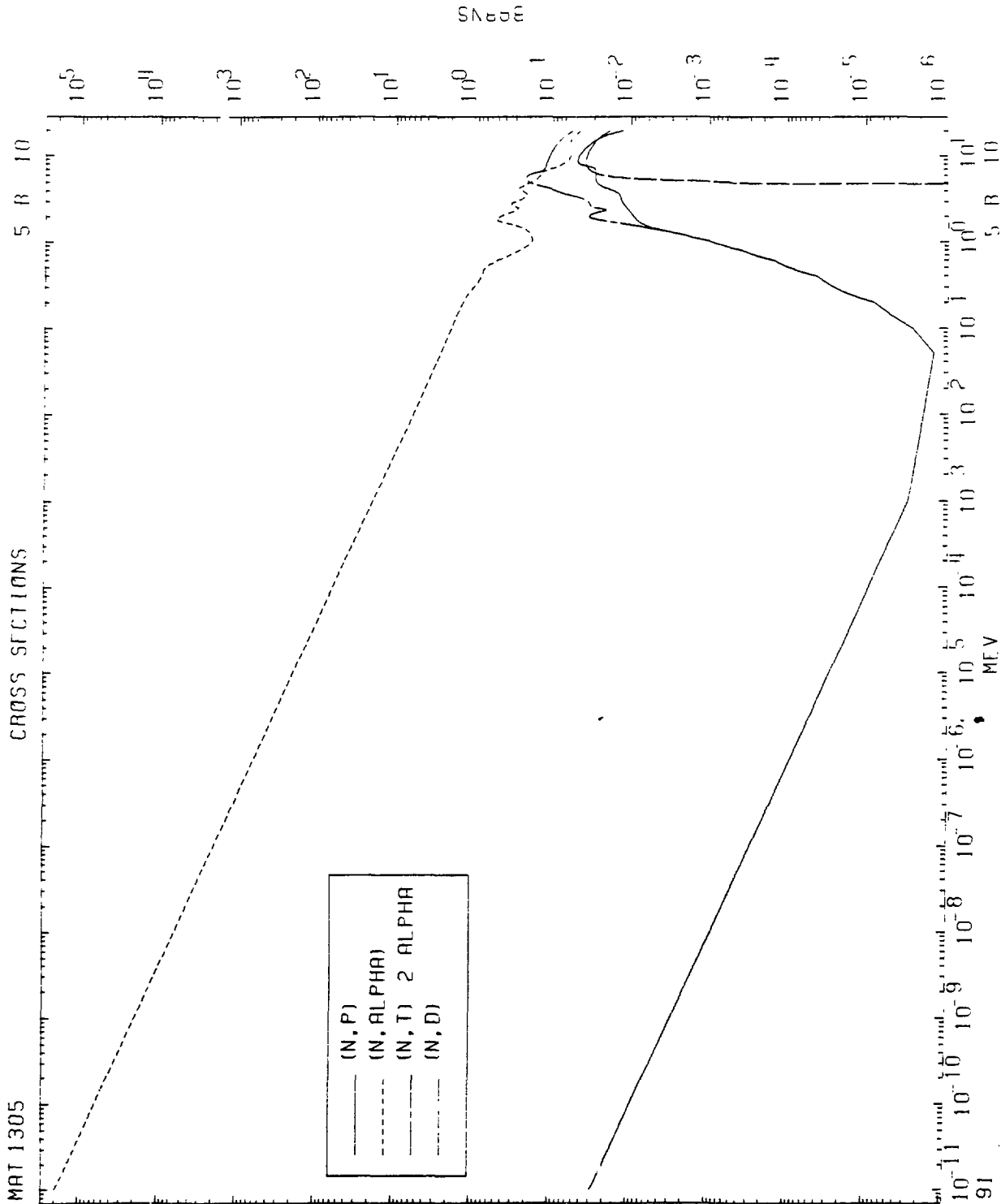
(N,N') CROSS SECTION

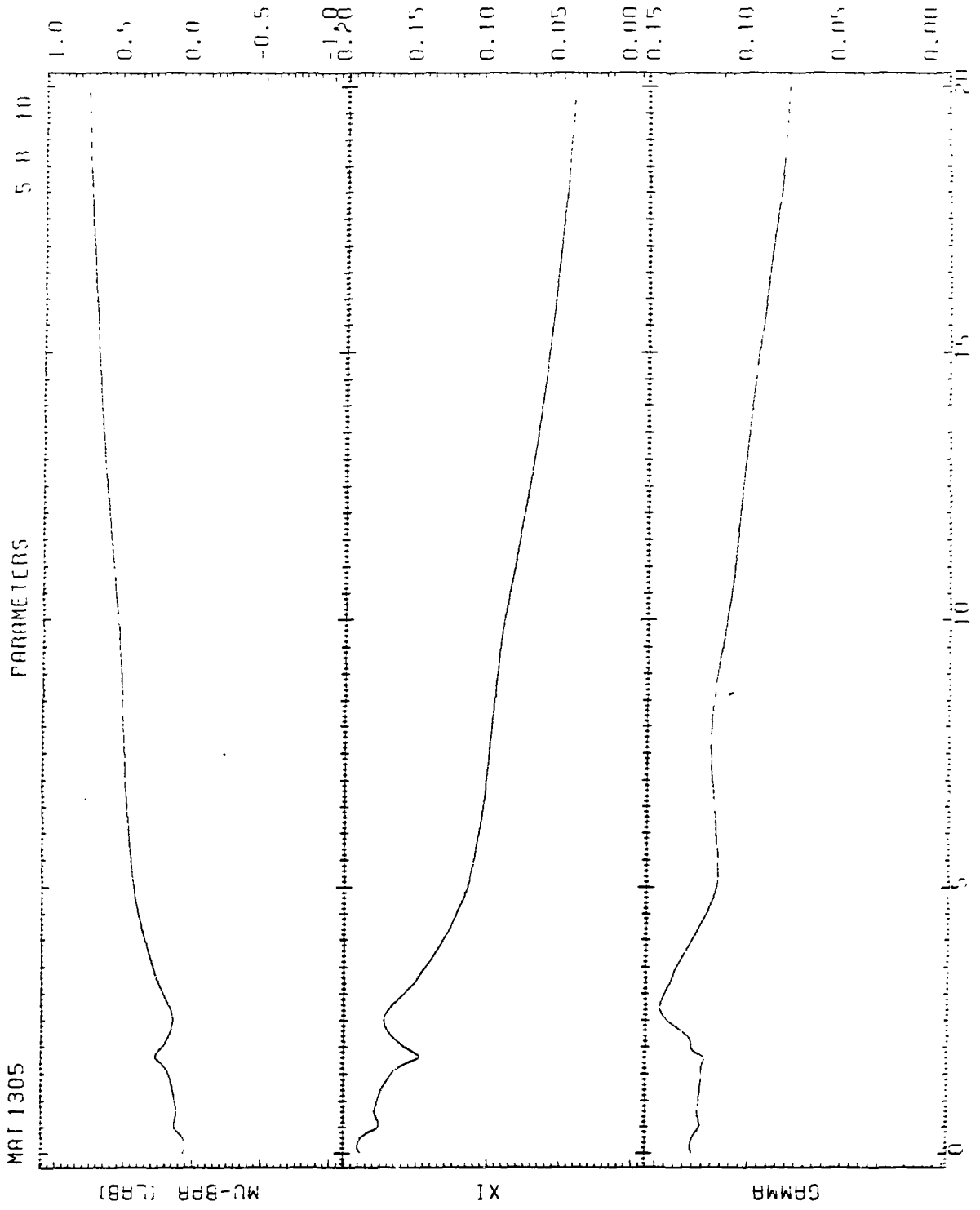
5-B 10











92

MI V

5

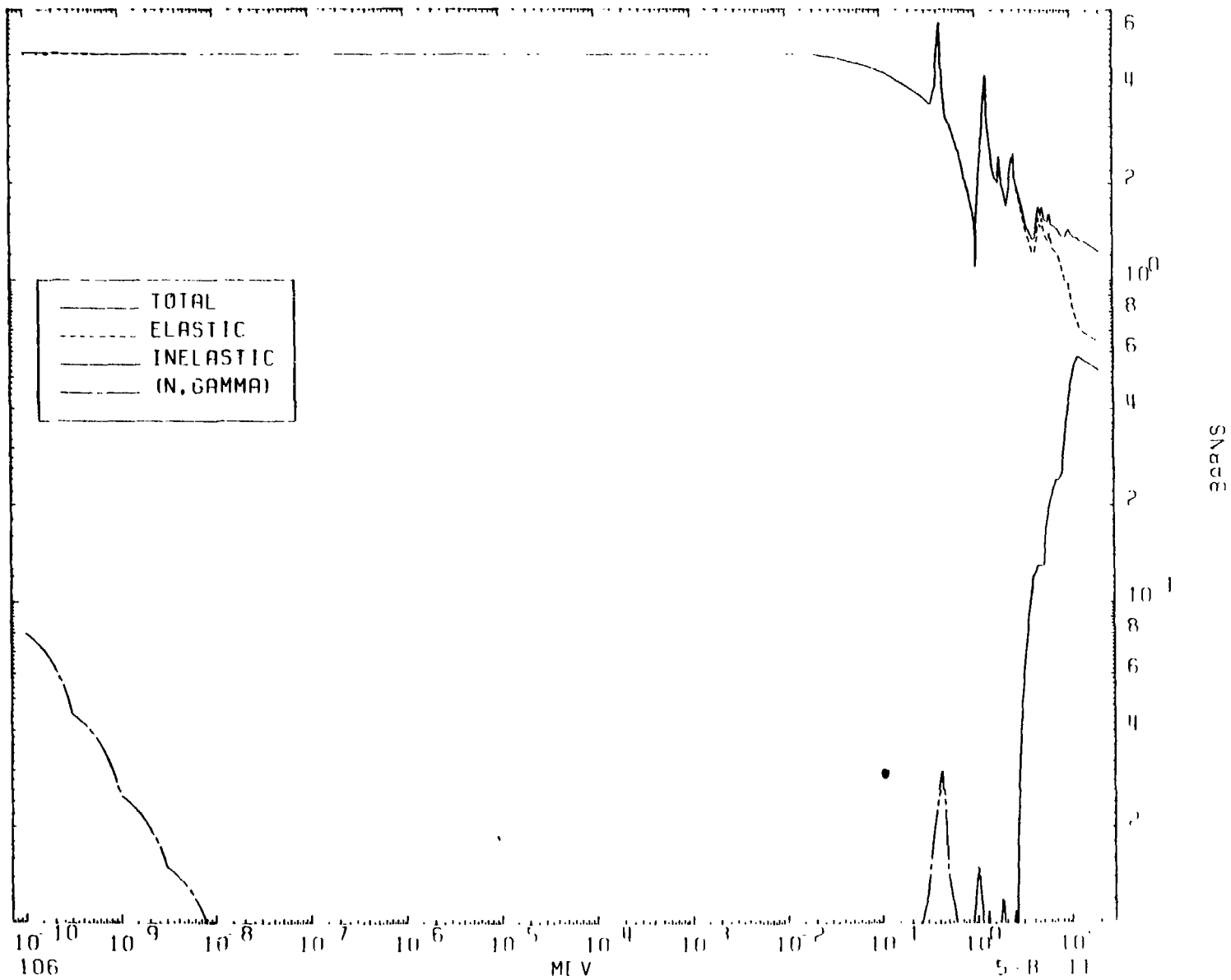
10

20

MAT 7811

CROSS SECTIONS

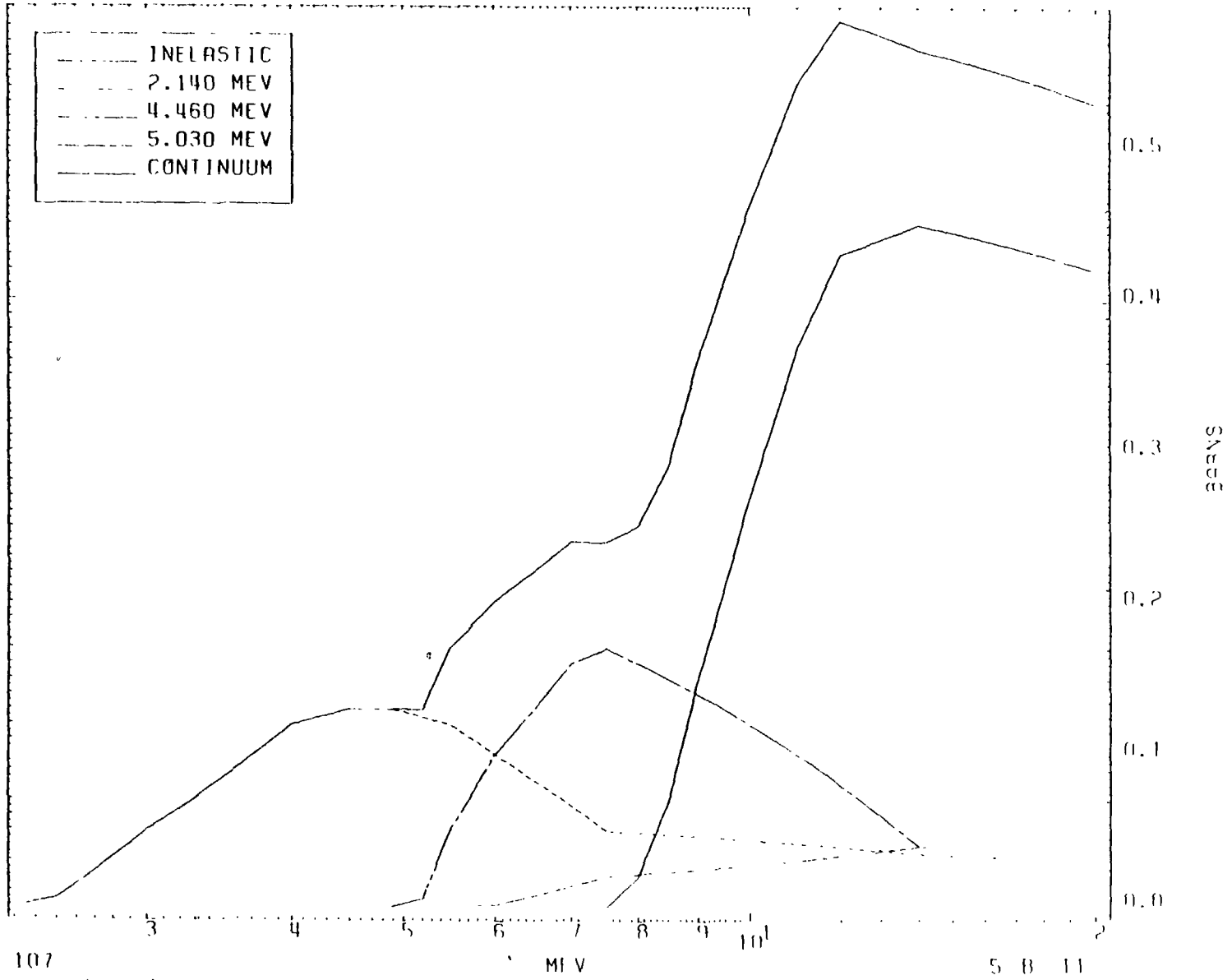
5-B 11

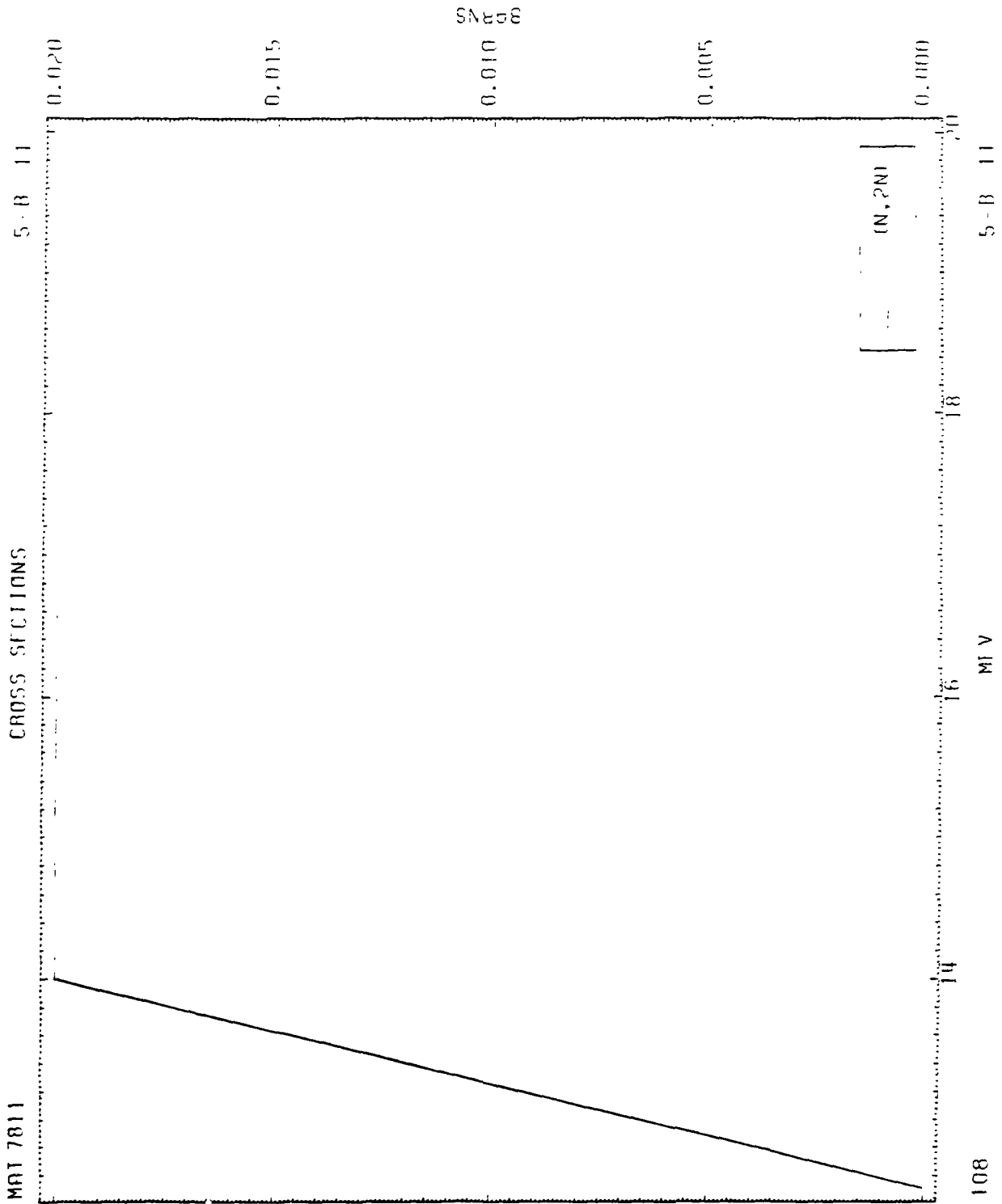


MAT 7811

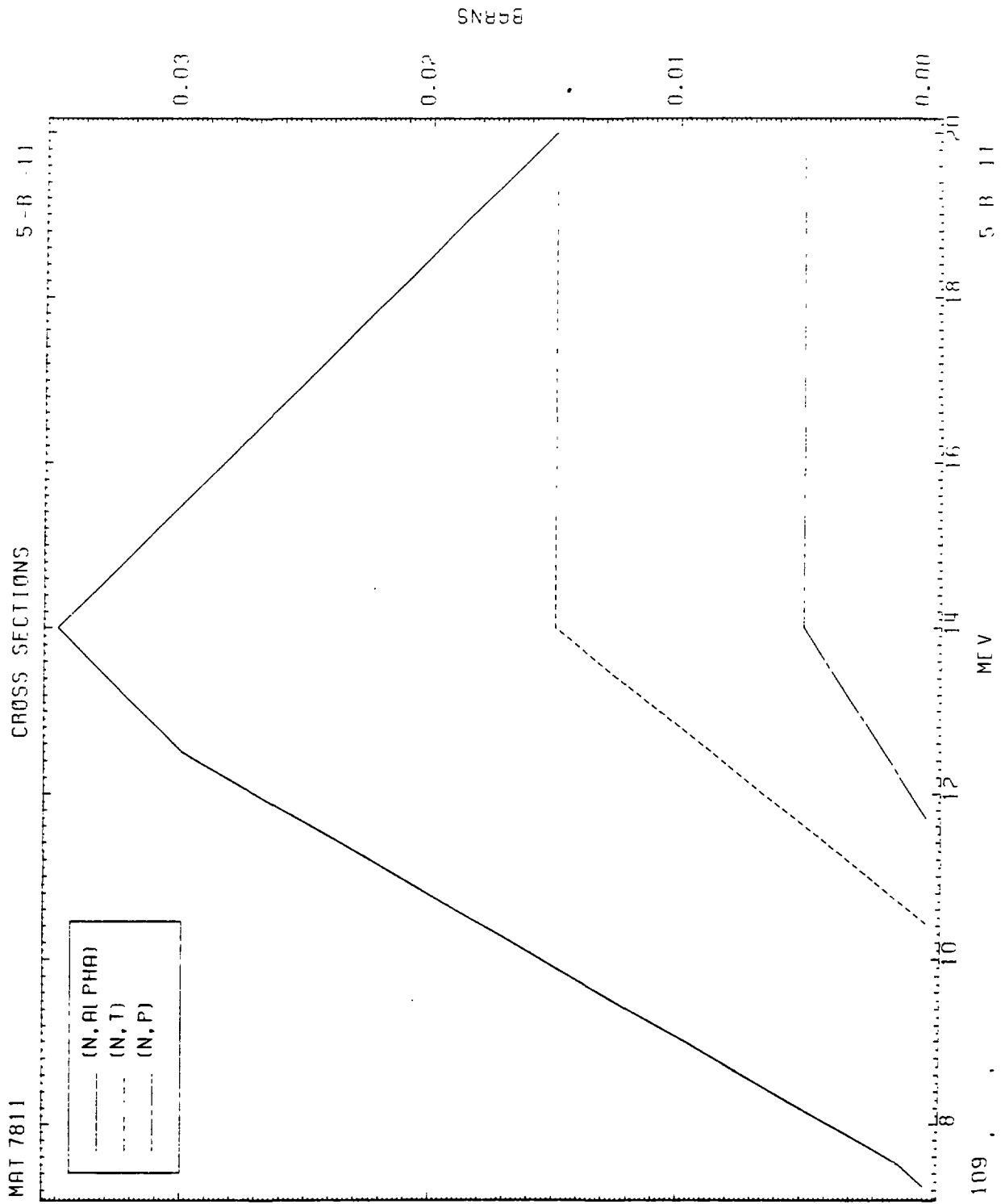
(N,N') CROSS SECTION

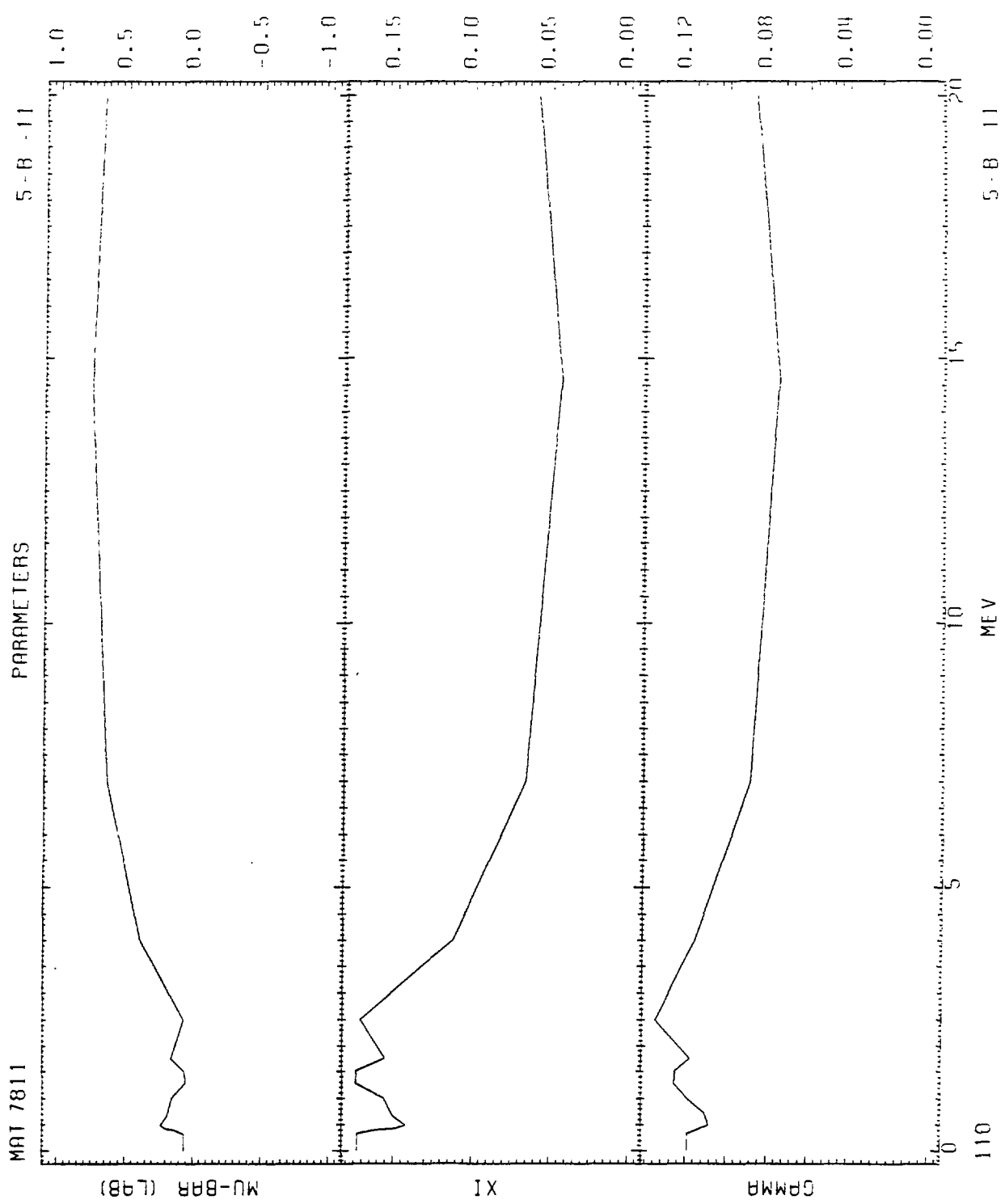
5-B 11

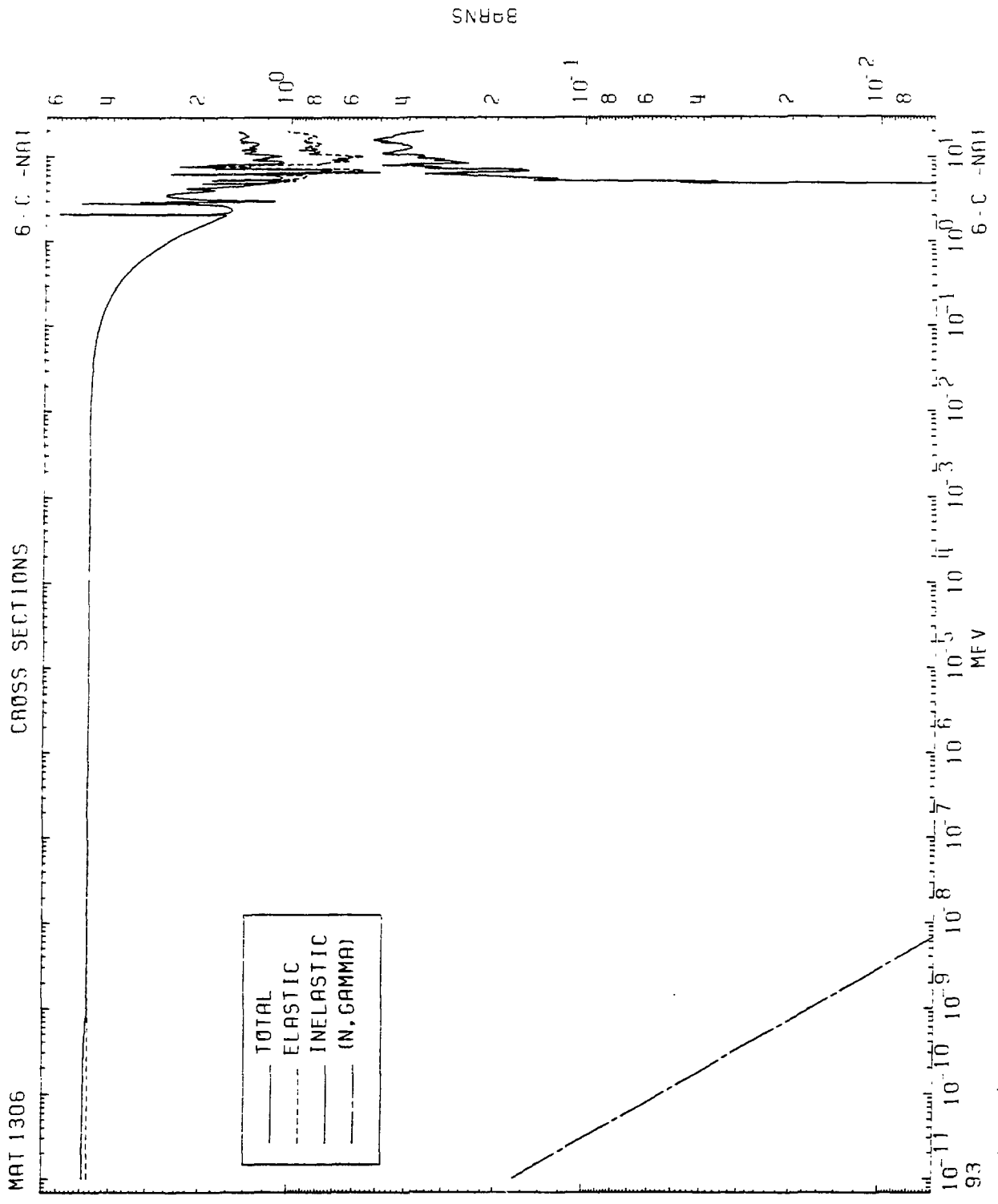


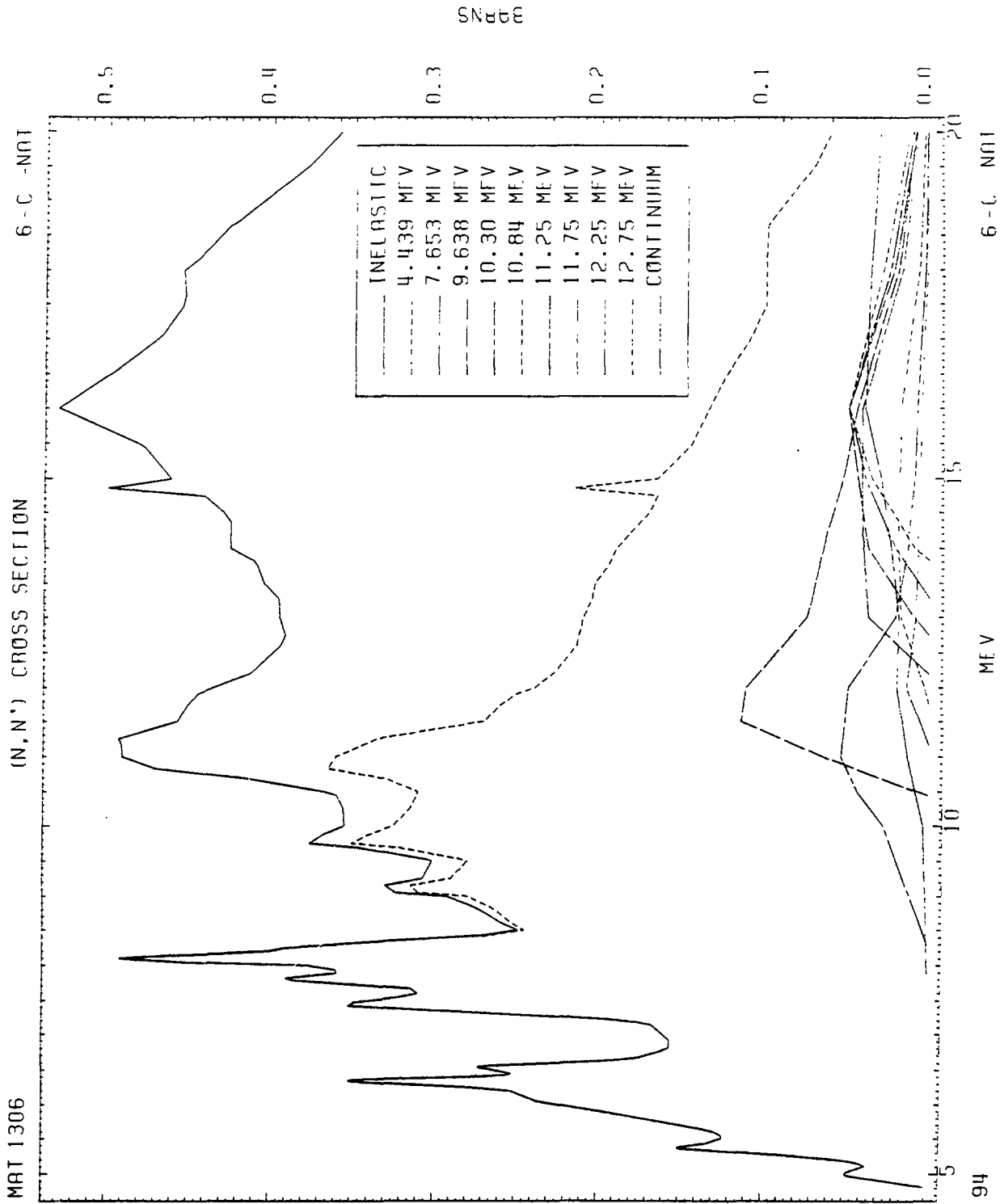


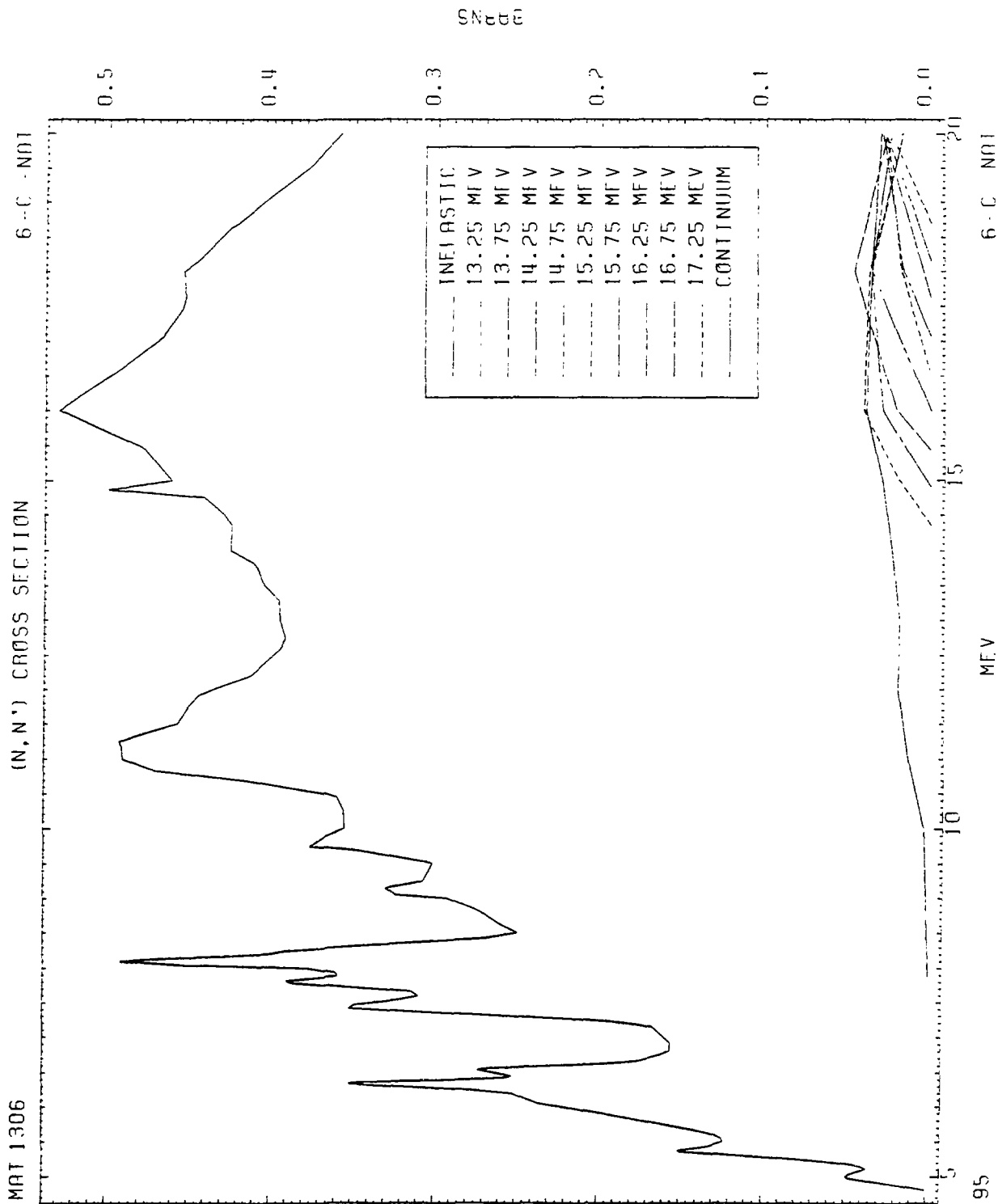








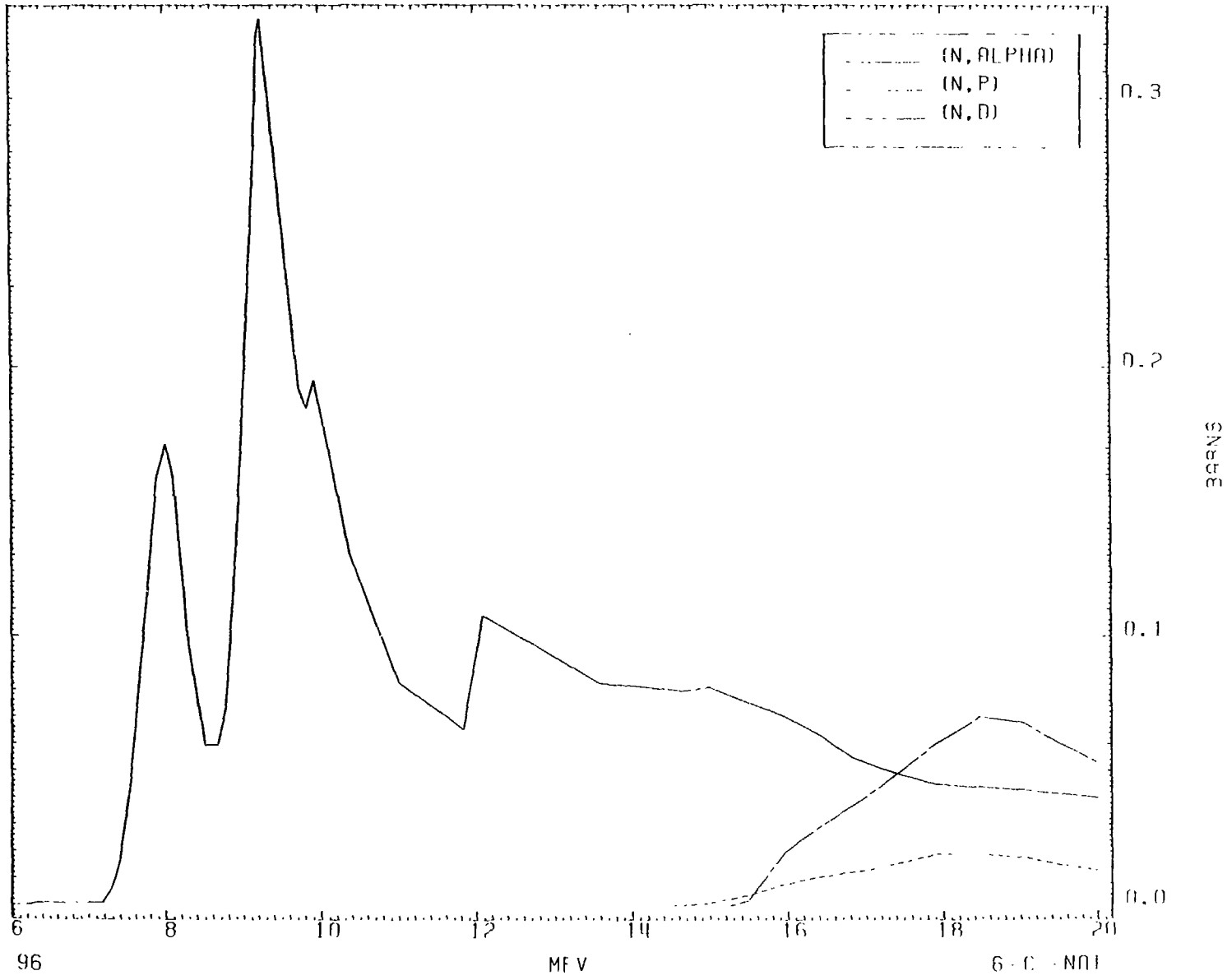




MAT 1306

CROSS SECTIONS

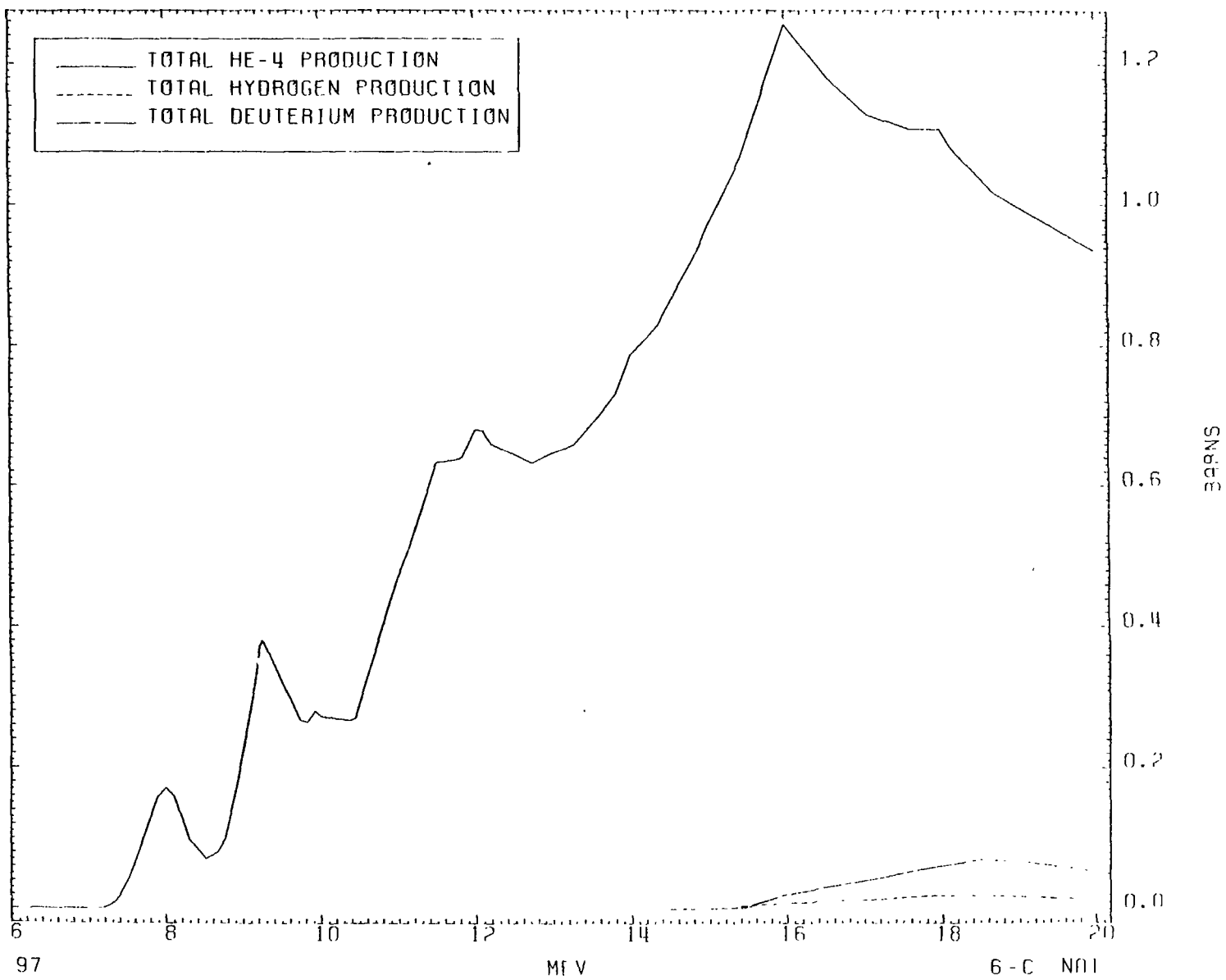
6-C -NAT

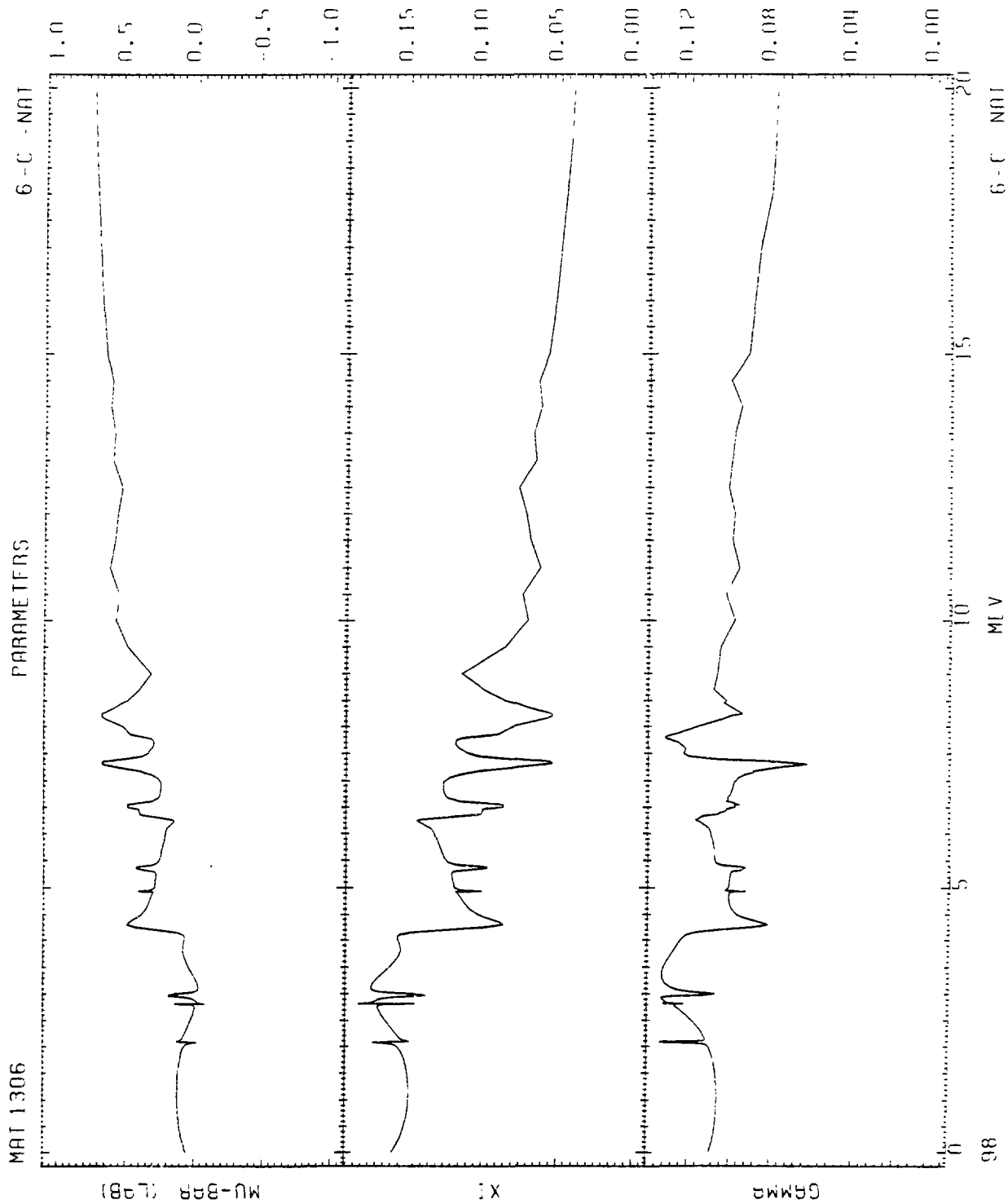


MAT 1306

CROSS SECTIONS

6-C -NAT



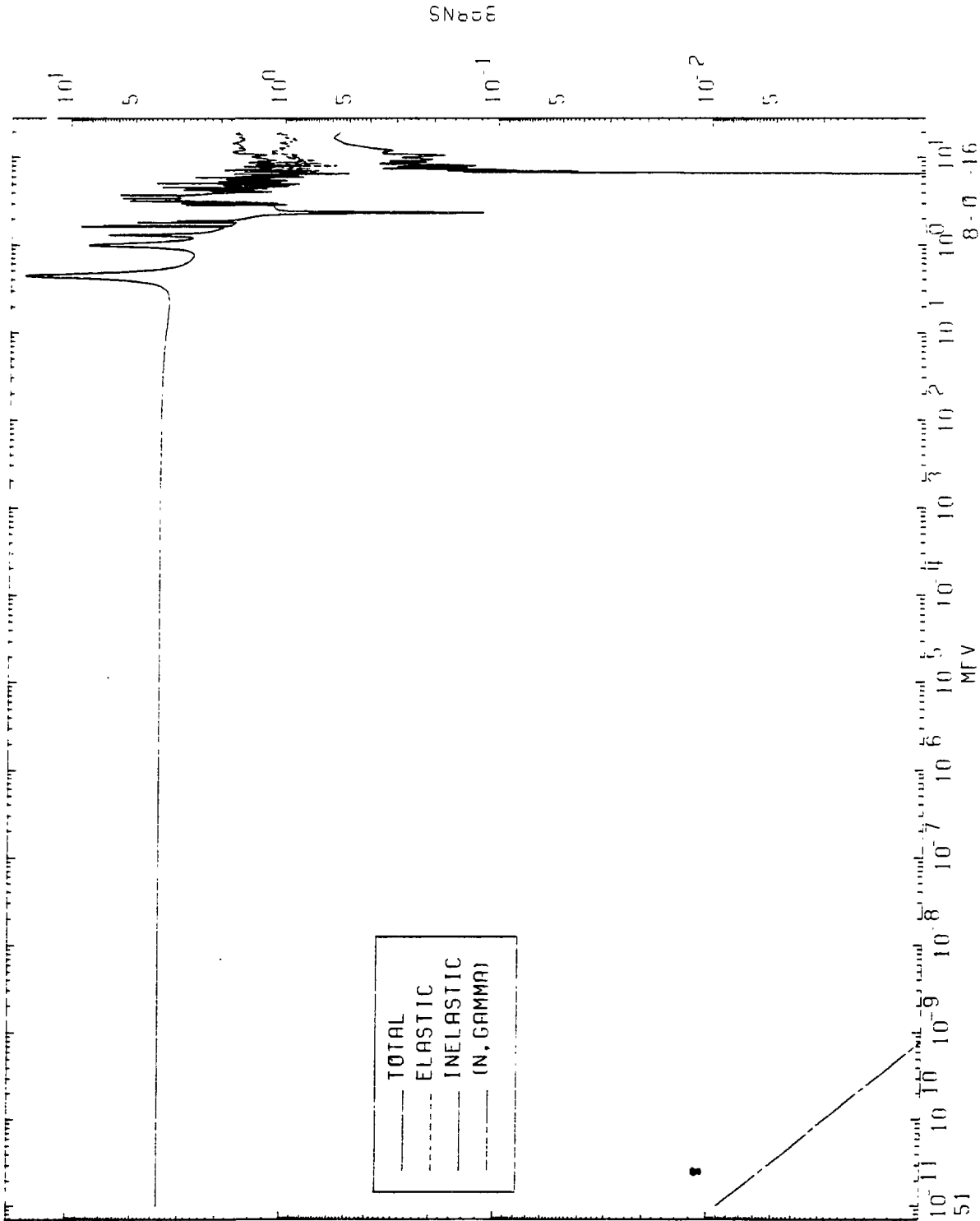




MPI 1276

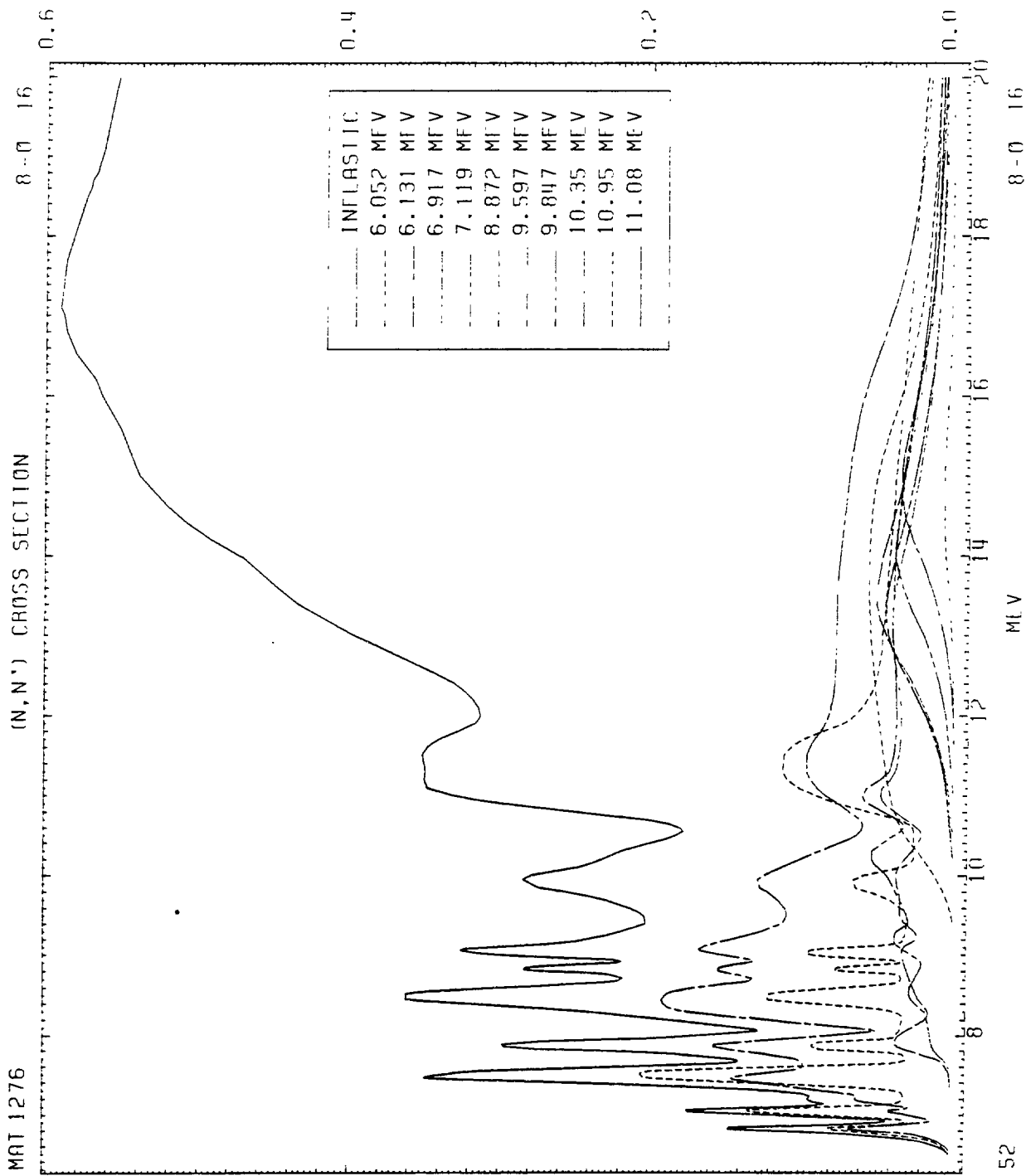
CROSS SECTIONS

8-0-16



MAT 1276

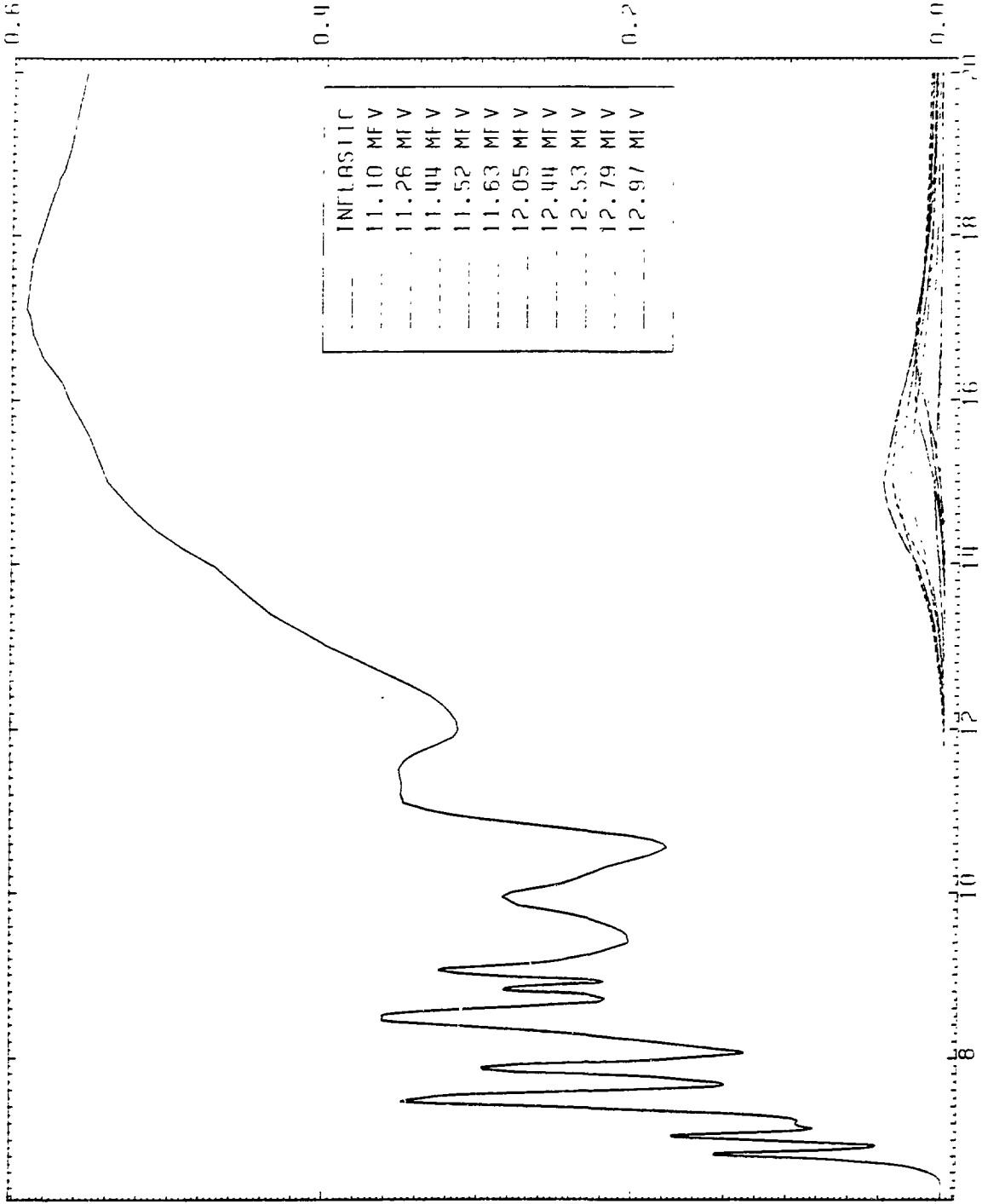
(N,N') CROSS SECTION



MAT 1276

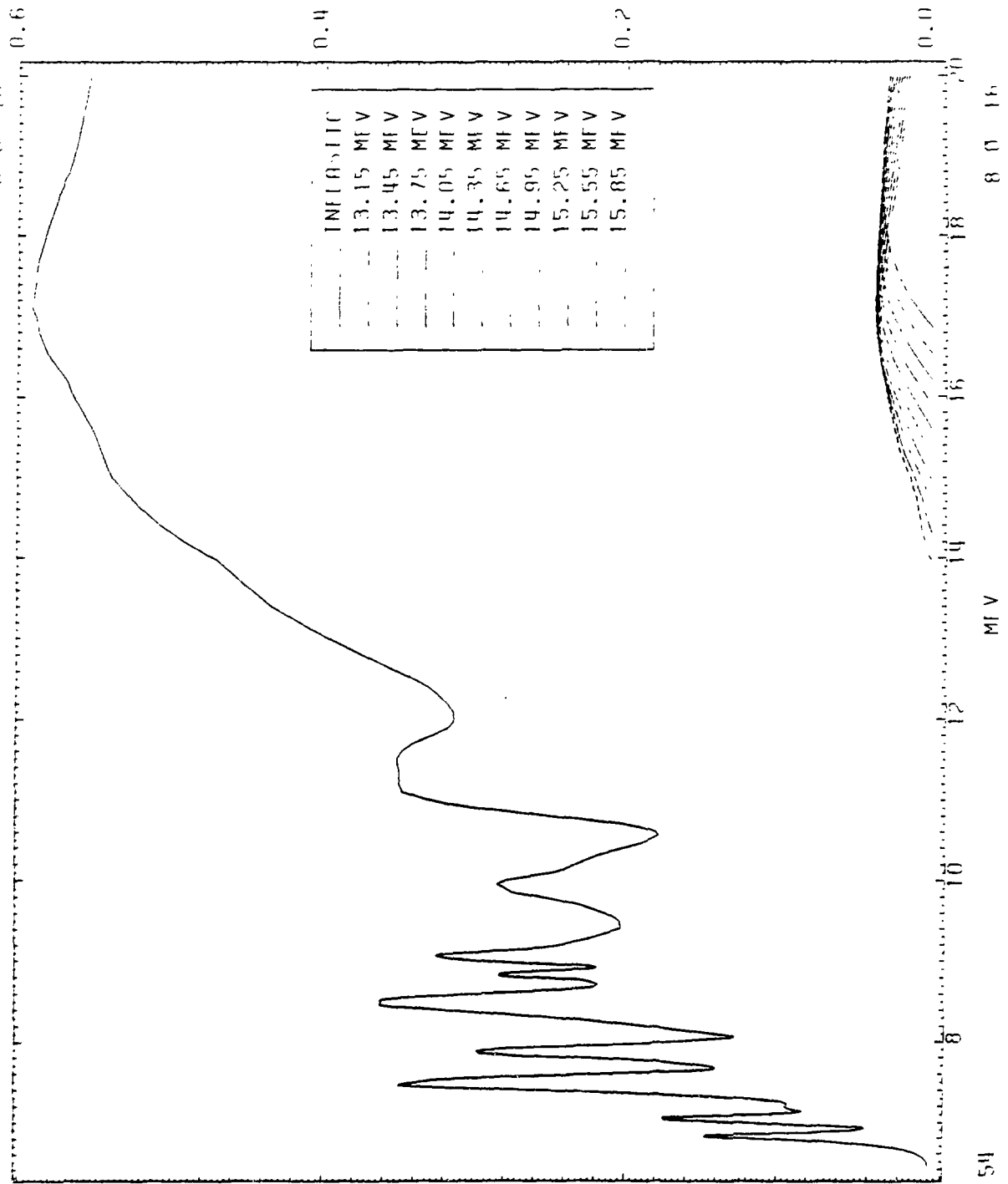
(N,N') CROSS SECTION

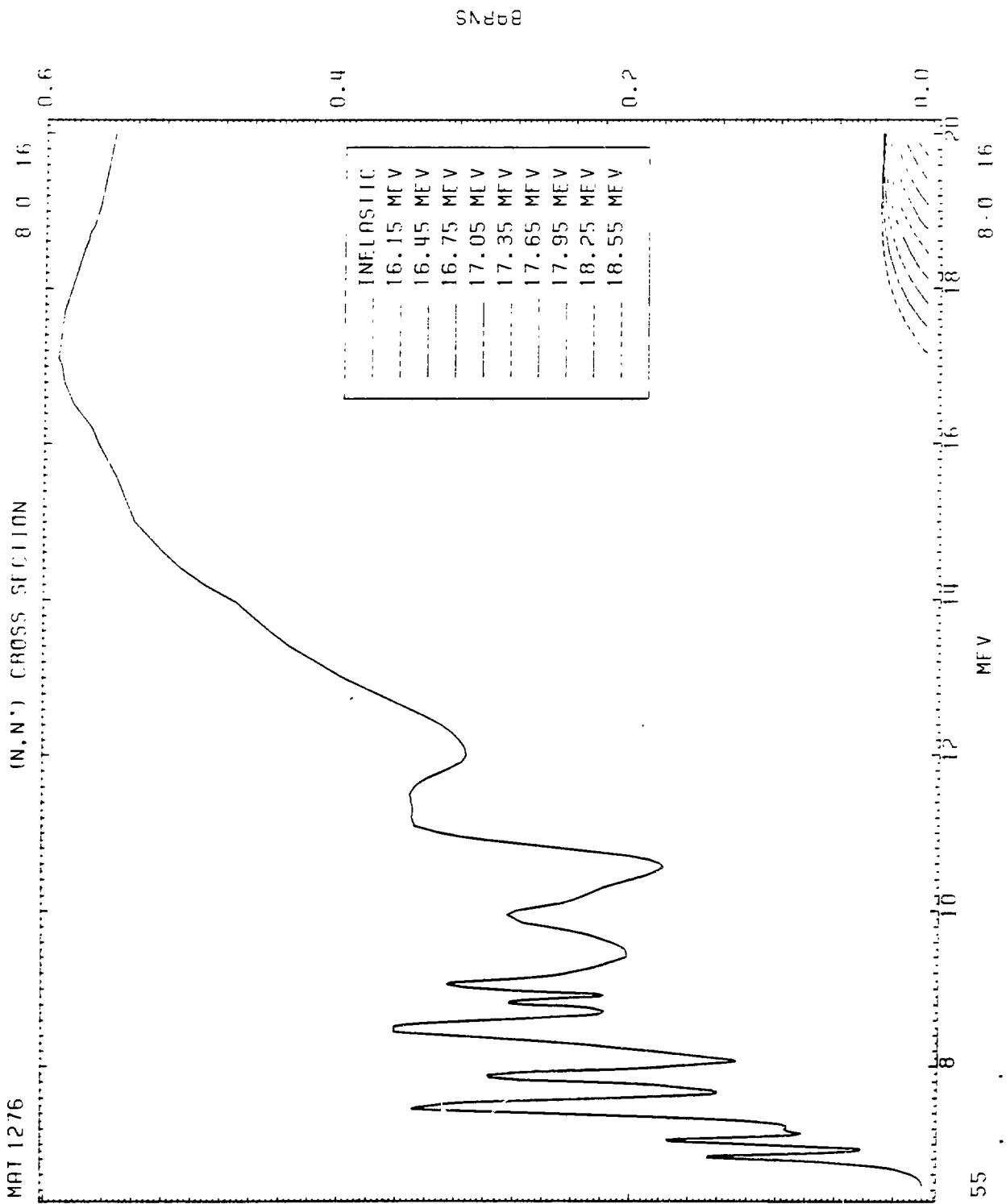
8 0 16



MDI 1276

(N.N.) CROSS SECTION

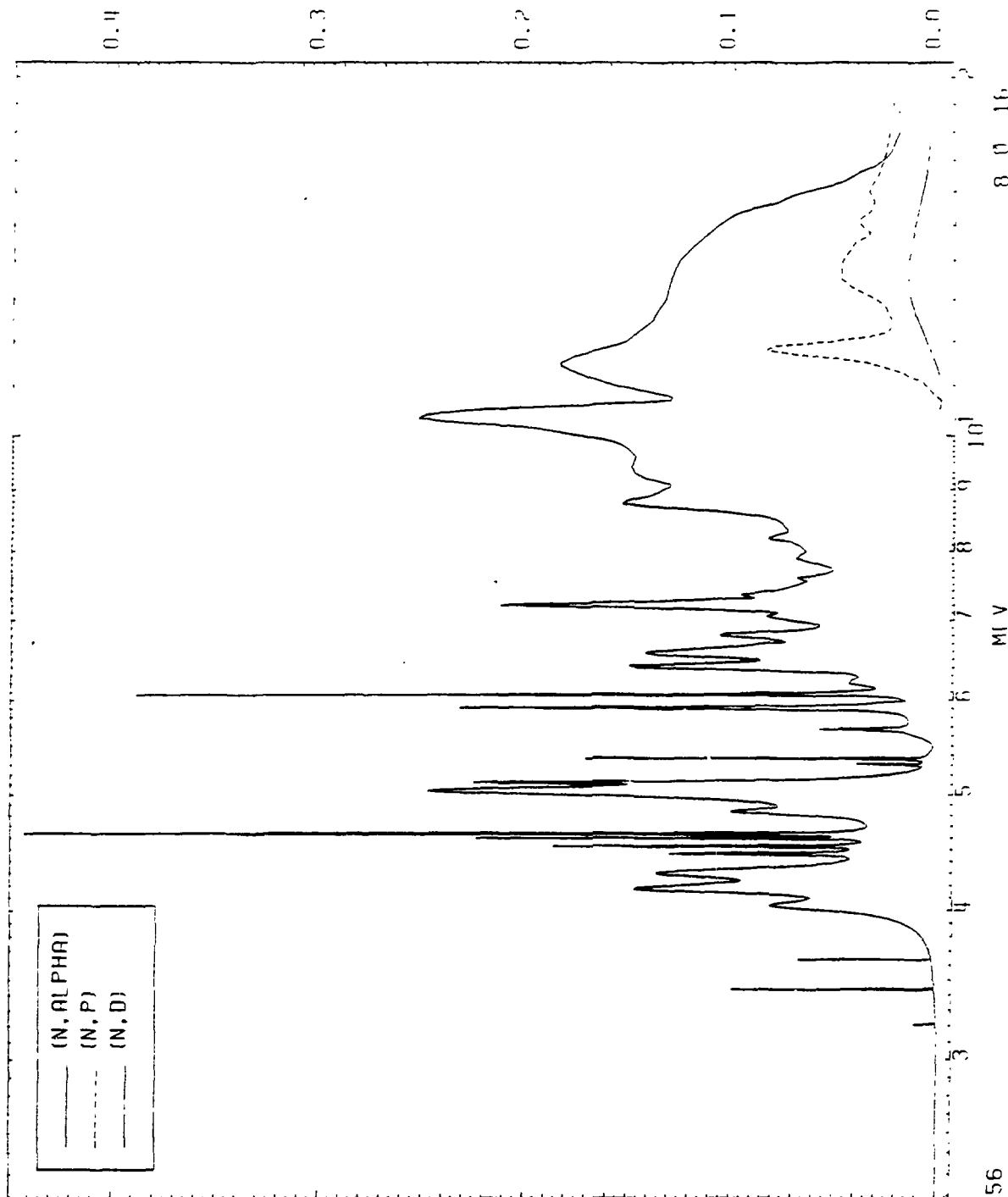
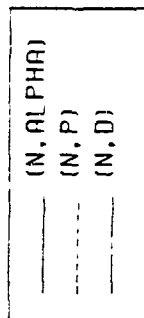




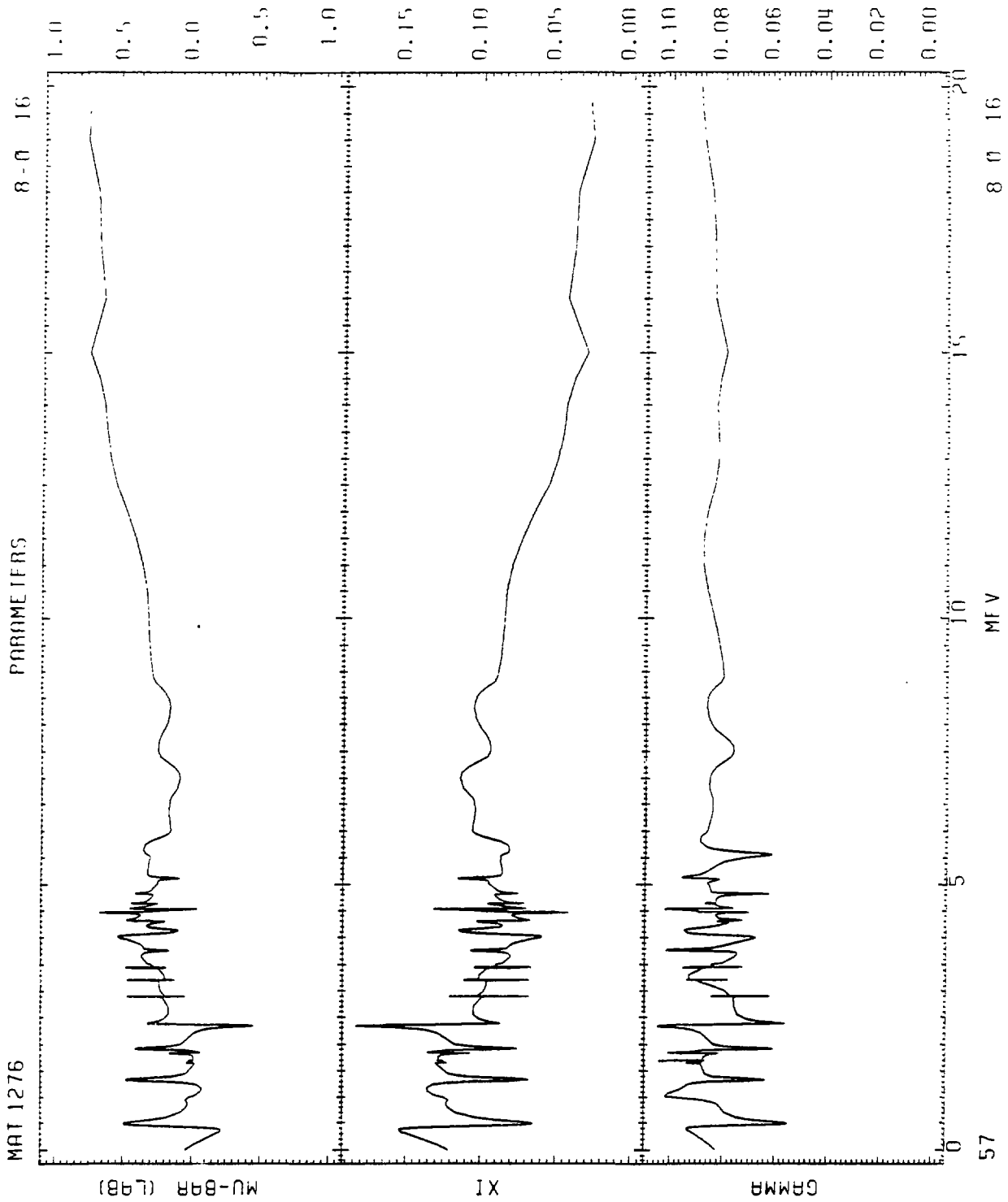
MAT 1276

CROSS SECTIONS

8 0 16



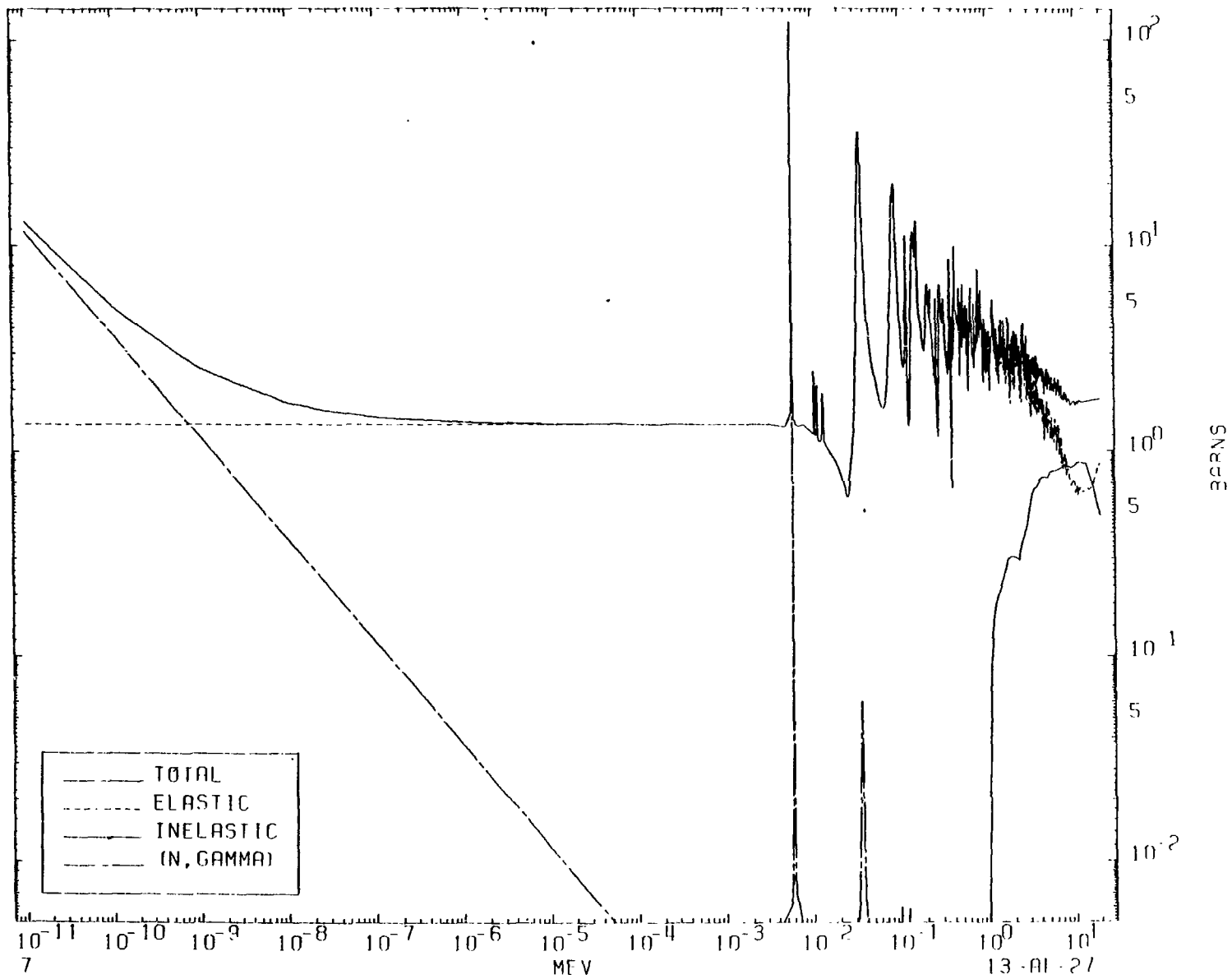
56



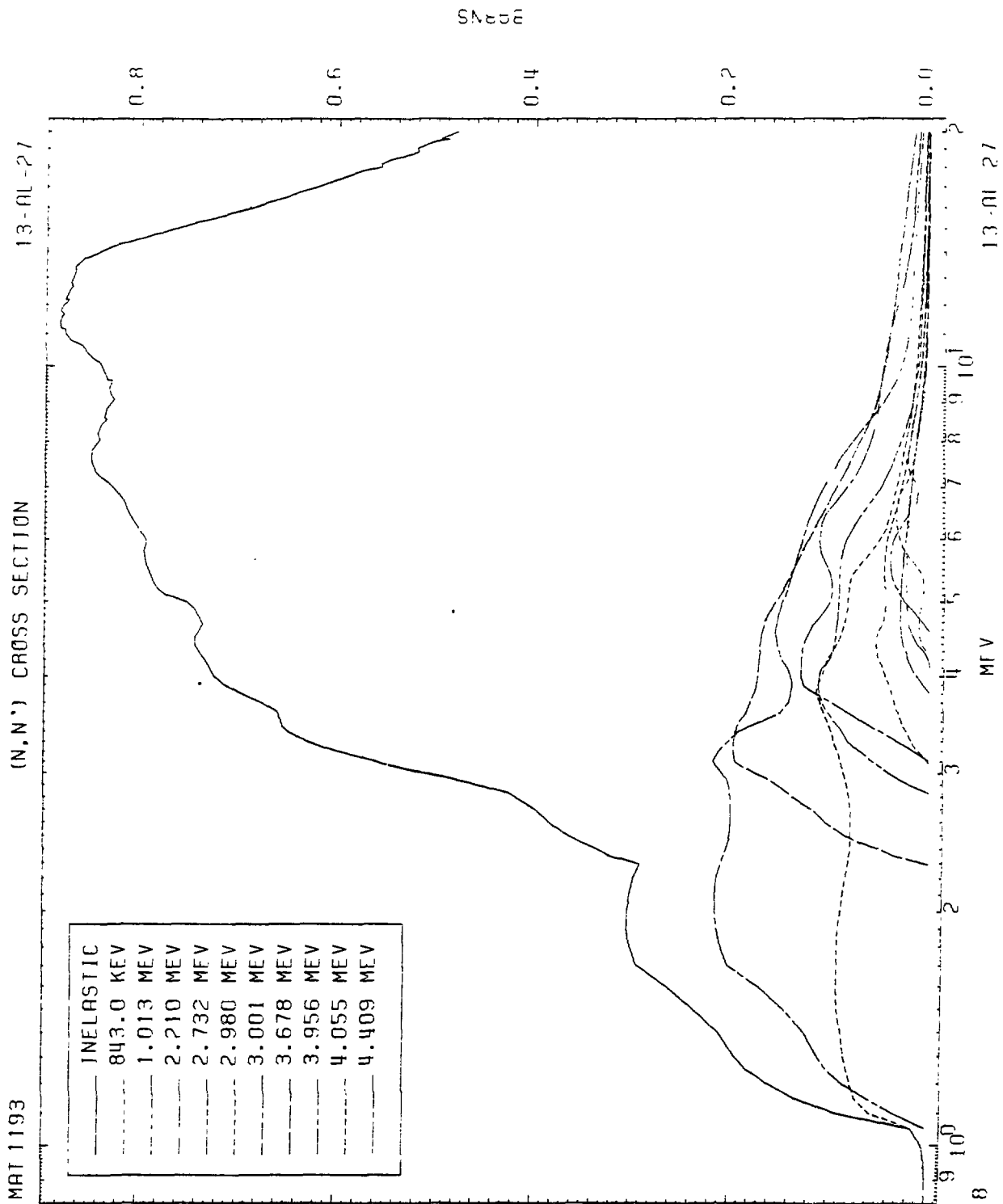
MAT 1193

CROSS SECTIONS

13-AL-27



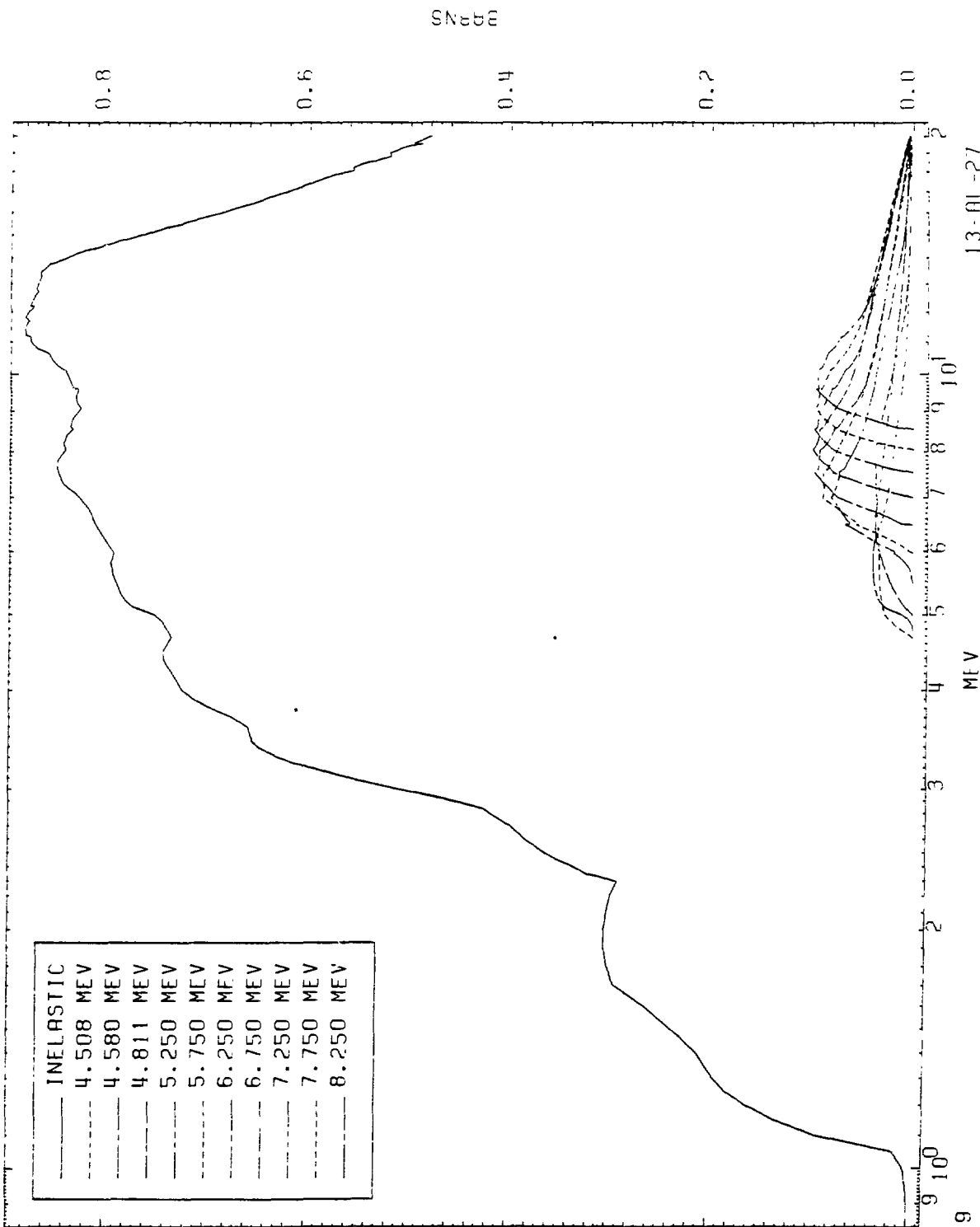




MAT 1193

(N,N') CROSS SECTION

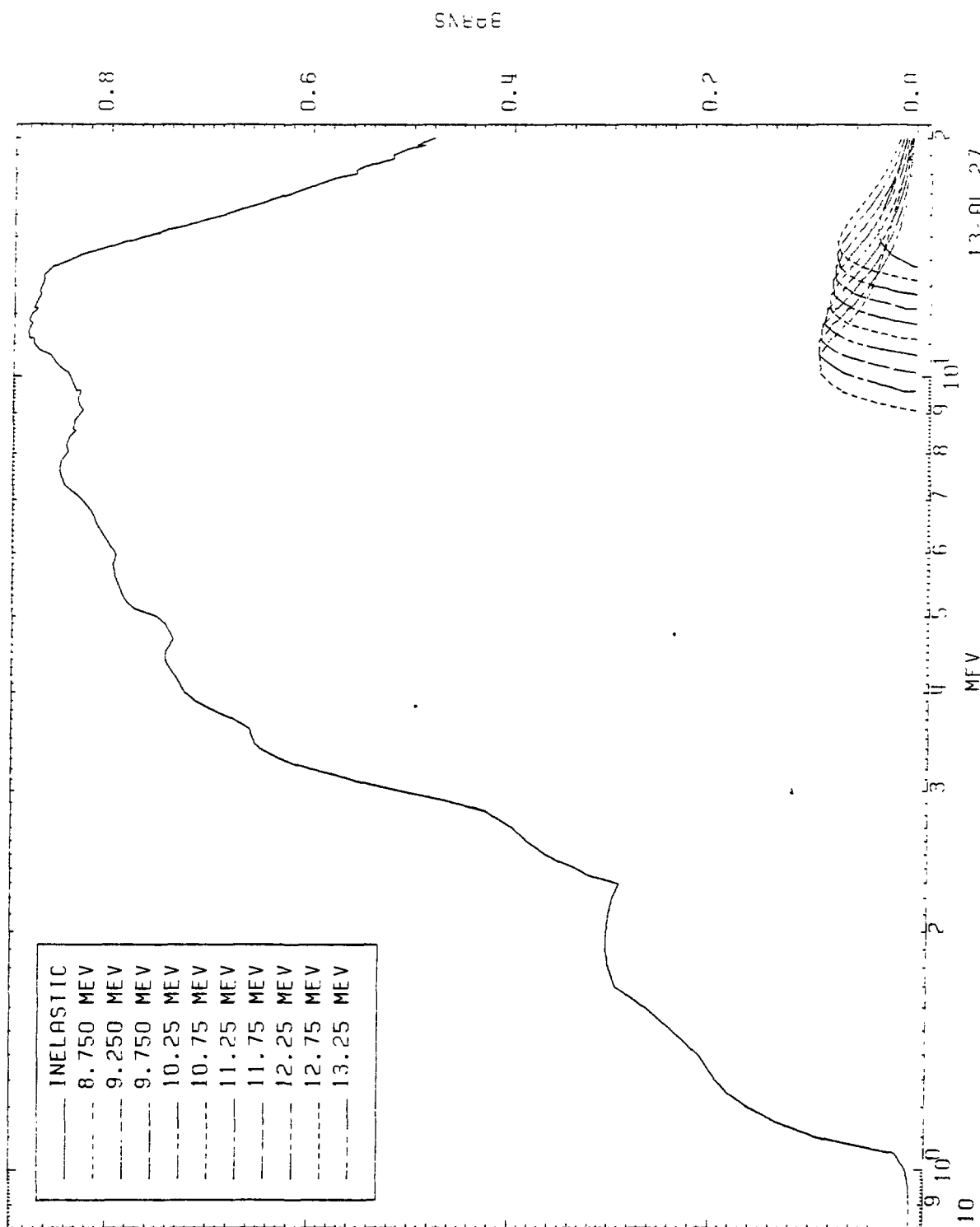
13-AL 27



MAT 1193

(N,N') CROSS SECTION

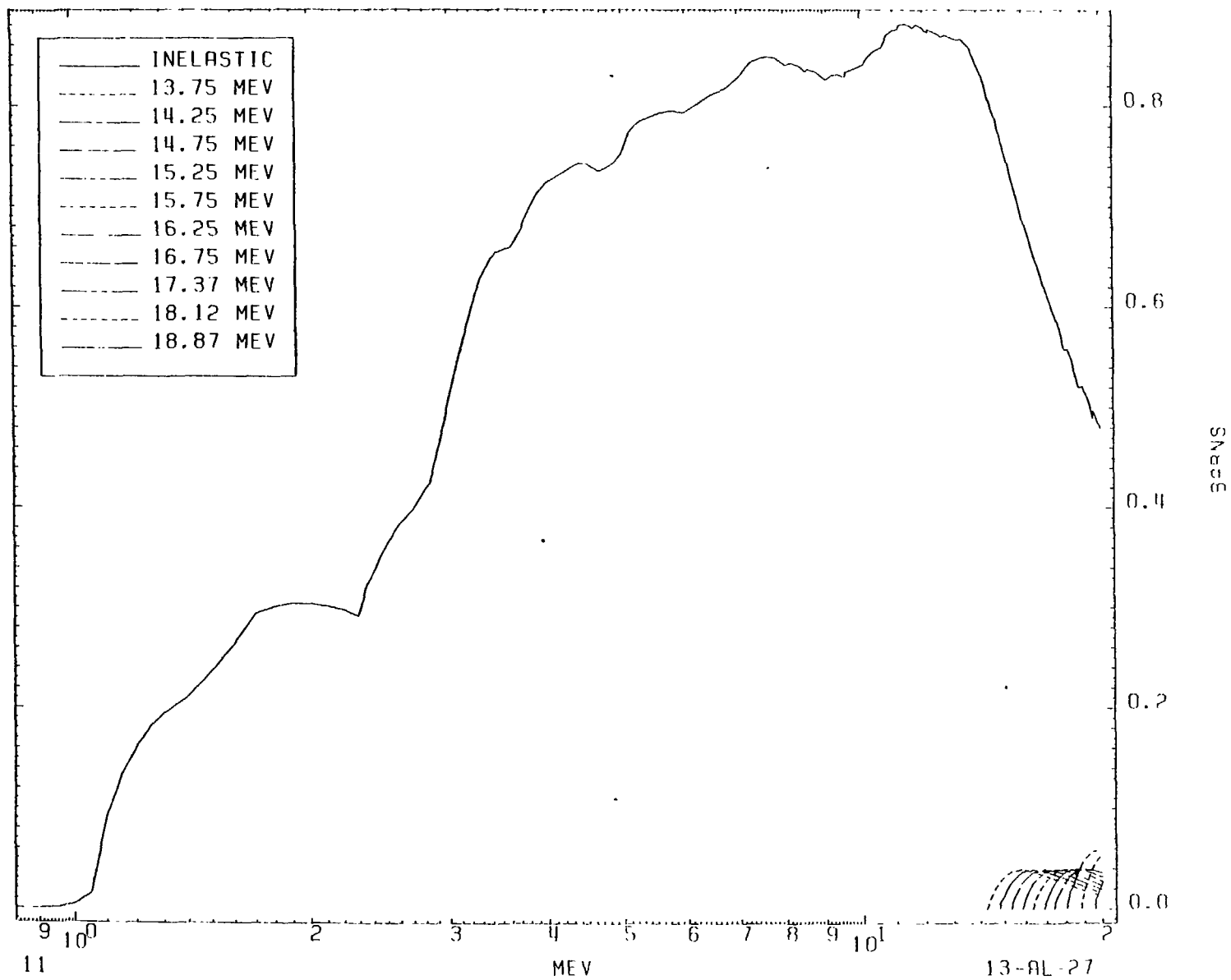
13-AL-27

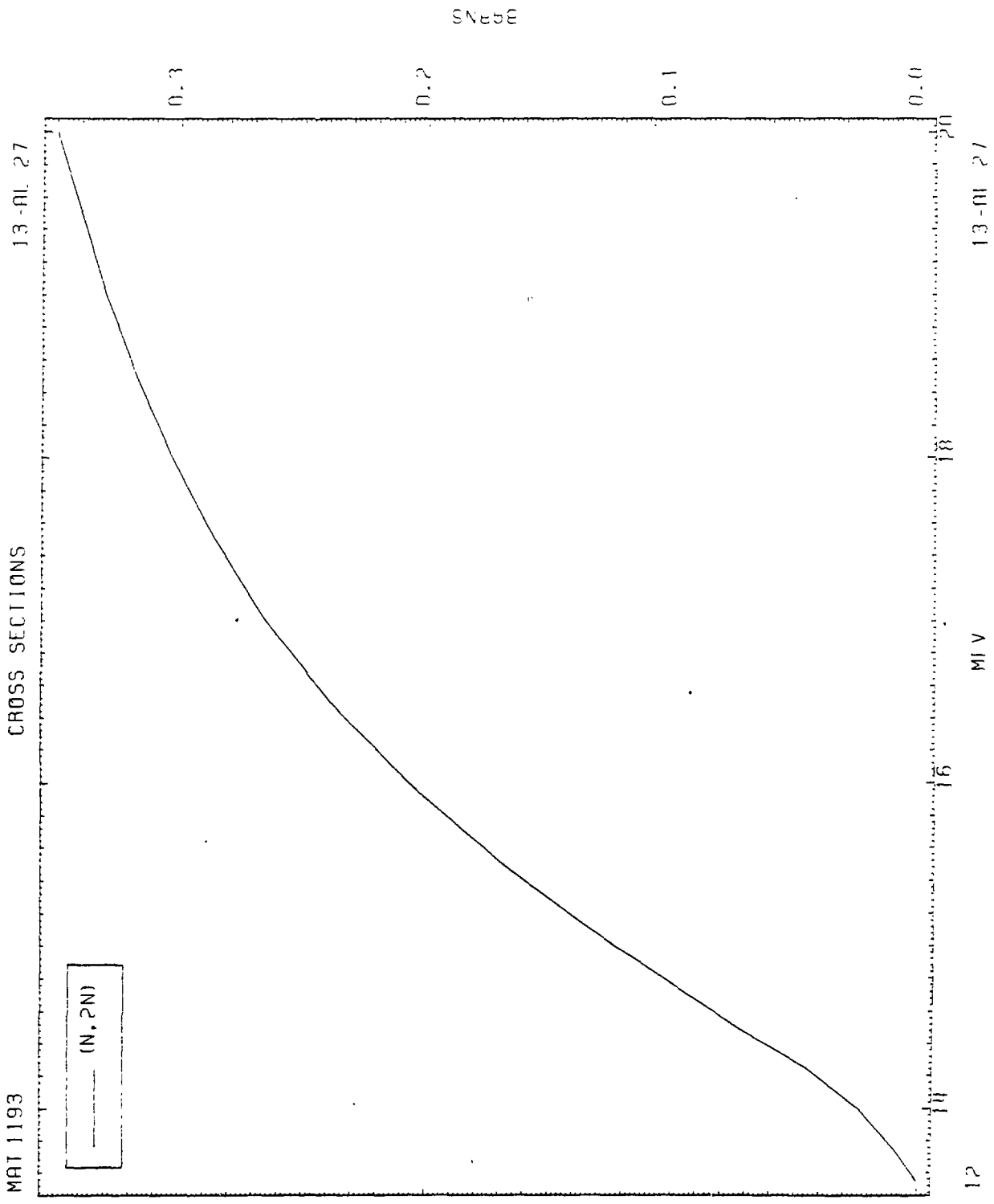


MAT 1193

(N,N') CROSS SECTION

13-AL-27

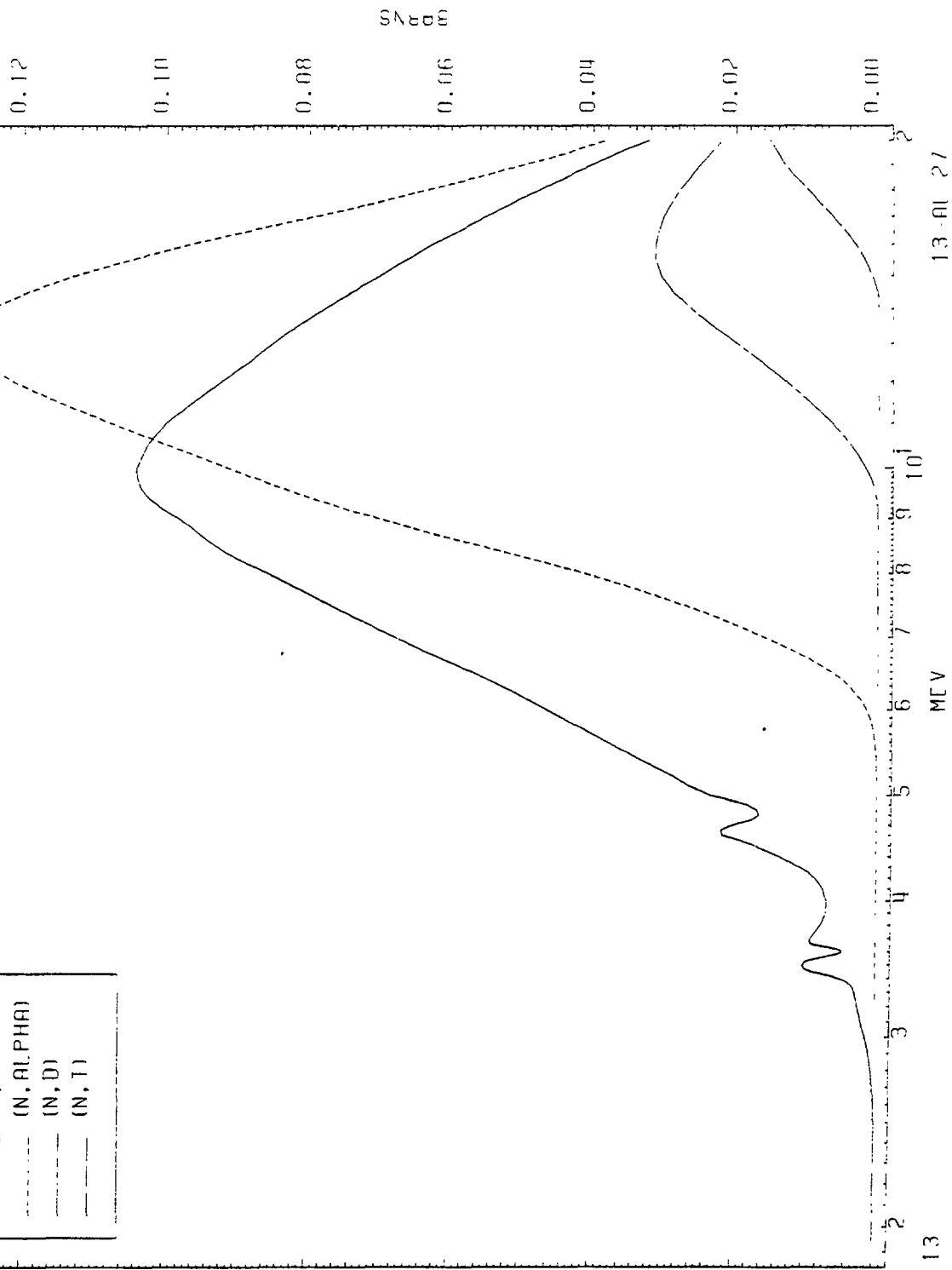
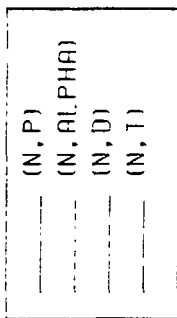




MAT 1193

CROSS SECTIONS

13 NI -27



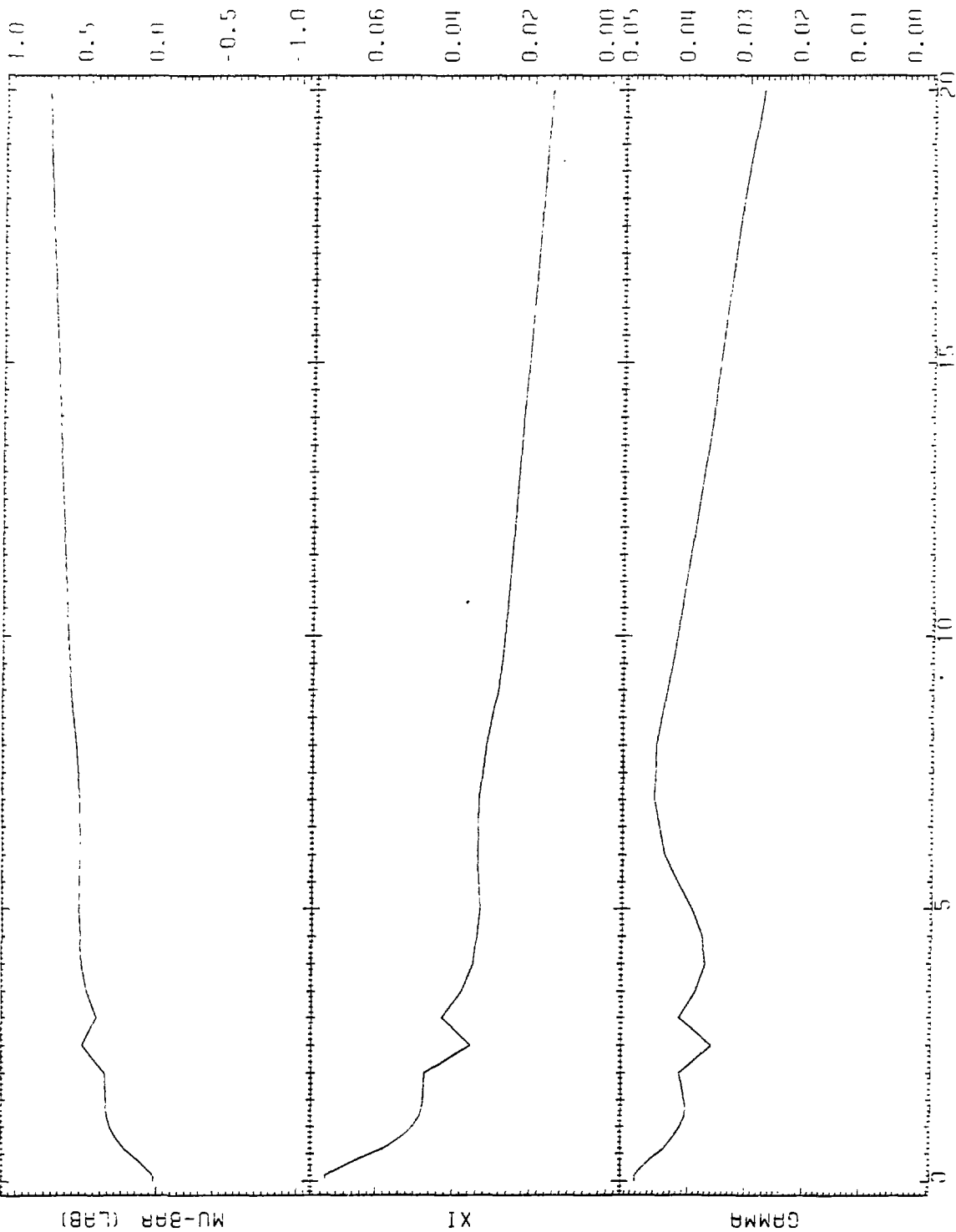
13

13 NI 27

MAR 11 1963

PARAMETERS

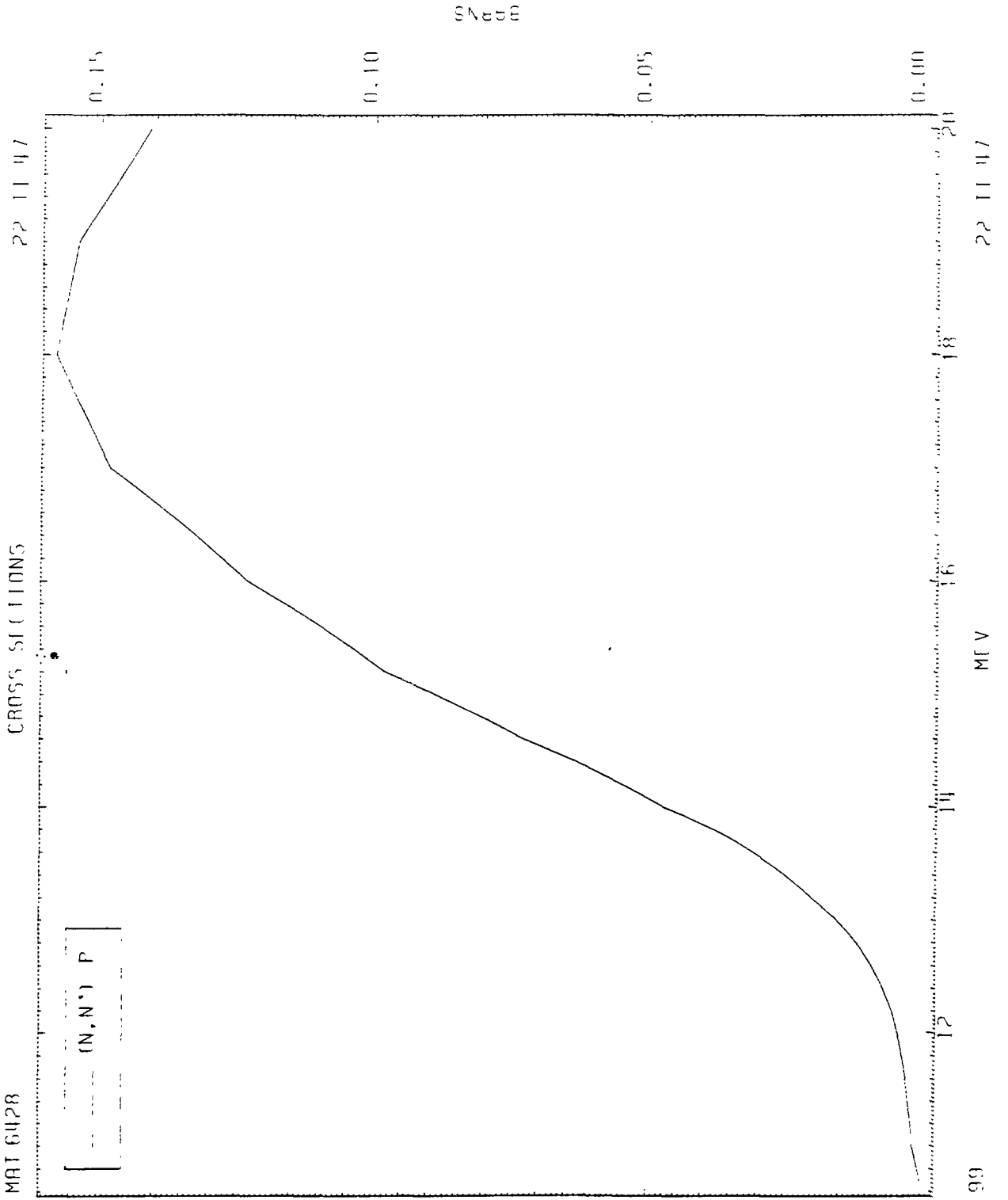
13-01-27



14

MI V

13-01-27

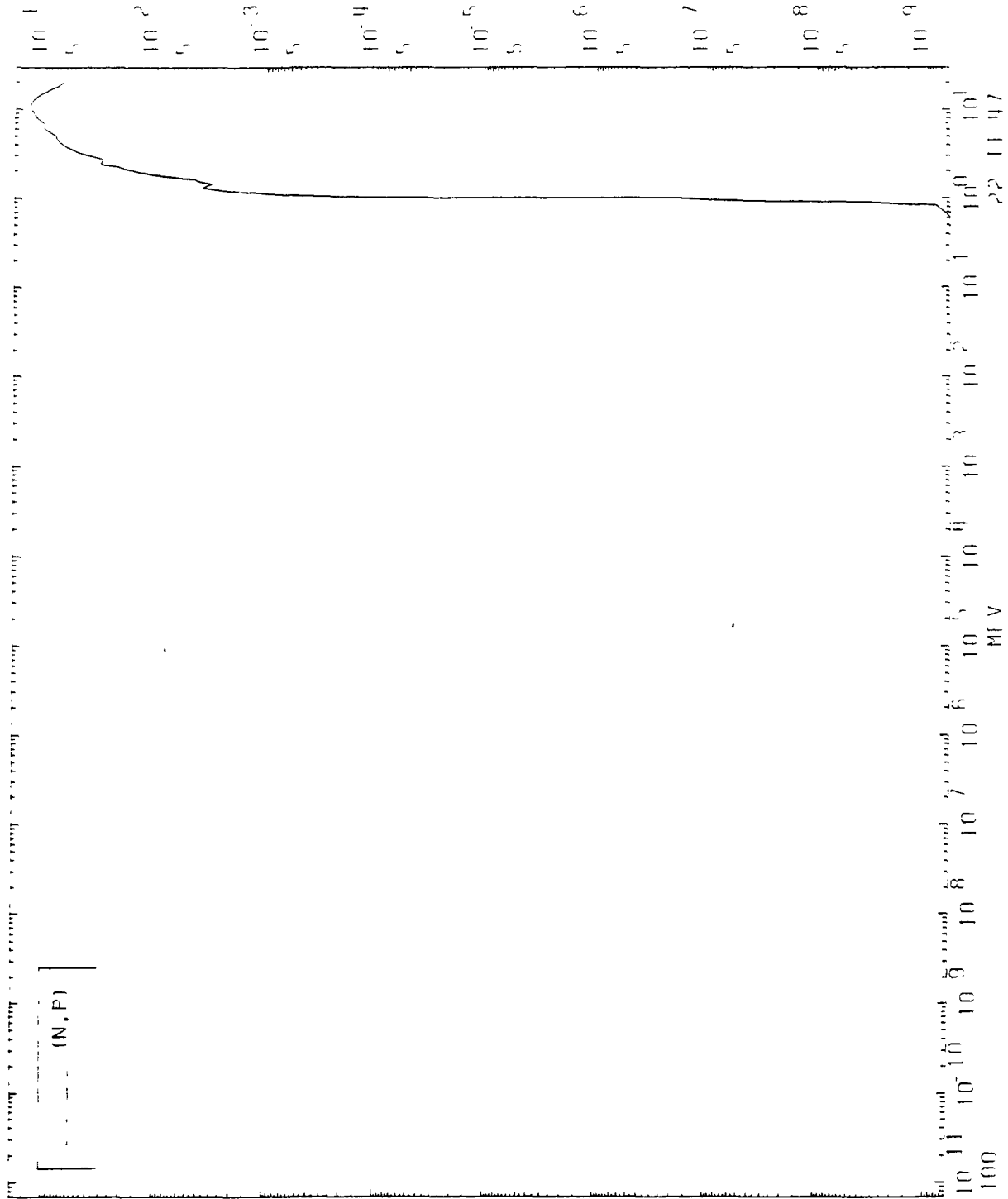


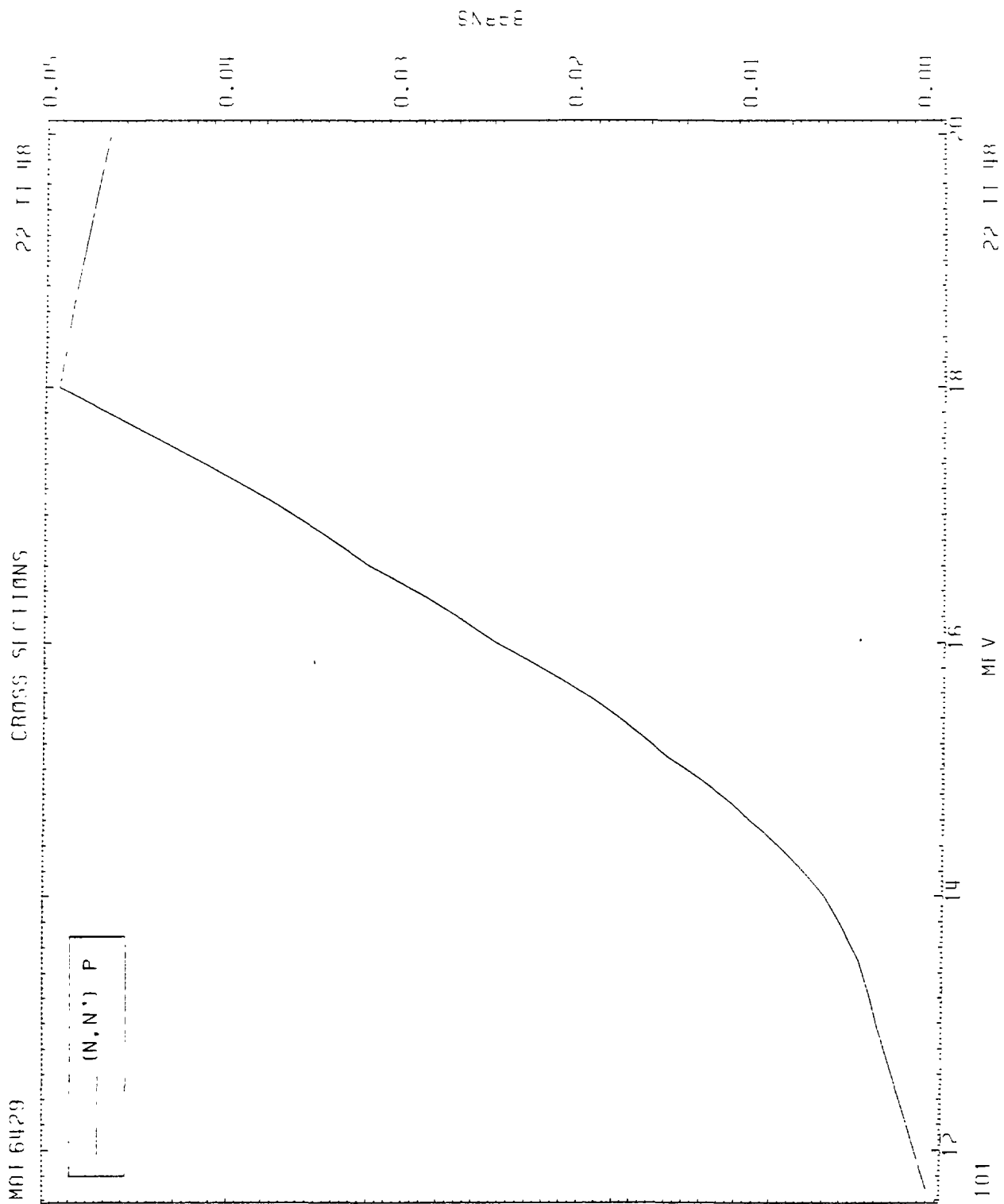


MAI 6428

CROSS SECTIONS

22 11 47



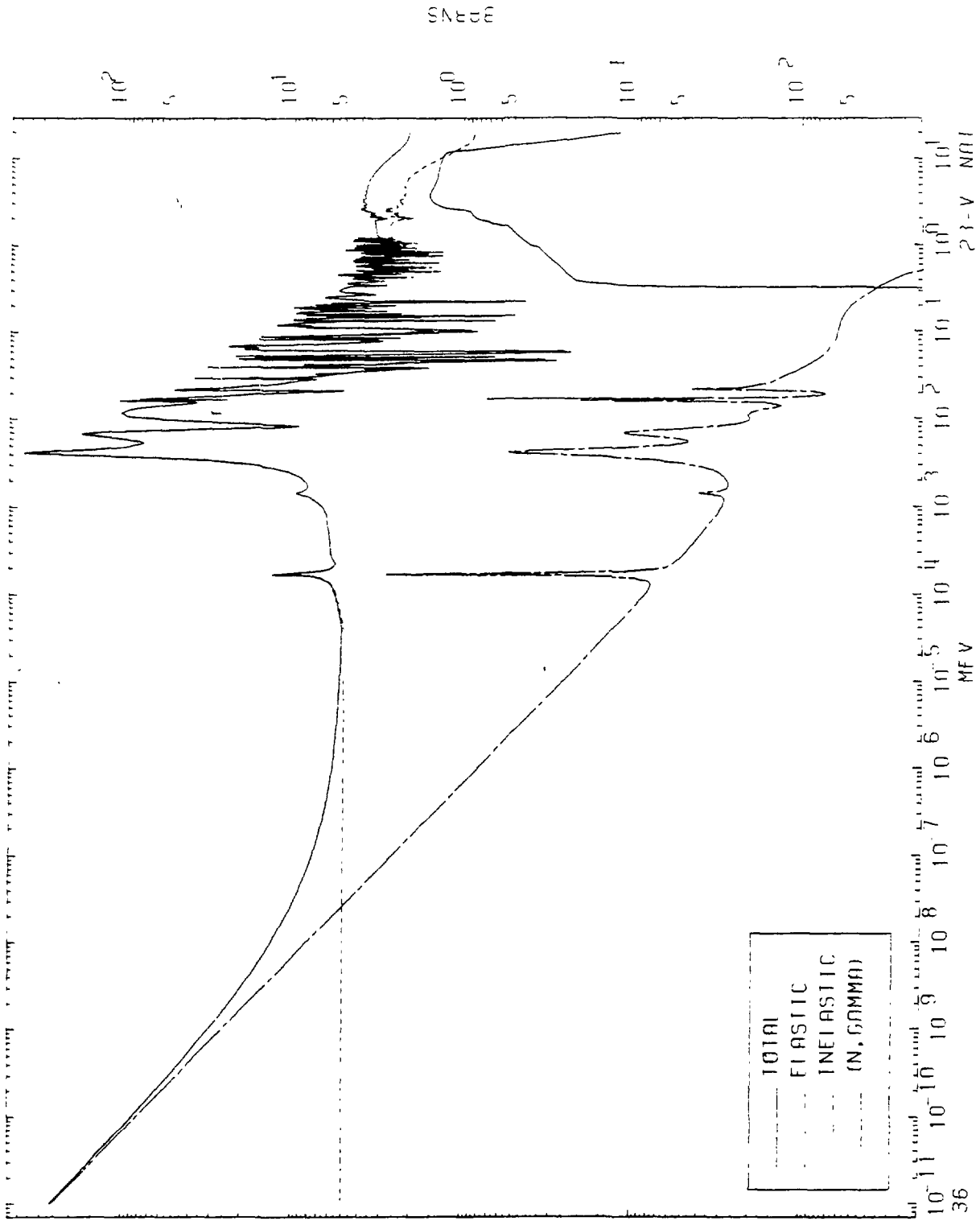




MOI 1196

CROSS SECTIONS

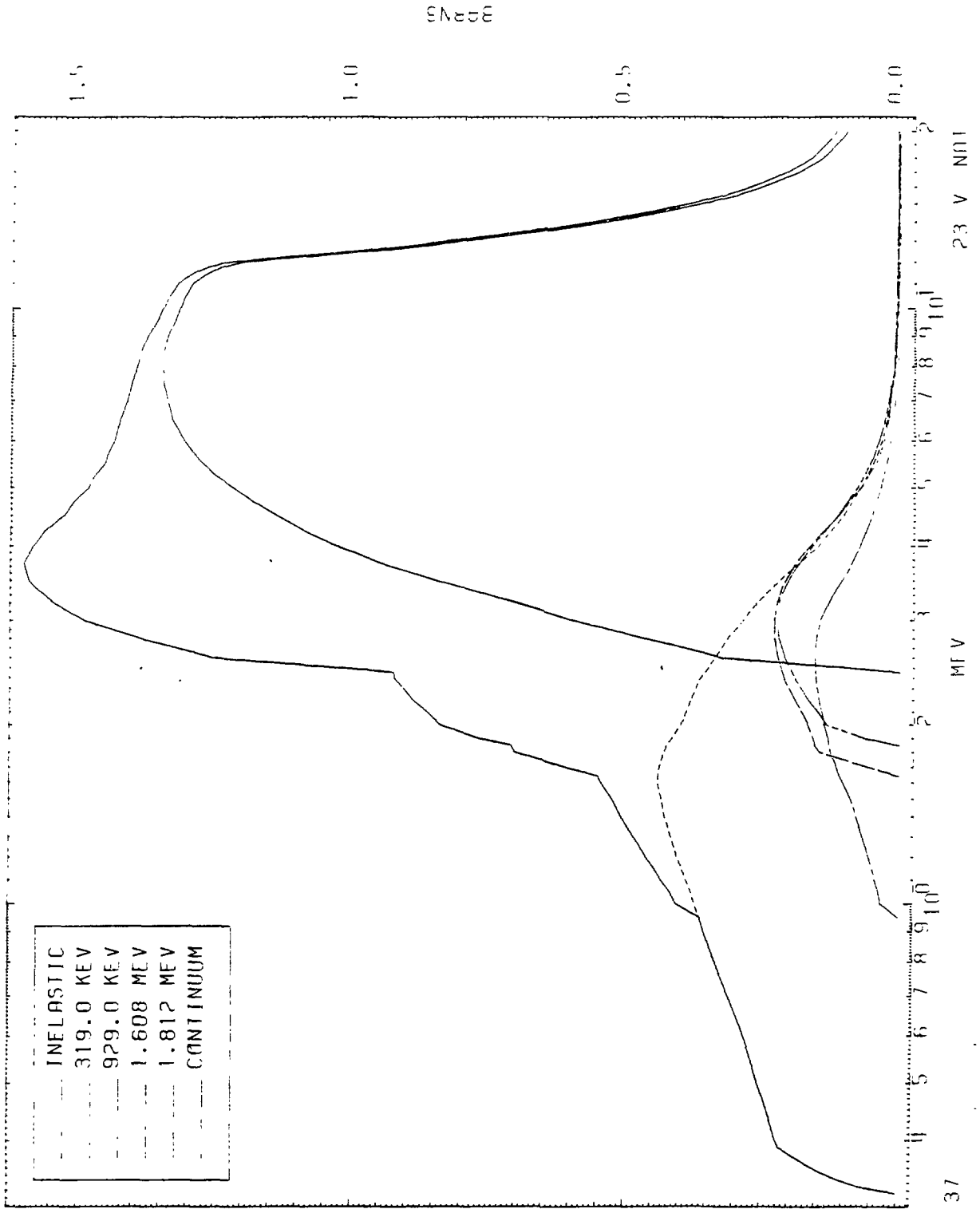
23 V MOI



MAI 1196

(N,N') CROSS SECTION

23 V - NI11



37

MEV

23 V NI11

MAT 1196

CROSS SECTIONS

23-V NDT

(N,N') P  
(N,N') ALPHA  
(N,2N)

0.8

0.6

0.4

0.2

0.0

SECS

20  
18  
16  
14  
12  
10

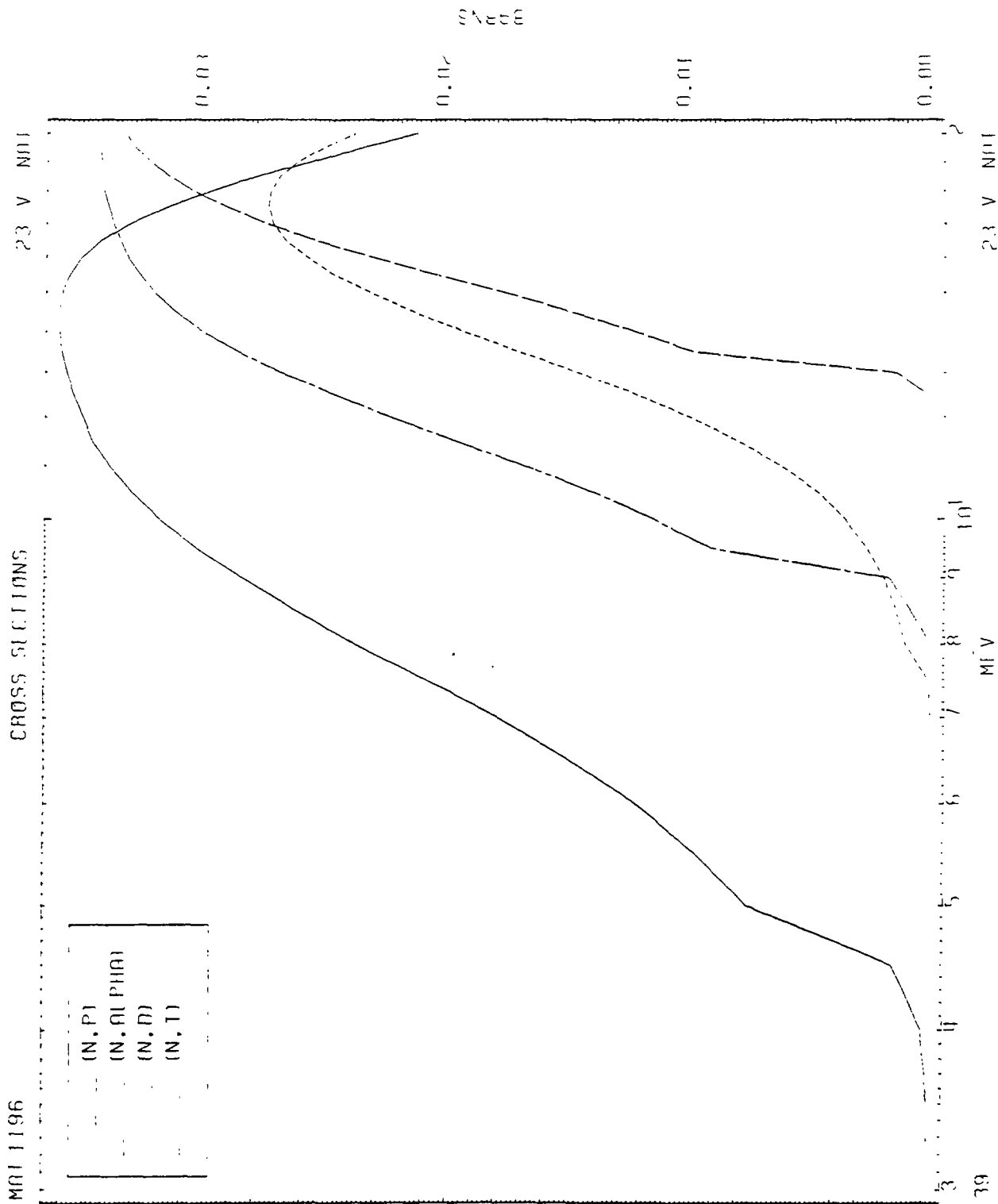
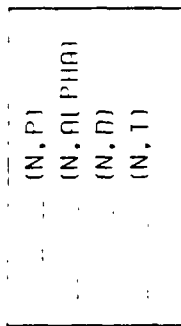
23 V NDT

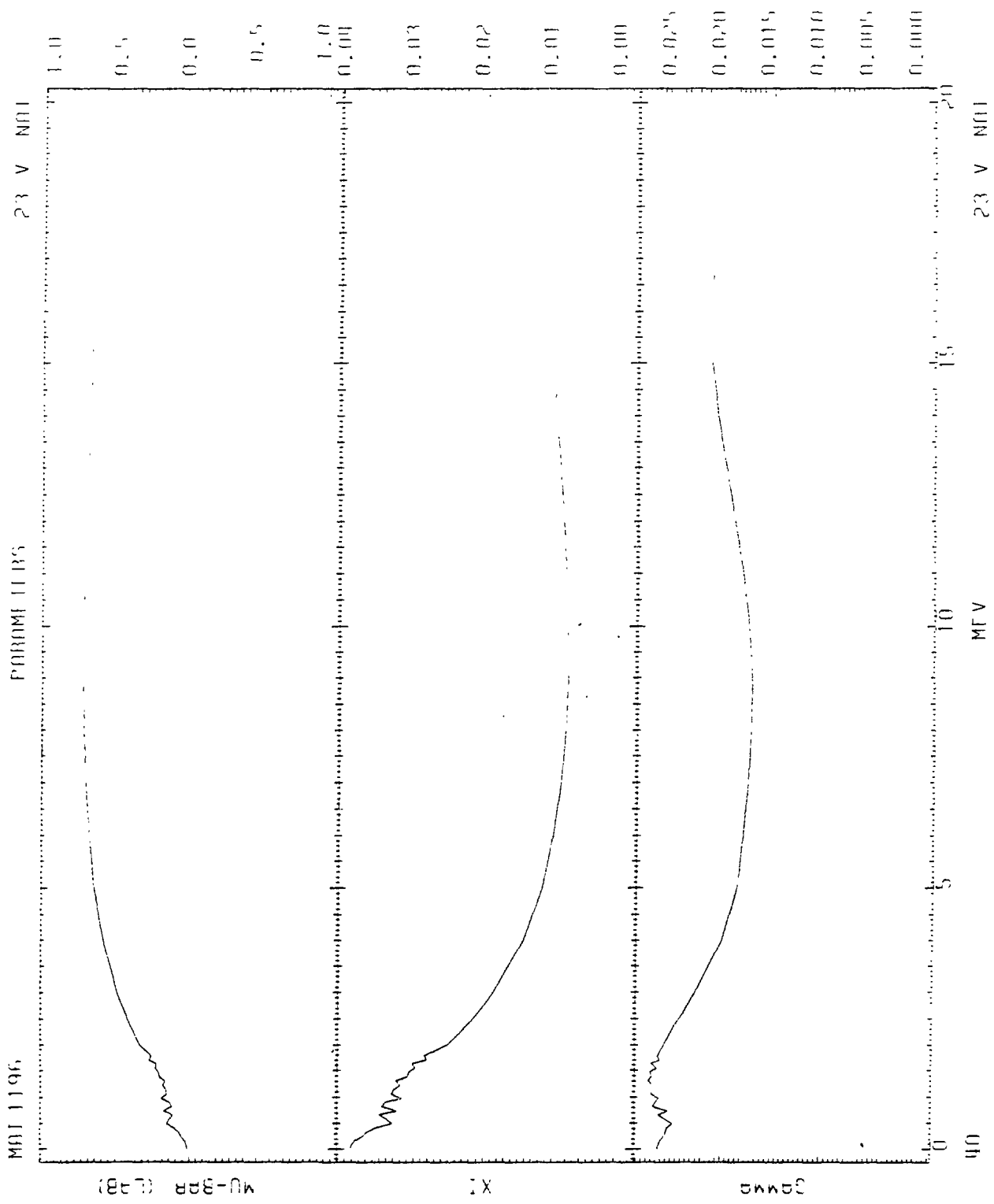
MEV

38

MDI 1196

CROSS SECTIONS



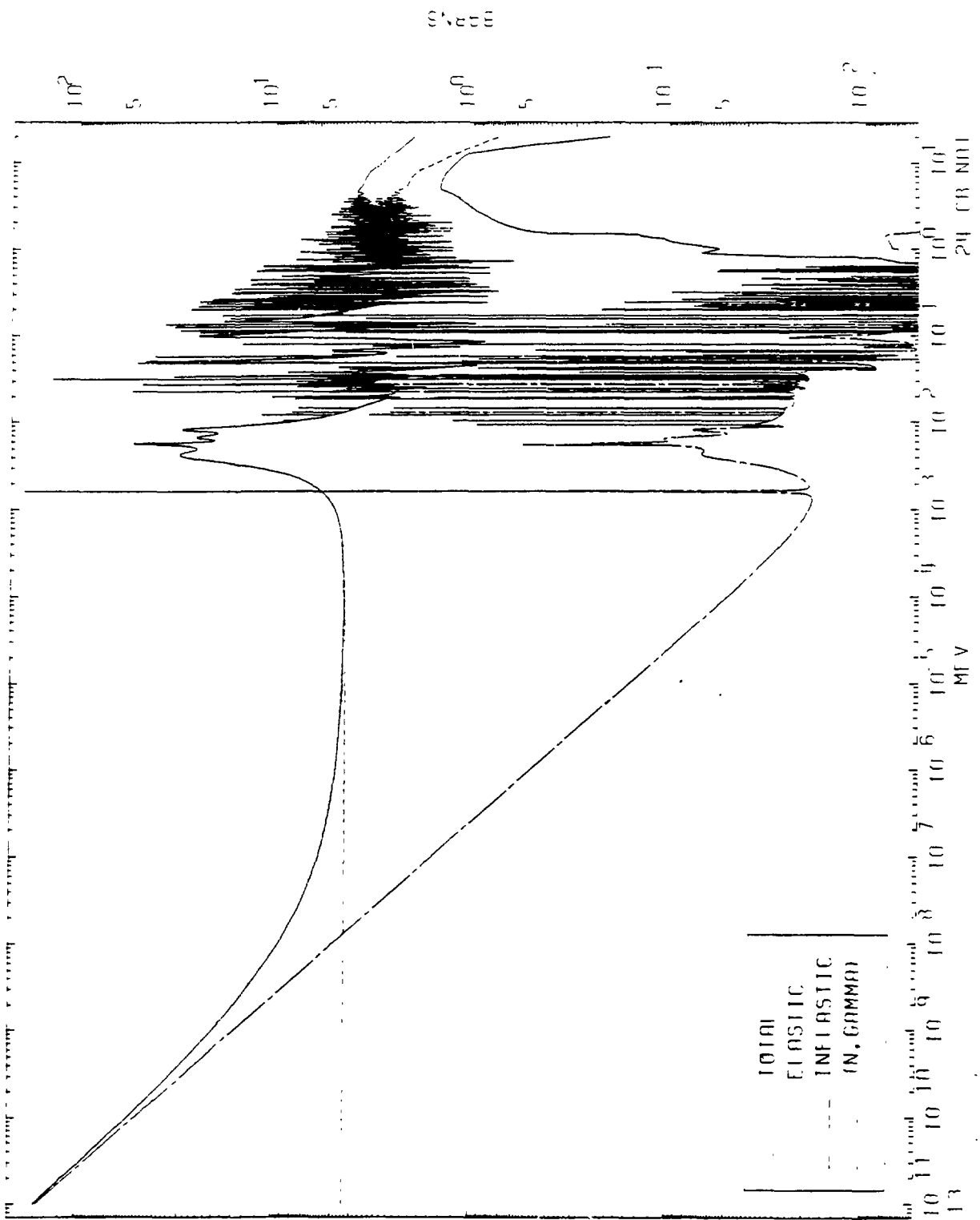


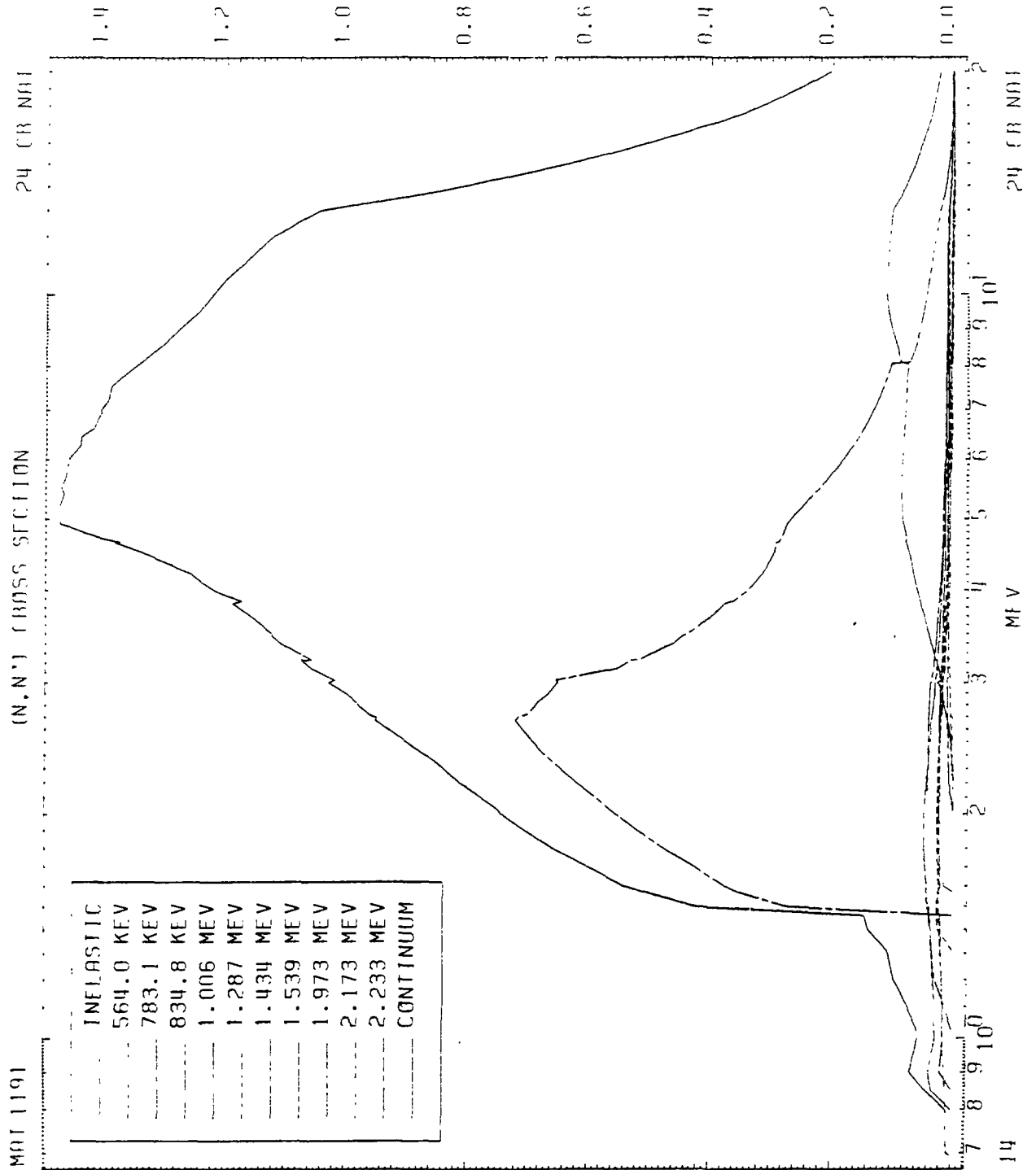


MAT 1191

CROSS SECTIONS

24 CR NI01

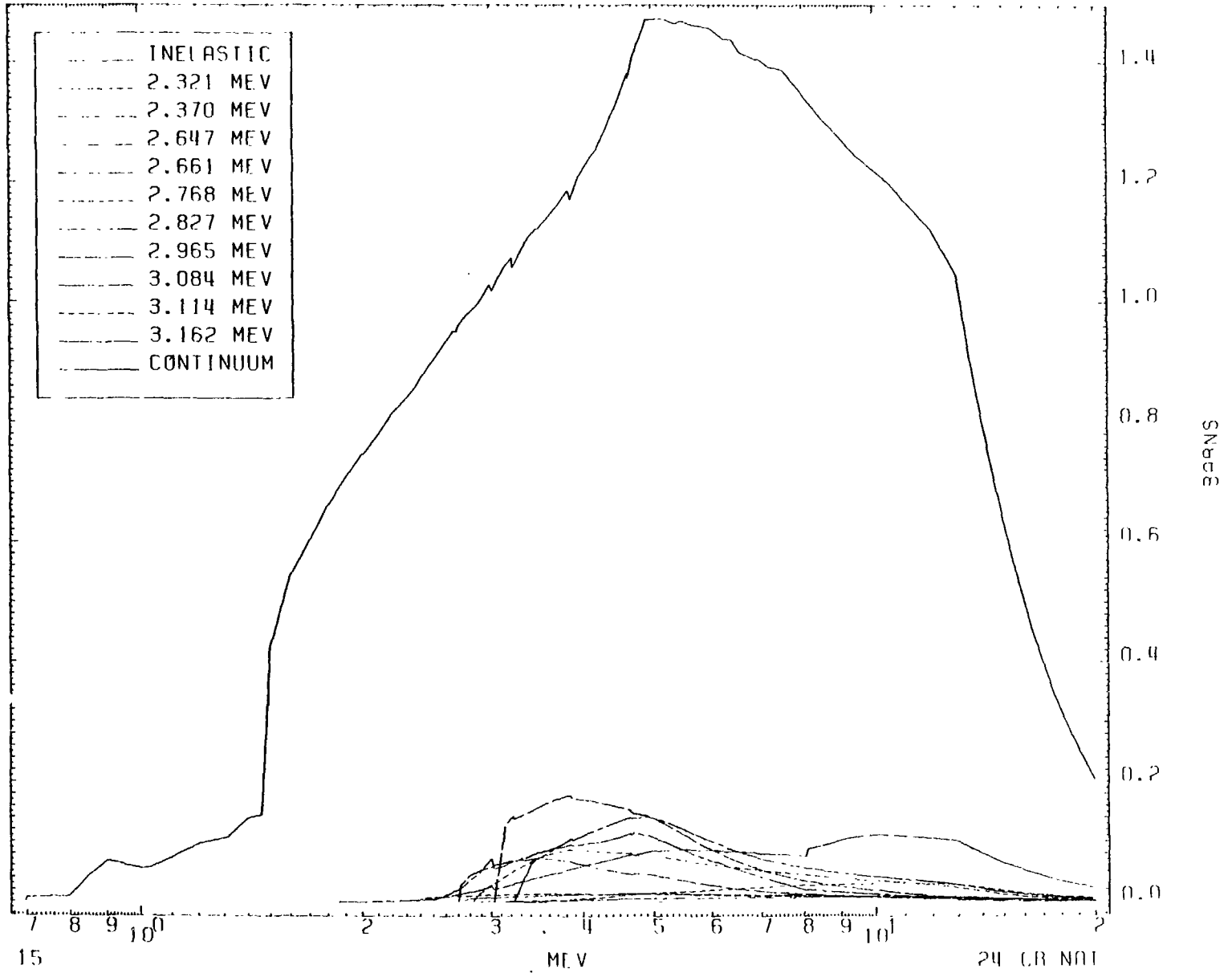




MAT 1191

(N,N') CROSS SECTION

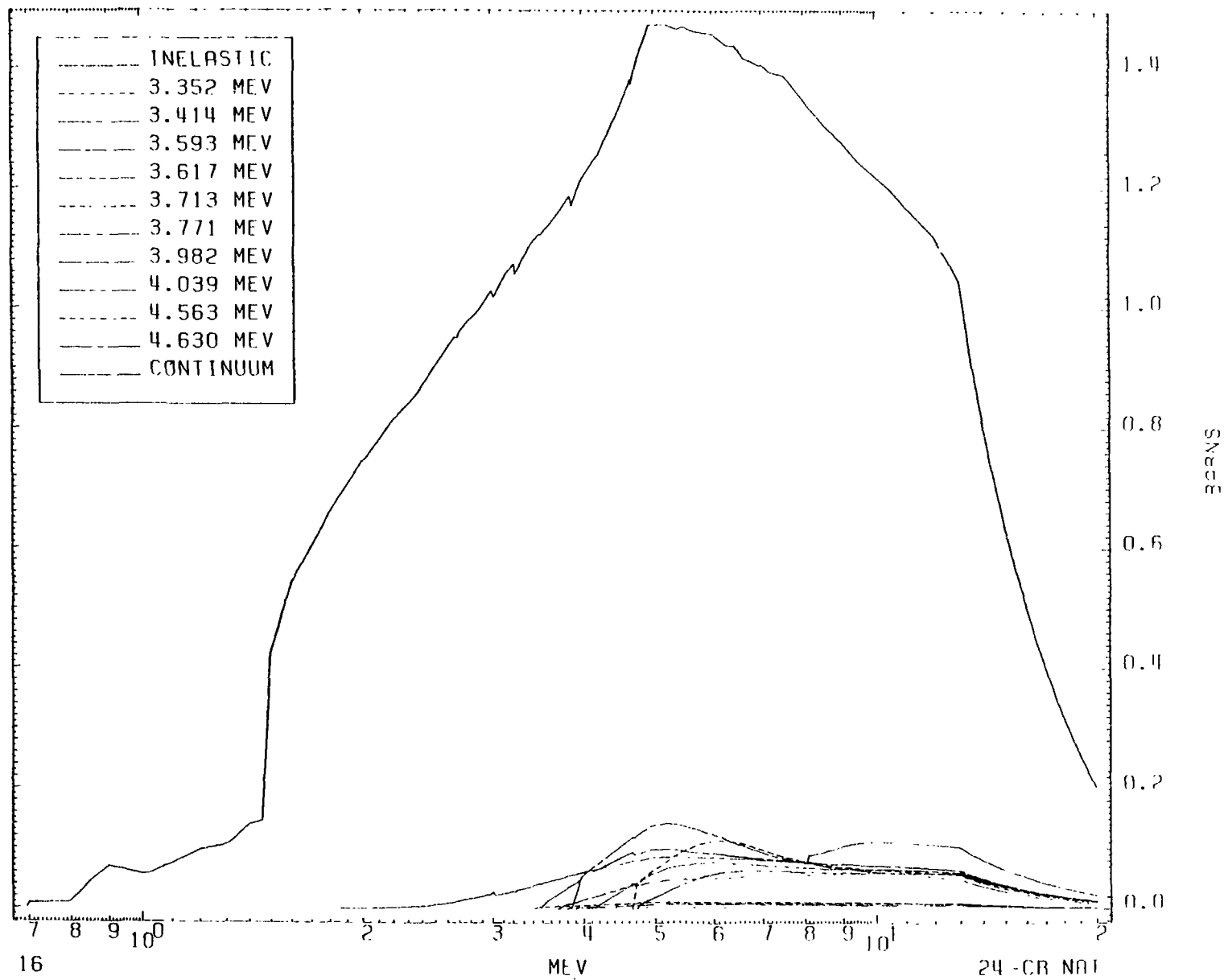
24-CR-N01



MAI 1191

(N,N') CROSS SECTION

24-CR NAT

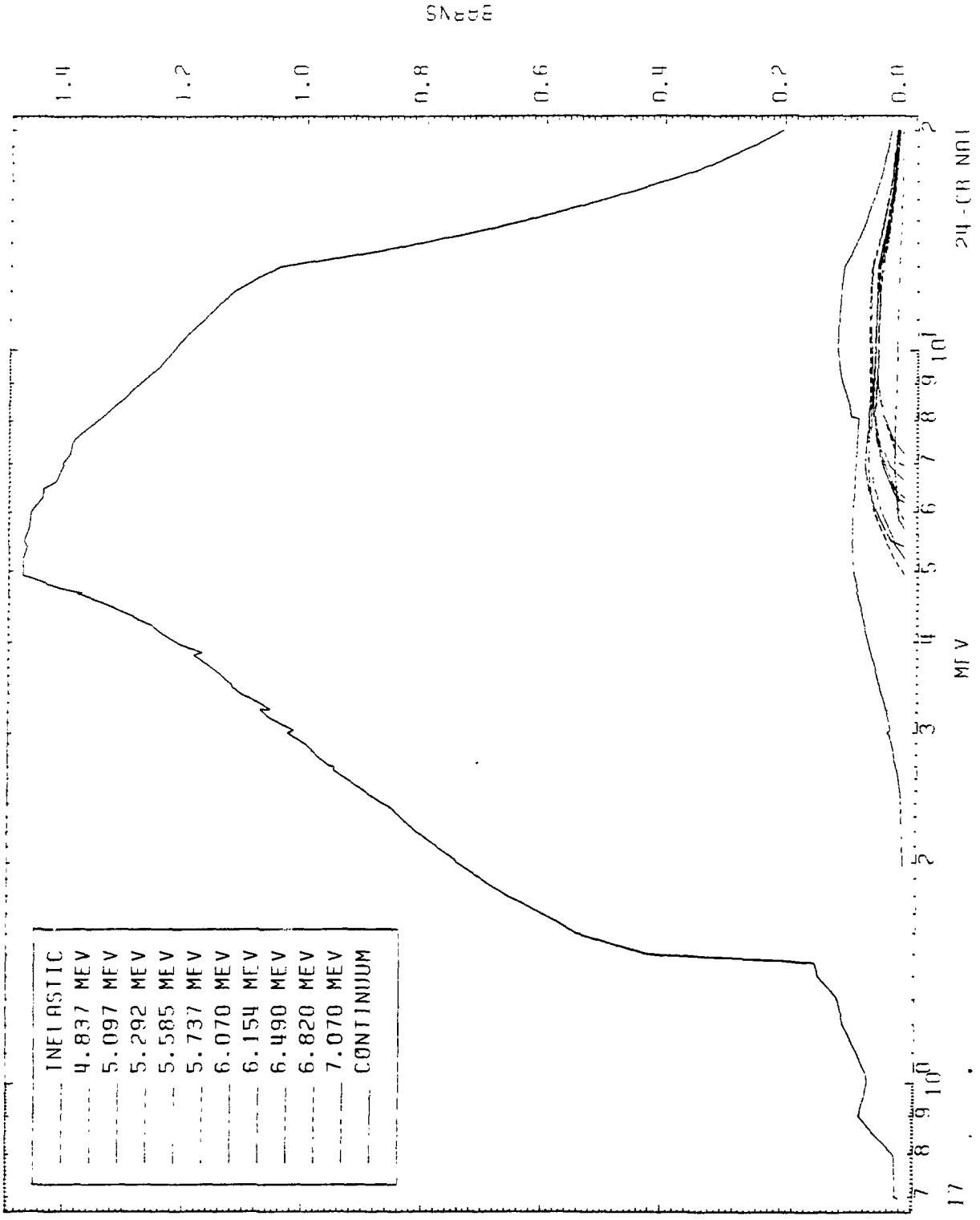


MAT 1191

(N,N') CROSS SECTION

24 (R N01

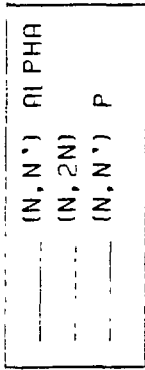
---	INELASTIC
---	4.837 MEV
---	5.097 MEV
---	5.292 MEV
---	5.585 MEV
---	5.737 MEV
---	6.070 MEV
---	6.154 MEV
---	6.490 MEV
---	6.820 MEV
---	7.070 MEV
---	CONTINUUM



MOI 1191

CROSS SECTIONS

24-CR-NOT



0.6

0.4

0.2

0.0

18 10 12 14 16 18 20

18

MEV

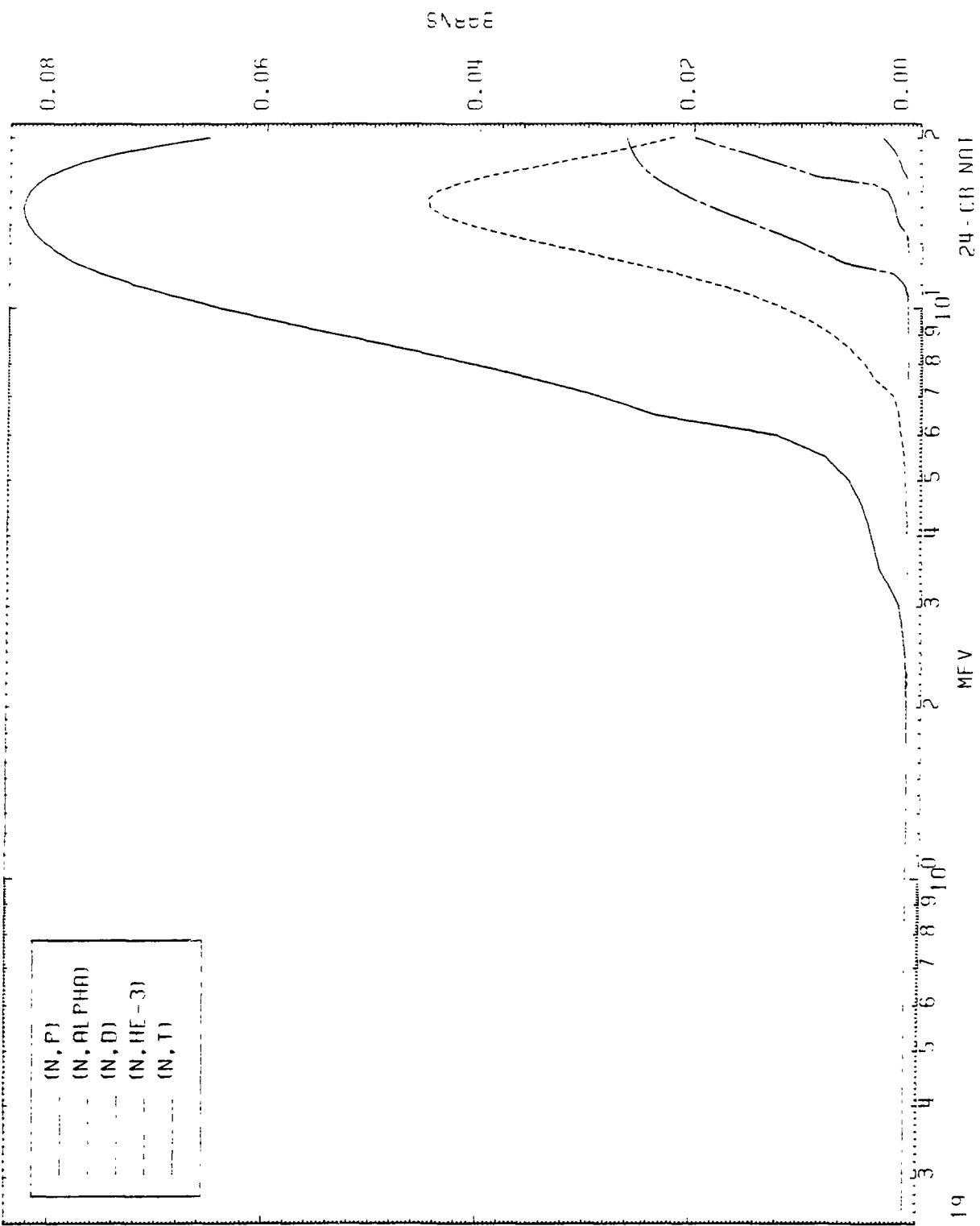
24-CR-NOT

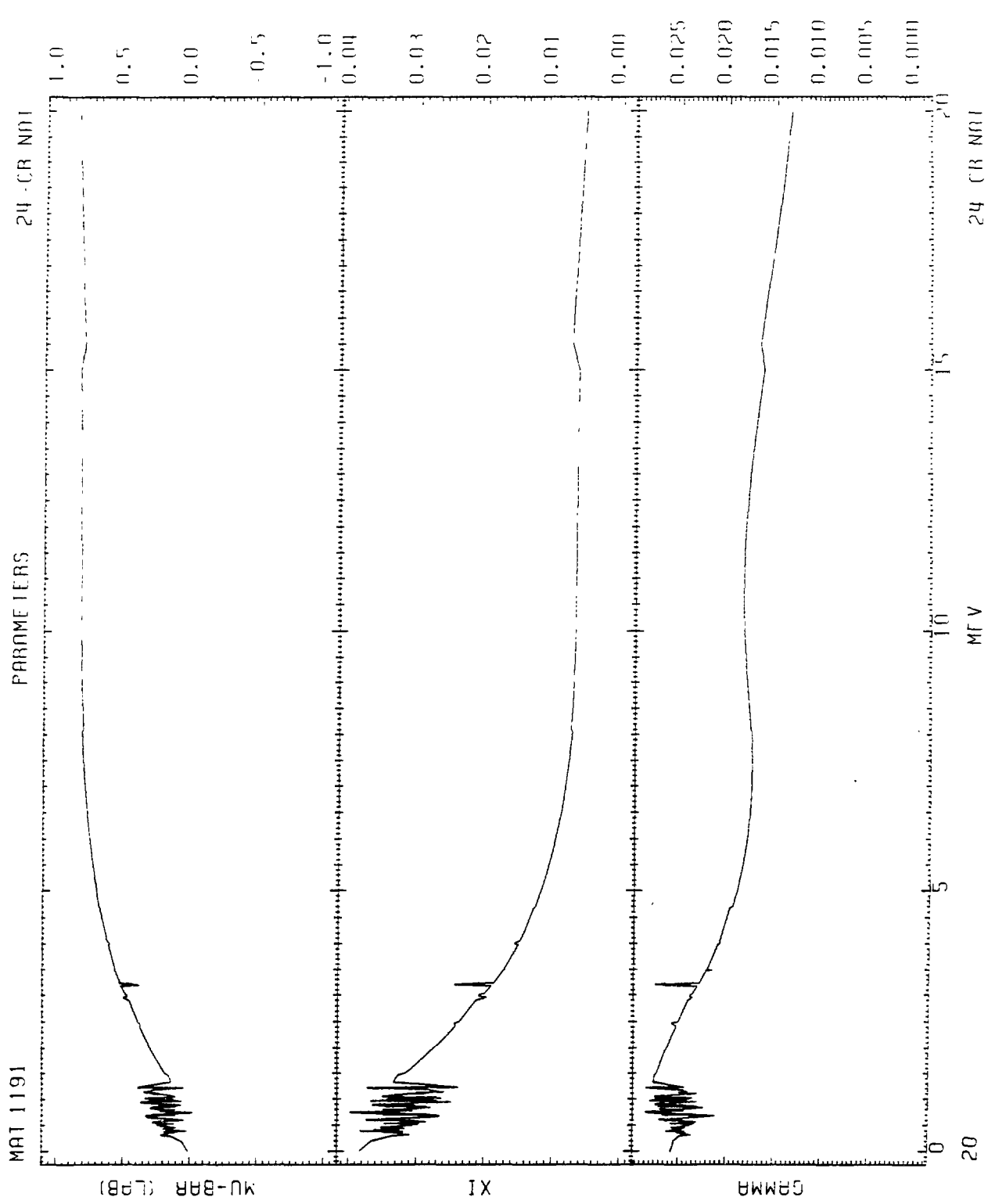
BRNS

MAT 1191

CROSS SECTIONS

24 - CR NNT



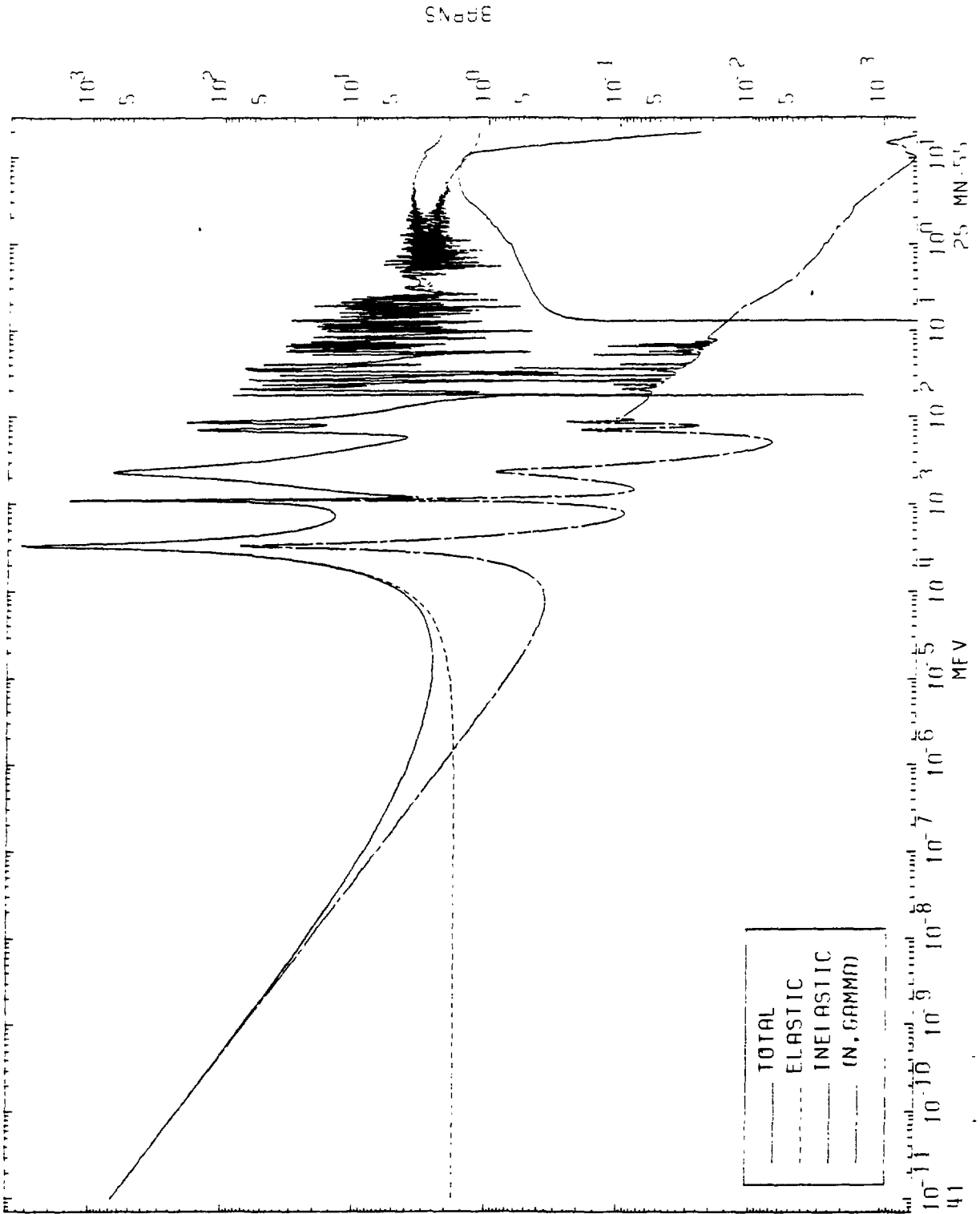


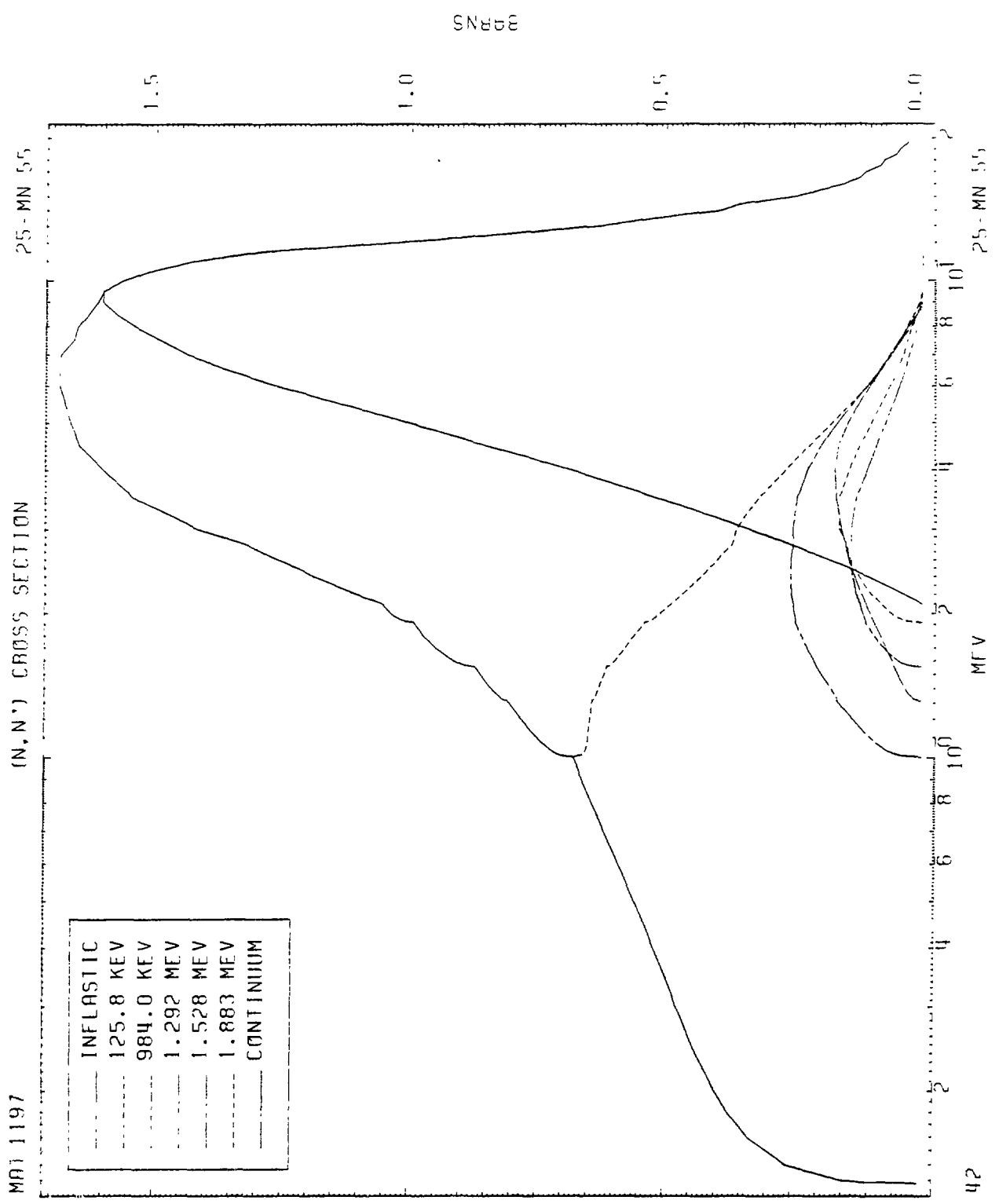


MOT 1197

CROSS SECTIONS

25-MN-55





MAT 1197

CROSS SECTIONS

25 MN 55

—	(N,N') P
—	(N,2N)
—	(N,N') ALPHA
—	(N,3N)

0.8

0.6

0.4

0.2

0.0

10 12 14 16 18 20

43

MEV

25-MN 55

BBNS

MAT 1197

CROSS SECTIONS

25 MN 55

- (N, ALPHA)
- (N, P)
- (N, D)
- (N, HF-3)

0.04

0.03

0.02

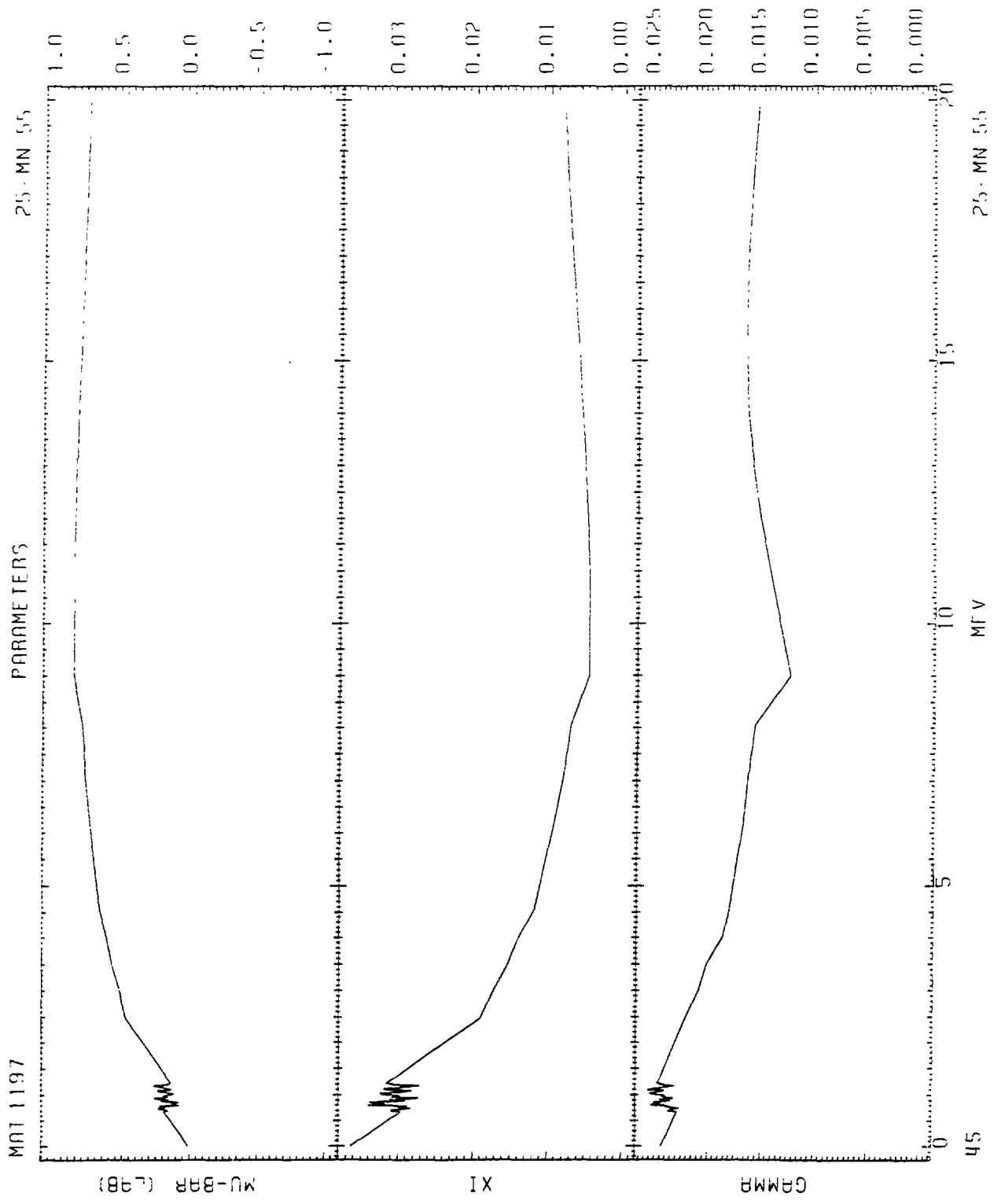
0.01

0.00

SECS

7 8 9 10  
MF V  
3 4 5 6 7 8 9 10  
25 MN 55

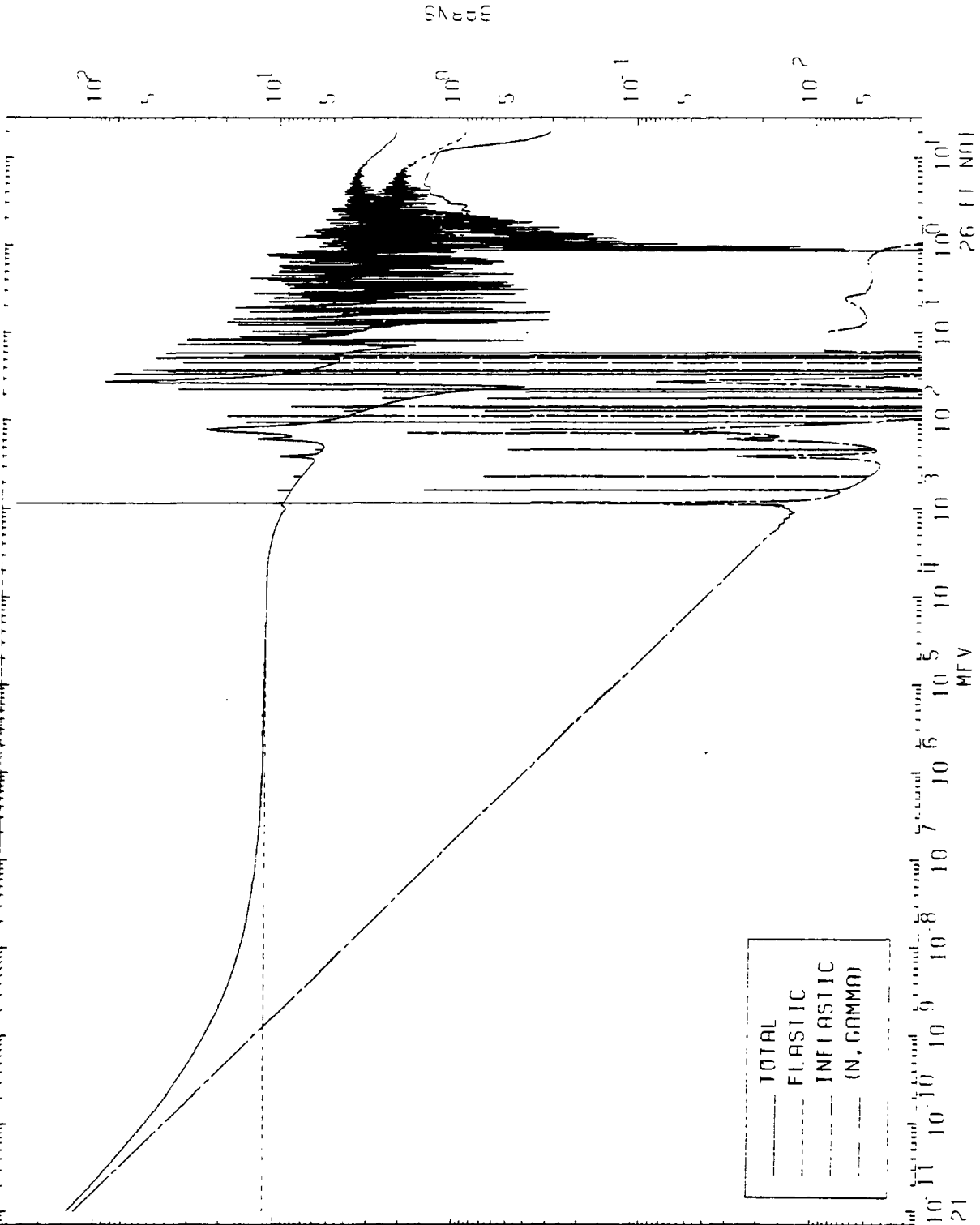
44



MAT 1192

CROSS SECTIONS

26 FT N01

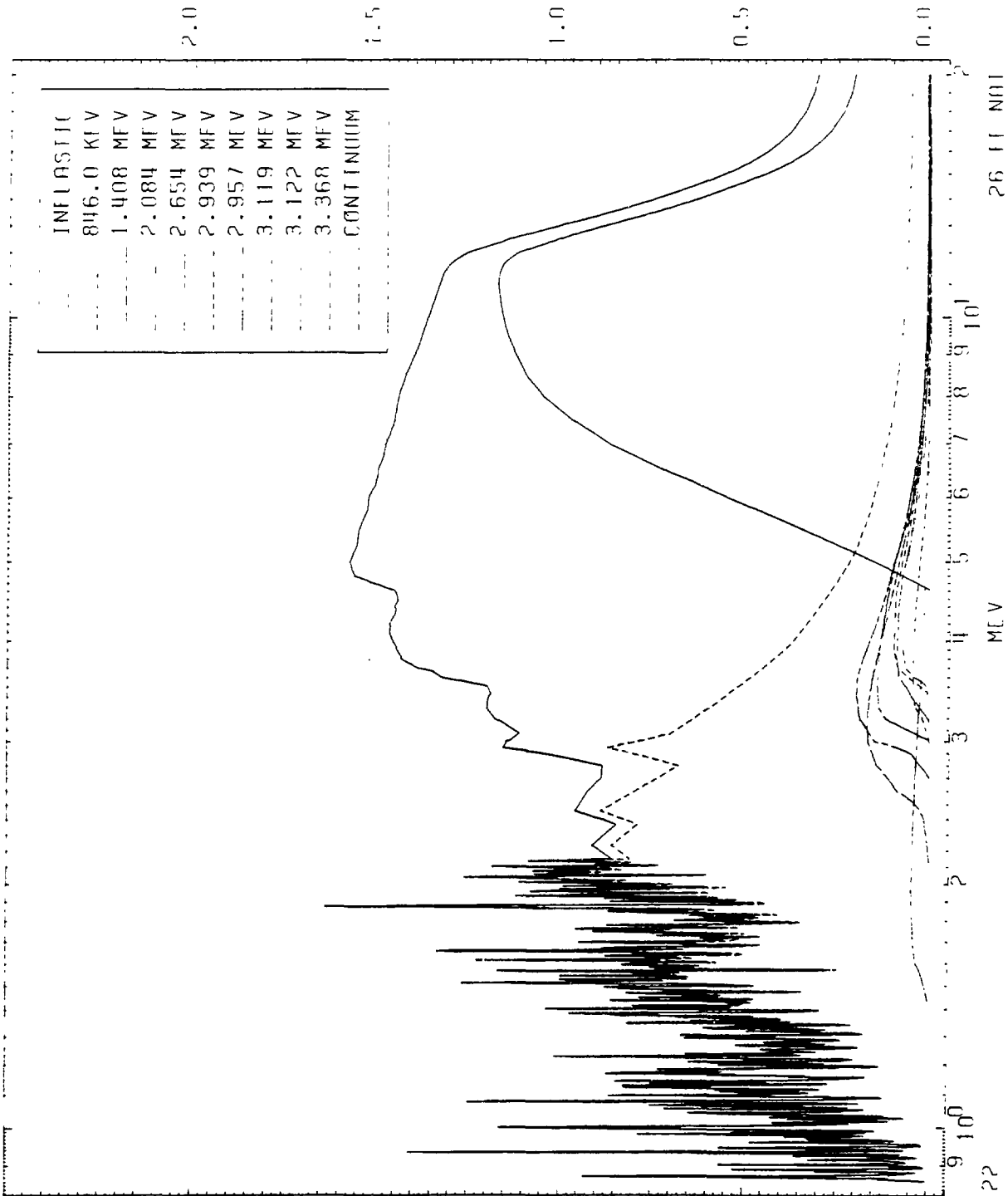


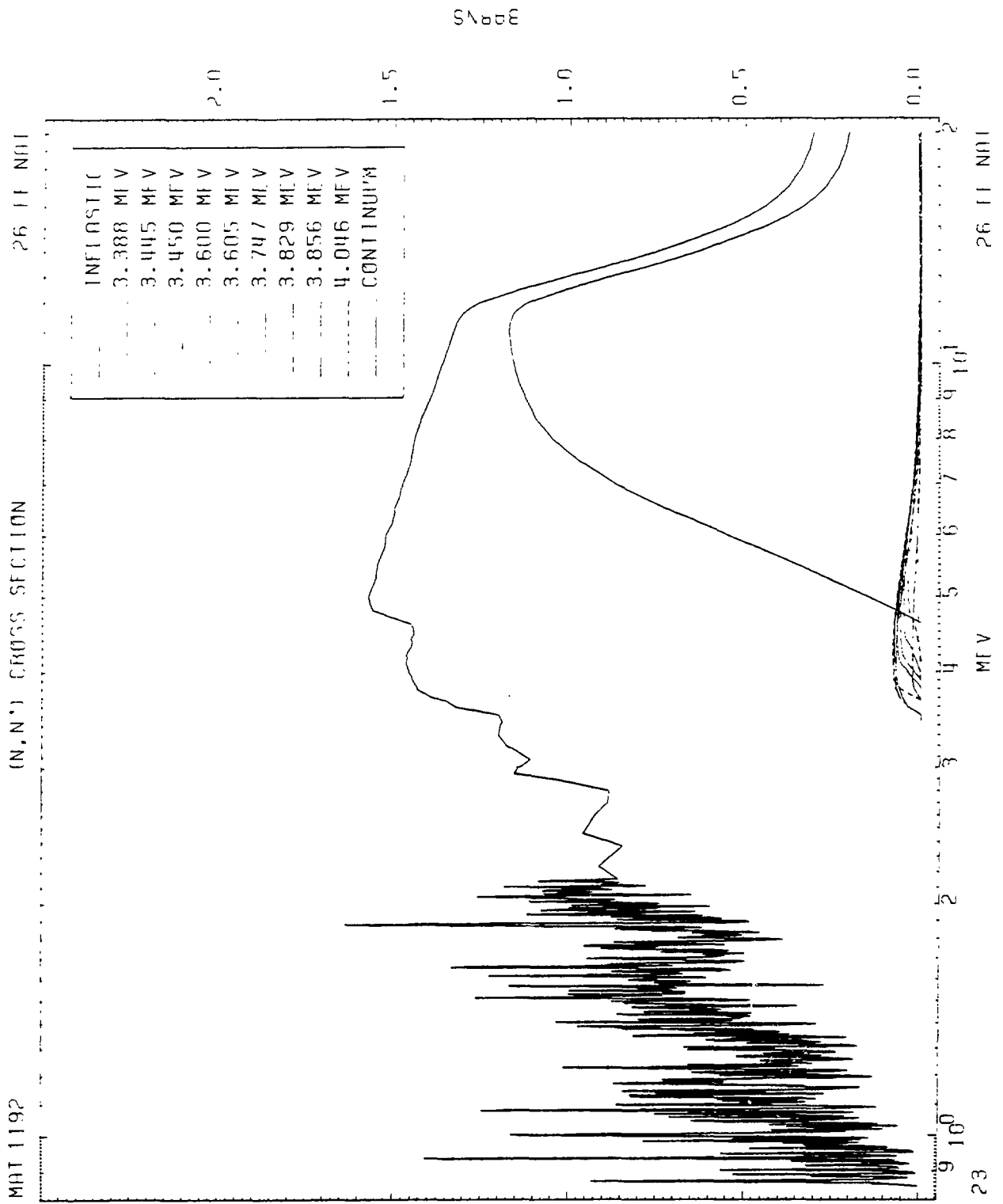
26 FT N01

MAT 1192

(N.N.) CROSS SECTION

26-11 N01



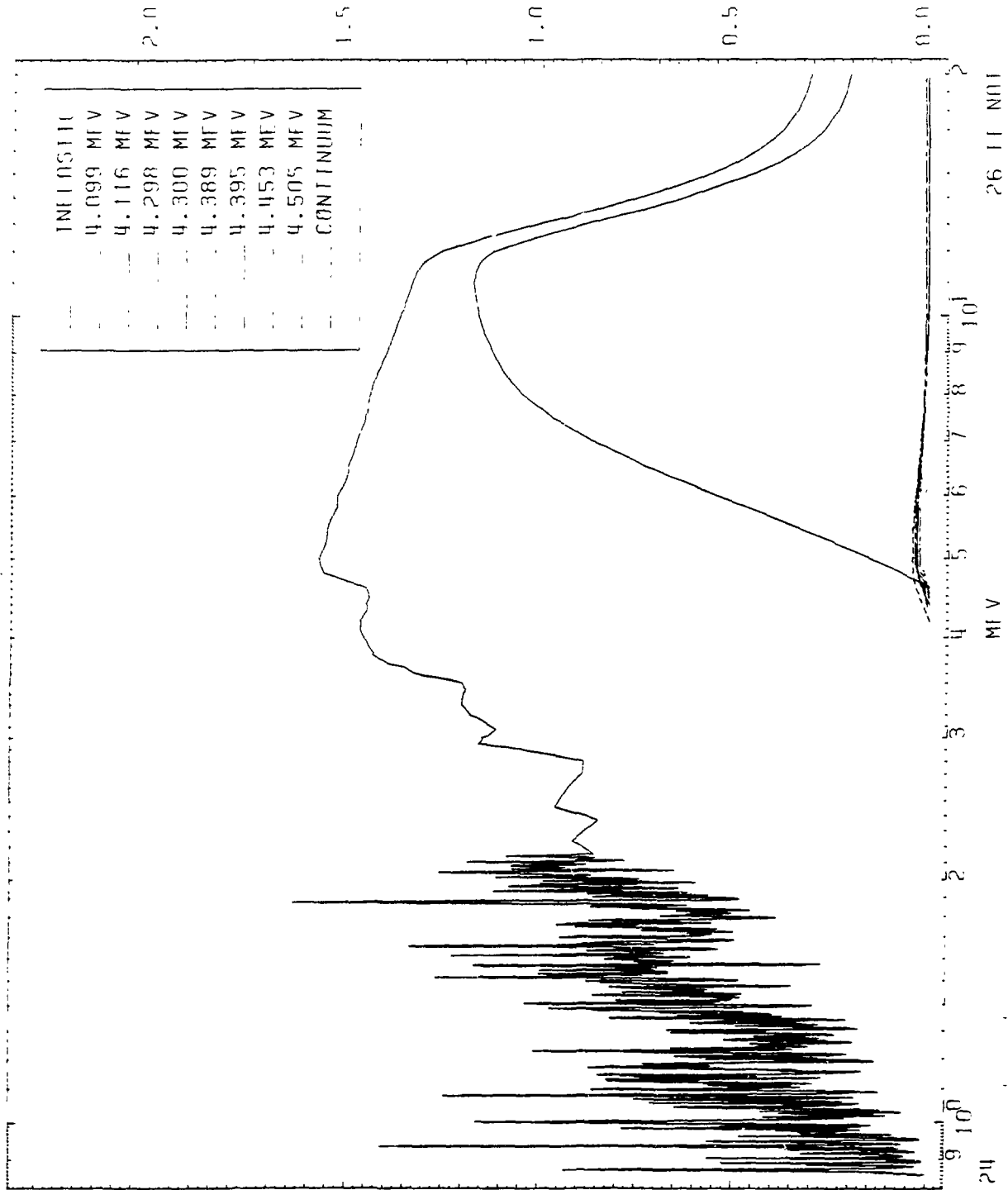




MAT 1192

(N.N.) CROSS SECTION

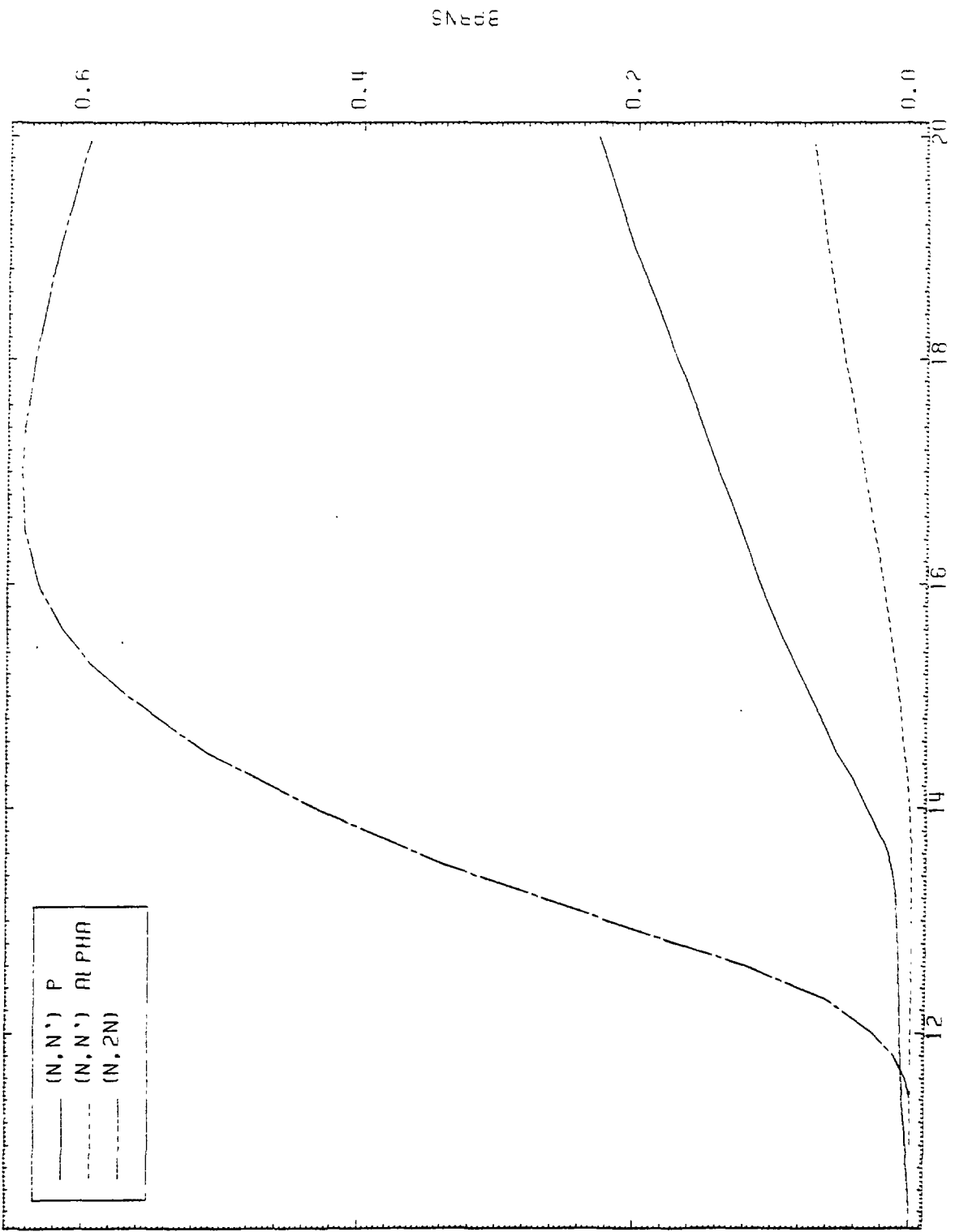
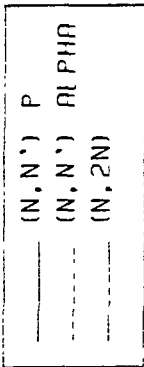
26 FT NOI



MNT 1192

CROSS SECTIONS

26-11 N01



25

MFV

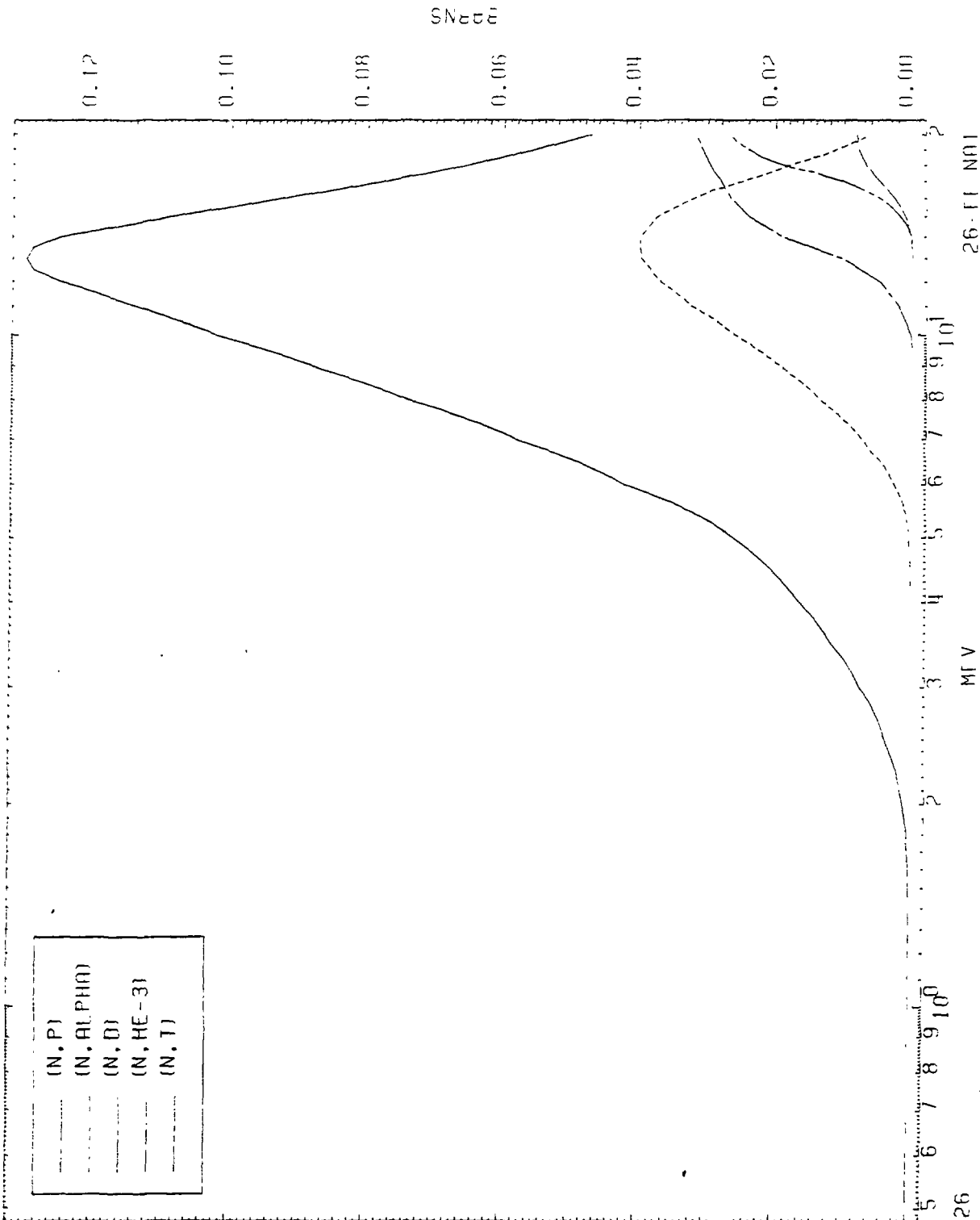
26-11 N01

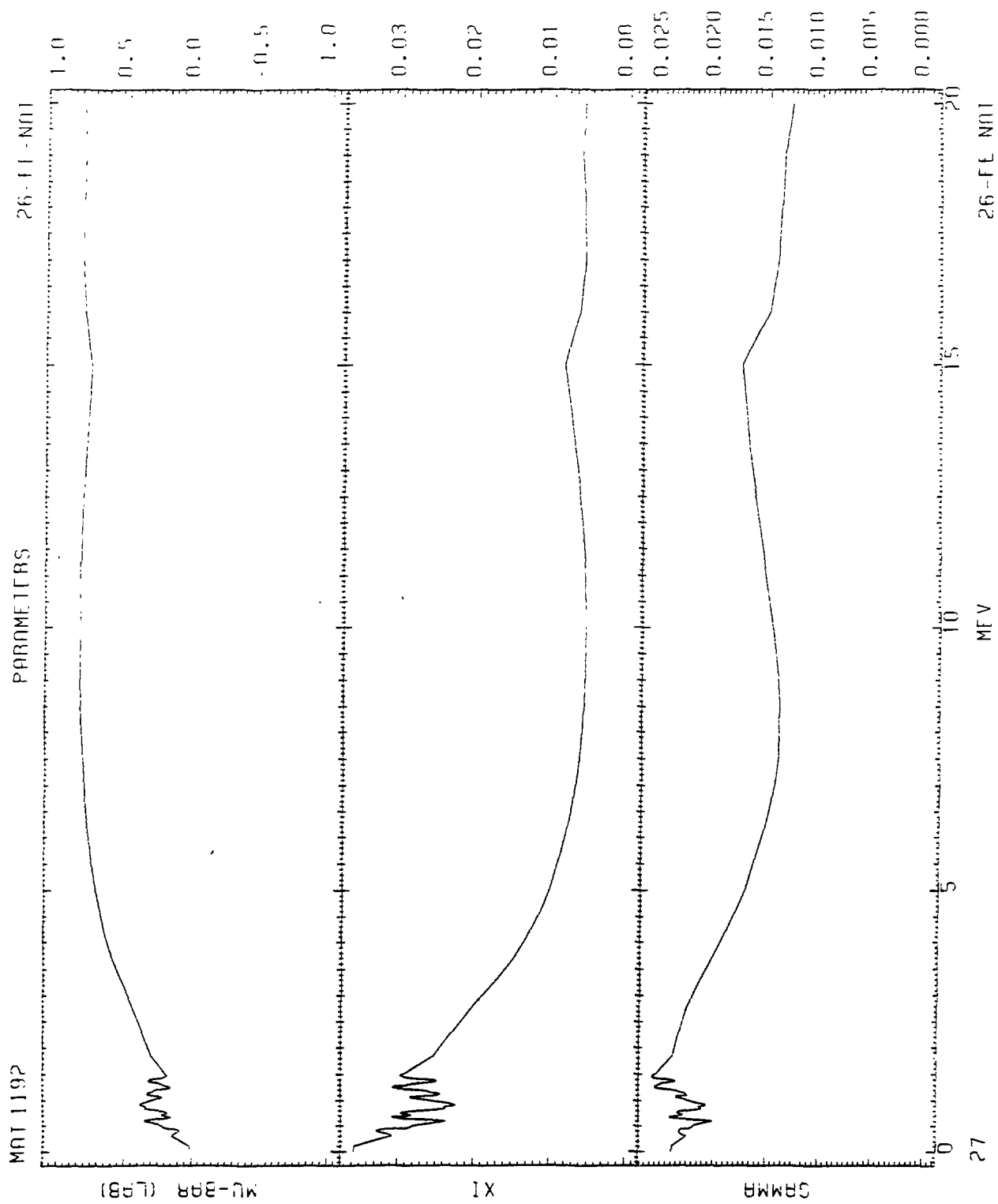
MAT 1192

CROSS SECTIONS

26-11 NOI

.....	(N, P)
-----	(N, ALPHA)
.....	(N, D)
-----	(N, HE-3)
.....	(N, T)





MAT 1192 26-11-N01

PARAMETERS

26-11-N01

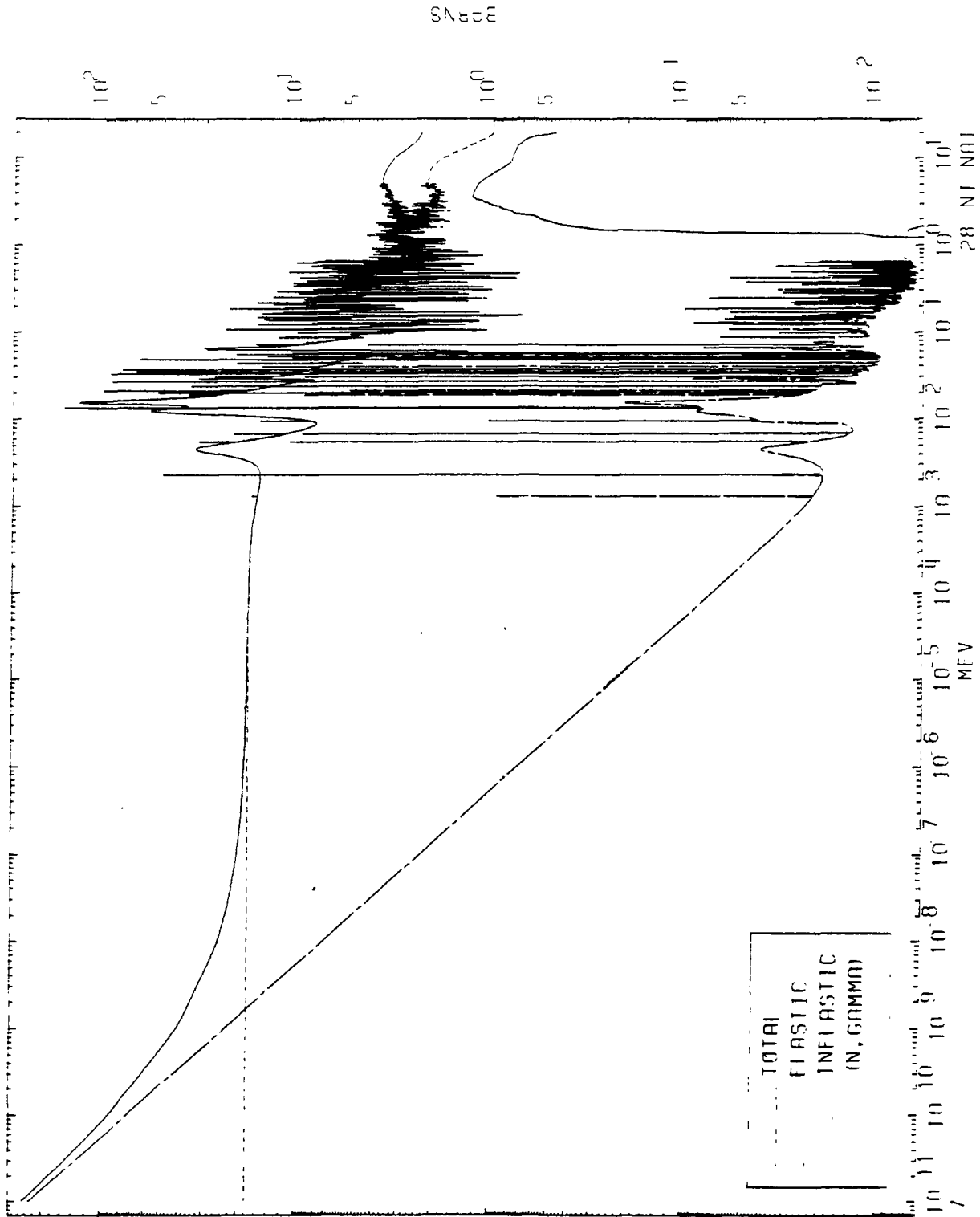
MEV

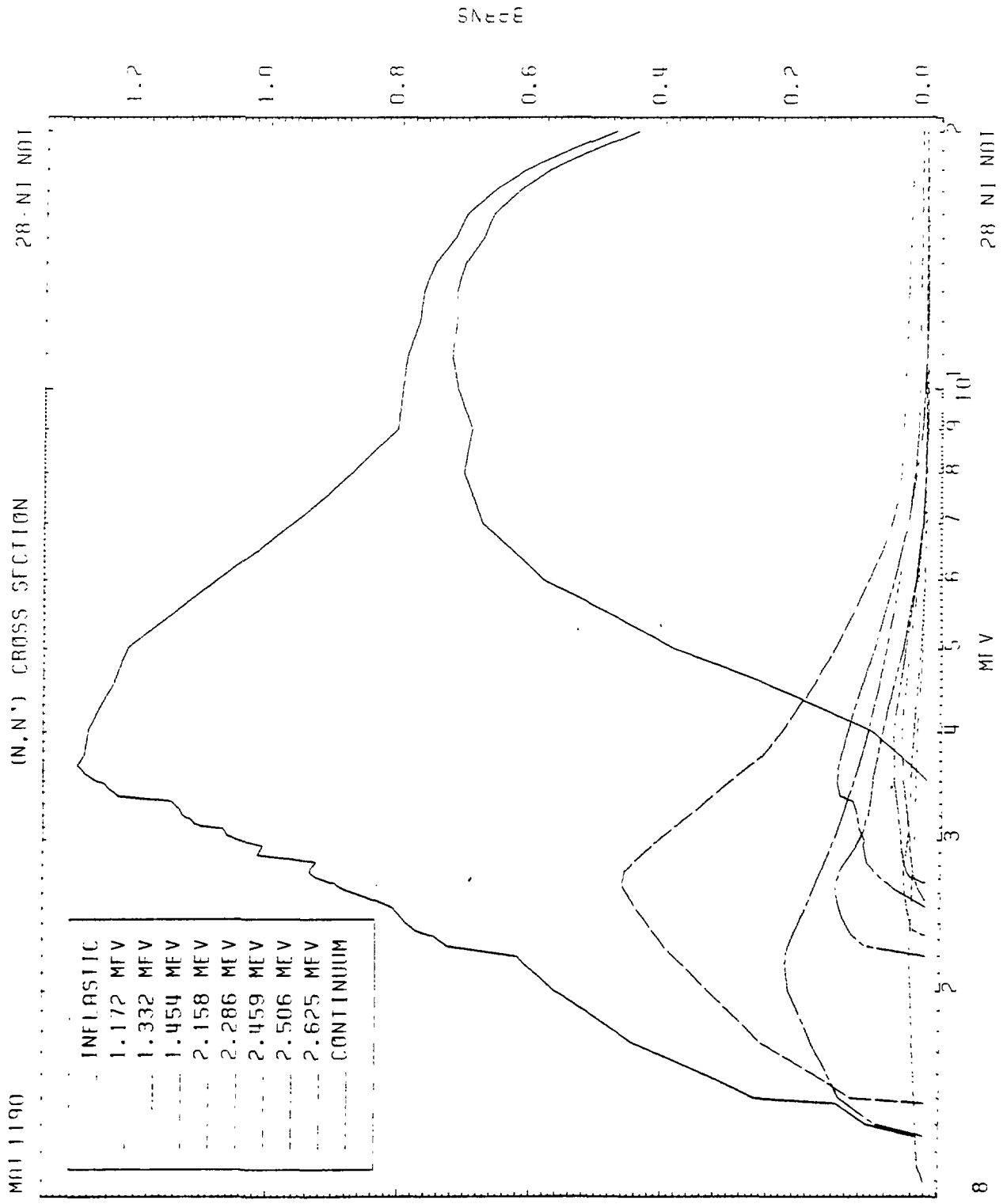
27

MAT 1190

CROSS SECTIONS

28-NI N01



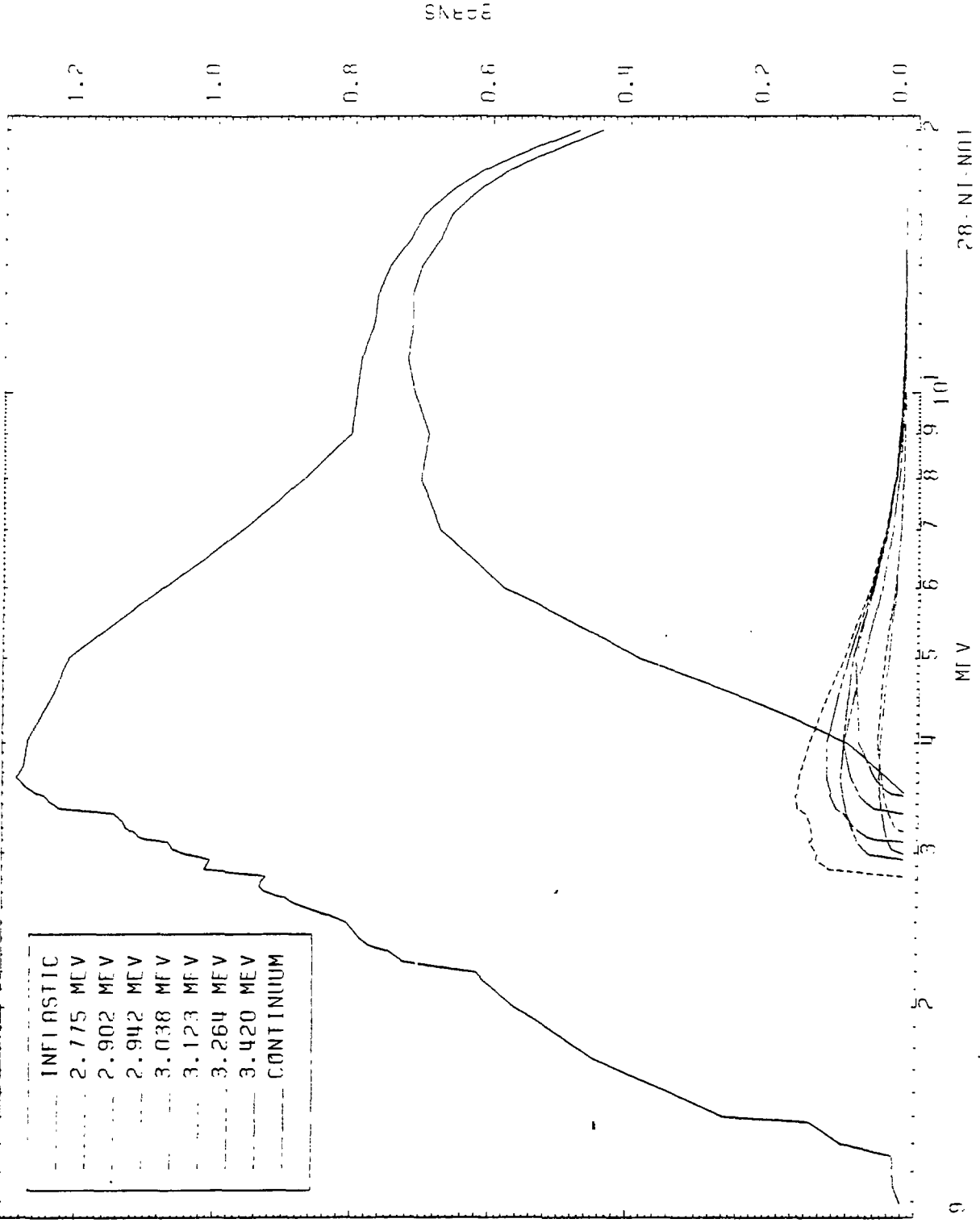


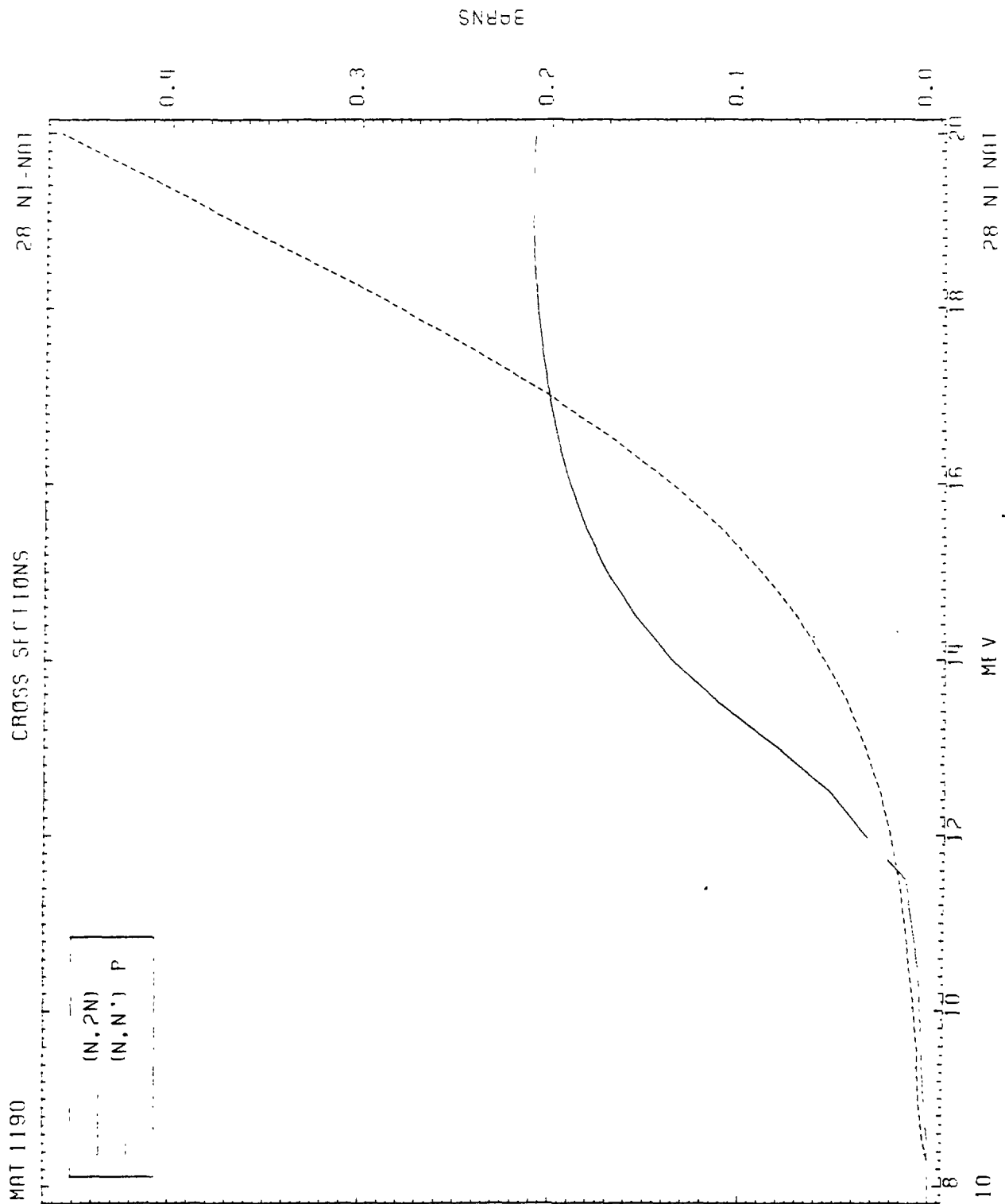
MAT 1190

(N,N') CROSS SECTION

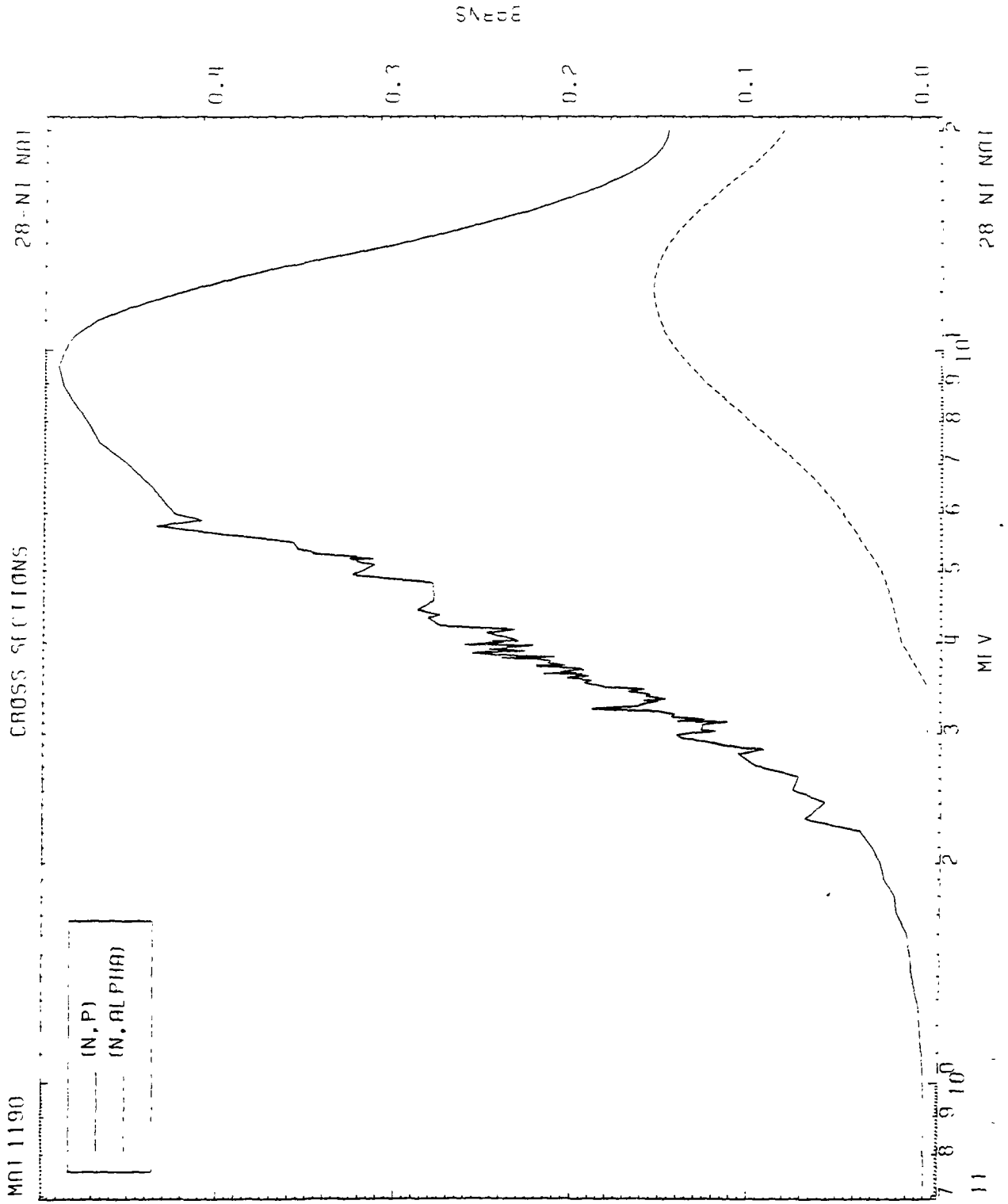
28 NI 001

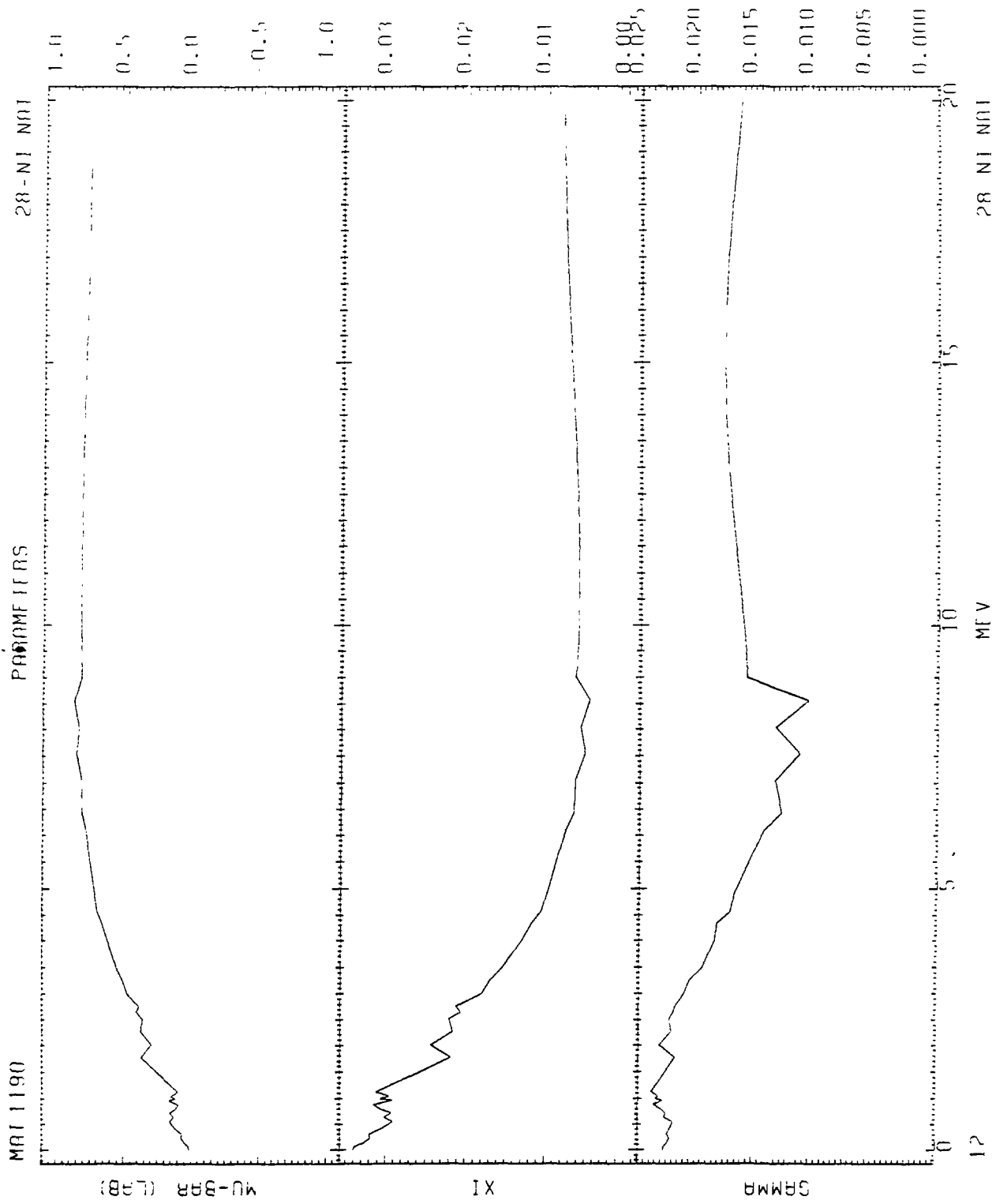
---	INFLASTIC
---	2.775 MEV
---	2.902 MEV
---	2.942 MEV
---	3.038 MEV
---	3.123 MEV
---	3.264 MEV
---	3.420 MEV
---	CONTINUUM







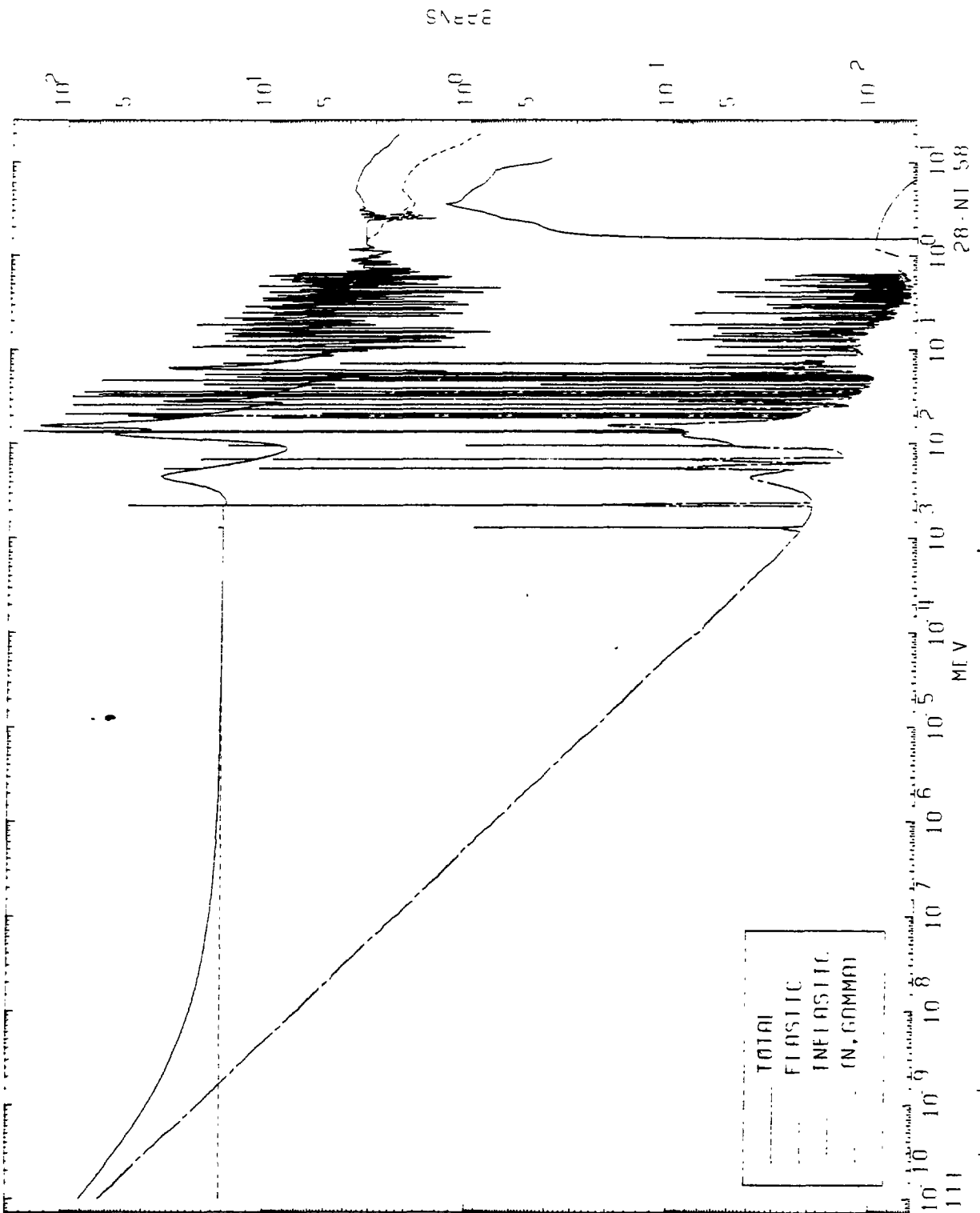


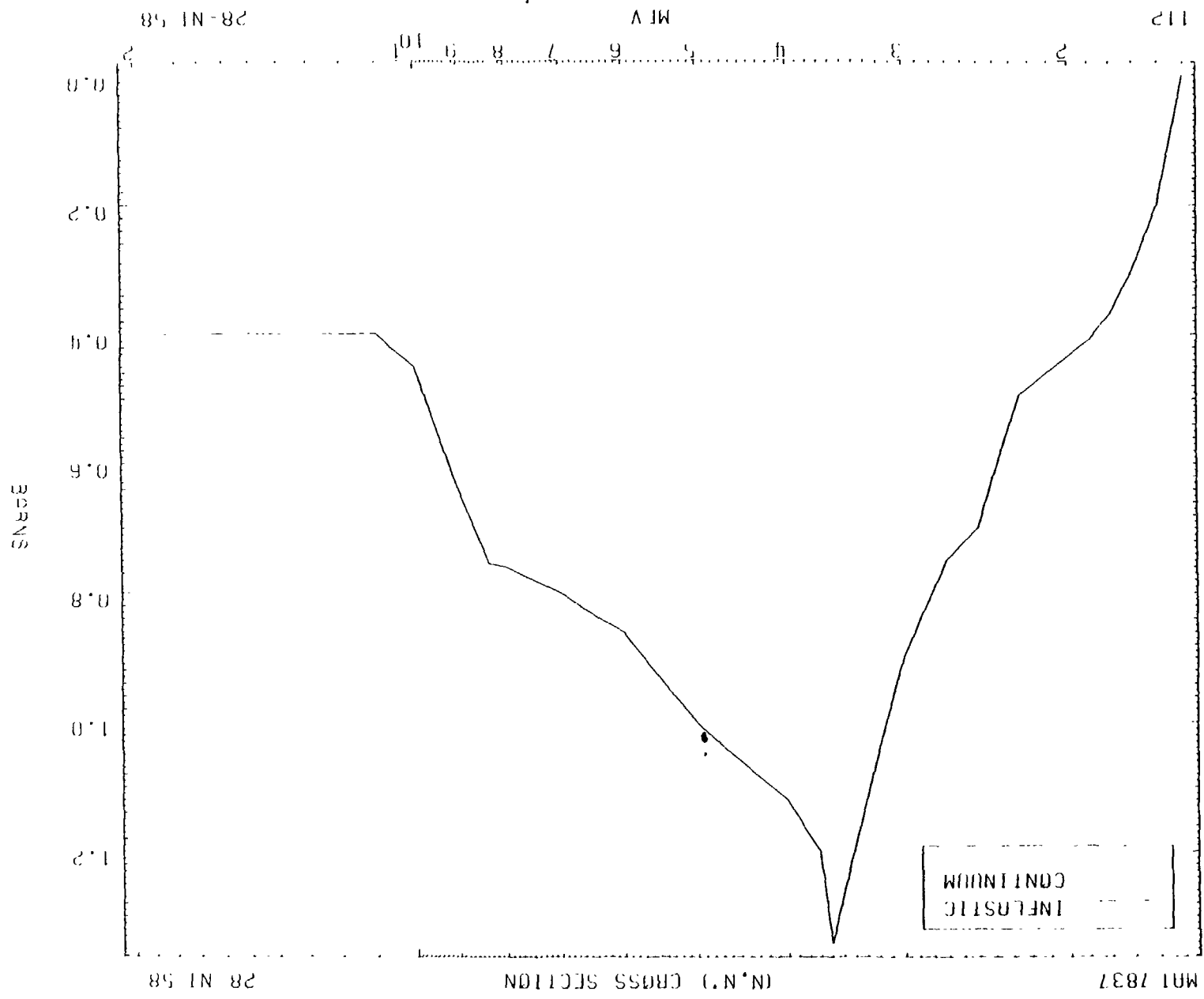


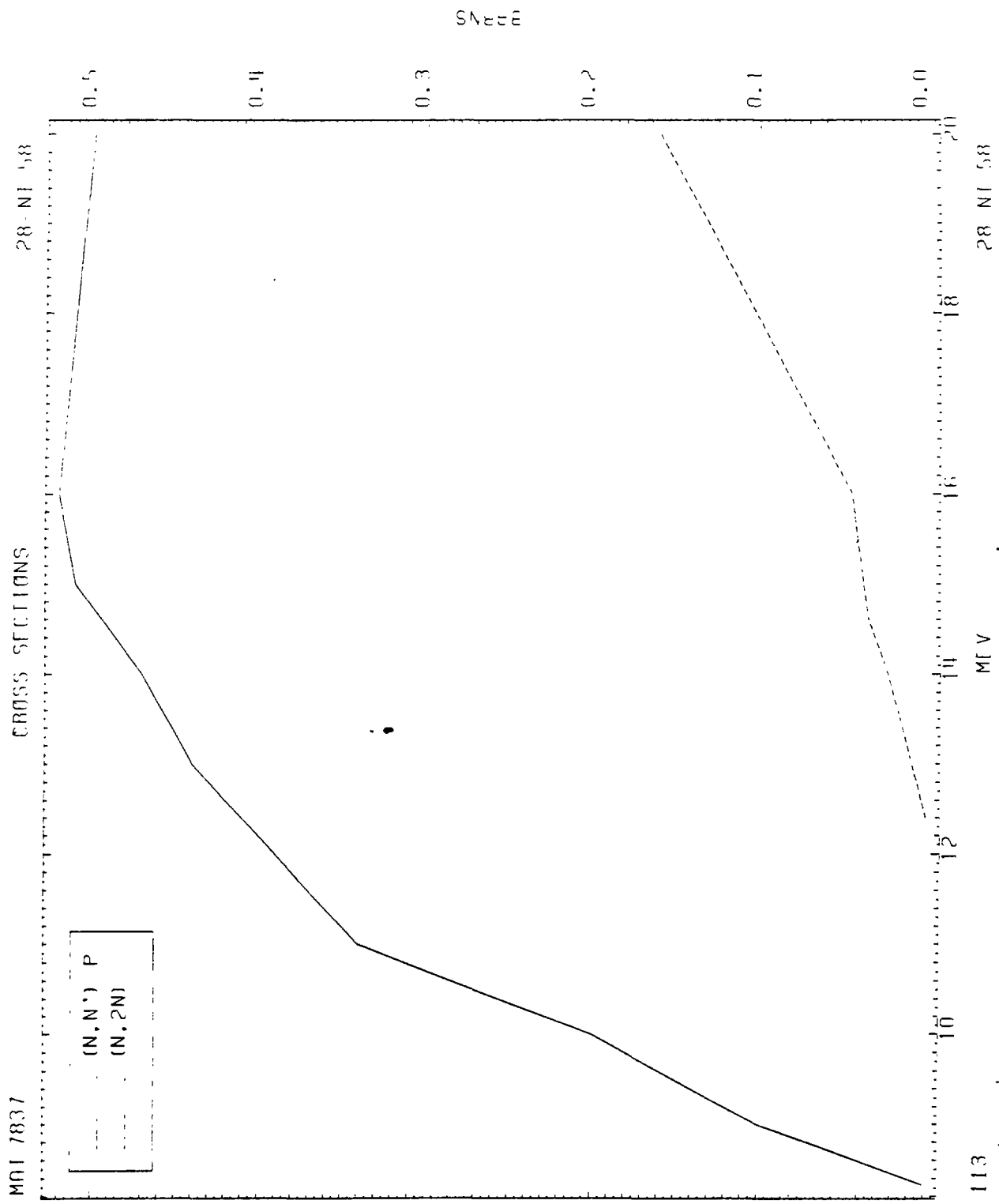
MAT 7837

CROSS SECTIONS

28 NI 58





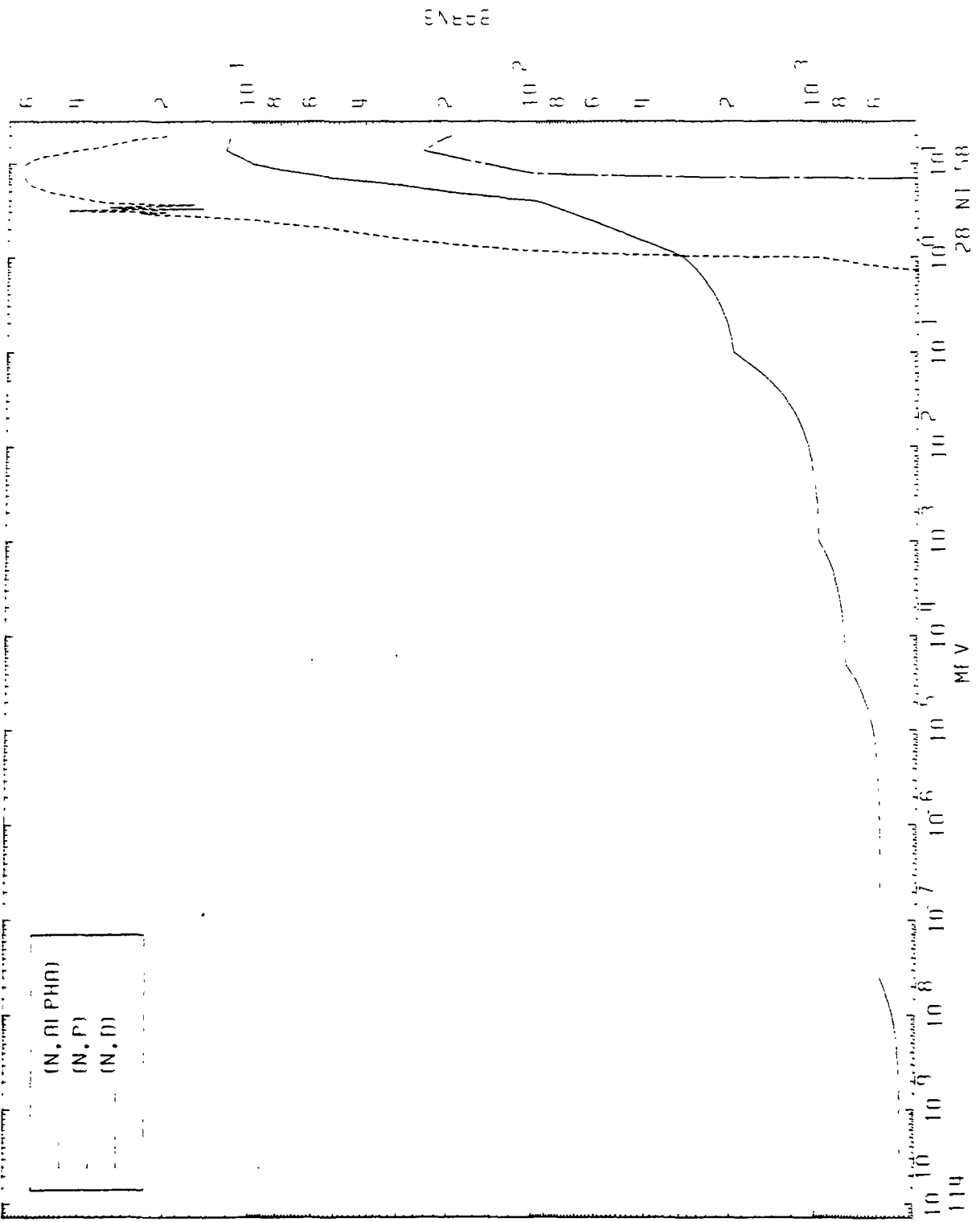


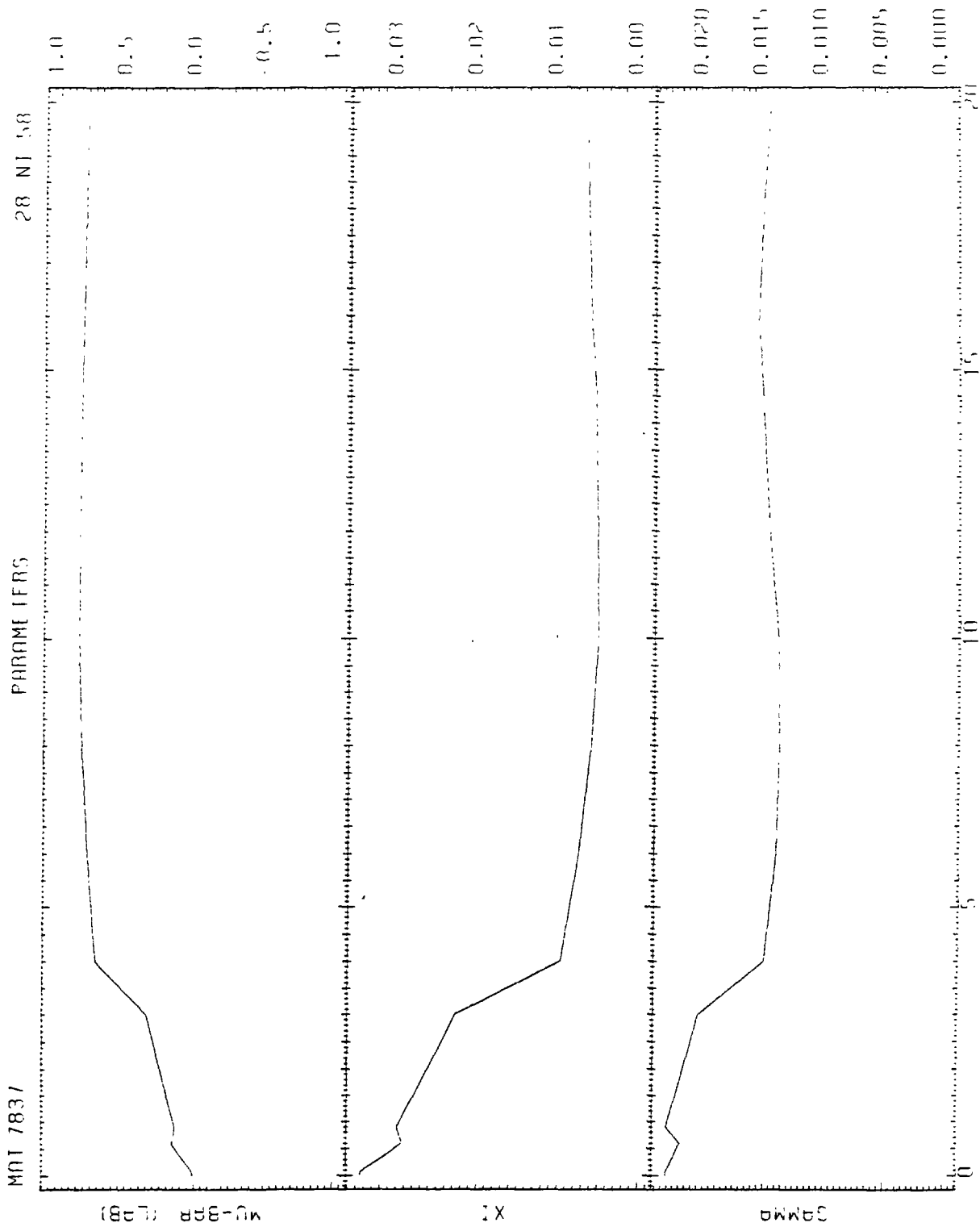
MAT 7837

CROSS SECTIONS

28 NI 58

—	(N, NI PHO)
- - -	(N, P)
· · ·	(N, D)





115

MIV

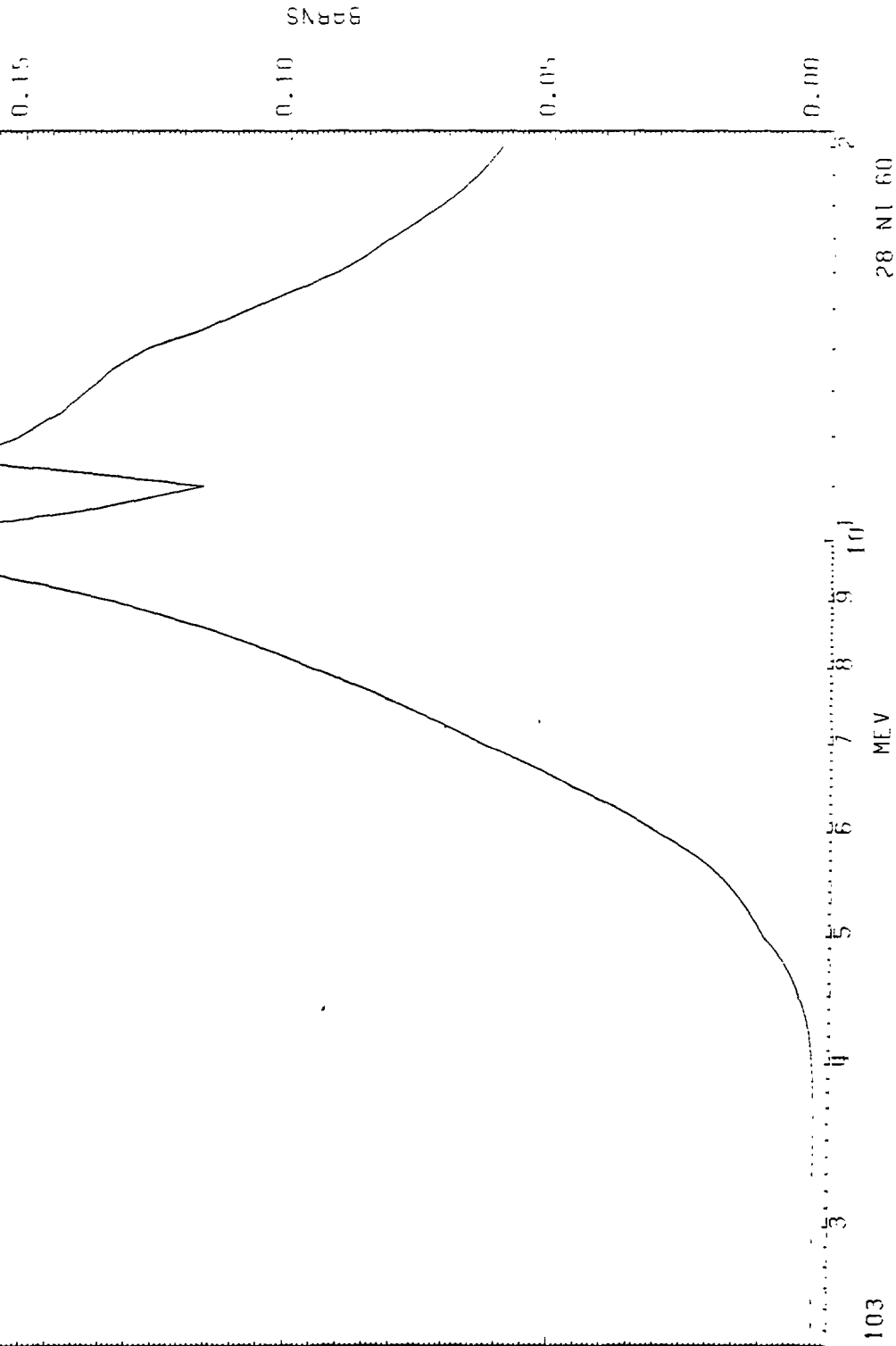
28 NI 58

MAT 6434

CROSS SECTIONS

28-NI 60

(N, P)

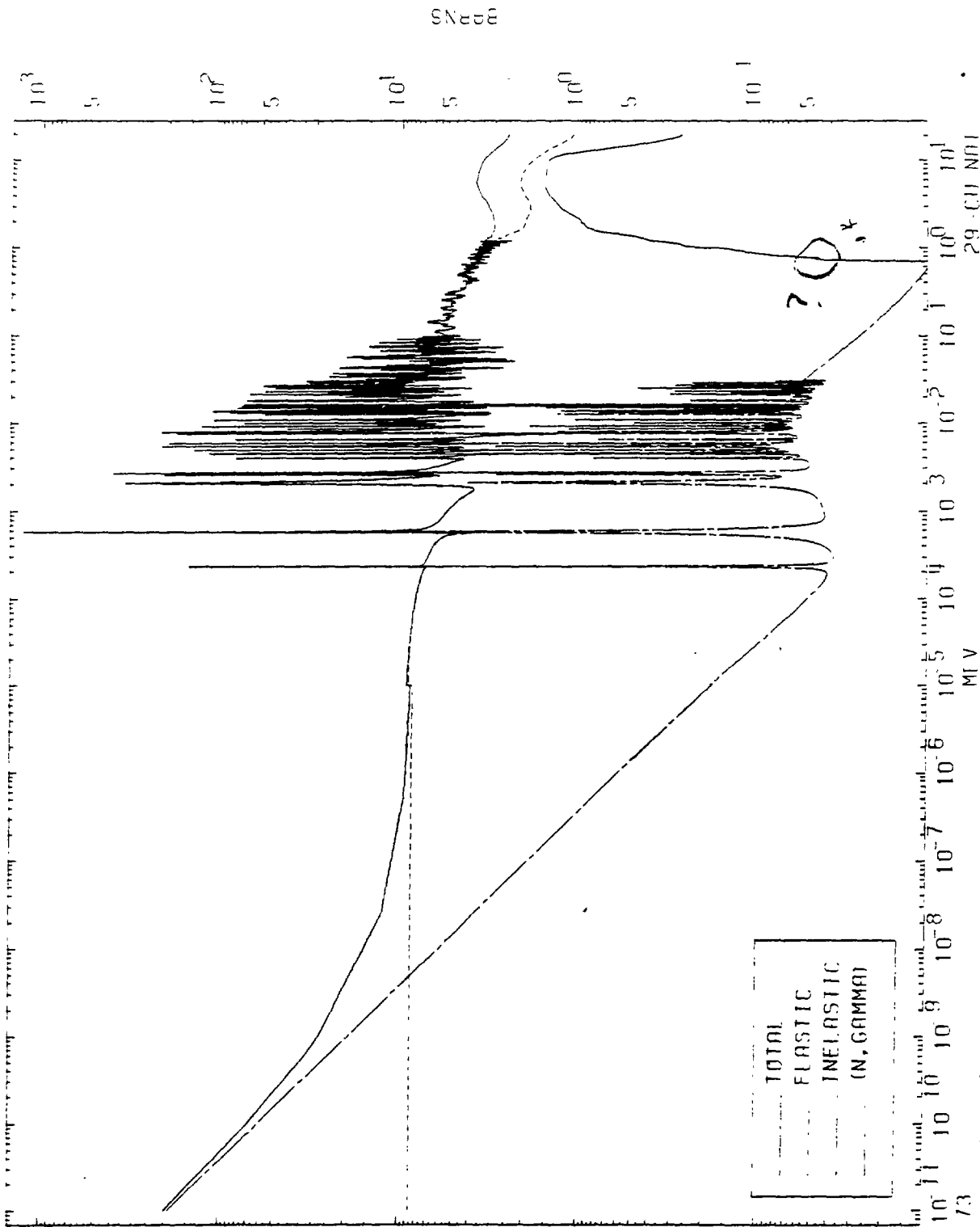


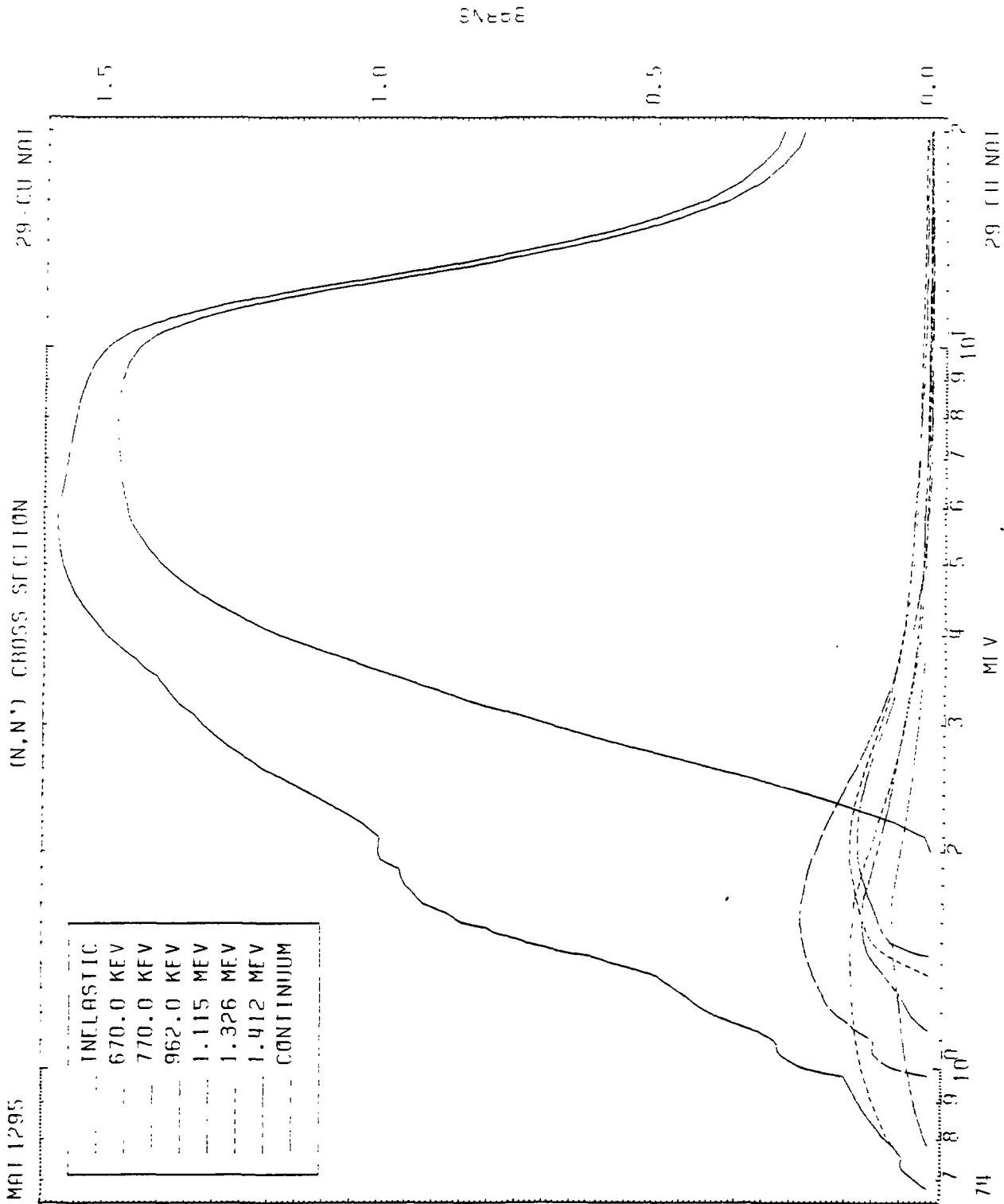


MAT 1295

CROSS SECTIONS

29-CU NPT



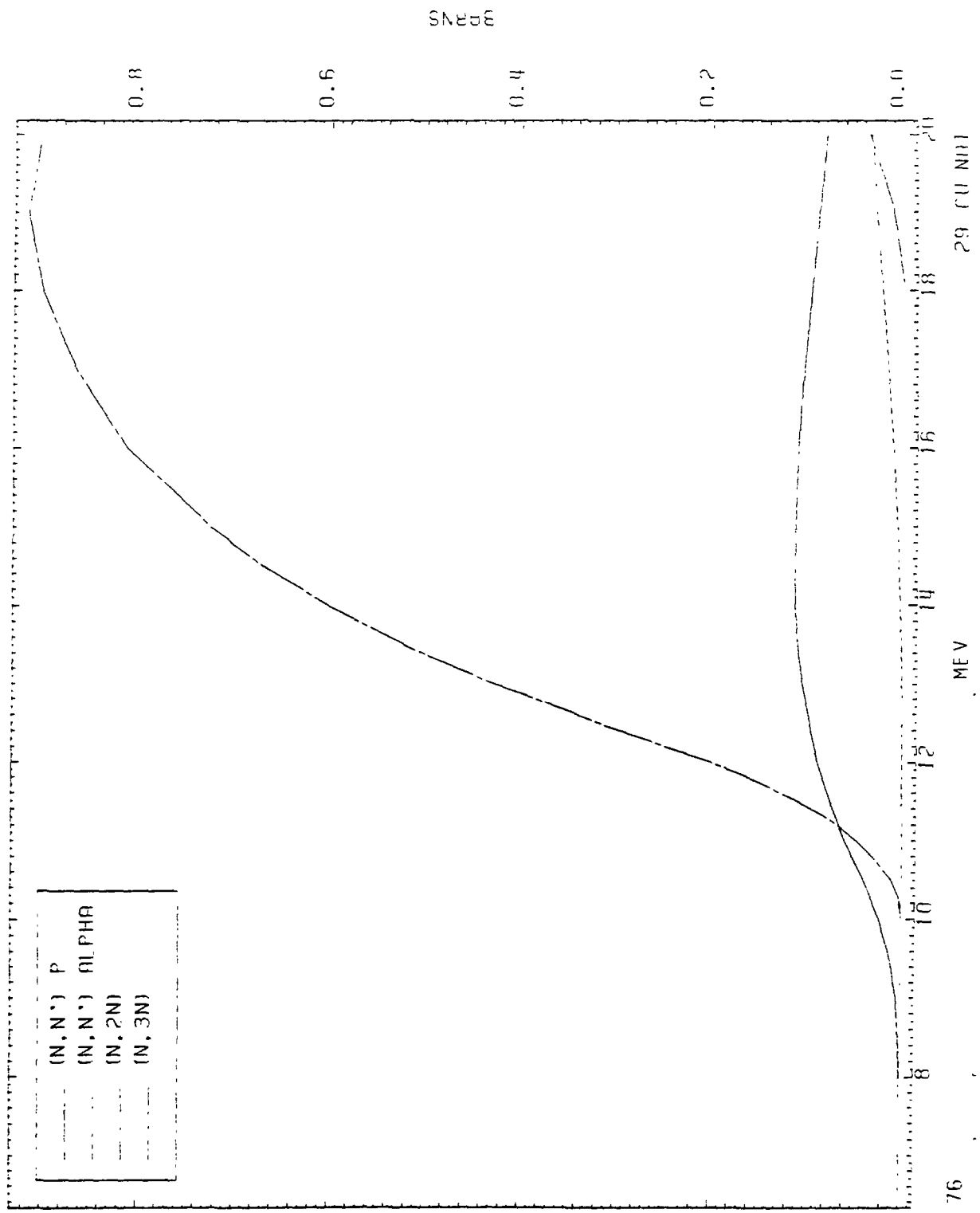


MAT 1295

CROSS SECTIONS

29 CU NDT

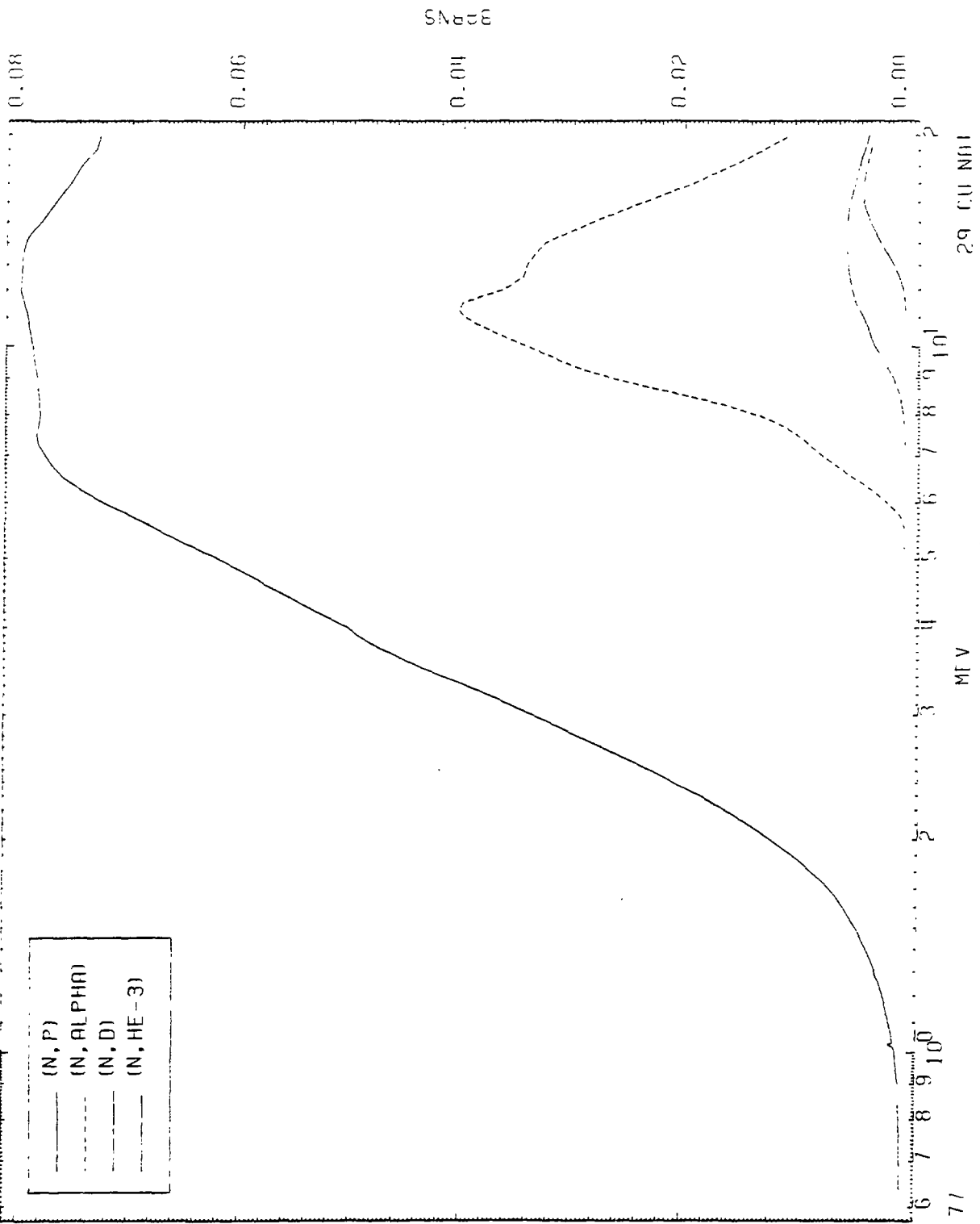
---	(N,N') P
---	(N,N') ALPHA
---	(N,2N)
---	(N,3N)



MAI 1295

CROSS SECTIONS

29 CU-NOT

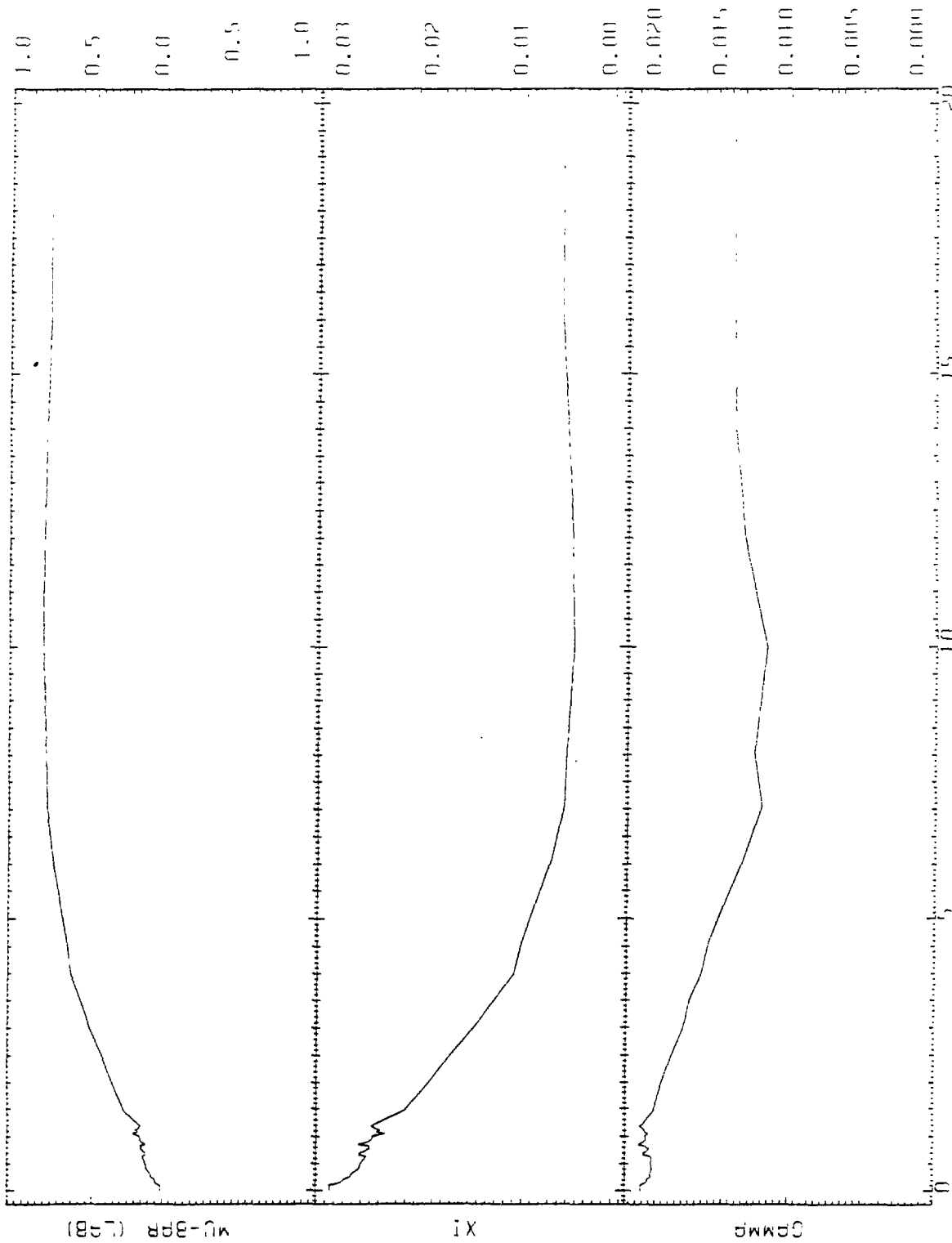


(N,P)  
——  
(N,ALPHA)  
- - -  
(N,D)  
- · -  
(N,HE-3)  
····

MPT 1295

PARAMETERS

29 CU-NOT



18

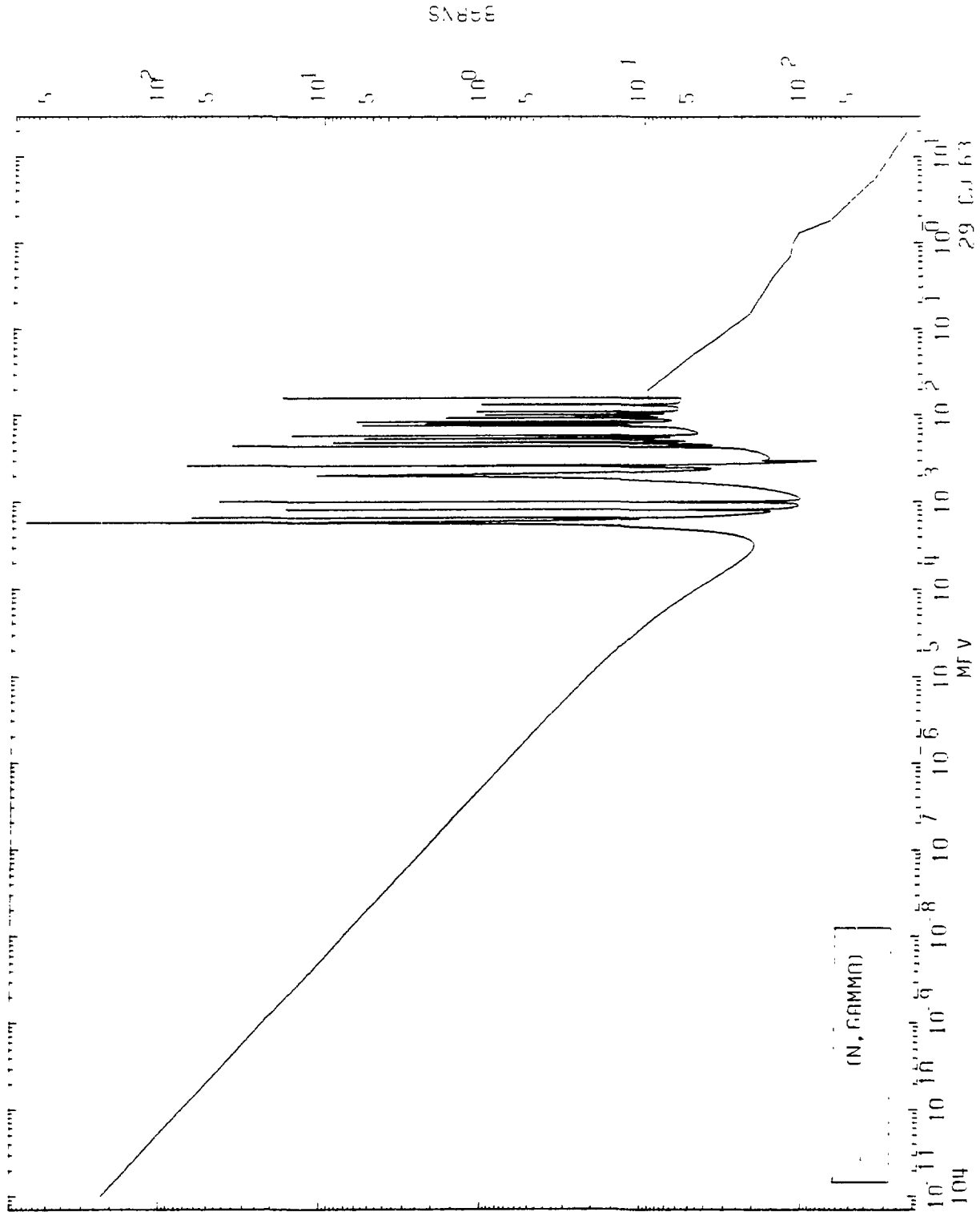
MIV

29 CU-NOT

MAT 6435

CROSS SECTIONS

29 (U 63)



MAT 6435

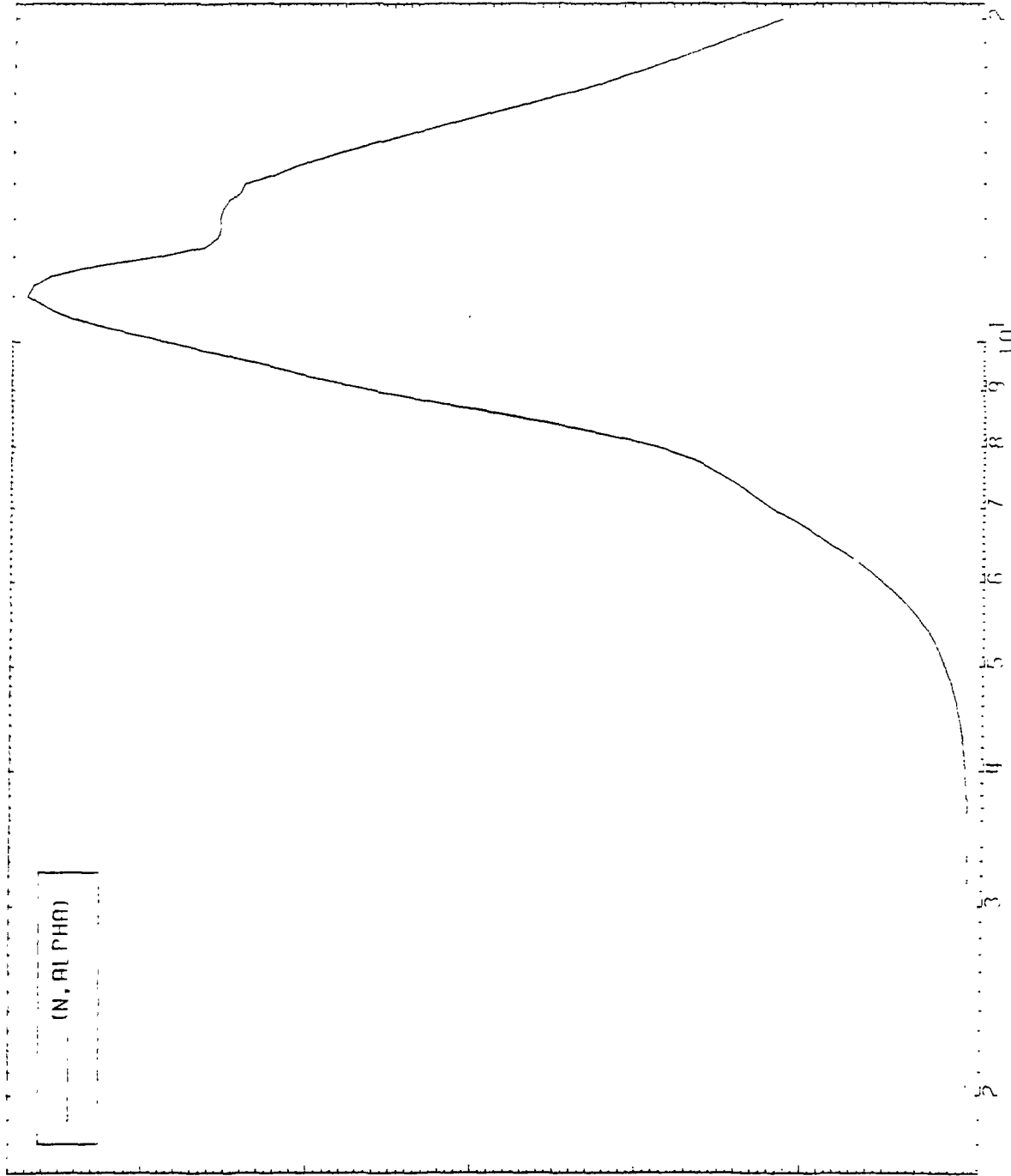
CROSS SECTIONS

29-CU 63

(N, ALPHA)

0.05  
0.04  
0.03  
0.02  
0.01  
0.00

B2NS



29 CU 63

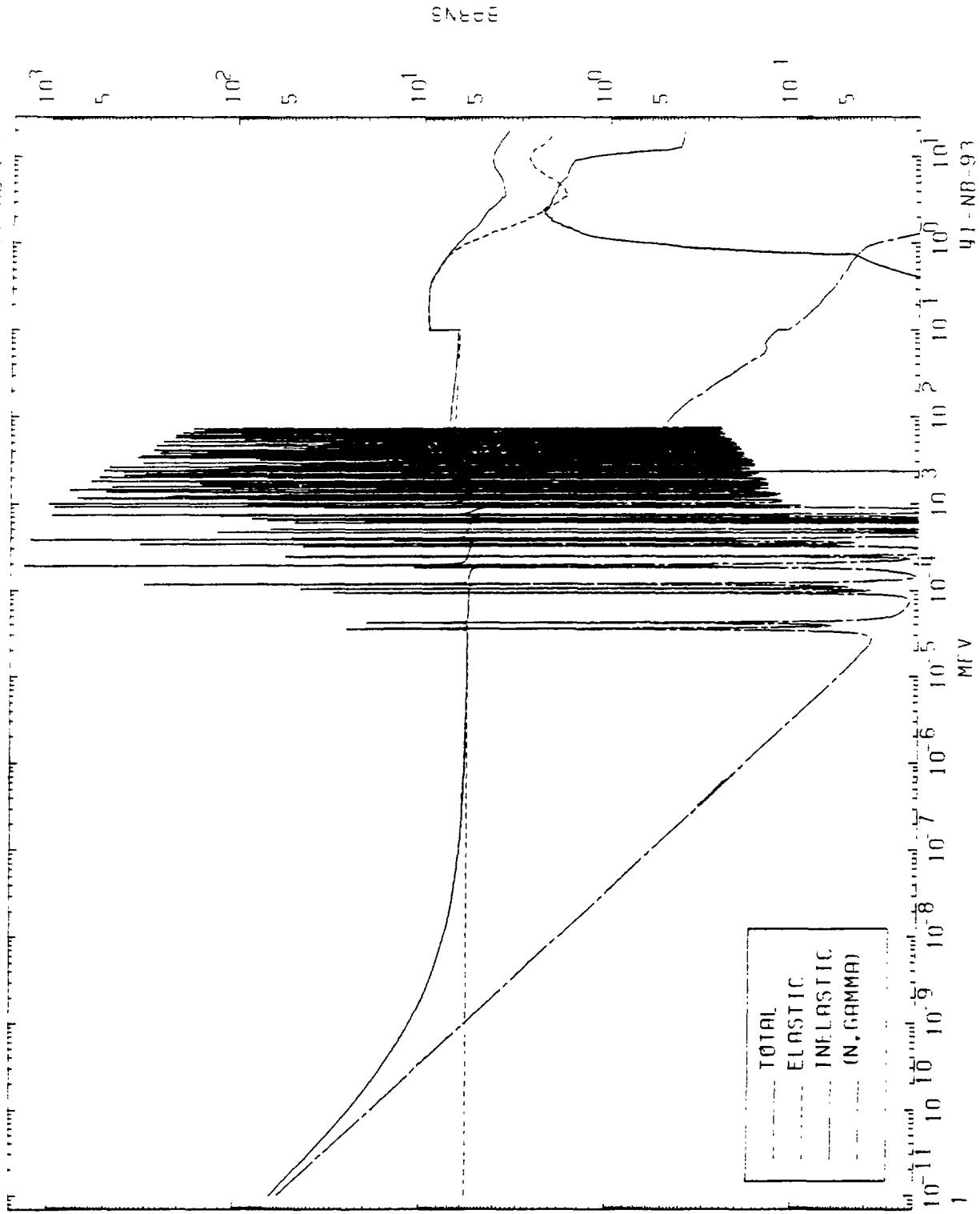
MEV

105

MAT 1189

CROSS SECTIONS

41-NB-93



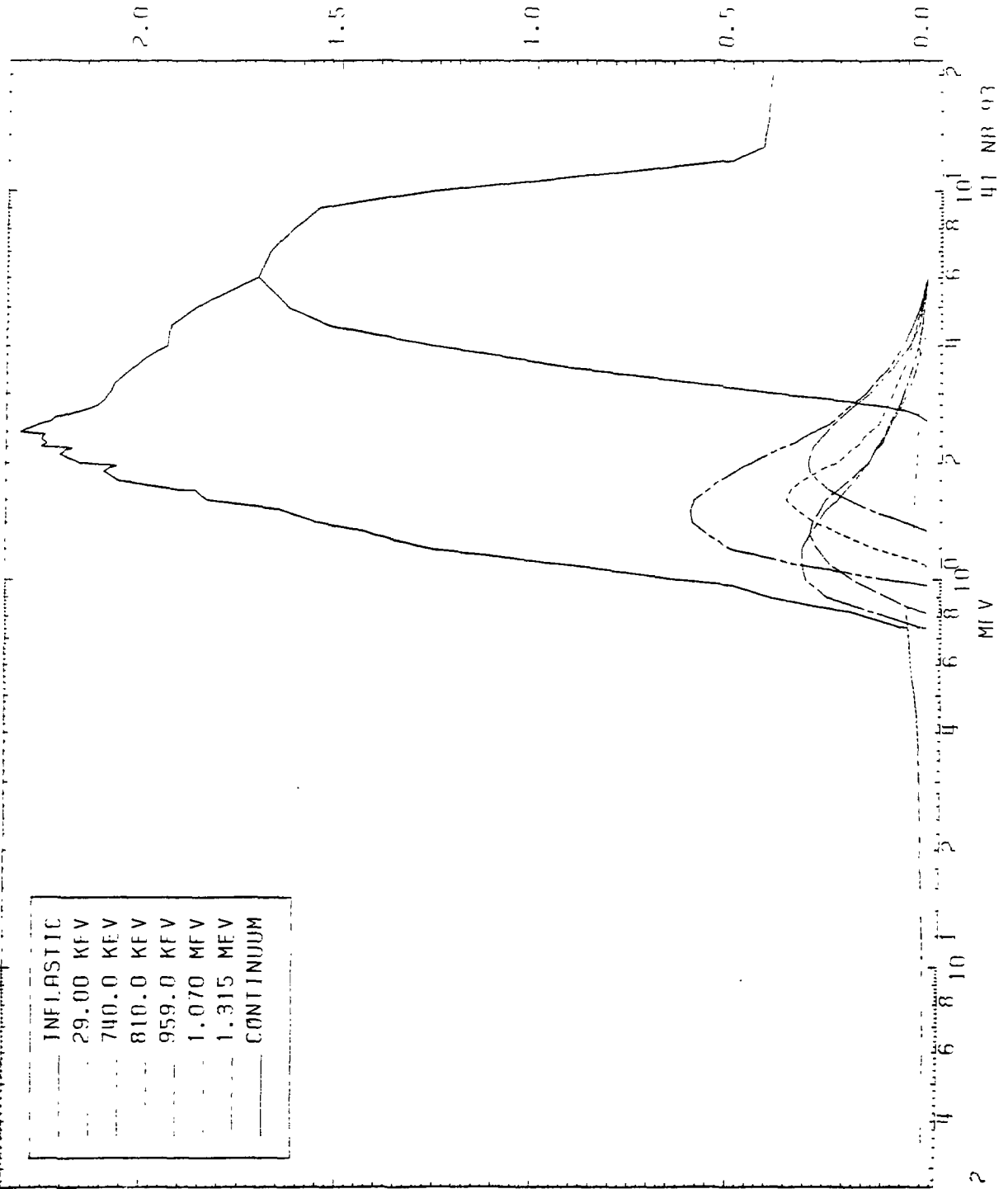


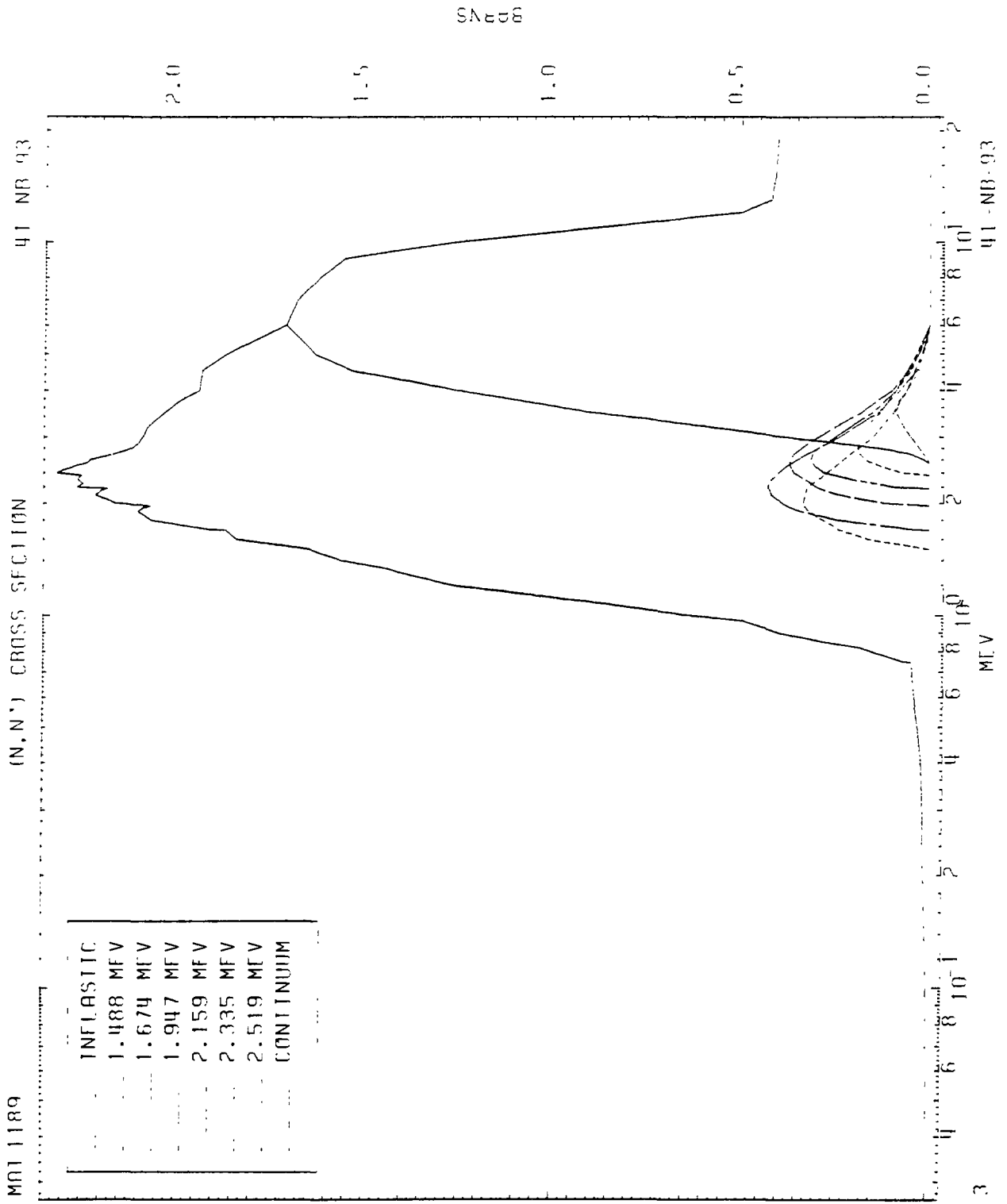
MAT 1189

(N,N') CROSS SECTION

41-NR-93

—	INELASTIC
- - -	29.00 KEV
· · ·	740.0 KEV
—	810.0 KEV
- - -	959.0 KEV
· · ·	1.070 MEV
—	1.315 MEV
—	CONTINUUM



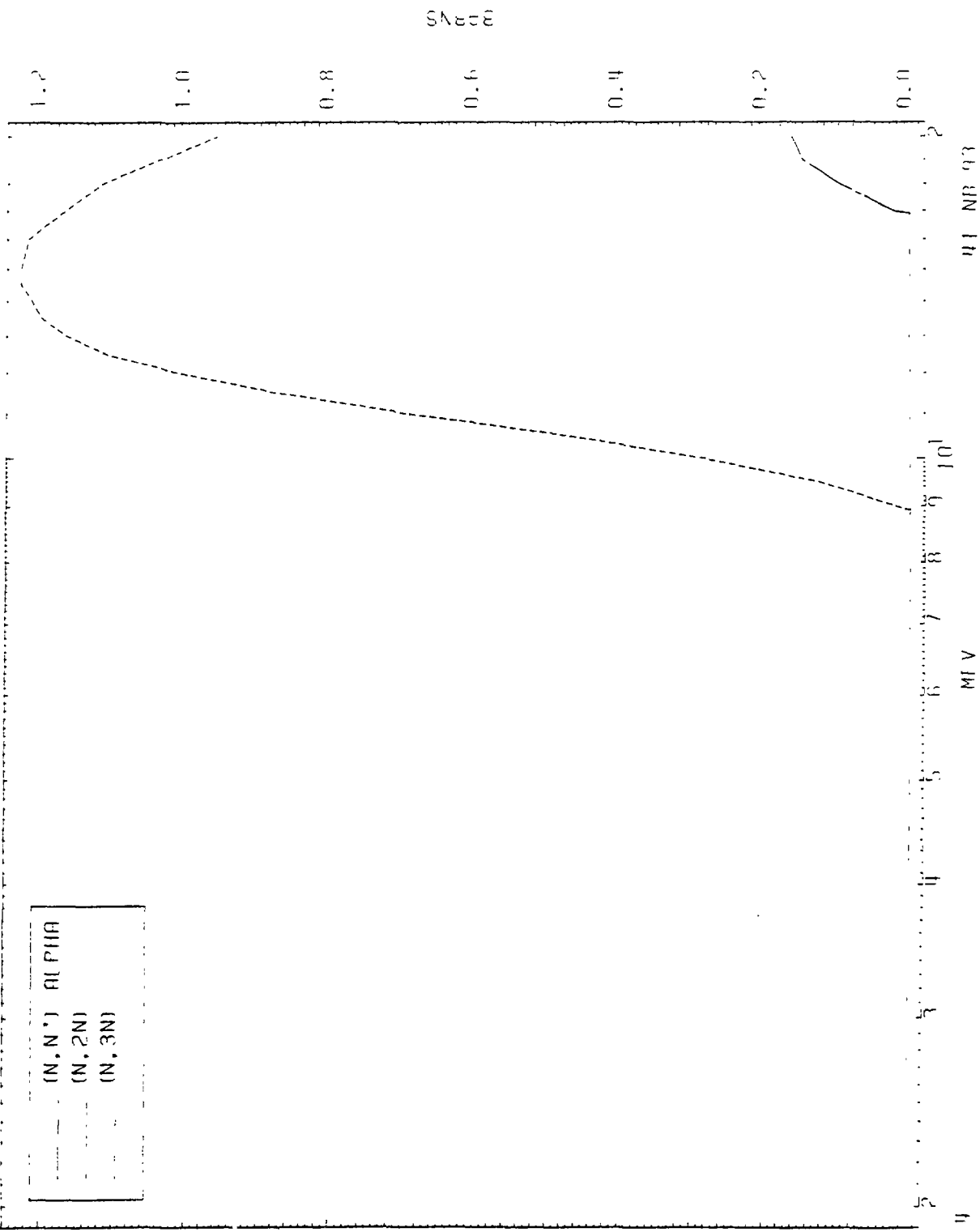


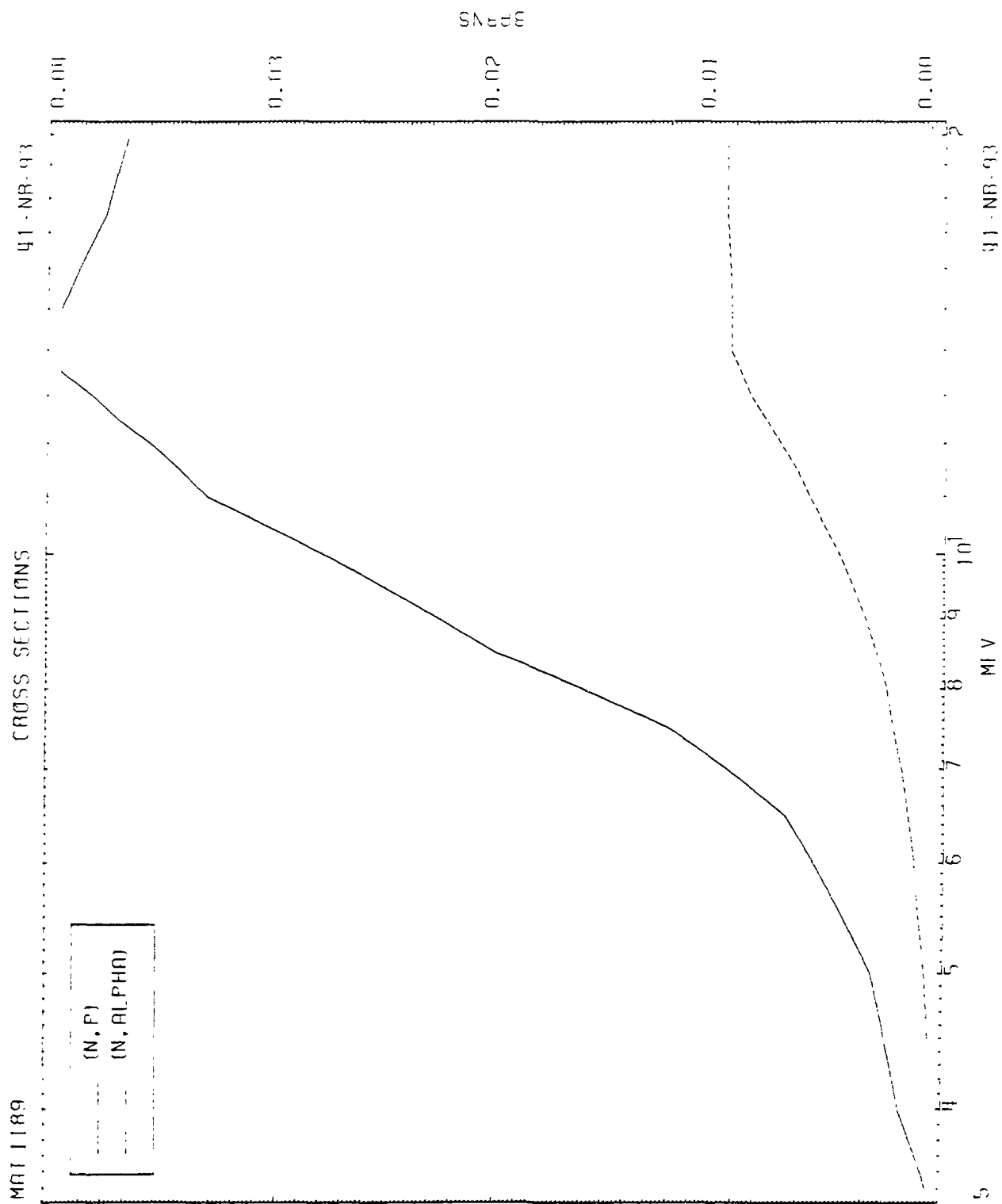
MAT 1189

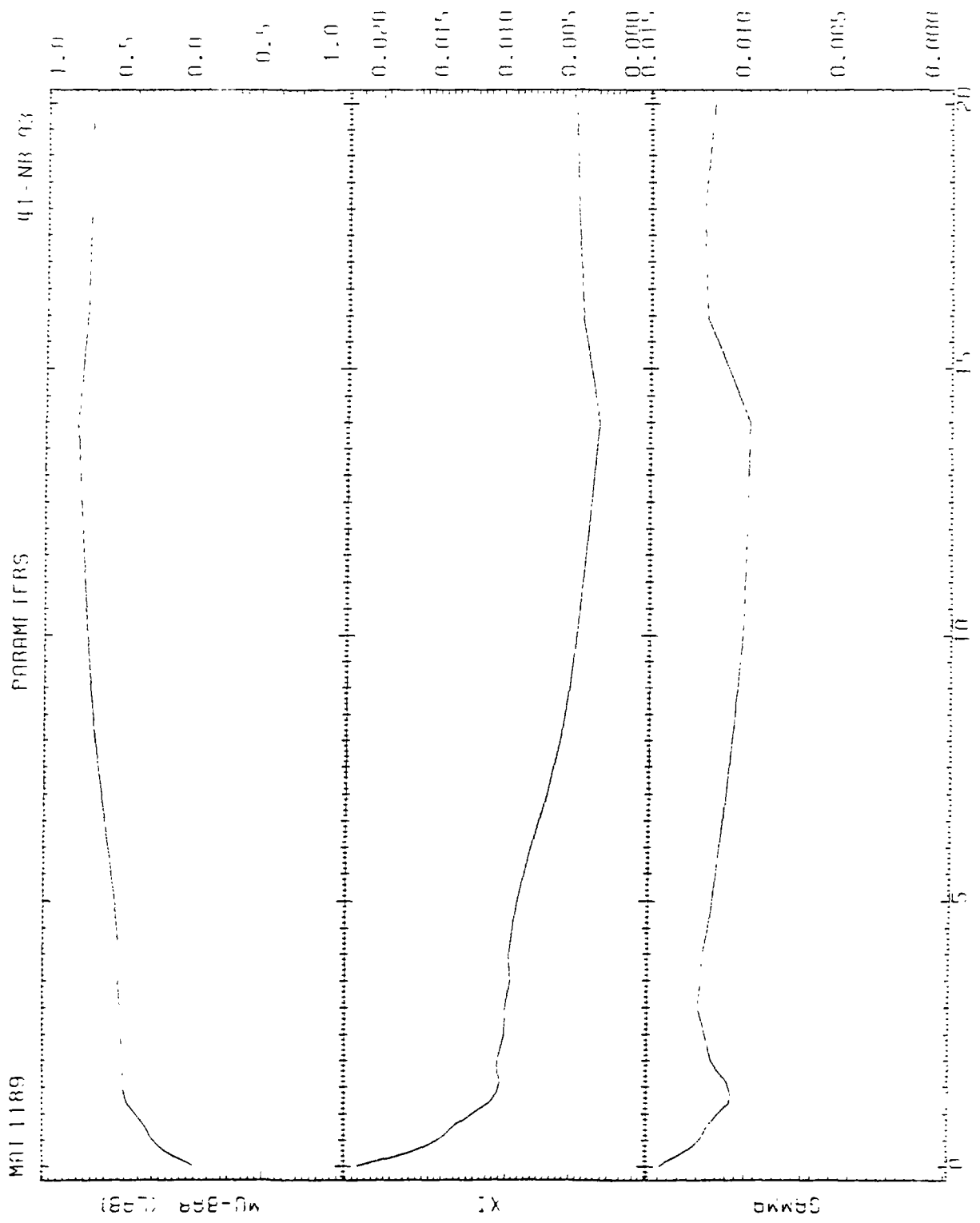
CROSS SECTIONS

41 NB 93

(N,N') ALPHA  
(N,2N)  
(N,3N)



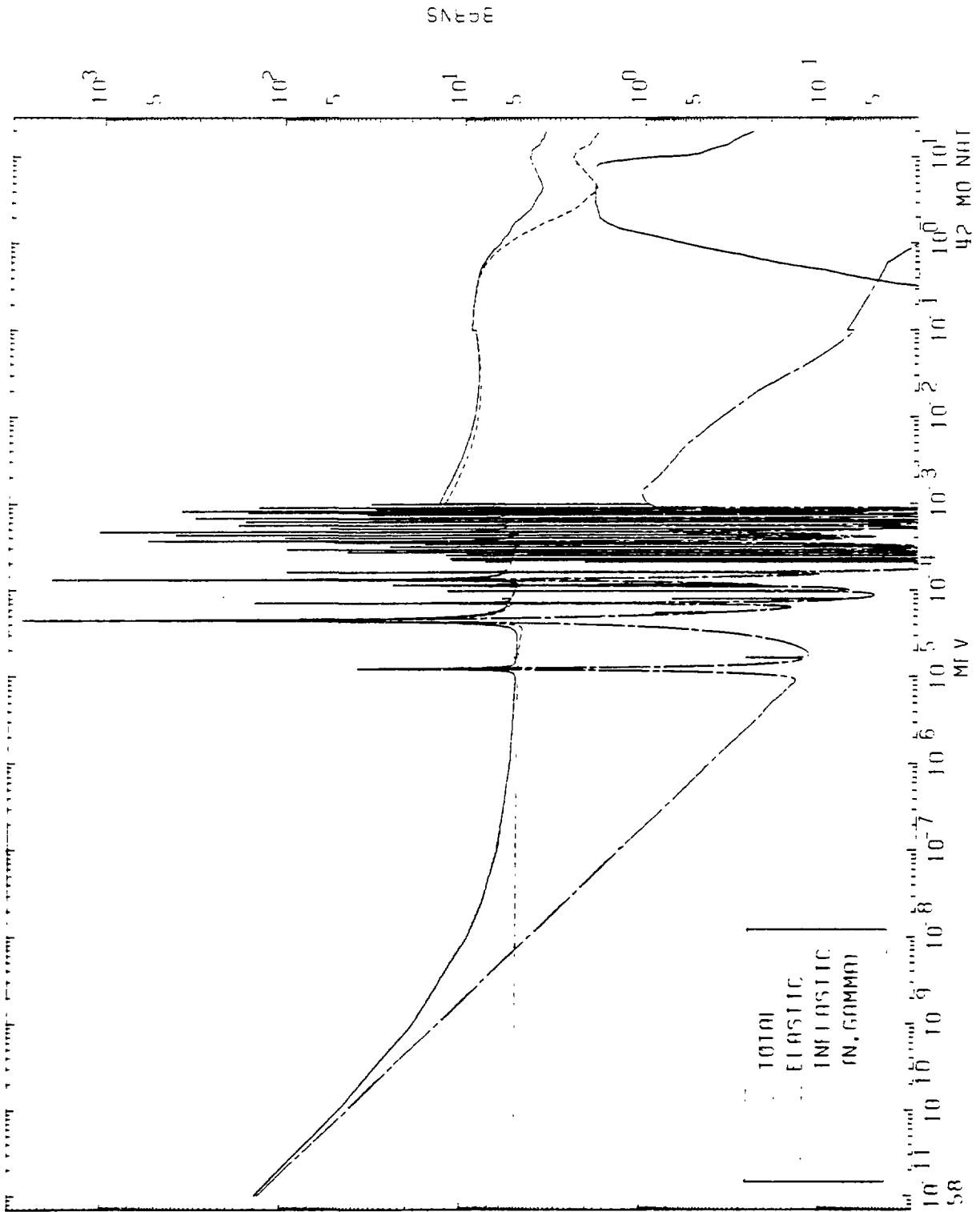


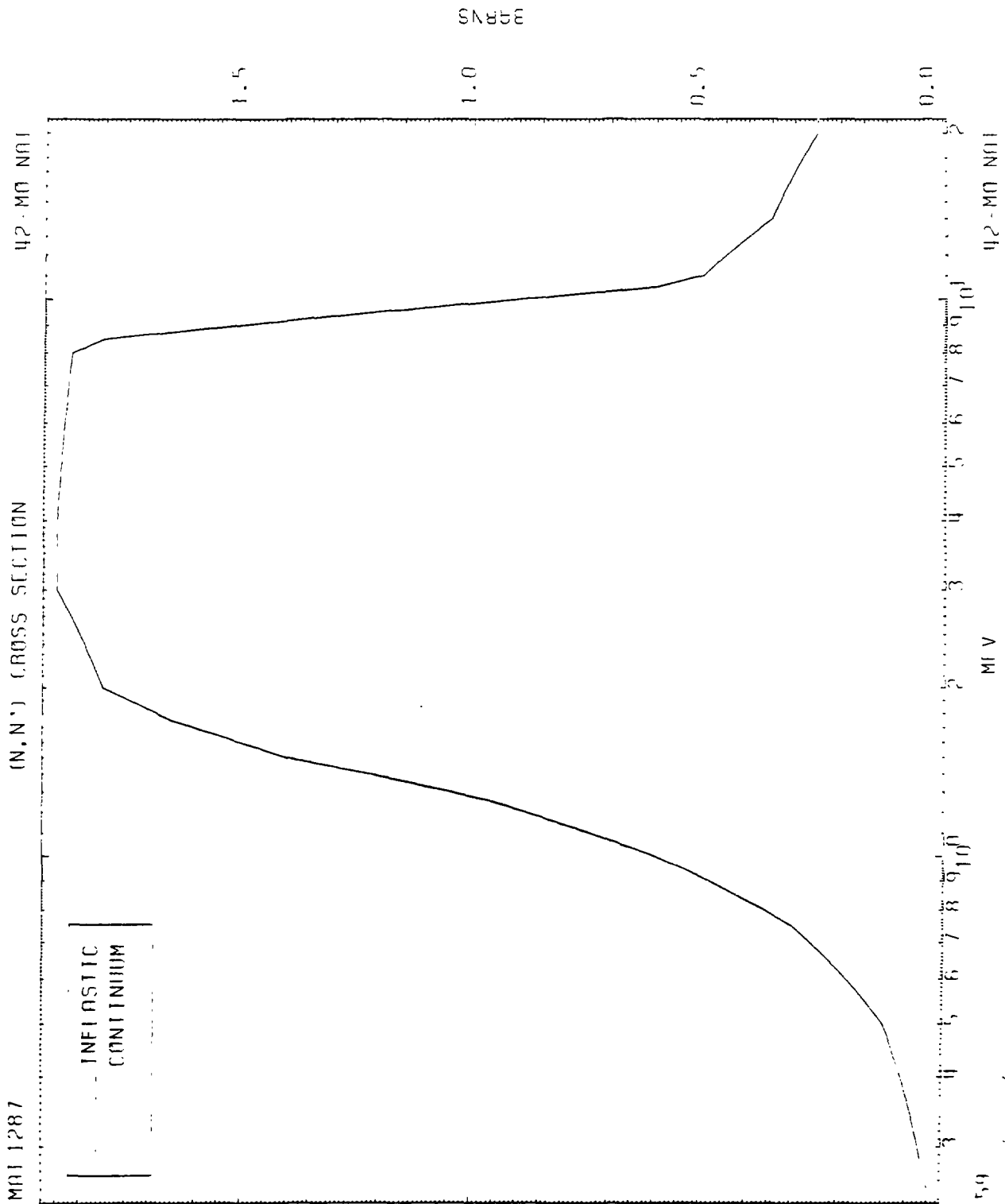


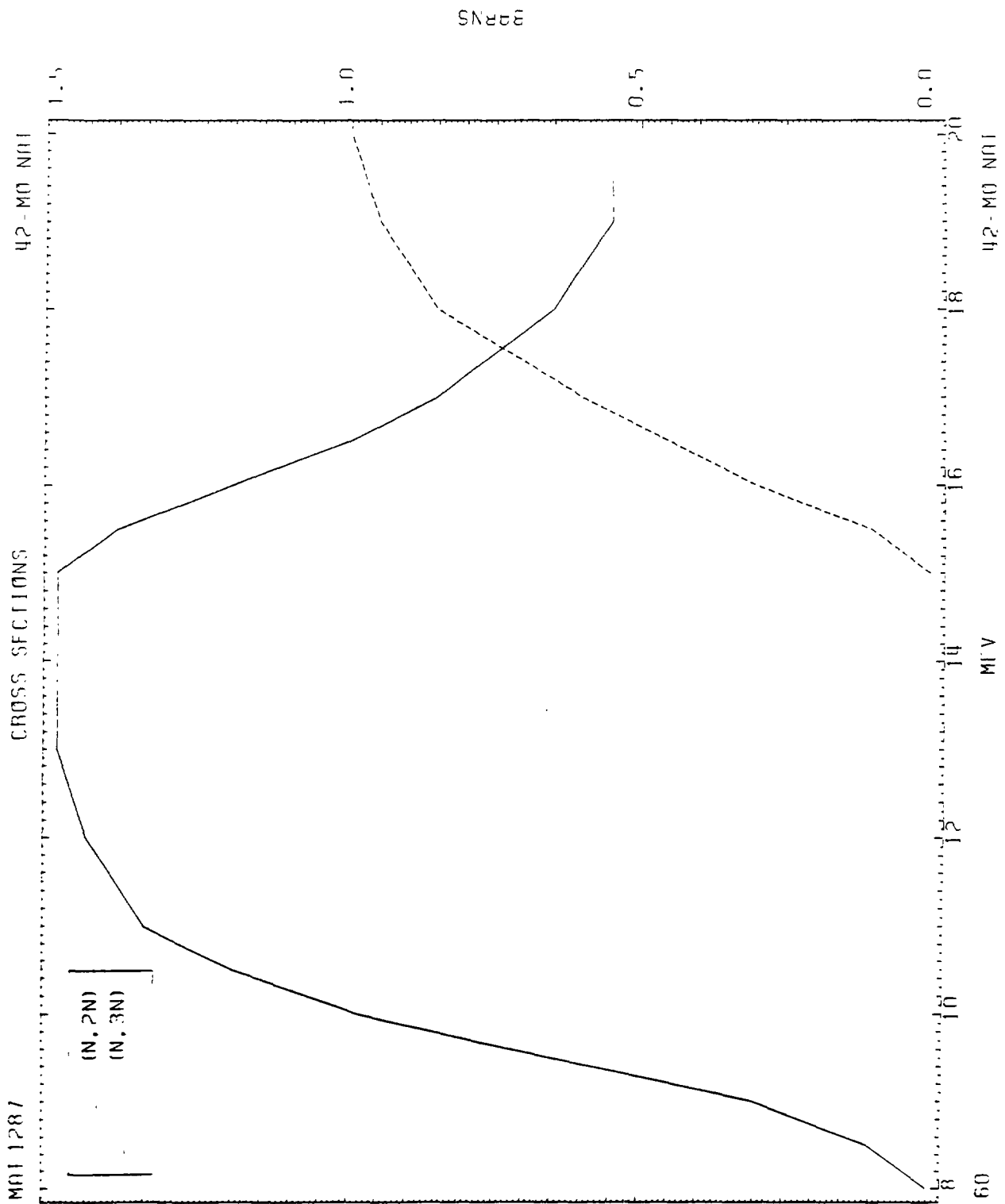
MAT 1287

CROSS SECTIONS

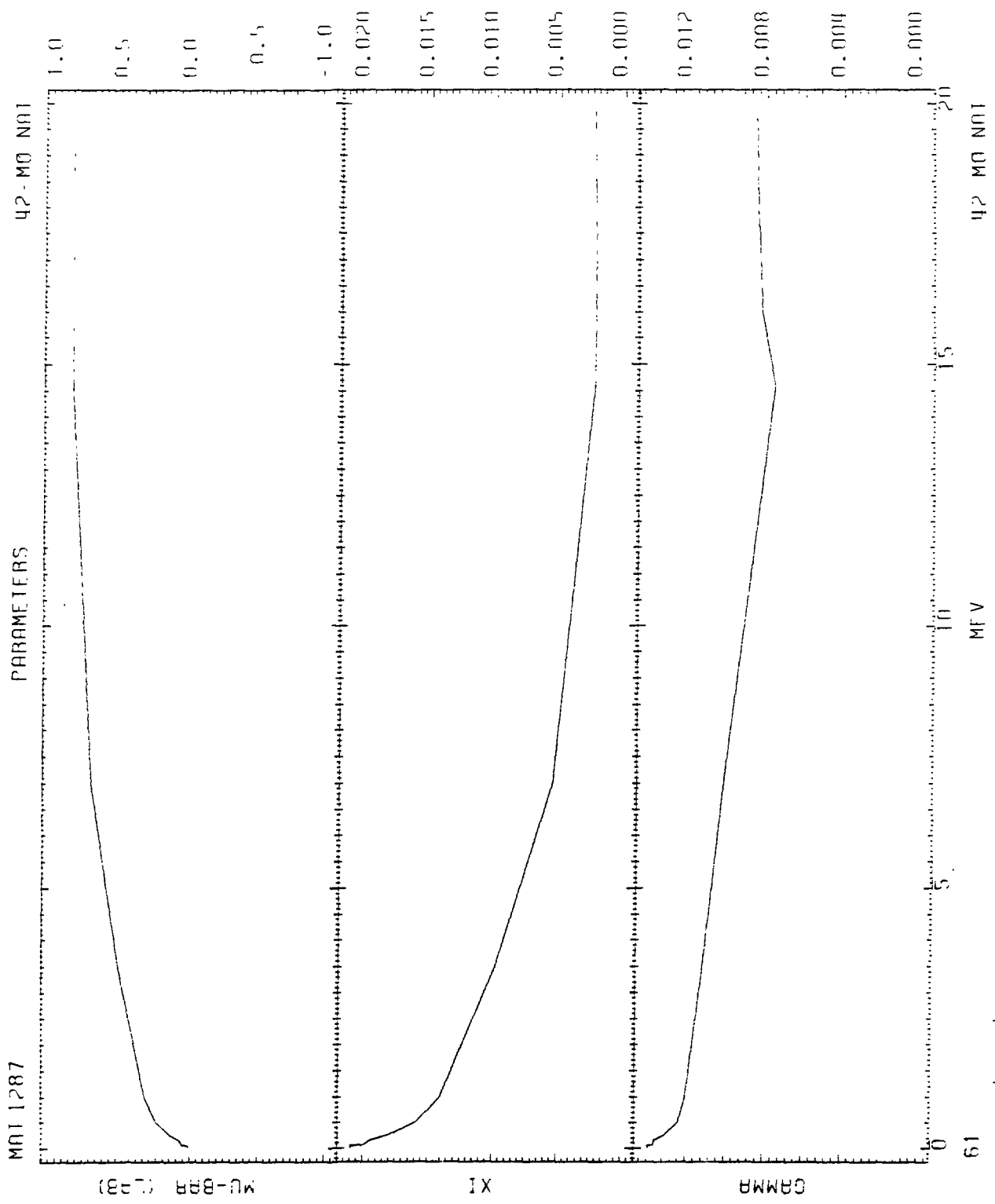
42-MO NAT

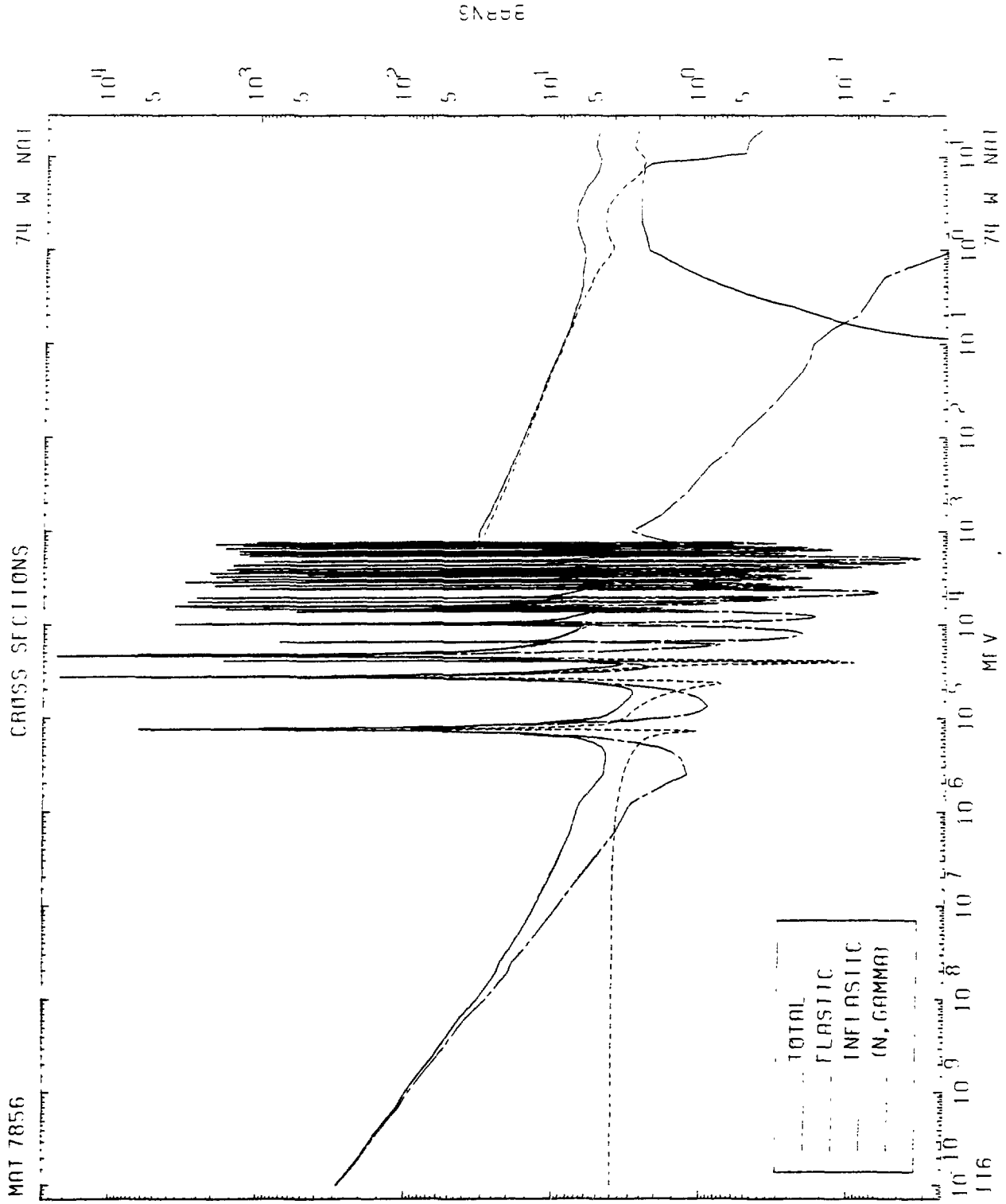




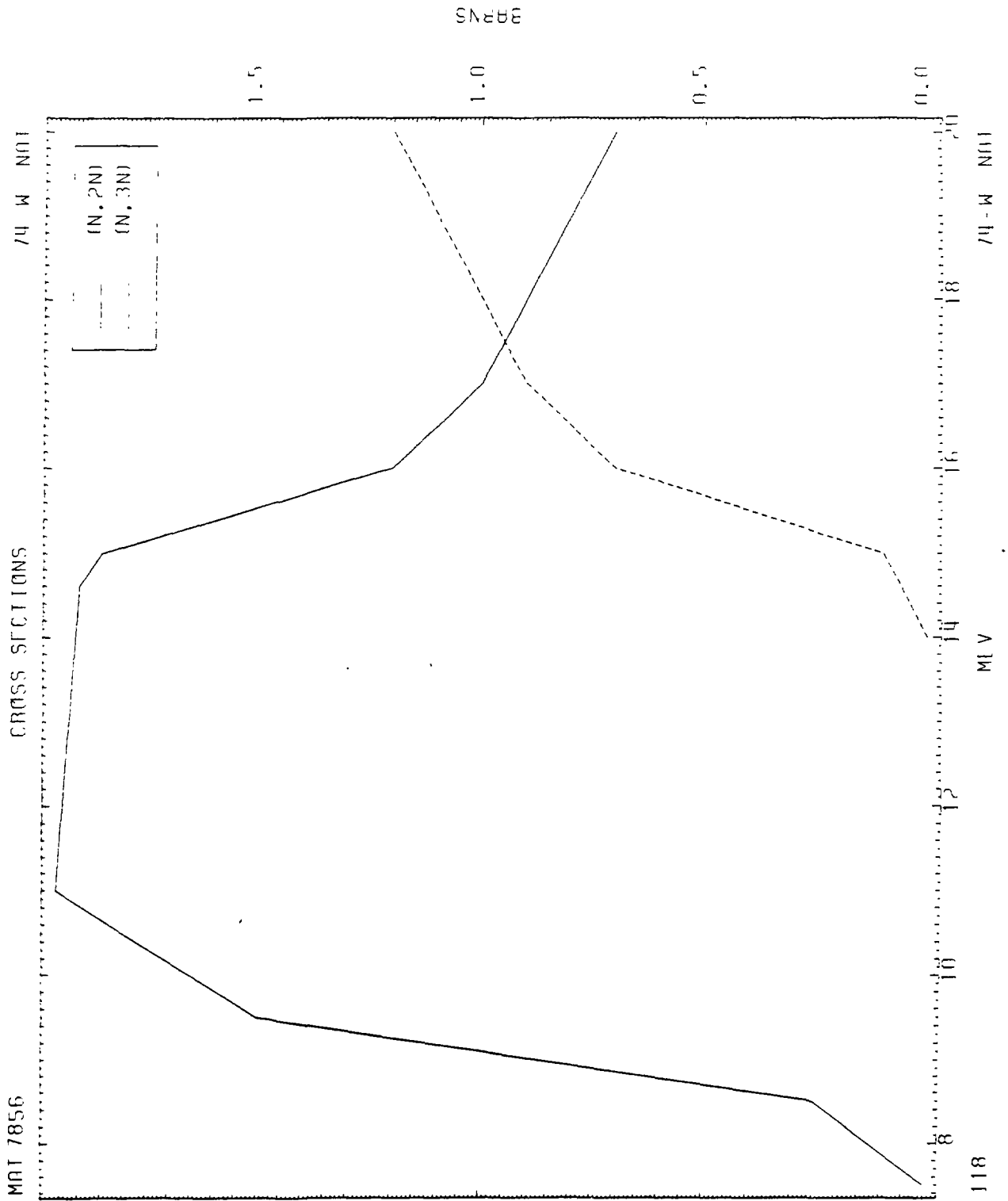


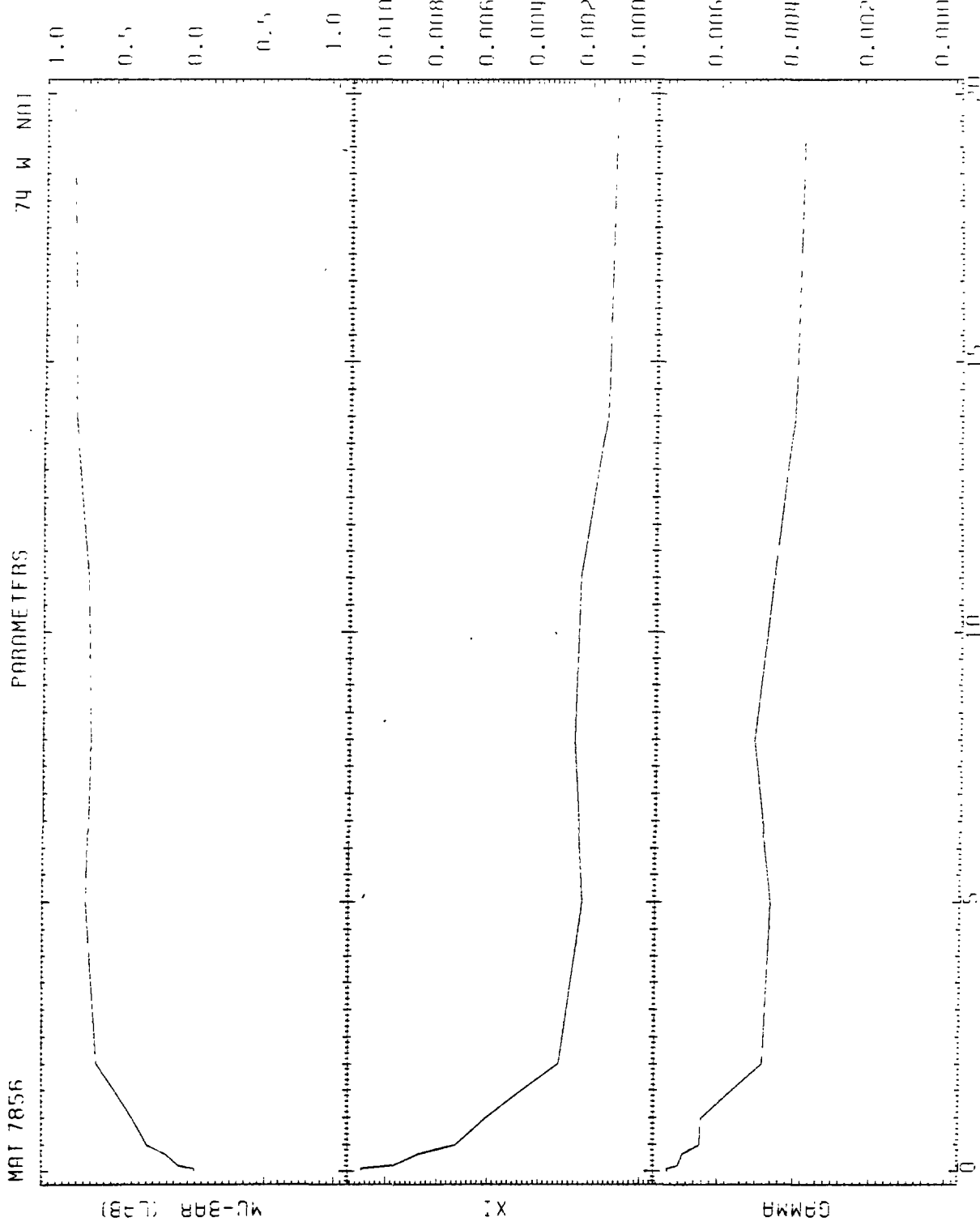












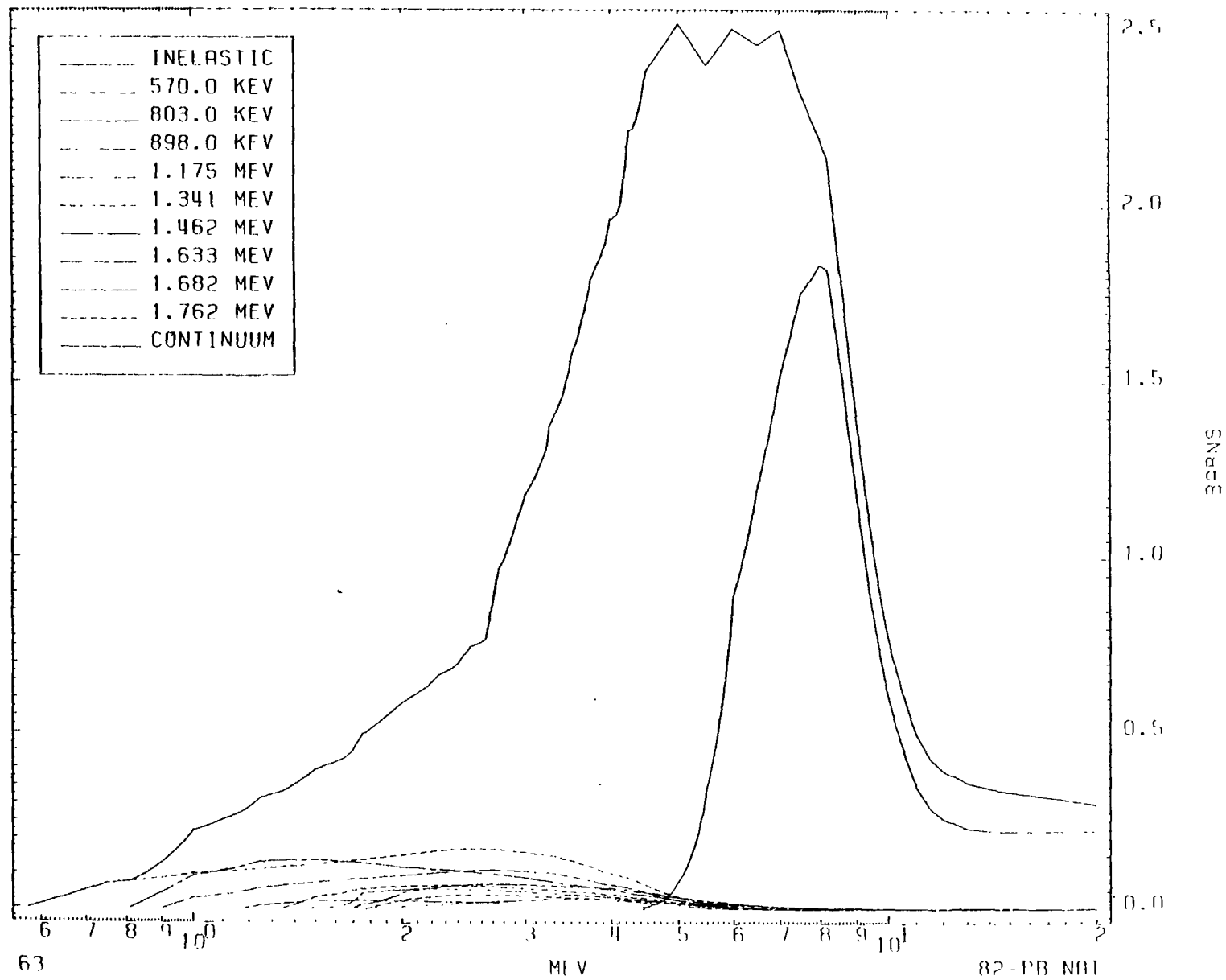
119 MFV 74 W N01

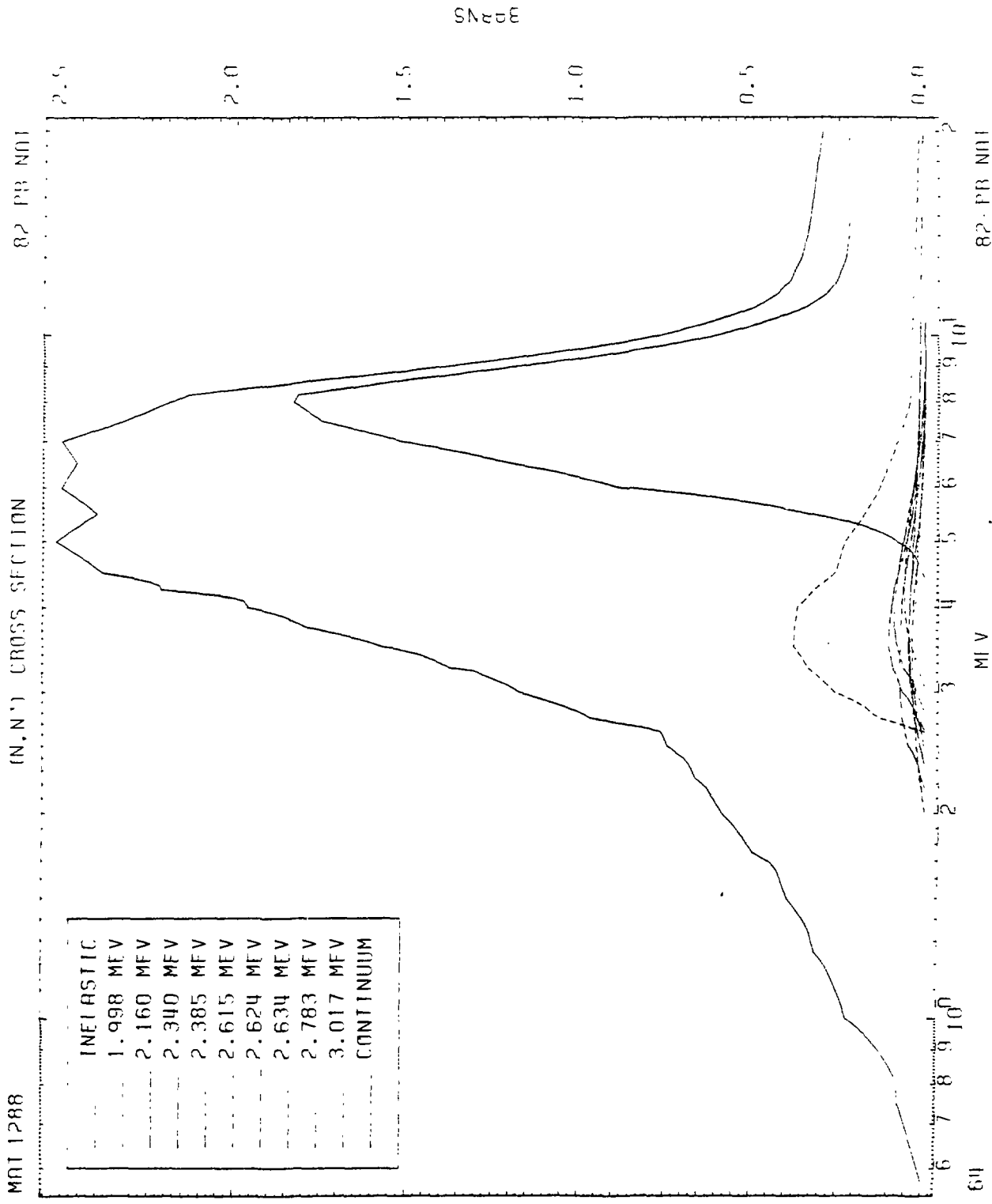


MAT 1288

(N,N') CROSS SECTION

82-PB-N01





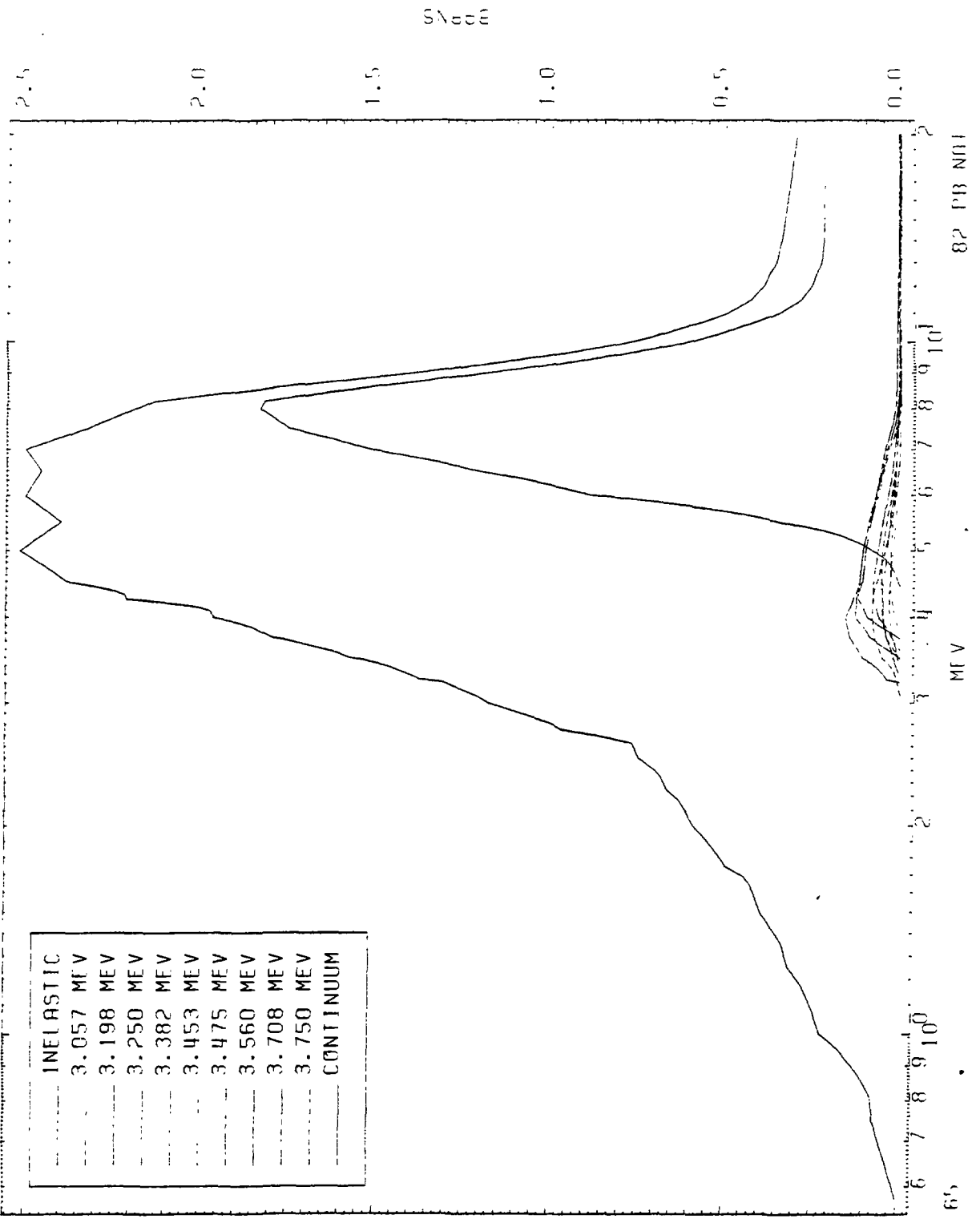


MAI 1288

(N,N') CROSS SECTION

82-PB N01

---	INELASTIC
---	3.057 MEV
---	3.198 MEV
---	3.250 MEV
---	3.382 MEV
---	3.453 MEV
---	3.475 MEV
---	3.560 MEV
---	3.708 MEV
---	3.750 MEV
---	CONTINUUM



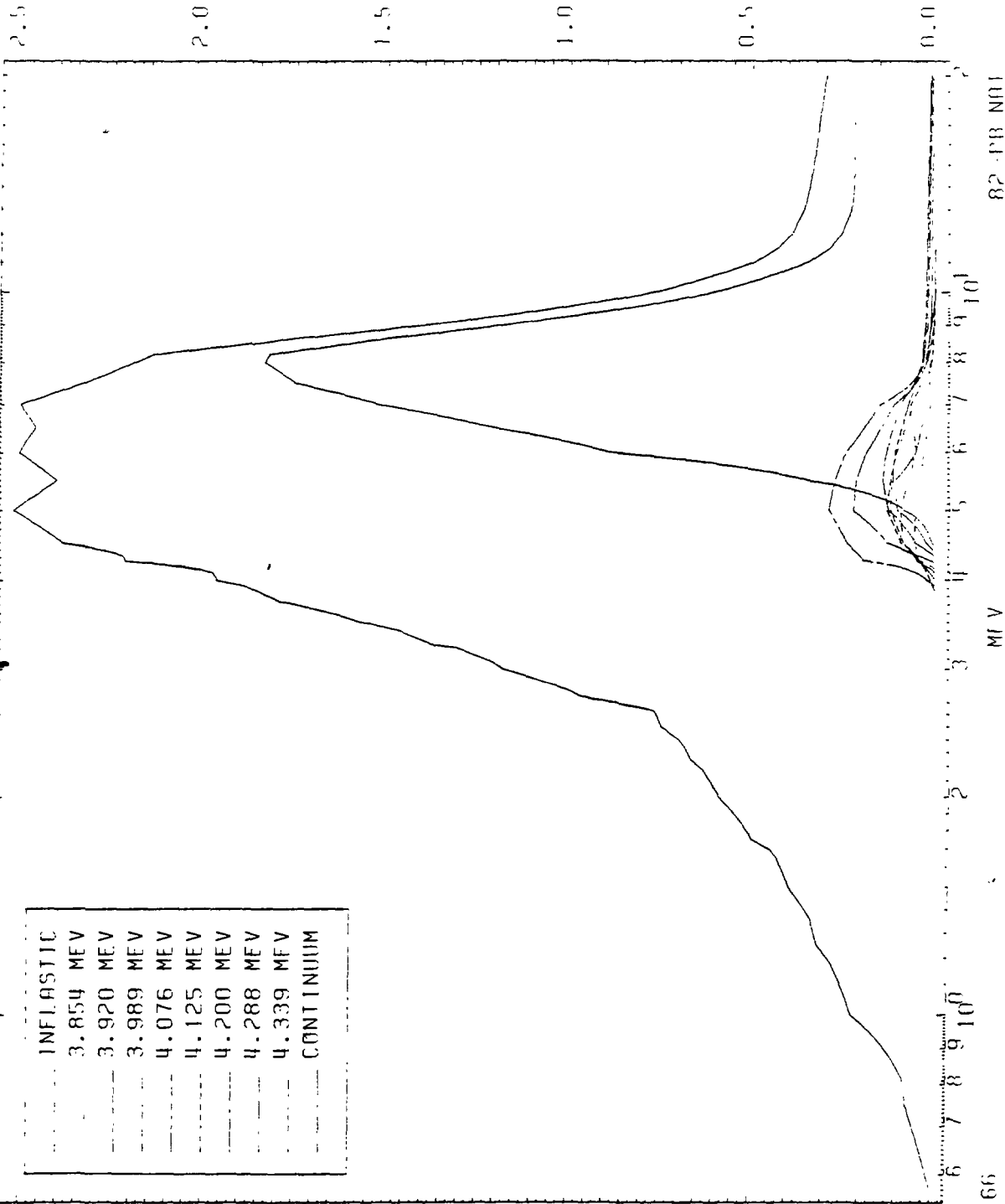
82-PB N01

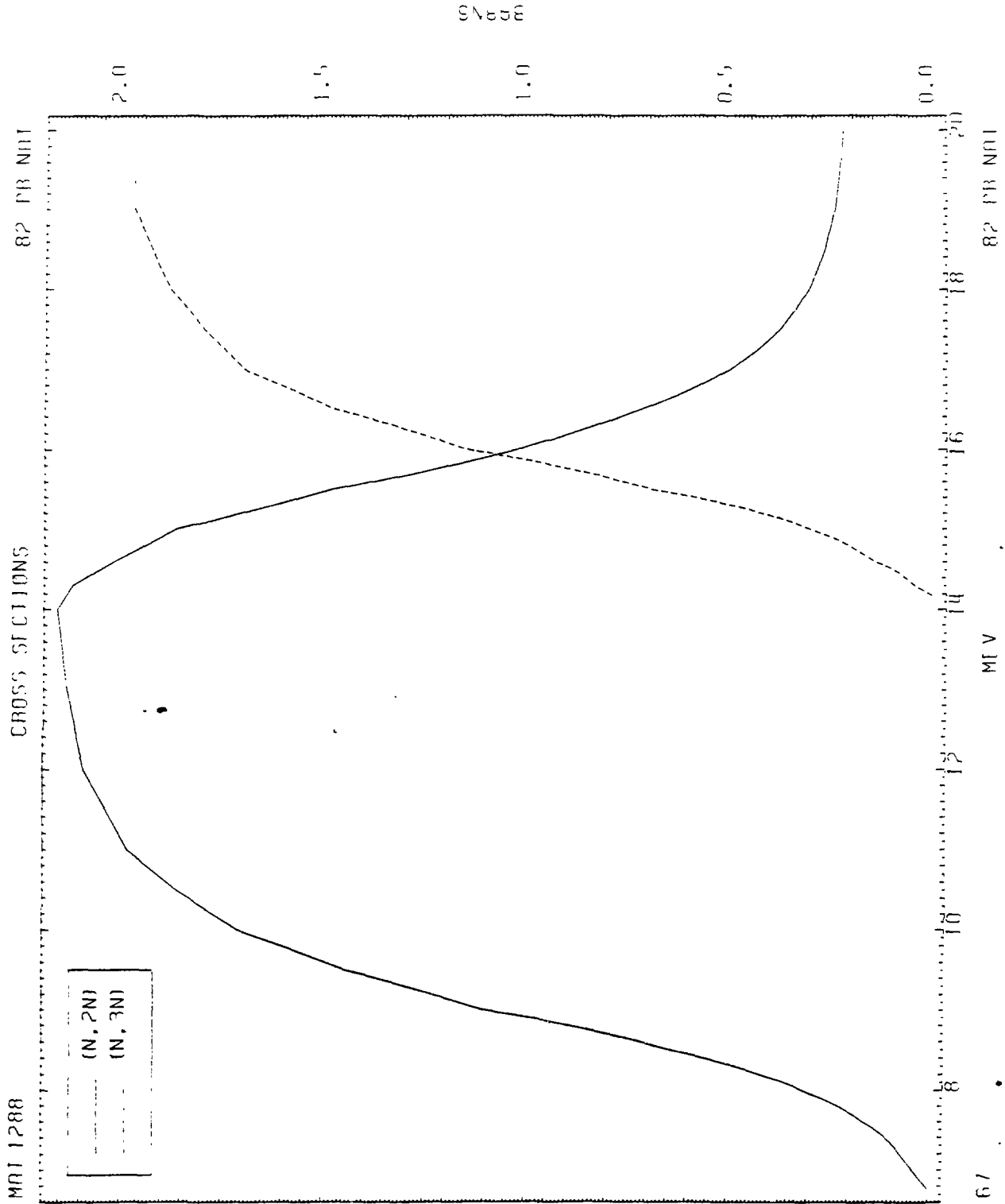
MAT 1288

(N,N'), CROSS SECTION

82 PB NDT

.....	INFLASTIC
-----	3.854 MEV
-----	3.920 MEV
-----	3.989 MEV
-----	4.076 MEV
-----	4.125 MEV
-----	4.200 MEV
-----	4.288 MEV
-----	4.339 MEV
-----	CONTINUUM

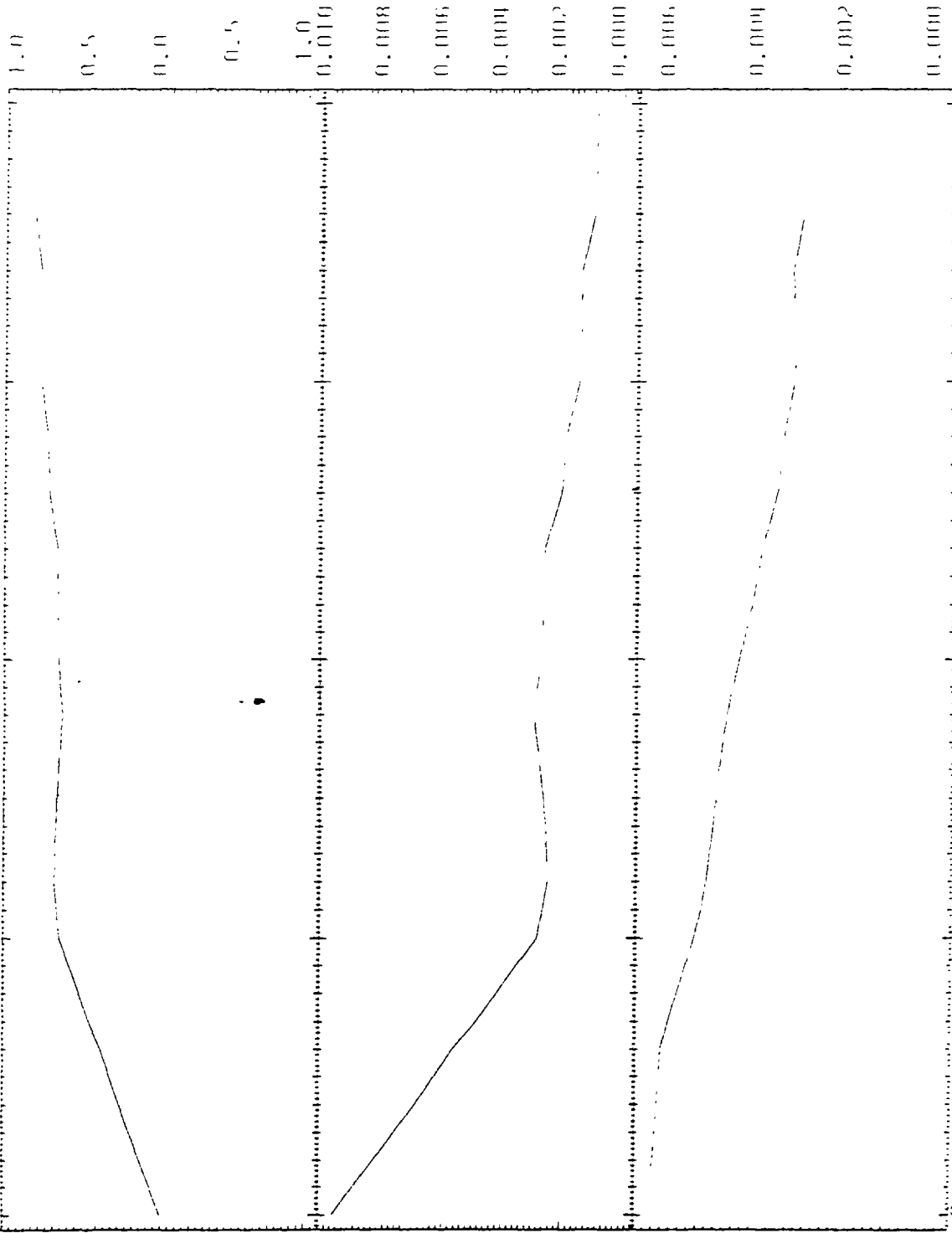




MMT 1288

PARAMETERS

82 FB MMT



MU-BPR (2.23)

YI

GAMMA

MMT 1288

82 FB MMT

MMV