

NJOY/MACFARLANE-~~10~~^{99A} - 8 June 1994

Status of NJOY and Future Plans

by

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CURRENT STATUS OF NJOY

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1. A number of patches have been made since the release of 91.91; some initiated here, and some sent in by users. I am still working on the testing and packaging of these changes, but to give users an idea of what is to come, I am giving a short synopsis of the changes below:

```
*/ reconr -- 10 jan 94 -- need more storage id's
*/ reconr -- 10 jan 94 -- initialize to zero before sum
*/ reconr -- 10 jan 94 -- fix typo in error message
*/ reconr -- 29 jan 94 -- allow for more ur sequences
*/ reconr -- 25 feb 94 -- fix loophole in threshold logic
*/ broadr -- 31 jan 94 -- take care with threshold reactions
*/ unresr -- 5 jan 93 -- allow for more spin sequences (jendl monat)
*/ heatr -- 4 jan 94 -- allow for general file 5 contents
*/ heatr -- 5 jan 94 -- install more file 6 options
*/ heatr -- 15 jan 94 -- add sn120 as major isotope of sn
*/ heatr -- 3 feb 94 -- fix case with mf6 for neutron only
*/ heatr -- 1 jun 94 -- avoid fortran reserved name
*/ groupr -- 5 jan 94 -- install more file 6 options
*/ groupr -- 15 jan 94 -- add sn120 as major isotope for sn
*/ groupr -- 27 jan 94 -- more room for gamma lines
*/ groupr -- 31 jan 94 -- fix stounr error messages
*/ groupr -- 1 mar 94 -- fix problem with multiple sections in mf5
*/ ccccr -- 16 feb 94 -- fix problems with delayed neutron file
*/ acer -- 31 dec 93 -- fix area for tabulated semilog distr.
*/ acer -- 31 dec 93 -- allow for more mf12, mt>600 sections
*/ acer -- 31 dec 93 -- fix missing suffixes (cai)
*/ acer -- 15 jan 94 -- add sn120 as the major isotope of sn
*/ acer -- 27 jan 94 -- fix incorrect change of ref. frame for law 7
*/ acer -- 1 feb 94 -- watch out for histogram case
*/ acer -- 17 feb 94 -- fix printing controls
*/ acer -- 3 mar 94 -- fix value of boltzmann constant
*/ acer -- 3 mar 94 -- provide band error cutoff for thinning
*/ acer -- 21 mar 94 -- convert madland-nix lf=12 to ace law 4
*/ acer -- 29 mar 94 -- fix problem with type 1 and type 3 in law 44
*/ acer -- 8 apr 94 -- make sure findf doesn't go to wrong temp
*/ acer -- 26 may 94 -- increase size of xss array
*/ acer -- 26 may 94 -- remove hollerith from thrprt
*/ acer -- 26 may 94 -- misc acer fixes from ecn petten
*/ njoy -- 29mar94 -- upgrade the math functions el and gami
*/ matxsr -- 25 apr 94 -- abandon the old thermal mt numbers
```

Most of the limitations on MF5 and MF6 are now gone. Specifically, the order of subsections in MF5 is now free, several different tabulated subsections can now be given in MF5, several subsections for a given particle can be given in MF6, MF6 sections can be incomplete (i.e., no recoil given), and discrete lines in the CM are now handled for MF6.

2. A number of users have noticed problems with the new method for interpolating in thermal scattering distributions along lines of constant energy transfer. There are two nonexclusive possibilities here: (1) energy-transfer interpolation is inherently faulty, and (2) there is an error in the implementation of the technique. I have determined that (2) is true, but that doesn't prove that (1) is false! A one-line correction to UP64 is available to anyone who wants to help in the testing.
3. The new direct-to-PostScript plotting package is basically complete. There are a few improvements that I would like to

make, but they could be put in later as updates. This new package splits PLOTR into two parts: PLOTR becomes a code to extract plotting information from ENDF, PENDF, and GENDF files and write it out as a simple ASCII file for VIEWR,, and VIEWR contains all the logic for converting the coordinates, labels, etc., into actual plots in PostScript format. DTFR and COVR have been modified to produce VIEWR input files. I have also added logic to HEATR to produce the kinematic checking plots in VIEWR format, and ACER is now capable of producing a fairly complete set of plots for the Monte Carlo data in VIEWR format. Some sample plots are included with this summary.

4. I am currently working on a patch to HEATR to handle evaluations that give MT102 photon production in File 6 (ENDF/B-VI F-19) and evaluations that give particle production in File 6 but omit the corresponding recoil subsection (several LANL and BROND cases). This patch will attempt to reconstruct the recoil distribution in MF6 format by assuming that the first particle out carries most of the momentum kick. The first particle out is assumed to be the neutron for (n,2n) or (n,n'), and it assumed to be the charged particle for (n,n'p) or (n,n'alpha). These new subsections could also be used to permanently update the evaluations if the evaluator is not able to provide something better.
5. The report is basically ready for printing as soon as I receive formal approval from the editors.
6. I still hope to issue an NJOY 94 in the near future. In addition to the changes discussed above, it will contain the LEAPR module and an updated version of PURR. It will also allow for a reorganization in which each module is a separate program. The sequence of modules will be controlled by an executive program. There will also be a user-friendly interactive method for preparing input decks.
7. Once again, I would like to thank all the European users of NJOY for the extremely valuable feed back that has been provided over the years. The NJOY program is much better due to your help.

**Plots that Demonstrate
the direct-to-PostScript Capability**

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NEADBB::SARTORI

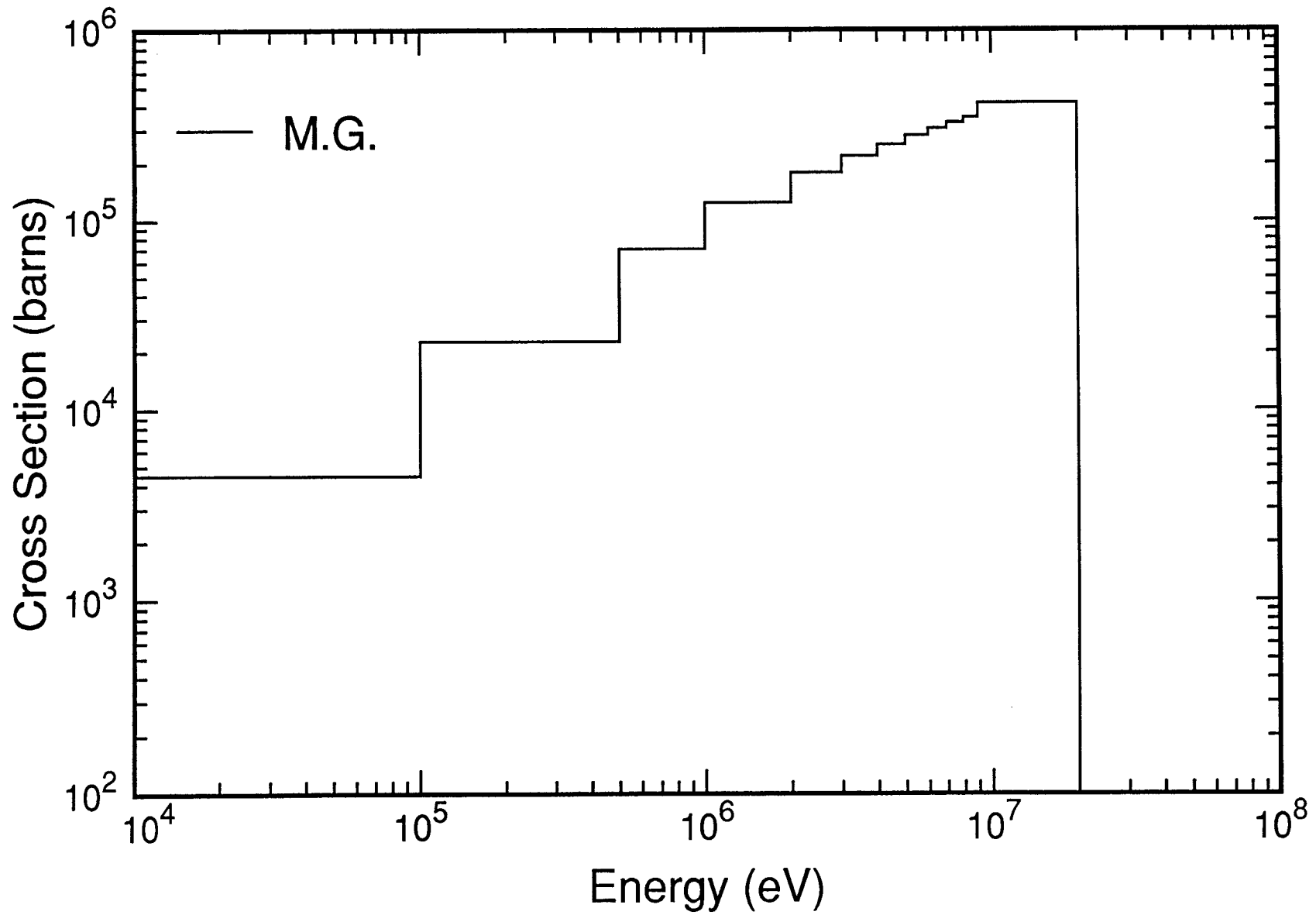
JOB 716

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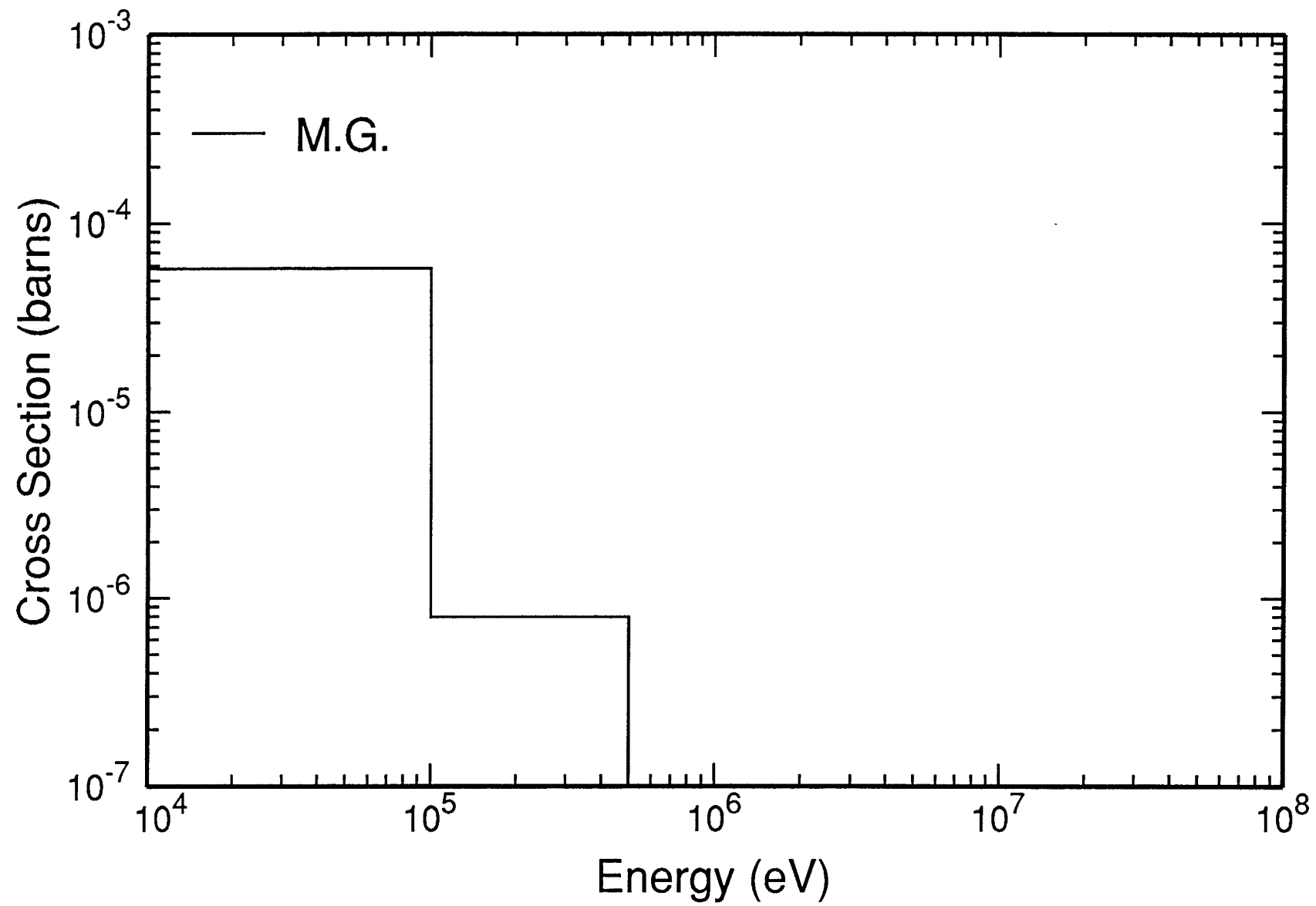
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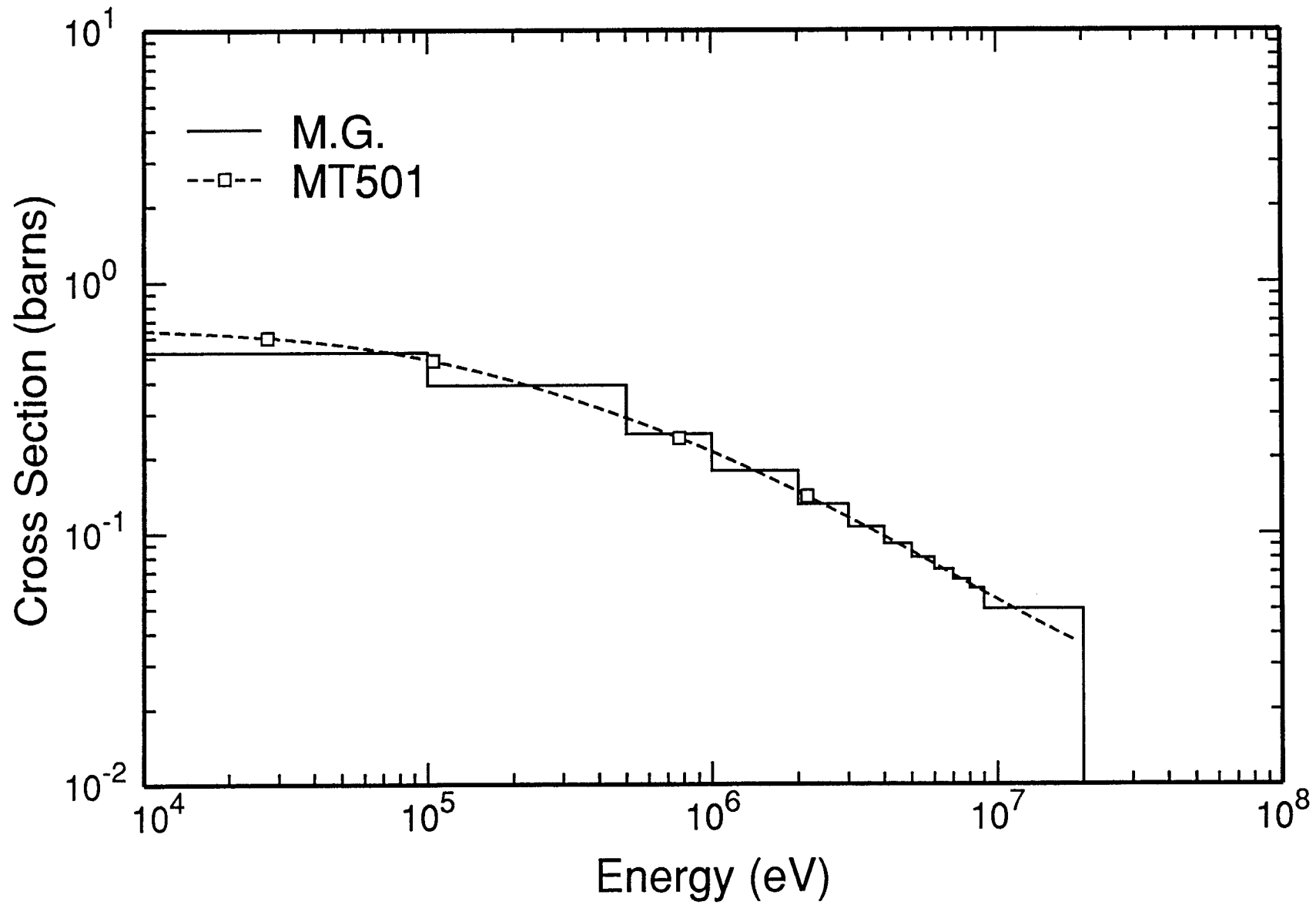
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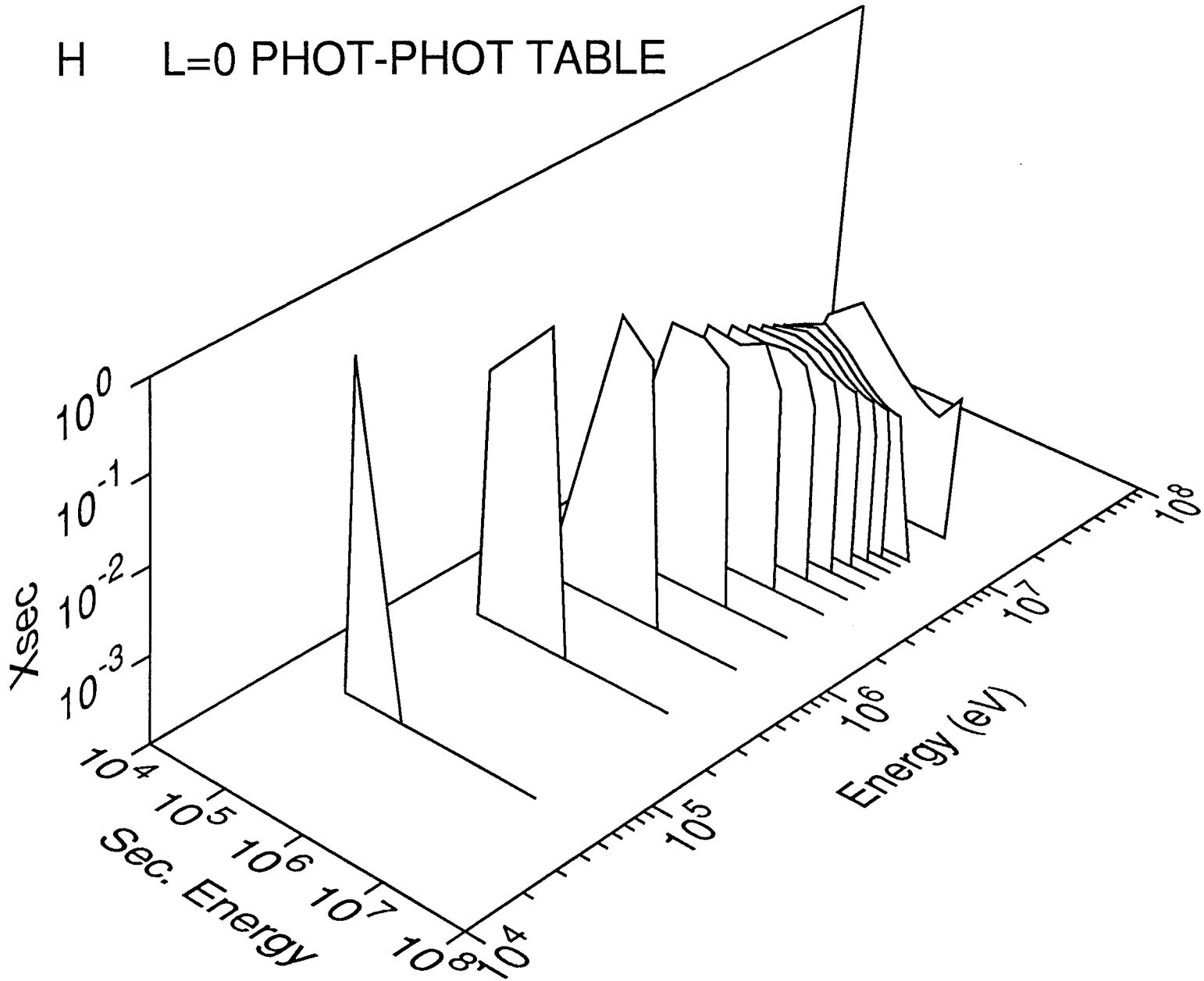
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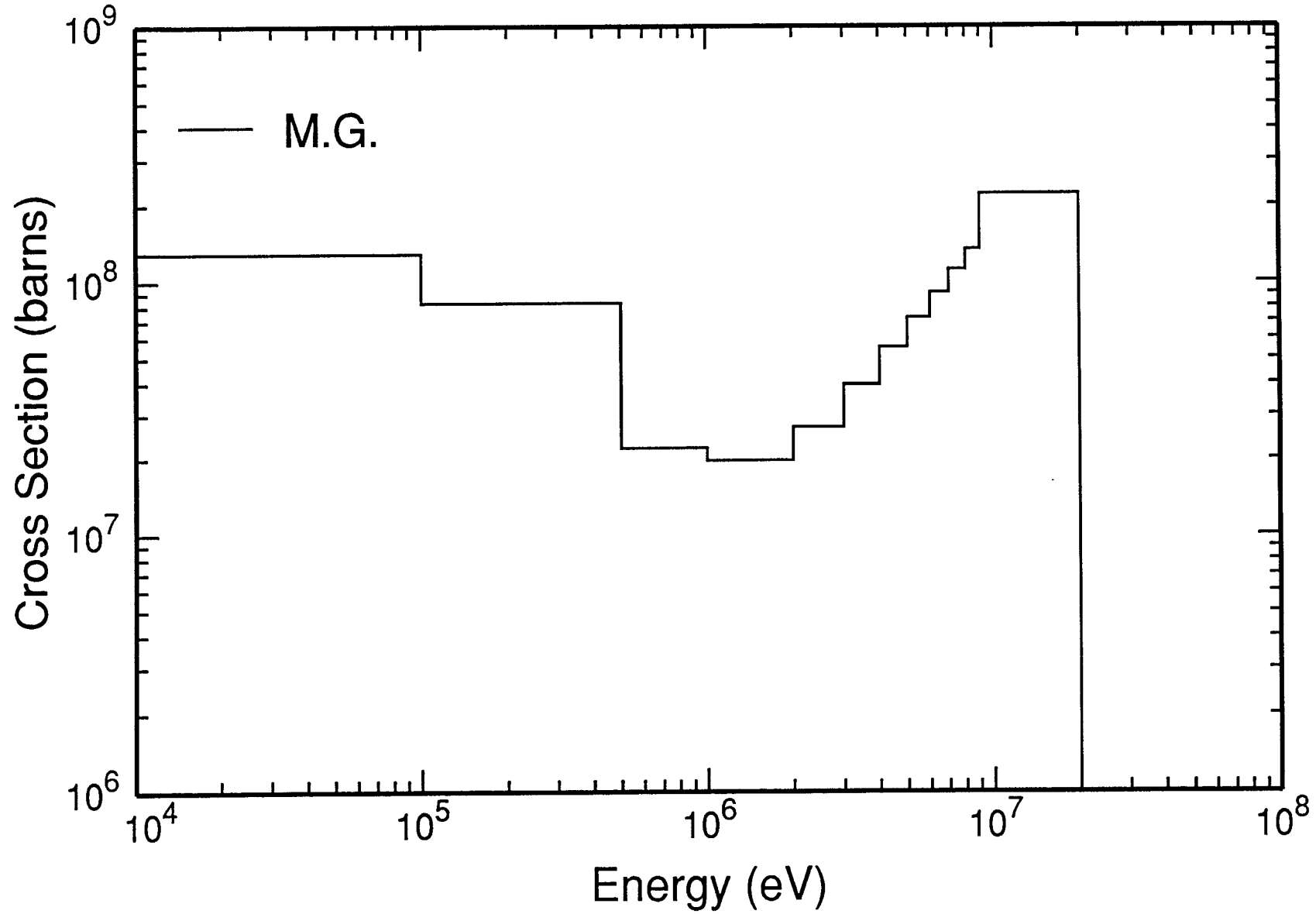
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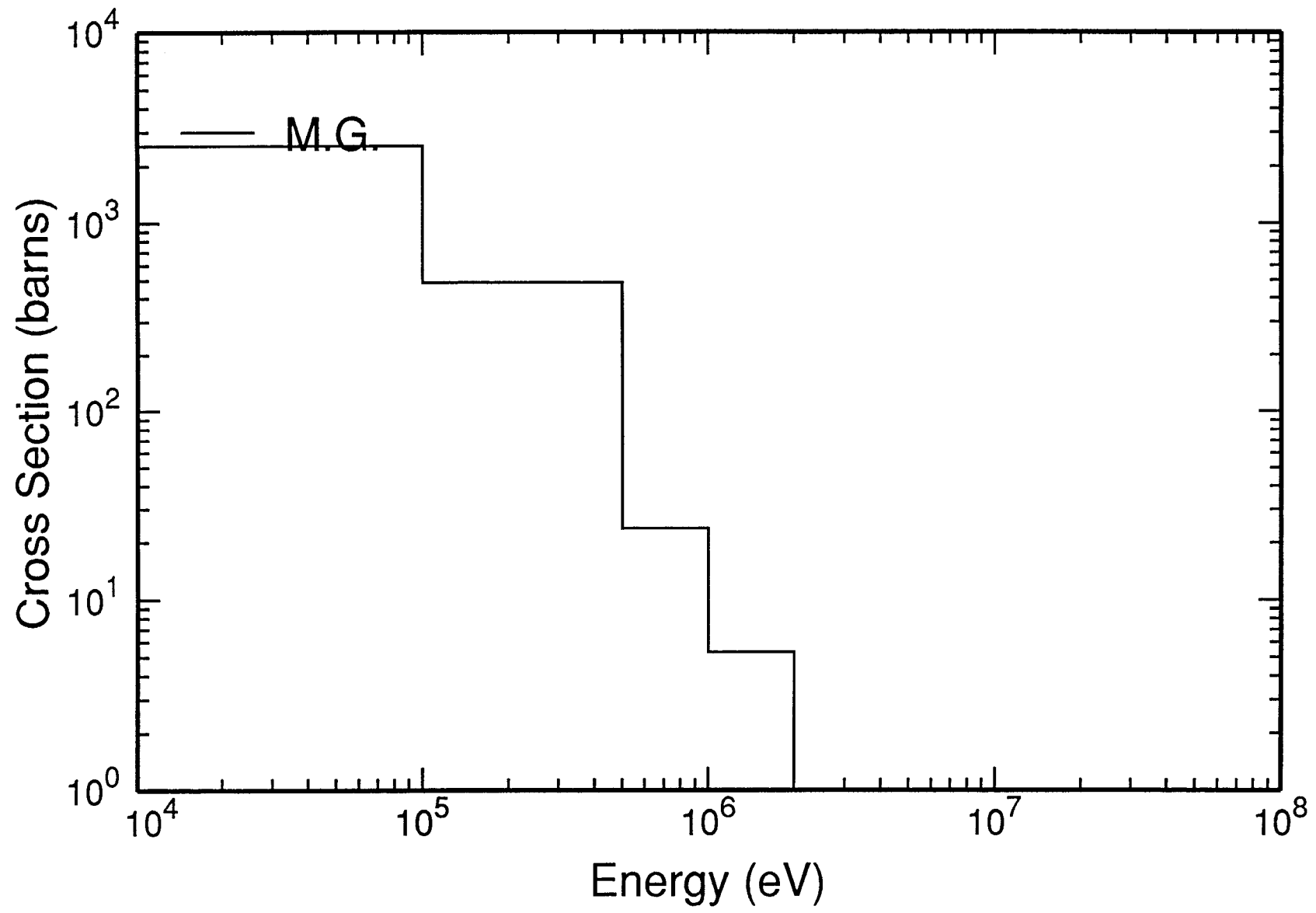
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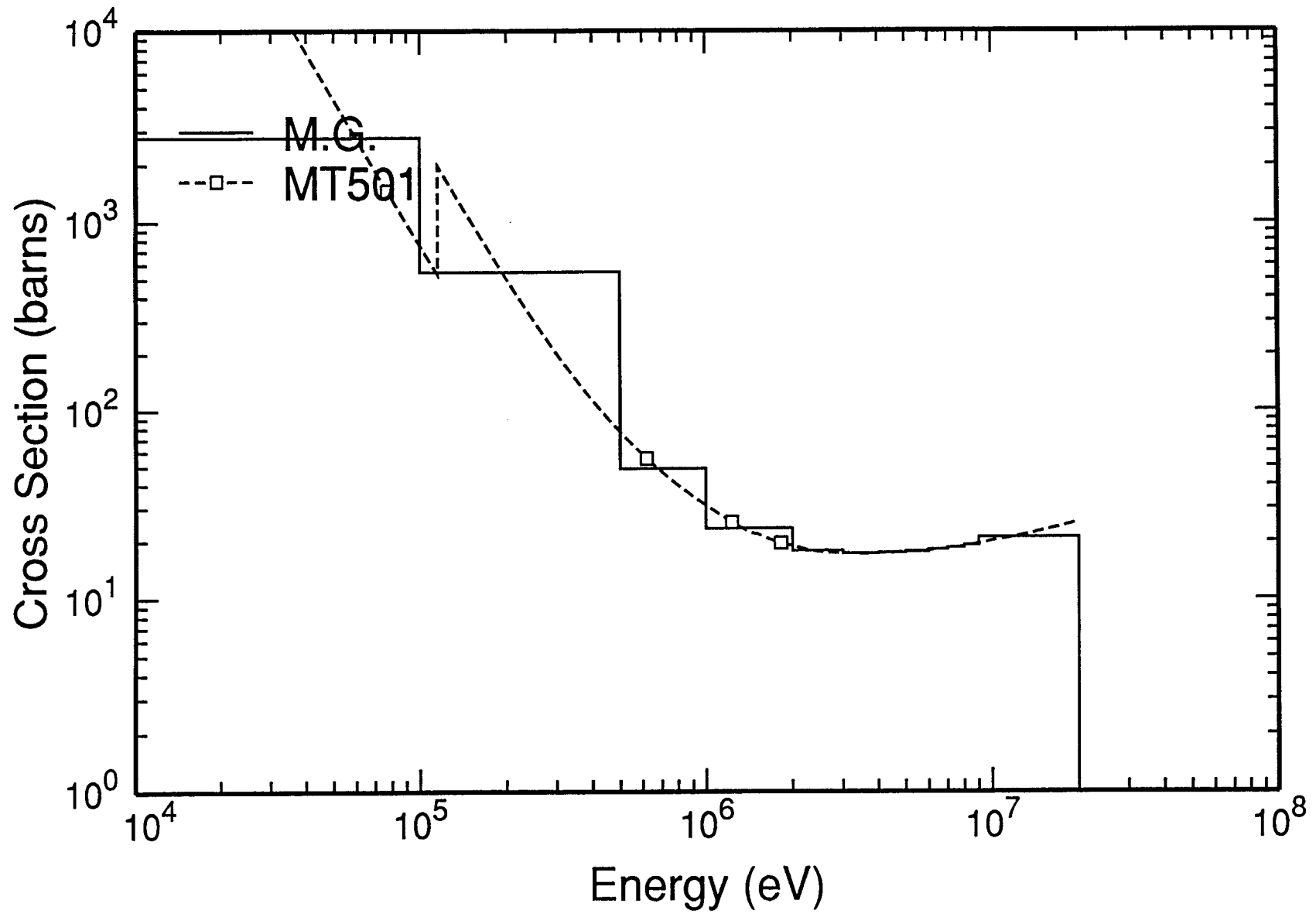
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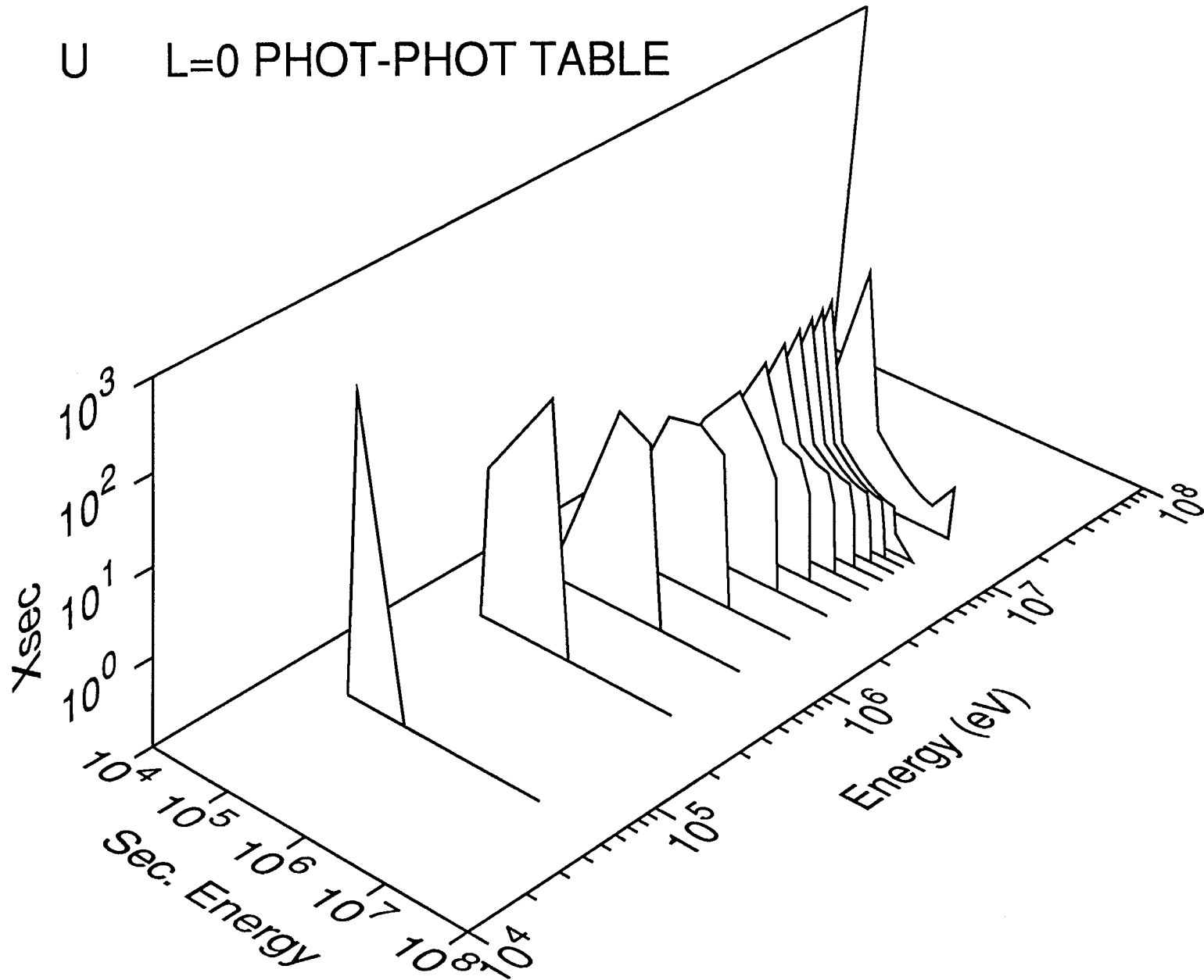
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U TOTAL



U L=0 PHOT-PHOT TABLE



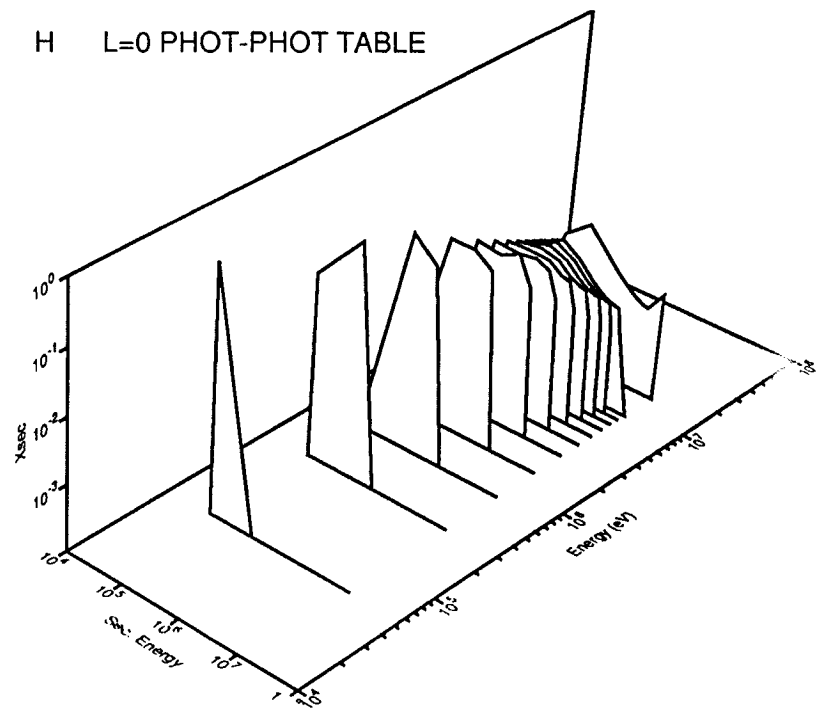
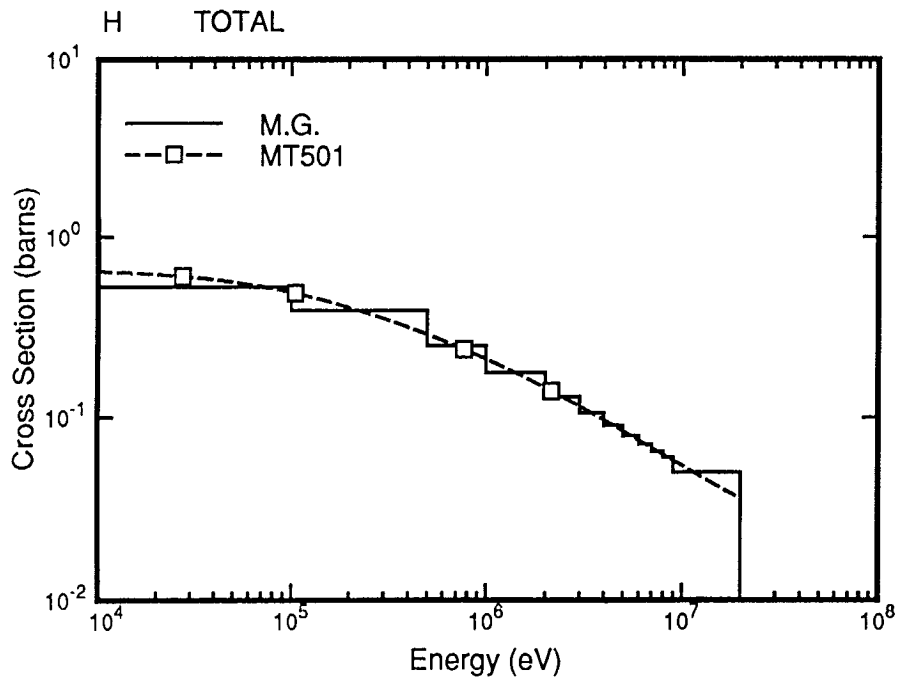
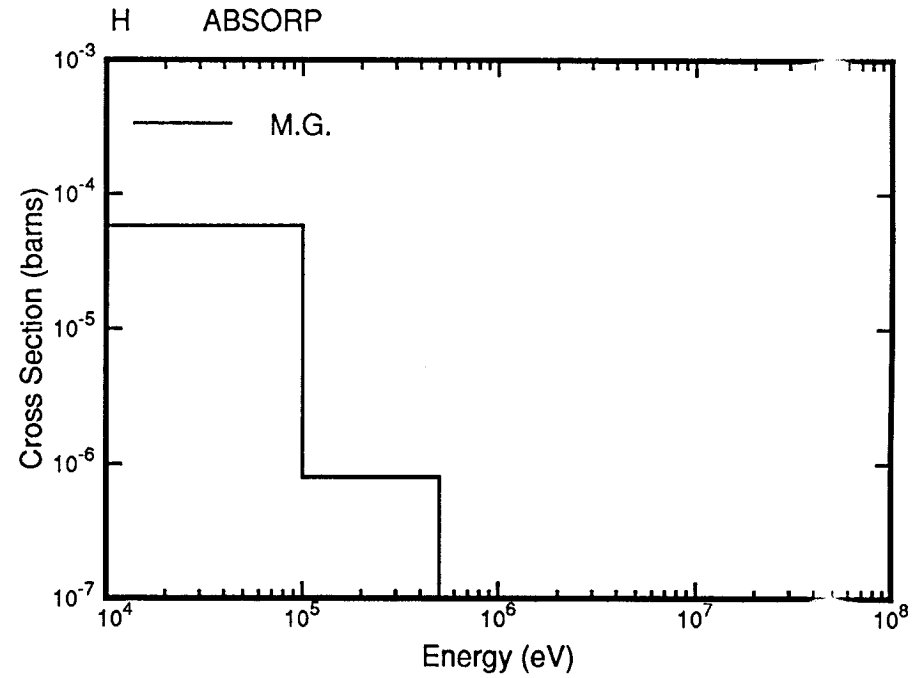
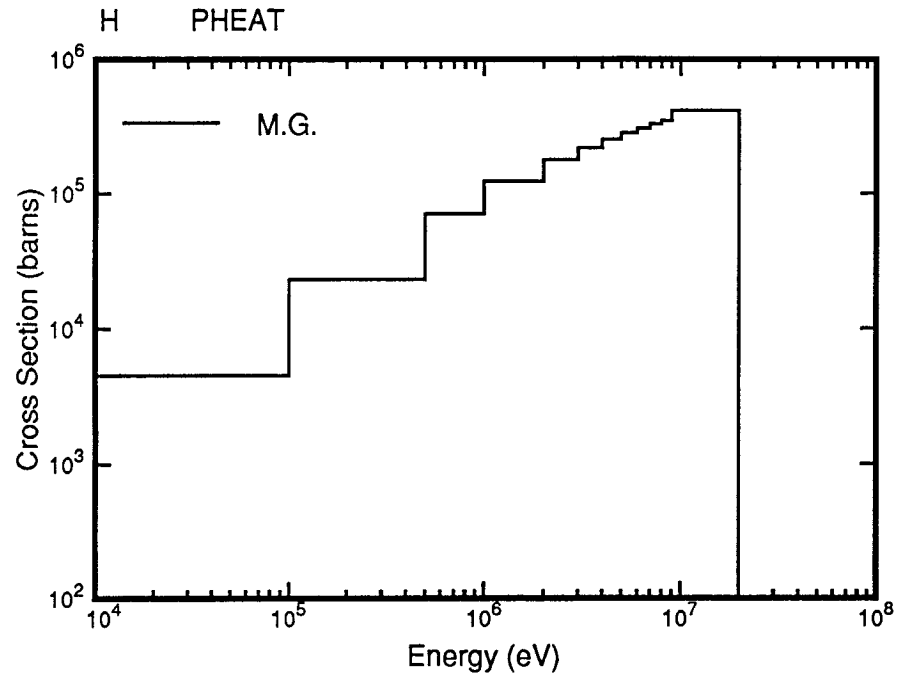
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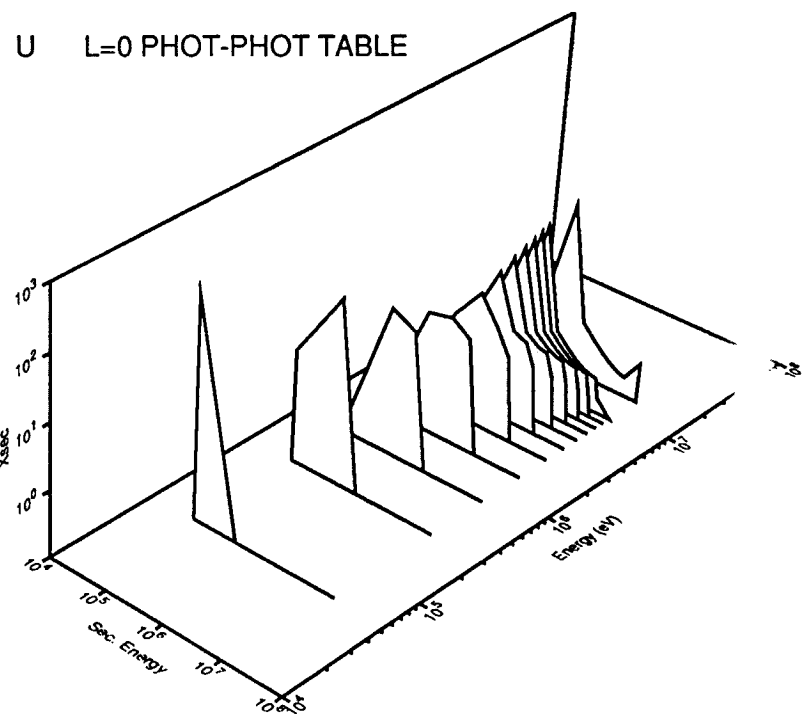
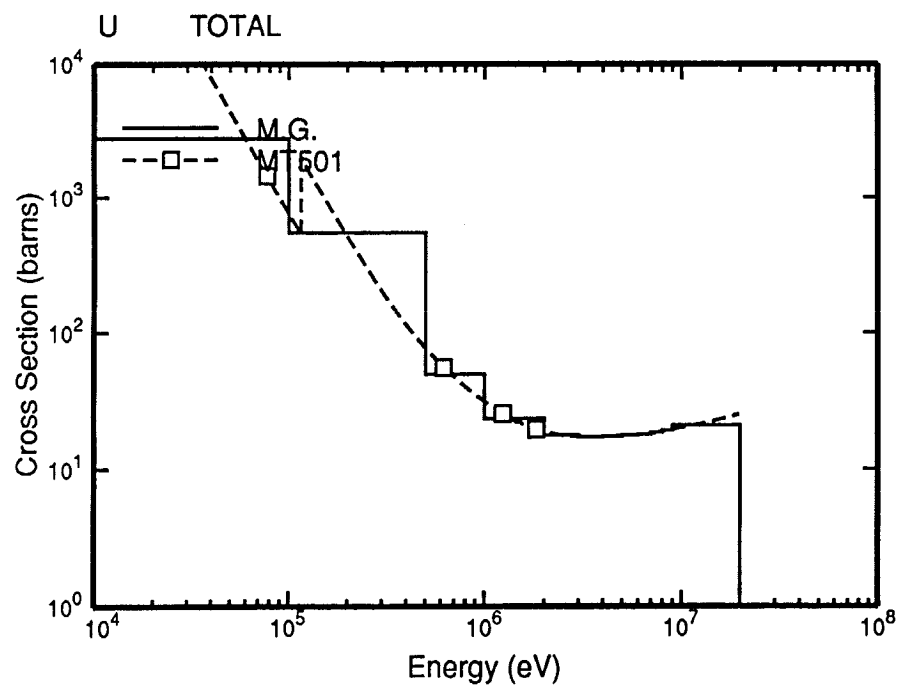
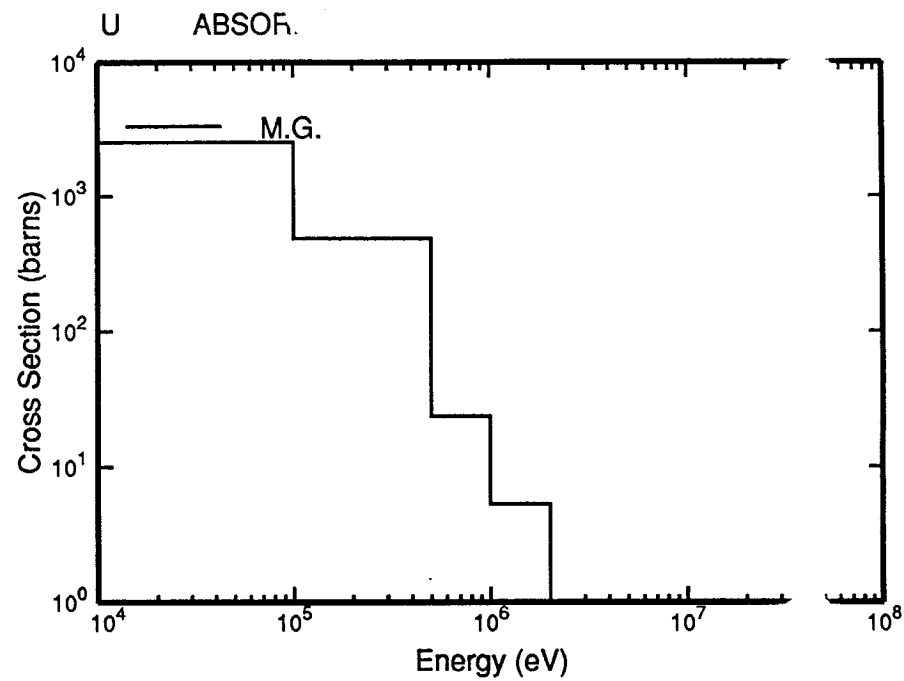
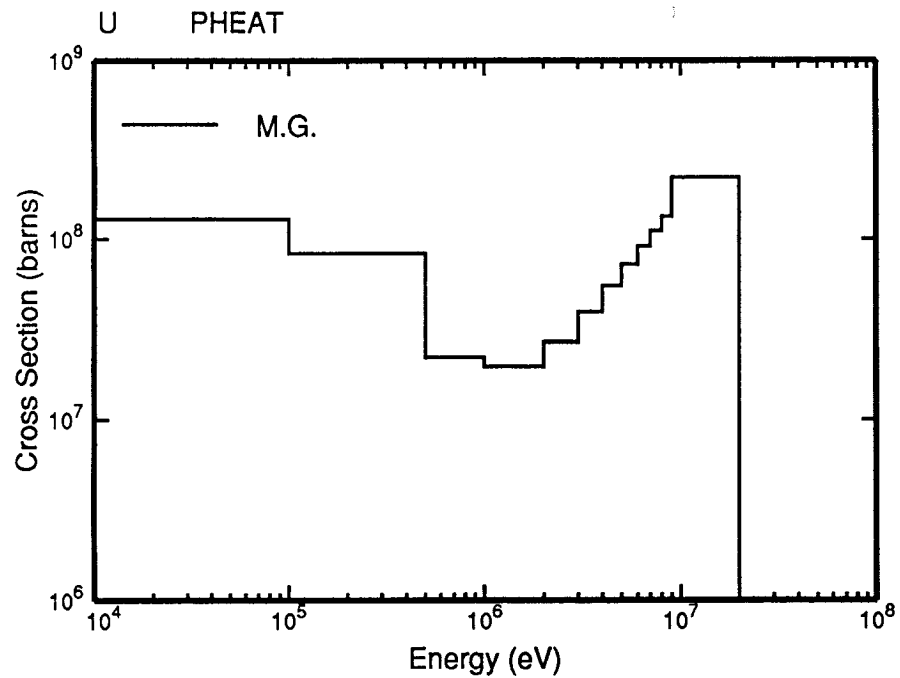
JOB 717

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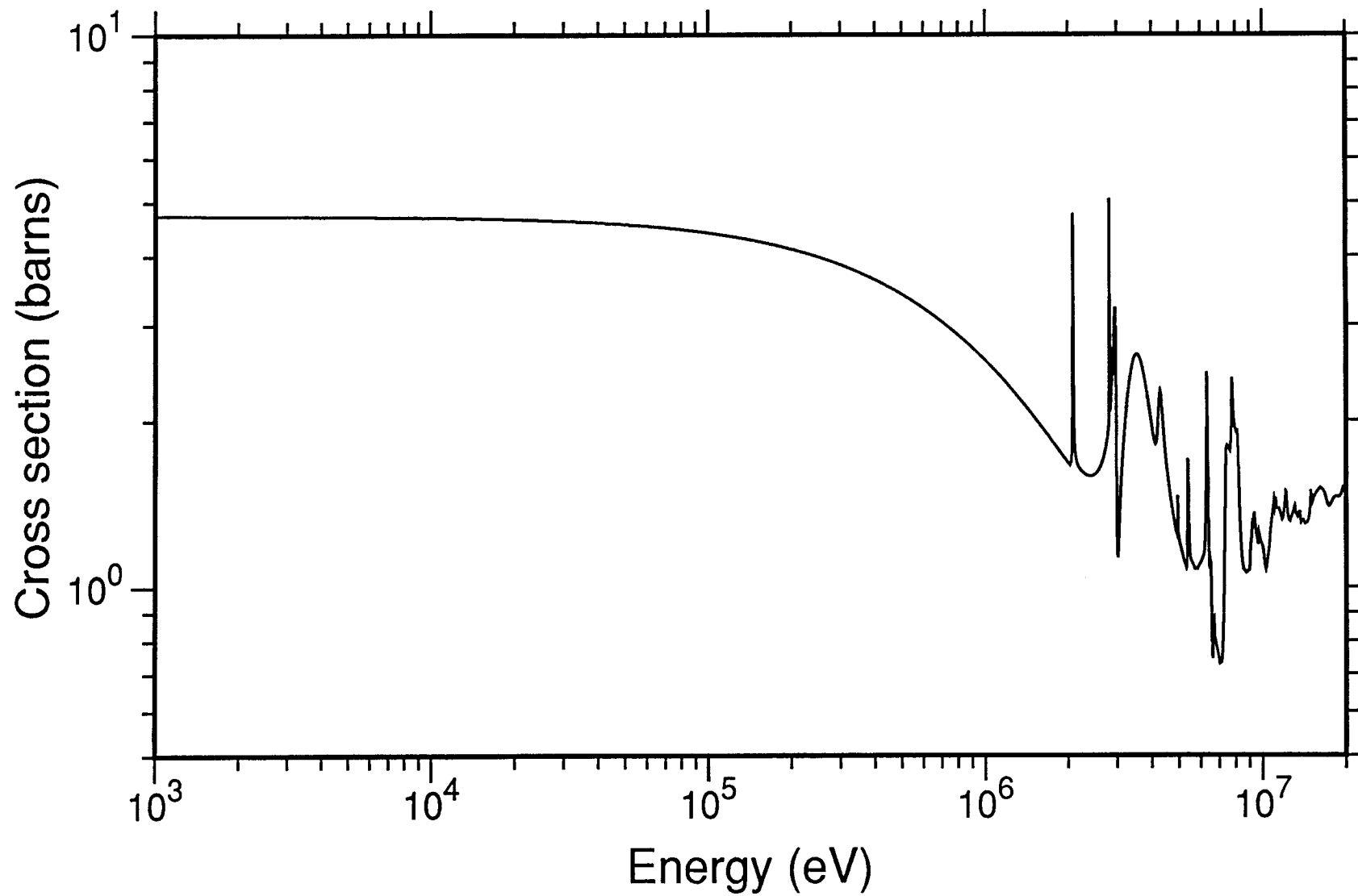
JOB 718

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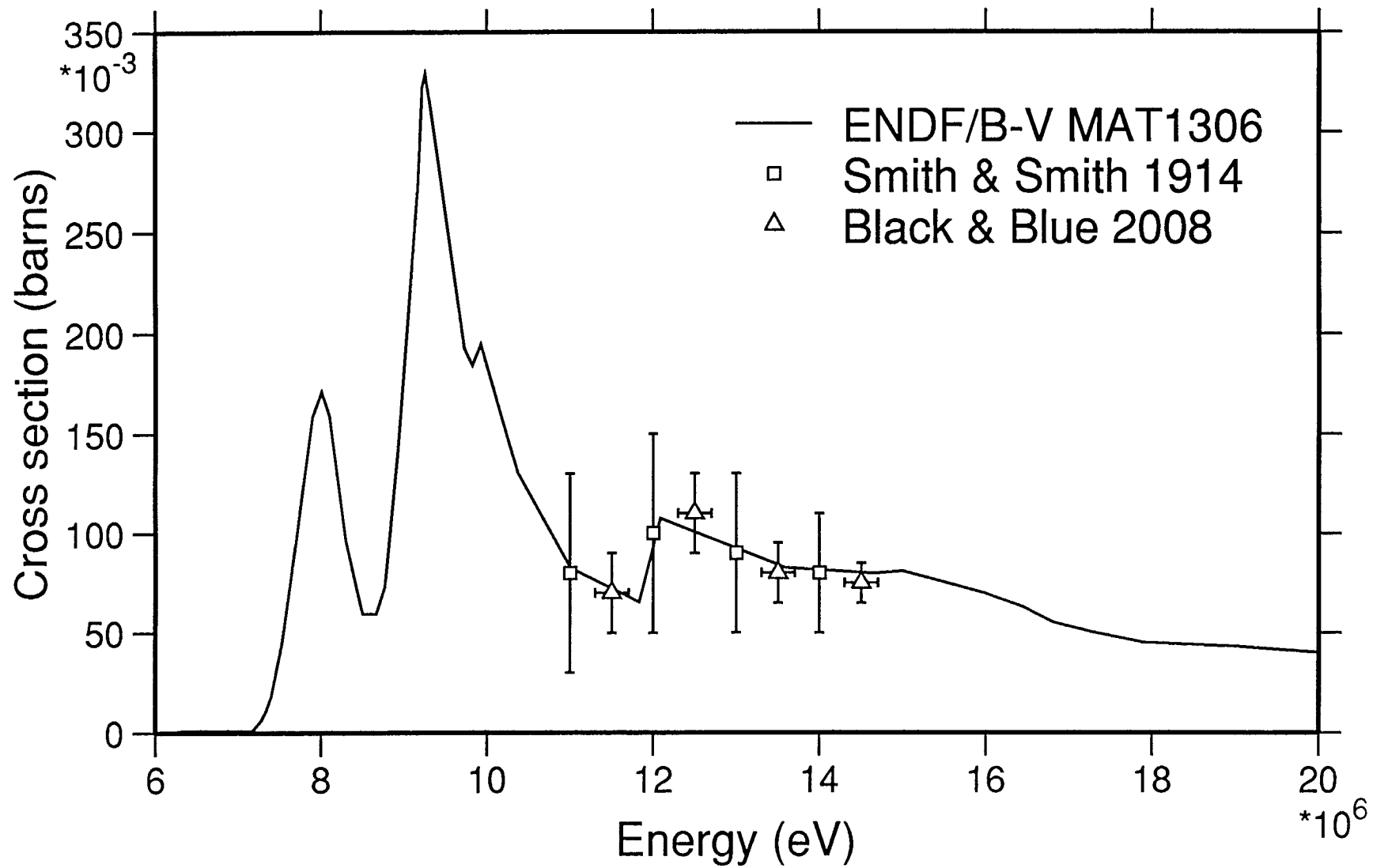
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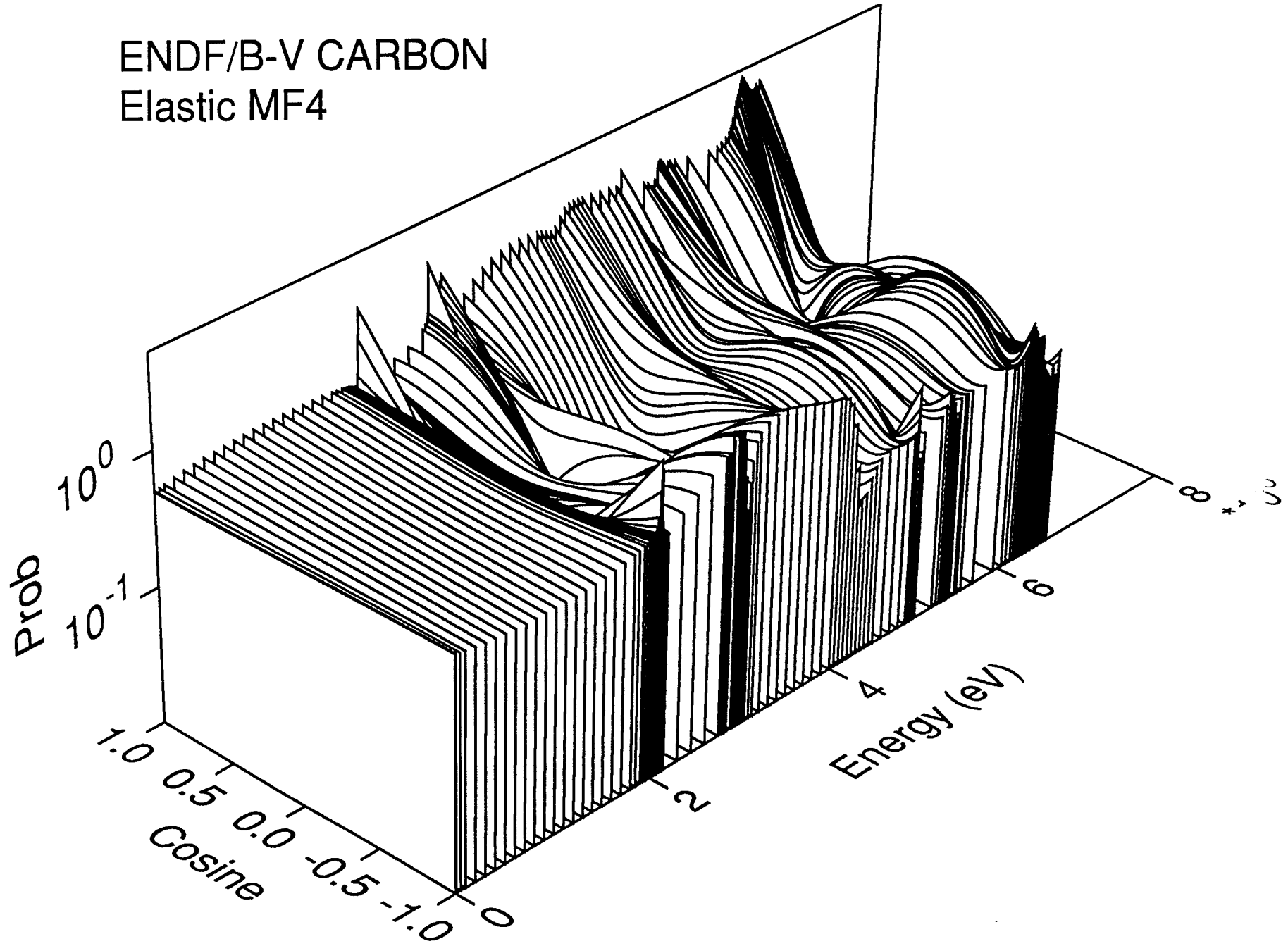
ENDF/B-V CARBON Total Cross Section



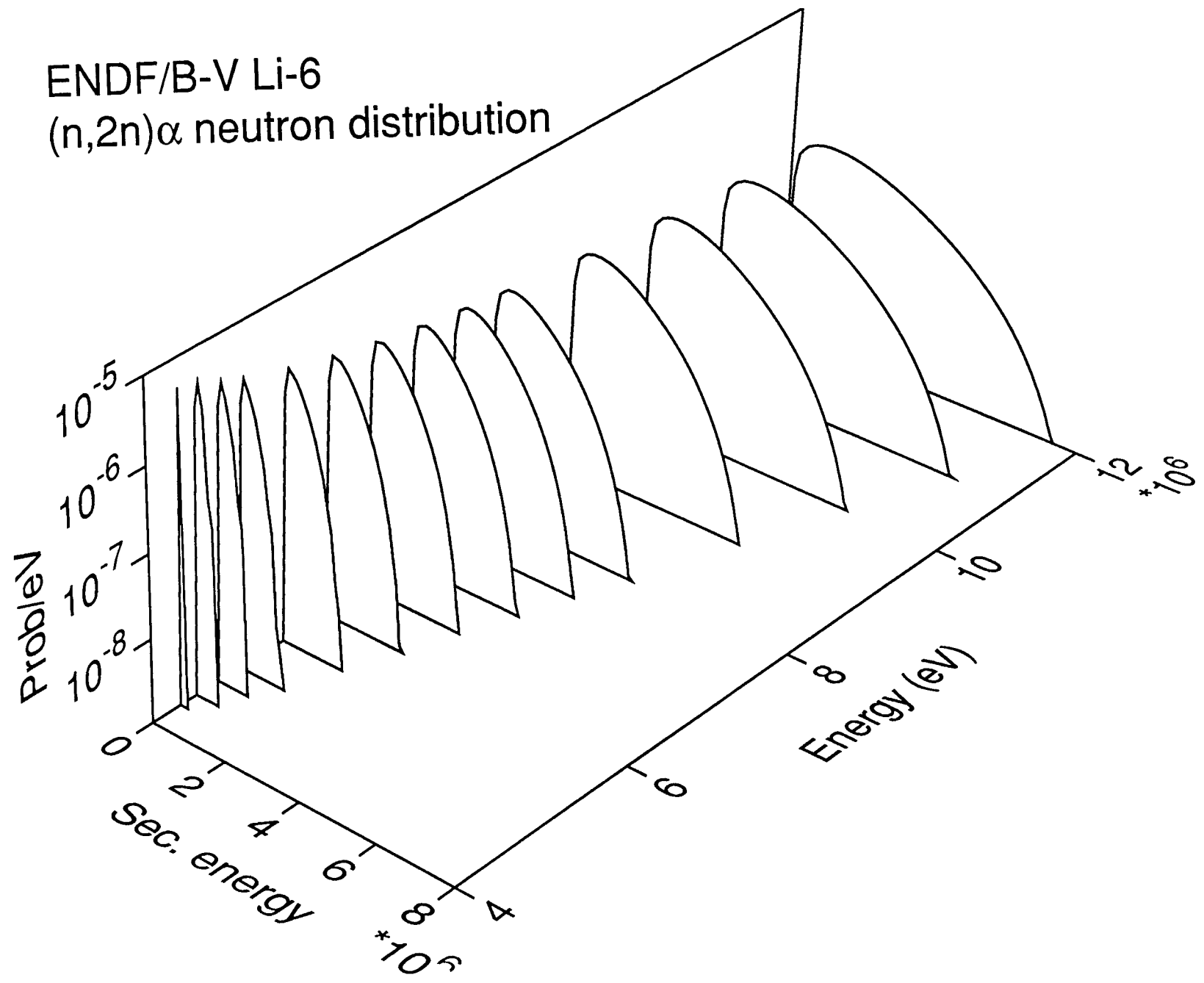
ENDF/B-V CARBON (n, α) with fake data



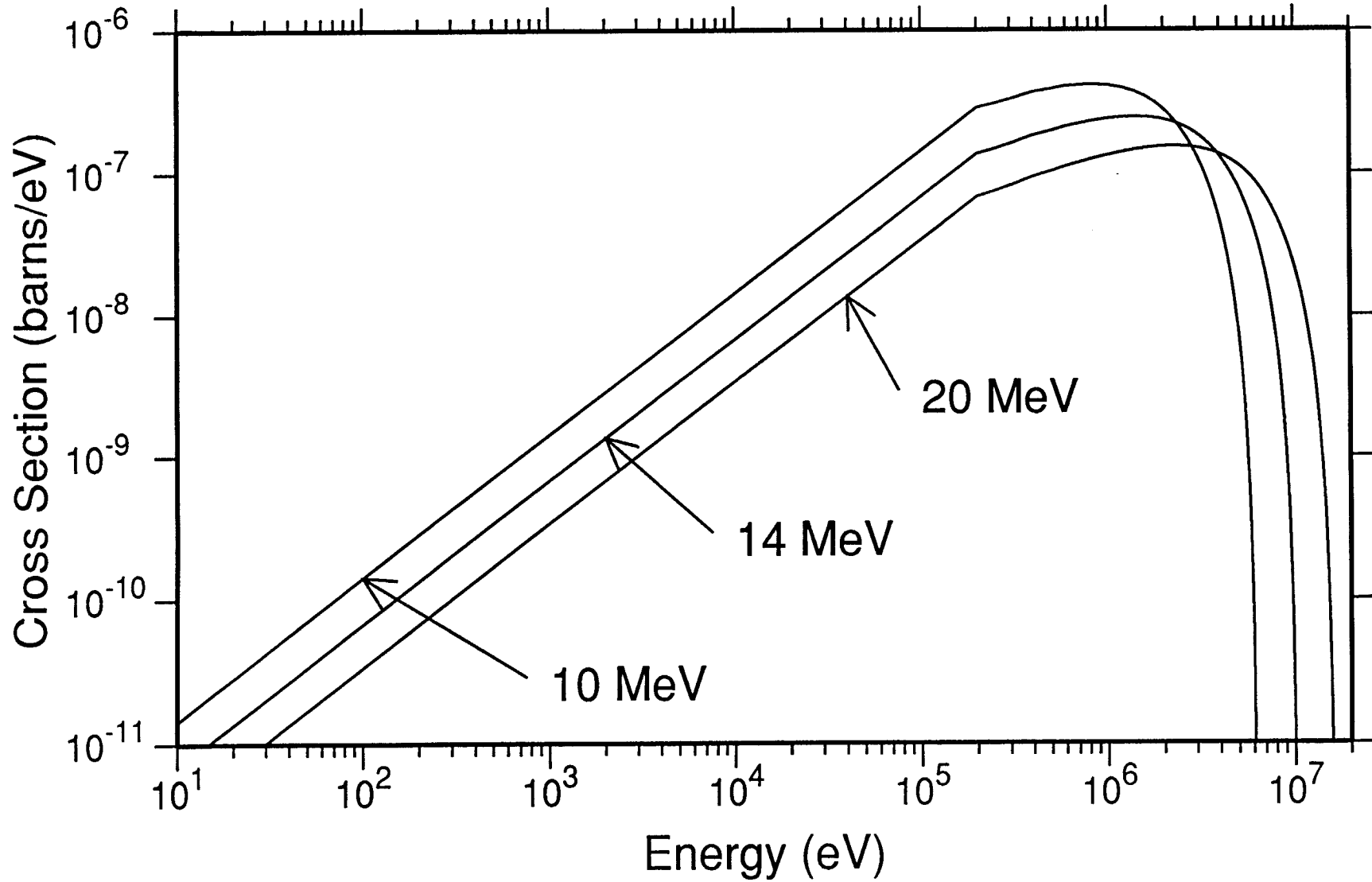
ENDF/B-V CARBON
Elastic MF4



ENDF/B-V Li-6
(n,2n) α neutron distribution



ENDF/B-V Li-6
(n,2n) α neutron spectra vs E



NEADBB::SARTORI

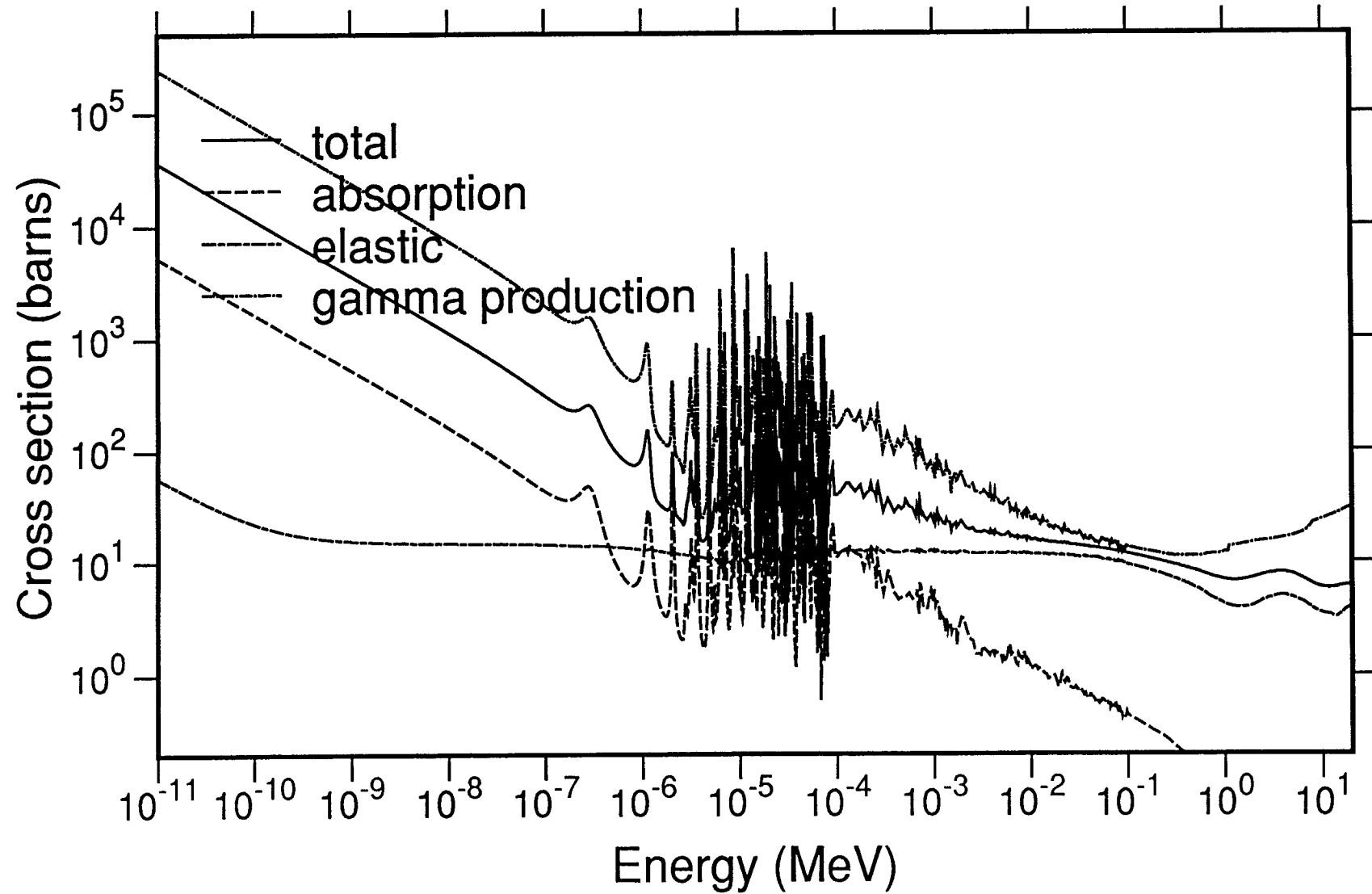
JOB 766

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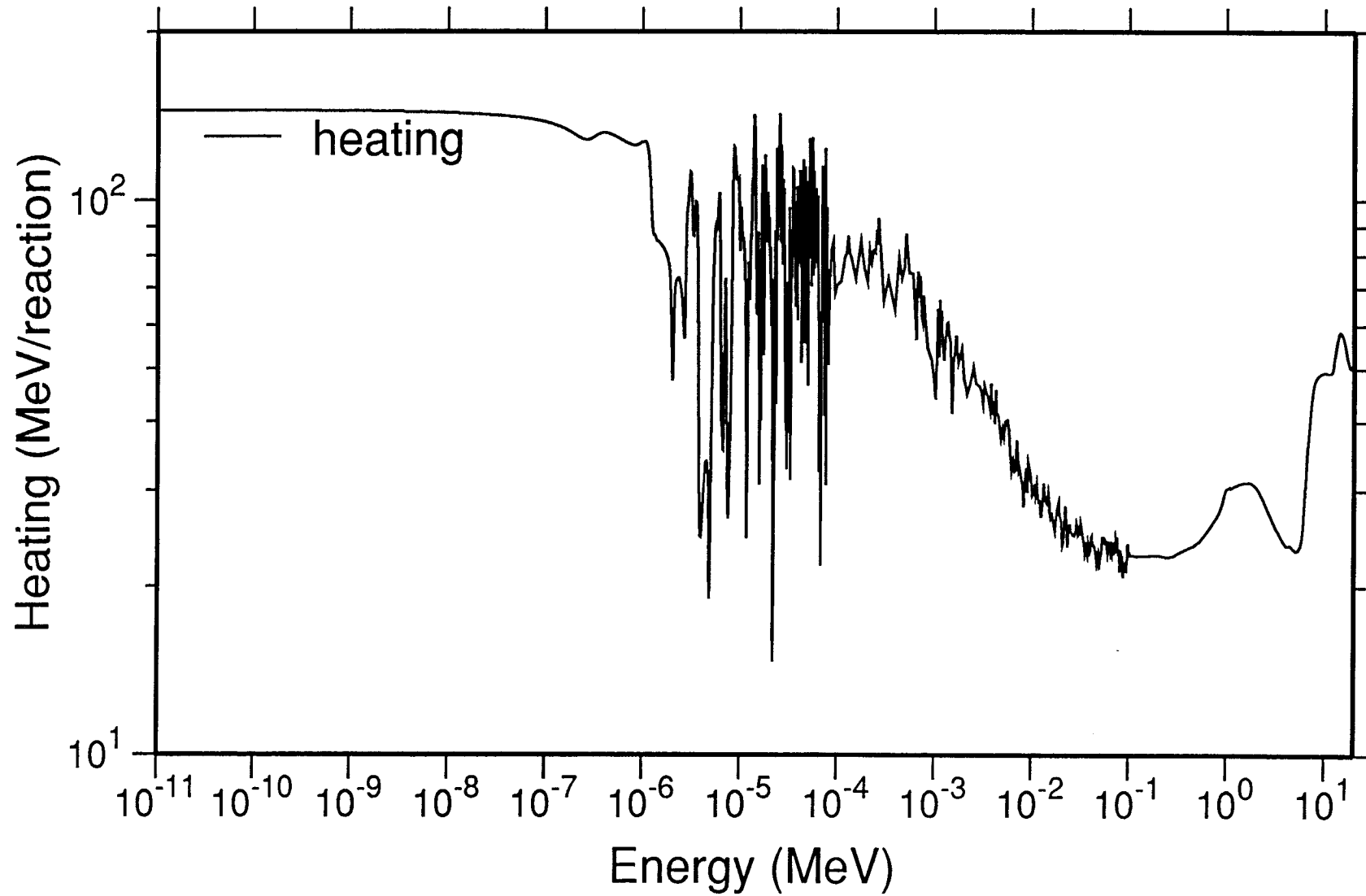
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92-U-235 FROM ENDF/B-V
ACE principal cross sections

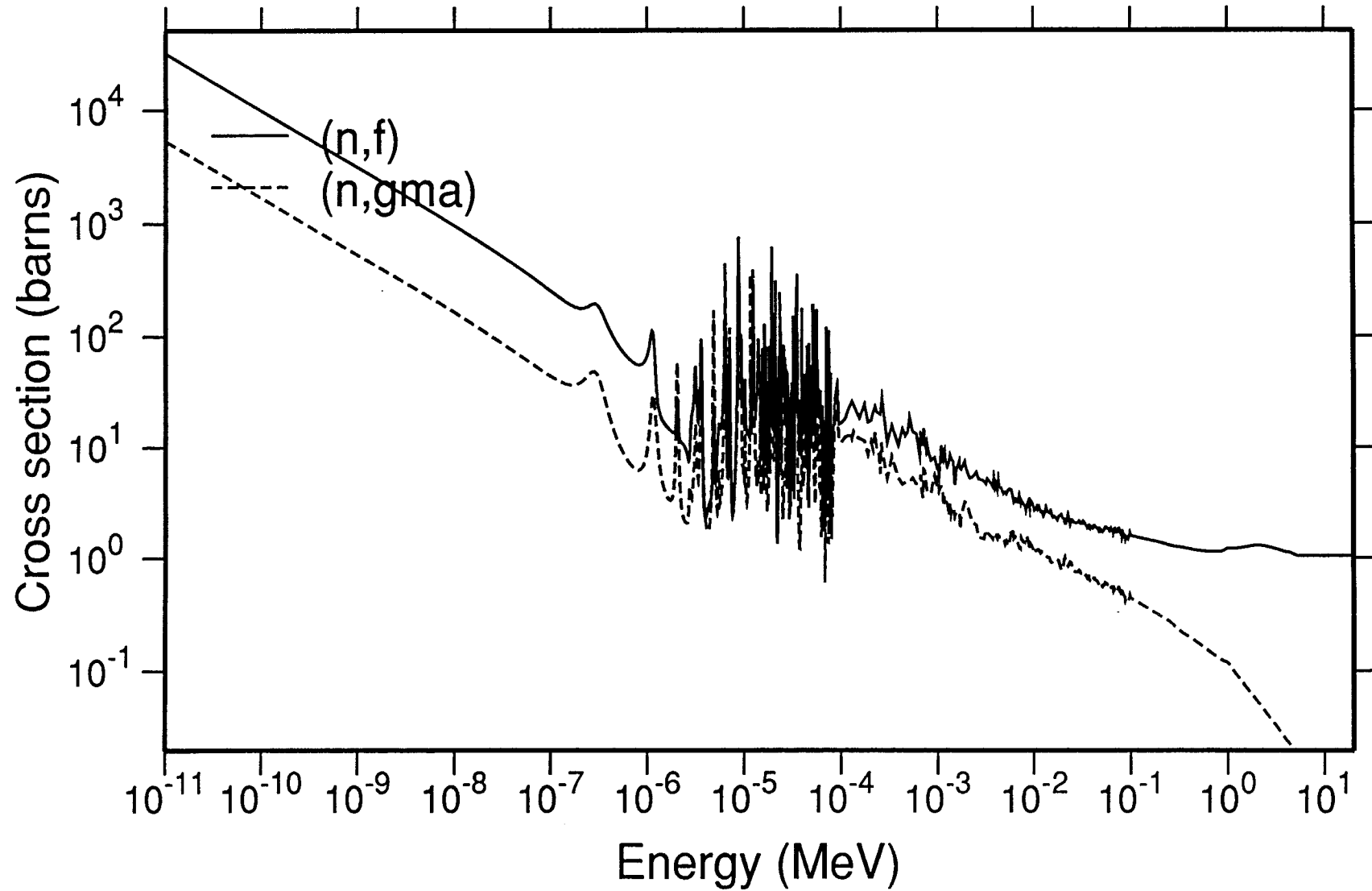


92-U-235 FROM ENDF/B-V
Heating

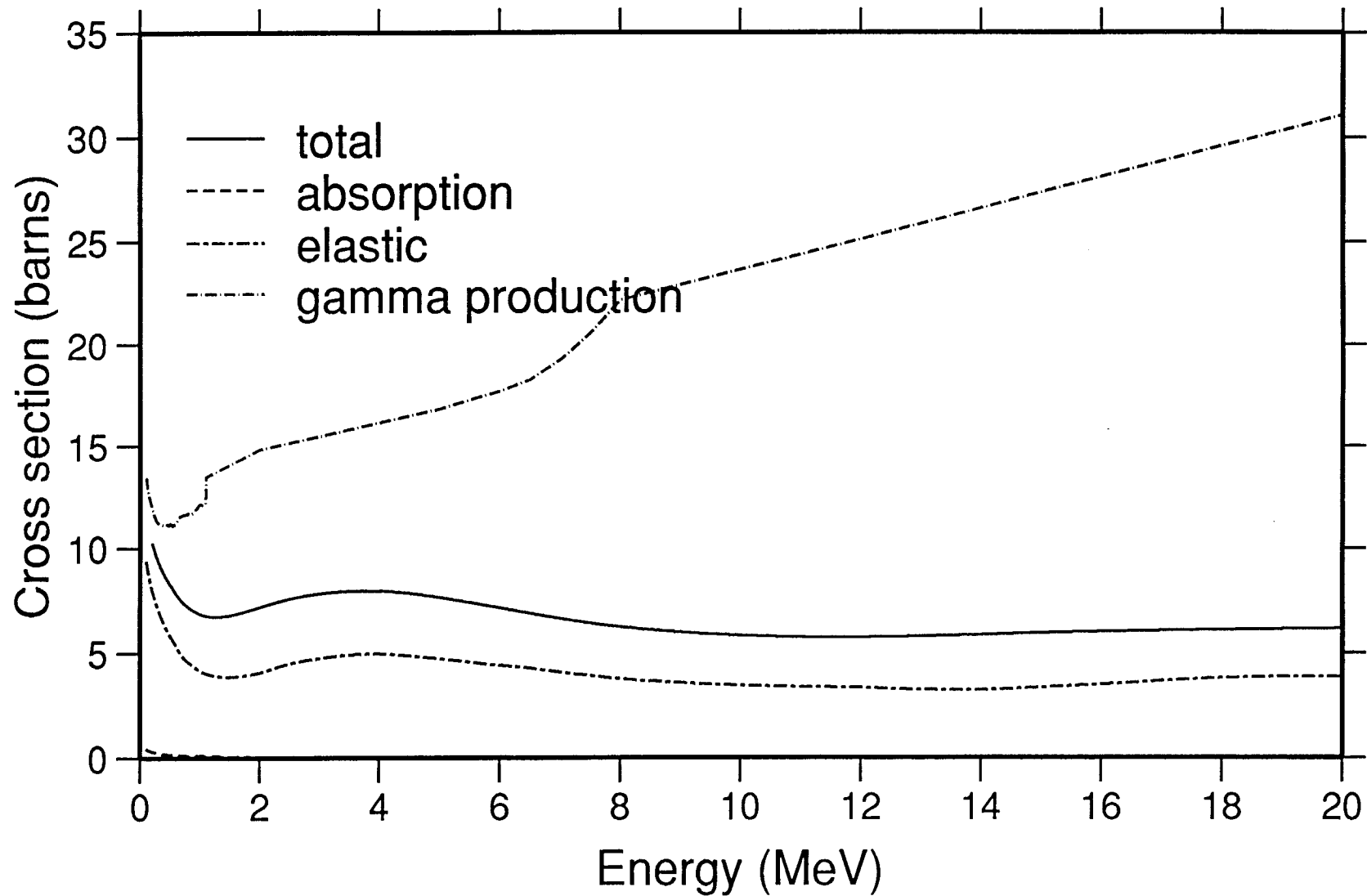


92-U-235 FROM ENDF/B-V

Non-threshold reactions

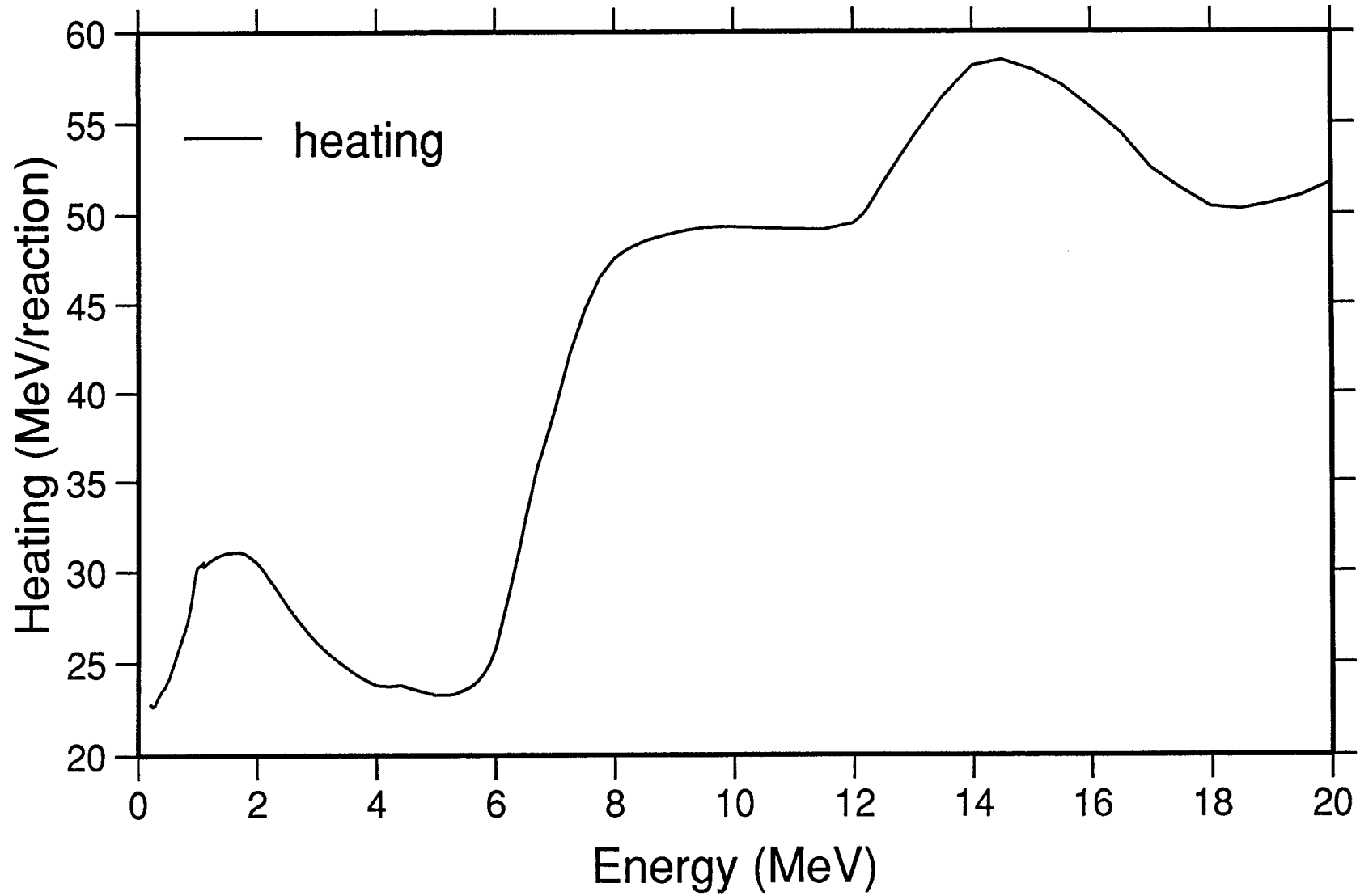


92-U-235 FROM ENDF/B-V
ACE principal cross sections



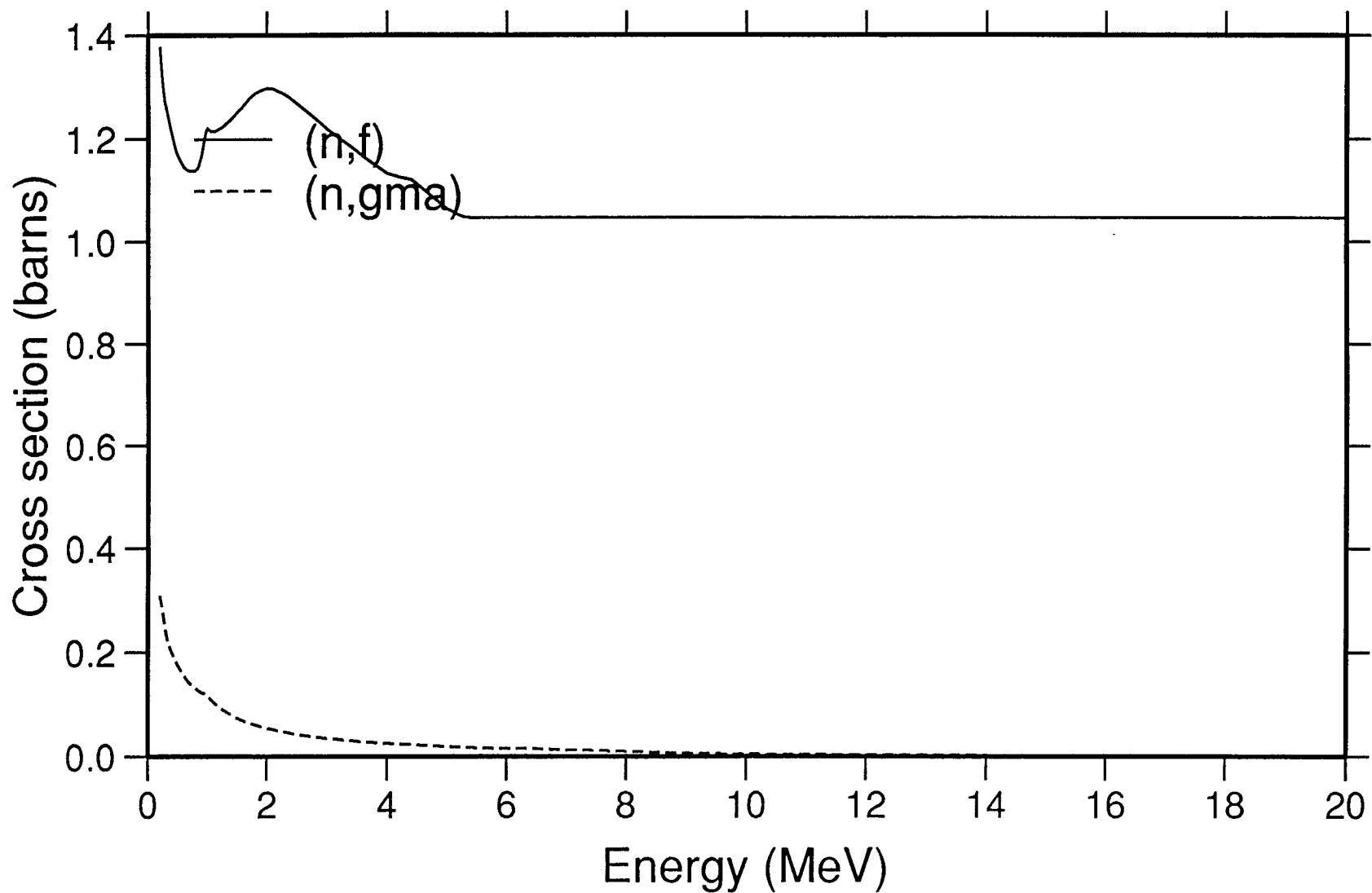
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Heating

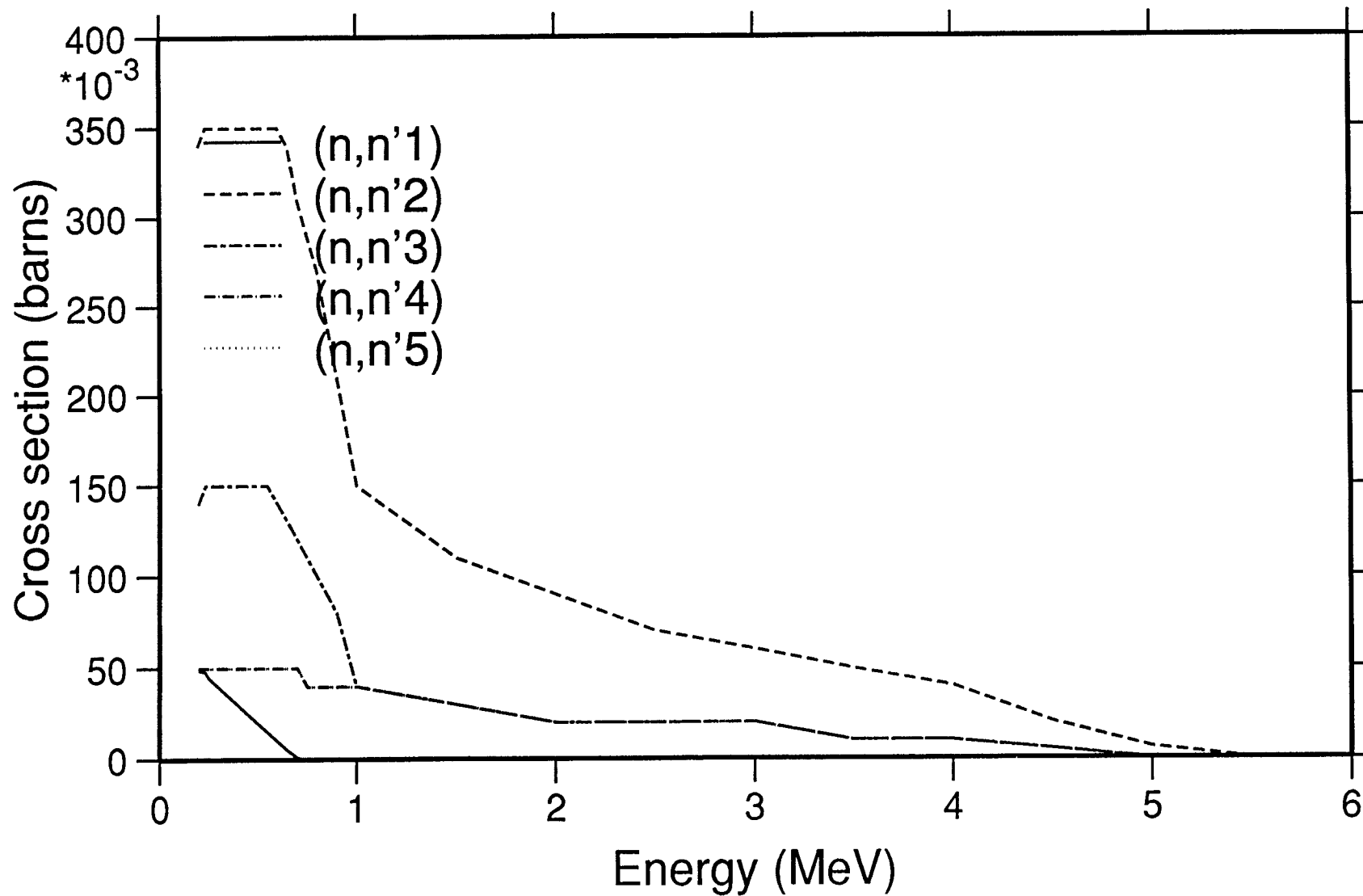


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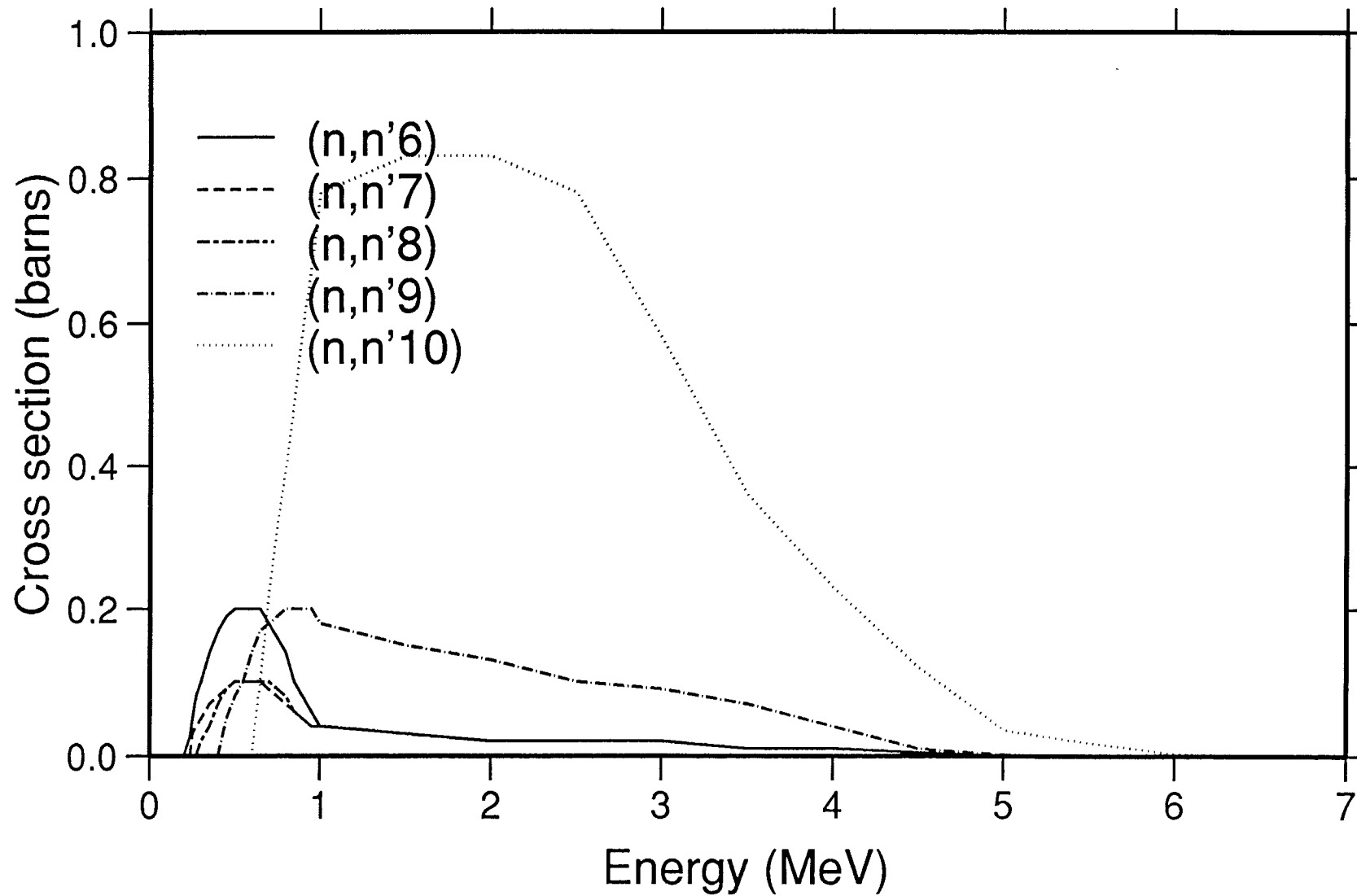
Non-threshold reactions



92-U-235 FROM ENDF/B-V
Inelastic levels

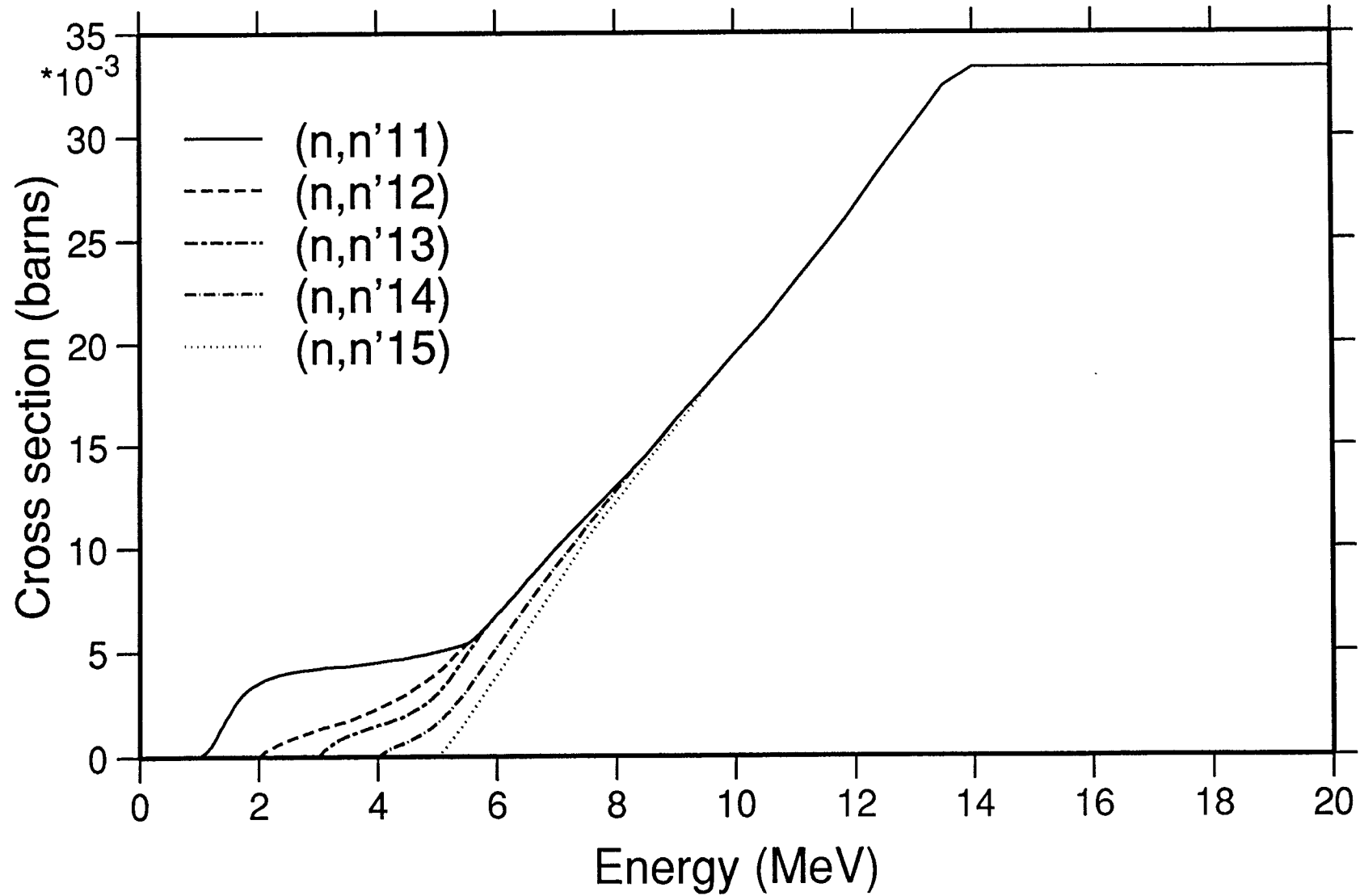


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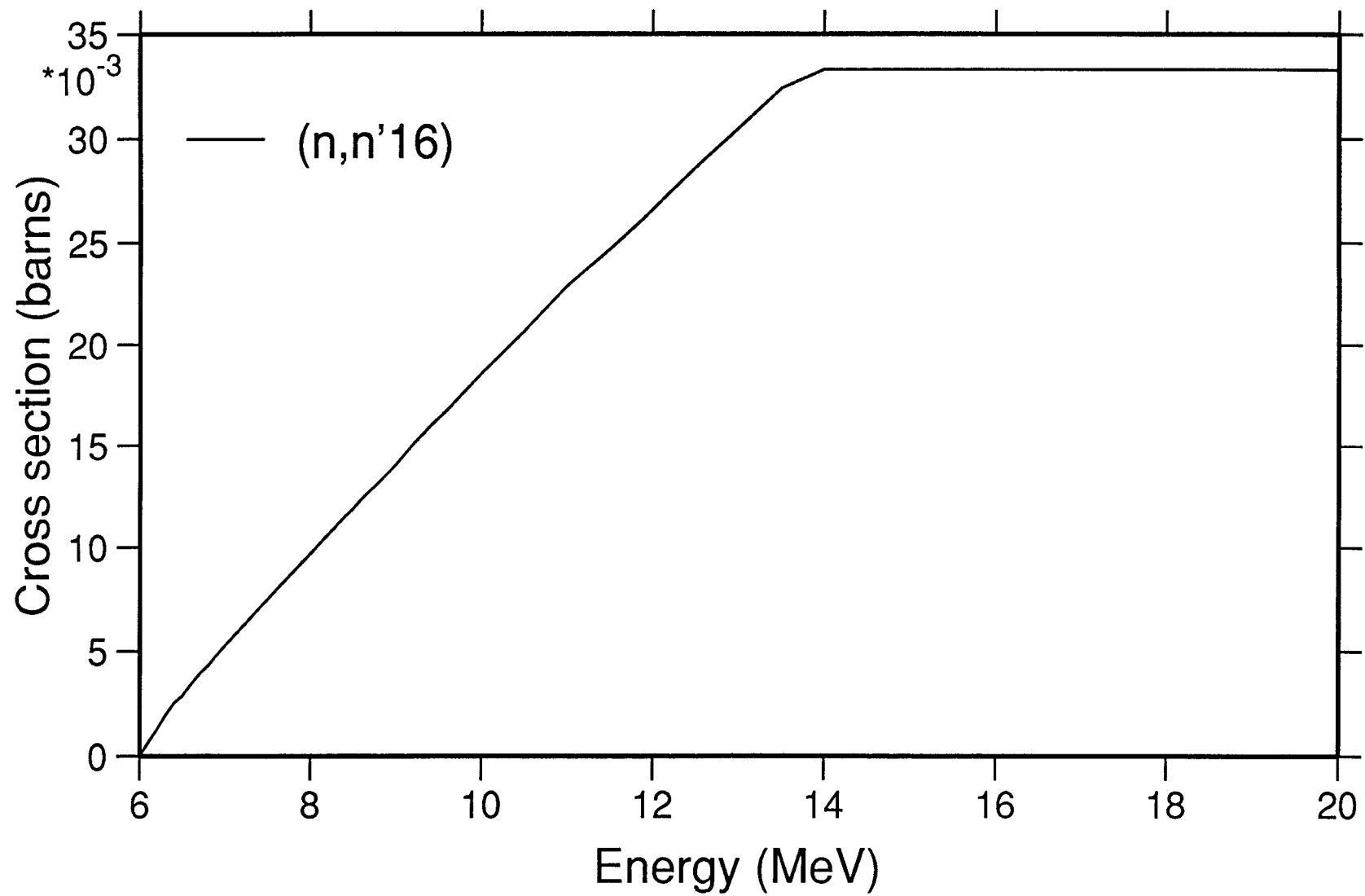


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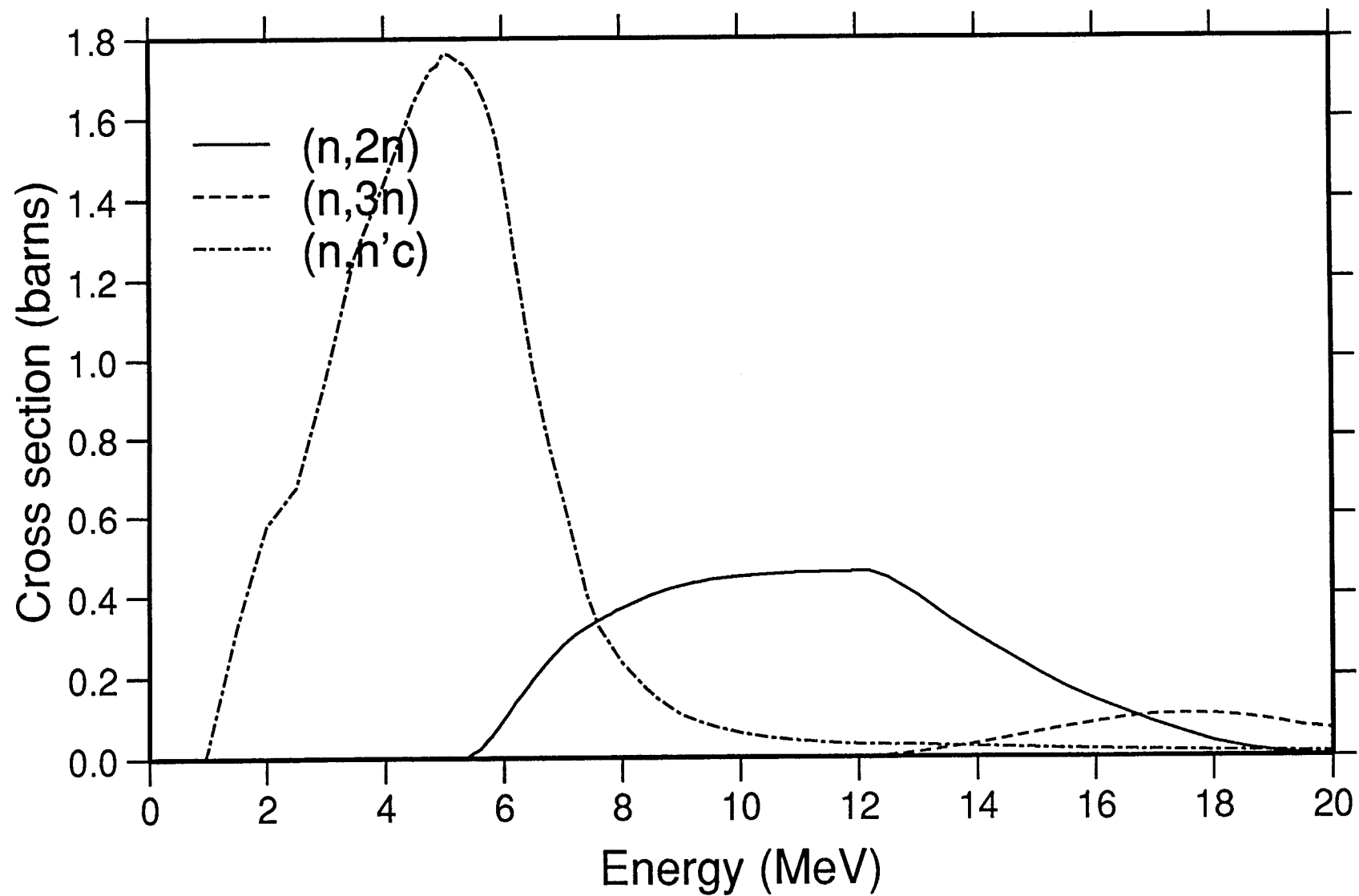
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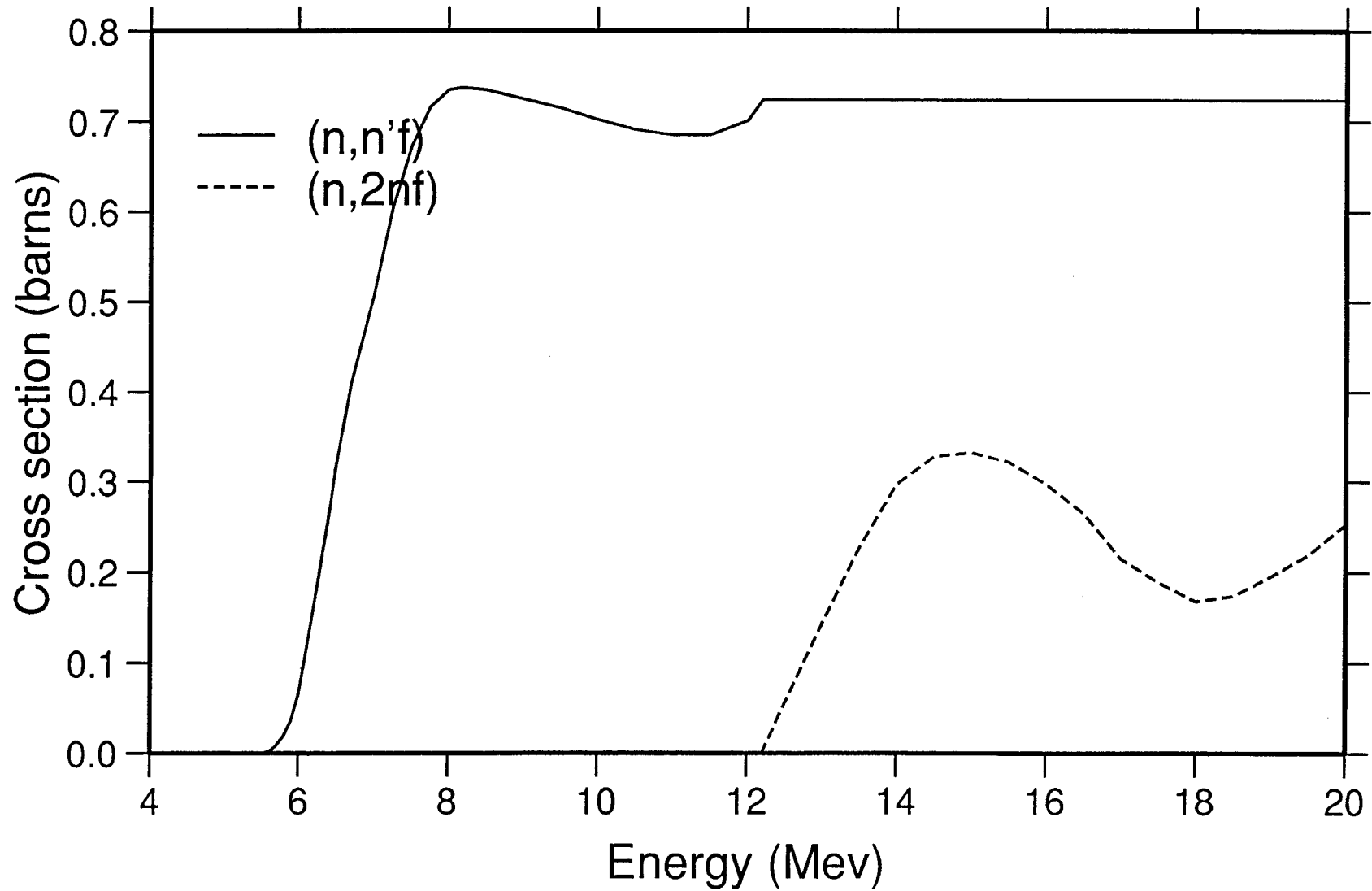
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Inelastic levels



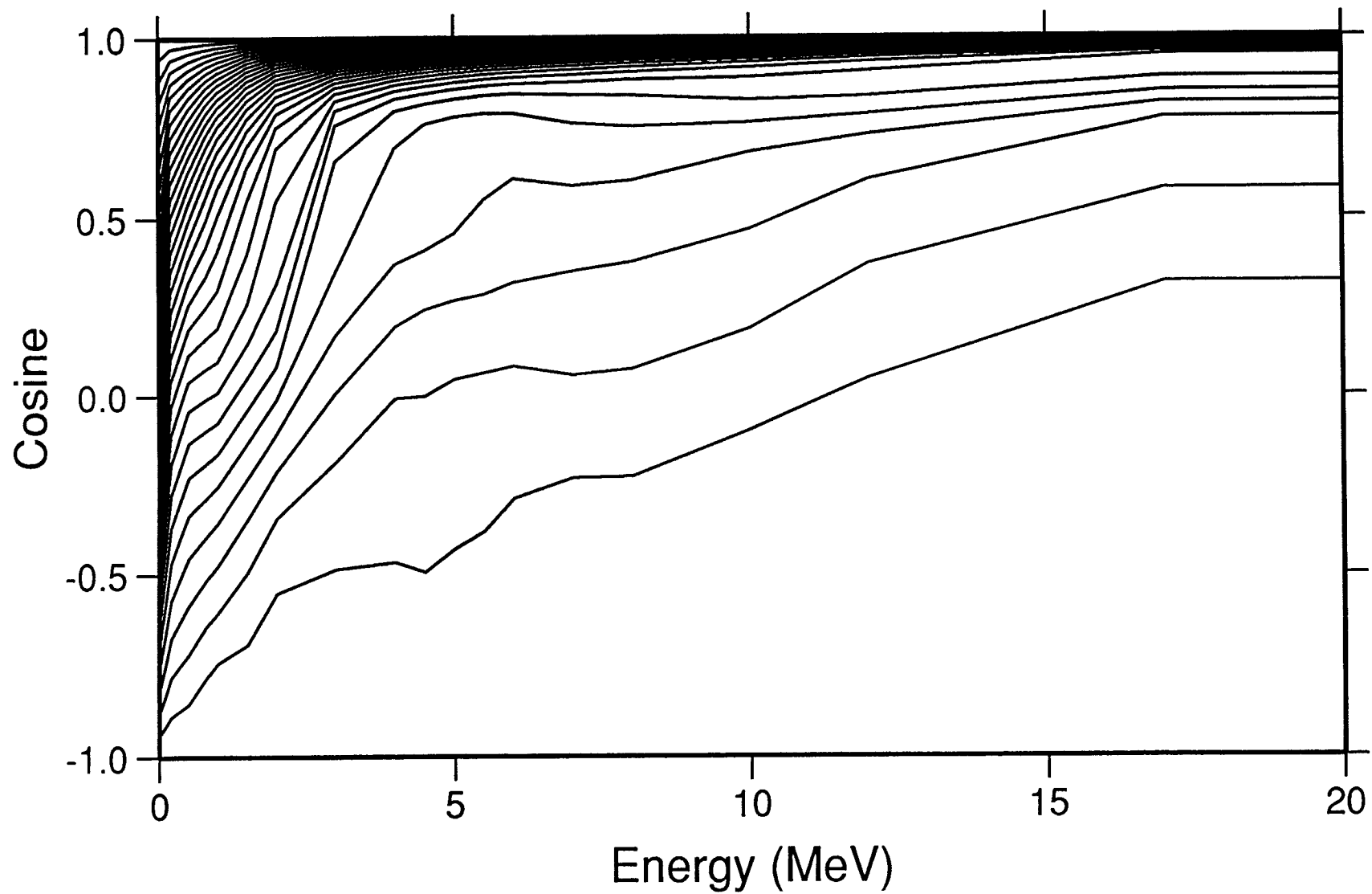
92-U-235 FROM ENDF/B-V
Continuum scattering reactions



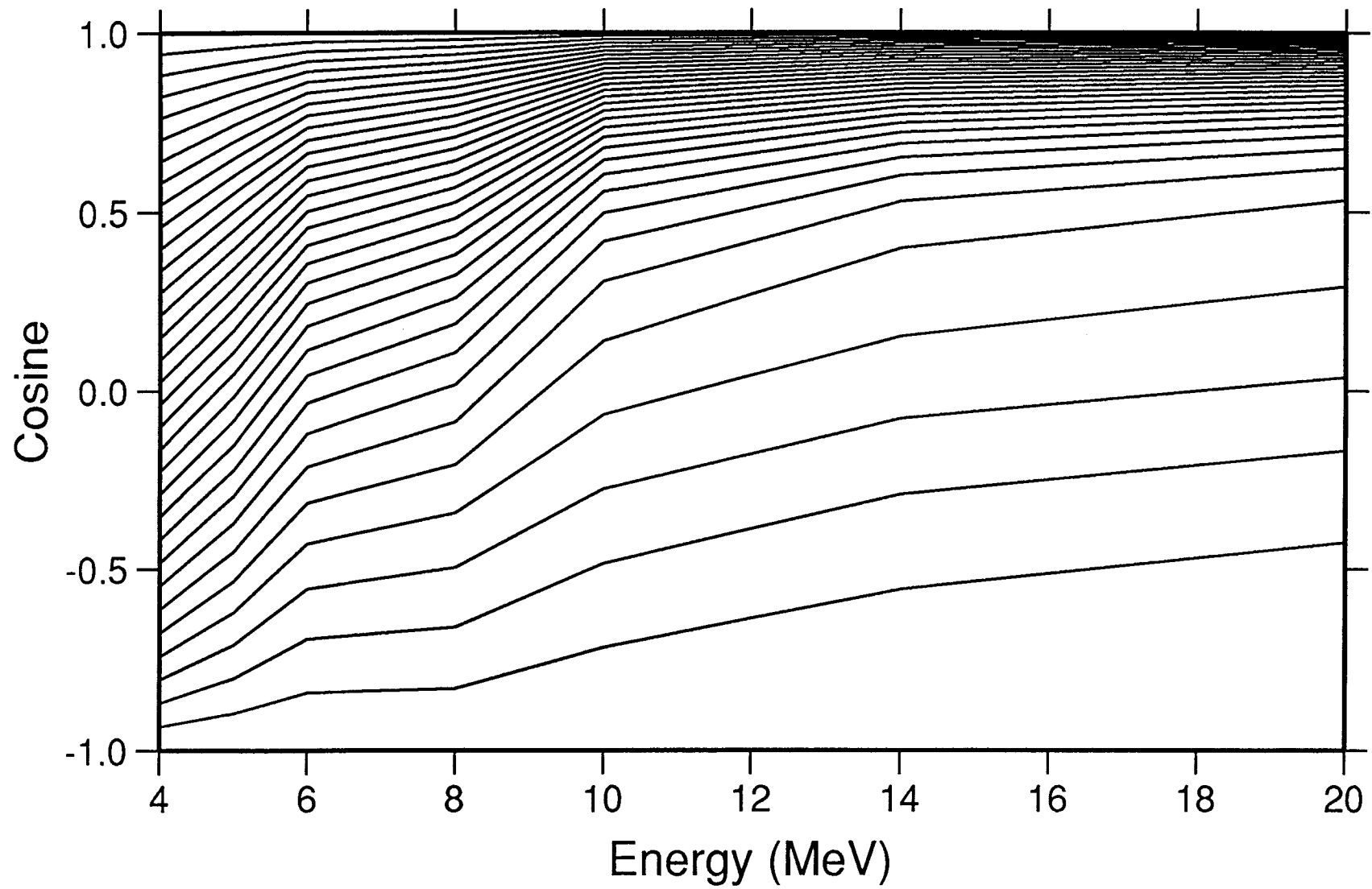
92-U-235 FROM ENDF/B-V
High-order fission reactions



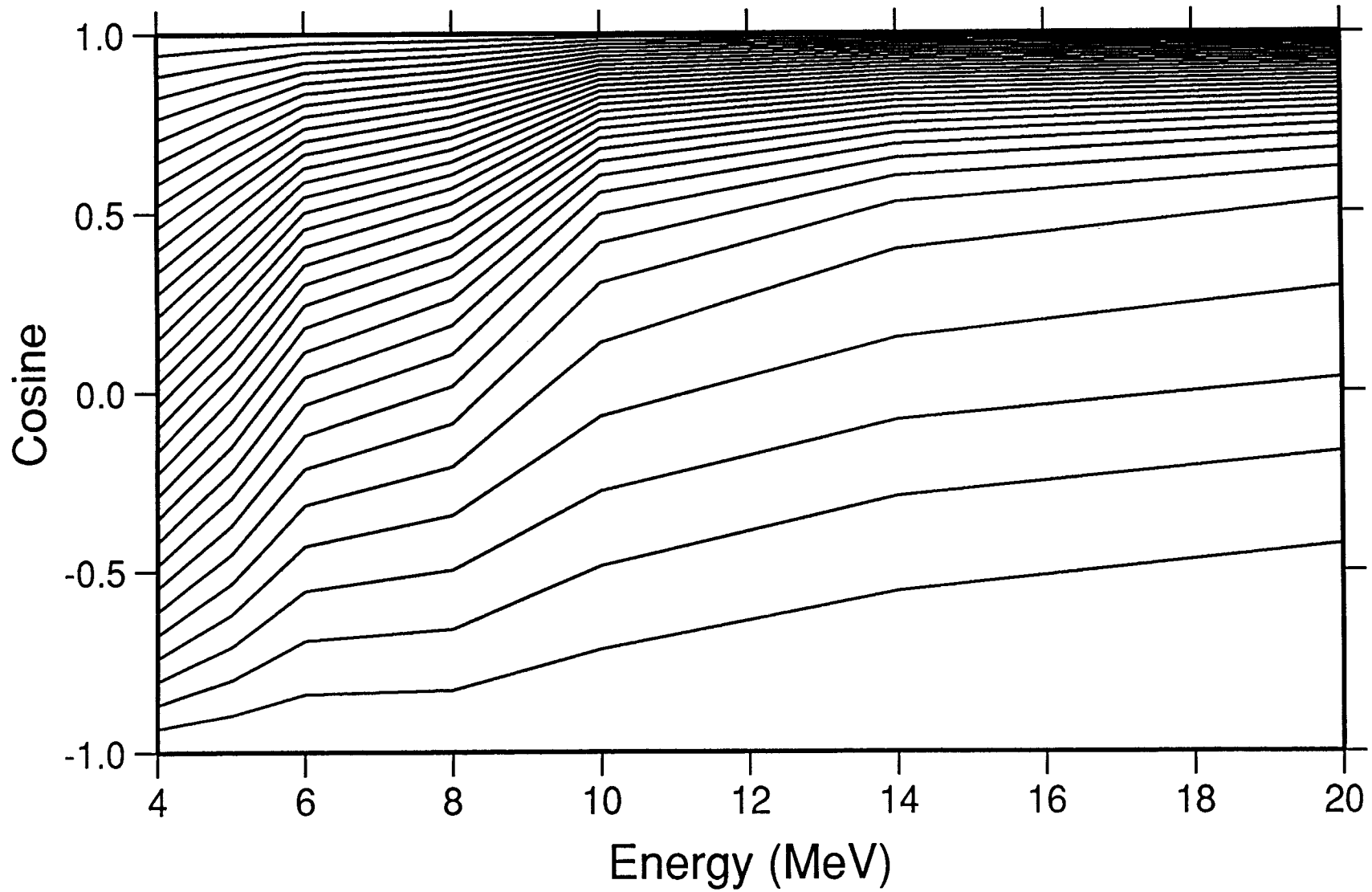
92-U-235 FROM ENDF/B-V
Scattering contours for elastic



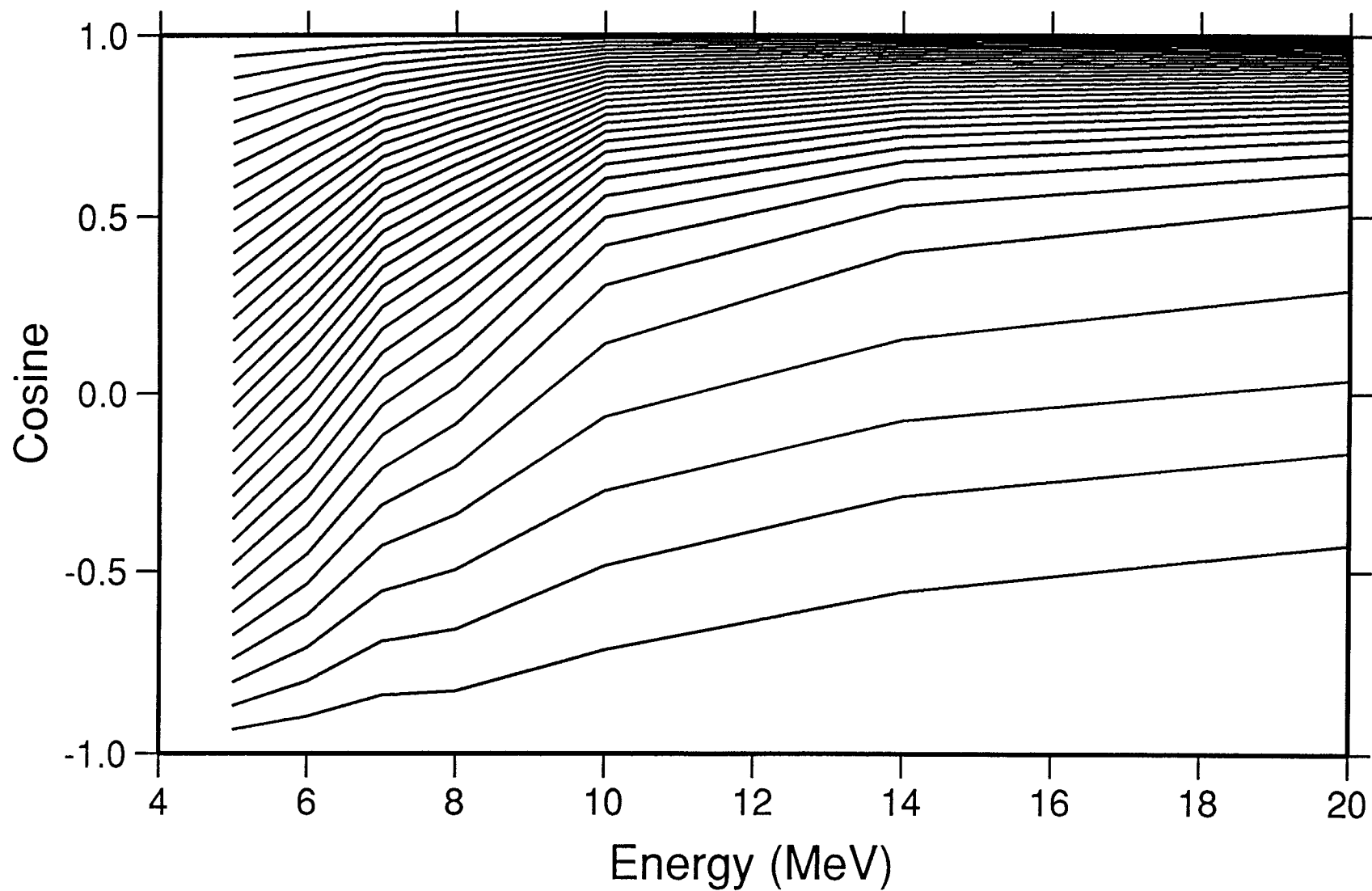
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Scattering contours for (n,n'11)



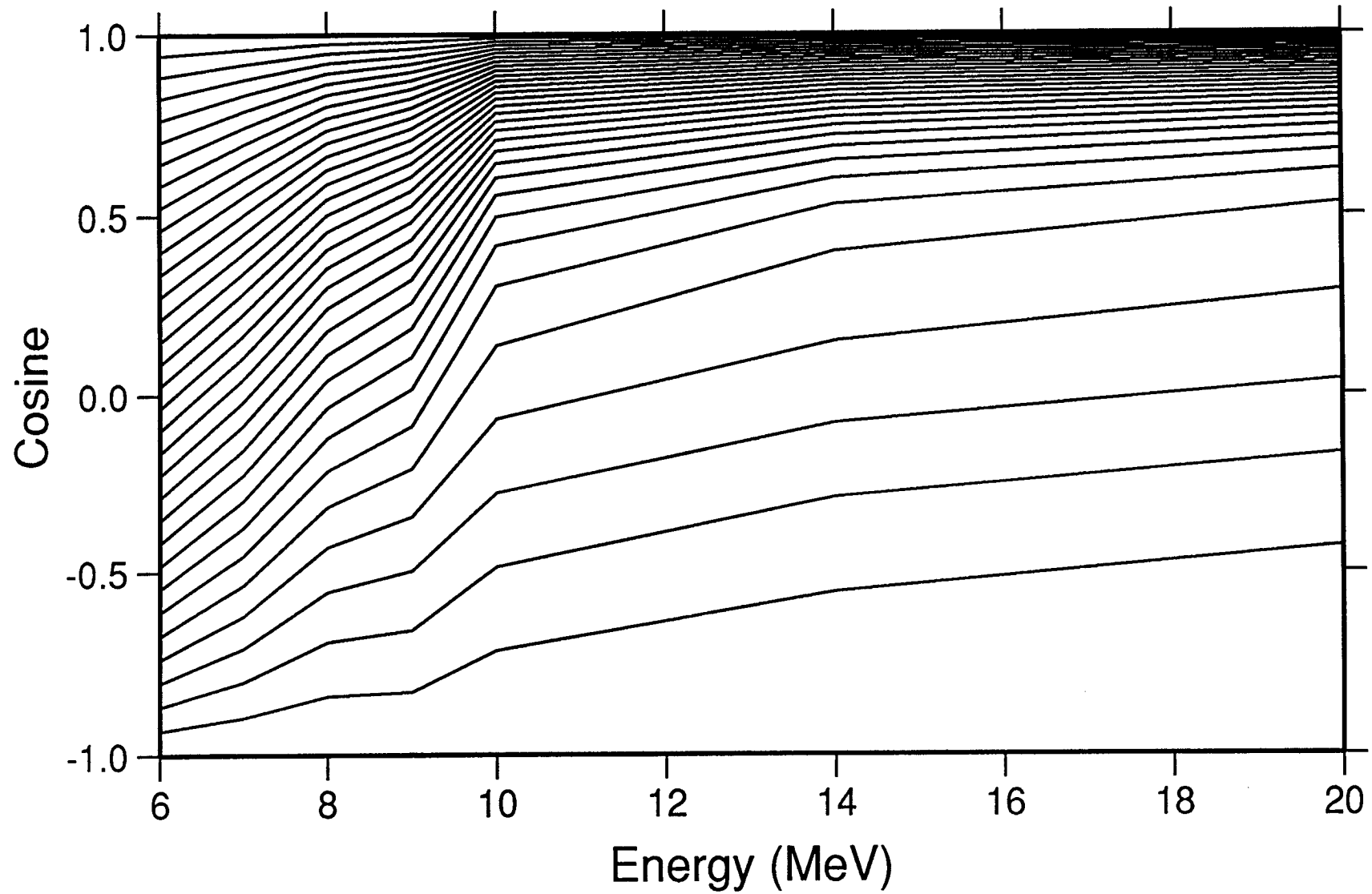
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Scattering contours for (n,n'12)



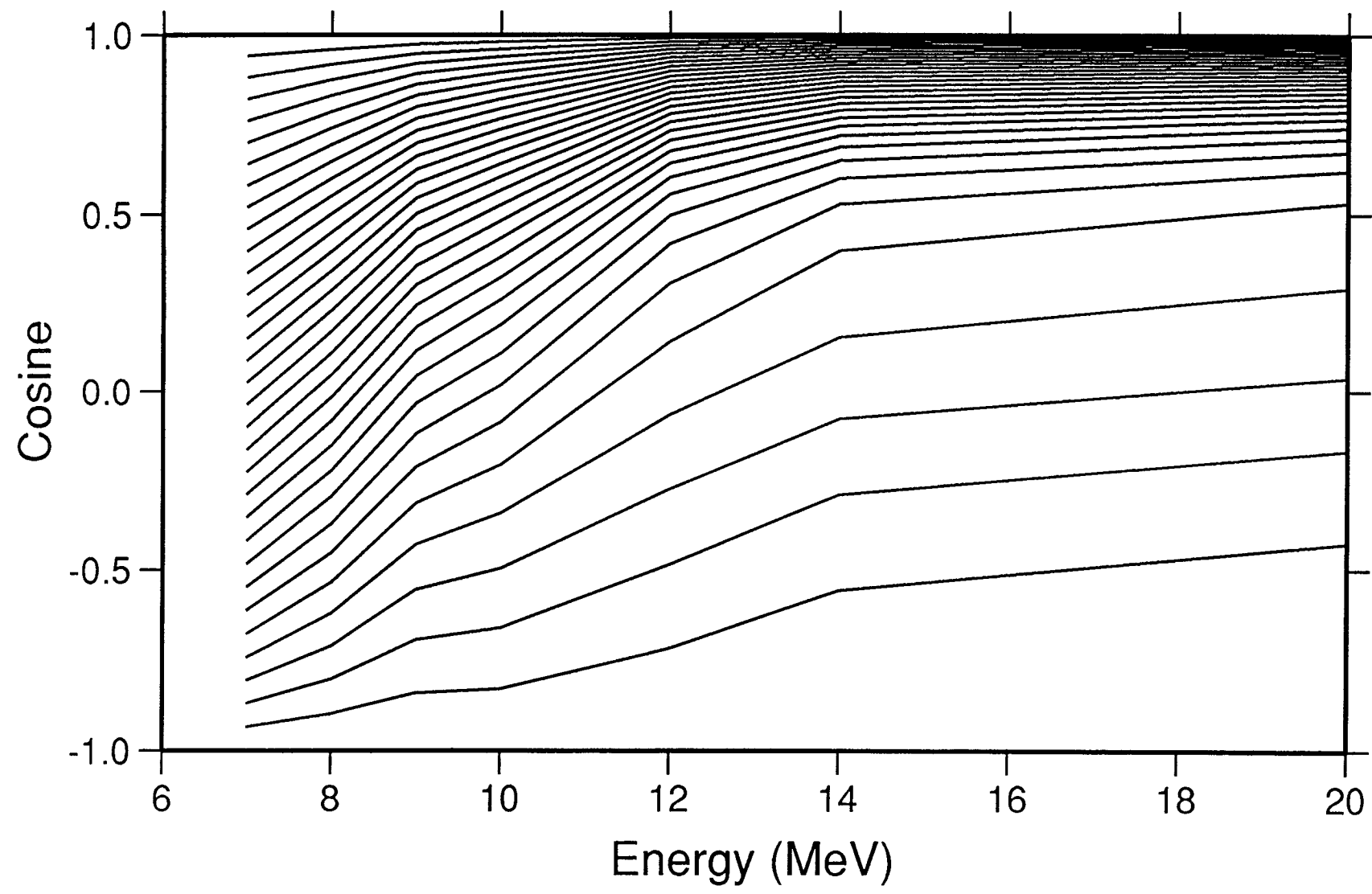
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Scattering contours for (n,n'13)



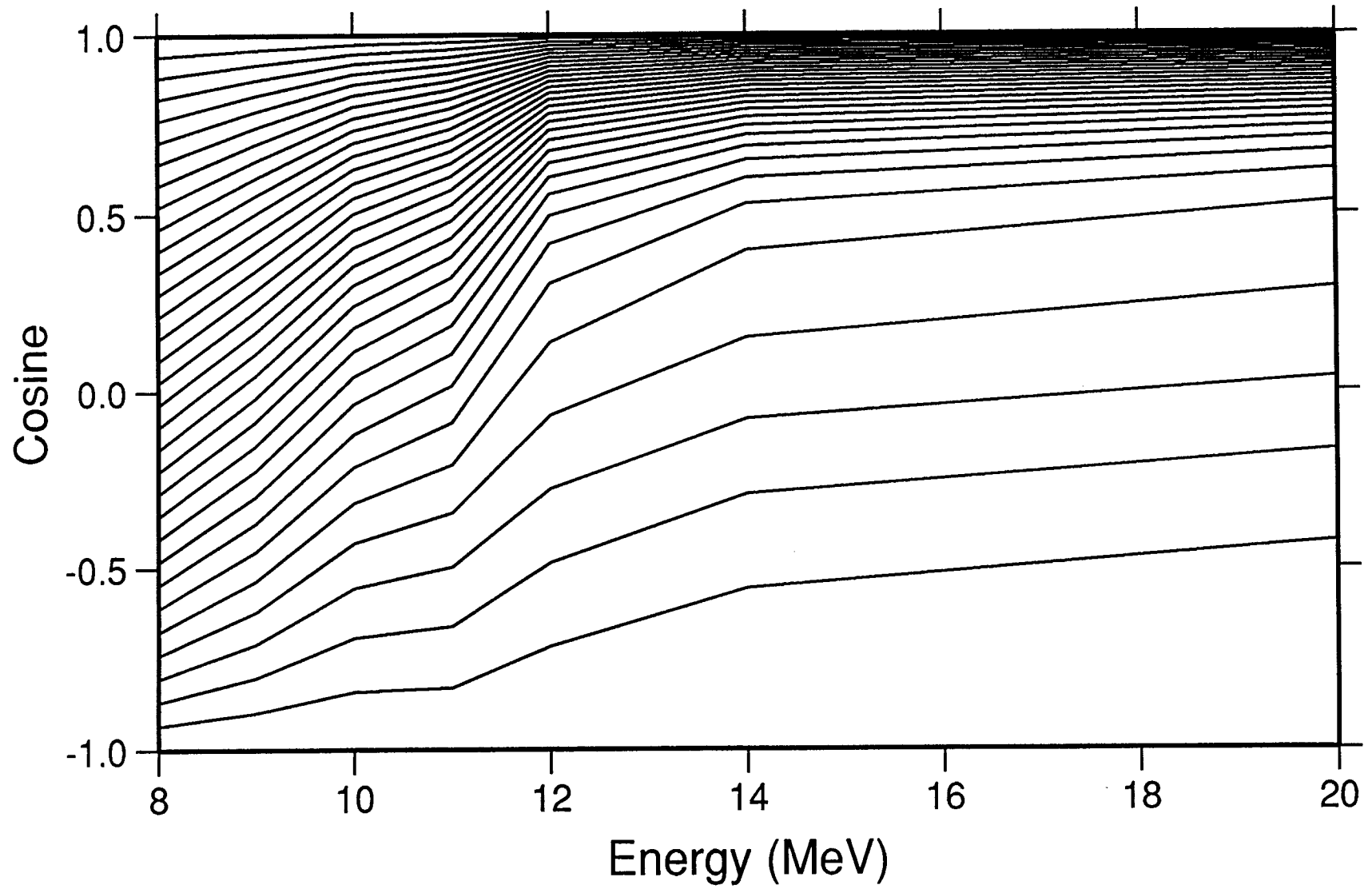
92-U-235 FROM ENDF/B-V
Scattering contours for (n,n'14)



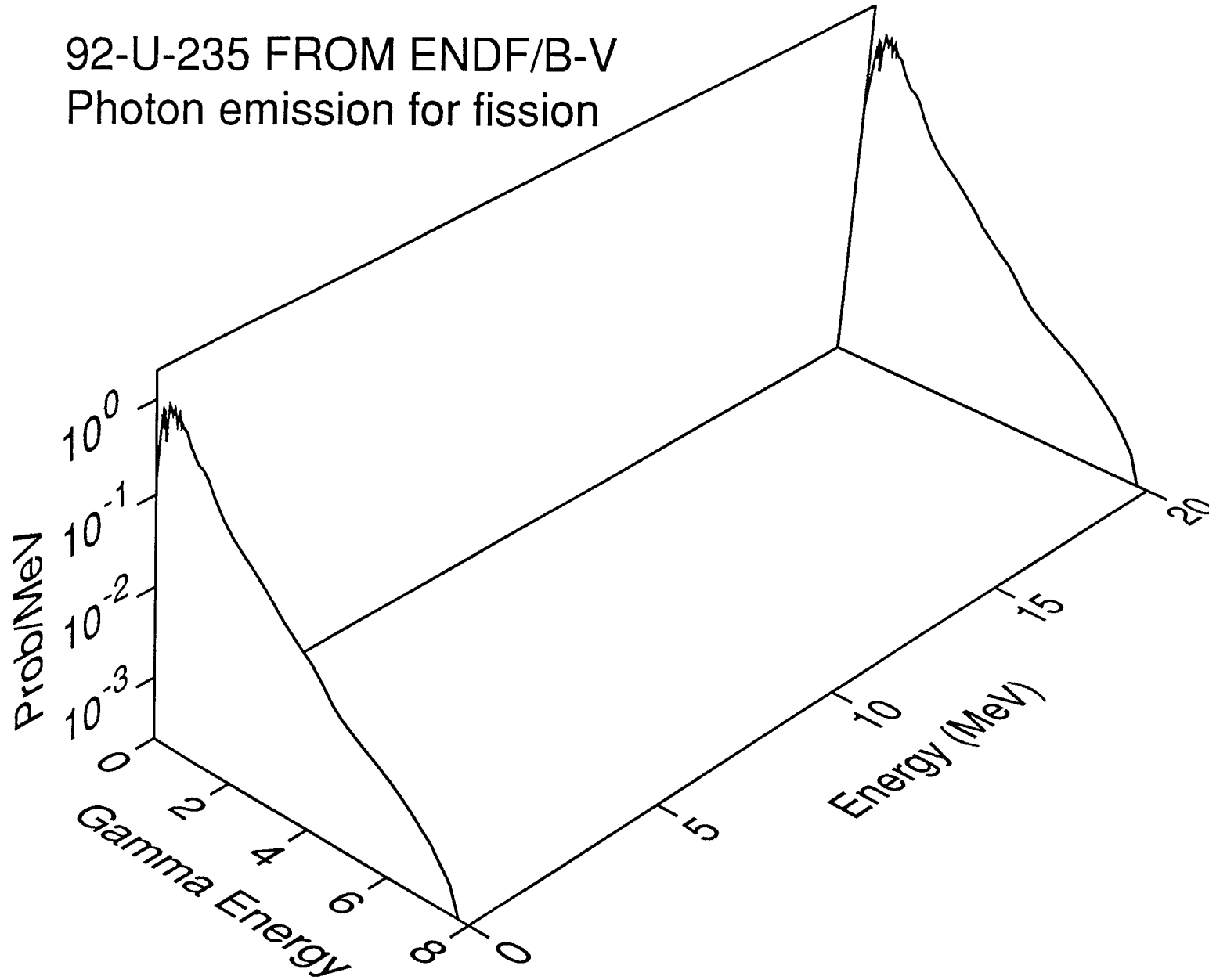
92-U-235 FROM ENDF/B-V
Scattering contours for (n,n'15)



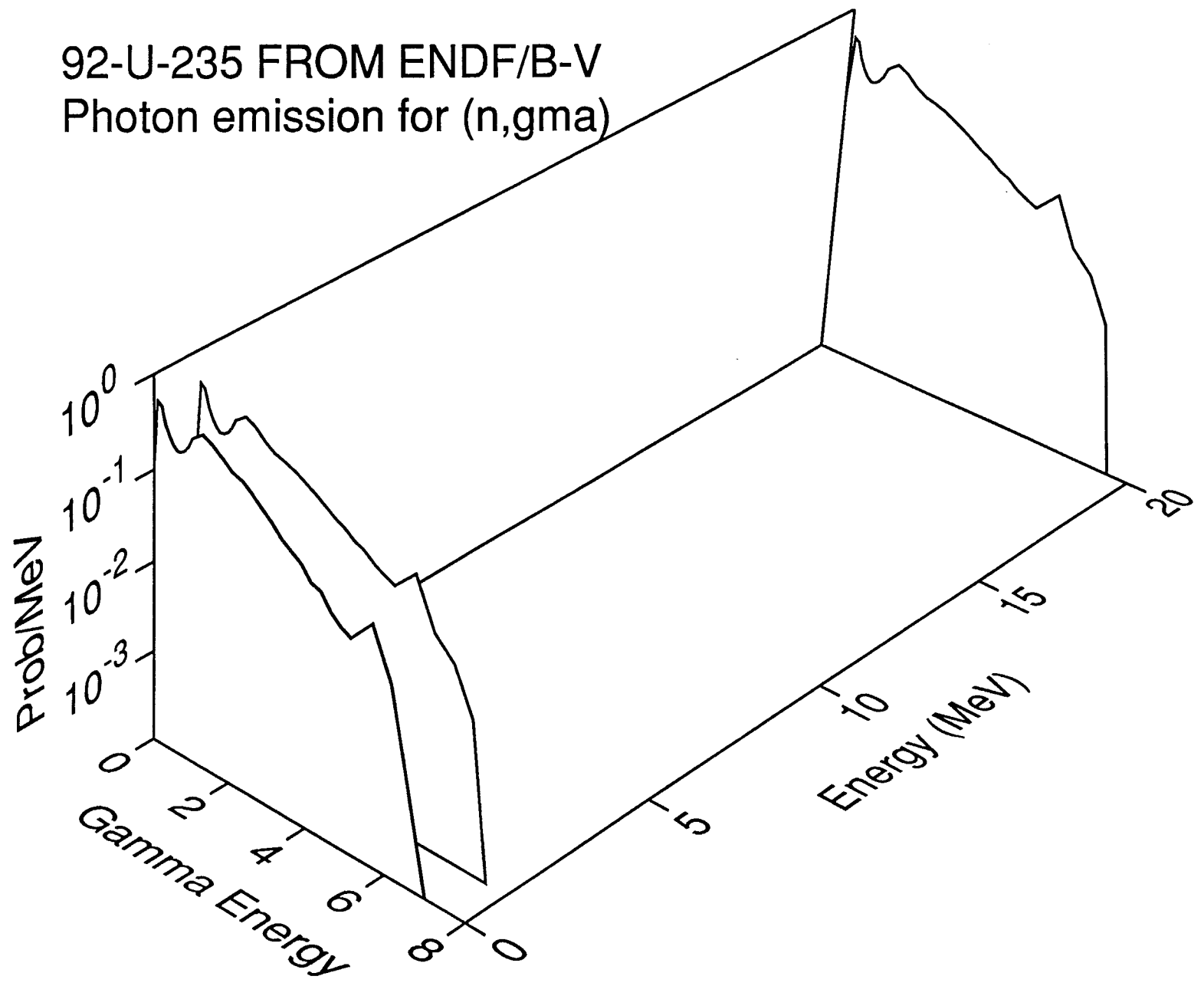
92-U-235 FROM ENDF/B-V
Scattering contours for (n,n'16)



92-U-235 FROM ENDF/B-V
Photon emission for fission



92-U-235 FROM ENDF/B-V
Photon emission for (n,gma)



92-U-235 FROM ENDF/B-V
Photon emission for nonelastic

