

Comparison of EXFOR eta values with evaluated ones

(N. Otsuka, 2022-03-11, Memo 4C-3/0419)

Note: The eta value is compiled with ,ETA in EXFOR. For fissiles $\eta = v\sigma_f / (\sigma_f + \sigma_\gamma)$

I received a request for plotting of evaluated eta values, and I compared the eta values of four fissile nuclides (^{233}U , ^{235}U , ^{239}Pu , ^{241}Pu) in EXFOR with the evaluated ones in this opportunity. The evaluated values were calculated from JENDL-5 files by using PREPRO17 codes (LINEAR, RECENT, SIGMA1 and FIXUP). Their plots and an input file of FIXUP are appended to this memo just for your information. In the ^{239}Pu plot, we observe the last data point of 20917.025 at 11.23 eV is too high. The numerical data were originally received by private communication and converted from NEUDADA.

Input file of FIXUP for ^{241}Pu

The fourth line is for construction of the absorption cross section (MF=3 MT=27) by summing MF=3 MT=18, 102-117, 155, 182, 191-193 and 197 according to the description given in the ENDF-6 manual.

The fifth line is for calculation of the product of the total fission neutron multiplicity (MF1 MT452) and absorption cross section (MF3 MT18).

The sixth line is for calculation of the product divided by the absorption cross section (MF3 MT27).

The eighth line specifies $1000*Z+A$ of the target nuclide (94241) in columns 1 to 11, MAT number of the target nuclide (9443) in columns 45 to 48, and the MT number of the calculated eta value (255) in column 49 to 51.

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-----1-----2-----3-----4-----5-----6-----7
11111111111
./sigma1.out
./fixup.out
 27=( 18, 18)+(102,117)+(155,155)+(182,182)+(191,193)+(197,197)
*333=(452* 18)
R255=(333/ 27)
                                     (BLANK LINE TO TERMINATE SUMMATION/DELETION RULES)
 9.42410+ 4 0.00000+ 0                0                09443255
 0.00000+ 0 0.00000+ 0                0                0
                                     (BLANK LINE TO TERMINATE SECTION CREATION RULES)

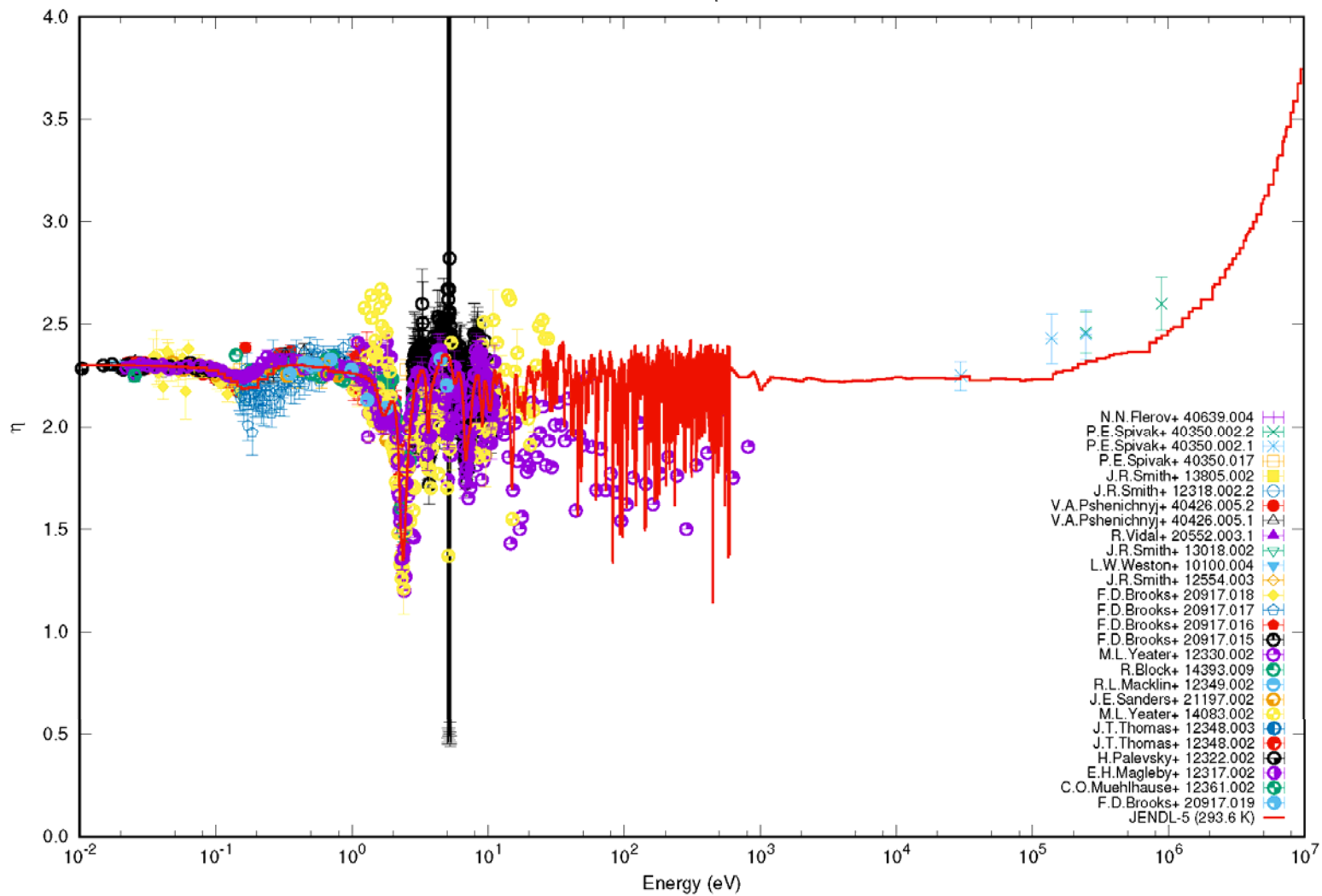
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Output file of FIXUP for ^{241}Pu

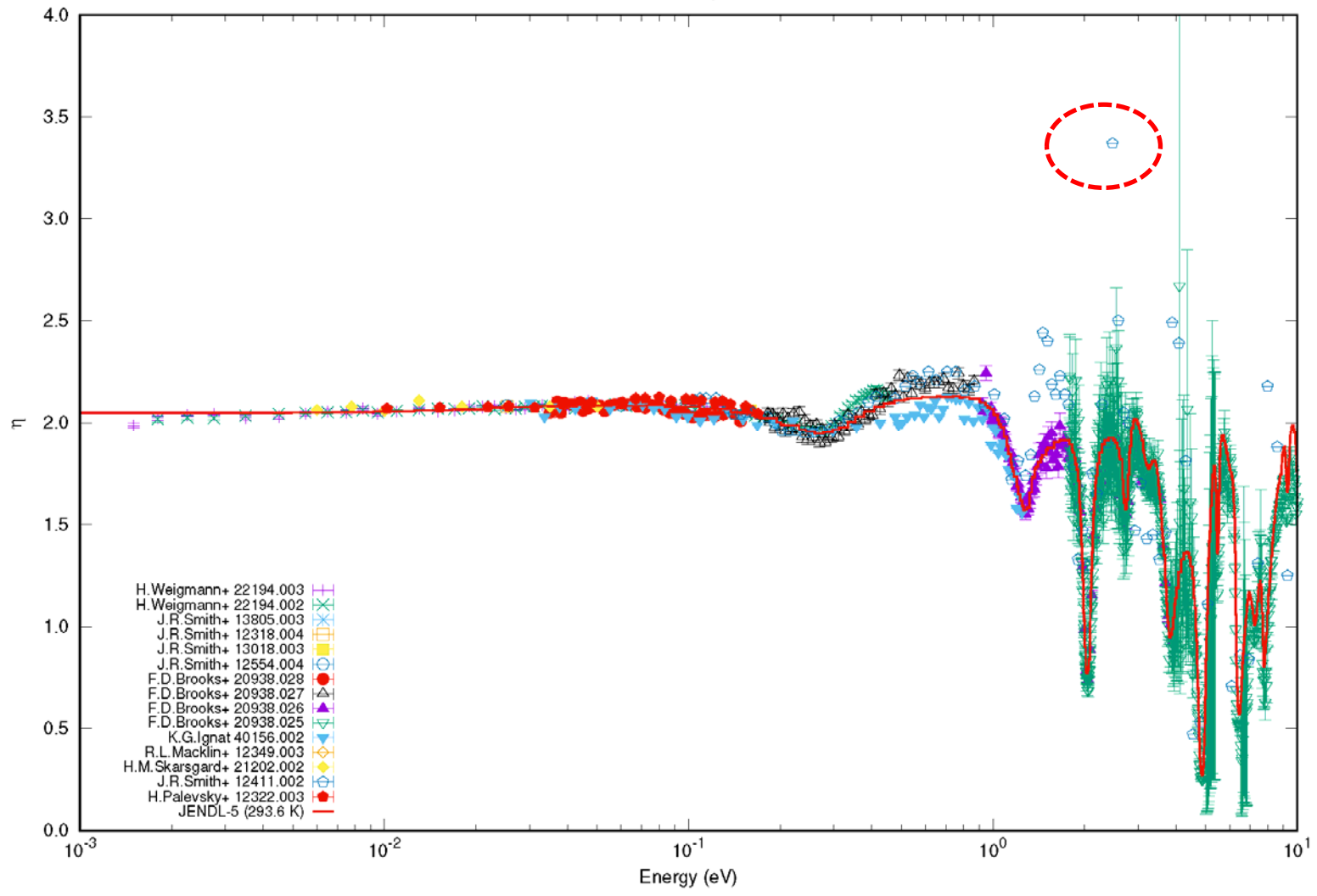
The fourth line and below give the eta value in the TAB1 format starting from $(E,\eta)=(10^{-5} \text{ eV}, 2.064064971)$.

94241.0000	238.986000	0	0	0	09443	3255	1
0.0	0.0	0	0	1	76569443	3255	2
7656	2				9443	3255	3
1.00000E-5	2.064064971	3.64111E-5	2.064083771	8.59726E-5	2.064109379443	3255	4
2.536868E-5	2.06414434	3.45858E-5	2.064191934	7.17874E-5	2.064256959443	3255	5
6.43201E-5	2.064345448	7.73949E-5	2.064466311	1.196178E-4	2.064630779443	3255	6
...							

$^{233}\text{U}\eta$



$^{235}\text{U } \eta$



$^{239}\text{Pu } \eta$

