Statistical Verification and Validation of the EXFOR Database (A61, A69)

(K. Matsumoto, E. Dupont, N. Otsuka, A. Koning, 2014-10-08, Memo CP-N/124)

In the continuity of WPEC SG30 on improving the accessibility and quality of the EXFOR database, the NEA Data Bank and the IAEA Nuclear Data Section organised a comprehensive review of cross-section data in the EXFOR database in collaboration with A. Koning.

The first part of the review covers all neutron-induced threshold and activation reactions. The final report [1] describes the development of an efficient review system to systematically compare about 10 000 cross-section data sets with the corresponding values in the major evaluated nuclear data libraries. The resulting "goodness-of-fit" (GOF) information gives rise to various interesting trends in the data, including a list of suspicious data sets, for which the associated publications have been systematically reviewed. In most cases, the review confirmed that the experimental data were correctly compiled in EXFOR and mistakes have been notified to Data Centres.

As agreed during the NRDC meeting in 2013 (conclusion C10) the list of GOF scores is made available as an appendix to this Memo (in a separate file).

[1] A. Koning, "Statistical verification and validation of the EXFOR database: (n,n'), (n,2n), (n,p), (n,alpha) and other neutron-induced threshold reaction cross-section", NEA report NEA/DB/DOC(2014)3, available at www.oecd-nea.org/databank/docs/2014/db-doc2014-3.pdf.

Addition for WP2015-31: See the next page for an extraction from the appendix to this memo.

Extraction from Appendix of Memo CP-N/124

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# Quality  11097017 : T1
# Date     11097017 : 11-07-2014
# Reaction 11097017 : NP:    1 E-range:   14.1    -   14.1     MeV 47-AG-0(N,2N),,SIG                 pdf: y
# Paper    11097017 : V.J.Ashby+ Jour. Physical Review Vol.111, p.616, 1958 Absolute measurement of (n,2n) cross sections at 14.1 MeV.
# Action   11097017 :
# Comment  11097017 : Evaluation       N=     1 F=   1.21     chi-2=  1.702E+04 D=   269.     mb T=  1.401E+03 mb E=  1.670E+03 K1=  1.42     K2=  107.
# Comment  11097017 : TALYS            N=     1 F=   1.24     chi-2=  2.218E+04 D=   323.     mb T=  1.347E+03 mb E=  1.670E+03 K1=  1.50     K2=  247.
# Comment  11097017 : cendl3.1         N=     1 F=   1.22     chi-2=  1.900E+04 D=   299.     mb T=  1.371E+03 mb E=  1.670E+03 K1=  1.45     K2=  130.
# Comment  11097017 : eaf.2010         N=     1 F=   1.24     chi-2=  2.218E+04 D=   323.     mb T=  1.347E+03 mb E=  1.670E+03 K1=  1.50     K2=  246.
# Comment  11097017 : endfb7.1         N=     1 F=   1.22     chi-2=  1.872E+04 D=   297.     mb T=  1.373E+03 mb E=  1.670E+03 K1=  1.45     K2=  122.
# Comment  11097017 : irdff1.0         N=     0 F=   0.00     chi-2=   0.00     D=   0.00     mb T=   0.00     mb E=  1.670E+03 K1=  0.00     K2=  0.00
# Comment  11097017 : jeff3.2          N=     1 F=   1.04     chi-2=   702.     D=   57.5     mb T=  1.612E+03 mb E=  1.670E+03 K1=  1.08     K2=  1.47
# Comment  11097017 : jendl4.0         N=     1 F=   1.18     chi-2=  1.416E+04 D=   258.     mb T=  1.412E+03 mb E=  1.670E+03 K1=  1.38     K2=  47.1
# Comment  11097017 : tendl.2013       N=     1 F=   1.24     chi-2=  2.218E+04 D=   323.     mb T=  1.347E+03 mb E=  1.670E+03 K1=  1.50     K2=  247.
#
# Quality  21264011 :
# Date     21264011 : 30-06-2012
# Reaction 21264011 : NP:    1 E-range:   14.1    -   14.1     MeV 47-AG-0(N,N+P),,SIG                 pdf: n
# Paper    21264011 : L.Colli+ Jour. Nuovo Cimento Vol.13, p.730, 1959 (n,p) and (n,np) reactions with 14 MeV neutrons
# Action   21264011 :
# Comment  21264011 :
#
# Quality  11951004 : T1
# Date     11951004 : 11-07-2014
# Reaction 11951004 : NP:    1 E-range:   1.55    -   1.55     MeV 47-AG-0(N,INL),PAR,SIG             pdf: y
# Paper    11951004 : W.G.Vonach+ Jour. Nuclear Physics Vol.78, p.389, 1966 ELASTIC AND INELASTIC SCATTERING OF FAST NEUTRONS FROM AG, IN AND CD.
# Action   11951004 :
# Comment  11951004 : Evaluation       N=     1 F=   3.02     chi-2=   1.21     D=   132.     mb T=   68.3     mb E=   200.     K1=  3.02     K2=  11.1
# Comment  11951004 : TALYS            N=     0 F=   0.00     chi-2=   0.00     D=   0.00     mb T=   0.00     mb E=   200.     K1=  0.00     K2=  0.00
# Comment  11951004 : cendl3.1         N=     1 F=   2.60     chi-2=   1.05     D=   123.     mb T=   76.9     mb E=   200.     K1=  2.60     K2=  6.24
# Comment  11951004 : eaf.2010         N=     0 F=   0.00     chi-2=   0.00     D=   0.00     mb T=   0.00     mb E=   200.     K1=  0.00     K2=  0.00
# Comment  11951004 : endfb7.1         N=     1 F=   2.46     chi-2=  0.980     D=   119.     mb T=   81.2     mb E=   200.     K1=  2.46     K2=  5.32
# Comment  11951004 : irdff1.0         N=     0 F=   0.00     chi-2=   0.00     D=   0.00     mb T=   0.00     mb E=   200.     K1=  0.00     K2=  0.00
# Comment  11951004 : jeff3.2          N=     0 F=   0.00     chi-2=   0.00     D=   0.00     mb T=   0.00     mb E=   200.     K1=  0.00     K2=  0.00
# Comment  11951004 : jendl4.0         N=     1 F=   3.09     chi-2=   1.27     D=   135.     mb T=   64.7     mb E=   200.     K1=  3.09     K2=  10.9
# Comment  11951004 : tendl.2013       N=     1 F=   3.97     chi-2=   1.55     D=   150.     mb T=   50.4     mb E=   200.     K1=  3.97     K2=  28.8
#
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