WP2017-21

Proposal for Compilation of Complementary Data Re-Analyses

(B. Pritychenko, 2017-05-16, Memo CP-C/456)

In nuclear physics we often observe a situation when the experiments have been re-analysed by the physicists who did not participate in the original measurements. The need for such re-analyses arises from the fact that it is more cost effective to re-process the existing data sets than conduct a new and perhaps very lengthy experimental campaign.

The recent example of such work is related to the inelastic cross section data extracted by the Berkeley Group (BG) from the Bagdad Atlas [1], where the original Soviet-Iraqi group has published nuclear structure and decay information only. At the same time this publication contains sufficient information to extract neutron inelastic cross sections. The corresponding project Web page (http://www.nndc.bnl.gov/lbnlatl.html) is shown in Fig. 1. Therefore, instead of conducting a lengthy and costly experiment BG has re-analysed the existing data and produced valuable results. The initial success has emboldened BG to conduct more new inelastic measurements and data re-analyses. The BG-style work is strongly motivated by the fact that there are many raw data sets in the U.S. laboratories that have been not comprehensively analysed and occasionally abandoned by the original experimentalists; these data sets have been identified by DOE-sponsored committees and they would be re-analysed by different groups of physicists in the near future.

These re-analysed data often represent an enormous value for nuclear physicists and data evaluators. The recent work on the ENDF/B-VIII library and discussions during the MiniCSEWG meeting in Los Alamos (May 4-5, 2017) highlights needs for the compilation of these data. The latest version of ENDF library research and development effort heavily relies not only on the original results of J.L. Kammerdiener (EXFOR entry 14329) [2] but also on the complementary data sets produced by T. Kawano (14329163-14329165).

It is not unusual when not original experimental data are compiled in EXFOR for data preservation and dissemination. For instance, in 2012 NNDC has compiled integral values from Atlas of Neutron Resonances by S.F. Mughabghab [3]. The Atlas of Neutron Resonances handbook contains a compilation of experimental and calculated neutron-induced reaction values. These compilation data sets have been re-compiled again by NNDC as V1001-V1002 EXFOR entries. There are also other examples when evaluated data sets have been added to EXFOR because they cannot be added to ENDF library directly or preserved somewhere else.

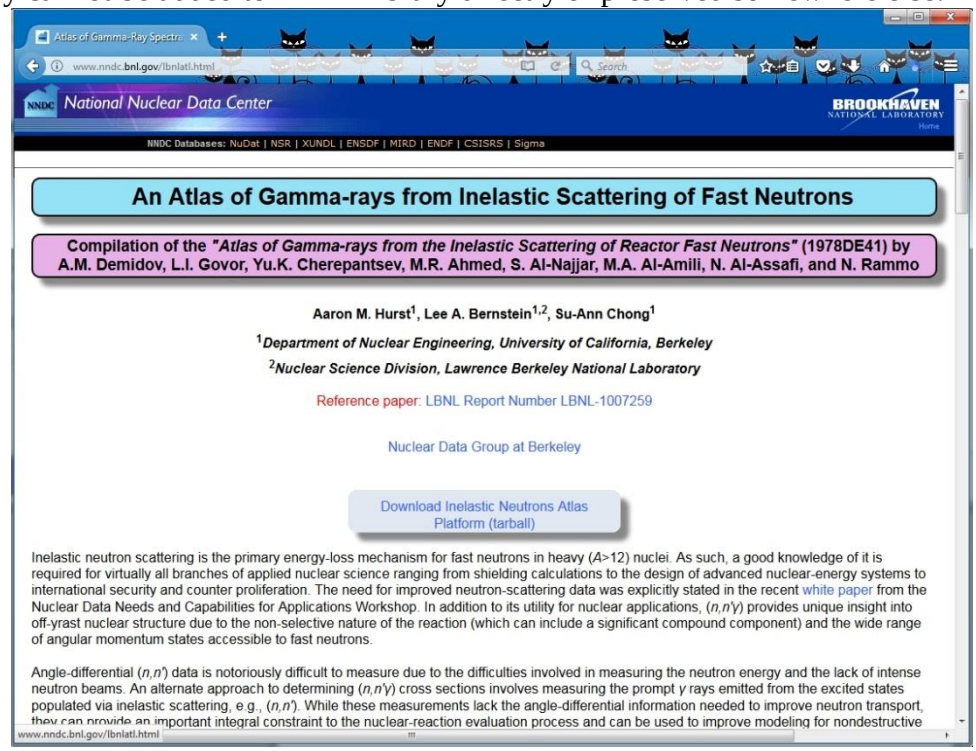

Fig. 1. An Atlas of Gamma-rays from Inelastic Scattering of Fast Neutrons Web page.

In light of the described above situation it makes a perfect sense to respond to the needs of nuclear physics community and introduce a new X-series EXFOR compilations that would be designated for the compilation of complementary data re-analyses performed by different than the original physicists groups.

References

1. Aaron M. Hurst, Lee A. Bernstein, Su-Ann Chong, LBNL Report Number LBNL-1007259 (2017); Downloaded from http://www.nndc.bnl.gov/lbnlatl.html, May 9, 2017.

3. J.L. Kammerdiener, R,UCRL-51232,1972) UC Davis Ph.D.thesis.

2. S.F. Mughabghab, Atlas of Neutron Resonances, Elsevier (2006).