

Compilation of Baghdad Atlas Data

(B Pritychenko, 2021-03-08, Memo CP-C/489;
N. Otsuka and M. Mikhailyukova, 2021-04-10, 4C-3/0418)

Memo CP-C/489

The Baghdad Atlas is a collection of γ -ray data sets published by the Soviet-Iraqi group in 1978 [1]. The authors of this work did not produce any reaction data sets, however they left plenty of information that can be used to extract reaction cross when reasonable assumptions about incoming neutron flux are made. Such analysis has been performed at the Lawrence Berkeley National Laboratory (LBNL) by A. Hurst et al. [2], and the Berkeley group has expressed the strong desire to compile these data into EXFOR database and learn about compilations.

NNDC worked with Dr. Andrew Voyles+ (LBNL), produced EXFOR compilation and submitted the final version to the NDS, IAEA:

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HISTORY (20190306C) A.S.Voyles, L.A.Bernstein, A.M.Hurst, B.Pritychenko

This compilation was not processed by the NDS, IAEA, and we were asked to remove it from the transmission 1449 on June 17, 2019. NNDC was informed that our compilation cannot be included into EXFOR because of the NRDC 2014 decision on refereed publications for data that were not produced by original authors. This requirement was promptly communicated to Berkeley, and the Berkeley group produced a Nuclear Instruments and Methods publication on the Baghdad Atlas [3]. Therefore, we ask the permission of NRDC to include this work into EXFOR as the Area #1 entry 14521 because we followed all the required procedures. We have invested plenty of time and effort into this work, and these efforts should not be wasted. Entry #14521 is available as a complementary zip file.

In the meantime, we have learned that the Baghdad Atlas was added to EXFOR as entry 31816 in 2020. To accomplish this task, the Area#3 compiler simply downloaded the files from Berkeley website on January 23, 2020:

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*HISTORY (20200123T) On. Converted from A.Hurst's compilation
(CSV files) downloaded on 16 Jan. 2020 from
<https://nucleardata.berkeley.edu/download.html>.*

Here, I would like to reiterate that Baghdad data and their interpretation are not trivial. It involves very complex data and error analysis procedures that are described in detail in the entry 14521, and these details are missing from the entry 31816. In addition, multiple NRDC rules about contacting the authors and refereed publication requirements were ignored by the compiler, and these problems were not caught during the Area #3 transmission check. Therefore, it makes sense to remove incomplete entry #31816 as duplicate.

References

1. A.M. Demidov, L.I. Govor, Yu.K. Cherepantsev et al., *Atlas of Gamma-Ray Spectra from the Inelastic Scattering of Reactor Fast Neutrons*, Part I and II, Atomizdat, Moscow (1978).
2. A.M. Hurst, L.A. Bernstein, S.A. Chong, *Compilation of the "Atlas of Gamma-Rays from the inelastic scattering of Reactor Fast Neutrons" (1978DE41) by A.M. Demidov, L.I. Govor, Yu.K. Cherepantsev, M.R. Ahmed, S. Al-Najjar, M.A. Al-Amili, N. Al-Asafi, and N. Rammo*, Lawrence Berkeley National Laboratory Report LBNL-10072591 (2017).

3. A. M. Hurst, L.A. Bernstein, T. Kawano, A.M. Lewis, K. Song, *The Baghdad Atlas: A relational database of inelastic neutron scattering (n,n') data*, Nucl. Instr. Meth. **A 995**, 165095 (2021).

Memo 4C-3/0418

1. Compilation of data measured in Baghdad and Moscow

The Baghdad Atlas tabulates the gamma spectra **measured** at the IRT-2000 reactor of Nuclear Research Centre (**Baghdad**) and the IRT-M reactor of Kurchatov Institute (**Moscow**). They were partly compiled in 15 EXFOR entries by NDS and CJD from various sources several decades ago (e.g., EXFOR 30303 and 40449).

In 2017, the UC Berkeley group has released a database compiling all spectra published in the Atlas [1]. In 2019, we developed a code converting the new database (CSV) to EXFOR format in close contact with the UC Berkeley group, and the EXFOR entries were transmitted to other centres in 2020. See Memo 4C-3/417 for more details. We got various comments during this CSV-EXFOR conversion, and they were sent to the UC Berkley group for update of their database.

2. Compilation of data derived by UC Berkley group from the Baghdad+Moscow data

The UC Berkley group also **converted** the gamma spectra measured in Baghdad and Moscow to the gamma production cross sections by using a spectrum averaged 548 keV gamma production cross section derived from the ENDF library as the reference cross section, and included them in the new database, too. NDS and CJD do not plan their compilation, and do not have an objection for their compilation by NNDC if the newly created NNDC entry follows the rules mentioned in LEXFOR "Data type" - Data derived by other than the author.

N.B. The NRDC 2014 meeting agreed to compile such data derived by other than the author (experimentalist) exceptionally when there is a strong need from EXFOR users and the derived data are well documented in a peer-reviewed journal with the derivation procedure (C30 of NRDC2014). When NNDC compiled the converted cross sections in EXFOR 14521 and transmitted in PRELIM.1449, the entry was not accepted due to absence of documentation published in a peer-reviewed journal. On 30 January 2021, however, the UC Berkley group published the conversion procedure [2], and inclusion of the derived cross sections in EXFOR is now legal.

References

- [1] A.M. Hurst, L.A. Bernstein, S.A. Chong, Report LBNL-1007259 (2017).
- [2] A.M. Hurst, L.A. Berstein, T. Kawano A.M. Lewis, K. Song, Nucl. Instrum. Meth. **A995** (2021)165095.