Ukrainian Nuclear Data Centre Progress Report, 2015/16

Summary of Nuclear Data Studies by Staff of the Ukrainian Nuclear Data Centre
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Ukrainian Nuclear Data Centre (UkrNDC) is subdivision within the Neutron Physics Department at the Institute for Nuclear Research of the National Academy of Sciences of Ukraine. UkrNDC has 3 permanent researchers.

Compilation

We continue collection and compilation of experimental neutron, charged particle and photonuclear data. Number of the new/renew EXFOR's entries sent to the NDS IAEA by UkrNDC is the following:
  - for charged particle data – 11 entries (D5021, D5022, D5066, D5108, D5109, D5114, D5116, D5119, D5120, D5123, D5124);
  - for photonuclear data – 1 entry (G4048).

We realize review of compilation scope in home journals and scientific issues:
  - Nuclear Physics and Atomic Energy;
  - Ukrainian Journal of Physics;
  - Problems of Atomic Science and Technology, Series Nuclear Physics Investigations;
  - Uzhhorod University Scientific Herald. Series Physics;
  - Bulletin of Taras Shevchenko National University of Kyiv Series: Physics & Mathematics;
  - East European Journal of Physics.

Collaboration

We continue our collaboration with the Nuclear Physics Department of Taras Shevchenko National University of Kyiv.
  - The teaching course "*Nuclear Data for Science and Technology and modern computer codes for nuclear data processing*" (38 hours) has been lectured in 2015 for the fifth-course students of NPD KNU. This course includes the following items: ENDF/B libraries, EXROR system, ENSDF library, the use of the PREPRO code in work with the ENDF libraries, the introduction to NJOY code system, the Network of Nuclear Reaction Data Centers and the use of the on-line services.
  - The teaching course "*Experimental Methods at Atomic Power Engineering*" (38 hours) is lectured in 2016 for third-year students of NPD KNU.

We continue our collaboration with the Power Systems Physics Department of the Physics and Technology Institute of National Technical University of Ukraine "Kyiv Polytechnic Institute".

- The teaching course "*Nuclear Data*" (38 hours) is lectured in 2016 for fifth--year students of the PSFD.
- The teaching course "*Nuclear and Thermonuclear Power* " (48 hours) is lectured in 2016 for fourth-year students of this department.

We continue our collaboration with Pavel Sukhoi State Technical University of Gomel in frame of the task on development and organization of scientific methodology and information databases for nuclear technology calculations in the Republic of Belarus. Activity on creation of the web-site **"**Scientific, Methodological and Information Basis for Nuclear and Technological Calculations" in Physics Research Laboratory (PRL), Pavel Sukhoi State Technical University of Gomel is in progress.

Customer Services

- During 2015-2016 the data for users requests were prepared and adapted (from ENDF, ENSDF and EXFOR libraries) for our institute researchers and for ones from other institutes. The organizations, whose requests on nuclear data have arrived and were executed in the accounting period:
  1. Uzhgorod Institute of Electron Physics of NASU.
  2. Department of Nuclear Physics of the Institute for Nuclear Research of NASU.
- The UkrNDC site is operating. Ukrainian customers, especially students and those physicists, who wish to prepare the point-wise and multi-group cross sections self-dependently, but do not have a good experience in it, use this site very often. Address of the UkrNDC site: *http://ukrndc.kinr.kiev.ua.*
- Ukrainian version of the UkrNDC site has been updated. Seven codes (CR-LIB, PD-ORI, LIN, REC, SIG, GRO, MIX) were created and included in this new version. The code package FILTER was transformed (the FILTER-8 code was updated) and included in the new version of the UkrNDC site. An English version updating is in progress.

Experimental and Computational Activity

A method of experimental verification to resolve the contradiction in neutron cross sections in the ENDF libraries was developed. This method based on a using of the filtered neutron beams and followed measurement of an appropriate sample. The basic idea of the method is to modify the suited filtered neutron beam so that the differences between the neutron cross sections in accordance with different ENDLs become measured. The method was experimentally demonstrated by the example of cerium, which according to the latest versions of the four ENDLs have significantly different total neutron cross section.

A method of determination of the resonance parameters from a set of the average total neutron cross sections, received with using a shift of the average energy of the filtered neutrons is in progress. The method was experimentally demonstrated by the example of ^{52}Cr.

The numerical view of the neutron spectrum after the interference filters used at the Kyiv Research Reactor have been prepared.