

Joliot-Curie School 2014

**Mini-workshop on
IAEA activities and available services related to nuclear data**

S. Simakov, Nuclear Data Section, IAEA, Austria

Both the development and maintenance of nuclear technologies rely on the availability of atomic and nuclear data to provide accurate numerical representations of the underlying physical processes. Essential data include energy-dependent reaction probabilities (cross sections), the energy and angular distributions of reaction products for many combinations of target and projectile, properties of excited states, and their radioactive decay data. The Nuclear Data Section (NDS, <https://www-nds.iaea.org/>) within the IAEA Department of Nuclear Sciences & Applications is responsible for undertaking Agency activities in the related areas of the [development](#) and [dissemination](#) of atomic and nuclear data for nuclear physics and various applications, which cover fission, fusion and accelerator technologies, radiation medicine, material analysis and others. To meet such a goal NDS performs nuclear data collection, evaluation and dissemination. This is implemented through organization and coordination of the nuclear data projects with involvement of experts from different countries. Scientists in developing countries are assisted in their evolution of local capabilities through participation in the data developments and maintenance projects, training programmes or mirroring databases in home countries.

The lecture will give an overview of the databases maintained and relevant data development projects run by NDS. This will include:

- EXFOR – collection of experimental reaction cross sections and relevant quantities;
- CINDA – bibliographical references to the published measurements of reaction cross sections;
- ENDF – collection of evaluated reaction cross sections and interface for retrieving and plotting;
- ENSDF, XUNDL, LiveChart – nuclear structure databases and retrieval interface;
- RIPL – reference parameters for nuclear reaction model calculations;
- IRDF - dosimetry cross sections for fission, fusion and accelerator;
- IBANDL – experimental and evaluated data for ion beam analysis of materials;
- Medical Portal – reaction cross section data for medical applications;

Nuclear Reaction Standards, data for Safeguards, prompt and delayed Neutron Activation Analysis and for other applications.

For every database the purpose and field of application, history of development and perspective for extensions, content of physical quantities and their uncertainties, examples of usage and access to data will be given.

A set of practical cases will illustrate a few typical nuclear processes and their associated data. They will demonstrate how the experimental or evaluated data of interest could be searched in databases, retrieved in numerical forms, plotted and intercompared.

Besides internet access to the data via internet, NDS distributes several databases and corresponding retrieving software tools on CD-ROM or DVD which allow users to access the data on different computers and operation systems. Such services will be illustrated during the lecture by running EXFOR/CINDA/ENDF databases and nuclear reaction modelling code EMPIRE.