

Progress Report

For the period of August 2006-September 2008
To the NRDC Meeting (22-25 September 2008, Obninsk, Russia)

ATOMKI NUCLEAR REACTION DATA GROUP

Institute of Nuclear Research of the Hungarian Academy of Sciences (ATOMKI)
Debrecen, Hungary

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Introduction

The main task and profile of the Atomki Nuclear Reaction Data Group did not change: measurement, compilation, evaluation and application of low and medium energy charged particle nuclear reaction data. The activity is done in the frame of international collaborations. Measurement, compilation and evaluation are connected to international projects and to the every day applications at the home institute and at institutes of collaborating partners.

Collaborating partners (nuclear data)

- Cyclotron Laboratory, Vrije Universiteit Brussels (VUB), Brussel, Belgium
- Cyclotron Radioisotope Centre, Tohoku University, Sendai, Japan
- Nuklearchemie (INB-4) für Neurowissenschaften und Biophysik, Forschungszentrum Jülich, Jülich, Germany
- Institute of Theoretical Physics, Institute of Physics and of Power Engineering (IPPE), Obninsk, Russia
- Nuclear Data Section, Division of Physics and Chemistry, IAEA, Vienna, Austria
- Division of Advanced Technology for Medical Imaging of the National Institute of Radiological Sciences (Chiba, Japan)
- Radionuclide Production Laboratory of the iThemba Laboratory for Accelerator Based Sciences (Somerset West, South Africa).

Experimental works

During the last years we have continued the systematic measurement of excitation functions of charged particle reactions for many different applications (see list of references):

- Production of medical radioisotopes for diagnostic and for therapy.
- Excitation functions of monitor reactions.
- Activation cross sections for accelerator technology (waste transmutation, IFMIF, target technology).
- Activation cross sections for Thin layer Activation (TLA).
- Activation cross sections for charged particle activation analysis.

Compilations and evaluations

EXFOR compilations

During the August 2006 – A 2008 period practically all new works from Debrecen, Brussels and Jülich were compiled.

Upgrading the charged particle cross-section database for medical radioisotope production: monitor reactions

The Debrecen group is participating in the upgrading process of the IAEA recommended cross-section data base for charged particle induced reactions relevant to production of radioisotopes used for medical diagnostics and the related reactions to monitor beam parameters. During 2006 - 2008 the upgrade of the database of charged particle monitor reactions was completed. The upgraded version is available on web. The preparation of the paper on the upgrading and on the status is in progress.

Development of database for production of therapeutic radionuclides

The IAEA – Coordinated Research Project (CRP) for development of a standard database for production of therapeutic radionuclide was completed. The database will be available on the web from October 2008. The draft of the TECDOC are ready.

The main contributions of the Debrecen group to the development of the database are new measurements and compilation of the cross section data of selected charged particle reactions (compilation, critical selection, comparison with integral data). Significant work was devoted to the preparation of the final database and of the TECDOC.

Database for fusion evaluated nuclear data library.

The Debrecen group will participate in extension of FENDL library with p- and d-activation libraries in the frame of a new IAEA CRP.

Nuclear data service

The ATOMKI group continues to distribute compiled or evaluated cross section/thick target yield data for low and medium energy charged particle nuclear reactions mainly for cyclotron applications according to the requirements.

Staff

The staffs connected to the experimental nuclear reaction data measurement consist of six physicists and two chemists. Out of them three (B. Király, S. Takács, F. Tárkányi) physicists are working in part time on data compilation and evaluation. All are engaged in practical application of the ATOMKI cyclotron.

Future plans

Continuation of the present activity.

Remarks and recommendations to the NRDC Meeting (key words)

- Publication of experimental data (limitations).
- Lack of experimental data.
- Status of the databases (extensions).
- Support of new databases.
- Errors in EXFOR.
- Missing link at BNL homepage to medical isotopes.
- Nuclear data related FP7 projects.
- Parallel nuclear data activities at Division of Physics and Chemistry (IAEA).
- Importance of the theory for measurements.
- Compilation of preliminary or submitted data.

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