

Progress Report

NUCLEAR REACTION DATA GROUP at ATOMKI

(NRDC Meeting, 23-25 April 2013)

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General

The activity of the Atomki Nuclear Reaction Data Group

- 1) systematic measurements of new charged particle induced reaction data (cross sections, excitation functions, yields)
- 2) compilation and evaluation of measured data
- 3) cross checking of data measured at different laboratories
- 4) developments of recommended data sets
- 5) compilation of data in EXFOR format
- 6) application of nuclear data in isotope production and TLA investigations

Staff

The group at this time has 6 six permanent members (4 physicist and 2 chemists) after one physicist was moved to other position. The main activity is measurement of cross section data of charged particle induced nuclear reactions.

Collaborations

The experimental work is done in international collaborations involving several laboratories using bombarding particle beams of up to 100 MeV protons and 50 MeV deuterons.

- Cyclotron Laboratory of the Vrije Universiteit Brussel (VUB, Brussels, Belgium)
- Cyclotron Radioisotope Centre of the Tohoku University (CYRIC, Sendai, Japan)
- 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).
- Centre de Ressources du Cyclotron, UCL, (Louvain-la-Neuve, Belgium)
- Institute of Nuclear Chemistry (FZ Jülich, Germany)

Theoretical approximation of the measured data using different computer codes (TALYS, EMPIRE, ALICE, etc) is done in collaboration with

- Institute of Theoretical Physics, IPPE, Obninsk, Russia.

Result are regularly reported in international peer reviewed journal and conferences. During the covered period (2012-2013) 26 papers were published in recognized international journals.

EXFOR compilations

Although the EXFOR compilation is done only by one member of the group all the data measured and published from our responsibility area were introduced in the EXFOR data base with minor delay. During the 2012 - 2013 period 33 publications on charged particle induced nuclear reactions with experimental data reported from Debrecen, Brussels and Jülich were compiled in EXFOR format in collaboration with IAEA NDS.

Participations in current CRP-s

- Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production (F41029, CRP, 2012-)
- Accelerator-based Alternatives to Non-HEU production of Mo-99/Tc-99m (F22062, CRP, 2012-)

Maintaining data libraries

The ATOMKI Data Group is actively participating in the creation and maintenance of different data libraries for medical radio isotope production for diagnosis and therapy, for monitor reactions of proton, deuteron, helium-3 and alpha beams, and database for TLA applications.

We continue to distribute experimental cross section/thick target yield data for low and medium energy charged particle induced nuclear reactions for different applications according to the requirements.