

Progress Report of ATOMKI

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General

New administrative changes are started to introduce the aim to change the network of the research institutions of the Hungarian Academy. It was promised that the new administrative structure would not change the main research areas, which means our research team can continue its activity: the experimental investigation of light charged particle induced nuclear reactions. Measurement of reaction cross section data and/or reaction yields for proton, deuteron, ^3He and ^4He particles. Compilation and evaluation of the available experimental data of the actual investigated reactions. Participation in the Agency organised coordinated research programs.

Experimental work is done in international cooperation with members of:

- VUB, Cyclotron laboratory of Free University Brussels, Belgium,
- Nishina Center for Accelerator-Based Science, RIKEN, Wako, Saitama, Japan,
- Faculty of Science, Hokkaido University, Sapporo, Japan,
- Molecular Imaging Center, NIRS, Chiba, Japan
- Cyclotron Facility, Nuclear Research Centre, Atomic Energy Authority, Cairo, Egypt,
- Institute of Physics and Power Engineering (IPPE), Obninsk, Russia.
- Austrian Competence Center for Tribology, AC²T Wiener Neustadt, Austria

Staff

The research team consists of physicists, radiochemists and technical staff. The number of the actual staff members is reduced to:

4 experimental physicists,
1 radiochemist
1 technical staff member

Nuclear data related experimental work

Our research group continued the systematic study of light charged particle induced nuclear reaction by measuring reaction cross sections for proton, deuteron, ^3He and alpha particle beams. The investigated target materials during the last one year period were: Al, Ti, Ni, Se, Rb, Y, Zr, Ru, Ag, Cd, Tb, Tm, Yb, W, Bi . The obtained results are included in the Exfor data library.

Beside experimental works, compilation and evaluation of earlier measured data are also performed for selected nuclear reactions. Results of these compilation works are part of larger international projects (CRP) and are published in international scientific journals.

EXFOR compilation

The newly measured experimental data are compiled in EXFOR data library. Our responsibility is to compile experimental data of charged particle induced nuclear reactions reported from Hungary and VUB Brussels. Although all the published experimental works are regularly compiled in EXFOR from our responsibility area, there is sometimes delay in the compilation work. EXFOR compilation is done only one compiler from Atomki.

Participations in CRPs

- *Therapeutic Radiopharmaceuticals Labeled with New Emerging Radionuclides (^{67}Cu , ^{186}Re , ^{47}Sc), (2016-2019)*
All possible accelerator production routes for the three selected radionuclides were collected and evaluated regarding the possible yields, radionuclidic purity, chemical purity, specific activity. Based on the reaction network analysis the "best" accelerator production routes were selected for the ^{67}Cu , ^{186}Re and ^{47}Sc medically important radioisotopes.
- *Imaging Technologies for Process Investigation and Components Testing (2017 - 2021)*
The objective of the CRP is to facilitate further advancement and implementation of imaging nuclear technologies in industries and to develop a synergetic approach to imaging technologies coming from different fields.
- *Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production (2012–2017)* The work of this CRP was completed, but separate publication of the results (monitor reactions, positron emitters, gamma emitters and therapeutic isotopes) was completed during the last year. WEB publication of the results was developed and most parts were implemented.

Publications in 2018 and 2019

In the 2018 and 2019 period 25 papers were published with our co-authorship. All the relevant experimental data are compiled in EXFOR database.