# Progress Report of ATOMKI

NRDC 2018 Meeting, 01-04 May, 2018, Bahadurgarh, India

(S. Takács)

## General

The administrative structure of the Atomki was changed and Laboratory structures were introduced. The nuclear reaction data group now belongs to the Cyclotron Laboratory. The new administrative structure does not really change the main task of the research team which remained the same as before: systematic investigation of light charged particle induced nuclear reactions. The experimental work covers measurement of cross section data and/or reaction yields for the nuclear reactions induced by protons, deuterons and helium particles $^{3}$He and $^{4}$He. Compilation and evaluation of the available experimental data of the actual investigated reactions also considered.

The experimentally determined and/or evaluated cross section data are directly applied in isotope production, in Thin Layer Activation (TLA) investigations or in other tracing applications in our laboratory. The measurements are done as part of an extensive international collaboration. Our partners in 2017 and 2018 are:

- 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, AC$^{2}$T 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

## Experimental work

Our research group continued the systematic study of light charged particle induced nuclear reaction by measuring reaction cross sections for proton, deuteron, $^{3}$He and alpha particle beams. The investigated target materials during the last period were: Al, Ca, Ti, Ni, Cu, Ag, Cd, Tb, Tm, Yb, Hf, Ir.

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. 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

- *Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production (2012–2017)*
  The main part of the work in this CRP is completed. The reactions are evaluated, new recommended datasets are determined. Results for monitor reactions were published *(Nuclear Data Sheets 148 (2018) 338–382)* and the web version was created. (https://www-nds.iaea.org/medical/monitor_reactions.html)

- *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*
  Approved: 17 November 2017 to 16 November 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.

## Publications in 2017 and 2018

Papers published by our research team on all area in 2017 and 2018 are 28. All the EXFOR relevant data are compiled in EXFOR database.