Progress Report for

NRDC Meeting 2022

ATOMKI

S. Takács

14-17 June, 2022

Staff and changes

The organizational structure of the institute had changed from laboratory level to group level.

Nuclear reaction data group: Overall staff number: 10.5 persons. Staff reduced by 1 physicist. One PhD student joined to the group.

Nuclear astrophysics group: Overall staff number: 10 persons, 7 permanent staff member and 3 PhD students

Nuclear spectroscopy data group: Overall staff number: 11 persons, 8 permanent staff member and 3 PhD students.

Nuclear Reaction Data Group at ATOMKI

The research program:

- Experimental determination of cross sections for light charged particle induced reaction on various target materials.
- Compilation, evaluation of low and medium energy data.
- Contribution to international collaborations.

Staff

The research team consists of physicists, radiochemists and technical persons.

- experimental physicists: 4
- radiochemist : 2+1
- technical staff member: 3

Activity in 2021-22

- Measurements of reaction cross sections.
- Evaluations of experimental cross section data of nuclear reactions for production of medical isotopes.
- Irradiation of machine parts for TLA applications
- Data may contribute to improve theoretical models and update data libraries.
- EXFOR data compilations

Collaborations

- 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,
- Institute of Physics and Power Engineering (IPPE), Obninsk, Russia.
- Cyclotron Facility, Nuclear Research Centre, Atomic Energy Authority, Cairo, Egypt,
- Austrian Competence Center for Tribology, AC^2T Wiener Neustadt, Austria

EXFOR compilation

Our responsibility to compile experimental data of charged particle induced nuclear reactions reported from Hungary (Atomki) and VUB, Brussels, Belgium.

All newly published experimental data were compiled in EXFOR

Publications in 2020

Number of publications: 23+

All relevant data were compiled in EXFOR

Nuclear Astrophysics Group at ATOMKI

- Staff: 7 physicists 3 PhD student.
- The research program is to measure charged particle induced reaction cross sections at low energies relevant for various astrophysical processes.
- Reaction cross sections have been investigated during the last three years:

$^{115}In(\alpha,\gamma)^{119}Sb$	$^{115}In(\alpha,n)^{118}Sb$	$^{121}Sb(\alpha,\gamma)^{125}I$
$^{121}Sb(\alpha,n)^{124}I$	$^{123}Sb(\alpha,n)^{125}I$	$^{197}Au(\alpha,\gamma)201Tl$
$^{197}Au(\alpha,n)^{200}Tl$	$^{197}Au(\alpha,2n)^{199}Tl$	$^{191}Ir(\alpha,n)^{194}Au$
$^{193}Ir(\alpha,n)^{196}Au$	$^{193}Ir(\alpha,n)^{196m}Au$	$^{96}Zr(\alpha,n)^{99}Mo$
$^{3}He(\alpha,\gamma)^{7}Be$	$^{14}N(p,\gamma)^{15}O$ resonance strengths	

- In the LUNA collaboration:

$d(p,\gamma)^{3}He$	$^{6}Li(p,\gamma)^{7}Be$	$^{22}Ne(p,\gamma)^{23}Na$
$^{18}O(p,\gamma)^{19}F$	$^{18}O(p,\alpha)^{15}N$	$^{23}Na(p,\gamma)^{24}Mg$

- At GSI: $^{124}Xe(p,\gamma)^{125}Cs$ reactions has been studied
- Half-lives measurements of the ^{95}Ru, ^{95}Tc, ^{95m}Tc radioisotopes.
- Publications: 20+

Nuclear Spectroscopy Data Group at ATOMKI

- Measurements and evaluation of new nuclear structure and decay data.
- Collaboration work with research groups at RIKEN, GANIL, GSI, Gammasphere, Exogam, Jurogam
- Mass-chain evaluation work for ENSDF and compilation work for XUNDL.
- Evaluation responsibility of the A=101 – 105 mass chains.

- Staff: 12+5 physicists

- Activity
- Measurements of new experimental nuclear structure and decay data of exotic nuclei using radioactive beams, study of exotic shapes, excitation modes and decay of nuclei, as well as study of neutron skin and neutron halo in nuclei.
- Part time participation in the nuclear structure and decay data compilation and mass-chain evaluation work.
- Horizontal evaluation of beta-delayed neutron emission probabilities.

- Publications: ~50

Thank you