Progress Report
2017

NRDC Meeting, 23-26 Vienna, Austria

Charged particle induced nuclear reaction data measurement at ATOMKI
(S. Takács)

General

The administrative structure of the Atomki was renewed. Instead of research groups, departments and divisions Laboratory structures were introduced. Now our research team belongs to the Cyclotron Laboratory. The main task of the research team remained the same as before: systematic investigation of light charged particle induced nuclear reactions on series of target materials and their possible applications. 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 beside measuring new activation cross section data. Some of the experimentally determined and/or evaluated cross section data are directly applied in isotope production, in Thin Layer Activation (TLA) investigations or in other tracer applications in our laboratory. The measurements are done as part of an extensive international collaboration. Our partners in 2016 and 2017 were:

- VUB Cyclotron laboratory, 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.

Staff

The research team consists of physicists, radio-chemists and technical staff. The actual staff members are: four experimental physicists two radio-chemists and 2 technical staff members.

Data compilations and evaluation

The different experimental data newly measured in ATOMKI are compiled in EXFOR database. Our responsibility is to compile experimental data of charged particle induced nuclear reactions reported from Atomki, Debrecen 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. In the last one year period a total of 13 new

papers were compiled in EXFOR, and only one paper is delayed due to delay in receiving the proper numerical data from the authors.

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/or published in international scientific journals.

EXFOR statistics: compiled in 2017

Number of new entries:	13
Number of subentries with new data:	143
Number of data lines:	2540
Corrected entries:	2
Update of entries of TTY	41

Review of REACTION codes for thick target radioisotope yields

All EXFOR entries compiling charged particle experimental thick target radioisotope yields TTY were revised and corrections were proposed.

The checked number of entries and REACTION codes sorted by area code and responsible centres

Area	Responsible centre	# of entries for revisions	# of REACTION codes checked
A	CNPD	67	932
B	NDS	23	83
C	NNDC	29	119
D0	NDS	65	313
D4	ATOMKI	41	164
D6	NDPCI	6	20
D7	KNDC	3	35
E	JCPRG	22	179
F	CNPD	11	59
M	CDFE	4	9
O	NEA DB	54	231
R	JCPRG	12	52
S	CNDC	2	4
T	NNDC	3	4
Sum		**342**	**2204**

REACTION lines checked: 2204
1213 lines required changes and
no changes were made in 991 lines.

Participations in CRPs

- Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production (2012–2016)

- Therapeutic Radiopharmaceuticals Labeled with New Emerging Radionuclides (^{67}Cu, ^{186}Re, ^{47}Sc), (2016-2019)

Publications in 2016 and 2017

Papers published by our research team on all area in 2016 and 2017 are 37. All the EXFOR relevant data are compiled in EXFOR database.