



Progress report on the CDFE 2022/2023 photonuclear data processing activity.
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Progress report for the Technical Meeting of the International Network of Nuclear Reaction Data Centres, 9 to 12 May 2023.

This report shortly describes the main photonuclear data activity results obtained in the Centre for Photonuclear Experiments Data (Centr Dannykh Fotoyadernykh Eksperimentov - CDFE) of the Russia Lomonosov Moscow State University Skobeltsyn Institute of Nuclear Physics for the period of time from the Technical Meeting of the International Network of Nuclear Reaction Data Centres (the IAEA's Headquarters, Vienna, Austria, 14 - 17 June 2022). The compilations of new photonuclear data, corrections of old previously compiled data, together with the results of analysis and evaluation of photonuclear data obtained in various experiments are presented.

EXFOR Compilation

5 CDFE EXFOR final TRANSES **trans.m118** – **trans.m122** and 2 preliminary **prelim.m123** and **prelim.m124** have been produced and transmitted to the IAEA NDS. All CDFE TRANSES contain **94** ENTRYs – **8** new ones compiled in accordance with the contents of the NRDC Network Memos, the NDS database “Articles for compilation” (<https://www-nds.iaea.org/nrdc/alloc/>) and 86 old ones corrected in accordance with the new EXFOR format rules and the comments and recommendations of the NRDC experts, first of all Naohiko Otsuka and Daniela Foligno.

The contents of all CDFE TRANSES transmitted to the IAEA NDS during the reported period of time are presented in Table.

New and Old trans.m and prelim.m* contents*

TRANS	<i>Old</i>	New	Total
m118	24	0	24
m119	27	0	27
m120	21	1	22
m121	1	4	5
m122	2	2	4
<i>prelim.m123</i>	7	1	8
<i>prelim.m124</i>	4	0	4
Common	86	8	94

Photonuclear Data Evaluation

The CDFE program of evaluation of reliable partial photoneutron reaction cross sections using the experimental-theoretical method based on objective physical criteria was continued.

In addition to evaluations using experimental neutron yield cross sections obtained in experiments with quasimonoenergetic annihilation photons those were carried out using the relevant data obtained in experiments with bremsstrahlung for ^{51}V , ^{59}Co , $^{58,60}\text{Ni}$, $^{112,114,119}\text{Sn}$, ^{127}I , ^{165}Ho , and ^{181}Ta . It was found out that in many cases cross sections obtained using

corrections of neutron yield cross sections based on statistical model also are not reliable because of some shortcomings of such procedure.

In the same time it was found out that experimental cross sections obtained for ^{159}Tb and ^{197}Au using beams of laser Compton scattering photons and the flat efficiency detector are satisfied physical criteria of reliability.

Main publications

1. V.V.Varlamov, A.I.Davydov. Experimental and evaluated data on photodisintegration of ^{197}Au . *Physics of Atomic Nuclei*, 85, N1 (2022) 1 - 11.
2. V.V.Varlamov, A.I.Davydov, V.N.Orlin. Reliability of photonuclear experiments results for ^{58}Ni . *Physics of Atomic Nuclei*, 85, N4 (2022) 316 - 327.
3. V.V.Varlamov, A.I.Davydov, V.N.Orlin. New evaluated data on photonuclear reactions cross sections for ^{60}Ni . *Physics of Atomic Nuclei*, 85, N5 (2022) 411 - 424.
4. V.V.Varlamov, A.I.Davydov, V.N.Orlin. The specific features of photoneutron reactions on ^{58}Ni . *Eur. Phys. J. A* 58 (2022) 123 (10 pages).
5. V.V.Varlamov, A.I.Davydov. Reliability of ^{159}Tb partial photoneutron reaction cross sections obtained in various experiments. *Physics of Atomic Nuclei*, 85, N6 (2023) 361 - 371.
6. V.V.Varlamov, A.I.Davydov, V.N.Orlin. Similarity and distinctions of $^{58,60}\text{Ni}$ photodisintegration processes. *Bull. Rus. Acad. Sci. Phys.* (2023), in print.
7. V.V.Varlamov, A.I.Davydov, V.N.Orlin. Partial photoneutron reaction cross sections in experiments with bremsstrahlung. *Bull. Rus. Acad. Sci. Phys.* (2023), in print.
8. V.V.Varlamov, A.I.Davydov, I.A.Mostakov, V.N.Orlin. Cross sections of partial photoneutron reactions on ^{59}Co in experiments with bremsstrahlung. *Physics of Atomic Nuclei*, (2023), in print.
9. V.V.Varlamov, A.I.Davydov, V.N.Orlin. Status of the results of photonuclear experiments. *Moscow University Physics Bulletin. Physics and Astronomy*, № 3 (2023), in print.
10. A.I. Davydov, V.V. Varlamov, V.N. Orlin. Cross sections of partial photoneutron reactions: the problems with reliability and new data. *Moscow University Physics Bulletin. Physics and Astronomy*, № 3 (2023), in print.

Short-term (2023/2024) Program

The main items of CDFE 2023/2024 program, main priorities and most important tasks are traditional and the following:

- continuation of new photonuclear data compilation using EXFOR format, production of new TRANSES (m125, m126, etc.);
- correction of old ENTRIES in accordance with new EXFOR coding rules and the NRDC Network expert's comments and recommendations;
- continuation of analysis and evaluation using objective physical criteria of total and partial photonuclear reaction cross sections obtained in various experiments, carried out using different sources of photons (quasimonoenergetic annihilation photons, laser Compton backscattering photons, bremsstrahlung photons).