The CDFE progress report on new photonuclear data compilations and old data corrections for 2013 - 2014.

V.V.Varlamov, N.E.Gorskikh, S.Yu.Komarov, M.A.Makarov, N.N.Peskov, M.E.Stepanov

Progress Report to the IAEA Technical Meeting
on International Network of Nuclear Reaction Data Centres (NRDC)
6 – 9 May 2014, Congress Centre Smolenice, Slovakia

The report contains short review of the main results obtained at the Centre for Photonuclear Experiments Data (Centr Dannykh Fotoyadernykh Eksperimentov – CDFE) of the Lomonosov Moscow State University Skobeltsyn Institute of Nuclear Physics (MSU SINP) concern nuclear data processing, analysis and evaluation for the period of time from the IAEA's Technical Meeting On International Network of Nuclear Reaction Data Centers" (NRDC), 23 – 25 April 2012, IAEA's Headquarters, Vienna, Austria till the spring of 2014.

General

The CDFE provides scientific and educational institutes and organizations of Russian Academy of Science with nuclear data for basic research, education and various applications. CDFE activities include the compilation, verification, evaluation and dissemination of modern international nuclear data. CDFE maintains several international and specially developed nuclear databases available through the CDFE Web-site – http://cdfe.sinp.msu.ru.

Organization

The CDFE has a status of laboratory (Nuclear Data Analysis Laboratory) within the MSU SINP. The total permanent stuff incudes 5 professional (the Centre head Vladimir Varlamov, Sergei Komarov, Nikolay Peskov, Mikhail Stepanov, Valery Viazovsky), 2 general service officers and several students of the MSU Physics Faculty.

EXFOR Compilation

6 new CDFE EXFOR transes **TRANS.M067 - 072** have been produced and transmitted to the IAEA NDS. In the reported period of time all transes in addition to number of new ENTRYs contain primarily old ENTRYs corrected in accordance with the NRDC Network experts comments and recommendations.

The main subjects of corrections were:

- English translation additions for REFERENCE (YF <-> SNP, YF <-> PAN, ZET <-> JET, ZEP <-> JEL, IZV <-> BAS, DOK <-> SPD);

- REACTION SF8 corrections BRA <-> BRS;

- REACTION SF8 corrections ST2 <-> SN2;

- deleting of some ENTRYs because data duplications.

On the whole contents new CDFE trances have been produced in the reported period contain 164 corrected ENTRYs and 15 new ENTRYs.

Photonuclear Data Evaluation

In accordance with CDFE program of investigation of reliability of experimental data for photonuclear total and partial reaction cross sections obtained using various methods the correspondent analysis and evaluations were continued. Using specially proposed objective criteria of data reliability and new experimental-theoretical method for evaluation many new reliable and data for neutron yield reaction $(\gamma,xn) = (\gamma,n) + 2(\gamma,2n) + 3(\gamma,3n)$, total photoneutron reaction $(\gamma,sn) = (\gamma,n) + (\gamma,2n) + (\gamma,3n)$ and partial (γ,n), $(\gamma,2n)$, $(\gamma,3n)$ reactions cross sections were obtained for many nuclei ($^{63,65}Cu$, $^{91,94}Zr$, $^{186,188,189,190,192}Os$, ^{207}Pb) in addition to those investigated before (^{89}Y, ^{90}Zr, ^{115}In, $^{112,114,116,117,118,119,120,122,124}Sn$, ^{159}Tb, ^{165}Ho, ^{181}Ta, ^{197}Au, ^{208}Pb). New reliable evaluated data were presented at the International Meetings on Nuclear Spectroscopy and Nuclear Structure (NUCLEUS 2013 and NUCLEUS 2014) and included into the EXFOR database.

Nuclear Database Service

All CDFE DB available through the CDFE Web-site (http://cdfe.sinp.msu.ru) were corrected added and upgraded.

Main CDFE international databases (DB) are produced and maintained using data funds of Nuclear Reaction Data Centres Network and USA NNDC and NSDD:

- "Nuclear Reaction Database (EXFOR)";
- "Complete Nuclear Spectroscopy Database "Relational ENSDF" (Evaluated Nuclear Structure Data File);
- "Nuclear Physics Publications ("NSR" Database)".

Additionally CDFE produced and maintained several another DB:

- digital "Chart of Giant Dipole Resonance Main Parameters" contains data on main parameters (energy position, amplitude, width, integrated cross section) of GDR for many nuclei;

- digital "Chart of Nucleus Shape and Size Parameters" contains data on quadrupole moments, parameters of quadrupole deformation and charge radii for many nuclei;

- "Nucleus Ground and Isomeric State Parameters" combines many useful information on the nucleus as whole and its ground and isomeric states properties (masses, binding energy, nucleon separation energy, decay mode, energy of various decays, etc);

- "Calculator and Graph Engine for Atomic nuclei Parameters and Nuclear reactions and Radioactive Decays Features" gives to one possibility for convenient calculation of various nuclei, nuclear reactions and nuclear decays parameters.

Short-term (2014/2015) Program

The main items of CDFE (2013/2014) program, main priorities and most important tasks are traditional and the following:

- continuation of photonuclear data compilation using EXFOR format, new TRANSes (M073, M074, etc.) production;

- correction of old ENTRYs in accordance with new EXFOR coding rule changes and the NRDC Network experts comments and recommendations;

- continuation of joint analysis and evaluation of total and partial photonuclear reaction cross sections obtained using various methods in experiments with quasimonoenergetic annihilation and bremsstrahlung photons;

- upgrading (corrections and additions) of all databases put upon the CDFE Web-site (http://cdfe.sinp.msu.ru).