

Ukrainian Nuclear Data Centre Progress Report, 2007/08
Summary of Nuclear Data Studies by Staff of the Ukrainian Nuclear Data Centre
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Editor: O. Gritzay

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Web: <http://ukrndc.kinr.kiev.ua/>
e-mail: ogritzay@kinr.kiev.ua

Introduction

Ukrainian Nuclear Data Centre (UkrNDC) is subdivision within the Neutron Physics Department at the Institute for Nuclear Research of the National Academy of Sciences of Ukraine. UkrNDC has 5 permanent researchers. During year under review three members of the staff were involved in an implementation of the STCU contract UZ-25 "Creation of modern manufacturing technologies and certification methods for radioisotope production needed in science, medicine and industrial applications in Ukraine and Uzbekistan Republic".

Compilation

We continue collection and compilation of experimental neutron, charged particle and photonuclear data. Number of the EXFOR's entries sent to NDS IAEA by UkrNDC are:

- for neutron data –6 entries;
- for charged particle data –8 entries;
- for photonuclear data –5 entries.

The list is presented in Table.

We realize review of compilation scope in home journals:

- "Nuclear Physics and Atomic Energy";
- "Ukrainian Journal of Physics"

and in the journal "Bulletin of the Russian Academy of Sciences: Physics".

Collaboration

We continue our collaboration with the Physics Department of the Taras Shevchenko National University of Kyiv.

- The teaching courses "*Nuclear Data for Science and Technology*" (36 hours per year) and "*Modern computer codes for nuclear data processing*" (36 hours per year) are lectured in 2007-2008 for graduate course students of NPD KNU. These courses include the following items: ENDF/B libraries, EXROR system, ENSDF library, the use of the PREPRO code in work with the ENDF libraries, the introduction to NJOY code system, the Network of Nuclear Reaction Data Centers and the use of the on-line services.
- The teaching courses "*Neutron Physics at the Kyiv Research Reactor*" (36 hours per year) are lectured in 2007-2008 for fourth-year students of NPD KNU.

Table. EXFOR's entries sent to NDS IAEA by UKRNDC.

#	EXFOR's entry	Reference	Author
<i>Neutron data</i>			
1	32217	W, 2008 NPAE-Kyiv2006, ISRD13, NPAE-Kyiv2008, ID# 86-95	O.Gritzay, V.Libman
2	32218	J,ZNJD,,(4),68,2007 R,AIP-958,211,2007	N.R.Dzysiuk, I.M.Kadenko, V.K.Maydanyuk, G.I.Primenko, A.M.Berlizov
3	32219	J,ZNJD,,(2),...,2008 NPAE-Kyiv2008 ID#253-260	N.R.Dzysiuk, I.M.Kadenko, V.K.Maydanyuk, G.I.Primenko, R.V.Yermolenko
4	32220	J,ZNJD,,(3),42,2007	S.V.Begun, N.R.Dzysiuk, I.M.Kadenko, V.K.Maidanyuk, G.S.Primenko
5	32221	J,ZNJD,,(4),61,2007	O.O.Gritzay, M.L.Gnidak, V.V.Koloty, O.I.Korol, V.F.Razbudey, V.M.Venedyktov, J.Richardson, K.Sale
6	32222	W, NPAE-Kyiv2008, ID# 87-96	P.N. Vorona, O.I.Kalchenko, V.G.Krivenko
<i>Charged particle data</i>			
1	D5049	J,PR/C,8,(6),2072,1973	L.F.Hansen, S.M.Grimes, J.L.Kammerdiener, V.A.Madsen
2	D5050	J,ZNJD,,(1),36,2007	O.F.Nemets, Yu.N.Pavlenko, V.L.Shablov, F.I.Karmanov, V.O.Kyva, V.N.Dobrikov, O.K.Gorpinich, I.N.Kolomiets, B.A.Rudenko, Yu.Y.Karlyshev, A.P.Voiter, I.A.Mazny, V.V.Ostashko, S.E.Omelchuk, Yu.S.Roznuk
3	D5051	J,ZNJD,,(2),65,2007	Yu.N.Pavlenko, V.L.Shablov, O.S.Bondarenko, O.K.Gorpinich, V.N.Dobrikov, N.L.Doroshko, Yu.Y.Karlyshev, F.I.Karmanov, V.O.Kyva, I.N.Kolomiets, S.E.Omelchuk, V.V.Ostashko, Yu.S.Roznuk, B.A.Rudenko, I.A.Tyras
4	D5052	J,EPJ/A,33,317,2007 J,ZNJD,,(1),72,2007	A.T.Rudchik, V.O.Romanyshyn, E.I.Koshchy, A.Budzanowski, K.W.Kemper, K.Rusek, V.D.Chesnokova, J.Choinski, B.Czech, L.Glowacka, S.Kliczewski, V.M.Kyryanchuk, S.Yu.Mezhevych, A.V.Mokhnach, O.A.Momotyuk, O.A.Ponkratenko, R.Siudak, I.Skwirczynska, A.Szczurek
5	D5053	J,ZNJD,,(2),131,2007	O.M.Povoroznyk
6	D5055	J,NP/A,165,19,1971	T.H.Curtis, H.F.Lutz, D.W.Heikkinen, W.Bartolini
7	D5056	J,NP/A,198,257,1972	H.F.Lutz, D.W.Heikkinen, W.Bartolini
8	D5057	J,ARI,66,653,2008	Ye.Skakun, S.M.Qaim

<i>Photonuclear data</i>			
1	G4013	J,UFZ,52,(8),744,2007	V.M. Mazur, Z.M.Bigan, V.L.Lyamayev, D.M.Symochko
2	G4014	J,UFZ,52,(9),823,2007	I.G.Goncharov, A.M.Dovbnya, Yu.M.Ranyuk, O.S.Shevchenko
3	G4015	J,VAT/I,5,(48),22,2007	I.G.Goncharov,A.M.Dovbnya,Yu.M.Ranyuk,O.S .Shevchenko
4	G4016	J,VAT/I,5,(48),48,2007	O.S.Shevchenko, Yu.M. Ranyuk, A.M.Dovbnya, E.L.Kuplennikov, A.A.Nemashkalo, I.G.Goncharov, V.N.Borysenko, V.I.Noga
5	G4017	J,ZNJD,,(1),37,2008	I.M.Vyshnevskiy, O.I.Davidovskaya, V.A.Zheltonozhsky, E.V.Kulich, A.N.Savrasov, N.V.Strilchuk

Customer Services

- During 2006-2007 the data for users requests were prepared and adapted (from ENDF, ENSDF and EXFOR libraries) for our institute researchers and for ones from other institutes. The organizations, whose requests on nuclear data have arrived and were executed in the accounting period:
 1. Center of Environmental Problems INR of NASU.
 2. Department of Nuclear Physics of Kyiv National University.
 3. Department of Nuclear Physics of the Institute for Nuclear Research (INR) of NASU.
 4. Department of the Theory of Nuclear Reactions INR of NASU.
 5. Department of Nuclear Reactions INR of NASU.
- The UkrNDC site is operating. Ukrainian customers, especially students and those physicists, who wish to prepare the pointwise and multigroup cross sections self-dependently, but do not have a good experience in it, use this site very often. Address of the UkrNDC site: <http://ukrndc.kinr.kiev.ua>.

Calculation

The ACE-format libraries for the isotopes needed for calculations of the maximum specific activity of the irradiated products at the INR WWR-M reactor, namely, $^{50, 52, 53, 54}\text{Cr}$, $^{54, 56, 57, 58}\text{Fe}$, $^{92, 94, 95, 96, 97, 98, 100}\text{Mo}$, $^{58, 59}\text{Co}$, ^{89}Y , $^{96, 98, 99, 100, 101, 102, 103, 104, 105, 106}\text{Ru}$, $^{107, 109, 111}\text{Ag}$, $^{106, 108, 110, 111, 113, 114, 115m, 116}\text{Cd}$, $^{112, 113, 114, 115, 116, 114, 117, 118, 119, 120, 122, 123, 124, 125, 126}\text{Sn}$, $^{120, 122, 123, 124, 125, 126, 128, 130, 132}\text{Te}$, $^{133, 134, 135, 136, 137}\text{Cs}$, $^{136, 138, 140, 141, 142, 143, 144}\text{Ce}$, $^{141, 142, 143}\text{Pr}$, $^{142, 143, 144, 145, 146, 147, 148, 150}\text{Nd}$, $^{144, 147, 148, 149, 150, 151, 152, 153, 154}\text{Sm}$, $^{151, 152g, 153, 154, 155}\text{Eu}$, $^{152, 153, 154, 155, 156, 157, 158, 160}\text{Gd}$, ^{159}Tb , $^{175, 176}\text{Lu}$, ^{181}Ta , $^{180, 182, 183, 184, 186}\text{W}$, $^{185, 187}\text{Re}$, $^{191, 193}\text{Ir}$, $^{84, 86, 87, 88, 89, 90}\text{Sr}$, ^{197}Au , $^{196, 198, 199, 200, 201, 202, 204}\text{Hg}$, were prepared. The input data were taken from the nuclear data libraries: BROND-2.2, ENDF/B-VI (rel. 8), ENDF/B-VII, JEFF-3.1, JENDL-3.3, CENDL-2. Calculations were doing by NJOY99.90 code at the computer ESCALA S120 with RISC/6000 processor under AIX operating system.

Visits and Conferences

- O. Gritzay took part in the 13-th International Symposium on Reactor Dosimetry (ISR'D'13), which was held from 25-30 May 2008 in Alkmaar in the Netherlands
- All of the UkrNDC staff took part in the second International Conference on Current Problems in Nuclear Physics and Atomic Energy (NPAE-Kyiv2008) , which was held from 9-15 June 2008 in Kyiv, Ukraine