



INDC

INTERNATIONAL NUCLEAR DATA COMMITTEE

Table of Content Translations

of

Soviet Reports received by the

INDC Secretariat

Translated by the IAEA

January 1976

Translated from Russian

INDC(CCP)-70/U

Table of Content Translations

of

Soviet Reports received by the

INDC Secretariat

Translated by the IAEA

January 1976

Foreword

The INDC Secretariat receives a number of Soviet reports in Russian as part of the INDC document distribution system. Because of their large number and size most of them cannot be translated by the IAEA. The "Nuclear Physics Research in the USSR - Collected Abstracts" report series and occasional reports of interest to the nuclear data community are translated by the IAEA on a regular basis, and are normally given a "U" distribution.

The "Table of Content Translations" contain the translation of the table of contents, and abstracts when available, of those Soviet reports which the IAEA does not translate. These original reports are normally available in limited quantities only and are given an INDC "G" distribution.

INDC(CCP)-67/G: NUCLEAR CONSTANTS, Volume 18

Fission Product Energies and Yields in the Fission of heavy Nuclei by heavy Particles.

A.A. Lbov, Yu. S. Zamyatnin, V.M. Gorbachev

The extensive experimental data on the energies and yields of the products of the binary and ternary fission of heavy nuclear ($Z \geq 90$) by charged particles (protons, deuterons, ^3He , ^4He) are generalized and systematized.

Complex of Programs for calculating Heterogeneous Cells by the Monte Carlo Method.

V.V. Korobejnikov, A. Ya. Kuranova, G.N. Manturov, M.N. Nikolaev, B.G. Ryazanov, S. Kh. Saberov, D.A. Usikov

The authors describe a program complex intended for calculations of resonance and heterogeneous effects in reactor assemblies by the Monte Carlo method. All the programs are written ALGOL-60 in the TA-2M translator system for M220-M222 computers.

INDC(CCP)-68/G: NUCLEAR CONSTANTS, Volume 19

Thermal Neutron Fission Cross Sections and Fission Resonance Integrals of Curium Isotopes.

K.D. Zhuravlev, N.I. Kroshkin

The thermal neutron fission cross sections and fission resonance integrals have been measured for $^{244-248}\text{Cm}$ isotopes by the method of cadmium difference on neutron beam of the SM-2 reactor relative to ^{235}U . The values of thermal fission cross sections: $1,0 \pm 0,2$; 2055 ± 150 ; $0,14 \pm 0,05$; 79 ± 7 ; $0,39 \pm 0,07$ barn and fission resonance integrals: $13,4 \pm 1,5$; 802 ± 80 ; $13,3 \pm 1,5$; 728 ± 70 and $13,1 \pm 1,5$ barn have been obtained.

The Evaluation of Energy Dependence of the Cross Section of ${}^6\text{Li}(n,\alpha)\text{T}$ Reaction.

E.A. Seregina, P.P. D'yachenko

The evaluation of the available experimental cross sections of the ${}^6\text{Li}(n,\alpha)\text{T}$ reaction are made for the purpose of obtaining recommended values.

Average Kinetic Energies of Fragments Fission Nuclei.

V.G. Vorob'eva, B.D. Kuz'minov

Analysis of experimental data on the mean kinetic energies of fragments at fixed nucleonic structure and excitation energy of the fissionable nuclei was carried out. Numerical data were brought to the single standard.

Fission Fragment Yield and Reaction Cross-Section of Photofission ${}^{232}\text{Th}$, ${}^{238}\text{U}$, ${}^{237}\text{Np}$ and ${}^{239}\text{Pu}$ by Gamma Rays with Maximum Energy from 5 to 12 MeV.

K.N. Ivanov, K.A. Petrzhak

Information on yields of photofission of ${}^{232}\text{Th}$, ${}^{238}\text{U}$, ${}^{237}\text{Np}$ and ${}^{239}\text{Pu}$ by gamma-rays with the maximum energy from 5 to 12 MeV has been obtained, the observed fission thresholds and the influence of the competing reaction (γ,n) on the energy dependence of photofission cross-section were determined. A Betatron was used as a source of bremsstrahlung radiation. Fission fragments were registered by mica detectors. The curves of photofission yields were converted into the cross-sections by the Penfold-Leis method.

Neutron Radiative Capture Cross Sections of In, I, Ta and Au in 5-80 KeV Neutron Energy Region.

V.S. Shorin, V.N. Kononov, E.D. Poletaev

Neutron capture cross sections of natural In, I, Ta and Au have been measured relative to ${}^{10}\text{B}(n,\alpha\gamma)$ reaction cross sections and capture cross section of gold at 30 KeV (596 mb) in the neutron energy range from 5 to 80 KeV. The data have been analyzed using Hauser-Feshbach statistical theory and radiative $(F\gamma/D)$ and p-wave neutron (S_1) strength functions have been obtained.

The Differential Cross-Sections of Elastic and Inelastic Neutron Scattering on Be, Al, Y, Zr, Mo and Bi.

V.I. Trykova, V. Ya. Baryba

Differential cross-sections of elastic and inelastic neutron scattering for incident neutron energy of 4,37 MeV on Be, Al, Y, Mo and Bi are presented in this report. The cross-sections have been corrected for multiple scattering, angular resolution and neutron flux absorption in the sample using the Monte-Carlo method.

The measurements were carried out in cylindrical geometry. The monocrystal scintillation detector with pulse shape discrimination of gamma rays was used.

Inelastic Scattering γ -ray Production Cross Section due to 14 MeV Neutron Interaction with Various Nuclei.

V.M. Bezotosnyj, V.M. Gorbachev, L.M. Suvorov, M.S. Shvetsov

The results of measurements of the γ -rays production cross sections of inelastic interaction 14 MeV neutrons with nuclei ${}^6\text{Li}$, ${}^7\text{Li}$, ${}^9\text{Be}$, ${}^{10}\text{B}$, ${}^{11}\text{B}$, ${}^{12}\text{C}$, ${}^{14}\text{N}$, ${}^{16}\text{O}$, Al, Fe, Ta, W, Pb are given in this paper. The measurements were carried out on spherical samples using pulsed 14 MeV neutron source, time-of-flight method and scintillator γ -spectrometer with NaI(Tl)-crystal of (ϕ 200x100 mm) size.

Determination of the Spin Cut-off Parameter.

N.S. Biryukov, B.V. Zhuravlev, N.V. Kornilov, V.I. Plyaskin, O.A. Sal'nikov, V.I. Trykova

The spin cut-off parameter for Cr, Fe, Co, Ni, Y nuclei was obtained from the analysis of angular distributions of inelastic scattered neutrons with the initial energy 9,1 MeV. It is shown that the experimental values of σ are below data calculated from independent particle model. Observed effect can be probably explained by particle interaction which differs from the pair correlation.

S-Matrix for One-Nucleon Nuclear Reactions.

A.A. Luk'yanov, E.M. Saprykin

Fundamental results of nuclear collision theory have been applied to design a parametrization schemes for s-matrix (cross-sections) energy dependence. The matrix of direct interaction processes were eliminated. For resonance part we suggested the simple method of extracting a doorway

(deca ng) states and a narrow resonances, which have no coupling with continuum. The structure of observed resonance widths and some problems in their numerical calculations are discussed.

Application of the Theoretical Models to the Evaluation of Average Neutron Cross-Sections of Iron.

V.M. Bychkov, V.V. Vozyakov, A.G. Dovbenko, A.V. Ignatyuk, V.P. Lunev, V.G. Proyaev, V.S. Shorin

Application of the theoretical models to evaluation tasks allows one to obtain a self-consistent description of the nuclear reaction cross-sections. Possibilities of these models for application to evaluation of the average neutron cross-sections of ^{56}Fe in the energy region of 1 to 15 MeV have been investigated in this paper.

Method of Analysis of Inelastic Scattering Neutron Spectra with Account of the Direct Interaction.

E.M. Saprykin, A.A. Luk'yanov

The method of practical application for the qualitative evaluation scheme of the direct process contribution to the double-differential inelastic scattering neutron cross-sections described in the article 6 is presented.

As an example of this method, a parametrization of the spectra and angular distributions of inelastically scattered neutrons with initial energies of 14.36 MeV and 9,1 MeV for nuclei ^{93}Nb and ^{56}Fe has been made.

The observed features of the inelastic scattering neutron angular distribution for the nuclei considered have a simple physical interpretation within a shell-model approach.

Determination of the Gaussian Function Parameters by the Maximum Likelihood Method.

A.A. Greshilov, L.A. Piskareva

The paper gives a technique for determining estimations of the Gaussian function free parameters (σ , A , t_0)

$$y(t) = \frac{A}{2\pi\sigma} \exp \left[-\frac{(t-t_0)^2}{2\sigma^2} \right] = f(t, \bar{a}),$$

by the maximum likelihood method taking into account uncertainties on two coordinate axes for the following cases:

1. A discrete set of values of the experimental points coordinates is given;
2. For the discrete set of (t_k) values the values of (Y_k) integrals, taken on the corresponding intervals $[t_{k-1}, t_k]$, are known.

The Computerized Experimental Neutron Data Library.

V.M. Bychkov, V.N. Manokhin, V.V. Surgutanov

The description of the computerized experimental neutron data library of the Nuclear Data Centre (Obninsk) is given. The format of the library (EXFOR) and the system of programmes connected with the library are briefly described.

Reproduced by the IAEA in Vienna
January 1976
75-10203