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INDC

INTERNATIONAL NUCLEAR DATA COMMITTEE

Table of Content Translations

of

Soviet Reports received by the

INDC Secretariat

Translated by the IAEA
January 1979

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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. The originals of these reports are normally available in limited quantities only and are given an INDC "G" distribution.

This issue contains the table of content translation of the following reports:

- Nuclear Constants, Number 1(28)
Original distributed as INDC(CCP)-129/G

- Nuclear Constants, Number 2(29)
Original distributed as INDC(CCP)-130/G

NUCLEAR CONSTANTS, Number 1(28), 1978

INDC(CCP)-129/G

On the Nuclear Charge Distribution between Isomeric States of Fission Products

V.V. Kovalenko, A.B. Koldovskij, V.M. Kolobashkin

A method to calculate fission-products isomer ratios is suggested. Thermal-neutron-induced fission of ^{233}U , ^{235}U and ^{239}Pu is considered. A possibility to use this method for other fission processes is discussed.

The (n,p) Reaction Cross-Section for Stable Nuclei with $Z \geq 20$ at 14,5 MeV

V.M. Bychkov, A.B. Patzenko, V.I. Pliaskin

Simple dependence of the (n,p) cross-section on the neutron and proton number in the nucleus was obtained on the basis of usual statistical relations for nuclear reaction cross-section and the Weizsäcker formula for the nuclear binding energy. It is shown that empirical dependence of the (n,p) cross-section on the $(N-Z)/A$ parameter results from the exponential dependence of the reaction cross-sections on the proton binding energy in the nucleus. $\sigma_{n,p}$ values for all stable nuclei with $Z \geq 20$ are calculated.

On the Calculation of Photoneutron Yields

V.I. Issaev, V.P. Kovalev

An analytical expression for photon track length in the region of giant resonances was obtained by summing the thin target bremsstrahlung in the $\sim 1/k$ form. Calculated for the checking of this expression, the neutron yields from thick targets of Cu and Pb are in a good agreement with experimental results obtained by Barber and George.

Linear Response Approach for One-Body Dissipation of the Collective Energy of Nuclei

V.M. Kolomietz

The mechanism of the transformation of the collective energy of nuclear deformation into internal degrees of freedom is treated. The linear response function of the system in an external time dependent field is reviewed. In this approach the friction coefficient and the relaxation time are estimated. The influence of the shell effects on the temperature dependence of the friction coefficient is considered.

Calculation of the Neutron Albedo from Laminated Semiinfinite Media
Yu.L. Dobrynin, L.A. Mikaelian, M.D. Skorokhvatov

Results of Monte-Carlo calculation of the integral numerical current albedo for neutrons falling normally on a semiinfinite multilayer media are presented. Results of the calculations are of interest for measuring external neutron fluxes and particularly for neutron detection using neutron capture gamma-rays.

The Study of the Characteristics of a Multiplying Medium Composed of ^{235}U and Stainless Steel. Part I. Multiplying Coefficients of Infinite Media and Reactivity Coefficients of Iron, Nickel and Chromium
V.I. Golubev, S.I. Issachin, Yu.A. Kazanskij, V.G. Kozlovtssev, M.H. Lantsov, I.P. Markelov, A.M. Tsibulia

The Infinite Media multiplying factors and the reactivity coefficients of iron, nickel and chromium were measured for three compositions of ^{235}U and stainless steel. It is shown that disagreements between the experimental and calculation results can be reduced by increasing the capture cross sections of iron, nickel and chromium in the resonance energy region.

Programs of Planning and Evaluation of Multi-Factor Experiments
I.V. Kravchenko, Yu.G. Bobkov

The algorithm and program of planning and evaluation of multi-factor experiments is described.

Neutron Cross-Section Library for the SAND-II Program and Service Program
M.A. Berzonis, Kh.Ya. Bondars, A.A. Lapenas

The logical structure of the library of activation detector neutron cross-sections for using in the SAND-II program complex and its service program are described.

NUCLEAR CONSTANTS, Number 2(29), 1978

INDC(CCP)-130/G

The Calculation of Neutron Cross Section from Evaluated Resonance Parameters

V.V. Tebin, M.S. Yudkevick

The description of the resonance parameter library and the CROS program which allows one to obtain neutron cross-sections in the range of resolved resonances is presented. The calculation is done according to the formalism being used in the course of evaluating the resonance parameters. Comparison between evaluation of various authors of group cross-sections for the main fissile isotopes is given.

The Calculation of Neutron (n,2n) Cross-Sections and Inelastic Scattering Neutron Spectra for A = 50 - 200

V.M. Bychkov, A.B. Pashchenko, V.I. Pliaskin

Calculation of neutron emission spectra and of (n,2n) neutron cross-sections at incident neutron energy 7-15 MeV is done within the framework of statistical theory and preequilibrium model. The necessity of accounting (n,n' γ) competition has been shown for calculations of (n,2n) reactions. The best agreement with experimental data was achieved with "back shifted" parameters of fermi-gas level density.

The Evaluation of $\alpha(^{235}\text{U})$ in the 0,1 - 1000 keV Energy Range

V.A. Kon'shin, V.F. Zharkov, E.Sh. Sukhovitskij

The results of the α -parameter evaluation for ^{235}U in the energy region of 0,1 - 1000 keV are discussed. This evaluation method takes into account the correlation between partial errors of different experiments. This evaluation includes all data on ^{235}U alpha which has been published up to the middle of 1977.

The Resolution Corrections in the Resonance Analysis Based on the Pade-Approximation

V.N. Vinogradov, E.V. Gai, N.S. Rabotnov

A method is proposed of solving the Fredholm integral equation of the first type in the problem of restoring the energy dependence of a nuclear reaction cross-section measured with finite resolution. The method is based in the Pade-approximation of both the measured cross-section and resolution function with subsequent Fourier transformation made analytically. A model problem is solved as an example.

Anisotropy Scattering Considerations in the Calculation of Constants
used in Neutron Transport Multigroup Equation

M.N. Nikolaev, M.M. Savos'kin

In the process of averaging cross-sections over group energy intervals, the anisotropy of scattering, which entails a considerable energy loss, is normally not taken into account in the evaluation of the resonance structure of the neutron spectrum. This study illustrates the extent to which this approximation affects the values of the nuclear constants and the macroscopic characteristics of the reactor systems in which this effect is most pronounced. The question of errors arising from the omission of the anisotropy of elastic scattering on medium and heavy nuclei when averaging group cross-sections is also investigated.

An Evaluation of Water and Cadmium-Water Reflector Savings in
Homogeneous Uranium Water Systems

V.N. Gurin, Yu.N. Mironovich, A.M. Poplavko

Savings of water and cadmium-water reflectors for spherical reactors are evaluated. Cores consist of homogeneous mixtures of highly enriched uranium and water. Atomic fraction $\xi_{h/5}$ varies from 0 to 1500. $(\Delta R/R)$ and $(\Delta k/k)$ for bare and cadmium-water reflected reactors are given.

Analysis of Two-Zone Fissionable Systems by the Diffusion Approximation

Yu.Yu Vassiliev, V.N. Gurin

The applicability of diffusion approximation to determine critical parameters of fissionable systems by the subcritical inset method is analysed. The results of calculations of critical parameters using a 21-group S_8 -approximation of the transport equation are used as "experimental" data. The compositions from mechanical mixture of uranium dioxide and water are considered. The accuracy of the subcritical inset method is evaluated by means of the comparison with the results of calculation in the S_8 -approximation.

The Initial Conditions in the Oscillator Method of Reactivity
Perturbation Measurements

V.G. Kozlovtssev

An algorithm for the transformation of experimental data, which characterize the change of the neutron flux in a reactor at the time of a reactivity change is presented, and considerations of initial conditions pertinent to reactivity perturbation measurements with the use of a pile oscillator are analyzed.

Some Yields and Characteristics of Ternary Heavy Nuclei Fission
Products

A.A. Lbov

Experimental data on the yields and some other characteristics of the (fission) products of ternary fission of heavy nuclei ($Z \geq 90$) induced by neutrons, photofission and spontaneous fission are compiled. These data were compiled for the benefit of scientific workers engaged in the area of nuclear physics and nucleonics.