INTERNATIONAL NUCLEAR DATA COMMITTEE

Progress Report on Nuclear Data Research in the Federal Republic of Germany *

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Neutron Nuclear Data Evaluation

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In addition to KFK 120 / part I a new (compared to the first edition, KFK 120 / part II in 1962) much improved and enlarged volume with tables of evaluated "best" microscopic cross sections and related nuclear data for the most important reactor materials was edited [1]. Being essentially a copied print-out of the Karlsruhe evaluated nuclear data file KEDAK it simultaneously serves as documentation of the content of KEDAK.

The first phase of the evaluation of all microscopic cross sections and related nuclear data needed in reactor calculations for the higher Pu isotopes Pu^{240}, Pu^{241} and Pu^{242} performed by the group of Prof. Yiftah in collaboration with Karlsruhe as part of a contract between the TECHNION, Haifa, and the Gesellschaft für Kernforschung Karlsruhe is finished [2]. Before entering these data into the KEDAK file capture cross sections and resonance parameters for Pu^{240} were still improved by taking into account the recent comprehensive resonance results obtained at Geel. As part of a new two years contract the present evaluations for Pu^{240}, Pu^{241} and Pu^{242} will be still improved particularly regarding fission, capture and inelastic scattering cross sections.

For Cd an existing GGA evaluation has been improved and incorporated into KEDAK. 26-group cross section sets (ABN-group structure) have been calculated from these data with ABN and Na prototype reactor spectrum weighting, respectively.

In order to enable the transfer of the KEDAK file to the IBM-360/65 recently installed at Karlsruhe and to the Saclay CCDN computer, a card image format has been developed for KEDAK [3]. Very shortly the KEDAK file in this

format will be sent to the Saclay CCDN together with the necessary documentation of its present content.

As one of the main points of the Karlsruhe evaluation work a systematic comparison and evaluation of recent discrepant absorption and fission cross section measurements particularly for U^{238} and Pu^{239} has been started, in close interaction with integral experimental results obtained at the Karlsruhe facilities SNEAK and SUAK. First results of these investigations together with the feedback on reactor physics calculations were reported at the International Winter Meeting of the American Nuclear Society at Washington, November 1968 [4].

The treatment of inelastic scattering within the reactor physics computer programs was improved over the hitherto used AEM scattering matrices by making use of the evaluated excitation cross section data from KEDAK in the region of resolved rest nucleus levels and of the evaporation model in the so-called "continuum" range.

In the framework of theoretical safeguard investigations the methodically still simple derivation of five-group cross section sets for σ_γ, σ_f, σ_{2n} and $\bar{\nu}$ for a series of Pa, U, Np, Pu, Am and Cm isotopes was started.

As one of the main users the Karlsruhe nuclear data evaluation group participates extensively in the principal considerations and efforts of the four international data centres for the creation of an advanced international neutron data storage and retrieval system (SCISRS-II) [5]. At several occasions reviews were given on the technical principles and the organizational aspects in the field of neutron nuclear data evaluation [6,7].

Table of Literature

1. I. Langner, J.J. Schmidt, D. Woll, "Tables of evaluated neutron cross sections for fast reactor materials", KFK 750 (EANDC(E)-88"U", EUR-3715e), 1968.
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4. H. Küsters, J.J. Schmidt, E. Eisemann, H. Metzenroth, K.E. Schroeter, D. Thiem, "Analysis of fast critical assemblies and large fast power reactors with group-constant sets recently evaluated at Karlsruhe", Proceed. of the International Winter Meeting, American Nuclear Society, Washington D.C., November 1968; see also KFK 793 (EUR 3962e), 1968.
5. J.J. Schmidt, "Karlsruhe comments on SCISRS-II", 1968, restricted distribution.
6. J.J. Schmidt, "Principles of cross section evaluation", Second Conf. on Neutron Cross Sections and Technology, Washington D.C., March 1968, Proceed. Vol. II, p. 1067; see also KFK 772, 1968.
7. J.J. Schmidt, "Organizational and technical aspects in the field of neutron nuclear data evaluation", First International CODATA Conference at Evangelische Akademie Arnoldshain/Taunus/Frankfurt, July 1968; see also KFK 791, 1968.