



International Atomic Energy Agency

INDC(NED)-010/G

INDC/P(90)-20

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PROGRESS REPORT FOR THE NETHERLANDS FOR THE PERIOD 1989/90

By H. Gruppelaar

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September 1990

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IAEA NUCLEAR DATA SECTION, WAGRAMERSTRASSE 5, A-1400 VIENNA

### Nuclear Data Activities in The Netherlands

In the Netherlands most of the nuclear data activities related to neutron-induced reactions are performed at the Netherlands Energy Research Foundation (ECN) at Petten.

Experimental nuclear physics activities with neutron beams of the High Flux Reactor at Petten are shrinking. During the last year the  $(n, \gamma)$  reactions on light nuclei ( $H, D, {}^3He$ ) were studied with different techniques, including oriented targets, polarized neutrons and polarized  $\gamma$ -rays. The results are of fundamental interest: it has been shown that exchange currents influence spin interfering amplitudes for capture  $\gamma$ -ray polarization and angular distribution from a polarized deuteron target [1]. Furthermore, the single photon cross-section for s-wave capture in  ${}^3He$  has been measured accurately [2].

The neutron cross-section evaluation work at ECN is directed to contribute to three data files: the Joint Evaluated File (JEF-2), the European Fusion File (EFF-2) and the European Activation File (EAF). To support this work new approaches were studied to calculate photon-production data and neutron emission data, by introducing modified  $\gamma$ -ray strength functions [3] and new multi-step direct reaction models [4], respectively.

The ECN contribution to JEF-2 consisted of a revision of the fission-product nuclear data file, with emphasis on the improvement of the thermal and resolved-resonance ranges, including corrections for missed resonances. This work was a joint activity of ECN and the NEA Data Bank.

The work for EFF-2, sponsored by the European Community's Fusion Technology Programme, included new evaluations for the structural materials, Li-7, Be, Al and Si. Various European laboratories contribute to this work. The file is maintained at ECN Petten. The Dutch contribution was the completion of the evaluations for Cr-52, Fe-56, Ni-58 and Ni-60, by introducing the high-energy evaluation of Dr. M. Uhl (IRK, Vienna) [5] and an update of the Pb evaluation. First results with respect to sample calculations of the uncertainty in the heating of superconducting coils of the NET reactor have been completed [6].

Good progress has been made with respect to the EAF. This file contains a very large number of stable and unstable targets ( $T_{1/2} > 0.5$  d) with all possible activation reactions. Current work is directed to the low energy range, with emphasis of improving the capture and inelastic cross-sections [7].

List of References:

- [1] M.W. Konijnenberg, K. Abrahams, J. Kopecky, F. Stecher-Rasmussen, R. Wervelman and J.H. Koch, Phys. Lett. B205 (1988) 215.
- [2] R. Wevelman, H. Postma, K. Abrahams, F. Stecher-Rasmussen, G.J. Davids and G.J.C. Bots, Nucl. Sci. Eng. 102 (1989), 428.
- [3] J. Kopecky and M. Uhl, Phys. Rev. C41 (1990) 1941.
- [4] J.M. Akkermans and A.J. Koning, Phys. Lett. B234 (1990) 417.
- [5] H. Gruppelaar, J. Kopecky, H.A.J. van der Kamp and M. Uhl, ECN Report (1990), to be published.
- [6] A. Hogenbirk, Sensitivity and uncertainty analysis of the nuclear heating in the coils of a fusion reactor, ECN Report ECN-C-90-034 (1990).
- [7] J. Kopecky and H. Gruppelaar, NEANDC-259 'U' (1990), p.41.