

PACKAGE ID - 001334IBMPC00 STAPREF

KWIC TITLE - Nuclear Reactions X-Sections By Evaporation
Model, Gamma-Cascades

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LIMITATION CODE -UNL **AUDIENCE CODE** - UNL

COMPLETION DATE - 04/05/1983 **PUBLICATION DATE** - 04/05/1983

DESCRIPTION - Calculation of energy-averaged cross sections for nuclear reactions with emission of particles and gamma rays and fission. The models employed are the evaporation model with inclusion of pre-equilibrium decay and gamma ray cascade model. Angular momentum and parity conservation are accounted for. Major improvement to the 1976 STAPRE program (NEA 0461) relates to level density approach, implemented in subroutine ZSTDE. Generalized superfluid model is incorporated, Boltzman-gas modelling of intrinsic state density and semi-empirical modelling of a few quasiparticle effects in total level density in equilibrium and saddle deformations of actinide nuclei.

PACKAGE CONTENTS - Media Directory; Software Abstract; Information File; Media Includes Source Code, Executable File, Sample Problem Input and Output Files, Input Auxiliary Files, and Program Manual;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - Integrations in connection with the evaporation formulas are approximated by summation over energy bins. For gamma ray cascades a recursion formula is employed. The width-fluctuation correction factor is calculated by use of Simpson's rule.

COMPUTER - IBM PC

OPERATING SYSTEMS - MS-DOS

PROGRAMMING LANGUAGES - FORTRAN-90

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - In addition to the activation cross sections, particle and gamma ray production spectra are calculated. Isomeric state populations and production cross sections for gamma rays for low excited levels are obtained too. For fission a single or double humped barrier may be chosen.

RELATED SOFTWARE - Since transmission coefficients are needed as input data for the code STAPRE, it is advantageous to have an optical

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RELATED SOFTWARE - (CONT) model code at one's disposal to generate these quantities.

OTHER PROG/OPER SYS INFO - The program description contains instructions for segmentation in order to reduce storage requirements.

HARDWARE REQS - Program was installed on usual Pentium IBM PC, it was run on a PC Pentium 200mhz, 32 RAM, using FORTRAN-90 Lahey system

TIME REQUIREMENTS - The calculation of cross sections at 77 energy points in the neutron energy range from 1 MeV up to 20 MeV for actinide nucleus requires 50 sec. on IBM PC Pentium 200PRO.

REFERENCES - V. M. Maslov: Fission Level Density and Barrier Parameters for Actinide Neutron Induced Cross Section Calculations, INDC (BLR)-13, 1998, Vienna; V. M. Maslov, Yu. V. Porodzinskij, A. Hasegawa, et. al.: Neutron Data Evaluation of 238-U, JAERI-Research 98-040, 1998.

ABSTRACT STATUS - Released 6/27/2000

SUBJECT CLASS CODE - A

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
CROSS SECTIONS
EMISSION SPECTRA
GAMMA RADIATION
NUCLEAR MODELS
STATISTICAL MODELS

EDB SUBJECT CATEGORIES -
990200

SPONSOR - NEA

PACKAGE TYPE - AS - IS