PACKAGE ID - 001206UNIXW00 ECIS-95

KWIC TITLE - Differential Equation Solution of Nuclear Model

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

COMPLETION DATE - 07/10/1996 **PUBLICATION DATE -** 09/01/1994

DESCRIPTION - ECIS uses a sequential iteration method for solving the coupled differential equations arising in nuclear model calculations. It also performs parameter searches to fit calculated results to experimental data. It can be used for a range of models, e.g. first or second order harmonic or anharmonic vibrational model, symmetric or asymmetric rotational model, with a similar range of interaction potentials. It includes spin-orbit deformation. For the rotational model vibrational bands are included. An option for solving the Dirac equation has been added. It also contains the statistical model including width fluctuation corrections as formulated by Peter Moldauer. Besides the use of Bessel expansion for form factors, the use of deformation lengths and the use of symmetrized Woods-Saxon potentials it includes: two bound state transitions for particle-mode excitations with the possibility of the particle in the continuum, expression of cross sections in terms of Legendre polynomials, possibility of angular distribution for uncoupled states without giving explicitly all the reduced nuclear matrix elements, and for Coulomb excitation, use of the magnetic multipole.

PACKAGE CONTENTS - Media Directory; Software Abstract; CEA-N-2772; Media Includes Source Code, Sample Problem Input and Output; Readme File;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 2 3.5 Diskettes

METHOD OF SOLUTION - The ECIS method is designed to solve sets of coupled differential equations when the coupling terms are not too strong. The iteration technique searches for the one required solution among the many which are mathematically possible. The method supposes some ordering of the channels: first the ground state, then the state most strongly coupled to it. All channels must be coupled to some preceding one. The result of each iteration depends on this chosen order. If there is more than one equation related to the ground state the whole calculation must be repeated. The efficiency of the method is proportional to the ratio of the total number of equations to the number of those related to the ground state. The usual methods can also be used, but the iteration method is compulsory for spin-orbit deformation and Dirac formalism.

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METHOD OF SOLUTION -(CONT)
COMPUTER - UNIX WORKSTATIN

OPERATING SYSTEMS - Machine dependent

PROGRAMMING LANGUAGES - FORTRAN

SOURCE CODE AVAILABLE (Y/N) - Y

RELATED SOFTWARE - The ECIS-95 code has been developed over a period of more than 15 years, and several earlier versions exist. the statistical model part is based on the version ANLECIS developed by P. Moldauer.

OTHER PROG/OPER SYS INFO - There are two machine-dependent features, the management of the working array and the control of the job time limit. Information on how to implement these functions on various computers is given on the comment cards in the main program.

REFERENCES - Jacques Raynal, Notes on ECIS-95, CEA-N-2772, September 1994.

ABSTRACT STATUS - Released tested 3/18/98.

SUBJECT CLASS CODE - A

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
E CODES
NUCLEAR MODELS
COUPLED CHANNEL THEORY
DIFFERENTIAL EQUATIONS
STATISTICS

EDB SUBJECT CATEGORIES -
990200

SPONSOR - NEA

PACKAGE TYPE - TESTED