

ORNL NUCLEAR DATA PROJECT

Progress Report

April 2000 - April 2001

I. STAFF

The Nuclear Data Project staff and FTE's for the last five years are

	FY 1997 -----	FY 1998 -----	FY 1999 -----	FY 2000 -----	FY 2001 -----
^a Y. A. Akovali	-	0.5	0.5	0.5	0.5
^a A. Artna-Cohen	0.5	0.5	-	-	-
^b J. Blackmon	-	0.2	0.2	0.2	0.2
^a M. Martin	1.0	-	-	-	-
^a D. Radford	-	0.3	0.3	0.2	0.2
^b M. Smith	-	0.2	0.2	0.2	0.2
^a C.-Hong Yu	-	0.1	-	-	-
^c M. R. Lay	0.8	0.5	0.5	0.25	-

^a Nuclear Structure evaluator

^b Nuclear Astrophysics evaluator

^c Technical support

II. NUCLEAR STRUCTURE DATA EVALUATIONS

A. Completed work

- ✓ Critical evaluations of nuclear structure data pertaining to all nuclei with mass number *250, 254, 258, 262 and 266* have been **completed**, and the files have been transferred to the BNL Nuclear Data Center.
- ✓ Evaluation of *A = 231* nuclei has been **reviewed**.

B. Plans for future evaluations and reviews

- The evaluation of nuclear structure data for *A=242* nuclei is expected to be completed by the end of FY 2001.
- The review of the *A=215, 219, 223 and A=227* evaluations will be completed in April 2001.
- The *A=244* nuclei will be evaluated in FY 2002.

These evaluations will bring the structure information for the heavy-mass region close to up to date, and they should serve as a basis for understanding of some nuclear properties from their systematic behavior in the region and for expectations of these properties in the heavier-mass region.

Such studies should be valuable for contemplated experiments for nuclei in superheavy regions.

III. NUCLEAR ASTROPHYSICS EVALUATIONS

A. Accomplished work

- ✓ A paper on our work on the evaluations of the $^{18}\text{F}(p,\alpha)^{15}\text{O}$ and $^{18}\text{F}(p,\gamma)^{19}\text{Ne}$ reactions has been drafted. This includes a new direct capture reaction rate calculation, as well as estimates for contributions from states missing in ^{19}Ne but known in ^{19}F .
- ✓ A paper on our work on the evaluations of the $^{17}\text{O}(p,\alpha)^{14}\text{N}$ and $^{17}\text{O}(p,\gamma)^{18}\text{F}$ reactions is in preparation.

B. Plans for future evaluations

- Work will continue on the evaluation of reaction rates important for nuclear burning in the interior of the sun and in stellar explosions.

IV. DATABASE DEVELOPMENT and DISSEMINATION AT ORNL for REACTION γ 's & NUCLEAR STRUCTURE

A. Accomplished work

- ✓ A new level scheme directory and level scheme JPEG/PDF view script have been added to the Physics Division's web site. This script will let evaluators/researchers create figures from the database directly, without running the RadWare programs. One can zoom and pan the figures. If editing a level scheme is necessary, one would still need to download the data and run the RadWare software. The directory also refers nuclear structure reference queries to the BNL NSR link manager.

B. Plans for future work

- We will continue to participate in the NNDC Common Web Interface working group. This initiative aims to improve the consistency of the data dissemination web interface at different NNDC sites, to provide more modern, efficient and consistent user access to the nuclear data.
- The software, already developed at ORNL, will continue to be maintained and further developed, as the need becomes apparent. These programs include software for semi-automatic extraction of tabular level-scheme data contained in PDF manuscripts (and possibly other formats of published and unpublished data) into ENSDF-format data sets, for the XUNDL database, and for conversion of ENSDF data sets to RadWare format, a high-quality graphical level scheme interface.
- The compilation and electronic dissemination of most recent data on reaction gammas will be done continuously as data become available. Upkeep of the RadWare database which is very much in accordance with the Steering Committee's recommendation for addressing the immediate needs of the main stream research community, will be continued.