

**United States nuclear data program evaluated nuclear structure  
data file (ENSDF) at Texas A&M**

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As Since 2005, when we started our data evaluation effort at the Cyclotron Institute, Texas A&M University has become an important participant in the nationwide United States Nuclear Data Program (USNDP), to which we contribute about 10% of the total effort. Our work continued in 2008-09 with the A=97 mass-chain evaluation [1]: this encompassed all publications since 1993, when this mass chain was last fully evaluated [2].

The A=97 mass chain is a large one, composed of 14 different elements (Br, Kr, Rb, Sr, Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Ag and Cd); it contained 71 datasets\* in 1993 [2], and the new evaluation, when published, will contain 90 [1]. As well, the number of lines in the database files† will be 15,000, a 50% increase over what it was before. Fig. 1 shows a detailed comparison for each nucleus, where one can see significant increases in data particularly for Sr, Tc and Ru (numbers 4, 9 and 10 respectively). There is also a significant increase in the number of publications, about 328 now compared to 236 before. From Fig. 2 one can see that, with 15,000 lines, the A=97 mass chain will rank among the largest ones.

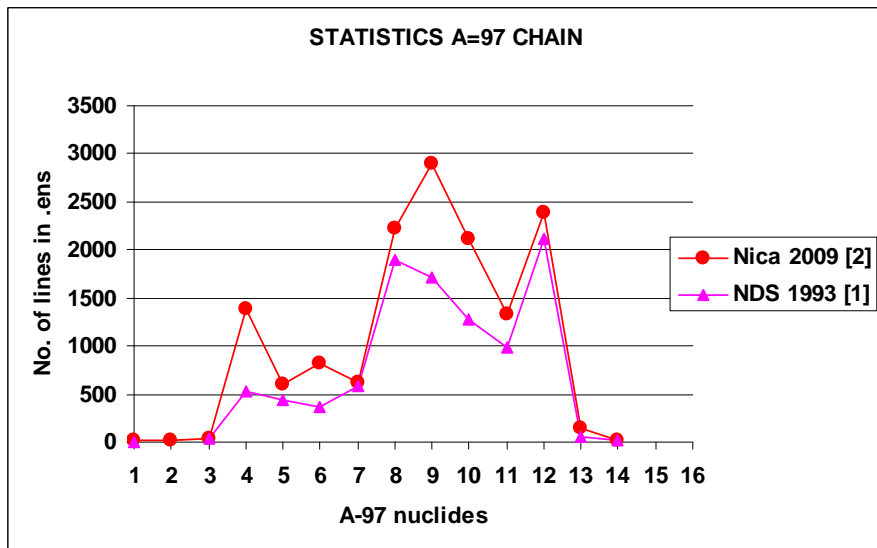


FIG. 1 Comparison of the new evaluation [1] with the previous one [2], showing the number of database lines for each of the 14 nuclei of A=97 mass chain. They appear from lightest to heaviest (left to right).

\* A dataset collects the data for one nucleus as measured in a particular decay or reaction, frequently by several independent experiments. The “Adopted Levels, Gammas” dataset, one for each nucleus, is built from the decay and reaction datasets for that nucleus. It gives the best and most extensive data for each nucleus.

† The database file (.ens file), one for each dataset, is written in the special ENSDF data format where one line (sometimes extended) contains typical data for a nuclear level, a particular nuclear transition, or other types of data, as well as comment lines.

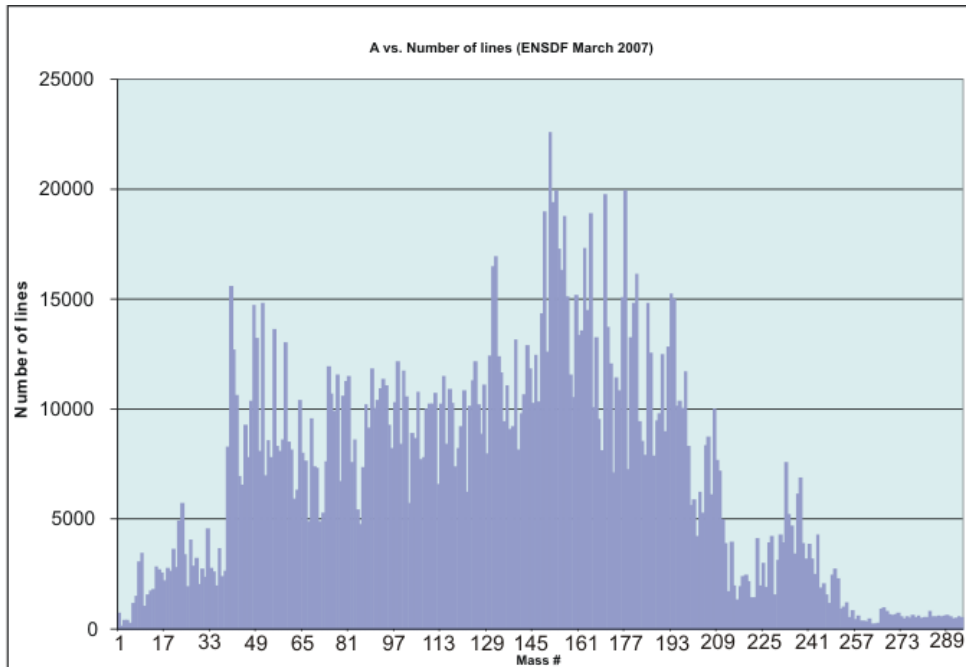


FIG. 2. The number of lines in the data-base files for each mass chain in ENSDF as of March 2007. With 15,000, lines the new evaluation for  $A=97$  will be among the largest chains.

With two-thirds of an FTE dedicated to evaluation, the Cyclotron Institute is making an important contribution to the U.S. national nuclear data program, and its official establishment as an evaluation center would be desirable. While evaluation now is located predominantly in national laboratories, we are proof that this activity can be done successfully in a university environment at lower costs. Furthermore, at a university some evaluation work can be done with the help of students. Thus, in addition to its intrinsic value for the community, evaluation could also become a tool for teaching nuclear physics.

[1] N. Nica, Nucl. Data Sheets (to be published).

[2] A. Artna-Cohen, Nucl. Data Sheets **70**, 85 (1993).