

NUCLEAR STRUCTURE DATA EVALUATIONS

Y. A. Akovali, A. Artna-Cohen¹, M. R. Lay

The nuclear structure evaluation procedure involves the critical analysis of all literature on nuclei under study. The evaluators are responsible for preparation of critical reviews with recommended values for a wide range of nuclear structure properties. Systematic properties are investigated both as a guide in the evaluation procedure and as a means of gaining new insight into nuclear structure phenomena.

Critical evaluations of nuclear structure data pertaining to all nuclei with mass numbers 193 and 246 have been completed, and adopted data, levels, spin, parity and configuration assignments are presented in Nuclear Data Sheets **83**, 921 (1998) and Nuclear Data Sheets **84**, 901 (1998).

An extensive review of alpha decay data from all doubly-even nuclei has been completed and published in Nuclear Data Sheets **84**, 1 (1998). This evaluation includes recommendations for half-lives and decay branchings of parent nuclei, as well as energies and intensities of alpha radiations. Nuclear radius parameters for their daughter nuclei and alpha-hindrance factors are calculated. Based on systematic behavior of the calculated radius parameters, irregularities indicating incorrect data and their probable causes are discussed. This systematic study is utilized also to calculate some unmeasured properties of observed alpha transitions and to predict some nuclear properties, such as half-lives, branchings and alpha intensities, for yet unobserved alpha decays of some neutron-deficient nuclei. The radius parameters for odd and odd-odd nuclei (which are essential for hindrance factor calculations) are to be obtained from local trends of the radius parameters for even-even nuclei.

Evaluations of nuclear-structure data for nuclei with mass numbers 248, 249, 251, 252, 253, 255, 256, 257, 259, 260, 261, 263, 264, and 265 have been completed and transmitted to the Data Files at Brookhaven National Laboratory National Nuclear Data Center where the manuscripts have been prepared. These evaluations have not been reviewed.

The nuclear structure evaluation effort has been redirected, in accordance with recommendations of the 1998 Advisory Report, from the traditional mass-chain evaluations to horizontal evaluation of selective nuclear properties and/or selective nuclei, particularly nuclei in the far-from-stability regions.

¹Consultant