

AVERAGE DESCRIPTION OF DIPOLE GAMMA-TRANSITIONS IN ATOMIC NUCLEI

Vladimir A. Plujko

*Nuclear Physics Department, Taras Shevchenko National University,
Kyiv, Ukraine*

Average description of E1 gamma-transitions in atomic nuclei using the gamma-ray (phonon, radiative) strength functions (RSF) [1,2] are discussed.

Main features of microscopic and phenomenological descriptions of the RSF in dependence on energy range of gamma-transitions are considered. The effect of averaging parameter shape in folding procedure for calculations of the RSF by the use of microscopic methods without allowance of the 2p2h states is investigated.

The practical semi-phenomenological methods based on excitation of the isovector giant dipole resonance (GDR) at gamma-transitions [1-3] are overviewed. The effects of different mechanisms of GDR splitting are considered. The origin of dependences of RSF shape parameter ("width") on gamma-ray energy and the nuclear temperature is discussed. For the RSF measurements by the Oslo method, the effect of energy averaging at different excitation energies is studied.

The systematic expressions for the GDR parameters are proposed on the base of the renewed values and uncertainties of the GDR parameters [2]. The values of volume and surface coefficients of the symmetry energy are extracted from GDR energy systematic and they are compared with current data.

1. R. Capote, M. Herman, P. Oblozinsky, P.G. Young, S. Goriely, T. Belgya, A.V. Ignatyuk, A.J. Koning, S. Hilaire, V.A. Plujko, M. Avrigeanu, O. Bersillon, M. B. Chadwick, T. Fukahori, Zhigang Ge, Yinlu Han, S. Kailas, J. Kopecky, V. M. Maslov, G. Reffo, M. Sin, E. Sh. Soukhovitskii and P. Talou, Nucl. Data Sheets, 110 (2009) 3107;
<http://www-nds.iaea.org/RIPL-3/>
2. V. A. Plujko, R. Capote, O.M. Gorbachenko, At. Data Nucl. Data Tables, in press.
3. A.R. Junghans, G. Rusev, R. Schwengner, A. Wagner, E. Grosse, Phys. Lett. B670 (2008) 200.