

Level density of $^{59-64}\text{Ni}$ isotopes from lithium induced reactions

A.V. Voinov

Department of Physics and Astronomy, Ohio University, Athens OH 45701, USA

Needs for better nuclear level density systematic is an important problem for reaction cross section calculations as well as for evaluation of experimental data. Traditionally, the level density systematic is obtained from data on neutron resonance spacing. The known problems of such a procedure are unknown parity and spin distributions at the neutron binding energy as well as the shape of the level density function. This creates large uncertainties when converting the neutron resonance spacing to the total level density. The different experimental data on nuclear level densities come from particle evaporation spectra of compound nuclear reactions but data lack completeness to be suitable for any systematic conclusions.

We measured level densities of $^{59-64}\text{Ni}$ isotopes from proton evaporation spectra of $^{6,7}\text{Li}$ induced reactions. Experimental data are presented. Conclusions of how level density depends on the neutron number and on the degree of proximity to the closed shell (^{56}Ni) are drawn. The level density parameters have been compared with parameters obtained from the analysis of neutron resonances and from model predictions.