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Level densities of nickel isotopes: microscopic theory versus experiment[1] MARCO BONETT-MATIZ, Yale University, ABHISHEK MUKHERJEE, ECT*, YORAM ALHASSID, Yale University — The shell model Monte Carlo (SMMC) approach has enabled the microscopic calculation of nuclear level densities in model spaces that are many orders of magnitude larger than what can be treated with conventional diagonalization methods. The density calculated in the SMMC method is the *state* density, in which each level with spin J is counted $2J+1$ times. However, the experimentally measured density is often the *level* density, in which each level is counted just once irrespective of its $2J+1$ magnetic degeneracy. Recently our group introduced a spin projection method [1] that enables the direct calculation of the level density in the SMMC approach. We present an application of this method to a family of nickel isotopes $^{59\text{-}64}$Ni in the complete $pfg_{9/2}$ shell [2]. We find the calculated level densities to be in close agreement with level densities obtained from recent measurements of proton evaporation spectra [3] and from level counting data. We also compare our results with neutron resonance data.

[1] Y. Alhassid, M. Bonett-Matiz, S. Liu, and H. Nakada, arXiv:1304.7258.
[2] M. Bonett-Matiz, A. Mukherjee, and Y. Alhassid, arXiv:1305.0250.
[3] A. V. Voinov *et al.*, EPJ Web of Conferences **21**, 05001 (2012).

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