

# Drip line to drip line microscopic nuclear level densities

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New developments have been brought to our previously calculated energy-, spin- and parity-dependent nuclear level densities based on the microscopic combinatorial model [1]. Like in our previous study, a detailed calculation of the intrinsic state density and of rotational enhancement factor is included, but this time the vibrational contributions explicitly take the phonon excitations into account using a vibrational partition function instead of a phenomenological enhancement factor. This new model predicts the experimental s- and p-wave neutron resonance spacings with a degree of accuracy comparable to that of the best global models available and also provides reasonable description of low energies cumulative number of levels. The predictions are also in good agreement with experimental data obtained by the oslo group [2]. Total as well as partial level densities for more than 8500 nuclei are made available in a table format for practical applications, and for the nuclei for which experimental s-wave spacings and enough low-lying states exist, renormalization factors are also provided to reproduce simultaneously both observables.

[1] S. Hilaire and S. Goriely, Nucl. Phys. **A779** (2006) 63.

[2] A.C. Larsen et al., Phys. Rev. C **73** (2006) 064301 and references therein.