Drip-line to drip-line microscopic nuclear level densities

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New energy-, spin- and parity-dependent nuclear level densities based on the microscopic combinatorial model are proposed for practical applications. The combinatorial model includes a detailed microscopic calculation of the intrinsic state density and of the rotational enhancement factor, but a phenomenological treatment of the vibrational effect. The calculations make a coherent use of nuclear structure properties determined within the deformed Skyrme-Hartree-Fock-Bogolyubov framework.

The present model predicts the experimental s-wave and p-wave neutron resonance spacings with a degree of accuracy comparable to that of the best global models available. It is also shown that the model gives reliable extrapolations to low energies where experimental data on the cumulative number of levels can be extracted. Level densities for more than 8500 nuclei are made available in a table format for practical applications.