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Calculation of Nuclear Level Densities Near the Drip Lines
SHALEEN SHUKLA — Nuclear Level Densities are crucial inputs in the study of many physical processes spanning from Astrophysics to Nuclear Medicine. We focus on Nuclear Level Densities for nuclei that exist away from the valley of stability. The efforts to make these nuclei theoretically accessible involve a variety of theoretical and computational tools. Effective potentials and regular Quantum mechanical methods have been used to compute the single particle excitation energies of a neutron or a proton inside a nucleus. These single particle energy levels are then used as inputs in rigorous many-body calculations that formulate the nucleus as a gas of fermions. Our results show that nuclei near the drip lines can indeed be studied using the methods described here at least for $40 \leq A \leq 100$.

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