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Study of neutron rich Cadmium isotopes and the possible N=82 shell quenching

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The abundances of r-process nucleosynthesis in the mass $A=130$ region are largely affected by the nuclear structure properties around the $N=82$ magic number.

Some simulations show a better description of the abundances if a shell quenching of $N=82$ is assumed. In addition, the anomalous behavior of the experimental $2+$ excitation energies in neutron rich Cd isotopes has been interpreted as an indication of a reduction of the shell gap in this region. In this work we will study the spectroscopic properties of even-even Cadmium isotopes from $N=50$ to $N=82$ shells with beyond mean field methods. Our results reproduce nicely both the $2+$ energies and $B(E2)$ transitions without adjusting any parameter of the nucleon-nucleon force (Gogny D1S). Furthermore, we do not observe $N=82$ shell quenching and the anomalous behavior of the ^{128}Cd can be interpreted in terms slight deformation effects.

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