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Ground States and Isomers of Cadmium by High-Resolution Laser Spectroscopy

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We report on the first hyperfine-structure study of cadmium by high-resolution laser spectroscopy. The goal is to determine nuclear spins, electromagnetic moments and root mean square charge radii of ground and isomeric states along the chain, ultimately reaching the neutron 50 and 82 shell closures. In the first part of the program we studied the intense beams of $^{106-124,26}\text{Cd}$ by fluorescence spectroscopy, which also covered the β -decaying isomers in the odd $^{111-123}\text{Cd}$. The measurements determined the ground-state spins as being $1/2$, $3/2$, and $5/2$ in close relation with the corresponding single-particle orbitals. Evidence is found whether the isomeric configuration is $11/2^-$ in all isotopes. The data is sensitive to the changes in the degree of collectivity between the ground states and the isomers, not only from their quadrupole moments, but also through their charge radii. This enable a discussion in terms of shape coexistence. In this contribution we will present the preliminary results and their interpretation.

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