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SPINS, MOMENTS AND RADII OF 100-130Cd BY LASER SPECTROSCOPY

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We report on the first study of cadmium by high-resolution laser spectroscopy. Nuclear spins, electromagnetic moments and root mean square charge radii of ground and isomeric states have been determined along the chain, ultimately reaching the neutron 50 and 82 shell closures. These experimental data provide a solid basis for improving the nuclear-structure understanding in the vicinities of the doubly magic 100Sn and 132Sn. Specific questions, for instance the deformation of the cadmium isotopes, can now be resolved.

The measurements were carried out with the collinear laser spectroscopy setup at ISOLDE-CERN. For increased sensitivity the exotic species towards 100Cd and 130Cd were measured as bunched beams in an exotic atomic transition at 214 nm. The latter was achieved by a laser system for frequency quadrupling. This development could potentially give access to isotopic chains thus far unstudied due to atomic transitions deep in the UV spectrum.

Long-lived b- isomers are discovered in 127Cd and 129Cd. Spins and configurations are assigned to all observed states. The data reveal the relative degree of collectivity between ground and isomeric states, not only from their quadrupole moments, but through their charge radii as well.

In this contribution the experimental results and their preliminary interpretation will be presented in the context of the shell structure in the vicinity of Z=50 and its evolution towards the neutron 50 and 82 shell closures.

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