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Progress and Recent Results from Collinear Laser Spectroscopy at ALTO and ISOLDE-CERN

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For more than three decades collinear laser spectroscopy has been an essential instrument in the inquiries of the atomic nucleus with the ability to detect the nuclear electromagnetism, size, and angular momentum. At the foot of the 21st century a number of innovations have emerged, such as: multiple orders of magnitude background suppression by beam cooling and bunching, wavelengths ever closer to the elusive boundary of 200 nm, an application of a frequency comb for ultimate frequency calibration, and resonant laser ionization in collinear geometry. Much of the progress in the field has been associated with the successes in isotope production and purification at ISOLDE/CERN.

This contribution will report on the measurements of 100-130Cd. h11/2 isomers have been observed and characterized up to 129Cd. A comprehensive picture has emerged on the relative degree of collectivity between ground and isomeric states from a consistent analysis of charge radii and quadrupole moments. Highlights from recent measurements on the isotopes of potassium and cadmium will be presented as well.

Accélérateur Linéaire auprès du Tandem d'Orsay (ALTO) is an electron-driven ISOL system dedicated to the production of neutron-rich radioactive beams by the interaction of a 50-MeV-10-μA electron beam with a UCx target. Some 10^11 fissions/sec inside the target-ion source are utilized for the production of exotic radioactive beams. As such, ALTO is the first electron-driven photo-fission facility operated in the world. This contribution will offer a short overview of the local project for laser spectroscopy with emphasis on the development of laser-induced nuclear orientation for β-delayed spectroscopy.

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