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Laser spectroscopy at the frontiers of RIB production

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The nuclear electromagnetic moments and changes in the charge radius are sensitive tools to investigate phenomena emerging in short-lived isotopes. These properties, extracted from laser spectroscopy experiments, are often essential to critically examine our understanding of the nuclear structure, and its evolution towards the edges of the nuclear landscape. In this contribution, recent highlights will be presented from the Collinear Resonance Ionization Spectroscopy (CRIS) experiment at ISOLDE and the collinear laser spectroscopy setup at the IGISOL facility, focusing on exploring the sensitivity of the charge radii to changes in the nuclear structure.

New technical developments enabled the CRIS measurement of the neutron-rich ^{52}K and demonstrated the feasibility of spectroscopy on the isotope ^{34}Al as well. These results contribute to tackling the questions associated with the proposed magic number at $N=32$ in the calcium region and the island of inversion near $N=20$, respectively. Furthermore, at IGISOL the proton-rich isotopes below Ni ($Z=28$) were explored by performing the first laser spectroscopy of radioactive $^{48,49,51}\text{Cr}$ and $^{54-55,58}\text{Co}$. These results pave the way for measuring the properties of the isospin partners in self-conjugate ^{54}Co , and ^{53}Co together with its proton emitter isomer.

Primary authors: KOSZORUS, Agota (CERN); COLLABORATION, CRIS; COLLABORATION, IGISOL

Presenter: KOSZORUS, Agota (CERN)

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