

Nuclear structure studies using laser spectroscopy techniques at ISOLDE and IGISOL

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Understanding how nuclear properties emerge and evolve in regions with extreme proton-to-neutron ratios requires the measurements of different observables, which probe different aspects of the nuclear force. Laser spectroscopy techniques can provide accurate information on the nuclear spin, electromagnetic moments and the changes in the mean-square charge radii, thus probing both collective and single-particle aspects of the nuclear force [1]. One of the major foci of recent experimental campaigns has been the exploration of the isotopes in $f_{7/2}$ proton and neutron shells between Ca and Ni, as well as the light isotopes in the $N = Z$ region. In this contribution, recent highlights from these measurements obtained at both ISOLDE and IGISOL will be presented. These newly collected data on radioactive Fe, Co and Cr highlight that nuclear charge radii below $N = 28$ display high sensitivity to the changes in the nuclear structure, while above it very similar radius trends are observed [2]. Meanwhile, the $N = Z$ isotopes feature isomers whose radii are underestimated by state-of-the-art theory [3]. Finally, ongoing and planned developments which aim at extending laser spectroscopy measurements ever further from stability will also be discussed.

- [1] X.F. Yang *et al.*, Progress in Particle and Nuclear Physics **129** (2022) 104005.
- [2] M. Kortelainen *et al.* Physical Review C **105.2** (2022): L021303.
- [3] Á.Koszorús *et al.*, Physics Letters B **819** (2022) 136439.