

Nuclear charge radii in the Calcium-Nickel region

Kristian König – TU Darmstadt

The measurement of charge radii via electron scattering and X-ray spectroscopy or relative measurements via high precision laser spectroscopy are well established methods to investigate the nuclear structure. Particular interest is devoted to nuclear shell closures, which generally manifest in kinks of the charge radius evolution across an isotopic chain. Due to the two shell closures at 20 and 28 and the three doubly magic nuclei $^{40,48}\text{Ca}$ and ^{56}Ni , the Calcium-Nickel region is highly interesting for nuclear studies.

In this talk collinear laser spectroscopy measurements on the neutron deficient $^{54,55,56}\text{Ni}$ and $^{40,41}\text{Sc}$ isotopes performed at the BEam COoler and LAser (BECOLA) spectroscopy facility at NSCL/ FRIB will be presented, which aimed to address the soft nature of doubly-magic ^{56}Ni and to investigate the $N=20$ shell closure, respectively. The results will be discussed, which include the surprising reestablishment of the $N=20$ kink structure that is absent in Ar, K and Ca but now appears in Sc. Furthermore, a new approach for an all-optical charge radius determination in He-like light ions will be discussed. The first results from collinear laser spectroscopy measurements on C^{4+} at TU Darmstadt will be presented.