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Electromagnetic moments and radii near N =32,34

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On behalf of the COLLAPS and CRIS collaborations at ISOLDE-CERN.
Nuclei in the neighborhood of calcium isotopes play a key role in the development of many-body methods and provide an important test for current descriptions of the nuclear force. The properties of stable nuclei in the vicinity of the two naturally occurring doubly-magic calcium (Z =20) isotopes, ^{40}Ca (N =20) and ^{48}Ca (N =28), have been extensively studied, both experimentally and theoretically. Recently, special attention has been given to the evolution of nuclear structure in exotic neutron-rich isotopes beyond N =28, where evidence of doubly-magic features have been reported at N =32 [1] and N =34 [2]. This contribution presents the latest results obtained with laser spectroscopy in the region. Measurements of the hyperfine structure spectra and isotope shifts for the potassium (Z =19) and calcium (Z =20) isotopic chains were obtained by using optical detection at COLLAPS, ISOLDE-CERN. From these measurements, our knowledge of nuclear ground-state spins, ground-state electromagnetic moments and changes in the root-mean-squared charge radii has been extended up to N =32 [3-7].
With relatively low production yields, the isotopes ^{51}K (˜4000 ions/s) and ^{52}Ca (˜250 ions/s) are at the limit of optical detection techniques. In order to extend laser spectroscopy studies further away from stability, a highly sensitive experimental setup has been developed at the COLLAPS beam line [8,9]. The current developments in this direction and the perspectives for future experiments using collinear resonance ionization spectroscopy (CRIS) [10,11] in the region towards N =34 will be discussed.
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