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In gas laser ionization and spectroscopy of actinium isotopes

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The knowledge of ground-state properties around the neutron shell closure N=126 are of great importance in order to understand the nuclear structure of heavy nuclei. They give the opportunity for testing nuclear models in the region where single particle character appears to be the key factor describing, for instance, the nuclear configuration in francium and bismuth isotopes.

In order to extend the understanding of the nuclear structure in this region, resonant ionization spectroscopy of {212-215,225,227}Ac was performed for the first time. {212-215}Ac were investigated in the gas cell-based laser ion source at the LISOL facility while {225,227}Ac were studied in the hot-cavity laser ion source setup at TRIUMF. Isotope shifts, magnetic dipole moments and tentative spin assignments of the nuclear ground-state for the chain of isotopes will be reported.

Recent experiments on {214,215}Ac at the LISOL facility using the novel in-gas-jet laser spectroscopy technique on short lived species will be reported. The results have allowed increasing the spectral resolution by a factor of 20 with a comparable overall efficiency to that obtained by the in-gas-cell technique. From these data spin, magnetic dipole moments and also electric quadrupole moments will be reported and compared with theoretical calculations.

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