Nuclear Moments of the Neutron-Deficient Lanthanum Isotopes by Collinear Laser Spectroscopy

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— The hyperfine-structure-splitting constants and isotope shifts of the 6s² 1S₀-5d6p 3D₁ (λ=538 nm) and 5d² 3P₂-5d6p 1D₂ (λ=548 nm) transitions of singly charged lanthanum ion have been measured by collinear laser-ion-beam spectroscopy for the neutron-deficient isotopes ¹³⁵La, ¹³⁷La, and ¹³⁸La. The magnetic moments and quadrupole moments of the ground states of these isotopes have been determined from the measurements. The ratio of the magnetic dipole coupling constants A(138)/A(139) of the level 5d6p 3D₁ has shown a -0.35(23)% hyperfine anomaly with respect to the NMR ratio of the nuclear g factors. These moments and the changes in the mean-square nuclear charge radii determined from the isotope shifts are compared with theoretical predictions. Work to measure more neutron-deficient lanthanum isotopes is in progress by our laser spectroscopy collaboration at the ISAC facility at TRIUMF.