Excitation of the 5p-8p Electric Quadrupole Transition in Cold Rb Atoms

RICO PIRES, MARCO ASCOLI, EDWARD EYLER, PHILIP GOULD, University of Connecticut — We have observed the electric-dipole (E1) forbidden, but electric-quadrupole (E2) allowed, 5p-8p transition in a sample of ultracold ⁸⁷Rb atoms. The 5p₃/₂ level is populated by a diode laser at 780 nm, while the 5p₃/₂ to 8p₁/₂,3/₂ transition is driven with a dye laser at 587 nm. We have performed the experiment both with cw dye laser excitation and with pulsed amplification (~7 ns) of this cw light. In both cases, the 8p atoms are detected by pulsed photoionization. With cw excitation, we can easily resolve the 5p and 8p hyperfine structures. By comparing transitions from the 5p₃/₂, F' = 0 level to 8p₁/₂,3/₂ levels with F'' = 1 and 2, we can set a limit on the weak magnetic-dipole (M1) contribution to the transition strength.¹ This work is supported by NSF.