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Autler-Townes Effect in Rydberg Excitation of Metastable He Atoms[1] S-H. LEE, K. CHOI, J. KAUFMAN[2], A. VERNALEKEN[3], O. KRITSUN[4], H. METCALF, Physics, Stony Brook University, NY 11794-3800 USA — We have studied the Autler-Townes (AT) effect in the two-step excitation of He atoms from the metastable 2^3S_1 state (He*) that serves as an initially populated ground state in an atomic beam (He* is produced in a dc discharge source). A relatively strong blue laser (λ = 389 nm) couples this He* state to the 3^3P_2 state, which in turn can be excited to the 26^3S_1 Rydberg state by a relatively weak red laser (λ = 796 nm) that serves as a probe. Keeping the laser frequencies fixed, we exploit the large Stark shift of the Rydberg state to measure the AT splitting of the 3^3P_2 state *vs.* the intensity of the 389 nm light. We do this by scanning a weak dc electric field (few V/cm) and observing the AT effect through the subsequently ionized Rydberg atoms using an ion detector located just downstream of the field plates (the scan amplitude exceeds the AT splitting). We compare our experimental results with a dressed atom picture of the AT effect.

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