

Abstract Submitted
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Microwave Spectroscopy of High-L n=10 Rydberg Levels of Argon¹ MARK E. HANNI, JULIE A. KEELE, S.R. LUNDEEN, Colorado State University, W.G. STURRUS, Youngstown State University — Using the RESIS/microwave method [1], we have determined the relative positions of the twenty fine structure levels with $L \geq 5$ in the n=10 Rydberg manifold bound to the $^2P_{3/2}$ ground state of the Ar^+ ion. The typical measurement precision (± 0.03 MHz) is approximately a factor of 1000 better than a recent study of similar levels by optical spectroscopy [2]. By comparing the measurements to the predictions of the long-range polarization model, several properties of the Ar^+ ion can be determined, including its scalar and tensor dipole polarizabilities, its quadrupole moment, and its g-factor. Also determined, but with less precision, are its quadrupole polarizability and its vector hyperpolarizability [3].

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Stephen Lundeen
Colorado State University

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