Abstract Submitted
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Microwave Spectroscopy of High-L, n=10 Rydberg states of Silicon[1] R.A. KOMARA, E.L. SNOW, M.A. GEARBA, S.R. LUNDEEN, Colorado State University, C.W. FEHRENBACH, Kansas State University — Using the RESIS/microwave technique [1], we have measured two fine structure intervals between high-L, n=10 Rydberg states of Silicon. A fast Si beam was obtained from an 8 keV Si^+ beam by charge exchange in an n=10 Rb Rydberg target. Individual n=10 Rydberg levels with L=6-9 were selectively detected by upwards excitation to n=31, using a Doppler tuned CO_2 laser, followed by Stark ionization of the n=31 level and collection of the resulting ions. This L-selective detection was then used to detect microwave-induced transitions from L=7 to L=8 and from L=8 to =9. The measured intervals give a much improved determination of the dipole polarizability of the ground state of Si^+,($3p\ ^2P_{1/2}$). An unexpected observation is the large "spin-splitting" between the two levels formed by coupling J_c to L. The observed splittings are more than an order of magnitude larger than expected from magnetic interactions. [1] R.A. Komara, M.A. Gearba, C.W. Fehrenback and S.R. Lundeen, J. Phys. B: At. Mol. Opt. Phys. **38** S87 (2005).

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