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Microwave ionization of non-hydrogenic Rydberg atoms[1] H. MAEDA, T.F. GALLAGHER, Department of Physics, University of Virginia, 382 McCormick Road, Charlottesville VA 22904-4714 — We have studied ionization of Li np and Sr $5snd$ Rydberg states, whose quantum defects are 0.05 and 2.3, respectively, by linearly polarized, 17.5-GHz pulsed microwave fields where scaled microwave frequencies $\Omega(= n^3\omega$ in which ω is microwave angular frequency) are nearly equal to or larger than the classical Kepler frequencies of the Rydberg electron, $1/n^3$ (a.u.). Our measurements show that threshold fields of ionization of Li np and Sr $5snd$ states coincide with each other within experimental errors in the high scaled frequency region in spite of the different sizes of the ionic cores. The ionization thresholds manifest global monotonical increases in the scaled plot, verifying quantum suppression of classical diffusive ionization of non-hydrogenic atoms in this regime. We also report the dependence of ionization thresholds of Li np states on the microwave pulse width and frequency, and the existence of local structures which are observed at several sub-harmonic resonances above $\Omega = 1$, and effects of frequency chirp on MW ionization at high frequency region.

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