

Abstract Submitted
for the DAMOP06 Meeting of
The American Physical Society

Orbital dynamics of two-electron atoms in a static electric field probed by scaled energy spectroscopy J. MURRAY-KREZAN, J. KELLY, M.R. KUTTERUF, R.R. JONES, Department of Physics, University of Virginia — Photoabsorption spectra for Ba and Ca Rydberg atoms are measured as a continuous function of electric field strength and electron energy. In both Ba and Ca, the singly-excited *msnd* series are strongly perturbed by doubly-excited configurations. Using scaled energy recurrence spectroscopy, we investigate the dynamical signatures associated with the spectral variations observed in perturbed Rydberg series, namely oscillator strength modulation and energy-dependent quantum defects. In Ca, small shifts in the Kepler period, conspicuous at large action are attributed to the broad *3d5s* and *3d3d* perturbing resonances. In Ba, splittings in the primary recurrence peaks are observed only if the recurrence spectra are measured at energies near the narrow *5d7d* perturber. These splittings reflect the time delay between electron scattering into and back out of the doubly-excited configuration and are consistent with measurements by Bates *et al.*[Phys. Rev. A **64**, 033409 (2001)]. Our observations suggest that, in general, the dynamical consequences of interactions between low angular momentum. This work has been supported by the NSF.

Robert R. Jones

Date submitted: 23 Feb 2006

Electronic form version 1.4