Abstract Submitted
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**Scaled Energy Spectroscopy of Collisionally Perturbed Potassium Rydberg States**[1] MATTHEW LEN KEELER, WILLIAM SETZER, University of Minnesota, Morris — We will present preliminary results on the recurrence spectroscopy (or scaled energy spectroscopy) of highly-excited potassium in the presence of collisional perturbations. Recurrence spectroscopy, with the aid of closed orbit theory, has produced useful insights into the semi-classical description of non-hydrogenic spectral features of excited atoms in external fields. We demonstrate how to apply recurrence spectroscopy to the Stark spectrum of potassium subject to collisional line-shift and line-broadening. When krypton gas is added to the system the absorption spectrum experiences line broadening, differential line shifts, and state mixing. With an appropriately modified energy scale, perturbations of the absorption spectrum become meaningful features within the scaled-energy spectrum. New features found within the recurrence spectra can then, with semi-classical closed orbit theory, be interpreted in terms of classical decoherence, elastic and inelastic collisions.

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