Abstract Submitted
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Progress toward measuring the ^{85}Rb ng-series quantum defect using $\Delta l = 0$ microwave spectroscopy[1] KAITLIN MOORE, GEORG RAITHEL, University of Michigan — We describe progress toward a new measurement of the ^{85}Rb ng-series quantum defect via two-photon microwave spectroscopy of a $\Delta l = 0$ transition using cold Rydberg atoms. Past efforts have used resonant energy transfer[2] and preliminary microwave spectroscopy of a $\Delta l = 2$ transition[3], yielding $\delta_g(n = 30) = 0.00405(6)$ and $\delta_g = 0.00400(9)$, respectively. By performing a $\Delta l = 0$ measurement, we hope to eliminate uncertainties due to lower-l-state quantum defects and differing Landé-g factors and thereby achieve an improved precision. Preliminary measurements will be presented, including efforts at resolving fine structure in the spectrum. Applications of this high-l measurement method toward experimentally determining the dipole and quadrupole core polarizabilities of ^{85}Rb will be discussed, including comparisons with calculated values[4],[5] and preliminary experimental limits[3], which yield inconsistent results for the dipole polarizability value.

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Kaitlin Moore
University of Michigan

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