Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Measurement of AC polarizability and photoionization cross section of the Rb $5D_{3/2}$ state in a 1064 nm optical lattice[1] RYAN CARDMAN, JAMIE L. MACLENNAN, Univ of Michigan - Ann Arbor, XIAOXUAN HAN, Shangxi University, GEORG RAITHEL, Univ of Michigan - Ann Arbor — We perform measurements of the AC polarizability and photoionization cross section for the $5D_{3/2}$ state of ultracold ^{85}Rb in a cavity-enhanced optical lattice. An in-vacuum cavity, with a finesse of 600, enhances the 1064 nm light field and results in $\sim$GHz-deep AC-Stark shifts on the $5S_{1/2} \rightarrow 5P_{1/2}$ (795 nm) and $5P_{1/2} \rightarrow 5D_{3/2}$ (762 nm) transitions. The two excitation lasers are scanned through the AC-Stark-shifted resonances while phase-locked to lasers stabilized to atomic references. Atoms are photoionized by the 1064 nm field, and the resulting ions are then collected with a micro-channel plate detector (MCP). A two-dimensional map of the ion counts is then analyzed with the known AC polarizabilities of the $5S_{1/2}$ and $5P_{1/2}$ states and with the D1 hyperfine structure. This analysis yields the resulting AC polarizability for $5D_{3/2}$. Measured linewidths of the spectra are used to extract the photoionization cross section.

[1]NSF Grant No. PHY1806809

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Date submitted: 31 Jan 2020 Electronic form version 1.4