Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Observation of Rydberg excitation blockade effects in strongly magnetized atom clouds[1] E. PARADIS, K.C. YOUNGE, S. ZIGO, G. RAITHEL, University of Michigan, FOCUS center — We report on observations of a Rydberg excitation blockade within a strong magnetic field (B = 2.6 T). In this system, either permanent electric quadrupole moments or induced electric dipole moments can provide a strong interaction between neighboring Rydberg atoms, leading to an excitation blockade. The diamagnetic Rydberg states generated by the high-magnetic-field are well suited for this research because they are non-degenerate and have large oscillator strengths for photo-excitation. Rydberg states of laser-cooled Rb atoms are populated using narrow-band laser excitation ($<$ 5 MHz, variable pulse width). The blockade is measured through saturation of the observed number of Rydberg excitations as a function of laser power. The high-magnetic-field setup also affords high spatial resolution when reading out the Rydberg excitations present in the sample. This enables us to search for deviations of the spatial distribution of the detected Rydberg excitations from random ordering.

[1]We acknowledge funding from the DoE.

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Date submitted: 26 Jan 2010 Electronic form version 1.4