

Abstract Submitted  
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**Imaging spatial correlations of Rydberg excitations in cold atom clouds**<sup>1</sup> ANDREW SCHWARZKOPF, DAVID ANDERSON, GEORG RAITHEL, Univ. of Michigan — We measure correlations between excitation positions in cold Rydberg gases. We have previously observed<sup>2</sup> Rydberg-blockade-induced structures in the Rydberg pair correlation function similar to those predicted in.<sup>3</sup> Here, we study the effect of Coulomb repulsion after field ionization, which could possibly influence the pair correlation measurement. We have simulated the ion trajectories in our chamber and determined that Coulomb repulsion did not play a role in any of our previous experiments. However, with higher magnification we expect to observe this effect as well. In the experiment, we already have obtained a magnification increase by about a factor of two, and progress towards even higher magnification is still being made. We will report on our progress in imaging smaller structures in the pair correlation function, induced by Coulomb repulsion and possibly by adiabatic Rydberg crystal formation.<sup>4</sup>

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<sup>2</sup>A. Schwarzkopf et al. Phys. Rev. Lett. 107, no. 10 (2011): 103001.

<sup>3</sup>F. Robicheaux and J. Hernandez. Phys. Rev. **A 72**, 63403, 1-4 (2005).

<sup>4</sup>T. Pohl et al. Phys. Rev. Lett. 104, no. 4 (January 27, 2010): 043002.

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