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**The effect of a rotary echo on the correlation function of interacting Rydberg atoms** NITHIWADEE THAICHAROEN, University of Michigan, Ann Arbor, ANDREW SCHWARZKOPF, zeroK NanoTech Corporation, Gaithersburg, MD 20878, USA, GEORG RAITHEL, University of Michigan, Ann Arbor —
We use a direct spatial imaging technique to study rotary-echo effects on the pair correlation function of interacting rubidium Rydberg atoms. The echo is achieved by inverting the phase of the Rydberg-atom excitation pulse at selected times during the pulse. The resultant rotary excitation echo depends on the interplay between atom-field detuning and van-der-Waals interactions of Rydberg-atom pairs. In the on-resonant case, the rotary echo enhances the pair correlation function at distances near the blockade radius. As predicted previously [1], this is because un-paired Rydberg excitations are de-excited back to a ground state due to the echo, leaving pair-excitations, whose energies are shifted by the van-der-Waals interaction, to be detected. In the case of off-resonant excitation, we have identified a complementary case in which simultaneously excited Rydberg-atom pairs undergo the echo, leaving un-paired Rydberg excitations to be detected.

[1] Phys. Rev. A 81, 023406 (2010)

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