Abstract Submitted
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Magnetic trapping of high-angular-momentum Rydberg atoms in strong magnetic fields[1] J.-H. CHOI, J. R. GUEST[2], A. P. POVILUS, E. HANSIS, G. RAITHEL, Focus Center, Department of Physics, University of Michigan, Ann Arbor, Michigan 48109-1120 — We report on both the generation and magnetic trapping of high-angular-momentum Rydberg atoms in strong magnetic fields. Clouds of ^{85}Rb atoms are laser-cooled and trapped in a high-magnetic-field optical molasses and magnetic trap with bias fields of a few Tesla. Long-lived drift-state Rydberg atoms are generated via laser excitation into Rydberg states followed by electron-Rydberg-atom collisions and other collisions in the Rydberg atom gas. Electric-field-ionization detection indicates the presence of long-lived, trapped drift-state Rydberg atoms at delay times of up to 200 ms after the initial excitation. We have studied the dynamics of the trapped Rydberg atoms, and observed initial transient sloshing-type and breathing-mode oscillations. The trapped Rydberg-atom cloud gradually expands, probably due to heating caused by Rydberg-atom collisions.

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