Trapping of Rydberg Atoms in Strong Magnetic Fields

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We report on the trapping of long-lived Rydberg atoms, extending the trapping frontier to include highly-excited atomic species. In our experiment, 85-Rb atoms are collected and laser-cooled in a cryogenic chamber at a magnetic field of 3T, excited into highly magnetized Rydberg states, and probed using time-delayed, position-sensitive detection. A fraction of the atoms evolves into long-lived ExB drift atoms. We observe magnetic trapping of drift Rydberg atoms for times up to 200ms.Employing measurements of oscillations of the atoms in the trap, we observe an average magnetic moment of the trapped atoms of about 8 Bohr magnetons.