A Rydberg-dressed Magneto-Optical Trap

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We propose and demonstrate the laser cooling and trapping of Rydberg-dressed Sr atoms. By off-resonantly coupling the excited state of a narrow (7 kHz) cooling transition to a high-lying Rydberg state, we transfer Rydberg properties such as enhanced electric polarizability to a stable magneto-optical trap operating at <1μK. By increasing the density to 1 × 1012 cm-3 we show that it is possible to reach a regime where the long-range interaction between Rydberg-dressed atoms becomes comparable to the kinetic energy, opening a route to combining laser cooling with tunable long-range interactions.

- H2020 [2]
- RySQ [3]
- FP7 [4]
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