

Abstract Submitted
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Efficient broadband de-excitation of Rydberg atoms with half-cycle pulses KOUROSH AFROUSHEH, ANDREW SPECK, Rowland Institute at Harvard — We report on progress towards demonstrating population redistribution of Rydberg atoms using a train of unipolar terahertz bandwidth pulses (half-cycle pulses) as initially proposed by Hu and Collins [1]. In principle this broadband technique should allow the efficient de-excitation of antihydrogen atoms from the currently produced mix of excited states to the ground state which is a necessary prerequisite for a CPT comparison with hydrogen. Here a cloud of ultracold ^{85}Rb atoms are excited to a Rydberg state with $n \approx 40$, allowed to interact with an 80 MHz pulse train of half-cycle pulses, and then the final state distribution is measured. Initial demonstrations of the techniques used for the generation of half-cycle pulses and Rydberg atom production will be described.

[1] S. X. Hu and L. A. Collins, Phys. Rev. A 69, 041402 (2004).

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