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Coherent control of single atom Rydberg excitation[1] TODD JOHNSON, ERICH URBAN, THOMAS HENAGE, LARRY ISENHOWER, DENIZ YAVUZ, THAD WALKER, MARK SAFFMAN, University of Wisconsin — We demonstrate Rabi flopping of cold Rb atoms between ground state and Rydberg levels as high as n=43 with a Rabi frequency of 0.5 MHz. A double pulse experiment is used to demonstrate coherence of an atom left for a short time in a Rydberg level, which is an important step towards a neutral atom quantum gate. Rabi flopping with more than one atom is shown to dephase rapidly due to dipole-dipole interactions between atoms.

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