Abstract Submitted
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Redistribution of atomic population among nearly degenerate Rydberg states through dipole-dipole interactions[1] THOMAS J. CARROLL, Ursinus College, DONALD P. FAHEY, MICHAEL W. NOEL, Bryn Mawr College, ALEX MELLUS, JON WARD, Ursinus College — Ultra-cold highly-excited atoms in a magneto-optical trap are strongly coupled by the dipole-dipole interaction. Rubidium atoms that have been excited to the $32d_{5/2}$, $|m_j| = 1/2$ sublevel can exchange energy when an applied static electric field tunes the Stark states into resonance. They do so via the densely packed set of resonant interactions 32d+32d→34p+30g near 0.3 V/cm. Atoms that have exchanged energy and are now in the final p and manifold states can be coupled to a resonance involving $32d_{5/2}$, $|m_j| = 3/2$ and $1/2$ states, which redistributes population among the $|m_j|$ sublevels. We present experimental and computational studies that investigate this redistribution.

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