

Abstract Submitted
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Oscillations in dipole-dipole transitions from nearly degenerate Rydberg states¹ DONALD P. FAHEY, MICHAEL W. NOEL, Bryn Mawr College, THOMAS J. CARROLL, Ursinus College — Pairs of ultracold highly excited atoms can exchange energy over long distances through a dipole-dipole coupling. We present an experimental study of the time dependence of this interaction. Rubidium atoms in a magneto-optical trap are impulsively excited to a coherent superposition of three closely spaced (<10 MHz) $32d_{5/2}$ $|m_j|$ sublevels. An electric field is used to control the $|m_j|$ Stark splitting. Atoms are allowed to exchange energy according to $32d+32d\rightarrow 34p+30f$, and the distribution of final states is measured using state selective field ionization. As the time between excitation and ionization is varied, oscillations in the energy exchange are observed. The period of these oscillations is seen to decrease as the initial $|m_j|$ state separation is increased.

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