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Inducing Resonant Interactions in Ultracold Atoms with an Oscillating Magnetic Field[1] D. HUDSON SMITH, The Ohio State University — In systems of ultracold atoms, two-atom interactions can be resonantly enhanced by a new mechanism which does not rely upon the presence of a Feshbach resonance. In this mechanism, interactions are controlled by tuning the frequency of an applied oscillating magnetic field near the Bohr frequency corresponding to the energy gap between a pair of low-energy atoms and a two-atom bound state. Near the resonance, the s-wave scattering length is a simple function of the oscillation frequency whose asymmetric line-shape is similar to that of Feshbach resonances. Atom pairs can absorb (emit) quanta from (to) the oscillating field leading to inelastic losses. This mechanism for inducing resonant interactions is illustrated using two simple models, from which the dependencies of the resonance parameters on the strength of oscillating field are extracted. This mechanism gives experimental access to strongly interacting systems of atoms that have no convenient Feshbach resonance.

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