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Coherent Population Exchange between BCS Atom Pairs and Ground Molecular BEC Atom Pairs ANDREW ROBERTSON, HONG LING, Rowan University — Two fermionic atoms of opposite spins (represented by the hyperfine Zeeman sublevels) can be combined either into a molecule highly localized in real space or into a Bardeen-Cooper-Schrieffer (BCS) pair highly correlated in momentum space. In an attractive fermionic system with atoms of opposite spins, we show that the simultaneous presence of a Feshbach resonance and an optical laser coupling can lead to a coherent superposition between the ground molecular state and the BEC state. By optically perturbing the system, we demonstrate numerically stable coherent atom-molecule oscillations.

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