

Abstract Submitted
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Coherent Population Trapping in Quantum Gas of Fermions¹ ANDREW ROBERTSON, Department of Physics and Astronomy, Rowan University, Glassboro, New Jersey 08028-1700, LEI JIANG, HAN PU, Department of Physics and Astronomy, and Rice Quantum Institute, Rice University, Houston, TX 77251-1892, WEIPING ZHANG, Department of Physics, East China Normal University, Shanghai 200062, P. R. China., HONG LING, Department of Physics and Astronomy, Rowan University, Glassboro, New Jersey 08028-1700 — Coherent population trapping (CPT) is an important concept and a well known phenomenon in quantum optics. We generalize this concept from systems in quantum optics to systems in ultracold atomic physics. We consider a specific system, which is derived by introducing, in the usual BEC-BCS crossover model involving Feshbach resonance, an optical coupling between the ground and excited molecular states. We present the conditions under which a CPT superposition between the ground molecular BEC and the BCS pairing state can be formed. We take advantage the tunability offered by both magnetic and optical fields, and explore this superposition for the purpose of converting the BCS pairs into ground molecular BECs as well as demonstrating coherent oscillations between ground molecules and BCS atom pairs.

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