

Abstract Submitted
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Cavity Optomechanics with synthetic Landau levels of ultra cold Fermi gas¹ SANKALPA GHOSH, BIKASH PADHI, Physics Department, Indian Institute of Technology, Delhi — Ultra cold fermionic atoms placed in a synthetic magnetic field arrange themselves in Landau levels. We theoretically study the optomechanical interaction between the light field and collective excitations of such fermionic atoms in synthetic magnetic field by placing them inside a Fabry Perot cavity. We derive the effective hamiltonian for particle hole excitations from a filled Landau level using a bosonization technique and obtain an expression for the cavity transmission spectrum. Using this we show that the cavity transmission spectrum demonstrates cold atom analogue of Subnikov de Hass oscillation in electronic condensed matter systems. We discuss the experimental consequences for this oscillation for such system and the related optical bistability. Ref. Bikash Padhi and Sankalpa Ghosh, Physical Review Letters, Vol 111, 043603 (2013)

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