

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

The electromagnetic field induced excitation of magnons in spin-orbit coupled Mott insulators ROHIT HEGDE, ALLAN MACDONALD, University of Texas, Austin — The spin-only description of the Hubbard model's low-energy states belies an active charge degree of freedom that can in principle couple to external electromagnetic fields. The precise way in which the charge and current densities manifest in the spin sector is constrained when the electronic system possesses $SU(2)$ spin-rotational symmetry, thus limiting the response to electric and magnetic fields. This constraint lifts in the presence of spin-orbit coupling, leading to the emergence of novel responses like that of an electron's spin to an external magnetic field resulting from induced orbital currents in addition to the usual direct Zeeman coupling. Magnons mediate the linear response of electrons to time varying fields of low-frequency ($\hbar\omega \ll U$). We study the electric and magnetic susceptibilities of single band Hubbard models with spin-dependent hopping on various lattices, and comment on the applicability to magnetically ordered materials like the iridates.

Rohit Hegde
University of Texas, Austin

Date submitted: 14 Nov 2014

Electronic form version 1.4