Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

**Boson Hubbard model with weakly coupled fermions**[1] SUMANTA TEWARI, Department of Physics, Clemson University, Clemson, SC, ROMAN LUTCHYN, Condensed Matter Theory Center (CMTC) and Joint Quantum Institute (JQI), Department of Physics, University of Maryland, College Park, MD, SANKAR DAS SARMA, Condensed Matter Theory Center, Department of Physics, University of Maryland, College Park, MD — Using an imaginary-time path integral approach, we develop the perturbation theory suited to the boson Hubbard model, and apply it to calculate the effects of a dilute gas of spin- polarized fermions weakly interacting with the bosons. The full theory captures both the static and the dynamic effects of the fermions on the generic superfluid-insulator phase diagram. We find that, in a homogenous system described by a single-band boson Hubbard Hamiltonian, the intrinsic perturbative effect of the fermions is to suppress the Mott insulating lobes and enhance the superfluid phase.

[1]Work supported by ARO-DARPA

Sumanta Tewari
Department of Physics, Clemson University, Clemson, SC

Date submitted: 21 Nov 2008 Electronic form version 1.4