Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Quantum Monte Carlo study of the superconductor-insulator transition in the dual vortex representation[1] HASAN KHAN, The Ohio State University, SNIR GAZIT, University of California, Berkeley, MOHIT RANDERIA, NANDINI TRIVEDI, The Ohio State University — The superconductor-insulator transition (SIT) in two dimensions is a paradigm for quantum criticality that has been observed experimentally in Josephson junction arrays, superconducting thin films, and cold atoms trapped in an optical lattice. The conventional picture of the transition is in terms of the condensation of bosonic degrees of freedom (Cooper pairs in superconductors). Interestingly, the transition has a dual description, where the insulating phase is a Bose condensate of vortices. We study the SIT numerically by means of a large-scale quantum Monte Carlo (QMC) simulation in the vortex representation. This provides direct access to both the boson and vortex degrees of freedom and allows us to numerically test the duality and quantify deviations from self-duality. Our main focus is on critical properties such as the vortex and the boson phase stiffness. We compare our results to previous studies in the bosonic representation.

[1]We acknowledge support from Grant DOE-BES DE-FG02-07ER46423 (HK, NT).

Hasan Khan
Ohio State Univ - Columbus

Date submitted: 11 Nov 2016 Electronic form version 1.4