Superfluid and Transport Properties of Disordered Bose Gases in Two Dimensions

M. Holzmann[1,2]

[1] *LPMMC, CNRS, Grenoble, France*
[2] *LPTMC, CNRS, Universit Pierre et Marie Curie, Paris, France*
markus@lptl.jussieu.fr

We discuss the normal to superfluid transition of two-dimensional Bosons under the influence of a correlated disorder potential in parameter regimes directly relevant to experiments [1]. Using path-integral Monte Carlo calculations we establish the phase diagram for homogeneous systems. We further calculate the conductivity and characterize the insulating behavior at large disorder strength. Our calculation indicates that the conductance always exhibits a thermally activated behavior vanishing only at zero temperature [2].

[1] B. Allard, T. Plisson, M. Holzmann, G. Salomon, A. Aspect, P. Bouyer, and T. Bourdel, Phys. Rev. A**85**, 033602 (2012).
[2] G. Carleo, G. Boeris, M.Holzmann, and L.Sanchez-Palencia, Phys. Rev. Lett. **111**, 050406 (2013).