

CONDENSED MATTER THEORY SEMINAR

Subject: **Disordered one-dimensional Bose fluid**

Speaker: **Nicolas Dupuis (Laboratoire de Physique Théorique de la Matière Condensée Sorbonne Université & CNRS)**

Date & time: **Friday, November 27th 2020 at 3:15 p.m.**

Venue: **Online Seminar**

In a one-dimensional Bose fluid, disorder can induce a quantum phase transition between a superfluid phase (Luttinger liquid) and a localized phase (Bose glass). Using bosonization, the replica method and a nonperturbative functional renormalization-group approach, we find that the Bose-glass phase is described by a fully attractive strong-disorder fixed point characterized by a singular disorder correlator whose functional dependence assumes a cuspy form. This reveals the glassy properties (pinning, "shocks" and "avalanches") due to the existence of metastable states, as well as the crucial role of quantum tunneling between different metastable configurations. We also show that long-range interactions can stabilize a Mott glass, i.e. a state intermediate between a Mott insulator and a Bose glass, and characterized by a vanishing compressibility and a gapless optical conductivity.