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Theory of quantum matter

Jeudi 8 Décembre 2022, 14 :00
LPTHE, INSP Jussieu towers 22-23 room 3-17
Domaines : cond-mat

Titre : *One-dimensional disordered Bose fluid : from Bose glass to Mott glass*

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Résumé : *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.*