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Influence of thermal fluctuations on quantum phase transitions in 1D disordered systems: CDWs and Luttinger liquids THOMAS NATTERMANN, ANDREAS GLATZ — The low temperature phase diagram of 1D weakly disordered quantum systems like charge or spin density waves and Luttinger liquids is studied by a *full finite temperature* renormalization group (RG) calculation. For vanishing quantum fluctuations this approach is amended by an *exact* solution in the case of strong disorder and by a mapping onto the *Burgers equation with noise* in the case of weak disorder, respectively. At *zero* temperature we reproduce the quantum phase transition between a pinned (localized) and an unpinned (delocalized) phase for weak and strong quantum fluctuations, respectively, as found previously by Fukuyama or Giamarchi and Schulz. At *finite* temperatures the localization transition is suppressed: the random potential is wiped out by thermal fluctuations on length scales larger than the thermal de Broglie wave length of the phason excitations. The existence of a zero temperature transition is reflected in a rich cross-over phase diagram of the correlation functions. In particular we find four different scaling regions: a *classical disordered*, a *quantum disordered*, a *quantum critical* and a *thermal* region. The results can be transferred directly to the discussion of the influence of disorder in superfluids. Finally we extend the RG calculation to the treatment of a commensurate lattice potential. Applications to related systems are discussed as well.

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