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What is local about the Local Density Of States? REZA JAMEI, JOHN ROBERTSON, EUN-AH KIM, ALAN FANG, AHARON KAPITULNIK, STEVEN KIVELSON, Stanford University — While the influence of impurities on the local density of states (LDOS) in a metal is notoriously non-local due to interference effects, low order moments of the LDOS in general can be shown to depend only on the local structure of the Hamiltonian. Specifically, we show that an analysis of the spatial variations of these moments permits one to “work backwards” from scanning tunneling microscopy (STM) data to infer the local structure of the underlying effective Hamiltonian. Applying this analysis to STM data from the high temperature superconductor, BSCCO, we find that the variations of the electrochemical potential are remarkably small (i.e., the disorder is, in a sense, weak) but that there are large variations in the local magnitude of the d-wave gap parameter.

Reza Jamei
Stanford University

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