Spatially resolved dynamic susceptibilities of disordered two dimensional Hubbard model[1] NANDINI TRIVEDI, OINAM NGANBA MEETEI, The Ohio State University — We predict the existence of an emergent metallic phase in the disordered two dimensional Hubbard model [1] that has recently been confirmed by experiments on 1T-TaS$_2$ intercalated with Cu. The metallic state has a finite dc conductivity but unusual dynamical properties. We present here a comprehensive analysis of the spatially resolved spin susceptibility, screened charge density, and optical conductivity of the disordered Hubbard model. We develop a new method in which the exact eigenstates from inhomogeneous mean-field theory are used to calculate dynamical susceptibilities within the random phase approximation. By combining the non-perturbative effects of self-consistent mean-field theory with analytical perturbative methods, this approach gives insights about fluctuations near the quantum phase transitions. We make several predictions which can be directly tested in spatially resolved experiments.

[1] D. Heidarian and N. Trivedi, Phys. Rev. Lett. **93**, 126401 (2004)

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