Incoherent metal phase of doped Mott insulators: pseudogaps and non-Fermi liquid behavior.

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It is shown that the highly incoherent regime of hole-doped Mott-Hubbard insulators in two dimensions at moderately small doping δ and not too low temperatures $T \geq 0.1$ J (J is the exchange coupling) is characterized by pseudogaps in the single particle and spin excitation spectra. Moreover, the thermodynamic and transport properties display strong deviations from Fermi liquid behavior. We use an extended dynamical mean-field approximation for the t-J model and a generalized non-crossing approximation to calculate the single-particle spectral function, the dynamical spin susceptibility, thermodynamic and transport properties [1]. Short-ranged antiferromagnetic fluctuations lead to incoherent single-particle dynamics, large entropy and resistivity. The Hall coefficient is found to change sign to positive values upon lowering the doping level and to increase inversely proportional to δ.

[1] K. Haule, A. Rosch, J. Kroha, and P. Wölfle, Phys. Rev. Lett**. 89**, 236402 (2002); and submitted to Phys. Rev. B, cond-mat/0304096.