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Quantum Critical Point revisited by the Dynamical Mean Field Theory[1] WENHU XU, Brookhaven Natl Lab, GABRIEL KOTLIAR, Rutgers University, ALEXEI TSVELIK, Brookhaven Natl Lab — Dynamical mean field theory is used to study the quantum critical point (QCP) in the doped Hubbard model on a square lattice. The QCP is characterized by a universal scaling form of the self energy and a spin density wave instability at an incommensurate wave vector. The scaling form unifies the low energy kink and the high energy waterfall feature in the spectral function, while the spin dynamics includes both the critical incommensurate and high energy antiferromagnetic paramagnons. We use the frequency dependent four-point correlation function of spin operators to calculate the momentum dependent correction to the electron self energy. Our results reveal a substantial difference with the calculations based on the Spin-Fermion model which indicates that the frequency dependence of the the quasiparitcle-paramagnon vertices is an important factor.

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