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Spin-density-wave fluctuations in underdoped cuprates: pseudogap and coherence TIGRAN SEDRAKYAN, University of Maryland, ANDREY CHUBUKOV, University of Wisconsin-Madison — We study the form of the spectral function in a spin-density- wave (SDW) state of a quasi-2D syatem at a finite temperature and apply the results to underdoped cuprates. We explore the fact that dominant corrections to a mean-field SDW propagator come from near-divergent thermal fluctuations and use a nonperturbative eikonal-type approach in which we sum up infinite series of thermal self-energy corrections and solve integral equation for the fully dressed fermionic propagator. We use the results to study (i) the evolution of the Fermi- surface with increasing temperature and doping, (ii) the behavior of SDW order parameter as a function of temperature and doping, (iii) the transfer of spectral weight to higher energies, (iv) the temperature and doping dependence of optical conductivity. We show in particular that, when SDW order gets weaker, the spectral function in the antinode region splits into a running quasiparticle peak, whose residue and position scale with the magnitude of the SDW order, and a maximum (a pseudogap) which remains at about the same energy as at T=0. When SDW order disappears, only a pseudogap remains. We discuss the relation of our results to ARPES and optical conductivity data, and to the experiments on quantum oscillations.

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