

Abstract Submitted
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The spin density wave transition and the genus expansion MAX METLITSKI, SUBIR SACHDEV, Harvard University — A multitude of recent experiments on cuprates suggest that the underlying metallic state has a quantum critical point near optimal doping, which is masked by the superconducting dome. A natural possibility is that this critical point is associated with the onset of spin density wave order. In this talk, I will discuss the scaling theory of the spin density wave transition in two spatial dimensions. Previously, it has been suggested that the critical properties of the theory can be extracted using an expansion in the inverse number of fermion flavours N . I will discuss the RG flow of the theory to one loop and show that the $1/N$ expansion fails at low energies due to dynamical nesting of the fermi surface. Moreover, I will demonstrate that the naive large N counting fails at higher loop orders and has to be replaced by the so-called “genus” expansion, whereby each diagram is classified by its topology. In particular, even when N is infinite one must still sum an infinite set of planar diagrams.

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