

Abstract Submitted
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The Transformation of the Superconducting Gap to an Insulating Pseudogap with Decreasing Hole Density in the Cuprates T. MAURICE RICE, YE-HUA LIU, Inst Theor Phys ETH Zurich — The D-Mott Insulator state of the $\frac{1}{2}$ -filled 2-leg Hubbard ladder is a 1D example of a short range ordered Mott insulator at weak coupling. The recent wavepacket formalism developed by Ossadnik [arXiv 1603.04041] can describe the generalization to 2D, necessary to examine the pseudogap state in underdoped cuprates. We focus on maximizing umklapp scattering near the Fermi energy as the driver of this precursor state to Mott localization in 2D as it is in 1D. To this end we show how an insulating energy gap driven by umklapp scattering can open on an appropriately chosen 2D-surface as proposed earlier by Yang, Rice and Zhang. The key feature of a pairing instability with umklapp scattering is the opening of a gap in the 2-particle spectrum thereby turning the superconductor gap into an insulating pseudogap, in the anti-nodal parts of the Fermi surface.

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