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Low Energy Electronic Structure of an Excitonic CDW Melted Novel Superconductor[1] DONG QIAN, DAVID HSIEH, LEWIS WRAY, YUQI XIA, Physics Department, Princeton University, E. MOROSAN, R.J. CAVA, Chemistry Department, Princeton University, M.Z. HASAN, Physics Department, Princeton University — A superconducting (SC) state has very recently been observed upon successful doping of the charge-density wave (CDW) ordered triangular lattice $TiSe_2$ with copper. Using angle-resolved photoemission spectroscopy (ARPES) we studied the doping evolution of the electronic structure of Cu_xTiSe_2. The momentum space locations of the doped electrons that form the Fermi sea of the parent superconductor is identified. With increasing electron doping, we observe a significant rise of chemical potential which is found to destabilize the long range CDW order. At the same time the emergence of a large density of states in the form of a narrow electron pocket near the L- points of the Brillouin zone favors the onset of superconductivity within the BCS-Eliashberg scenario. With doping, we find that the kinematic nesting volume increases whereas the coherence of the CDW order sharply drops. The k- space electron distributions highlight the unconventional interplay of CDW to SC cross-over achieved through non-magnetic copper doping.

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