

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Interplay between pair density waves and random field disorders in the pseudogap regime of cuprate superconductors CHEUNG CHAN, Institute for Advanced Study, Tsinghua University — To capture various experimental results in the pseudogap regime, we propose a four-component pair density wave (PDW) state in which all components compete with each other. Without random field disorders (RFD), globally the PDW components are phase separated and only one of the component survives locally. If the RFD is included, this state becomes a phase separated state with short range PDW stripes, and induces charge density waves (CDW) and loop current order as secondary composite orders. We call this phase-separated pair nematic (PSPN) state. This state could capture a number of important experimental features in the pseudogap, in particular, the predominantly *d*-wave CDW with spatial dependent charge smecticity, the unusual ARPES quasiparticle spectrum, and the time reversal symmetry breaking order in polarized neutron diffraction and polar Kerr rotation. We also discuss how the various temperature scales arisen in the pseudogap can be understood in terms of the interplay with the RFD and fluctuating orders.

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Date submitted: 05 Nov 2015

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