

Abstract Submitted  
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**Quarter-filled systems with frustration: Candidate for correlated electron superconductivity**<sup>1</sup> NILADRI GOMES, Univ of Arizona, W. WASANTHI DE SILVA, Mississippi State Univ, TIRTHANKAR DUTTA, Univ of Arizona, R. TORSTEN CLAY, Mississippi State Univ, SUMIT MAZUMDAR, Univ of Arizona — A necessary condition for superconductivity (SC) driven by electron correlation is that electron electron (e-e) interactions enhance superconducting pair-pair correlations, relative to the non-interacting limit. We present the results of high-precision calculations of superconducting pair-pair correlations on four different frustrated lattices over the complete range of carrier density  $0 < \rho < 1$  in each case. We find that pair correlations are enhanced relative to the noninteracting limit only for density  $\rho$  equal to or close to 0.5 (1/4 filling). At all other  $\rho$  pair correlations are suppressed by interactions. This enhancement is due to the proximity to a spin-gapped paired-electron crystal (PEC) state that occurs at  $\rho = 0.5$ . Our theory explains the pseudogap observed at high temperatures in many organic superconductors. The remarkable bandfilling specificity is an essential ingredient to understanding the mechanism of superconductivity in the two-dimensional organic charge-transfer solids as well as the many different families of other unconventional superconductors that share this bandfilling.

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