Abstract Submitted
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Failure of RVB theory to give superconductivity in layered quasi-two dimensional organic charge transfer solids[1] NILADRI GOMES, Department of Physics, University of Arizona, R. TORSTEN CLAY, Department of Physics, Mississippi State University, SUMIT MAZUMDAR, Department of Physics, University of Arizona — The discovery of high Tc superconductivity in doped cuprates and the consequent proposal of Anderson's RVB theory have brought much focus on the Mott insulators as a novel phase. Following this, RVB mean field and other related theories developed in 1/2-filled band systems have also been applied to study the pressure-induced Mott insulator-to-superconductor transition (without external doping) in the layered quasi-two-dimensional organic charge transfer solids (CTS) like κ-(BEDT-TTF)$_2$X. We show that although the antiferromagnetic phase of these highly dimerized CTS can be described within effective half-filled band Hubbard or Hubbard-Heisenberg models, the superconducting phase is absent within these models. The so-called valence bond solid that has been found in $EtMe_3P[Pd(dmit)_2]_2$ is also absent within the effective 1/2-filled band model. We conclude that the effective 1/2-filled band models give an incomplete description of the layered CTS and are thus inappropriate for such systems.

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