Abstract Submitted
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Superconductivity in quasi-2d organic doped Mott insulators: a superconducting dome without an antiferromagnetic quantum critical point[1] A. -M. S. TREMBLAY, CHARLES-DAVID HÉBERT, Université de Sherbrooke, PATRICK SÉMON, Université de Sherbrooke and Rutgers University — Layered organic superconductors of the BEDT family are model systems for understanding the interplay of the Mott transition with superconductivity, magnetic order and frustration. Recent experimental studies on a hole-doped compound reveal an enhancement of superconductivity and a rapid crossover between two different conducting phases above the superconducting dome. Using plaquette cellular dynamical mean field theory with state of the art continuous-time quantum Monte Carlo calculations, we study this problem with the two-dimensional Hubbard model on the anisotropic triangular lattice. Phase diagrams are in broad agreement with experiment. As in the case of the cuprates, we find, at finite doping in the unstable normal state, a first-order transition between a pseudogap and a correlated metal. We make several experimental predictions. This work also clearly shows that the superconducting dome in organic superconductors is tied to the Mott transition and its continuation as a transition separating pseudogap phase from correlated metal in doped compounds, as in the cuprates. Contrary to heavy fermions for example, the maximum T_c is definitely not attached to an antiferromagnetic quantum critical point. That can also be verified experimentally.

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