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Absence of superconductivity in the $\frac{1}{2}$-filled band Hubbard model on a triangular lattice HONGTAO LI, University of Arizona, R. TORSTEN CLAY, Mississippi State University, S. MAZUMDAR, University of Arizona — The superconducting κ-(BEDT-TTF)$_2$X salts are strongly dimerized, with one hole per dimer unit cell. The occurrence of antiferromagnetism under ambient pressure, and the appearance of superconductivity under pressure has led several investigators to suggest that the superconductivity can be explained within an anisotropic triangular lattice $\frac{1}{2}$-filled band Hubbard Hamiltonian. Within this picture, pressure takes the system closer to the isotropic limit, when antiferromagnetism gives way to d-wave superconductivity. We have performed exact diagonalizations on a 16-site periodic anisotropic triangular lattice as a function of the Coulomb interaction (Hubbard U) and the anisotropy to investigate this claim. We calculate bond orders, double occupancies, spin-spin correlations, spin structure factors and $d_{x^2-y^2}$ superconducting pair-pair correlations. We are able to confirm the Mott metal-insulator transition and antiferromagnetism, but we do not find any hint of long range superconducting correlations. Neither is there any region of the Hubbard U where these correlations are enhanced by the interaction strength. [1].

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