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Quantum critical Mott transition in triangular lattice Hubbard model ZI YANG MENG, Department of Physics and Astronomy, Ceneter for Computation and Technology, Louisiana State University, KUANG SHING CHEN, Department of Physics and Astronomy, Louisiana State University, UNJONG YU, GIST-college, Gwangju Institute of Science and Technology, Korea, SHUXIANG YANG, Department of Physics and Astronomy, Louisiana State University, JUANA MORENO, MARK JARRELL, Department of Physics and Astronomy, Center for Computation and Technology, Louisiana State University — Using large-scale dynamical cluster quantum Monte Carlo simulations, we study the correlation-driven metal-insulator transition in the half-filled Hubbard model on a triangular lattice, with the interaction strength (U/t) and temperature as control parameters. We compute spectral and transport properties and estimate the Mott transition to occur at the critical interaction strength Uc/t=8.5+/-0.5. From the metallic side, the van Hove singularity in the density of states moves towards the Fermi level with increasing U/t and eventually collapses at the Mott transition, above which the Mott gap opens. In the quantum critical region above the transition point, the system exhibits a marginal Fermi liquid behavior. Due to the competition between electronic correlations and geometric frustrations, we observe non-trivial transport properties across the transition such as a universal jump in the resistivity, consistent with recent quantum field theory proposals. Implications for experiments on the layered triangular lattice organic material k-(BEDT-TTF)2Cu2(CN)3 and EtMe3Sb[Pd(dmit)2]2 are also discussed.

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