Emergent states of interacting electrons in triangular-lattice organics: quantum spin liquid, charge glass, and unconventional superconductivity

Prof. Dr. Kazushi Kanoda

Department of Applied Physics, the University of Tokyo,
Hongo 7-3-1, Bunkyo-ku, Tokyo 113-8656, Japan

Abstract:
Coulomb interactions among electrons have huge impacts on their behavior through competition of charge localization/delocalization and spin order/disorder. Layered organic compounds host flexible lattice geometries and appreciable Coulomb interactions, both of which are varied by pressure or chemical substitution to display diverse emergent phenomena like a showcase of correlation physics. In this colloquium, I review a variety of electron correlation-derived phenomena that show up on the molecular triangular lattices, which exert geometrical frustration on the spins and charges of interacting electrons. These include quantum-critical Mott metal-insulator transition [1], quantum spin liquid [2], BEC-like superconductivity in a doped spin liquid [3], charge glass [4], and massless Dirac electrons with dynamic mass generation [5]. Some of these phenomena have links to soft-matter physics and particle physics beyond the conventional discipline of solid-state physics.


There will be coffee, tea, and cookies in front of the lecture hall at 17.00 h