

NMR study on strongly correlated electrons in Q2D organics

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Mott transition is a metal-insulator transition induced by electron-electron Coulomb interaction. When the lattice is triangular, antiferromagnetically interacting spins suffer from geometrical frustration against ordering. So, the correlated electrons on triangular lattice in the vicinity of Mott transition are in an intriguing situation where both the charge and spin degrees of freedom possibly exhibit quantum fluctuations. The family of layered organic conductors, kappa-(ET)₂X, whose bandwidth is comparable with the Coulomb repulsive energy and controllable by pressure, are model systems of interacting electrons on anisotropic triangular lattice.

In this conference, I review our NMR studies on kappa-(ET)₂X, which revealed the criticality of Mott transition, the possible existence of spin liquid and the natures of superconductivity and vortices.

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[2] Y. Shimizu et al., PRL 91 (2003) 107001; Kurosaki et al., PRL95 (2005) 177001; Shimizu et al., PRB 70 (2006) 060510; PRB 81 (2010) 224508.

[3] K. Kanoda, chapter 22 in "The Physics of Organic Superconductors and Conductors," Edited by A. Lebed, Springer, 2008