

Session 27aB

Tunneling Between Spin Triplet Molecular Organic Superconductors

27aB1

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We present the first ever tunneling data between two organic superconductors. Current - voltage measurements were taken on a bicrystal of the molecular organic superconductor $(\text{TMTSF})_2\text{ClO}_4$ ($T_c=1.3\text{K}$). Strong evidence for spin triplet pairing has accumulated recently for this class of materials. We interpret the resulting dI/dV conductance vs. bias as representing a S-I-N-I-S junction between two triplet superconductors ("TNT"). An enormous zero bias conductance peak likely due to Andreev bound states (possibly coupled with Josephson effect) is observed, as well as a clearly identified superconducting energy gap of 0.5 meV ($2\Delta=4.2k_B T_c$). Magnetic field studies show a Zeeman effect which provides information on the direction of the order parameter \mathbf{d} -vector. We discuss the relevance of these results to the pairing symmetry (p or f -wave) of this spin triplet superconductor. This work was supported by the NSF.

Pseudogap, field-induced SC-AFI transition and quantum critical spin fluctuations in two-dimensional organics

27aB2

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A family of quasi-two-dimensional organic conductors, κ -(ET)₂ X , span a phase diagram including superconducting (SC) phase and antiferromagnetic insulating (AFI) phase. In this conference, we present our NMR observation of the pseudogap behavior and field-induced SC-AFI transition in the marginal superconducting phase, to which access was made by deuterated κ -(ET)₂Cu[N(CN)₂]Br. We also report that a doped Mott insulator, κ -(ET)₄Hg_{2.78}Cl₈, show quantum critical AF fluctuations in contrast to κ -(ET)₂ X with half-filled band.

27aB3 Anisotropic Superconductivity in Magnetic Field Induced Superconductors
 $\lambda\text{-}(\text{BETS})_2\text{Fe}_x\text{Ga}_{1-x}\text{Cl}_4$

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We have measured the resistance of the organic conductors $\lambda\text{-}(\text{BETS})_2\text{Fe}_x\text{Ga}_{1-x}\text{Cl}_4$ and found the anisotropic feature of the critical fields.

27aB4 Genuine Two Dimensional Electrons in Bechgaard Salts

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We will present our comparative study of Bechgaard salts which have played a key role to develop the physics of quasi-one-dimensional electron systems. However, our recent investigations revealed that a genuine two dimensional electron system can also be realized in this system. Angular magnetoresistance (AMR) of $(\text{TMTSF})_2\text{FSO}_3$ under 8.2 kbar showed oscillatory behavior just like as many other $(\text{TMTSF})_2\text{X}$ salts. However, the peak positions could not be explained with Lebed resonance model but with Yamaji resonance model. The former has been successfully used to explain the AMR of $(\text{TMTSF})_2\text{X}$ and the latter for two dimensional $(\text{ET})_2\text{X}$. Also supporting the idea is a pronounced peak structure observed both in *bc* and *ac* rotations when the magnetic field was nearly parallel to the conducting plane.