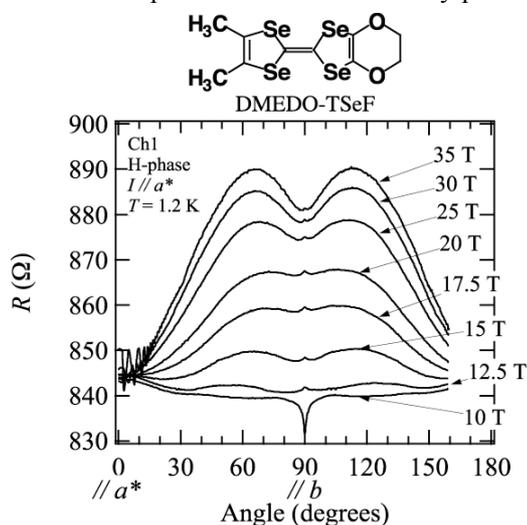


# Electronic states in a weakly incoherent layered organic superconductor

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Recently, two ambient pressure organic superconductors with the same chemical composition,  $\kappa_L$ - and  $\kappa_H$ -(DMEDO-TSeF)<sub>2</sub>[Au(CN)<sub>4</sub>](THF) have been developed, where DMEDO-TSeF is dimethyl(ethylenedioxy)tetraselenafulvalene [1]. Although the  $\kappa_L$  phase has disordered THF and shows a structural phase transition at  $T_d = 209$  K [2], THF of the  $\kappa_H$  phase is ordered even at room temperature. The  $\kappa_H$  phase has two crystallographically independent conducting layers, and the donor arrangements of both layers are the  $\kappa$  type [1]. Transport properties of the  $\kappa_H$  phase, in which the thick anion layer is a characteristic structure, have been investigated. The field angle dependence of the upper critical field and the short interlayer coherence length indicate that the present compound is a highly two-dimensional superconductor. The angular dependent magnetoresistance (ADMAR) shows opposite background behavior, incoherent like one, in spite of the absence of the one-dimensional Fermi sheet. The resistance peak under the field nearly parallel to the conducting sheet depends on the field, which indicates that the present compound is a weakly incoherent interlayer transport system [3]. The Shubnikov-de Haas oscillations show two closed orbits with nearly 100% cross sectional area of the first Brillouin zone, and the cross-sectional areas differ 10%. This indicates that the charge transfer degree of the crystallographically independent layer differs.



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[1] T. Shirahata *et al.*, Chem. Commun. 1592 (2006).

[2] T. Kawamoto *et al.*, Phys. Rev. B **76**, 134517 (2007).

[3] M.P. Kennett and R.H. McKenzie, Phys. Rev. B **78**, 024506 (2008).