Determination of Electronic Dimension by Stereoscopic Angular Magnetoresistance Study

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Measurement of the angular magnetoresistance oscillations (AMRO) is valuable in determining of the given Fermi surface (FS) and providing insights into dimension-related phenomena. Kartsovnik-Kajita-Yamji (KKY) oscillations are present if the FS is quasi-two-dimensional (Q2D). Tangents of angular positions of the resistance *maxima* are proportional to integers and only weakly dependent on the azimuthal rotation. In the quasi-one-dimensional (Q1D) case, the AMRO in a magnetic field perpendicular to the most conducting axis also shows fine structures, but tangents of angular positions of the resistance *minima* are linear to integers (Lebed resonances). When the rotation plane approaches the one-dimensional conducting axis, the elevation angles from the conducting plane for the resistance minima approach zero and a complicated pattern including Danner-Kang-Chaikin (DKC) oscillations and the third angle effect appears. In this presentation, we will provides manifest evidence for the existence of Q1D FS in $(TMTSF)_2NO_3$ under pressures larger than the critical pressure of 6.0 kbar. This is evident even in the presence of the anion ordering, thus suggesting the appearance of the FISDW likely [1]. Contrarily, we found no evidence to support the existence of the FISDW in Q2D semimetals. Without excluding the presence of the Q2D FS pockets in the low-pressure SDW state, our study makes obvious that the Q1D FS dominates the metallic properties of the this compound in the absence of the SDW. Stereoscopic measurements of the AMRO were vital in determining the dimensionality of the FS. In addition, the periodicity of Lebed type resonances and the overall stereoscopic features of R_{zz} suggest an additional anion ordering along the *b* axis should be present as in $(TMTSF)_2ClO_4$ [2]. Whether the *b* axis ordering persists down to low pressure can only be clarified by further structural analysis between T_{SDW} and T_{AO} since ARMO is not sharp enough in this temperature range.

*This work was supported by the KOSEF/MEST.
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