Pulsed-field study of the interference commensurate effect in quasi-one-dimensional organic conductors

1 J. ROY, J.I. OH, H. YOSHINO2, P. DHAKAL, M.J. NAUGHTON, Boston College — We report angle-dependent magnetoresistance oscillations for fields up to 43 T oriented mainly in the most conducting $x$-$y$ plane, with small field component along the least conducting $z$ axis, in the q1d compounds $(\text{TMTSF})_2\text{ClO}_4$ and $(\text{DMET})_2\text{I}_3$ at 1.5 K. A hybrid plastic-metal cryoprobe system with pseudo dual-axis rotation has been built for these pulsed-field measurements. Due to the interference commensurate effect, (aka Lee-Naughton oscillations) [1-3], we have observed rich magnetoresistance oscillations, resulting from an interference effect of commensurate electron trajectories in the extended Brillouin zone. Also, we have found that, as theoretically expected [2], field-dependent magnetoresistance shows 1D and 2D transport behavior at local resistance maxima and minima (versus field angle), respectively.


1This work was supported by NSF Grant No. DMR 0605339.
2Permanent address: Osaka City University.

M.J. Naughton

Date submitted: 20 Nov 2007

Electronic form version 1.4