Possible verification of tilted and anisotropic Dirac cone in quasi-two dimensional organic compound α-(BEDT-TTF)$_2$ I$_3$ using inter-layer magnetoresistance TAKAO MORINARI, TAKAHIRO HIMURA, TAKAMI TOHYAMA, Kyoto University — It is proposed that a tilted and anisotropic Dirac cone is verified using the interlayer magnetoresistance in the layered Dirac fermion system, which is realized in α-(BEDT-TTF)$_2$I$_3$, quasi-two-dimensional organic compound. The formula for the inter-layer magnetoresistance is derived using the analytic Landau level wave functions and assuming local tunneling of electrons. Reflecting the deformation of the Landau level wave function due to tilt and anisotropy of the Dirac cone, the inter-layer magnetoresistance depends on the direction of the magnetic field in the plane. We discuss how to determine the parameters of the tilt and anisotropy experimentally using the theoretical formula.

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