Pressure dependence of interlayer magnetoresistance in α-$(BEDT\text{-}TTF)_2I_3$

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There is a group of condensed matter systems in which low-lying properties of the conduction electrons are described by a relativistic Dirac equation with the velocity of light replaced by the Fermi velocity. Remarkable physical phenomena of such Dirac fermions are clearly demonstrated in graphene which is a single layer of graphite.

Recently, Katayama *et.al.* theoretically suggested that the system is zero-gap and the energy dispersion is linear around the zero-gap point under high pressure[1]. In addition, they show that the effective Hamiltonian describing the massless fermions in this system written in a tilted and anisotropic Weyl equation[2]. In contrast to graphene, in α-$(BEDT\text{-}TTF)_2I_3$ crystals, conducting layers of BEDT-TTF molecules and insulating layers of I_3 anions stack alternately along the crystalline c-axis. Tajima *et.al.* have observed negative interlayer magnetoresistance[3]. This phenomenon has been explained theoretically as the increase of zero-mode Landau level degeneracy[4]. Although this observation strongly supports the presence of a Dirac cone. However there is no direct experimental verification that the cone is tilted and anisotropic.

In Ref.[5], we proposed theoretical formula for the interlayer magnetoresistance which is derived using the analytic Landau level wave functions and assuming tunneling of electrons between neighboring layers. In this paper, we discuss the pressure effect on the magnetoresistance. We use the parameters of the Weyl equation estimated by the tight-binding model with the transfer integrals determined by X-ray diffraction experiments[6].

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