

Evidence for Quantum Magnetotransport of Dirac Cone States in Ba(FeAs)₂

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The observation of Dirac cone states in Ba(FeAs)₂¹ opened up an interesting physical viewpoint in iron pnictide superconductors. Being the quantum state with high mobility carriers, Dirac cone states are more intriguing in considering the quantum transport that arises from the quantization of the states under magnetic field B . We will report the first evidence for the dominant effects of Dirac cone states on the transport properties of Ba(FeAs)₂². In the $B = 0$ limit, the transport properties are governed by the Dirac cone states despite the small number of Dirac carriers. In a larger B , a B -linear transverse magnetoresistance (MR) up to $B < 17$ T was observed. This B -linear MR is consistent with the unique quantum transport of the 0th Landau level in a Dirac cone state³. Our results lead to a conclusion on the essential role of Dirac cone states in understanding the physics of iron pnictide superconductors.

¹P. Richard *et al.*, Phys. Rev. Lett. **104**, 137001 (2010).

²K. K. Huynh, Y. Tanabe, and K. Tanigaki, arXiv:1012.3029.

³A. A. Abrikosov, Phys. Rev. B **58**, 2788 (1998).