

Terahertz Quantum Hall Effect in Topological Insulator HgTe

Friday, 27 July 2012 10:00 (12 minutes)

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Using terahertz spectroscopy in external magnetic fields we investigate the low-temperature charge dynamics of the topological insulator HgTe. Faraday rotation angle and ellipticity could be well described using a classical Drude model in two dimensions (2D). From these data complete characterization of the charge carriers could be done, including 2D density, scattering rate and cyclotron effective mass. In these experiments the quantum Hall oscillations are observed at terahertz frequencies. The two-dimensional density, estimated from the period of the oscillations, agrees well with direct transport experiments. The effective mass of the 2D carriers is found to be close to that in the bulk of the unstrained sample.

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Session Classification: Topological Insulators II

Track Classification: Topological Insulators