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Giant terahertz Faraday rotation in graphene

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The Faraday rotation of the polarization of light in a medium, where the time-reversal symmetry is broken due to external magnetic field, is an optical analogue of the Hall effect. We recently demonstrated that graphene, the thinnest existing material, can turn the polarization of terahertz radiation by several degrees in modest magnetic fields, which is a spectacular manifestation of the cyclotron resonance. In this talk I will review our Faraday rotation spectroscopy studies of single-layer and twisted multilayer epitaxial graphene with an emphasis on the physical information that one can extract from these measurements and potential applications.

[1] I. Crassee et al. Nature Physics **7**, 48 (2011).
[2] I. Crassee et al. Phys. Rev. B, **84**, 035103 (2011).