Max-Planck-Institut für Struktur und Dynamik der Materie

Max Planck Institute for the Structure and Dynamics of Matter

Wednesday, April 10th 2019 – 11:00
CFEL Seminar room IV (Bldg. 99)

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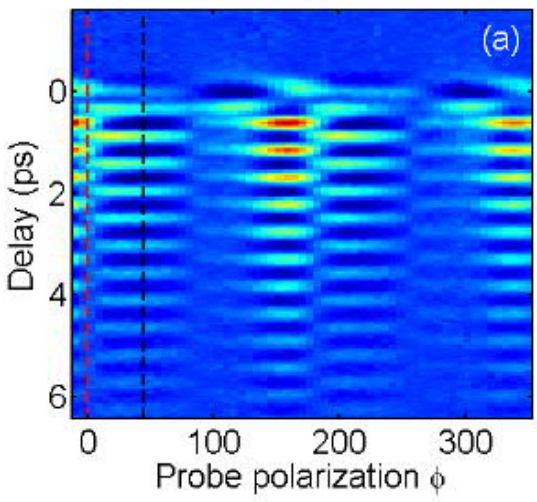
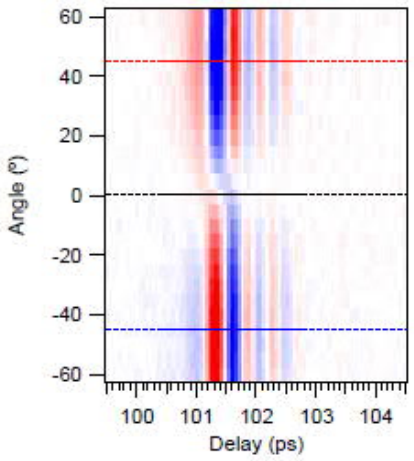
Shedding New Light on Dirac Materials with Nonlinear Optics

Nonlinear optics has recently emerged as an attractive approach for both probing topological properties and driving Dirac materials into new states. Here, I will describe our use of ultrafast nonlinear optics to study three representative Dirac materials: graphene micro-ribbons, topological insulators, and Weyl semimetals. We used terahertz (THz) magneto-optical spectroscopy to examine periodic arrays of graphene micro-ribbons, enabling us to control the transmission and Faraday rotation spectra of THz pulses via coupling to discretized magnetoplasmon modes. In the Weyl semimetal TaAs, time-resolved second harmonic generation enabled us to reveal a new photoinduced phase, and THz emission spectroscopy was used to provide new insight into the circular photogalvanic effect. Finally, we used intense THz pulses to drive and coherently control structural dynamics in the topological insulator Bi2Se3. Overall, our studies demonstrate the utility of nonlinear optics in shedding new light on both static and dynamic properties of topological materials.





Host: Andrea Cavalleri

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