

Ultrafast laser control of magnetic materials

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The manipulation of the magnetization with sub-picosecond laser pulses is attractive for potential information storage device applications. Some magnetic materials can already be switched solely by the effect of a laser pulse, without any external magnetic field involved. First, such effects were demonstrated for ferrimagnets but recently also for layered, synthetic ferrimagnets and even for ferromagnets. In this talk we investigate all-optical switching in ferri- and ferromagnets. We employ multi-scale models linking *ab initio* methods with spin models and mesoscopic theories to explore the spin dynamics which is triggered by the laser pulse, and to distinguish thermal heating effects from opto-magnetic effects, such as the inverse Faraday effect.

