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Optimal Control of Magnetization Dynamics in Ferromagnetic Materials using TDDFT[1] PETER ELLIOTT, KEVIN KRIEGER, E.K.U GROSS, Max Planck Institute of Microstructure Physics — Recently [1] intense laser-field induced ultrafast demagnetization was observed in ab-initio simulations using Time-Dependent Density Functional Theory (TDDFT) for various ferromagnetic materials (Fe,Co,Ni). From a practical and technological viewpoint, it is useful if the induced dynamics (e.g. of the total magnetic moment) are controllable. In this talk we apply optimal control theory together with TDDFT calculations to tailor the intense laser pulses so as to achieve a particular outcome (e.g. maximize the total moment lost) while also including any required constraints (e.g pulse duration, pulse frequencies, maximum fluence, etc).

[1] Laser induced ultrafast demagnetization: an ab-initio perspective, K. Krieger, J.K. Dewhurst, P. Elliott, S. Sharma, E.K.U. Gross, submitted (2014).

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Peter Elliott
Max Planck Institute of Microstructure Physics

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