Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Ultrafast demagnetization: A transport effect? YVES ACREMANN, ANDREAS FOGNINI, GERARD SALVATELLA, RAFAEL GORT, THOMAS MICHLMAYR, ANDREAS VATERLAUS, Laboratory for Solid State Physic, ETH Zurich — The ultrafast loss of magnetization caused by a femtosecond laser pulse is still not well understood. One of the important contributions is spin flip scattering in the bulk of the magnetic material, mediated by the presence of phonons. The second contribution is the creation of spin currents, which transport spin angular momentum from the magnetic film into the substrate, where spin slips can take place outside of the view of the observer. Spin currents have been predicted by Battiato et al., PRL p.105, 027203 (2010). Here, we discuss a simple thermodynamic model describing laser induced spin currents as a cause of the temperature dependent shift of the chemical potentials. Experiments are discussed, which may be able to separate the effect of the lattice temperature from spin transport effects.

Yves Acremann
Laboratory for Solid State Physic, ETH Zurich

Date submitted: 14 Nov 2014 Electronic form version 1.4