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# Magnetization Dynamics seen via Pump-Probe Holographic Imaging

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Magnetism exhibits phenomena on intrinsic timescales spanning many orders of magnitude, due to its electronic nature including ultrafast phenomena on short length scales. I will demonstrate how x-ray Fourier transform holography (FTH) [1] can be used in pump-probe schemes to follow magnetization dynamics on the nano-, pico- and femtosecond time scale in real space. Specifically, results on the GHz dynamic behavior of magnetic bubbles (pumped by magnetic field pulses) [2] and on ultrafast optical demagnetization (pumped by localized IR pulses) [3] will be discussed.

[1] S. Eisebitt et al., *Lensless imaging of magnetic nanostructures by X-ray spectro-holography*, Nature **432**, 885 (2004).
[2] F. Büttner et al. *Topological mass of skyrmionic spin structures*, (submitted)
[2] C. von Korff Schmising et al., *Imaging Ultrafast Demagnetization Dynamics after a Spatially Localized Optical Excitation*, Phys Rev Lett **112**, 217203 (2014)