

SFB – Colloquium

Speaker: **Dr. Sangeeta Sharma**

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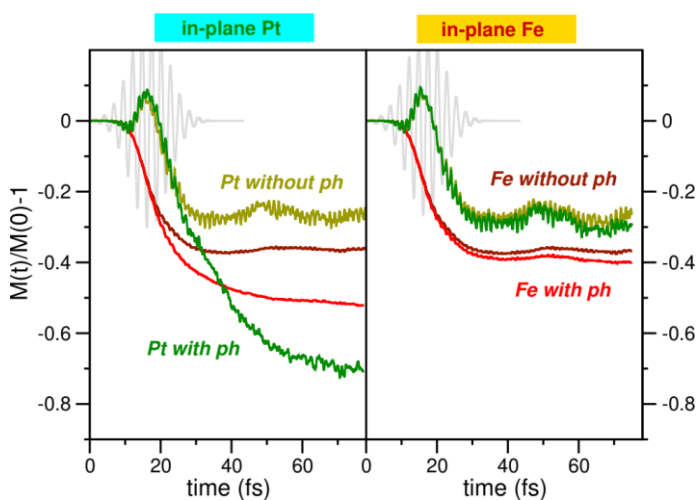
Date: Tuesday, 10 January 2023, 14:15, H34

Topic: Femto-phono-magnetism

Abstract:

In my talk I will advocate a parameter free ab-initio approach to treating ultrafast light-matter interactions uncovering novel and hitherto unsuspected early time spin dynamics phenomena [1,2]: (a) I will show that optical inter-site spin transfer (OISTR) is one of the fastest ways to control spins by light and (b) I will make a case for femto-phono-magnetism by demonstrating that selective excitation of optical phonon modes exert a strong influence on femtosecond demagnetisation, generating an additional loss of moment [3] in laser pumped materials (see Figure).

In the second part of the talk I address the question of valley control in 2d transition metal dichalcogenides (TMDC), with current understanding that it couples exclusively via circularly polarized light. In our work we show that on femtosecond time scales valley coupling is a much more general effect. We find that two time separated linearly polarized pulses allow almost complete control over valley excitation [4].



- [1] Dewhust et al., Nano Lett. **18**, 1842 (2018).
- [2] Siegrist et al. Nature **571**, 240 (2019).
- [3] Sharma et al. Sci. Adv. **8**, eabq2021 (2022).
- [4] Sharma et al. Optica **9**, 947-952 (2022).

Host: Prof. Dr. Jaroslav Fabian

Normalized spin moment as a function of time (in fs) in laser pumped FePt. The moment is calculated in presence of phonon modes as well as in absence of any nuclear motion.