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Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme
Fachbereich Physik, Universität Stuttgart

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Login data will be announced by e-mail and on the colloquium webpage.

Dienstag, 23. November 2021 | **16.15 Uhr** | **Online**

Stuttgarter Max-Planck-Institute, Heisenbergstraße 1, 70569 Stuttgart-Büsnau

Gastgeber: Prof. Gisela Schütz, Max-Planck-Institut für Intelligente Systeme, Telefon: 0711 689-1950

Ultrafast spintronics with terahertz electromagnetic pulses

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Abstract

Spintronics research takes advantage of the charge plus the spin of electrons to explore and develop functionalities for future information processing in solid-state nanostructures. Essential spintronic operations include the rotation and transport of spins and the detection of the resulting dynamics. This talk addresses strategies and examples of how these operations can be transferred from sub-gigahertz to terahertz rates by employing both ultrashort optical and terahertz electromagnetic pulses. In this way, new insights into fundamental phenomena such as the spin Seebeck effect, spin-to-charge-current conversion and anisotropic magnetoresistance are obtained. Interesting photonic applications such as the efficient generation of broadband terahertz electromagnetic pulses emerge.

References:

[1] Seifert *et al.*, Nature Comm. **9**, Article number: 2899 (2018)
[2] Gueckstock *et al.*, Advanced Materials 2006281 (2021)
[3] Seifert *et al.*, Nature Photon. **10**, 483 (2016)
[4] Fülöp *et al.*, Advanced Optical Materials 1900681 (2019)
[5] Nadvornik *et al.*, Phys. Rev. X **11**, 021030 (2021)

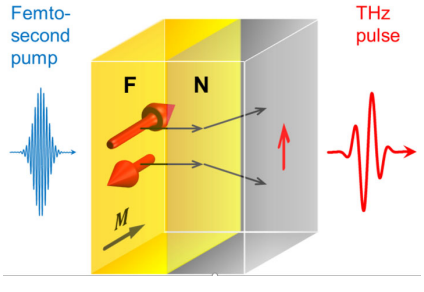

Figure: Schematic of a spintronic emitter of ultrabroadband terahertz electromagnetic pulses.