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:

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