Colloquium
Dahlem Center for Complex Quantum Systems

Probing Magnons and Phonons using Brillouin Light Scattering

Prof. Dr. Xiaoqin (Elaine) Li
University of Texas-Austin

Time: **Tuesday, May 26, 2015, 16:00 c.t.**

Location: Hörsaal A (1.3.14)

Abstract:

When light interacts with quasiparticles in solids such as phonons (coordinated lattice vibrations) and magnons (coordinated spin rotations), annihilation or creation of a quasiparticle leads to inelastically scattered light at higher or lower frequency known as the Anti-Stokes and Stokes peaks in the familiar Raman scattering. The principle of Brillouin light scattering is identical to Raman scattering, except that the experimental technique is modified to monitor low frequency quasiparticles (1 GHz-150 GHz) such as magnons and acoustic phonons. I will present two examples in this talk. In the first example, we study the how spin waves (or magnons) can be amplified or attenuated by a direct current passing through a heavy metal/ferromagnetic bilayer via the spin Hall effect. In the second example, we discuss how Brillouin light scattering can be used as a local temperature sensor for phonons and magnons in magnetic insulators. We extract information on magnon-phonon therm!alization length, which is essential to the recently discovered spin-Seebeck effect.