

Physikalisches Kolloquium

Sergej O. Demokritov, Universität Münster
»Spin-torque and spin-Hall nano-oscillators for magnonic applications«

Einführung: A. Ustinov

The recently introduced concept of magnonics is based on the use of propagating waves of magnetization - spin waves - as a medium for transmission and processing of high-frequency signals in magnetic nanostructures. The recent advances in the physics of nano-magnetism, such as the discovery of the spin-transfer torque and the spin-Hall phenomena, brought essentially new possibilities for nano-magnonics. For instance, it was recently experimentally demonstrated that nano-contact spin-torque [1,2] and spin-Hall [3] devices can radiate spin waves, which enables their utilization as nano-sources of spin waves for magnonic applications. It is demonstrated that in both cases the coherent auto-oscillation mode excited in the nano-oscillators is a nonlinear spin-wave bullet [4]. Micromagnetic simulations performed for the particular case of spin-Hall nano-oscillator corroborate these findings quantitatively. I also show how the integration of such nano-oscillators into magnonic circuits can be practically realized.

[1] V. E. Demidov, S. Urazhdin, and S. O. Demokritov, *Nature Materials* 9, 984 (2010).

[2] M. Madami, S. Bonetti, G. Consolo, S. Tacchi, G. Carlotti, G. Gubbiotti, F.B. Mancoff, M.A. Yar, & J. Åkerman, *Nature Nanotech.* 6, 635 (2011).

[3] V. E. Demidov, S. Urazhdin, H. Ulrichs, V. Tiberkevich, A. Slavin, D. Baither, G. Schmitz and S. O. Demokritov, *Nature Materials* 11, 1028 (2012).

[4] A.N. Slavin and V.S. Tiberkevich, *Phys. Rev. Lett.* 95, 237201 (2005).

Donnerstag, 30.04.2015, 17:30 Uhr,

KIT, Campus Süd,

Otto-Lehmann-Hörsaal, Physik-Flachbau (Geb. 30.22).

Anschließend Nachsitzung im Gastdozentenhaus „Heinrich Hertz“