

Spin-wave instabilities on the nanoscale

In this seminar I will discuss magnetization dynamics in strongly excited ferromagnetic systems. The research was motivated by application, specifically within the context of magnonic spintronics. In a magnonic device, one aims to utilize spin waves as information carriers, instead of charge currents. In particular in metallic magnetic systems compatible with standard CMOS technology, spin waves suffer from large damping. Thus compensating these losses is a practical necessity. I will discuss two strategies (inductive excitation and spin currents) which allow to reach this goal. When losses are compensated, the amplitudes of the spin waves increase exponentially. Understanding such instability processes is of fundamental importance for the realization of a useful magnonic device. An example for such a device will be presented in the end.