Seminar: Hard Condensed Matter Theory

JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Room: Galilei Raum, 01-128 (Staudinger Weg 9)
Time: June 13th, 2017 at 14:00

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Gilbert damping from first-principles methods

The Landau-Lifshitz-Gilbert (LLG) equation in combination with first-principles methods, has been used with great success to describe the magnetization dynamics in a wide range of cases and materials. Such as the motion of magnetic textures, e.g. domain walls and skyrmions, and the description of magnetic excitations such as spin waves. Recent developments have allowed for a more complete description of spin dynamics from first principles thanks to the capacity to calculate the Gilbert damping from *ab-initio* methods.

In the following talk a small overview of the most common methods used to determine the Gilbert damping from first principles will be presented. The role of different considerations to the damping, such as the density of states at the Fermi level, temperature, chemical alloying and the spin orbit coupling [1-3] will be presented making use of first principles studies of materials of great technological importance such as half-metallic Heusler alloys and permalloy.

[1] J. Chico, *et al.* Phys. Rev. B 93, 214439 (2016).
[2] F. Pan, J. Chico, *et al*. Phys. Rev. B 94, 214410 (2016).
[3] P. Dürrenfeld, F. Gerhard, J. Chico, *et al.* Phys. Rev. B 92, 214424 (2015).

All interested are cordially welcome!
