

Conférence - CEISAM - UMR CNRS 6230

Jeudi 16 Novembre 2017 - 10h00
Salle Marie Curie - CEISAM

Claudio Sangregorio
Chercheur CNR-ICCOM à l'Université de Florence - Italie

"Tailoring magnetic nanoparticle properties towards applications"

Abstract : Magnetic nanoparticles, MNP, are expected to have a tremendous impact on several technological fields, ranging from electronics, to spintronics and clinical applications, one of the most prominent reason relying on the possibility of fine tuning their physical properties to match the required optimal values. The feasibility of such a control requires the exact knowledge of the effect of the size, morphology, structure and chemical composition on the magnetic properties of the final product. However, large piece of information is still missing, mostly because of the difficulty in controlling independently each of the above parameters. However, the recent development of wet-chemistry syntheses has boosted a renewed interest in the field.

Exploiting the versatility of spinel ferrites, in this contribution we will show how some phenomena characteristic of the nanoscale could be advantageously exploited for improving their performances in several technological fields. In particular, we will discuss the state-of-the-art of the application of magnetic nanostructured materials and the future perspectives for a more extended use in two of the most prominent research areas in the field: the realization of a new class of theranostic agents, combining the therapeutic effect of targeted drug-delivery with hyperthermia and enhanced relaxometric properties, [1] and the quest for novel materials that can replace currently used Rare Earth (RE) compounds in a wide part of the spectrum of energy industrial necessities where the high performances of RE permanent magnets are not strictly required. [2-4]

[1] E. Fantechi et al. *ACS Nano*, 2014, 8, 4705-4719

[2] A. Lopez-Ortega et al. *Chem. Mater.* 2015, 27, 4048-56

[3] E. Lottini et al. *Chem. Mater.* 2016, 28 4214-4222

[4] A. López-Ortega et al. *Chem. Mater.* 2017, 29 1279-1289