The European School on Magnetism 2017

About ESM 2017

Virginie Simonet, Chair for ESM 2017

It is a great pleasure for us to host you in Cargèse (Corsica, France) for this 8th European School on Magnetism (ESM). **ESM2017 will gather together 15 lecturers and 86 participants coming from 27 different countries**, selected out of over 237 submitted applications. Participants come mainly from Europe, but also from other countries. As with previous sessions of ESM, the 2017 School aims at providing a thorough insight into magnetism through a broad series of fundamental lectures, and to address a specific topic of current interest in more detail. While in 2015 the focus was entitled *From basic concepts to spin currents*, the European School on Magnetism 2017 is named: *Condensed Matter Magnetism: from bulk to Nano* and is taking place from Oct. 9th to 21th 2017. The school will benefit from the hosting of Institut d'Études Scientifiques de Cargèse, which we deeply acknowledge.

The topic of the school has been chosen following the observation that two different communities have similar physical concerns in terms of magnetism, however have followed largely separate routes in the past decades. The first community, here shortened as *Bulk*, is interested in the microscopic investigations of unconventional magnetism in bulk materials. The second community, here shortened as *Nano*, is interested in the study of the physical properties and manipulation of engineered magnetic heterostructures at the nanoscale. These two communities could highly benefit from cross-fertilization, as many topics indeed exist and are growing in importance where the two communities have a mutual interest: multiferroics, magnetic frustration, spin-orbit coupling, oxitronics, skyrmions, topological matter etc. The community working on *bulk materials* pursues the quest of novel phases and associated exotic dynamics. This concerns in particular complex materials in which, in addition to the spin and orbit, there are other degrees of freedom such that lattice and charge, and additional ingredients like magnetic frustration or strong spin-orbit coupling. The motivations in this field are to understand the microscopic mechanisms at the basis of new behaviours, thus revealing fundamental concepts and theories in condensed matter that can spread well beyond the field of magnetism. The community of *nanomagnetism* is involved in the investigation of new functionalities associated to size reduction and interface effects at the nanoscale, magneto-resistance and spin-transfer in heterostructures, magnetization dynamics and novel ways to control magnetism, all topics intimately linked with condensed matter physics. Beyond the advancement of knowledge, these are largely motivated by the high potential of nanomagnetic systems for present and future technological applications, particularly based on spintronics. The experimental and theoretical tools employed by both communities are also largely distinct, as well as, often, the temperature and energy (time) ranges of investigation. **The aim of this school is actually to prepare the next generation of scientists in both these fields to work in closer collaboration**. A first half of lectures will provide a general introduction to fundamentals of Magnetism. Then, more specialized lectures will deal with the 2017 thematic of the school. It is worth mentioning that beside the physics lectures, we will also have two industrial perspectives talks during the school as well as several practicals, question/discussion sessions, and relaxing

events.

We hope that the 2017 ESM edition, aiming at providing a thorough understanding of the fundamentals of magnetism, will provide you also new horizons about spin textures, complex magnetic excitations, topological matter, magnetic frustration and chirality, spin-orbit coupling, those many concepts that are under the focus of the two communities of bulk and nanomagnetism. The school, by training you as the future generation of researchers in magnetism and by favouring networking, should also contribute to strengthen the link between the two communities.

All for previous editions, the slides for all lectures can be found on ESM web site:

http://magnetism.eu/school/2017/program

As regards future events, note that the next ESM will be held from Sept. 17th to 28th 2018 in Kraków, Poland. The school will be chaired by Marek Przybylski and will deal with *Magnetism by light*.

We wish you a very nice School, on behalf of the organizing committee and all the lecturers, Virginie Simonet.