

## PhD Fellowship at Uni Liege

The University of Liege offers full funding for a teaching assistant in the department of Physics, starting September 2009. The position is either for a duration of 3 years for a PhD student, or one year, renewable, for a post-doc. The candidate will carry out research in ab initio materials science, on either of the two subjects listed below. He/She will also have teaching responsibilities (tutoring and problem classes). For this reason, a working knowledge of French is important, although high-quality proposals from non-native speakers are encouraged and will certainly be considered.

### Scientific Topics

1) First principles modeling of spin-dependent electron-phonon coupling, in the context of spintronics applications. The progressive exhaustion of the possibilities of traditional silicon based semiconductors has given rise to a creative array of alternative technologies. One of the most promising is spintronics, using electron spin currents, instead of charge transport, to improve the speed, energy-efficiency, and integration of nano-electronical devices. The aim here is to explore spin relaxation mechanisms due to interactions with vibrations, and thermal effects on spin dynamics, both in ferromagnetic materials and in heavy element alloys with complex non-collinear magnetism.

2) The study of high temperature and pressure phase transitions in materials with complex bonding characteristics. Most elements possess a regular bonding behavior, preferring just one or two types of chemical hybridization in different environments. Some species, such as P, As, Bi, or carbon, have a much more complex behavior, with a large variability in bonding geometries and resulting crystal structures. This can give rise to novel and application-rich phases and structures. The phase transitions and underlying mechanisms will be investigated using Density Functional Theory based methods.

A full CV and two letters of recommendation should be sent to the following address, preferably electronically:

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