The European School on Magnetism 2017

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Lecture:

Magnetic frustration (bulk and nano)

The purpose of this lecture is to give an introduction to magnetic frustration, from the theoretical point of view, but also with the support of condensed matter and meta material examples. I will focus only on geometrical frustration, meaning that I will not address disorder and the vaste field of spin glasses. On the contrary, I will emphasise the notions of spin liquids and spin ices, should they be classical or quantum, and discuss how strongly correlated systems or models may remain disordered down to the lowest temperatures. This of course leads to non trivial thermodynamics, or dynamics, the signatures of which are not always trivial to obtain. I will give examples of fractionalisation of degrees of freedom, which are at the heart of many modern subjects, as well as examples of emergence, i.e. how collective behaviours of microscopic degrees of freedom can be described by effective quasi particles that do not have particle like equivalents.