



Understanding magnetic order and disorder

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Abstract

Magnetic order in solids may be understood within Lev Landau's framework of spontaneously broken symmetry. We will discuss the Landau mean-field description of magnetic order, along with the notion of critical behaviour. I will stress the role of dimensionality in determining the properties of a magnet, illustrated with the behaviour of some model magnetic systems formed from molecular building blocks. The renormalization group provides us with a means of examining the physics of a system at a particular energy scale, and I will introduce this method using Anderson localization as an example, before discussing its predictions for magnetism. Finally we will discuss the idea of the antiferromagnetic spin dimer as a building block of disordered quantum magnetic phases.