

Spin-lattice coupling effects in the iron based superconductors

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Abstract

The newly discovered iron based superconductors with unusually high transition temperatures exhibit a rich phase diagram that includes structural, magnetic and superconducting transitions. As such these materials are the latest playgrounds to study how in complex materials different phases compete, and how this unconventional setting eventually gives rise to superconductivity. The first part of the talk will be an experimental review of this topic. From a theoretical point of view one of the goals at present is to identify the microscopic interactions that give rise to the rich phase diagram. This is the motivation to present in the second part of the talk a study of the effects of magneto-elastic couplings between the magnetic and the lattice degrees of freedom. We will argue that several unusual magneto-structural features of these materials can be understood from this point of view.