Iron-based superconductors as probed by Nuclear Magnetic Resonance.

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In this seminar I will provide some insights into the underlying physics of iron-arsenides and I will focus on a detailed microscopic investigation regarding the structural/nematic-magnetic transitions in pure and slightly substituted BaFe$_{2}$As$_{2}$ single crystals by means of Nuclear Magnetic Resonance (NMR). The combination of NMR with high-resolution synchrotron x-ray diffraction and specific heat measurements revealed that a structural tetragonal-to-orthorhombic transition spontaneously emerges prior to a paramagnetic-to-antiferromagnetic (Spin Density Wave) one with well distinguished transition temperatures. We conclude that the nematic phase survives within a finite temperature range, which is mostly dependent on the level of substitution rather than the sort of impurity into the Fe site. Moreover, our results thus shed new light on the issue related with electronic doping and orbital differentiation in iron-arsenides.