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**Various forms of coexistence of superconductivity and magnetism in iron-pnictide superconductors:
a NMR study¹**

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Our NMR studies of iron pnictides allowed us to discover various forms of coexistence between superconductivity and magnetism. In Co-doped BaFe₂As₂, superconductivity and incommensurate antiferromagnetism coexist at the atomic level in an homogeneous state. In contrast, Ru isovalent doping leads to a disorderd situation where superconducting clusters appear in an antiferromagnetic background. Finally, in the 245 iron-selenide RbFeSe, antiferromagnetism and superconductivity separate in alternate layers of nanometer thickness. But in all these componds, the superconducting state remains similar in terms of local susceptibility and carrier doping. It looks as if, for superconductivity to appear, frozen Fe magnetic moments need to be small enough or far enough in distance, whatever the cause. Y. Texier et al., PRL 108, 237002 (2012); Y. Laplace et al., PRB Rapid Com 86, 020510(R) (2012); Y. Laplace, PRB Rapid Com 80, 140501 (2009)

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