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Coexistence between superconductivity and magnetism in the iron pnictides[1] RAFAEL FERNANDES, JÖRG SCHMALIAN, Ames Laboratory and Department of Physics and Astronomy, Iowa State University, Ames, Iowa 50011 — In this work, we present a theory to analyze the coexistence between the antiferromagnetic and the superconducting phases in the iron arsenides. Particularly, we focus on how distinct regimes of competition between these two phases are related to different symmetries of the Cooper pair wave-function. Using a mean-field microscopic model where superconductivity and itinerant antiferromagnetism are caused by electrons sharing the same bands, we show that while the so-called s^{++} state is generally incompatible to the antiferromagnetic phase, the unconventional s^{+-} state can coexist with magnetism depending on the Fermi surface topology. Neutron diffraction data on $Ba(Fe_{1-x}Co_x)_2As_2$ supporting these conclusions are also presented.

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