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Spin fluctuation pairing in Fe-based superconductors and its consequences¹

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The new Fe-based superconductors have occasioned excitement because transition temperatures are high and it is hoped that comparisons to cuprates can lead to new insights on the essential ingredients to high temperature superconductivity. According to conventional weak coupling spin fluctuation models, A_{1g} (sign-changing “s-wave”) states are probably favored. Such states may be isotropic on each Fermi surface sheet or highly anisotropic, possibly with order parameter nodes. I discuss how the anisotropy of the ground state can depend on interaction parameters, electronic structure, and disorder effects. Experiments indicating a possible gapped-nodal crossover in these systems will be discussed in this framework.

[1] S Graser et al., *New J. Phys.* **11**, 025016 (2009).

[2] T. A. Maier et al., *Phys. Rev. B* **79**, 224510 (2009).

[3] K. Kuroki, H. Usui, S. Onari, R. Arita, and H. Aoki, *Phys. Rev. B* **79**, 224511 (2009)

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