Abstract for an Invited Paper
for the MAR10 Meeting of
The American Physical Society

Experimental and computational evidence for the $s_{\pm}$ pairing symmetry in Fe-based superconductors

IGOR MAZIN, Naval Research Laboratory

I will first review the basic theoretical arguments that led to the so-called $s_{\pm}$ symmetry being predicted well before any experimental indications. I will discuss possible roles of phonons and of spin fluctuations, including possibility of electron-phonon coupling enhancement through magnetoelastic effects. Next I will list *negative* experimental evidence and argue that triplet pairing and d- wave pairing can be with a good degree of confidence excluded. Lastly, I will address the issue of distingushing between the $s_{\pm}$ and a conventional s_{++} states, in terms of already existing and potential experiments. While the question of nodal *vs.* nodeless superconductivity is not immediately related to the $s_{\pm}$ *vs.* s_{++} choice, I will briefly discuss the fact that gap nodes seem to exist in some, but not the others, Fe-based superconductors, and possible theoretical mechanisms for that.