

Neutron Scattering studies of iron arsenide superconductors

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In this Talk, I describe the most recent progress in the field of iron-based superconductors. Using neutron scattering as a probe, we study spin excitations in FeAs-based superconductors and its undoped parent compounds. For the undoped CaFe_2As_2 , we determine the entire spin wave dispersion curve and show that magnetic exchange coupling has strong in-plane exchange anisotropy with no evidence for Stoner continuum. Upon doping to induce superconductivity, we find that the spin excitations spectrum is dominated by a large spin gap and a neutron spin resonance. We show that the resonance is directly connected with superconducting electronic gap. These results suggest that spin excitations are the most promising candidate for electron pairing and superconductivity in iron-based superconductors.