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Magnetically driven nematicity in the iron-pnictide superconductors

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While the existence of nematic order in iron-based superconductors is now a well-established experimental fact, its origin remains controversial. In this talk we discuss the physical motivation and experimental implications of Ising nematic order caused by magnetic fluctuations. We demonstrate how emergent nematic order and nematic fluctuations are consistent with the overall phase diagram as well as numerous properties of both the normal and superconducting states of the iron pnictides. Due to its magnetic origin, nematic order enhances the strength of magnetic fluctuations and induces a highly anisotropic fluctuation spectrum, leaving distinctive signatures that affect elastic and transport properties, neutron scattering experiments and the NMR spin-lattice relaxation rate. In particular we show that scaling between magnetic and lattice fluctuations provides strong evidence for a magnetically-driven nematicity in the iron-pnictide superconductors.