

Magnetism and Superconductivity in the Pnictide High Temperature Superconductor $\text{SmO}_{1-x}\text{F}_x\text{FeAs}$

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Muon-spin rotation and relaxation experiments were performed on the pnictide high temperature superconductor $\text{SmO}_{1-x}\text{F}_x\text{FeAs}$ with the transition temperature determined by μSR reaching $T_c = 49$ K at $x = 0.18$ [1]. A complex magnetic behaviour was observed which demonstrates the distinct role played by slow fluctuations of the magnetic moments in this system. In particular, a temperature dependent enhancement of the spin fluctuations was seen to take place over a broad temperature region centred on the superconducting transition, crossing over to a region deep within the superconducting state where the fluctuation rate is independent of temperature. An estimate of the in-plane penetration depth $\lambda_{ab}(0) = 184(15)$ nm was obtained for the $x = 0.18$ sample and a comparison with measurements across the range of pnictide superconductors indicates that they obey an Uemura-style linear relationship between T_c and $\lambda_{ab}(0)^{-2}$.

[1] A.J. Drew, F.L. Pratt, T. Lancaster *et al*, cond-mat/0805.1042