Superfluid Density in the 111 Fe Pnictide Superconductors C. J. ARGUELLO, T. GOKO, J.P. CARLO, Y.J. UEMURA, Columbia University, A.A. ACZEL, T.J. WILLIAMS, G.M. LUKE, McMaster University, C.Q. JIN, Beijing IoP

— We performed muon spin relaxation studies in two kinds of '111' iron pnictides, Li$_{1.1}$FeAs and Li$_{0.9}$FeP. The zero field spectra of the latter show a fast relaxation in a small volume fraction (approximately 13%) due probably to magnetism. In the case of the arsenide, the zero field spectra show a completely paramagnetic state. Below Tc, an applied transverse field allowed us to measure the superfluid density (via relaxation rate $\sigma$) for both compounds. We found that both of them have very high superfluid density and low Tc: $\sigma(T = 2K) \simeq 1.8 \mu s^{-1}$ with Tc$\simeq$18K for Li$_{1.1}$FeAs, and $\sigma(T = 2K) \simeq 2.0 \mu s^{-1}$ with Tc$\simeq$4K for Li$_{0.9}$FeP.

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