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ME-μSR study in YBCO vortex states.[1] T.H. LE, Reed College, C. BOEKEMA, San Jose State University, WISE @ SJSU COLLABORATION — We are analyzing μSR vortex data of $YBa_2Cu_3O_{7-\delta}$ (T_c = 91 K). The average superconducting grain size is $\sim$20 μm. The μSR data are recorded in a transverse 1 kOe field and at temperatures below 10 K. The μSR technique is used to probe the magnetic fields in the cuprate vortex state. The μSR signals show an oscillatory time dependence. To determine the frequency-dependent signals, we use the Maximum Entropy (ME) transform technique. [2] The ME-Burg algorithm removes noise, and does not suffer from Fourier-like truncation effects. The frequency signals are better fit with Lorentzians than static Gaussians. This Lorentzian behavior indicates the existence of dynamic magnetism in and around the vortex cores. This is consistent with earlier YBCO vortex ME-μSR results [3] and the SO(5) modeling [4] of cuprate superconductivity, predicting the existence of antiferromagnetism in the vortex states. Research is supported by NSF-REU and WiSE at SJSU. [1] C. Boekema *et al*, Physica C282-287 (1997) 2069. [2] J Lee *et al,* J Appl Phys 95 (2004) 6906 and ref therein; AIP www: Virtual J Appl of Superconductivity 2004 V6 Iss11. [3] C. Boekema *et al*, 8th Int M2S-HTSC Conf, Physica C in press. [4] H-D Chen *et al,* Phys Rev B70 (2004) 024516; SC Zhang, Science 275 (1997) 1089.

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