Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

μSR search for loop currents in GdBCO[1] T. SONGATIKAMAS, San Jose State University, H. SIO, Harvey Mudd College, R. NORRIS, M.C. BROWNE, C. BOEKEMA, San Jose State University — In the cuprate pseudogap phase, Varma [1] predicts loop currents above T_c. We search for magnetic fields created by such currents in $GdBa_2Cu_3O_{(7-\delta)}$ (GdBCO). Using Maximum Entropy (ME) [2] we analyze zero-field (ZF) muon-spin-resonance (μSR) data [3] of GdBCO. ME-μSR applied to ZF-GdBCO data yields a frequency distribution with T-dependent signals at 0-MHz [3] and 0.3-MHz (f1) and hints of 1.4-MHz (f*) signals. To cancel systematic f1 effects, we analyze DS(t,T) $\equiv$ S(t,T>T_c) - S(t,T'<<T_c) by ME analysis. We find, f1 disappears and weak f* signals are seen above T_c. Their existence is similar to anomalous polar-Kerr behavior observed in YBCO. [4] We attribute the f* signals at $\sim$1.3 MHz (95 Oe) for underdoped GdBCO and $\sim$1.5 MHz (110 Oe) for optimal doped GdBCO to fields created by loop currents. Our TF μSR GdBCO evidence indicates, the muon probes at muon-O sites near the BaO and CuO-chain insulating layers without disturbing potential loop currents in the CuO_2 planes. Validating predicted loop currents [1] is essential for a better understanding of the pseudogap phase. [1] CM Varma, PRL 83 (1999) 3538. [2] C Boekema and MC Browne, MaxEnt 2008, AIP Conf Proc #1073 p260; JC Lee *et al,* J Appl Phys 95 (2004) 6906. [3] DW Cooke *et al*, PRB37 (1988) 9401. [4] J Xia *et al*, PRL 100 (2008) 127002

[1]Research is supported by REU-NSF, DOE-LANL and AFC.

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Date submitted: 24 Nov 2009 Electronic form version 1.4