Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

On the Nature of the Superconducting Transition in YBCO[1] M. YETHIRAJ[2], Bragg Institute, ANSTO, S.J. CROWE, D. MCK. PAUL, University of Warwick, D.K. CHRISTEN, ORNL, M. ARAI, Japan Atomic Energy Agency, T. YOKOO, Institute of Materials Structure Science, KEK, L. PORCAR, P.D. BUTLER, NCNR, NIST — In the high-Tc superconductor YBCO, a transition was observed from a hexagonal FLL at low magnetic field (parallel to the c-axis) to a square configuration at high fields. Also seen was a rapid decrease in the Bragg intensity at low temperature (T). It has been the general belief that both the symmetry change and the T-dependence behaviour was due to the d- wave nature of high-Tc superconductivity. However, we observed that the fall-off in intensity with increasing temperature depended on the strength of the applied external field and that excellent fits to this T-dependence could be obtained by simply multiplying the temperature dependence of the familiar Ginzburg-Landau two-fluid model, appropriate for high-kappa materials conventional superconductors, by an exponential factor exp(-aT), with the field-dependent variable 'a' being the only free parameter. The impact of these observations on the symmetry of the order parameter will be discussed.

[1]Measurements were made on the NG7SANS at NCNR, NIST. Work supported by the USDOE under contract with ORNL.
[2]Previous Affiliation: Oak Ridge National Laboratory

Mohana Yethiraj
Bragg Institute, ANSTO

Date submitted: 20 Nov 2006 Electronic form version 1.4