Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Angularly Dependent, Contact-free Current Density Measurements of YBCO Coated Conductor J.W. SINCLAIR, J.R. THOMPSON, Dept Physics, Univ. Tennessee, Knoxville, TN, USA, D.K. CHRISTEN, Y. ZHANG, Oak Ridge Natl Lab, Oak Ridge, TN, USA — Studying the angular dependence of the current density J gives insight into vortex pinning. We investigated a coated conductor of $YBa_2Cu_3O_{\sim 7}$ containing c-axis correlated defects (stacks of $BaZrO_3$ particles), striated into six strips to give a high aspect ratio. The current density was determined inductively from the magnetic moment $m \sim J$, using a SQUID magnetometer. The sample was mounted on a horizontal rotating platform to vary the angle θ of the sample with respect to the vertical applied magnetic field. The magnetometer allows us to measure both the longitudinal and transverse components of moment $\mathbf{m}(\theta)$, enabling calculation of the angular dependence of J. For a large range of applied magnetic fields at various temperatures, we found a pronounced peak in $J(\theta)$ at an angular value (θ_{peak}) near the c-axis. We observed that, for a large range of applied magnetic fields, θ_{peak} linearly scales with $1/h$, where $h = (H/H_{c2})$ is the reduced field. Research sponsored by DOE, Division of Materials Sciences and Engineering, and Office of Electricity Delivery and Energy Reliability.

John Sinclair
University of Tennessee Knoxville

Date submitted: 07 Dec 2008 Electronic form version 1.4