Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Finite size effects in NMR T_2 relaxation by vortex vibrations[1]
RACHEL WORTIS, Trent University, ERIC BROWN, SINAN BULUT — Nuclear magnetic resonance measurements are a powerful probe of electronic behavior in superconductors, but a precise understanding of all relaxation mechanisms is required to draw accurate conclusions. A previous calculation of the rate of transverse relaxation in the cuprate superconductor $YBa_2Cu_3O_{7-\delta}$ based on an overdamped elastic model of vortex motions predicted relaxation rates orders of magnitude slower than those observed in experiments, despite strong experimental evidence pointing to vortex vibrations as the dominant relaxation mechanism. Here the finite size of the powder grains is explicitly included in the calculation, and we find that both the relaxation rate and the time dependence of the recovery seen in the experiments can be accounted for. The dependence of the relaxation rate on the size and shape of the samples is explored.

[1]Supported by NSERC of Canada, SHARCNET and Trent University.

Rachel Wortis
Trent University

Date submitted: 27 Nov 2007 Electronic form version 1.4