Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

**One dimensional Brownian rotation of magnetic microspheres** MIRI SHLOMI, University of Michigan, BRANDON MCNAUGHTON, RAOUL KOPELMAN, University of Michigan, Ann Arbor, PANOS ARGYRAKIS, University of Thessaloniki, Greece — Many experimental observations of 3D random rotations of particles have been interpreted using Einstein's 1D Gaussian solution. However, in contrast to 1D, 3D rotations are non-commutative, and cannot rigorously be described by Einstein's model. To test the potential discrepancy between theory and experiment, we monitor a particle rotating freely around a single fixed axis, subsequently comparing it with the particle's 3D Brownian rotation. To carry out these observations, we use a fluorescent ferromagnetic microsphere that has one hemisphere coated with an opaque metal (aluminum), while the other is left intact. In rotating, the particle undergoes intensity fluctuations which are observed in a fluorescent microscope. Restraining the rotation by aligning the ferromagnetic particles with an external magnetic field, allows us to see, for the first time, Brownian rotation of a sphere around a fixed axis.

Miri Shlomi
University of Michigan

Date submitted: 27 Nov 2007 Electronic form version 1.4