## Abstract Submitted for the MAR12 Meeting of The American Physical Society

Using Micron-Sized Ellipsoids as a New Tool for Microrheology DAVID C. KILGORE, KENNETH W. DESMOND, ERIC R. WEEKS, Emory University — Microrheology is a well-established technique, and in its simplest form it allows you to measure the viscosity of a fluid by examining the diffusion of microspheres, provided the diameter of the microspheres is known. We are developing a similar technique using ellipsoids, where the viscosity can be calculated without prior knowledge of the length and width of the ellipsoid. The asymmetry of ellipsoids provides a distinct advantage, allowing for the diffusion to be decomposed into two translational motions and one rotational motion. For each of these diffusive motions, we can measure a diffusion constant and relate the constant to the three unknowns: the length and width of the ellipsoid, and the viscosity. By measuring the three diffusion constants, we can determine the three unknowns. To verify this technique, we produce ellipsoids in the lab and suspend them in a viscous solution for three-dimensional imaging of the diffusion with a confocal microscope. We are able to get good agreement between the microrheological measurements and macroscopic viscosity measurements.

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