

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Optical Tweezer as a Viscometer¹ DANIEL ERENZO, SAMUEL EL-ROD, TAYLOR BARNES, ANTHONY FARONE , MARY FARONE, Middle Tennessee State University — An optical tweezer (OT) has been widely used to study the mechanical properties of microscopic living biological systems like red blood cells. These studies are based on measurement of deformations caused by a force exerted directly or indirectly by an optical trap. The trap is usually pre-calibrated using Stokes viscous force of the suspension fluids for the biological system which is directly proportional to the viscosity of the fluids. Therefore, calibration of the trap depends on the viscosity of the fluid which depends on temperature. In this work, we have demonstrated that OT can be used to precisely measure the viscosity of biological fluids affected by temperature. Using a an infrared laser trap which is calibrated using silica sphere suspended in a distilled deionized water and measuring the power as function of escape velocity, we have measured the viscosities of a newborn and unborn bovine serum with a different concentration of antibodies.

¹Daniel Erenzo and Anthony Farone acknowledge support from FRCPC, and Taylor Barnes and Adam Shulman acknowledge support from URSCA at Middle Tennessee State University.

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Date submitted: 21 Nov 2008

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