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Rotational Diffusion of Plasmon-Resonant Gold Nanorods for Depth-Resolved Microrheology Using Optical Coherence Tomography[1] AMY OLDENBURG, RAGHAV CHHETRI, University of North Carolina at Chapel Hill, KRYSTIAN KOZEK, AARON JOHNSTON-PECK, JOSEPH TRACY, North Carolina State University — The ability to perform microrheology in optically thick samples would enable analysis of bulk tissues. Optical coherence tomography (OCT) provides imaging several mean free scattering path lengths into tissue. In this study we report the use of plasmon-resonant gold nanorods as microrheological sensors in OCT. Nanorods exhibit a longitudinal mode that is excited when they are oriented parallel to the polarization of the incident light, which is favorable for passive microrheology using polarized light to monitor their rotational diffusion. We demonstrate measurements of the rotational diffusion of unconfined, colloidal gold nanorods using polarization-sensitive OCT, and validate the Stokes-Einstein relationship for the nanorods in simple fluids of varying viscosity. We then show that OCT provides depth-resolved imaging of fluid viscosity through measurements of the rotational diffusion rate of the nanorods.

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[X] Prefer Oral Session
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