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Holographic microrefractometer HAGAY SHPAISMAN, BHASKAR J. KRISHNATREYA, DAVID G. GRIER, Department of Physics and Center for Soft Matter Research, New York University, New York, NY 10003 — In-line holographic microscopy of micrometer-scale colloidal spheres yields heterodyne scattering patterns that may be interpreted with Lorenz-Mie theory to obtain precise time-resolved information on the refractive index of the suspending medium. We demonstrate this method's efficacy with measurements on calibrated refractive index standards, and apply it to measurements of varying Sucrose concentration in a microfluidic channel. Using commercial colloidal spheres as probe particles and a standard video camera for detection yields volumetric refractive index measurements with a resolution approaching 10^{-3} RIU for each probe particle in each holographic snapshot. The combination of spatial resolution, temporal resolution, multi-point *in situ* access and technical simplicity favor this approach for cost-effective lab-on-a-chip applications.

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