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Holographic deconvolution microscopy for high resolution particle tracking[1] LISA DIXON, FOOK CHIONG CHEONG, DAVID GRIER, New York University — Rayleigh-Sommerfeld back-propagation can be used to generate a volumetric reconstruction of the light field responsible for the recorded intensity in an in-line hologram. Deconvolving the three dimensional light intensity with an optimal kernel derived from the Rayleigh-Sommerfeld propagator itself emphasizes the objects responsible for the scattering pattern while suppressing undesired artifacts. Bright features in the deconvolved volume may be identified with such objects as colloidal spheres and nanorods. Tracking their thermally-driven Brownian motion through multiple holographic video images provides estimates of the tracking resolution, which approaches 1 nm in all three dimensions.

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