Title:	Universal Long-Range Nanometric Bending of Water by Light
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Abstract:	Resolving mechanical effects of light on fluids has fundamental importance with wide applications. Most experiments to date on optofluidic interface deformation exploited radiation forces exerted by normally incident lasers. However, the intriguing effects of photon momentum for any configuration, including the unique total internal reflection regime, where an evanescent wave leaks above the interface, remain largely unexplored. A major difficulty in resolving nanomechanical effects has been the lack of a sensitive detection technique. Here, we devise a simple setup whereby a probe laser produces high-contrast Newton-ring-like fringes from a sessile water drop. The mechanical action of the photon momentum of a pump beam modulates the fringes, thus allowing us to perform a direct noninvasive measurement of a nanometric bulge with sub-5-nm precision. Remarkably, a <10nm difference in the height of the bulge due to different laser polarizations and nonlinear enhancement in the bulge near total internal reflection is isolated. In addition, the nanometric bulge is shown to extend far longer, 100 times beyond the pump spot. Our high precision data validate the century-old Minkowski theory for a general angle and offer potential for novel optofluidic devices and noncontact nanomanipulation strategies
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