Title:	Picometer resolved nanoscale optomechanics of micro-droplet
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Abstract:	ABSTRACT Interaction of light with fluid produces many competing phenomena at the nanoscale, which are less well understood due to the lack of picometer precision in measuring optofluidic deformation. Here, we employ a microliter sessile fluid drop as a self-stabilized laser microinterferometer and resolve its nanoscale interface dynamics, with precisions of about 600 pm in real-time and 20 pm with a modulated beam, below the thermal limit. For evaporating droplets having various absorbance values, we isolate a nanodimple due to laser heating from the nanobump induced by Minkowski's optical momentum transfer. We model the dimple as resulting from a negative surface-tension thermal gradient induced by nonuniform local temperature variation, which we resolved with unprecedented 600 nK precision, besides detecting pN level radiation pressure force at the transparent fluid interface. These signatures are generic for a wide variety of fluids including Au-nanoparticle suspension, olive oil, glycerine, and biofluids such as egg-white and human saliva. Our study opens a route to achieve picometer precision with tiny fluid samples for intriguing applications.
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