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Simple and versatile non-contact technique for measuring the interfacial tension of a liquid-liquid interface using pulsed acoustic radiation pressure

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We present a versatile non-contact technique for measuring the interfacial tension of a liquid-liquid interface using the acoustic radiation pressure. This technique is based on the analysis of the shape of the time-dependent deformation of the liquid interface induced by the radiation pressure of a focused, pulsed ultrasonic beam. It combines a simple optical detection step and a novel analytical model of interface deformation dynamics that accurately takes into account interfacial, gravitational, as well as viscous effects in both weakly and highly viscous limits. The accuracy of this technique is experimentally demonstrated on liquid-air and liquid-liquid interfaces.