Abstract Submitted
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Correlation-Force-Spectroscopy Rheometer[1] MILAD RADIOM, BRIAN ROBBINS, CHRISTOPHER D.F. HONIG, JOHN Y. WALZ, MARK R. PAUL, WILLIAM A. DUCKER — We describe a new method, correlation force spectrometry, which characterizes fluids through measurement of the correlations between the thermally-stimulated vibrations of two closely spaced micrometer-scale cantilevers in fluid. We discuss applications to measurement of the rheological properties of complex fluids at high frequency and high spatial resolution. We measure a large range of frequencies (up to 1 MHz) and use very small sample volumes (μL) and demonstrate that the thermal noise in the cross correlation is much smaller than in the autocorrelation. Our experimental measurements of the equilibrium fluctuations in cantilever displacement for cantilever pairs immersed in a Newtonian fluid are described accurately using a theoretical approach based upon the fluctuation-dissipation theorem [Paul and Cross, Phys. Rev. Lett. 92, 235501 (2004)].

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