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A new method for analyzing high-frequency microrheology data KENGO NISHI, Goettingen University, MARIA KILFOIL, University of Massachusetts Amherst, CHRISTOPH SCHMIDT, Goettingen University, FRED MACKINTOSH, Rice University — Passive microrheology is an experimental technique used to determine the mechanical response of soft materials from the measured fluctuations of micron-sized beads embedded in the medium. In one common approach, one uses the fluctuation-dissipation theorem to obtain the imaginary part of the material response function from the power spectral density of bead displacement fluctuations, while the real part of the response function is calculated using a Kramers-Kronig integral. The high-frequency cut-off of this integral strongly affects the real part of the response function in the high frequency region. To moderate the influence of the high-frequency cut-off, we propose a new analysis method for passive microrheology, using the fluctuation-dissipation theorem in the time domain. To test the validity of this method, we conducted one- and two-particle microrheology experiments, and a systematic numerical error analysis using synthetic data.

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