Abstract Submitted
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Calibration of optical traps by dual trapping of one bead[1] PAVEL DUTOV, JAY SCHIEBER, Illinois Institute of Technology — Optical trapping and tracking is a powerful method for many biological and rheological applications. Recent advances in microrheological techniques, like two-point microrheology, allow probing mechanical properties of viscoelastic networks with mesh size bigger than the size of the microbead itself, but require high signal to noise ratio. Noise level in the system can be reduced by removing active elements, like acousto-optical deflectors or galvo-mirrors from the optical train and making the trap fixed. We introduce a method for optical trap calibration that is suitable for viscoelastic material and allows calibration of a fixed trap. The method is designed for use on experimental setups with two optical tweezers and based on pulling a particle with one trap while simultaneously holding it with the other. No piezo-stage is needed and only one optical trap must be movable with galvo-mirrors, piezo-mirrors or acousto-optical deflectors. The method combines advantages of commonly known PSD-fitting and fast-sweeping methods, allowing calibration of a completely fixed trap in a fluid of unknown viscosity/viscoelasticity.

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