A DRIFT-CORRECTED, HIGH-RESOLUTION OPTICAL TRAP

Tech ID: 22763 / UC Case 2013-022-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,126,546	11/13/2018	2013-022

BRIEF DESCRIPTION

Optical trapping systems are commercially available through several companies. In these systems, the optical trap precision relies on the passive stability of the instrument itself, and therefore demands costly engineering solutions to limit environmental noise that can be coupled into the optomechanical components. Consequently, high-resolution measurements are not possible in common biological laboratory settings that typically lack appropriate vibration isolation and temperature stability.

Researchers at the University of California, Berkeley have developed an invention that addresses a critical problem currently limiting the performance of high-resolution optical traps: that the mechanical drift of optical components often results in physical drift in the location of an optical trap that obscures the displacement-of-interest. The motion of biological motor proteins that are specific to interacting with DNA often take steps along the double helix that is on the order of 0.3 nanometers in size. Accurate measurement of displacements on this scale requires that drift of the trap positions be limited to no more than a few angstroms. However, the current best-performing optical traps suffer from instrumental drift that is almost twice what can be tolerated. Owing to the critical role of these components in all optical trapping systems, and the previously undetectable levels of mechanical drift they undergo, we sought to measure the trap drift with angstrom-level precision using a new approach. This new approach has successfully measured for and corrected for the mechanical drift of these components and demonstrated that this novel invention is capable of consistently reducing the noise floor to levels that have not previously been accomplished.

SUGGESTED USES

Makes it possible to perform state-of-the-art measurements in previously inaccessible settings by providing for a real-time measurement of instrument drift

ADVANTAGES

Makes high-resolution measurements possible in common biological laboratory settings.

As a modular addition to commercially available optical traps, this invention broaden the users target market beyond the biophysics specialist to the entire biology community at large.

CONTACT

Laleh Shayesteh
lalehs@berkeley.edu
tel: 510-642-4537.

INVENTORS

» Bustamante, Carlos J.
» Coello, Yves
» Lionberger, Troy A.

OTHER INFORMATION

CATEGORIZED AS

» **Optics and Photonics**
» All Optics and Photonics
» **Biotechnology**
» Bioinformatics
» Genomics
» Proteomics
» **Imaging**
» Molecular
» **Medical**
» Diagnostics
» Imaging
» **Nanotechnology**
» NanoBio
» **Research Tools**
» Nucleic Acids/DNA/RNA
» Protein Synthesis
» Reagents
» Screening Assays

RELATED CASES

2013-022-0

RELATED MATERIALS

University of California, Berkeley Office of Technology Licensing
2150 Shattuck Avenue, Suite 510, Berkeley,CA 94704
Tel: 510.643.7201 | Fax: 510.642.4566
https://ipira.berkeley.edu/ | otl-feedback@lists.berkeley.edu