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Integrated Fluorescence and Interferometry Immunoassay System Based on the BioCD

A highly sensitive, multi-channel device uses simultaneous operation and spatial filtering to optimize biomaterial detection for applications in diagnostics, research, and drug development.

Researchers at Purdue University have developed a new device and method for reading immunoassays on microarrays. Current label-free technologies alone, such as interferometry, have limitations in detection sensitivity and label-based technologies, such as fluorescence, exhibit low photon flux that also inhibits sensitivity. The device created by Purdue researchers can identify biomaterial density on a disk, a BioCD, through a combination of four unique channels including a scattering channel, fluorescence channel, and two interferometric channels (amplitude and phase control) with a sensitivity of 2-5 pg/mm^2. This highly efficient technique allows all channels to operate simultaneously, optimizing biomaterial detection. In addition, this device uses spatial filtering to minimize background noise and improve signal-to-noise ratio. In testing, the system was able to detect a 10 ng/mL target protein with and complex protein background of lysate in 7 mg/mL concentration. This method can be implemented in optic sensing applications including disease diagnostics, biological research, and drug development.

Advantages:

-Improved Signal to Noise Ratio

-Highly Sensitive

-Optimized Detection Range

Potential Applications:

-Disease Diagnostics

-Biological Research

-Drug Development

Technology ID

64791

Category

Biotechnology & Life Sciences/Biomarker Discovery & Diagnostics

Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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Recent Publication:

â€œCombined Fluorescent and Interferometric Detection of Protein on a BioCDâ€

Optics Society of America

Journal of Applied Optics

â€‹DOI: 10.1364/AO.47.002779

Technology Validation: In testing, the system was able to detect a 10 ng/mL target protein with and complex protein background of lysate in 7 mg/mL concentration.

TRL: 9

Intellectual Property:

Provisional-Patent, 2007-01-19, United States | Provisional-Patent, 2007-05-04, United States | Utility Patent, 2008-01-22, United States | PCT-Patent, 2008-01-22, WO | CON-Patent, 2009-12-31, United States

Keywords: Immunoassays, microarrays, label-free technologies, fluorescence, BioCD, biomaterial detection, spatial filtering, optic sensing, disease diagnostics, drug development, Arrays, Assay, Assays, BioCD, biosensor, Biosensors, Biotechnology, Fluorescence, high throughput, Imaging, Light Scattering, Micro & Nanotechnologies, Micro-Array, Molecular Imaging, Multispectral Imaging, Optic Design, Optical Detection, Proteins