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Reference-free Spatial Heterodyne Detection of Intracellular Dynamics

A stable, reference-free interferometer design enables faster and more accurate detection of intracellular dynamics in live tissue for drug discovery, drug development, and personalized medicine applications.

Researchers at Purdue University have developed a new method and interferometer apparatus for detecting intracellular dynamics in living tissue samples. Traditional interferometers use two beams of light, a signal wave, and a reference wave to create an interference pattern that is sensitive to dynamic changes on microscopic surfaces. However, biodynamic imaging using these technologies is affected by mechanical disturbances leading to a low signal-to-noise ratio (SNR). Purdue researchers introduce a new interferometer design that allows for high stability and high sensitivity in detection of intracellular dynamics without requiring a reference wave. In testing with live tissue in vitro, this method was able to achieve higher SNR than traditional interferometers as well as high dynamic range Doppler spectra. Through this approach, live tissue can be analyzed more quickly and accurately. The new technique can be implemented in drug discovery, drug development, and personalized medicine applications.

Advantages

-Reference-Free

-Stable

-Highly Sensitive

Potential Applications

-Drug Development

-Drug Discovery

-Personalized Medicine

TRL: 2

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Category
Pharmaceuticals/Drug Discovery & Development
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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Intellectual Property:

Provisional-Patent, 2020-11-10, United States | NATL-Patent, 2021-11-10, Europe | NATL-Patent, 2021-11-10, Canada | NATL-Patent, 2021-11-10, Japan | PCT-Gov. Funding, 2021-11-10, WO | NATL-Patent, 2023-05-10, United States

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