PURDUE INNOVATES | Office of Technology Commercialization

SubMillimeter Real-Time Circular Dichroism Spectrometer with Metasurfaces

A real-time, submillimeter-sized circular dichroism spectrometer provides power-efficient measurement of chiral structures without requiring a laser or broadband lamp, simplifying biological sensing and structural analysis.

Circular dichroism (CD) spectrometry is a spectroscopic technique where the CD of molecules is measured over a range of wavelengths. It is a very important tool in sensing chiral structures that don't superimpose onto their mirror image and has application areas that include biological sensing, stereochemistry, crystallography, and DNA structural analysis. CD spectrometers measure the spectrum of differential absorption between left and right circularly polarized light (LCP and RCP). Conventional spectrometers utilize a process that includes time-consuming, complicated software and requires increasing the size of the device.

Researchers at Purdue University have developed a real-time CD spectrometer that separates LCP and RCP spectra in space using either a dielectric or metallic metasurface. This technology, which is submillimeter in size, includes a spectrometer that conducts real-time, power-efficient measurement without the need for a laser source or broadband lamp. This technology can generate strong phase accumulation, which can be used to reflect or transmit LCP and RCP at a wavelength dependent angle.

Advantages:

-Eliminates need for a laser, thus eliminating the need to operate with a broadband lamp

-Submillimeter in size

Potential Applications:

Spectrometer use can include, but is not limited to:

-Biological sensing

-Stereochemistry

Technology ID

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Category

Materials Science & Nanotechnology/Nanomaterial Characterization & Imaging Tools
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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View online

-Crystallography

-DNA structural analysis

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Intellectual Property:

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