Wednesday, June 10, 2020

WEBINARS

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A New Approach to Interferometry: Unlocking New Possibilities in UV/VIS Spectroscopy

Wednesday, June 17, 2020 10:00 AM - 11:00 AM EDT

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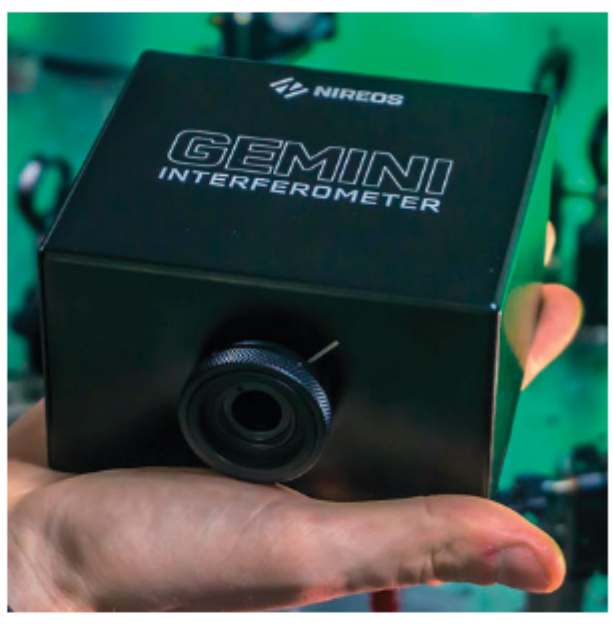
.: About This Webinar



Dispersive spectrometers are compact, industrial-grade devices capable of measuring the spectrum of light from the visible to the infrared (IR) spectral region. However, they are constrained by the presence of an entrance slit, which limits throughput and introduces a trade-off between sensitivity and spectral resolution.

A different approach to measuring the spectrum of light is to use Fourier-transform (FT) spectrometers, which record the interference signal produced by an interferometer. In these devices, the entrance slit is absent, thus providing higher throughput (the so-called Jacquinot advantage). Further, the signal is enhanced because all the wavelengths are detected simultaneously by a single detector instead of multiple ones (the so-called Fellgett advantage).

However, FT spectrometers can be bulky and expensive and can suffer from environmental vibrations. For these reasons, they cannot be easily used in the ultraviolet-visible (UV-VIS) spectral regions, where a high degree of stability is required. They are restricted to the IR and to research labs.

This webinar will describe an ultrastable, common-path (CP) interferometer called GEMINI. The CP design automatically guarantees phase locking between the two interfering replicas. In this way, the device is insensitive to external perturbations, is compact, and can bring all the advantages of FT spectroscopy down to the UV-VIS spectral regions, displaying a flat spectral response from 250 to 3500 nm.

The operation principle of the interferometer will be presented, together with a few applications, such as the measurement of Time-Resolved Emission Spectra (TRES) with picomolar sensitivity and Excitation-Emission Maps (EEM) down to the ultimate sensitivity, by detecting fluorescence/EEM of single molecules at room temperature. Finally, novel applications of the GEMINI interferometer for hyperspectral imaging will be presented.

About the presenter:

Antonio Perri, Ph.D., is chief technology officer at NIREOS in Italy. He coordinates a team of engineers, researchers, and doctoral students to develop spectroscopic solutions in the visible and infrared spectral regions, including interferometers, spectral imagers, and spectrometers.

In 2014 he received a B.S. in engineering physics from Politecnico di Milano, Italy. In 2016, he received an M.S. in photonics and nano-optics, and in 2020, he earned a doctorate degree in physics from Politecnico di Milano. During his doctoral studies, he developed an innovative common-path interferometer and several of its applications in fluorescence spectroscopy, spectral imaging, chirality, and coherent Raman spectroscopy. His work led to the publication of several peer-reviewed articles and to the filing of two international patents. In 2018, he co-founded NIREOS as an official Politecnico di Milano spin-off company.

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