

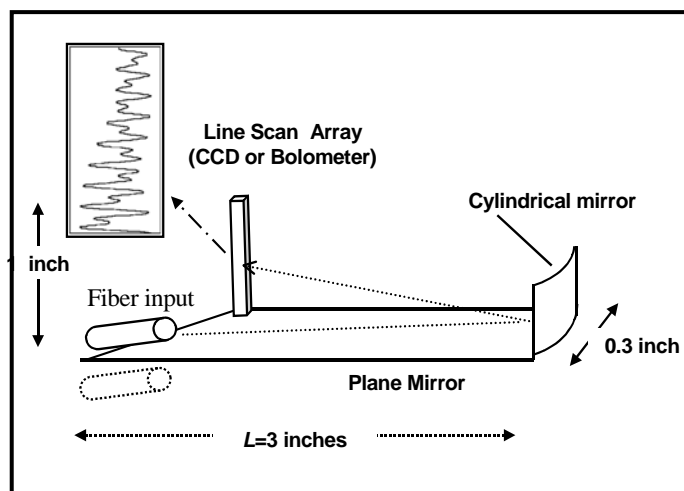
The CUNY Center for Advanced Technology In Photonics Applications (CUNY CAT)
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Compact Real-Time Fourier-Transform Spectrometer Without Moving Parts

The focus of this project is to develop a compact low-cost real-time Fourier-transform spectrometer for fast detection and characterization of chemicals in rapidly changing and/or fast moving environments such as chemicals in clouds and vapor.

The Fourier-transform (FT) technique is known to be a powerful tool for detection and identification of chemical species. Traditionally, the spectrum of the input light is inferred from the Fourier transform of an interferogram generated as the path difference between two arms of a Michelson interferometer is varied. The commercial FT systems with an interferometer equipped with a precision scanning mirror imply prohibitive high cost and substantial bulk volume. Furthermore conventional FT instruments are limited in their speed due to the use of relatively slower mechanically generated path length difference.

This new compact system consists simply of a pair of mirrors and a suitable linear detector array. The instrument utilizes a classical Lloyd's mirror arrangement whereby a light source of unknown spectral contents is placed in close proximity to a mirror such that the inference between the light source and its virtual image generates interference fringes at a plane perpendicular to the mirror. The interferogram is then recorded by a detector array and further analyzed via Fourier transform algorithms to generate the spectrum.



Features

- Miniature and lightweight
- No moving parts
- Wide spectral converge due to no overlapping diffraction orders
- Operation over the range from UV to mid-infrared (with suitable detector array)
- Can operate in rapidly changing environment
- Enclosed, stand-alone, real-time, digitizing spectrometer

This technology opportunity sheet describes continuing efforts in this area. Several patents may have been issued or are pending and which may be available for licensing.

For Details, contact Alan Doctor; email: alan.doctor@qc.cuny.edu; Phone: 718-997-4279 Fax: 718-997-4278
 Queens College • Razran 314 • 65-30 Kissena Boulevard • Flushing, NY 11367 www.cunyphotonics.com