FOURIER TRANSFORM SPECTROSCOPY WITHOUT MICHELSON INTERFEROMETERS

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Michelson interferometers have been for decades the main component of Fourier transform spectrometers. With the advent of femtosecond frequency combs, this obviousness is called into question.
In this talk, a Fourier transform spectrometer based on two frequency combs (2C-FTS) will be presented. One of the frequency combs serves as interferometer.
2C-FTS bears on the same principle as traditional FTS. The key is to make a down conversion of the optical frequencies characterizing the absorption spectrum of interest, so to allow practical measurements. A single detector may be used to record, generally as a function of time, the data called interferogram. The analyzed spectrum is recovered by a Fourier transform operation. In 2C-FTS, the optical frequency down conversion is obtained from the interference between two similar frequency combs. Two different frequency combs with slightly different repetition rates beat with each other. Acquisition time is then of the order of a few milliseconds. This spectrometer has no moving part. It is compact and able to provide detailed and sensitive spectra of single events.