FEMTOSECOND FREQUENCY COMBS: NEW TRENDS FOR BROADBAND SPECTROSCOPY

J. MANDON, P. JACQUET, N. PICQUÉ, G. GUELACHVILI, *Laboratoire de Photophysique Moléculaire, CNRS, Bâtiment 350, Université Paris-Sud, 91405 Orsay cedex, France*.

Frequency combs are new laser sources, equivalent to a million of monochromatic lasers emitting at equidistant frequencies on an octave-spanning spectral range. They have revolutionized the field of fundamental metrology and appear extremely attractive for spectroscopy. This talk will discuss how frequency combs should impact the practice of broadband spectroscopy. Two directions are actually clearly emerging. The first improvement can easily be conceived as an add-on to existing Fourier transform spectrometers. With the comb used as a new light source, numerous commercial instruments may easily improve their performances without modifying their basic structure. Higher sensitivities, reduced acquisition times, self calibration opportunities of the wavenumber scale, and simultaneous measurement of absorption and dispersion spectra will be provided. Second and most importantly, a new generation of Fourier spectrometers is being designed with unprecedented qualities. It is even foreseen that the practice of Fourier transform spectroscopy will not involve any more the Michelson interferometer, which is presently the essential component of Fourier spectrometers. The principles, anticipated fields of application and new opportunities to be offered by this new instrumentation will be presented and commented.