Contribution ID: **58** Type: **not specified**

Laser frequency combs for optical diagnostic and spectroscopy

Wednesday, 30 November 2011 09:45 (35 minutes)

Introduced in the late 1990s, laser frequency combs have revolutionized precise measurements of frequency and time. The regular pulse train of a mode-locked femtosecond laser can give rise to a regular comb spectrum of millions of laser modes with a spacing precisely equal to the pulse repetition frequency. Optical frequency combs have enabled the development of new ultra-precise optical atomic clocks and commercially available combs have quickly matured to routine instruments for precise optical spectroscopy. Emerging novel techniques for frequency comb generation include four-wave mixing of whispering gallery modes in microscopic toroidal optical resonators and hold much promise for on-chip miniaturized comb generators. Frequency combs are now becoming enabling tools for an increasing number of applications, from attosecond science to chemical sensing.

In this lecture, the principles of operation and advances in the technology of optical combs will be introduced. Recent promising applications of laser frequency combs to optical diagnostic will be reviewed. They include molecular spectroscopy, trace gas detection, interferometric distance measurements, optical coherence tomography and calibration of astronomical spectrographs.

Primary author: Dr PICQUÉ, Nathalie (Max Planck Institut für Quantenoptik)

Co-author: Prof. HÄNSCH, Theodor W (Max Planck Institut für Quantenoptik)

Presenter: Dr PICQUÉ, Nathalie (Max Planck Institut für Quantenoptik)

Session Classification: Spectroscopy