

PHYS

Mark Johnson

Tuesday, August 24, 2010

**191 - Broadband coherent spectroscopy in the near infrared using dual coherent frequency combs**

***Dr. Nathan R Newbury, Ian Coddington, Esther Baumann, Fabrizio Giorgetta, William C Swann, Alex Zolot. National Institute of Standards and Technology, Boulder, CO, United States***

Fiber-based frequency combs can provide broadband coherent light that enables new possibilities for high-accuracy, high-resolution broadband spectroscopy. We use a configuration with two coherently phase-locked combs; the output of one comb passes through the sample and is measured by heterodyne detection against the second comb. This system can be viewed as an extension of standard CW laser heterodyne spectroscopy to broadband laser heterodyne spectroscopy, or equivalently, as a coherent comb-based Fourier transform spectroscopy. It can measure both the magnitude and phase of a sample response over the spectral output of the comb. We will discuss our recent work exploring the potential of this comb-based spectroscopy including high signal-to-noise absorption/phase measurements of a molecular gas near 1550 nm as well as efforts to expand the spectral coverage more broadly over the near infrared and mid-infrared. We will also discuss an alternative configuration where the dual comb system is combined with a swept laser to provide both high accuracy and high sensitivity. Finally, we will summarize both the advantages and limitations of this technique.

**Tuesday, August 24, 2010 11:00 AM**

[Physical Chemistry of Spectrochemical Analysis \(08:25 AM - 12:00 PM\)](#)

**Location: Boston Convention & Exhibition Center**

**Room: Room 107A**

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