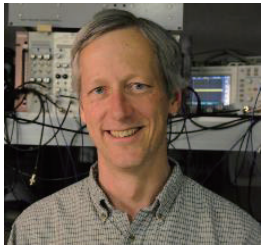
Title: Sending frequency comb light over the air with applications to future optical clock networks and atmospheric spectroscopy

Nathan R. Newbury (NIST, USA)



Abstract: Laser frequency combs can provide new capabilities across a range of precision measurements. I will discuss their unique properties and two applications currently pursued in our group. In both applications, frequency comb light is transmitted over long open air paths. In the first application, we exploit the femtosecond timing noise of frequency comb light to synchronize the time and frequency at two remote sites. This technique should enable future distributed optical clock networks. In the second application, we exploit the broad spectrum of frequency comb light to probe the atmospheric infrared absorption and thereby measure important atmospheric gases, such as carbon dioxide and methane, with high precision.

Biography: Nathan Newbury leads the Fiber Sources and Applications Group in the Applied Physics Division at the National Institute for Standards and Technology in Boulder CO. He and his colleagues focus on applications of highly coherent fiber-laser frequency combs to frequency transfer, metrology and precision spectroscopy. Before joining NIST in 2001, he received a Ph.D from Princeton University in 1992 and spent five years as a staff member at MIT Lincoln Laboratory. He is a fellow of NIST and the OSA.

UEC Seminar talk on April 26th, 2019

Title: Manipulation pulse in a mode locking fiber laser: a route to low noise laser resources

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Abstract: A short introduction for the mode-locking and a brief review of recent work on high power femtosecond fiber laser are demonstrated, which shows that few cycle laser pulse can be obtained by optimization of nonlinear process in fiber laser system. Pulse dynamics optimization also bring great impact on the time jitter of the pulse train. These new laser resources provide convenience for novel applications in the fields of high precision fabrication and measurement, experimental quantum physics, functional materials, etc.

Biography: Prof. Minglie Hu received the B. Eng. in Opto-electronics and Ph.D in Optic engineering degrees from Tianjin University in 2000 and 2005, respectively. For his PhD thesis, he studied the propagation of femtosecond laser pulses in photonic crystal fibers. After receiving his PhD from Tianjin University, Prof. Hu started to work in the ultrafast laser lab of Tianjin University from associate professor to full professor. Since then Prof. Hu focus on the pulse dynamics in the femtosecond fiber laser and amplifier.
Prof. Hu authored or coauthored over 200 peer reviewed publications plus 3 book chapters. Moreover, he holds 23 patents.
His current research interests include mode-locking laser oscillators and amplifiers, fiber lasers, linear and nonlinear propagation in photonic crystal fibers, and microstructure optical device.