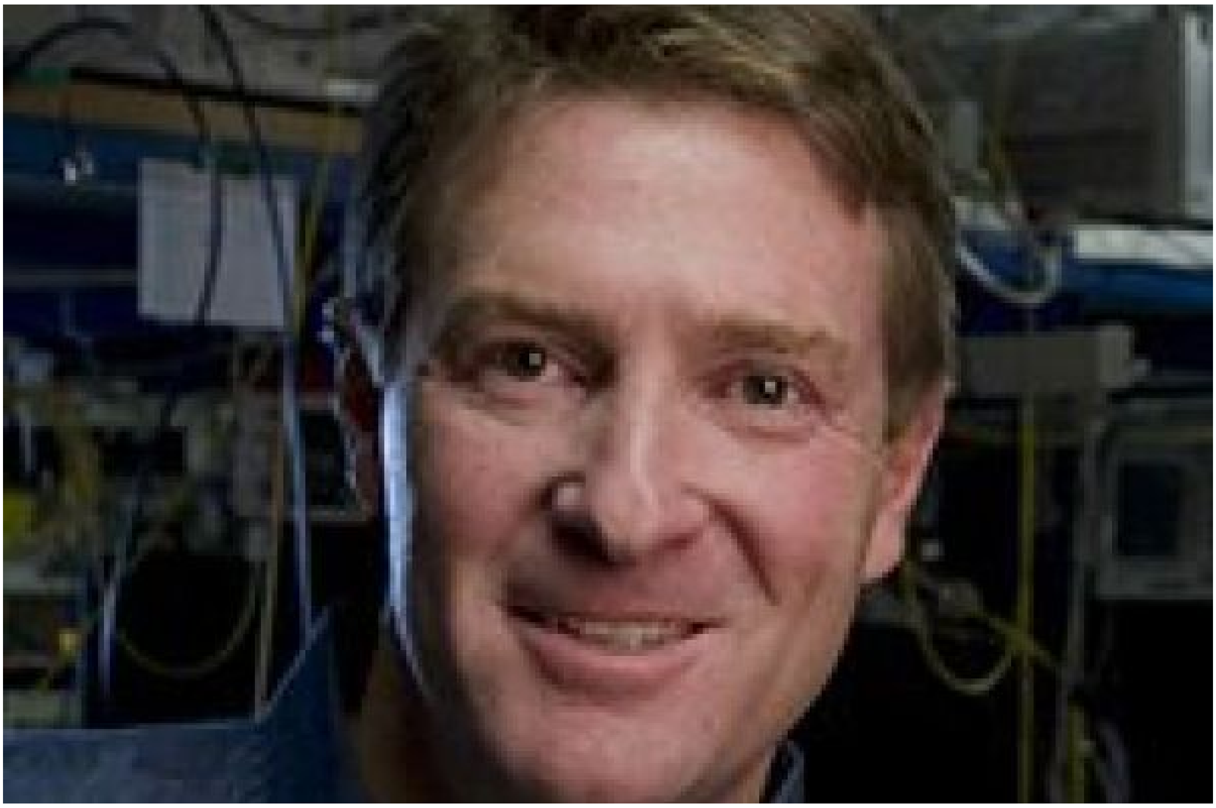

ICFO Colloquium SCOTT DIDDAMS 'Optical Frequency Combs: From Lab Scale to Chip Scale'

SCOTT DIDDAMS

May 09, 2014

Friday, May 9th, 12:00, ICFO's Auditorium

SCOTT DIDDAMS

National Institute of Standards and Technology (NIST) and Professor Adjoint of Physics at the University of Colorado, Boulder, Colorado$$Scott Diddams is an experimental physicist working in the fields of precision spectroscopy and metrology, nonlinear optics and ultrafast lasers. He received the Ph.D. degree from the University of New Mexico in 1996. From 1996 through 2000, he did postdoctroral work at JILA, University of Colorado. In 1998, Diddams was awarded a National Research Council fellowship to work with Dr. John Hall on the development and use of optical frequency combs. Together with colleagues at JILA, he built the first self-referenced, octave-spanning optical frequency comb and used it to demonstrate carrier-envelope phase stabilized pulses, as well as carry out direct optical to microwave measurements. Since 2000, Dr. Diddams has been a staff member and project leader at the

National Institute of Standards and Technology (NIST). With his group and colleagues at NIST, he has continued the development of optical frequency combs and pioneered their use in optical clocks, tests of fundamental physics, novel spectroscopy in the visible and mid-infrared, precision metrology, and ultralow noise frequency synthesis.
In the past decade we have witnessed remarkable advances associated with the frequency stabilization of the comb present in the output of a mode-locked femtosecond laser. While proving itself to be fantastically successful in its role as the "gears" of optical atomic clocks, the optical frequency comb has further evolved into a valuable tool for a wide range of applications, including ultraviolet and infrared spectroscopy, frequency synthesis, optical and microwave waveform generation, astronomical spectrograph calibration, and attosecond pulse generation, to name a few. In this talk, I will trace a few of these developments, while attempting to offer perspective on the challenges and opportunities for frequency combs that might lie ahead in the next decade. Along these lines, I will describe recent experiments with a new class of frequency combs based on monolithic microresonators. These "microcomb" devices have the potential to significantly reduce the bulk, cost, and complexity of conventional laser combs, and therefore hold tremendous potential for next-generation frequency comb applications outside the lab.

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