

Femtosecond Laser Frequency Combs: The Gears of Optical Atomic Clocks

Plática Plenaria

Scott A. Diddams

National Institute of Standards and Technology,
100 Bureau Drive, MD 20899, Gaithersburg, Estados Unidos de América.
sdiddams@boulder.nist.gov

ABSTRACT

The combination of femtosecond laser technology, nonlinear spectral broadening, and laser stabilization techniques set off the revolutionary advances in optical frequency metrology witnessed in the past decade. In this talk, I will describe the use of femtosecond laser frequency combs in optical atomic clocks, where measurement uncertainties are now approaching 1 part in 10^{17} . Additionally, I will highlight applications of frequency combs to low noise optical and microwave frequency synthesis and spectral fingerprinting techniques that take advantage of the broad optical bandwidth, low timing jitter and precise frequency knowledge provided by the comb.