ID de Contribution: **31** Type: **Invited talk**

Making 10^{-18} fractional frequency measurements with ytterbium optical lattice clocks

lundi 22 février 2016 09:30 (30 minutes)

We describe the design and operation of an optical lattice clock based on ytterbium. Exploiting a combination of narrowline laser cooling on the 1S0-3P1 transition and quenched sideband cooling on the 1S0-3P0 clock transition, we realize lattice-trapped ytterbium with temperatures <=1 uK. By using large atom number ensembles to reduce quantum projection fluctuation in atomic state measurements, we measure clock stability levels at the 1 x 10^{-18} level over long timescales. By operating two atomic systems in an interleaved interrogation scheme to achieve a composite system with zero dead time, we explore similar levels of instability on faster timescales. Finally, we report on recent efforts towards a full evaluation of systematic shift uncertainties at the 10^{-18} level, including a detailed study of high-order lattice Stark effects.

Auteur principal: LUDLOW, Andrew (NIST)

Co-auteurs: OATES, Chris (NIST); NICOLODI, Daniele (NIST); BELOY, Kyle (NIST); SCHIOPPO, Marco (NIST); HINKLEY, Nathan (NIST); PHILLIPS, Nathaniel (NIST); FASANO, Robert (NIST); BROWN, Roger (NIST); YOON, Tai Hyun (NIST); FORTIER, Tara (NIST); MCGREW, William (NIST)

Orateur: LUDLOW, Andrew (NIST)

Classification de Session: Session 1