The Mercury-ion Optical Clock

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The SI second is the most accurately realized of the base units, and time intervals can therefore be measured more precisely than any other fundamental quantity. Precision timing information from atomic clocks provides the backbone of such ubiquitous technologies as electrical power grids, wireless phone networks and the global positioning system. Today's best time and frequency standards, cesium fountain atomic clocks, have uncertainty at the level of about two nanoseconds per month. The search for yet more accurate and stable frequency standards has now led to the development of optical-frequency atomic clocks.

Optical clocks offer the promise of stability and accuracy orders of magnitude better than that of cesium clocks, but present new and interesting technical challenges. In my talk I will discuss how the most stable laser in the world, the fastest counter in the world, and one isolated atom come together in a next-generation atomic frequency standard.

Friday, March 11th 2005, MCEC 220, 3:00 pm, Refreshments 2:45 pm