How to Synchronize the World to One Atomic Transition: An Overview of Atomic Clocks and Global Timekeeping

Assistant Professor Travis Nicholson
National University of Singapore

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Time: 11:00am to 12:00pm
Venue: Hilbert Space (SPMS-PAP-02-02)
Host: Assoc Prof David Wilkowski

Abstract
Atomic clocks are at the heart of international commerce, long-range data synchronization, global positioning, cutting edge metrology, and more. Despite that most countries maintain national atomic clocks that neither gain nor lose a second in several million years, there are excellent reasons to push clocks further. This is because the best atomic clocks have a surprising range of applications, such as clock-based dark matter searches, quantum many-body physics, and new geophysical technologies.

Have you ever wondered how physicists and engineers synchronize the entire world to one atomic resonance frequency? In this seminar I will provide an overview of how atomic clocks work, how international timekeeping works, and how advances in low-noise lasers and ultracold atoms have led to a new generation of atomic clocks that have raised fundamental questions about what it means to measure time.

Short Biography
Travis Nicholson is a Principal Investigator at the Centre for Quantum Technologies and an Assistant Professor of Physics at NUS. He is an experimental physicist who uses ultracold atoms to study quantum optics, quantum metrology, and quantum many-body physics. He performed his PhD research at JILA in the United States. His PhD thesis demonstrated the world's most accurate atomic clock, which neither gains nor loses a second in 15 billion years. After this he was a postdoctoral fellow at MIT, studying nonlinear quantum optics with Rydberg atoms. Travis joined NUS and the CQT in 2017.