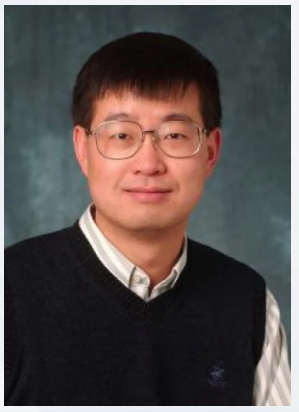
Department of Physics
THE UNIVERSITY OF HONG KONG

HK Institute of Quantum Science & Technology 香港量子研究院

Physics Colloquium

Coherence, entanglement, and clock: from emergent phenomena to fundamental physics

Date: February 1, 2023 (Wednesday)
Time: 10:00 a.m.
Zoom Online Lecture: https://bit.ly/3HHlgqB
Meeting ID: 916 0248 2628
Password: 2859



Prof. Jun YE
JILA, NIST & CU Boulder

Abstract:

Precise quantum state engineering, many-body physics, and innovative laser technology are revolutionizing the performance of atomic clocks and metrology, providing opportunities to explore emerging phenomena and probe fundamental physics. Recent advances include measurement of gravitation time dilation across a few hundred micrometers, and employment of quantum entanglement for clock comparison.

Biography:

Professor Jun Ye is undoubtably the world expert in the field of atomic, molecular and optics physics. Jun's research focuses on ultracold atoms, ultracold molecules, and laser-based precision measurement. His group has built record breaking very precise experimental optical atomic clocks. Using such clocks, Jun's group was able to observe the variations in the Earth's gravitational field. Ye's other research focuses include ultrastable lasers, frequency combs, and molecular spectroscopy. In 2012, his group successfully constructed the world's stablest laser. He pioneered the development of direct frequency comb spectroscopy, and also collaborates with Eric Cornell on an experiment aiming to measure the electric dipole moment of the electron using trapped ions.

Due to his tremendous contribution, he received numerous awards and recognitions. He has won four Gold Medals from the US Department of Commerce: for frequency combs (2001), ultracold molecules (2011), atomic clocks (2014) and quite recently in 2022 “for exceptional advances in metrology that enabled measurement of the difference between the frequency of two optical atomic clocks at the 10^-21 level. With this advance in clock operation, he resolved the gravitational redshift below the scale of a millimeter, an improvement of more than two orders of magnitude.” His work represents a new standard of clock precision for probing the fundamental properties of spacetime and demonstrates the practical importance of clock technology for quantum sensing and broader societal benefits. He was elected to the National Academy of Sciences of United States in 2011. In 2015, Obama selected Jun Ye to receive a Presidential Rank Award for “sustained extraordinary accomplishment”, citing his work advancing "the frontier of light-matter interaction and focusing on precision measurement, quantum physics and ultracold matter, optical frequency metrology, and ultrafast science." He was the recipient of APS Rabi Prize in 2007 and Norman F. Ramsey Prize in 2019, and more recently the highly prestigious 2022 Breakthrough Prize in Fundamental Physics.

Host: Professor Gang CHEN, The University of Hong Kong

Anyone interested is welcome to attend!

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