武汉物数所理论交叉学术交流系列报告

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Vacuum noise squeezing and its application to the gravitational wave detector and on-chip quantum circuits

Prof. Ray-Kuang Lee
Institute of Photonics Technologies,
National Tsing Hua University, Taiwan

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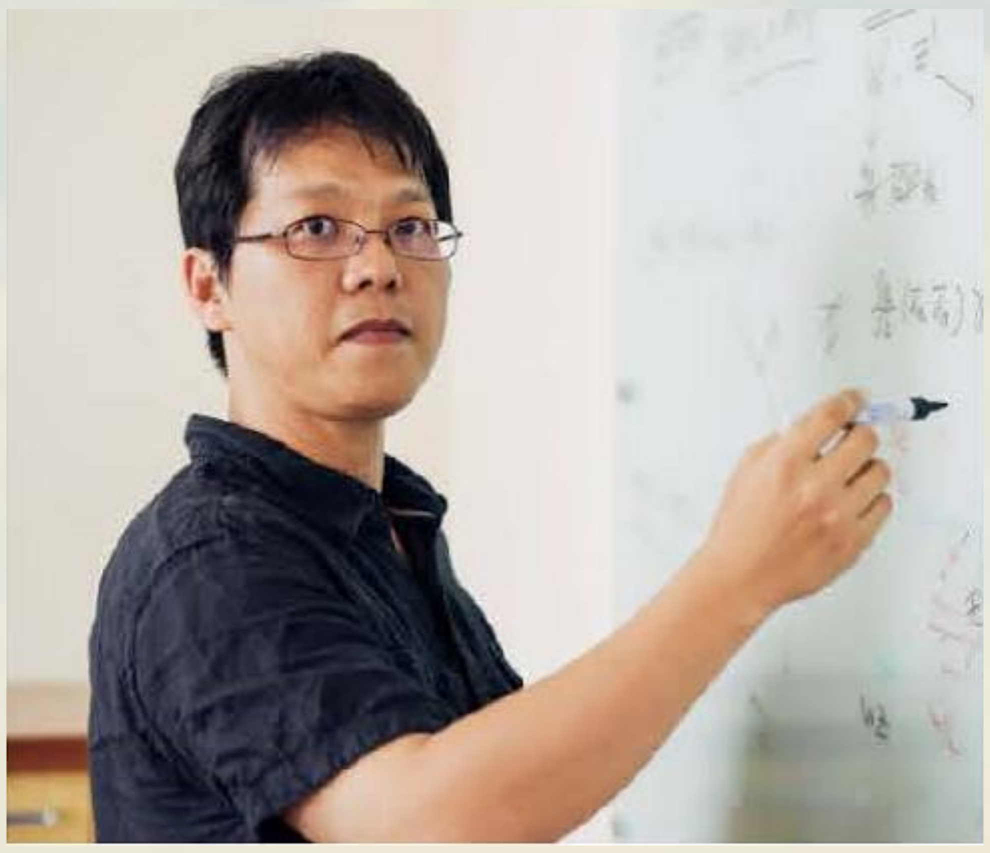
About the lecturer:



Ray-Kuang Lee, received his BS degree from department of Electrical Engineering of National Taiwan University (EE/NTU) in 1997, and his MS degree and PhD degree from Institute of Electro-Optical Engineering of the National Chiao Tung University (IEO/NCTU), in 1999 and 2004 respectively. After his graduation, he continued staying in IEO/NCTU as a postdoctoral fellow in 2005.

Currently, he is an adjunct Professor in the department of Physics, National Tsing-Hua University, the affiliate Scientist of the Physics division, National Center of Theoretical Science, for the research areas in Atom-Molecular-Optics/Interdisciplinary Physics.

Prof. Lee's research was recognized as an interdisciplinary work to the societies from theoretical physics, applied photonics, and laser engineering. And due to his contributions, he received the Outstanding Research Award, Ministry of Science and Technology(2015), the Young Investigator Award from the Academic Sinica, Taiwan (2012), and so on.

Abstract:

In this talk, I will report our recent implementation of squeezed vacuum states at 1064 nm. With a bow-tie, optical parametric oscillator cavity, and our home-made balanced homodyne detectors, noise reduction upto 10dB below the vacuum is measured. With the operation of a 300 m filter cavity prototype installed at the National Astronomical Observatory of Japan, application of such a vacuum squeezed state to the gravitational wave detector, in order to achieve a broadband reduction, will be discussed. At the same time, based on the niche of silicon photonics technologies and semiconductor industries in Taiwan, we will also introduce our new project toward the implementation of scalable quantum photonic chips by integrating photonic qubits (single photon source, entangled photon pair, squeezed light), optical components based on silicon photonics, and photon detector arrays (single photon avalanche diode, homodyne detector).

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