

# Gravitational effects on Hong-Ou-Mandel interference in terrestrial laboratory

**Date** 10:30 - 12:00, June 27 (Thursday), 2024

**Place** 1118, Building 9 (Zoom ID: 881 5903 1592)

## Speaker

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## Abstract

In recent decades, driven by the continuous advancement of quantum technology, there has been a growing interest in observing gravitational effects in quantum interference experiments. The Hong-Ou-Mandel (HOM) interference experiment, a two-photon interference phenomenon involving the indistinguishability of photons without a classical analogue, stands as a potential candidate for studying how quantum systems evolve in gravitational fields. The HOM interference experiment in a gravitational field may provide new insights into exploring a theory that combines general relativity and quantum theory. This seminar will provide a brief overview of the basics of the HOM interference experiments in an inertial reference frame, discussing current theoretical and experimental progress. Basing on our recent research, I will discuss how to encode Earth's relativistic effects into the HOM interference pattern and how to design an interferometer configuration to bring these relativistic effects to the current experimental accuracy. Additionally, I will introduce a possible probe for measuring relativistic effects in HOM interference experiments.

## Biography

Xuan Ye obtained his Ph.D. from the University of Science and Technology of China in 2023. Currently, he is working as a postdoctoral researcher at the University of Science and Technology of China. His research interests include quantum field theory in curved spacetime, relativistic quantum information, primordial gravitational waves, and primordial black holes.