EHU | Qc EHU Quantum Center

Theoretical Physics Seminar Series

Quantum nature of gravitational waves from binary black holes

Sugumi Kanno

Kyushu University, Japan

Abstract: Quantum mechanics is the fundamental framework of nature, and gravitational waves from binary black holes should likewise be analyzed quantum mechanically. It is commonly assumed that their classical description corresponds to a coherent state, so any deviation would signal the quantum nature of gravity. In this talk, I will show that the coherent-state description reproduces classical gravitational waves at leading order, while next-order effects generate squeezed states of gravitons. For GW150914, we estimate the squeezing parameter to be of order 10^{-3}. Detection of such squeezing with LIGO, Virgo, or KAGRA would provide direct evidence for the quantization of gravity. I will also briefly mention how inflationary squeezed graviton states might be probed through gravitational waves from binary systems.

Prof. A. Chamorro Seminar Room, Theoretical Physics Seminar Room
THURSDAY, Feb. 19th, 2026
Time: 11:40 pm