



University  
of Victoria

# PHYSICS AND ASTRONOMY COLLOQUIUM (In Person Only)

**Dr. Kristan Jensen**  
University of Victoria

## **“Wormholes and black holes in quantum gravity”**

### Abstract

The role and physics of wormholes in gravity has been a subject of long interest and great confusion over the years. Macroscopic traversable wormholes require exotic matter not found in Nature, but in quantum gravity where one sums over all possible configurations of spacetime, “virtual” wormholes can contribute to observable physics, potentially leading to small violations of causality and unitarity.

In this talk I will discuss a number of recent lessons concerning wormholes, largely coming from holographic duality. One of the most surprising lessons is that wormholes are deeply connected to black holes. In particular, while black hole geometries encode a coarse-grained microstate spectrum, wormholes encode the level statistics of that spectrum. I will also discuss some ongoing puzzles raised by wormholes that are a subject of ongoing investigation.

Wednesday, September 11th, 2024

3:30 p.m. PST

BWC A104