



University  
of Victoria

# PHYSICS AND ASTRONOMY COLLOQUIUM (In Person & Online)

**Dr. Ebrahim Karimi**  
University of Ottawa

## “Structured Quantum Waves: From Communication to Microscopy”

### Abstract

“The research field that deals with manipulating, controlling and detecting quantum wavepackets possessing specific states is referred to as structured quantum waves. Quantum wavepackets, e.g. electrons or photons, can be labelled with several different degrees of freedom. For instance, photonic states can be described by frequency, polarisation, spatiotemporal modes, and statistical distribution. Apart from the statistics, similar quantisation can be applied to other quantum entities, including electrons, neutrons or atoms. I will discuss different techniques to shape, manipulate and detect photons (electromagnetic fields) and free electrons (in transmission electron microscopy) states. Their applications in quantum information processing (e.g. communication and simulation) and in microscopy will also be the subject of my talk.”

Wednesday, January 25, 2023

3:30 p.m. PST

ECS 116

Zoom link available on Uvic Event Calendar