



Western

Western University  
Department of Physics and Astronomy

## PHYSICS & ASTRONOMY COLLOQUIUM

**Date:** Thursday, 9 December 2021

**Time:** 1:30 p.m.

**via Zoom:** <https://westernuniversity.zoom.us/j/93606368058?pwd=Rnd5Wxo5Z2VqanRWUUFhQ3hndnJWQT09>

**Dr. Maggie Xia**

Department of Materials Engineering  
The University of British Columbia

### ***“Germanium in next generation semiconductor lasers”***

#### **ABSTRACT**

Germanium, the most compatible semiconductor with Si, is also lattice-matched to GaAs and much more robust and scalable compared to GaAs. These make it a good substrate material for commercial GaAs-based semiconductor lasers, such as vertical cavity surface emitting lasers (VCSELs). Studies by Xia group and IQE will be discussed.

In recent years, Ge-on-Si lasers were demonstrated as a promising option for Si-compatible lasers. They have the advantages of easy integration and fabrication with Si-based microelectronics and thus much lower fabrication cost and shorter time to deployment. However, early Ge-on-Si lasers have much lower performance compared to commercial lasers. Our theoretical studies provided some insights on ways to improve their performance. Experimentally, we studied the impacts of doping and annealing on epitaxial Ge photoluminescence (PL) and Ge material quality.

**Host:** Prof. L. Goncharova