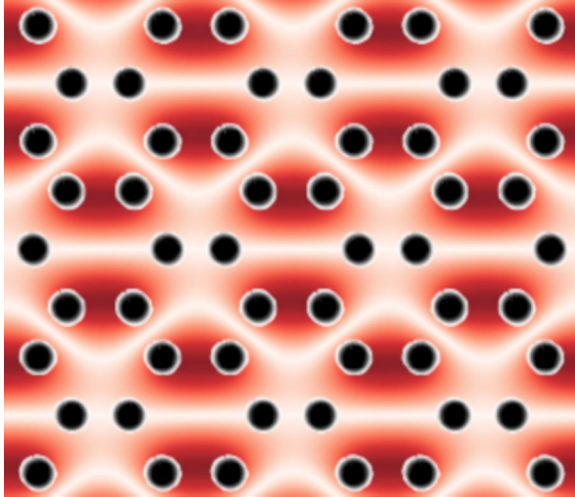


**M.Sc. / Ph.D. student position may be available, starting in the Fall 2021 / Winter 2022 in the group of Professor Pablo Bianucci at the Department of Physics, Concordia University, Montreal, Canada.**



In the Bianucci Research Group we investigate light, with particular interest in the interaction between light and matter and the trapping of light using microscale optical resonators. We perform experiments, use computer simulations, and apply theoretical models to understand the physics of light. Our current areas of research include cutting edge photonics, topological optics, optical sensors, and the growth and optical characterization of semiconductor nanostructures.

We have a vibrant research group, with international collaborations. Each student has their own project, and they present their results at regional, national, and international conferences.

We are looking for motivated students who are willing to take ownership of their projects. We believe that diversity is a strength of our research group, and take it seriously.

### **Topological nanowire lasers**

In this project, we investigate novel science in photonics and develop novel metaphotonic lasers using technologically important materials. Such novel metaphotonic lasers exploit edge states formed by unconventional bottom-up gallium nitride (GaN) nanowire metaphotonic structures with two different topological invariants. The metaphotonic structures will be engineered by molecular beam epitaxy (MBE) with an atomic scale precision. Compared to conventional metaphotonic devices, whose emission characteristics (such as emission wavelength) are very sensitive to imperfections, the topologically-protected metaphotonic lasers we intend to deliver in this project are robust to imperfections introduced during the micro/nanofabrication process. This novel concept of utilizing different topologies for creating robust optical cavities in metaphotonic structures can enable high-yield, low-cost, technologically important lasers.

Concordia Department of Physics is a growing department in a university with rapidly increasing rating. We offer research-based M.Sc. and Ph.D. programs. Our faculty members conduct research in the areas of Condensed Matter Physics (theoretical and experimental), Molecular Biophysics, Medical Physics / Imaging, Photonics, Theoretical High Energy Physics, Computational Physics and Physics Education.

Successful applicants will be offered financial packages consisting of RA, TA and various awards of at least 20,000 CAD per year (often more), for 4 years (Ph.D.) or 2 years (M.Sc.). International students will be offered tuition remissions or other awards to compensate for the international tuition fees.

Please contact Professor Pablo Bianucci ([pablo.bianucci@concordia.ca](mailto:pablo.bianucci@concordia.ca)) or Professor Valter Zazubovits, Graduate Program Director ([valter.zazubovits@concordia.ca](mailto:valter.zazubovits@concordia.ca)) for more information.