

Physics and Physical Oceanography MSc Seminar

## Optical Properties and Acoustic Phonon Dynamics in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ Crystals

Brad McNiven

Department of Physics and Physical Oceanography  
Memorial University

**DATE:** Thursday, April 9, 2020

**TIME:** 3:00 pm

**Place:** Brightspace Online Room (see link below)

<https://ysu-na.youseeu.com/syncactivity/invite/598371/44a195538db96044e574254a3125fb71?lti-scope=d2l-resource-syncmeeting-list>

**ABSTRACT:** Room temperature optical properties and acoustic phonon dynamics of the cuprate superconductor  $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$  were investigated by Brillouin light scattering spectroscopy and reflectance image analyses. Brillouin spectra contained peaks due to the Rayleigh surface acoustic mode, quasi-transverse and quasi-longitudinal bulk acoustic modes, and two as yet unidentified modes. Measurements of the frequency shifts and widths of a subset of these peaks allowed the refractive index and extinction coefficient at 532 nm to be determined. These constants were compared to those extracted from reflectance images by Kramers-Kronig transformations and a modified optical contrast method. Bulk acoustic mode velocities, obtained using Brillouin data and the newly-found refractive index, were calculated and compared to published values.

ALL ARE WELCOME!