



uOttawa

University of Ottawa – Project U05

Title: Optical characterization of organic materials

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Keywords: Bio-materials, Polymers, Ultrafast optics, THz spectroscopy

Field: Materials Science, Biophysics, Optics

Duration: 8-12 weeks

Project context:

Our research group uses ultrafast optical techniques such as time-resolved terahertz spectroscopy to monitor molecular vibrations, structural changes and electrical configurations in condensed matter systems. In other words, we rely on lasers and custom-made optical tools to study the intrinsic properties of different solids and liquids. In this project, the candidate will use our advanced optical characterization system to investigate organic materials, such as bio-tissues and polymers, and extract new information about their microscopic ordering and molecular structure. The goal of this project is to identify, and ultimately control, intrinsic physical mechanisms in these organic materials which are related to some of their most significant macroscopic properties.

Project objectives:

The candidate will first have the chance to become familiar with the field of optical characterization of organic materials by reading selected papers and reports. The student will then be involved in the preparation of the samples to be investigated. Data will be collected with our terahertz spectroscopy apparatus and analyzed with our numerical softwares. This part of the project will be conducted with the help of a graduate student. After completion of the project, the student will have the opportunity to remain involved in the data analysis process and other steps leading to the publication of the results.

Requirements:

This project is highly multi-disciplinary. The student will have the opportunity to acquire a broad technical and theoretical expertise in optics, biophysics, condensed matter and experimental physics. Experience and background in the field of optics would be an asset

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but is not mandatory. He or she must be able to work independently and as part of a team. We are looking for individuals with critical thinking abilities and problem-solving skills. Finally, we welcome curious minds and students motivated by a desire to learn about nature.

Additional information:

Our labs are located in the Advanced Research Complex on the uOttawa campus and are among the most modern infrastructure in the world to perform ultrafast optical experiments. You can learn more about our group and some of our current research interests on our website: <http://menard.physics.uottawa.ca>