Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **2846** Type: **Poster Competition (Graduate Student) / Compétition affiches (Étudiant(e) 2e ou 3e cycle)**

60 - Fiber-based nanoprobe for the detection of chemicals

Tuesday 4 June 2019 17:35 (2 minutes)

Optical tweezing is a well-known phenomenon for trapping or manipulating dielectric and metallic nanoparticles. The application of metallic nanoparticles in sensing has attracted much attention due to their unique optical and chemical properties. We manufactured a unique plasmonic structure on the surface of a nanoprobe. The nanoprobe was a tapered fiber, which was developed using a dynamic etching method where Hydrofluoric (HF) acid was used to etch a Multi-mode fiber (MMF). A laser was coupled to the un-tapered end of the nanoprobe, and along the tapered length the field was allowed to interact with the environment to trap the metallic nanoparticles via optical tweezing. To explain the formation of the nanostructure on the tapered fiber, we will present results of theoretical and experimental investigations. The theoretical results will include the variation of the mode field distribution as the diameter of the tapered fiber section changes. The theoretical results assisted in estimating the tip diameter to trap a single gold nanorod. We will present the Raman Spectra of chemicals (e.g. Rhodamine 6G) obtained using the nanoprobe. We will investigate the role of the plasmonic structure to enhance the Raman Spectrum.
The authors acknowledge the financial support of the Natural Sciences and Engineering Research Council of Canada (NSERC) and Canada Foundations for Innovations. Authors also gratefully acknowledge the contributions of past graduate and undergraduate students in the Photonics Research group.

Authors: Ms KAUR, Navneet (Department of Physics, Lakehead University); Mr TREVISANUTTO, Joshua (Lakehead University); Dr DAS, Gautam (Lakehead University)

Presenter: Ms KAUR, Navneet (Department of Physics, Lakehead University)

Session Classification: DAMOPC Poster Session & Student Poster Competition Finals (26) | Session d'affiches DPAMPC et finales du concours d'affiches étudiantes (26)

Track Classification: Division of Atomic, Molecular and Optical Physics, Canada / Division de la physique atomique, moléculaire et photonique, Canada (DAMOPC-DPAMPC)