Contribution ID: **763** Type: **Invited Speaker / Conférencier invité**

Applying nano-optomechanics to mass sensing

Thursday, 18 June 2015 14:15 (30 minutes)

The ultrasensitivity enabled by nano-optomechanical systems has rich potential from torque sensors able to see nanoscale magnet volumes to cantilever mass sensors able to weigh single large molecules. Mass sensitivity is determined from a combination of mechanical resonance sharpness (quality factor) and signal-to-noise ratio (SNR). With optomechanics, the signal readout technique is no longer the limiting factor to the latter – more fundamental noise sources become visible such as thermomechanical noise. By maximizing the SNR, sensitivity can even improve as quality factor falls. The implications of this are that mechanical resonators can remain ultrasensitive in ambient conditions where the resonance quality suffers due to fluid damping, and even in liquid environments. This opens up a host of sensing applications from gas chromatography to affinity bioassays, as well as many end-uses including environmental monitoring and microassay based disease diagnosis.

Primary author: HIEBERT, Wayne (National Institute for Nanotechnology)

Co-authors: Dr VENKATASUBRAMANIAN, Anandram (University of Alberta and NINT); Ms BACHMAN, Jocelyn (University of Alberta and NINT); Mr ROY, Swapan (University of Alberta and NINT)

Presenter: HIEBERT, Wayne (National Institute for Nanotechnology)

Session Classification: R2-1 Optomechanics - minisymposium II (DCMMP-DAMOPC) / Optomécanique - minisymposium II (DPMCM-DPAMPC)

Track Classification: Condensed Matter and Materials Physics / Physique de la matière condensée et matériaux (DCMMP-DPMCM)