Spin nano-optomechanics

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Abstract: Nano-optomechanical devices enhance the interaction between light and nanomechanical resonators, enabling coherent coupling between photons and mesoscopic phonons. When spin systems are attached to or embedded within these devices, technologies for nanoscale sensing, and for transducing quantum information between photons, phonons and spins become viable. In this talk I will illustrate this potential by presenting measurements of the susceptibility of nanomagnetic spin systems using optomechanical “split-beam” nanocavities. I will then present recent advances in creating optomechanical devices from single crystal diamond chips, and show that their ultralow dissipation and ability to support over a million photons within a volume of a few wavelengths enables observation of coherent photon-phonon coupling. Finally, I will discuss progress and challenges in realizing quantum transducers via optomechanical control of the dynamics of NV and SiV colour centre spin qubits embedded within these diamond devices.

Friday
November 10, 2017
3:30 pm, 330 Allen Building

Coffee will be served prior to the talk, at 3:00 pm, in 316 Allen Building (Coffee Room). Please join us for follow-up discussion, at 4:45 pm, in 316 Allen Building (Coffee Room).