Contribution ID: **87** Type: **Invited Talk**

Mechanics and spins in diamond

Thursday 23 February 2017 16:54 (36 minutes)

Single crystal diamond mechanical resonators are a promising platform for hybrid quantum systems comprising spins and phonons. Diamond mechanical resonators exhibit exceptionally high quality factors and diamond plays host to a highly coherent atomic-scale spin system: the nitrogen vacancy (NV) center. Through its strain sensitivity, the NV can be coupled coherently to a mechanical degree of freedom. We have characterized the strain sensitivity of the NV center's ground state spin, as well as its optical transitions. Through strain coupling, we show that mechanical control of individual spins in diamond is possible. These results are encouraging for proposals to use such a spin-mechanical platform for spin-squeezing, phonon-mediated spin-spin interactions, and phonon cooling of macroscopic mechanical resonators. We discuss the necessary steps needed to reach these goals and current progress including improvements in diamond fabrication, NV formation, and readout techniques.

Author: Prof. JAYICH, Ania (Univ of California Santa Barbara)

Presenter: Prof. JAYICH, Ania (Univ of California Santa Barbara)