

Wednesday, July 23<sup>rd</sup> :: 4-5pm :: Haus Room (36-428)

# Color centers in solids for sensing and opto-electronics applications



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Color centers in solids are promising candidates for metrology and opto-electronic applications such as magnetic sensing and single photon generation for quantum information processing. Some of these centers present tunable properties depending on their symmetry and immediate environment that make them ideal for applications that require a high level of control. Implementing such systems demands a deep understanding of their properties and how they interact with the environment intrinsic and external to the host matrix in which they are embedded. Here, we will show recent progress on using nitrogen-vacancy centers for room temperature monitoring of single C13 nuclear spins embedded in the diamond matrix. In addition, we will show recent advances on modeling the optical properties of the silicon-vacancy centre. Although some color centers look similar in their composition, small changes on their atomic configuration lead to important changes in their optical spectra. We will show how symmetry and external perturbations play an important role on radiative transitions. A deep understanding on these features is key for implementing opto-electronic applications such as single photon generation.

*Jero R. Maze is an industrial electrical engineer from Pontificia Universidad Católica de Chile (2002) and earned his Ph.D. from Harvard University (2010). Professor Maze researches on condensed matter and quantum optics. His research includes the study of nano systems where individual degrees of freedom such as the electric or spin charge can be accessed with high level of control to create novel applications in metrology and information storage. His investigation involves the experimental exploration of nano systems such as trapped molecules in solids and their interaction with the environment and external perturbations. He also conducts theoretical studies based on many body techniques and group theory to gain a detailed understanding of such systems with the goal of creating novel sensors for material science and biology and generating opto-electronics devices such as single photon sources.*