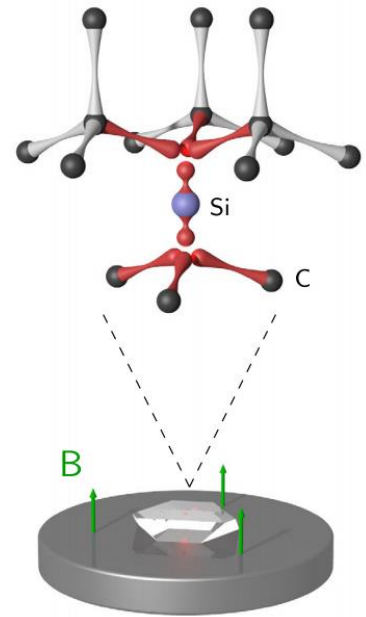


SPIE Purdue Student Chapter Visiting Lecturer Program 2015

Engineering Diamond Color Centers for Quantum Information and Sensing

by Prof. Philip Hemmer (Texas A&M University)

For over a decade diamond color centers like the nitrogen-vacancy (NV) have been investigated for applications ranging from quantum storage registers to room temperature quantum computers to quantum enhanced bio-sensors. Recently silicon-vacancy (SiV) centers in diamond have showed potential to replace the NV for applications requiring strong coupling between spins and photons, and also for molecule-sized bio-sensors. However the existing top-down fabrication approaches for these color centers are not very scalable. What is needed is a bottom-up approach wherein the NV (or SiV) plus its detailed surroundings are determined by chemistry (i.e. where the diamond is grown around a custom modified diamondoid molecule). Not only will this give superior NV-based quantum registers, but will allow engineering of new color centers to replace the NV, like the new super-high contrast optically detected magnetic resonance color centers, and possibly variations on the silicon-vacancy center. In this talk I will discuss preliminary experimental results toward this goal.



Speaker's Bio



Dr. Hemmer received his B.S. in physics from the University of Dayton, and his Ph.D. in physics from MIT. He worked many years as a physicist for the Air Force Research Laboratory at Hanscom, AFB, MA. Since 2002, he has been with the ECE Department at Texas A&M University. Dr Hemmer's current research interests include Quantum Optics especially with nitrogen-vacancy diamond, subwavelength imaging, quantum computing in solids, plasmon-based nano-optics, slow and stopped light, and ultrasound imaging.

November 23rd, Monday

11:30am-12:30pm

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