

**Department of Electrical Engineering  
Presents a Seminar on**

**“Inverted Atoms in SiC: Silicon Vacancies as Qubits”**

by

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**Abstract**

We often make the natural assumption that a “perfectly structured” material is required to produce “perfect functioning” of a device, where the function may relate to precision sensing, or the storing or transmission of information. Recently, however, there has been excitement about the performance of *defects* in crystalline semiconductors such as diamond and SiC. The defects, such as vacancies or “missing atoms”, are deviations from perfect, periodic crystalline order. Yet such defects can exhibit optical emission at a variety of wavelengths, and those optical transitions are coupled to long spin coherence times. A more useful description than “defect” might be that of an “inverted atom” where the defect forms an atomic-scale quantum mechanical bit (qubit) integrated within a high-bandgap protective environment (SiC). This talk will highlight our studies in 4H-SiC of defects (qubits), integrated within photonic amplifiers. This integrated system not only enhances the qubit signal, but also can serve as a “nanoscope” into the material, allowing us to learn about the details of their atomic environment.

**Biography**

Evelyn Hu is the Tarr-Coyne Professor of Applied Physics and Electrical Engineering at the John A. Paulson School of Engineering and Applied Sciences at Harvard. Prior to Harvard, she was a faculty member at UCSB, in the Departments of Materials, and of Electrical and Computer Engineering. While at UCSB, she also served as the founding Scientific co-Director of the California NanoSystems Institute, a joint initiative between UCSB and UCLA. Before joining UCSB, she worked at Bell Labs in both Holmdel and Murray Hill. She is a member of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences, and the Academia Sinica of Taiwan. She is a recipient of an NSF Distinguished Teaching Fellow award, an AAAS Lifetime Mentor Award, and holds honorary Doctorates from the University of Glasgow, Heriot-Watt University, Hong Kong University of Science and Technology, and the University of Notre Dame.

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**\*\* ALL ARE WELCOME \*\***