

Joint Quantum Seminar

Wednesday, January 30th, 4:00 pm
Jefferson 250

Prof. Jelena Vuckovic

Stanford University

“Optimized quantum photonics”

At the core of most quantum technologies, including quantum networks and quantum simulators, is the development of homogeneous, long lived qubits with excellent optical interfaces, and the development of high efficiency and robust optical interconnects for such qubits. To achieve this goal, we have been studying color centers in diamond (SiV, SnV) and silicon carbide (VSi in 4H SiC), in combination with novel fabrication techniques, and relying on the powerful and fast photonics inverse design approach that we have developed.

Our inverse design approach offers a powerful tool to implement classical and quantum photonic circuits with superior properties, including robustness to errors in fabrication and temperature, compact footprints, novel functionalities, and high efficiencies. We illustrate this with a number of demonstrated devices in silicon, diamond, and silicon carbide, including wavelength and polarization splitters and converters, power splitters, couplers, nonlinear optical isolators, on chip laser driven particle accelerators, and efficient quantum emitter-photon interfaces for color centers in diamond and in SiC. We are also employing this approach to implement a quantum simulator based on color centers in semiconductors.

Student Presentation by Bart Machielse (Electromechanical control of quantum emitters in nanophotonic devices) will begin at 4:00
Guest Presentation will begin at 4:30 PM
Refreshments will be provided

