Applications of Slow and Stopped Light

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Auditorium of the Center for Imaging Science

The talk will introduce recent experiments in which the following are demonstrated: image and entanglement preservation in a slow light medium, stopped light of two color pulses for thousands of pulse delays, dramatically enhanced Fourier transform interferometry, and packet synchronization. Time permitting we will explore methods for using slow light to improve quantum cryptosystems. Future applications including biphoton dispersion and gravitometry will be discussed.

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Abstract
The fields of “Slow” and “Stopped” light have recently been topics of great interest, because of the possibilities of obtaining all-optical buffers and routers, quantum memories and improving interferometers. I will discuss some of our recent experiments in which we have been able to show image and entanglement preservation in a slow light medium, stopped light of two color pulses for thousands of pulse delays, dramatically enhanced Fourier transform interferometry, and packet synchronization. If time permits I will show how slow light can be used to improve one of our recent quantum cryptosystems and discuss future applications including biphoto dispersion and gravitometry.

Speaker Bio
Prof. Howell received his B.S. in Physics (1995) with a minor in Mathematics from Utah State University, and his M.S. and Ph.D. in Physics (2000) from Pennsylvania State University. He then took a postdoctoral research position at the Centre for Quantum Computation at the University of Oxford. Prof. Howell joined the University of Rochester in 2002, as Assistant Professor of Physics. Howell received a Research Innovation Award from the Research Corporation in 2003, a Presidential Early Career Award for Scientists and Engineers in 2004, and the Adolph Lomb Medal from the Optical Society of America in 2006 "For innovative contributions in quantum optics, particularly aspects of quantum cloning, violations of Bell's inequalities and maximal photonic entanglement."