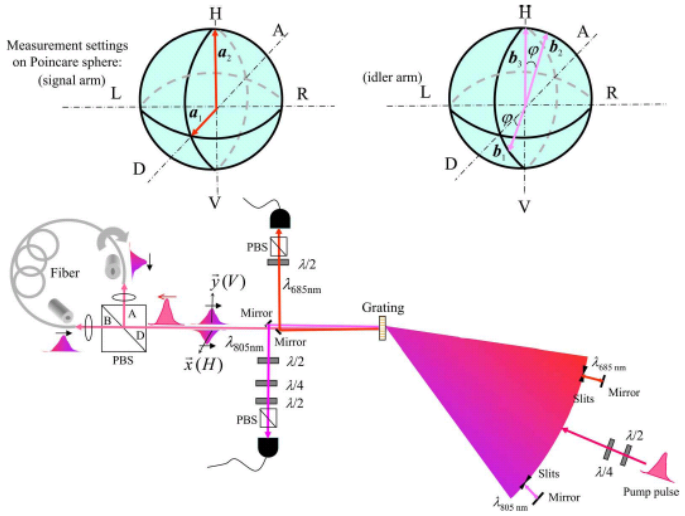
AMO Seminar



Tuesday, June 17, 2008
2:00 pm
Physics conference room (Small Hall 123)

Quantum memory and entangled photons: Building the tools for long-distance quantum communication

Matthew Eisaman
Optical Technology Division,
National Institute of Standards and Technology

Research over the last few decades has shown that applying quantum-mechanical phenomena such as superposition and entanglement to the field of information science results in fundamentally new concepts in computation and communication. I will discuss the current experimental status of two tools that are essential for the realization of long-distance quantum communication: quantum memories for photon states and sources of entangled photon pairs. Specifically, I will describe three main results from my own research: a quantum memory for photon states using atomic ensembles, extending the memory time of ensemble-based quantum memories by using rare-earth-ion-doped crystals, and the realization of a new, fiber-based source of polarization-entangled photon pairs.