

Joint Quantum Institute Seminar
April 23, 2007 at 12:30
Physics 1201

Squeezing light out of atoms: Using 4-wave mixing to generate strongly squeezed light

Paul Lett
JQI NIST

While the first demonstrations of squeezed light used 4-wave mixing in 2-level atomic systems, this approach was largely abandoned in favor of more successful results from optical parametric oscillators. Recently we have been able to generate much stronger levels of squeezing with 4-wave mixing in hot atomic vapors by using an off-resonant 4-level system. We have generated up to -7.1 dB of relative intensity squeezing with it. The system is remarkably simple and is robust and, without a cavity, is both insensitive to acoustic noise and the multi-spatial mode squeezing is easily adaptable to “quantum imaging” applications. In addition, this scheme, with a narrow gain feature associated with the 4WM, naturally produces slow light effects. Matched- and locked-pulse propagation occurs in the system. For a long enough medium an injected probe will generate a nearly identical conjugate pulse that propagates with a fixed propagation delay from the probe. This delay affects the measured spectrum of squeezing.

Host UMD: Luis Orozco