

# **Coherent Triplet-Phonon Generation by Dual-Pumped Multiwave Raman Scattering**

Professor Michael G. Raymer

Department of Physics, University of Oregon, Eugene, Oregon, USA

**Abstract:** By pumping a Raman-active medium with a strong laser field, cascading Raman scattering creates a wide frequency comb, with spontaneously initiated, phase-correlated spectral lines. When pumping with two phase-locked laser fields with appropriate frequencies, the phases of the Raman comb lines spontaneously lock to several distinct values, as a result of a newly identified process: coherent triplet phonon generation. The phonon mode is the collective vibration (or rotation) of the Raman-active molecules in the medium. This process creates a non-gaussian quantum state of the phonon mode, which might have applications in quantum information.