Quantized Nano Mechanics

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We discuss the possibility of cooling nano mechanical motion to ground state and thereby realizing the quantized behavior of macroscopic systems. We utilize the nonlinear nature of the radiation pressure interaction to identify a number of three wave and four wave parametric processes. We show how these phonon mediated interactions can produce different orders of Stokes and anti Stokes processes. We discuss the possibility of EIT at a single photon level which is required in connection with quantum memories. We show how such nano systems can be used as elements for quantum memories and for routers and transducers of single photons. Finally we also discuss the possibility of full quantum state tomography of nano systems.