

Cooling by heating

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<http://xxx.lanl.gov/abs/1104.0260> [2]

We introduce the idea of actually cooling quantum systems by means of incoherent thermal light, hence giving rise to a counter-intuitive mechanism of "cooling by heating". In this effect, the mere incoherent occupation of a quantum mechanical mode serves as a trigger to enhance the coupling between other modes. This notion of effectively rendering states more coherent by driving with incoherent thermal quantum noise is applied here to the opto-mechanical setting, where this effect occurs most naturally. We discuss two ways of describing this situation, one of them making use of stochastic sampling of Gaussian quantum states with respect to stationary classical stochastic processes. The potential of experimentally demonstrating this counter-intuitive effect in opto-mechanical systems with present technology is sketched.

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