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Laser phase noise effects on the dynamics of optomechanical resonators[1] GREGORY PHELPS, PIERRE MEYSTRE, Department of Physics, College of Optical Sciences and B2 Institute, University of Arizona — We present a theoretical analysis of the effects of laser phase noise on the sideband cooling of opto-mechanical oscillators, demonstrating how it limits the minimum occupation number of the phonon mode being cooled and how it modifies optical cooling rate and mechanical frequency shift of the mechanical element. We also comment on the effects of laser phase noise on coherent oscillations of the mechanical element in the blue detuned regime and on the back-action evasion detection method where an additional drive is used to prevent heating of one quadrature of motion of the oscillator.

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