

Abstract Submitted
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A general framework for analyzing pulsed optomechanical systems

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— One difficulty in understanding driven optomechanical systems comes from keeping track of the continuum of input and output optical modes. Can we formulate a simpler description? In the case of optical pulses of finite duration, the answer is yes. The dynamics of the joint optical and mechanical system can be summarized by a finite number of generalized modes! On the other hand, the analysis of the entanglement structure between the mechanics and optics is more involved, but could be approximated by a simple and bounded structure. Our work has immediate applications to the quantum engineering of optomechanical setups. We rigorously justify the formalism used in proposals for arbitrary Fock state preparation, extend the proposals to more realistic setups, and propose additional state preparation and state transfer protocols.

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