Optomechanical Description of Dynamical Casimir Effect BEL-
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Univ of Connecticut - Storrs / Harvard — We study theoretically the contribution
of dynamical Casimir effect (DCE) in optomechanical systems. By considering a
one–dimensional optical cavity consisting of one fixed and one movable mirror and
performing a second quantization, we represent the quantum states of the cavity
field modes coupled to one phonon mode associated with mirror's motion. Using
the Hamiltonian for the interaction between a moving mirror and radiation pressure,
we analyze the contribution of resonant and nonresonant terms in this optomechan-
ical setup. By doing a linear stability analysis, we identity the regions of interest
and show that the contribution of nonresonant terms are associated with DCE and
cannot be neglected. The complete dynamics of this configuration is studied in the
master equation approach.

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