Title:	Cavity Optimization for Unruh Effect at Small Accelerations
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Abstract:	One of the primary reasons behind the difficulty in observing the Unruh effect is that for achievable acceleration scales the finite temperature effects are significant only for the low frequency modes of the field. Since the density of field modes falls for small frequencies in free space, the field modes which are relevant for the thermal effects would be less in number to make an observably significant effect. In this Letter, we investigate the response of an Unruh-DeWitt detector coupled to a massless scalar field which is confined in a long cylindrical cavity. The density of field modes inside such a cavity shows a resonance structure, i.e., it rises abruptly for some specific cavity configurations. We show that an accelerating detector inside the cavity exhibits a nontrivial excitation and de-excitation rates for small accelerations around such resonance points. If the cavity parameters are adjusted to lie in a neighborhood of such resonance points, the (small) acceleration-induced emission rate can be made much larger than the already observable inertial emission rate. We comment on the possibilities of employing this detector-field-cavity system in the experimental realization of the Unruh effect, and argue that the necessity of extremely high acceleration can be traded off in favor of precision in cavity manufacturing for realizing noninertial field theoretic effects in laboratory settings.
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