

Abstract Submitted
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Particle Creation in the Sudden Approximation PAUL N. ARENDT, JR., IVAN G. AVRAMIDI, New Mexico Tech — We present a model of particle creation from the vacuum in the situation where one asymptotically time-independent background configuration changes to another, with the approximation that the change occurs instantaneously. Because time dependence has been removed from the model, the expressions for particles created involve only the properties of the spatial operators describing the two backgrounds. When the heat kernels of these operators can be computed, we show that the expressions for expected number and density of particles created can be given as simple integrals. However, the sudden approximation cannot be physically realistic for all modes, which may in turn lead to divergences in the expressions that require regularization. We give examples illustrating the method, and discuss its potential for modeling particle creation in violent phenomena.

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