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Time variation of particle number in non-equilibrium quantum field theory

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We study the variation of particle number in non-equilibirum enviroment. Using the scalar model with the particle number violating interactions, we study the time development of the particle number using the Closed Path Time (CPT) formalism. Two types of the particle number interactions are considered. One is the particle number violationg mass term and the other drives particle number production related to the decay of the heavy particle. The effect from particle number violating mass is included fully while the particle production interaction is treated perturbatively. We also discuss application to the method to more realistic models. *The work is based on the collaboration with R. Hotta (Hiroshima U.)and H. Takata (Tomsk petagogical U.))

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