



Simulation of thermal fragility of vacuum squeezing, in two photon lossy cavity

S Ahmadi and M Sadeghi

Department of Physics, University of Hormozgan, Bandar-e-Abbas, Iran

E-mail: m.sadeghi@hormozgan.ac.ir

(Received 18 January 2021 ; in final form 19 June 2021)

Abstract

In this research, squeezing fragility due to thermal bath, in quantum squeezed state generation, is simulated. For this purpose, single mode dissipative cavity with non-zero second-order susceptibility is used. Cavity nonlinear medium is driving by laser pump with known frequency, and pairs of identical photons are created, with one-half frequency of driving pump. This process known as degenerate parametric down conversion. In the absence of any dissipation, simulation shows linear time dependent squeezing parameter, which is in agreement with theoretical results. In two photon loss of cavity in contact with cold reservoir, competition between gain and two photon loss, results in stable squeezing of initial vacuum, in steady state of system. At the end, has been shown that, non-zero thermal reservoir, omits the squeezing and leads the final cavity field to the thermal mixture of Fock states.

Keywords: simulation, squeezed vacuum, squeezing fragility, two-photon loss

For full article, refer to the Persian section