Review of: "Dynamics of Three-Level Laser Pumped by Electron Bombardment"

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Potential competing interests: No potential competing interests to declare.

This manuscript “Dynamics of Three – Level Laser Pumped by Electron Bombardment” is clearly written and I thoroughly verified the logical sequences of the calculations, which are consistent and also very clear.

As a summary,

- This article discusses about the quantum mechanical properties of light emitted by three level atoms available in an open cavity and are pumped to the top level by electron bombardment at constant rate.
- In solving the equations of evolution for the expectation values of the atomic operators and the quantum Langevin equations for the cavity mode operators, large time approximation scheme is applied and hence, the steady solutions are obtained.
- The mean and variance of the photon number as well as the quadrature squeezing for the cavity light are calculated in section 3 and section 4, respectively.
- The photon statistics of the two-mode cavity light obtained is super-Poissonian. Further, due to reservoir noise operators, the photon number variance of the two-mode cavity light is greater than the results obtained by Fesseha [ref. 10].
- This article shows that the presence of the spontaneous emission process leads to a decrease in the mean and variance of the photon number.
- The quadrature squeezing of the two-mode cavity light in the entire frequency interval are calculated, and observed that it is independent of the number of photons. In addition, author reported that the two-mode cavity is in a squeezed state and the squeezing occurs in the minus quadrature.
- The maximum quadrature squeezing of the light generated by the laser, operating far below threshold is found to be 37.5% below the vacuum state level.
- The quadrature squeezing is greater for $\gamma = 0$ than that for $\gamma = 0.4$ for $0.01 < r_a < 0.35$ and is smaller for $\gamma = 0$ than that for $\gamma = 0.4$ for $0.35 < r_a < 1$.

As a conclusion, the above work, especially last few points listed are interesting and are significant in this area of research. I recommend this manuscript to publish in your journal.