OPEN ACCESS

Journal of Statistical Mechanics: Theory and Experiment
An IOP and SISSA journal

ERRATUM

Erratum: Re-examining Einstein's *B* coefficient and rate equations with the Rabi model (2019 *J. Stat. Mech.* 113104)

Najirul Islam[1], Tanmoy Mondal[1,3], Sagar Chakraborty[2] and Shyamal Biswas[1,4]

[1] School of Physics, University of Hyderabad, C.R. Rao Road, Gachibowli, Hyderabad 500046, India
[2] Department of Physics, Indian Institute of Technology Kanpur, Kanpur 208016, India
E-mail: sbsp@uohyd.ac.in

Received 9 December 2019
Accepted for publication 9 December 2019
Published 4 February 2020

Online at stacks.iop.org/JSTAT/2020/029901
https://doi.org/10.1088/1742-5468/ab6a02

During the production process the figures in this article were inadvertently cropped, removing the plot-labels in all five figures. The figures have been reproduced here to include the plot-labels.

[3] Present address: Harish-Chandra Research Institute, Chhatnag Road, Jhusi, Allahabad 211019, India
[4] Author to whom any correspondence should be addressed.

1742-5468/20/029901+4$33.00

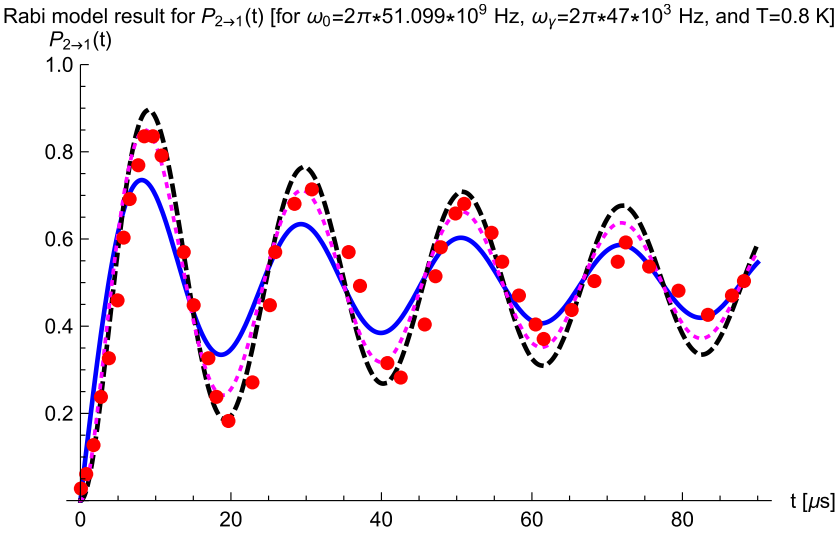

Figure 1. Probability of transitions from the upper level to the lower level of the two-level system in thermal radiation field with the condition that the system initially was in the upper level. Solid line represents free-space Rabi flopping in thermal radiation field, and follows equation (8) for the parameters as mentioned in the figure. Dashed line follows equation (13), and represents cavity-space vacuum Rabi flopping for the natural decay rate $A = 0.553\,6116 \times 10^6\ \mathrm{s}^{-1}$ with negligible contribution of the thermal photons in the resonant cavity of Q-factor $Q = 7 \times 10^7$. Dotted line represents fitting of the same equation for the same parameters except for the fitted value ($A = 1 \times 10^6\ \mathrm{s}^{-1}$) of the natural decay rate. Circles represent experimental data adapted for the circular Rydberg states (with the principal quantum number $n = 50$ and $n = 51$) of ^{87}Rb atoms in an open resonant cavity of Q-factor 7×10^7 and size $\pi(50/2)^2 \times 27\,\mathrm{mm}^3$ at the temperature $T = 0.8\,\mathrm{K}$ [12].

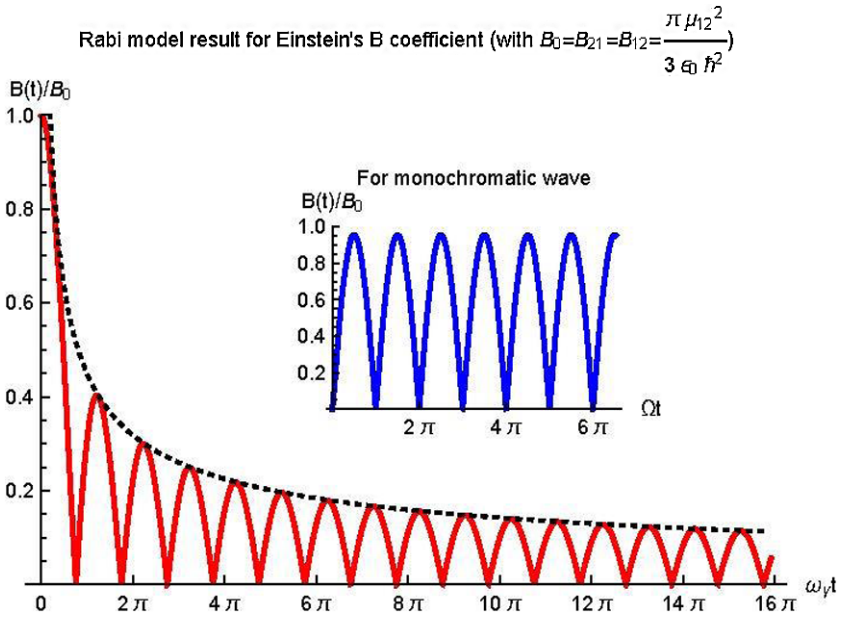

Figure 2. Solid line follows equation (11), and represents the Rabi model result for Einstein's B coefficient. Dotted line ($B(t)/B_0 \equiv \sqrt{2/\pi\omega_\gamma t}$) represents envelope for the oscillations in the B coefficient. Inset follows equation (23) and represents the B coefficient for the same system interacting with a monochromatic wave of a single polarization.

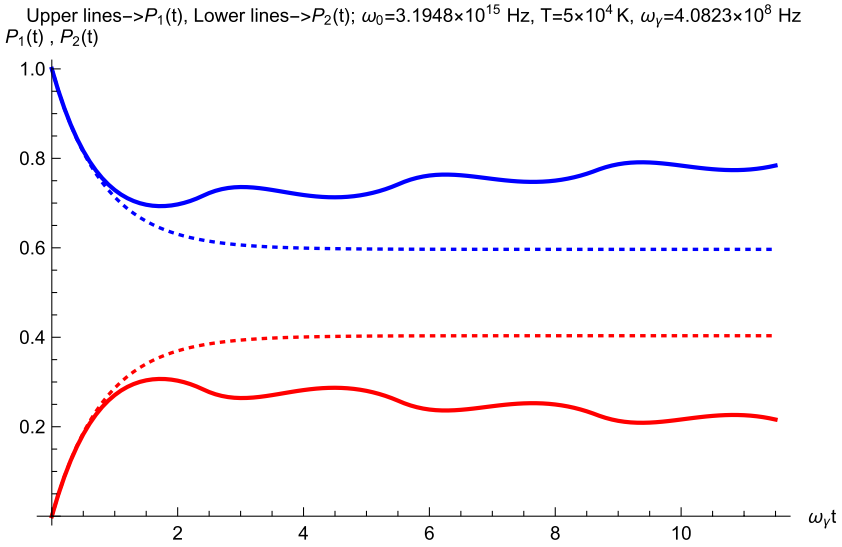

Figure 3. Occupation probabilities for the $3s_{\frac{1}{2}}$ and $3p_{\frac{1}{2}}$ states of a ^{23}Na atom in the thermal radiation field with the condition that the system initially was in the lower level. Upper and lower solid lines follow equations (19) and (21) respectively for the parameters as mentioned in the figure corresponding to $u_{12} = 2.5ea_0 = 2.1196 \times 10^{-29}$ cm [38]. Lower and upper dotted lines represent Einstein probabilities for the same system, and follow equation (18) and its follow-up respectively.

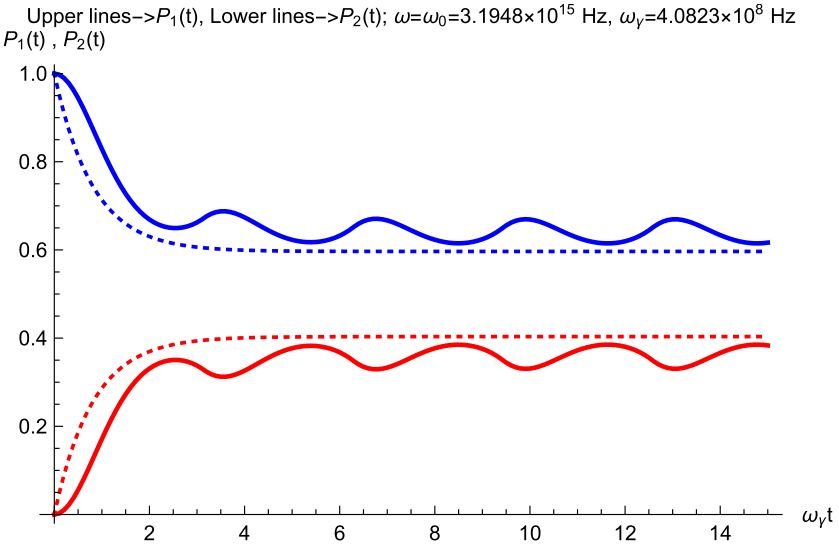

Figure 4. Lower and upper solid lines represent occupation probabilities, and follow equation (24) and its follow-up for the same parameters of the two-level system at the resonance in the monochromatic radiation field as mentioned in figure 3. Adjacent dotted lines represent corresponding Einstein probabilities, and follow equation (18) and its follow-up respectively.

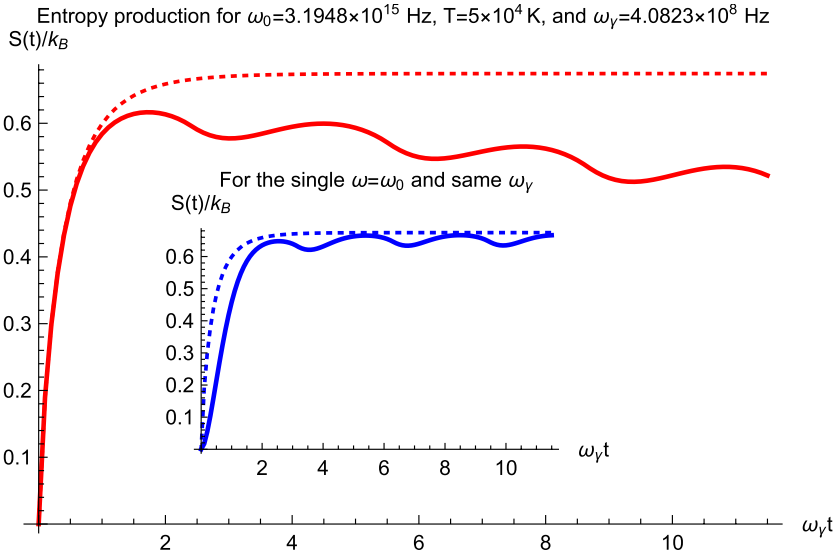

Figure 5. Entropy production for the $3s_{\frac{1}{2}}$ and $3p_{\frac{1}{2}}$ states of a ^{23}Na atom in the thermal radiation field. Plots follow from equation (26) for the parameters as mentioned in figure 3. Dotted lines represent the same obtained from Einstein probabilities (equation (18) and its follow-up).