
Table of contents

Probability:

$$P = \frac{\mathcal{I}}{N \cdot h\nu} dA dt = |\Psi|^2 = \Psi^* \Psi \stackrel{\text{interference, path independent}}{=} \left| \sum \Psi_i \right|^2 \stackrel{\text{no interference, path dependent}}{=} \sum |\Psi_i|^2 \quad (1)$$

where: $\mathcal{I} \equiv$ Intensity $N \equiv$ particles $A \equiv$ area of incidence orthogonal to movement

Absorption Probability:

$$\frac{P}{t} := W_{mn} = B_{mn} \cdot \frac{N(\nu)}{V} \cdot h\nu = B_{mn} \cdot w_\nu(\nu) = B_{mn} \cdot \frac{d}{d\nu} w_{EM} \quad (2)$$

Stimulated Emission Probability:

$$\frac{P}{t} := W_{nm} = B_{nm} \cdot \frac{N(\nu)}{V} \cdot h\nu = B_{nm} \cdot w_\nu(\nu) = B_{nm} \cdot \frac{d}{d\nu} w_{EM} \quad (3)$$

Spontaneous Emission Probability:

$$\frac{P}{t} := W_{nm} = A_{nm} = \frac{1}{\bar{\tau}} \quad (4)$$

where: $n \equiv$ excited state $m \equiv$ ground state $N \equiv$ particles amount $V \equiv$ Volume $\bar{\tau} \equiv$ mean lifetime of state for spontaneous emission $B, A \equiv$ Einstein coefficients