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

Absorbtion 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:  $n$   $\equiv$  exited state  $m$   $\equiv$  ground state  $N$   $\equiv$  particles amount  $V$   $\equiv$  Volume  $\bar{\tau}$   $\equiv$  mean livetime of state for spontaneous emission  $B, A$   $\equiv$  Einsteincoefficients