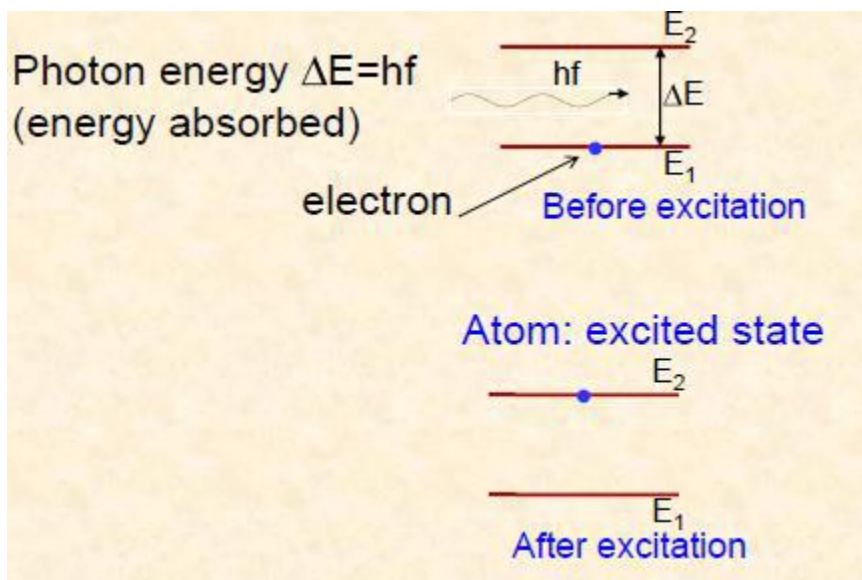


Laser in medicine

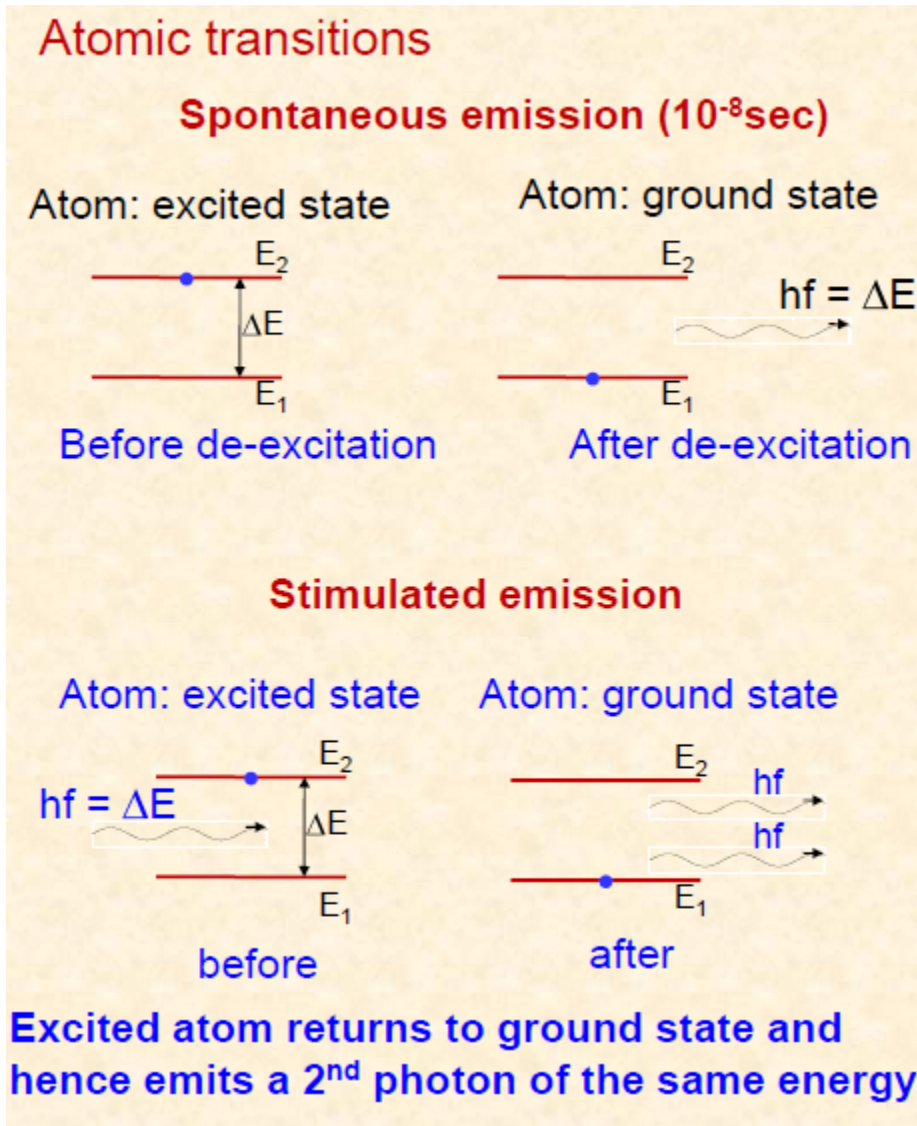
Atomic transitions

Electron energy levels, allowed states



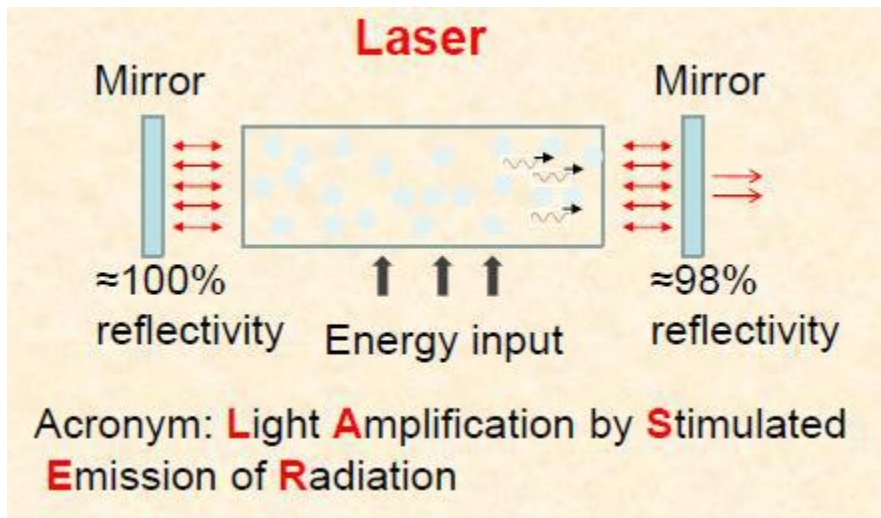
Population inversion

Ordinarily more atoms in the ground state than excited state population inversion happens if there are more atoms in the excited state than the ground state



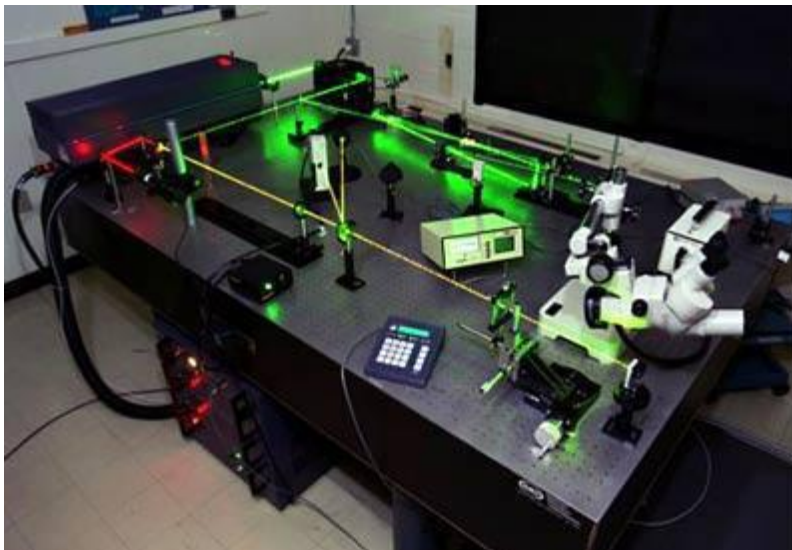
Both photons are in phase and have the same energy (color) (wavelength)

Both photons can stimulate other atoms to emit photons that in turn stimulate the emission of more photons.



Laser Typical Characteristics

- uni-directional; same direction
- Single wavelength in visible region; same frequency
- same phase
- Intense beam



General Applications

- CD players
- Pointers
- Printers
- Eye surgery (reshaping cornea)

- Cuts tissue (burns tumours)
- Cuts metal
- Cuts patterns (many layers of cloth at once)
- Telecommunications (sent down optical fibers)

Laser Dental Applications

- 1- Reshape gum tissue (reduce prominence)



- 2- Laser aided teeth whitening



3. Laser Drill

- Capable of killing bacteria located in a cavity
- No vibration

Laser: Erbium Yag (Er: YAG) Wavelength 2940 nm, light of this wavelength highly absorbed by water

Laser beam absorbed by decayed tissue because of large water content compared with healthy enamel

Result:

- selective ablation of decay,
- conservation of healthy tooth
- no increase in pulp temperature

