



# **TRINITY COLLEGE FOR WOMEN NAMAKKAL**

**Department of Physics**

**LASER**

**23PPHSE02-EVEN Semester**

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## What is Laser?

### Light Amplification by Stimulated Emission of Radiation

- A device produces a coherent beam of optical radiation by stimulating electronic, ionic, or **molecular transitions to higher energy levels**
- When they return to lower energy levels by stimulated emission, they emit energy.

## What are characteristics of Laser?

Lasers are essentially

- **highly directional,**
- **highly intense,**
- **highly monochromatic and**
- **highly coherent optical sources.**

Stimulated emission was postulated by einstein as early as in 1917. In 1960 , a solid state ruby laser is developed by maiman on this principle.

## What is laser principle?

The principle of a laser is based on three separate features:

- a) stimulated emission within an amplifying medium,
- a) population inversion of electronics and
- c) an optical resonator.

## What is Laser energy?

Laser, a device that **stimulates atoms or molecules to emit light at particular wavelengths and amplifies that light**, typically producing a very narrow beam of radiation.

## What is the wavelength of laser?

Intermediate wavelengths

From **380 to 740 nm**,

It produces visible (VIS) light from violet to red.

The longest wavelengths

From **700 nm to 1 mm**,

It produces infrared (IR) light which, like UV, is invisible to the human eye.

## **Based on their gain medium,**

**Lasers are classified into five main types:**

- **Gas Lasers**
- **Solid-State Lasers**
- **Fiber Lasers**
- **Liquid Lasers (Dye Lasers)**
- **Semiconductor Lasers (Laser Diodes)**

# What are the applications of Laser?

## Applications in medicine

- ❖ Cancer diagnosis
- ❖ Cancer treatment
- ❖ Dentistry
- ❖ Cosmetic dermatology

such as scar revision, skin resurfacing, laser hair removal, tattoo removal.



## **7 Top Applications of Lasers in Manufacturing**

- Laser Marking
- Surface Texturing
- Laser Ablation
- Laser Drilling
- Laser Cutting
- Laser Welding
- Wire Stripping
- New Laser Applications

# THANK YOU

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