

***Research Flow Cytometry Core
and***

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What is LASER

- L Light
- A Amplification
- S Stimulated
- E Emission
- R Radiation

Light amplification by stimulated emission of radiation.

Properties of Lasers

- Laser light is more hazardous than incandescent light because the energy of the light is focused on to a small area.

- **Monochromatic**

Emits light in one color or wavelength



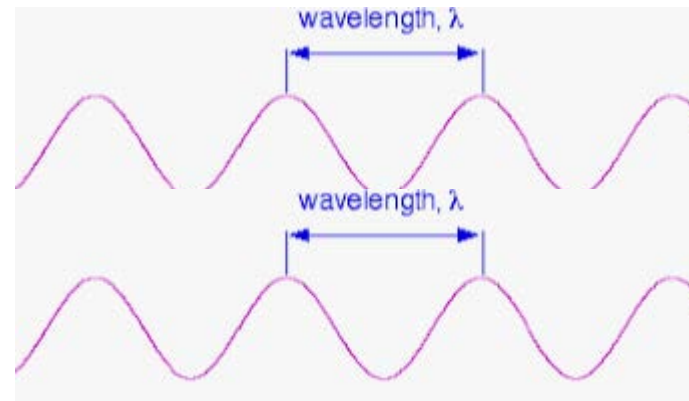
- **Directional (collimated)**

Light is emitted in one direction and in parallel, therefore no divergence.



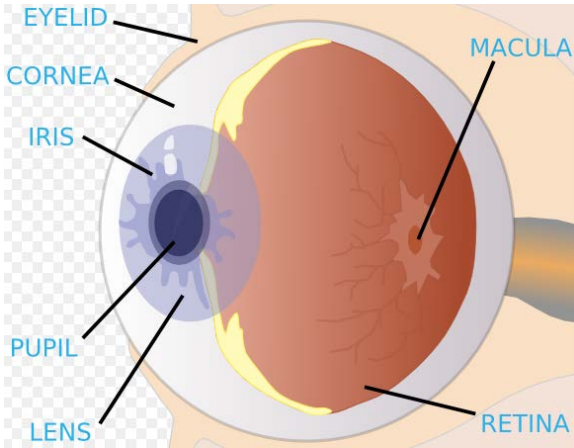
- **Coherent**

Waves align, are in phase; crest and trough



Laser beam hazards

• Hazards to the eye



Since laser light is intense and highly focused, the energy is absorbed by living tissue.

- In addition to direct viewing, reflected and diffused laser light also damage eye tissue. The human eye is very susceptible to this damage. Different wavelengths have effects on the eye. Cornea absorbs the far-UV and far infrared causing photokeratitis and corneal thermal burns. Lens is damaged when near UV and near infrared wavelengths are absorbed. This can result in cataracts. Exposure to wavelengths of approximately 400-1400 nm (entire spectrum) of laser light (collimated) when focused on the retina can cause scotoma or blind spots.

• Hazards to the skin

- Laser damage to the skin can range from erythema, hyperpigmentation, and skin burns, depending on the incidence of different wave lengths.

Laser safety of RFCC instruments

- Lasers inside RFCC instruments are class 3B lasers.
- However, all lasers are enclosed within the instrument and therefore, users are not exposed to the laser light.
- The BD sorters and the LSRII have laser interlocks that turn off the lasers when the instruments are opened. For all other instruments lasers are not accessible to users.

Safe practices



- Exposure to laser light can only happen when the instrument is being serviced and the technician has opened the encasing exposing the laser to the naked eye.
- Laser Techs (Servicing professionals) are aware of the hazards and use proper eye protection during servicing.
- We (RFCC) have laser shields to be used when instruments are being serviced (see picture above right). These shields protect people from laser light while repairs are being done.
- Lab members must not be present in the area or need to be on the other side of the shields when repairs are in progress. This is when exposure can occur.
- A signage will be posted on the door and laser shield when servicing is in progress.
- Please report any issues or concerns to staff.
- Report any and all exposures to 803-SAFE

Quiz

1. Properties of Laser light are (select all that apply)

- ☐ Monochromatic
- ☐ Collimated
- ☐ Coherent
- ☐ Divergent

2. Laser light is hazardous because the energy of the light is intense, highly focused and is absorbed by living tissue . T ☐ F ☐

3. Exposure to laser light causes damage to the eyes and skin T ☐ F ☐

4. Lab members must not be in the area or should be behind the laser shields when laser instrumentation is being serviced. T ☐ F ☐

5. All concerns and exposures must be reported to RFCC staff and 803-SAFE T ☐ F ☐