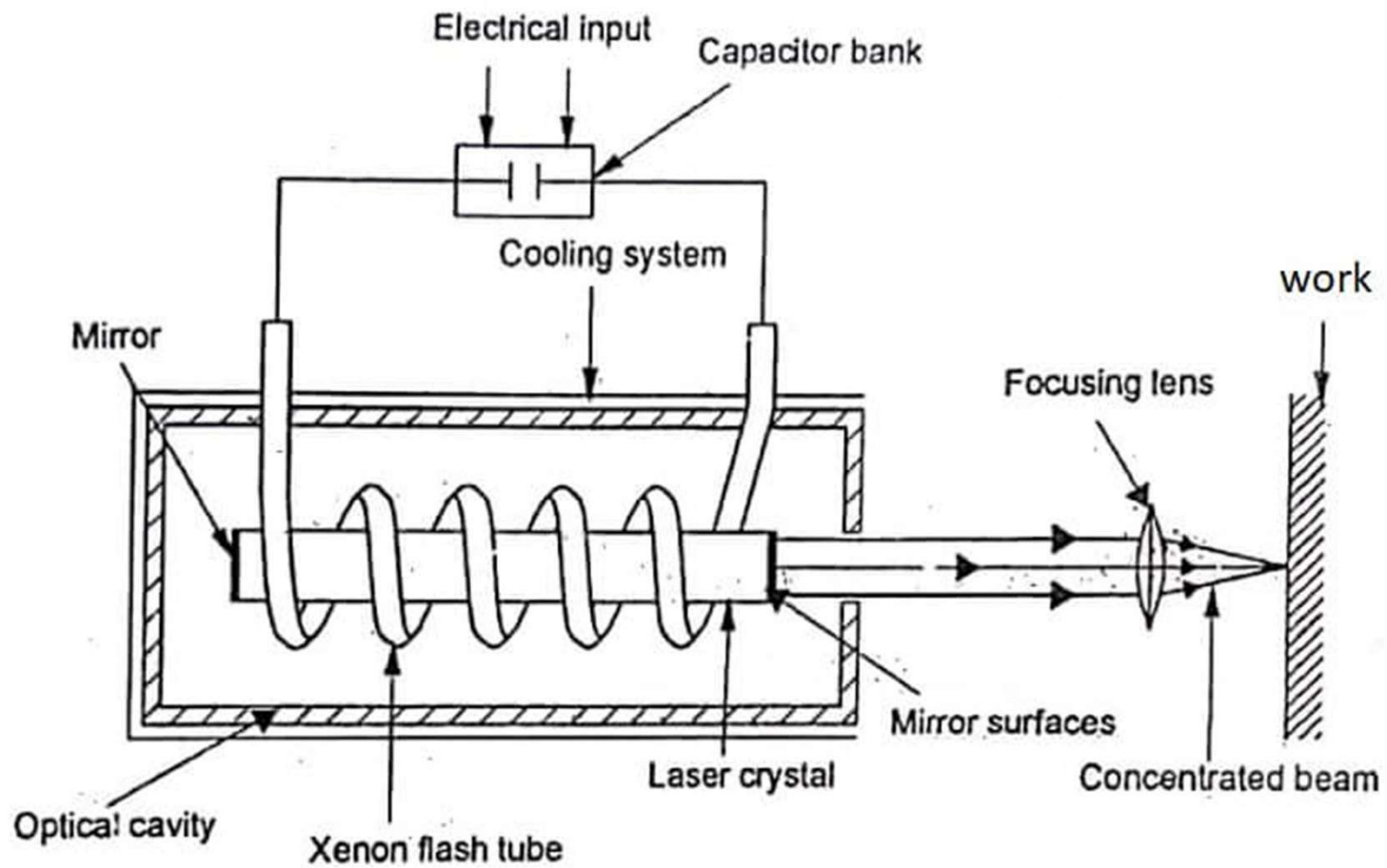


# LBM/LBW

- **Laser Beam Welding** is a Unconventional type welding process in which two metal pieces are joined together by the use of laser. The laser beams are focused to the cavity between the two metal pieces to be joined.
- The laser beams have enough energy and when it strikes the metal pieces produce heat that melts the material from the two metal pieces and fills the cavity.
- After cooling a strong weld is formed between the two pieces.

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# Working Principle

- First, the setup of welding machine at the desired location (in between the two metal pieces to be joined) is done.
- After setup, a high voltage power supply is applied to the laser machine. This starts the flash lamps of the machine and it emits light photons. The energy of the light photon is absorbed by the atoms of ruby crystal and electrons get excited to their higher energy level. When they return back to their ground state (lower Energy state) they emit a photon of light. This light photon again stimulates the excited electrons of the atom and produces two photons. This process keeps continue and we get a concentrated laser beam.

- This high concentrated laser beam is focused to the desired location for the welding of the multiple pieces together. Lens is used to focus the laser to the area where welding is needed. CAM is used to control the motion of the laser and workpiece table during the welding process.
- As the laser beam strikes the cavity between the two metal pieces to be joined, it melts the base metal from both the pieces and fuses them together. After solidification, we get a strong weld.
- This is how a laser Beam Welding Works.

# Advantages

1. It produces high weld quality.
2. LBW can be easily automated with robotic machinery for large volume production.
3. No electrode is required.
4. No tool wears because it is a non-contact process.
5. The time taken for welding thick section is reduced.
6. It is capable of welding in those areas which are not easily accessible.
7. It has the ability to weld metals with dissimilar physical properties.
8. It can be weld through air and no vacuum is required.

# Disadvantages

1. The initial cost is high.
2. The equipment used in LBW has a high cost.
3. High maintenance cost.
4. Due to the rapid rate of cooling, cracks may be produced in some metals.
5. High skilled labor is required to operate LBW.
6. The welding thickness is limited to 19 mm.