

Pulsed Laser Deposition (PLD)

Pulsed laser deposition (PLD) is a thin film deposition technique where a high power pulsed laser beam is focused inside a vacuum chamber to strike a target of the desired composition. Material is then vaporized from the target and deposited as a thin film on a substrate. This process can occur in ultra high vacuum or in the presence of a background gas, such as oxygen which is commonly used when depositing oxides to fully oxygenate the deposited films. PLD is applicable to almost any material; in particular to compounds that are difficult or impossible to produce in thin-film form by other techniques.¹ Examples of such materials include complex ceramic materials such as high-temperature superconductors and certain magnetic materials.

Make and Model: The system was designed and assembled at IIT Bombay with the help of Excel instruments.

Specifications:

Model: Coherent compex Pro 201

- **Wave length:** 248nm (KrF)
- **Pulse energy:** 700mJ
- **Max. repetition rate:** 10Hz
- **Pulse duration:** 30ns

Process Capabilities:

- **Substrate size:** 1 x 1 cm²
- **Substrates used in chamber:** Si
- **Substrates can be used in chamber but NOT available:** Pt/Si, ZnO, GaN, GaAs, MgO, LaAlO₃
- **Substrate history:** Substrates with organic coatings should not be used in chamber
- **Films that can be deposited:** Oxides
- **Target diameter:** 2cm
- **Targets available:** None
- **Substrate temperature:** Room temp to 800°C
- **Gases used in the system:** Oxygen (O₂)
- **Chamber pressure:** Up to 10⁻⁷ Torr

