



# PLD 3000



The PVD Products PLD 3000 is capable of depositing high quality, uniform films on substrates up to 3" (75 mm) in diameter. Our systems use a 304L SS box chamber with a front-mounted hinged door providing quick access for easy substrate and target changes. The chamber has multiple user accessory ports for target and substrate viewing, a magnetron or ion source and several spectroscopy's. A blackbody style oven with a bank of IR heat lamps is used for substrate heating. Transparent substrates such as sapphire,  $\text{LaAlO}_3$ , and  $\text{MgO}$  can be heated to  $850^\circ\text{C}$  without the use of a thermal bonding agent (such as silver paste) or clamping. Silicon or other absorbing substrates may be heated to  $950^\circ\text{C}$ . Temperature uniformity of  $\pm 3^\circ$  is readily achievable over 3" diameter substrates. A water-cooled housing that keeps the chamber walls, targets, and gears cool during deposition surrounds

the heater. A complete, enclosed optical train which rasters the laser beam over a 4-inch  $\phi$  rotating target is included. The optical train also utilizes our Intelligent Window with in-the-chamber energy monitoring. Three large target pedestals are provided for multilayer film growth. Optional motor driven target indexing is available along with complete system computer control. Complete vacuum gauging along with a 300 L/sec molecular drag turbo pump is provided to achieve pressures below  $5 \times 10^{-7}$  Torr. All electropneumatic valves are controlled from a rack-mounted pump chassis. Constant pressure is obtained by using a MFC, capacitance manometer, butterfly valve, along with a closed-loop pressure control unit. This system is ideal for materials and device related research or prototype production.



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## **PLD-3000 System Specifications:**

Maximum substrate size: Can handle one (1) 3-inch or one 2-inch diameter substrate, or multiple small substrates per customer requirement.

Maximum substrate temperature: 950 °C (in oxygen) for non-transparent substrates such as Silicon, and 850 °C for transparent substrates (such as LaAlO<sub>3</sub>). *No thermal paste or bonding required.*

Temperature uniformity: ± 3 °C across 3-inch diameter Si substrate.

Operating Pressure Range: 5 x 10<sup>-7</sup> Torr base to 300 mTorr.

Target Size: Three (3) 4-inch diameter targets (maximum diameter).

Film Thickness Uniformity: ± 4 % over 90% of a 3-inch diameter substrate (5-inch throw) for a 500 nm thick film using raster scan over a 4-inch diameter target.

Film Compositional Uniformity: ± 1.5 atomic percent over a 3-inch substrate for most materials such as YBCO using a 4-inch diameter target and programmable laser beam rastering, and 5-inch throw (uniformity of materials with high vapor pressures such as Lithium may vary significantly depending on deposition parameters).

Target to Substrate (Throw) Distance: Variable from 3.5-inch to 5-inch.

Raster path length: 3.8 inches.

Nominal Angle of incidence of the laser beam on target: 60°.

Base Pressure of the Main Chamber: P < 5 x 10<sup>-7</sup> Torr guaranteed, with system at room temperature without targets in the chamber.

Base Pressure with Load Lock: P < 5 x 10<sup>-8</sup> Torr guaranteed, with system at room temperature without targets in the chamber.

Operational Wavelength: 248 nm (KrF) or 193 nm (ArF), others available on request.

## **Guaranteed Super conducting properties for YBCO on LaAlO<sub>3</sub>:**

T<sub>c</sub> > 87 ± 1 K across 3-inch diameter area for LaAlO<sub>3</sub> substrates.

J<sub>c</sub> > 1.5 ± 0.5 MA/cm<sup>2</sup> across 3-inch diameter area for LaAlO<sub>3</sub> substrates.

## **System Options:**

Load locks for fast turnaround time and improved main chamber base pressure.

Front mounted glove box for hygroscopic materials.

Motorized target indexing.

DC or RF Ion source for IBAD processing.

Magnetron sputter source.

Computer control using LabVIEW platform of all system and laser functions.

Additional MFC's.

Dry Pump package.

Custom substrate holders.

**Note:** Specifications subject to change.

