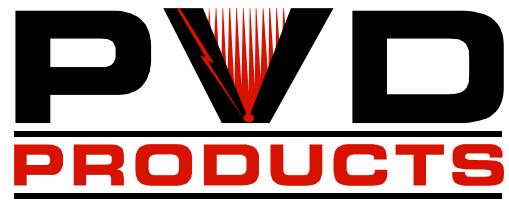


# Diode Laser Substrate Heater



PVD Products provides customized diode laser heaters to fit your specific substrate heating needs. Laser heating provides high substrate temperatures for small substrates (up to ~37 mm diameter) with a minimum of out gassing in the chamber. Such heaters can work in any background gas including O<sub>2</sub>, NH<sub>3</sub>, etc. without any problems. These heaters are ideal for localized heating in UHV applications such as MBE and PLD systems.

PVD Products provides turnkey fiber-coupled heaters based on robust laser diode technology. Custom optical trains can be integrated to provide the correct or variable spot size for your specific chamber requirements. Coupled with a fiber optic pyrometer our systems can provide accurate closed-loop temperature control for you most demanding substrate heating needs.

Using our unique susceptor technology, high substrate temperatures can be achieved without the need for substrate bonding to a back plate for most substrate materials. This provides clean vacuum and clean substrates.



Photo showing the fiber optic beam delivery and pyrometer optical assembly.



25-mm diam. Inconel Block heated in O<sub>2</sub> to 850°C by a 150-Watt Laser Heater. The bright spot on the top surface has a temperature of 1,200°C.

## Laser Heater Features

- Multiple configurations - all UHV compatible
- Heating to above 1,200°C for non-transparent substrates, and to ~1,000°C for transparent substrates such as sapphire
- Laser Diode packages providing power levels from 25 to 250 Watts. 808-nm radiation
- Red Laser Pointer Option for beam alignment
- Dual output options (for multiple chambers)
- Closed-loop fiber coupled feedback control
- Compatible with substrate rotation and substrate transfer for loadlocked systems
- Customized brackets and input windows to integrate into your vacuum chamber
- Rack mounted Temperature control module
- Rack mounted Diode Laser Power supply
- Software controllable, providing multiple ramp, dwell functions.
- Uniform substrate temperature profiles due to "flat-top" diode out-put



**Photo of 100-Watt Rack Mounted Fiber Coupled Diode Laser System**

### **Customized Configurations:**

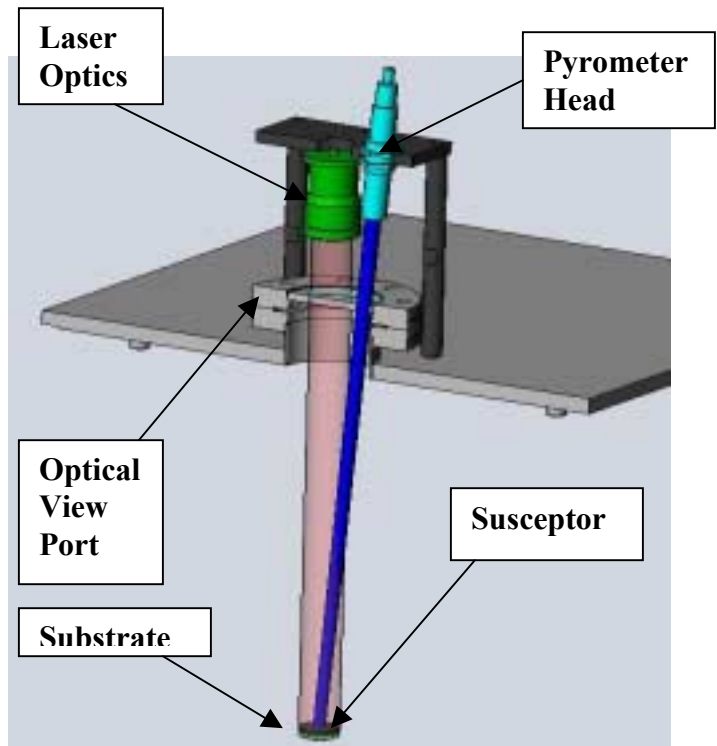
Customized configurations are readily available on request.

### **Please provide the following Information:**

- 1) Maximum substrate size
- 2) Substrate material
- 3) Maximum substrate temperature
- 4) Background gasses
- 5) Working distance (viewport to substrate distance)
- 6) Chamber flange size,
- 7) Fiber optic cable length
- 8) Mounting bracket Details

### **System Options**

- 1) Diode Laser Pointer
- 2) Dual chamber outputs
- 3) Variable Spot Size
- 4) Variable Working Distances
- 5) Rotating Substrate Assemblies



**Schematic of Laser Heater Integration Into a Deposition Chamber**