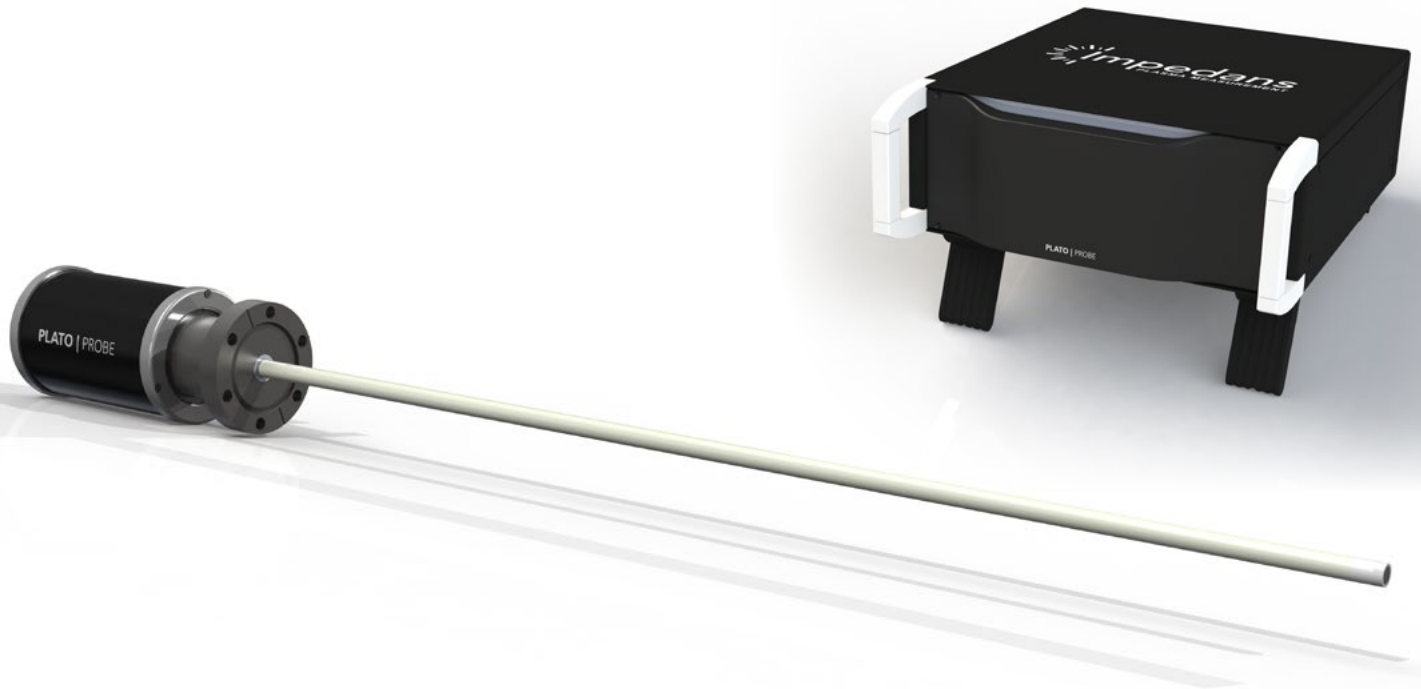


PLATO PROBE

Deposition Tolerant Plasma Measurement System



Measures

- Plasma density
- Ion current density
- Electron temperature

Functionality

- Time averaged
- Time resolved
- Time trend

Features

- Fully automated electronics and software
- Reactive process compatible probe tips
- External trigger
- DC compensation
- RF compensation

The Plato Probe is a planar Langmuir Probe designed to work in deposition plasmas when an insulating film is deposited on the probe surface. This deposition tolerant Langmuir Probe can remain inside a plasma reactor while deposition processes are in progress.

The Plato Probe measures plasma parameters such as plasma density, ion current density and electron temperature in plasmas with high deposition rates, like plasma enhanced chemical vapour deposition (PEVCD).

For many years it has been difficult to measure the parameters of plasma in high deposition environments. Impedans have developed a ground-breaking technology which measures the parameters of plasma, even when a thick insulating layer is deposited on the probe surface.

Measuring Parameters

Plasma Density	1×10^6 to $3 \times 10^{13} \text{ cm}^{-3}$
Ion Current Density	$1 \mu\text{A}/\text{cm}^2$ to $300 \text{ mA}/\text{cm}^2$
Electron Temperature	0.1 to 15 eV

Plato Probe Specifications

Plasma Power Source	DC, RF, Microwave, Continuous, Pulsed Plasma
RF Plasma Frequency	13.56 MHz to 100 MHz
Probe Length	300 mm to 1400 mm (custom available)
Probe Diameter	9.5 mm
Probe Tip Diameter	7 mm
Probe Customisation	On request
Maximum Operating Temperature	230° C

Electronics Control Unit

Probe Voltage Scan Range	Floating potential $\pm 30 \text{ V}$
Current Range	100 nA to 20 mA
Communication	USB 2.0
Signal Bandwidth	40 kHz
Data Acquisition Resolution	4.5 mV, 4.5 nA
Time Resolved Step Resolution	10 μs to 1 mS
External Trigger TTL Compatible	10 Hz to 50 KHz

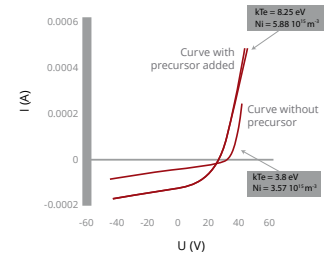
Operating Parameters

Pressure (Pascal)	< 0.1 Pa to 1,000Pa
Pressure (Torr)	< 1 mTorr to 10 Torr
Density	10^6 cm^{-3} to 10^{14} cm^{-3}
Gas Reactivity	Inert to highly reactive
Power Frequency	DC (0 kHz) • pDC (10 Hz to 50 kHz) • RF (13.56 MHz to 100 MHz) • UHF (100 MHz to 1 GHz) • Microwave (1 GHz to 3 GHz)

Application Software

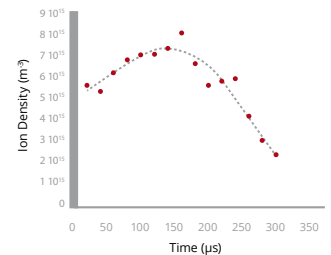
Operating Software	Windows 2000 / XP / Vista / Windows 7 / Windows 8 / Windows 10
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Plato Probe Measurements



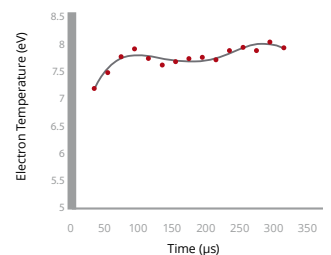
Current and voltage characteristic with and without depositing precursor

Time Resolved Ion Density



Time resolved ion density in a pulsed deposition plasma

Time Resolved Electron Temperature



Time resolved electron temperature in a pulsed deposition plasma