

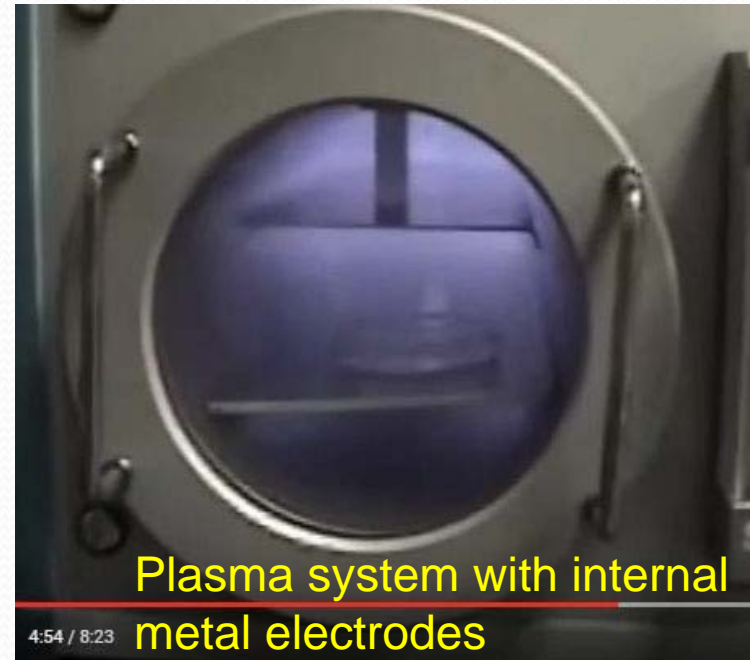
# Tergeo plasma cleaners

Versatile tabletop plasma cleaner for R&D and  
low volume production

# Spec

Items	Feature and Spec
RF power supply	75 watt or 150 watt, 13.56MHz high frequency RF power supply, automatic impedance matching
Sample chamber	Cylindrical quartz chamber (ID:110mm, OD:120mm, Depth 280mm for basic Tergeo; ID160mm, OD170mm, Depth 280mm for Tergeo plus). One rectangular quartz shelf included.
Plasma discharge mode	Capacitive coupled discharge for the direct plasma source. Inductively coupled plasma source as the remote plasma source.
Electrode placement	External rf electrode design to reduce ion sputtering on the metal electrodes.
Source design	Dual plasma sources in one system. Both the traditional direct mode plasma processing and the gentle downstream mode plasma processing in one system
Plasma diagnostics	Realtime plasma intensity sensor for quantitative plasma status monitoring
Gas delivery	One solenoid valve controlled gas input port for chamber venting/purging purpose; two or three additional MFC regulated gas input ports for process gas delivery. All the gas input ports use the standard 1/4" Swagelok tube compression fitting.
Pressure sensor	Premium full range (1e-4 to atm) micropirani pressure sensor from MKS Instruments
Pump	Basic oxygen service oil pump (ultimate pressure <10mTorr) or oil free dry pump. Pump is controlled by the plasma cleaner.
System control	7 inch LCD touchscreen. 20-recipe library. Fully automatic operation. 3-recipe job sequence mode.
Enclosure dimension	W450mm X H250mm X D430mm for basic Tergeo, W500mm X H300mm X D430mm for Tergeo-plus
AC input	Universal 110V~230V AC input 50/60Hz

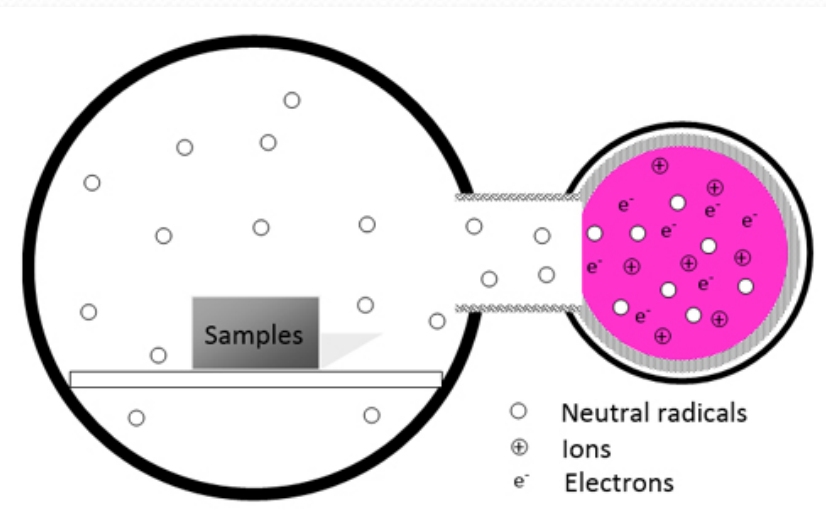
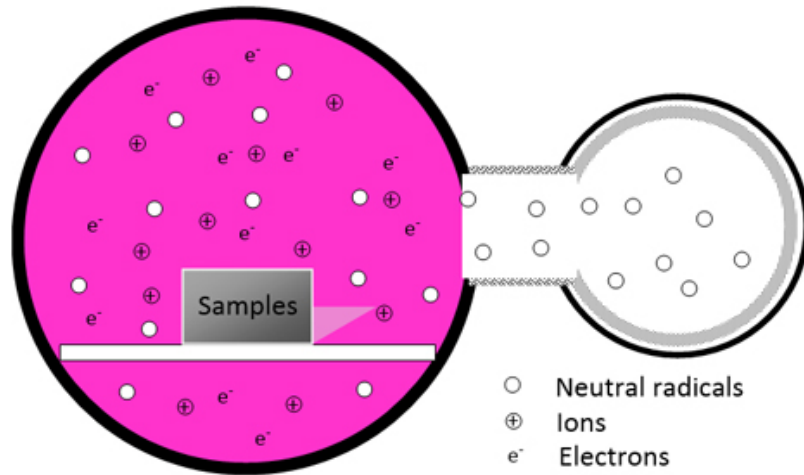
# Better uniformity and lower contamination



**Better uniformity.** Plasma discharge technology in Tergeo plasma cleaner originates from the research carried out in the Plasma & Ion Source Technology at the Lawrence Berkeley National Laboratory. The difference in plasma color is because of the different process gas. Tergeo plasma cleaner clearly has much better uniformity. Bad uniformity means bad process control.

**Lower contamination:** Electrodes are placed outside of the quartz tube in Tergeo plasma cleaner. Ions can't reach the metal electrodes. If high voltage metal electrode is placed inside the plasma sample chamber, ions will be accelerated to high energy and sputter metal out of the electrodes. Metal will then deposit onto the samples and cause metal contamination issue. Metal sputtering contamination issue is especially severe if KHz rf power supply is used to generate the plasma.

# Immersion/direct vs downstream cleaning modes



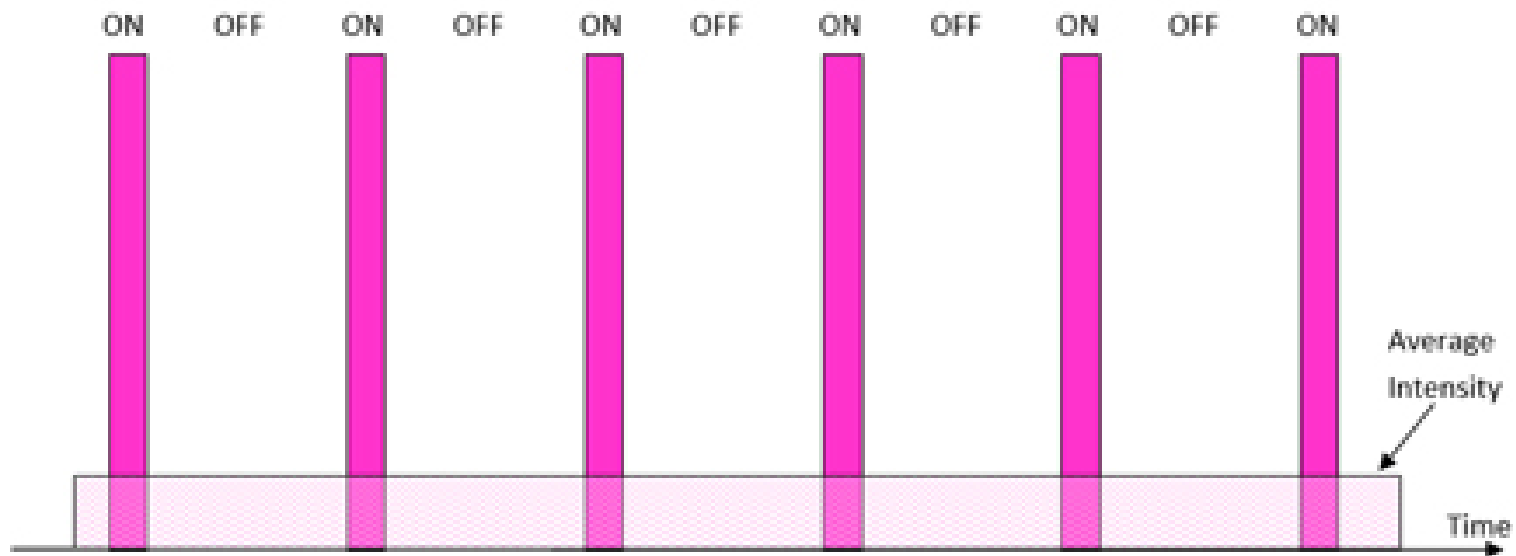
## Immersion mode plasma cleaning

Plasma is generated in sample chamber  
Samples are immersed in plasma  
Samples are subject to chemical reaction with radicals and energetic ion sputtering

## Downstream mode plasma cleaning

Plasma is generated outside sample chamber.  
Samples are not immersed in energetic plasma  
Only gentle chemical reaction takes place on sample surface.  
No energetic ion sputtering. No sample damage due to excessive heating, charging and ion bombardment.

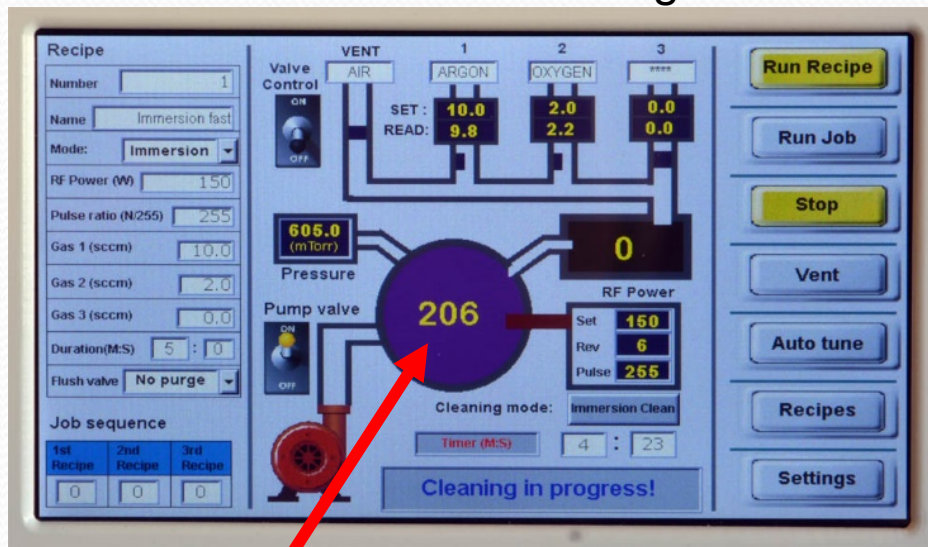
# Pulsed mode operation



Low duty cycle pulsed mode operation can significantly reduce average plasma intensity for delicate samples.

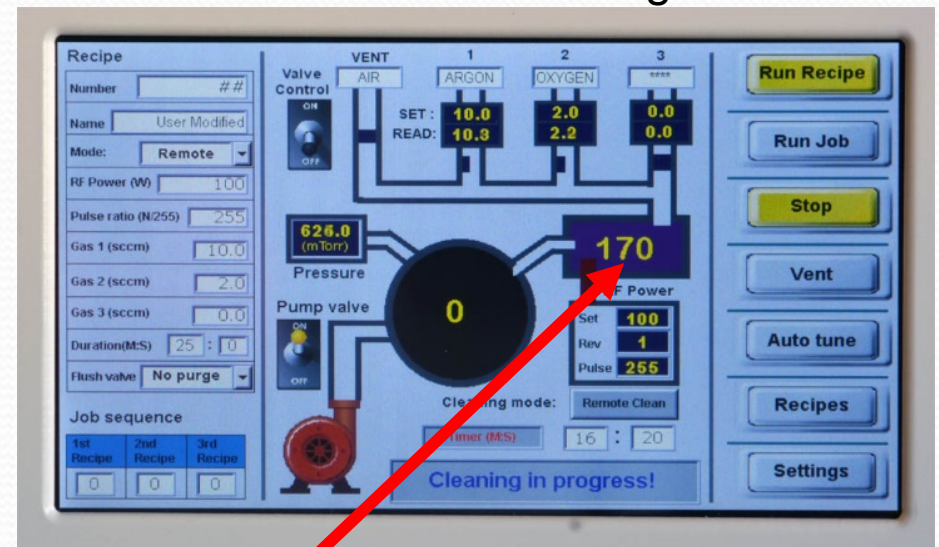
# Dual plasma source and dual sensor

Direct/immersion cleaning mode



Plasma generated in the sample chamber. Plasma strength reading is 206

Remote/downstream cleaning mode



Plasma generated in the remote plasma source. Plasma strength reading is 170

Take the guesswork out of plasma cleaning. Plasma sensor tells the user exactly how strong the plasma is. User can use the quantitative plasma strength measurement as feedback to adjust gas flow rate and rf power for desired cleaning speed. User doesn't need to be plasma expert to set up right cleaning recipe for different samples.