

## QUATRON Technology

Used and patented by HS-PlasmaTec GmbH methods of plasma generation and plasma extraction allow the use of plasma technology in a variety of applications. Our QUATRON Technology is based on four major properties which make our plasma sources to an outstanding tool for versatile use in industry and science.

### The 4 important QUATRON features:

- Capacitively coupled
- High energy
- Resistant against process-related pollution (no glass body)
- All possible gases can be used! Also reactive!

The possibility to rearrange our Plasma beam sources to 'other frequencies' e.g. 13.56 MHz, 27.12 MHz or 40 MHz is possible. This leads to the higher degree of ionization at higher frequencies and thus to higher plasma density, higher ion flow and energy. Coatings directly "from the plasma source" are possible. For example, for DLC processes we prepare the C+ atoms in the source and treat the surfaces with defined energy, power and direction. The magnetic field coils are axially oriented. This allows the influence of the magnetic field and change the beam characteristics (energy, focus). With the magnetic field plasma can be controlled and adjusted to a wide range of process conditions such as chamber - pressure.

### Other special QUATRON features:

- Neutral and parallel beam (no static charge of the substrate)
- Freely selectable coating of the surfaces that comes in contact with plasma
- Only one low-cost consumable: extraction grid
- Ion energy in the beam is precisely adjustable: 20... ~ 2000 eV
- Amperage of the beam: up to ~ 6 mA / cm<sup>2</sup> (depends on pump performance)
- Typical pressure range is from 1 x 10<sup>-4</sup>mbar up to 5 x 10<sup>-3</sup>mbar
- Very monochromatic energy distribution in the respective pressure range
- Operation with several gases at the same time with first contact (mixing) in the plasma

With our capacitively coupled plasma sources both CVD processes as well as just plasma-assisted processes during the standard PVD are possible. The energy ranges of typically 20eV to 1.5 keV and higher.



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# HS-Group

QUALITY VACUUM PRODUCTS

**HS-PlasmaTec**  
*Innovative Plasma Technology*



## Plasma Beam Sources

### QUATRON-L Series

### QUATRON-R Series

# QUATRON® Plasma Beam Source



QUATRON-L		270	600	800
Beam length	[ mm ]	270	600	800
Beam width	[ mm ]	140	100	100
Beam area, ca.	[ cm <sup>2</sup> ]	378	600	800
Pressure range	[ mbar ]	2e-3 - 1e-5		
Gas		all gases		
RF-power, max.	[ Watt ]	5000		
Energy, up to	[ eV ]	2000		
Current density, up to	[ mA/cm <sup>2</sup> ]	3,6		
Matching		manual, automatic		
Extraction net		tungsten, stainless steel, etc...		
Cooling		water		
Applications		Roll-to-Roll Coaters, PVD, PECVD, Etching, Cleaning, etc...		

\* Other beam length and specifications on request

QUATRON-R		300 IS	200	300	450
Beam diameter	[ mm ]	250	200	300	450
Beam area, ca.	[ cm <sup>2</sup> ]	490	314	706	1590
Pressure range	[ mbar ]	2e-3 - 1e-5			
Gas		all gases			
RF-power, max.	[ Watt ]	5000			
Energy, up to	[ eV ]	2000			
Current density, up to	[ mA/cm <sup>2</sup> ]	2,5	5		
Matching		manual, automatic			
Extraction net		tungsten, stainless steel, etc...			
Cooling		water			
Applications		Wafer, EB-Gun Assistance, PVD, Etching, PECVD, R&D, etc...			

\* Other beam diameter and specifications on request

