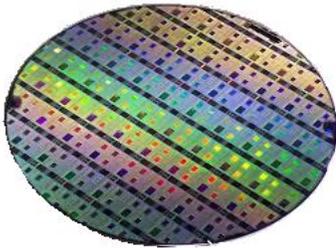




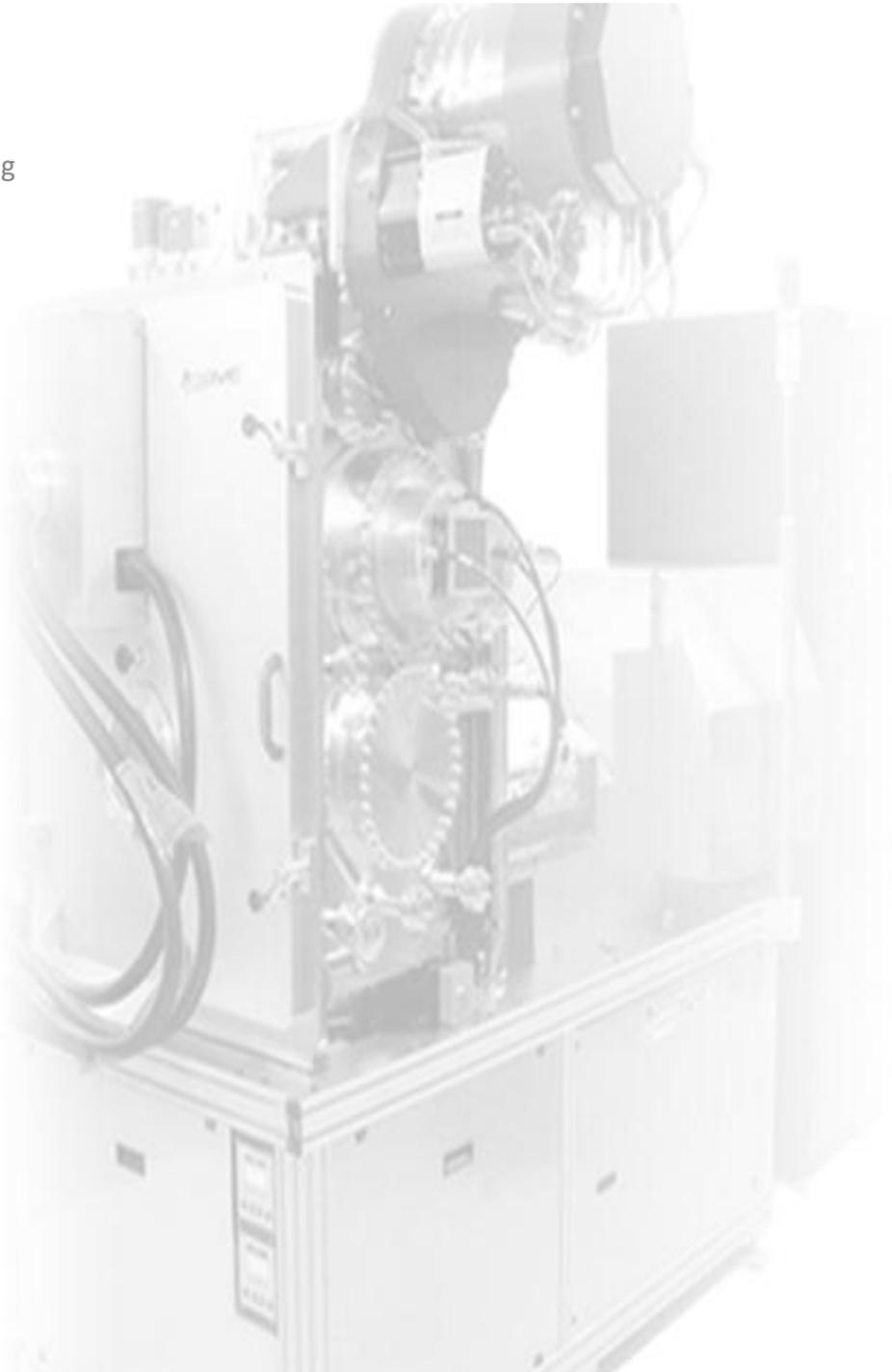
### *Ion Beam Innovations*

- Ion Beam Etching / Milling (IBE)
- Ion Beam Sputtering (IBS)
- Biased Target Sputtering (BTS)
- Magnetron Sputtering
- Pilot production and wafer manufacturing overflow



### **Corporate overview**

4Wave is the industry leader in thin film nanotechnology material science and products. Our core technology is Ion Beam Technology and Biased Target Technology. 4Wave offers the most advanced and cost efficient technologies for Ion Beam Etching (IBE), Ion Beam Deposition Sputtering (IBS), Biased Target Sputtering (BTS) and Magnetron Sputtering. 4Wave is the industry leader in the development of thin film processes and applications.



## **4Wave IBE12L01 FA Delayering System**



**Markets:**

- ✓ MEMS
- ✓ Thin film optics and lenses
- ✓ Semiconductor
- ✓ Data Storage
- ✓ Pilot production and foundry support

**Process Gases:**

- ✓ Ar
- ✓ Xe
- ✓ N2
- ✓ O2
- ✓ CF4
- ✓ SF6
- ✓ CH4
- ✓ C2H6

The 4Wave Load Lock Etch System is a flagship product addressing several significant markets. This system boasts high performance etching, critical thin film profile milling, glancing angle milling, etc. 4Wave Single Wafer Load Lock Etching Systems addresses the needs of customers seeking a flexible, cost-effective, small-footprint, ion-etching/ion processing workhorse for general purpose research and production applications.

Specifications	Technology (modules)	Integration
<ul style="list-style-type: none"> <li>▪ 8cm – 22cm gridded Kaufman ion source</li> <li>▪ &lt; 3% non-uniformity</li> <li>▪ Water cooled, tilting, rotating</li> <li>▪ Up to 150mm diameter process surface</li> <li>▪ SIMS end point detection</li> <li>▪ Single Wafer Platen</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ion Beam Etch (IBE)               <ul style="list-style-type: none"> <li>○ Dry Etching</li> <li>○ Reactive Ion Etching (RIE)</li> <li>○ CAIBE capability</li> <li>○ Endpoint detector optional</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Full computer control</li> <li>▪ Distributed Profibus architecture</li> <li>▪ SECS / HSMS</li> <li>▪ Ball room style cleanroom installation</li> </ul>

## Configuration

	Base System	Options	Options
<b>Vacuum System</b>			
Dimension	72" x 50"		
Pumping	Maglev Turbo Pump / Scroll Pump	10" Cryo / Scroll Pump	8" Cryo / Scroll Pump
Base Pressure	8.0 x 10 <sup>-8</sup> Torr		
<b>Stage</b>			
Sample Area	150 mm	100 mm	< 100mm
Process Angle	0 - 180°		
Rotation Speed	0 – 20 RPM		
Cooling	Water		
<b>Ion Source</b>			
Aperture Size	22 cm	12 cm	8cm
Grids	2 grid, Moly	2 grid, Moly	2 grid, Moly
Discharge	RF	RF	DC
Neutralization	PBN	PBN	Filament
Beam	200 – 1000 V, 0 - 1000 mA	200 – 1200 V, 0 - 500 mA	
Magnetron Cathodes		Up to Three 2" (RF / DC)	Up to Three 2" (RF / DC)
Process Gases	Ar, Xe, N <sub>2</sub> , O <sub>2</sub> , CF <sub>4</sub> , SF <sub>6</sub> , CH <sub>4</sub> , C <sub>2</sub> H <sub>6</sub>	Ar, Xe, N <sub>2</sub> , O <sub>2</sub> , CF <sub>4</sub> , SF <sub>6</sub> , CH <sub>4</sub> , C <sub>2</sub> H <sub>6</sub>	
<b>SIMS</b>		Hidden Analytical	

More on Ion Beam Sputtering (IBS), Ion Beam Etching (IBE), Biased Target Sputtering (BTS), RIE, CAIBE, please visit our website [www.4waveinc.com](http://www.4waveinc.com) or request more information at [sales@4waveinc.com](mailto:sales@4waveinc.com).