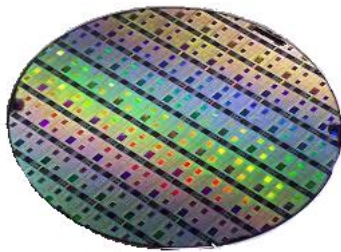




## 4Wave Cluster Tool

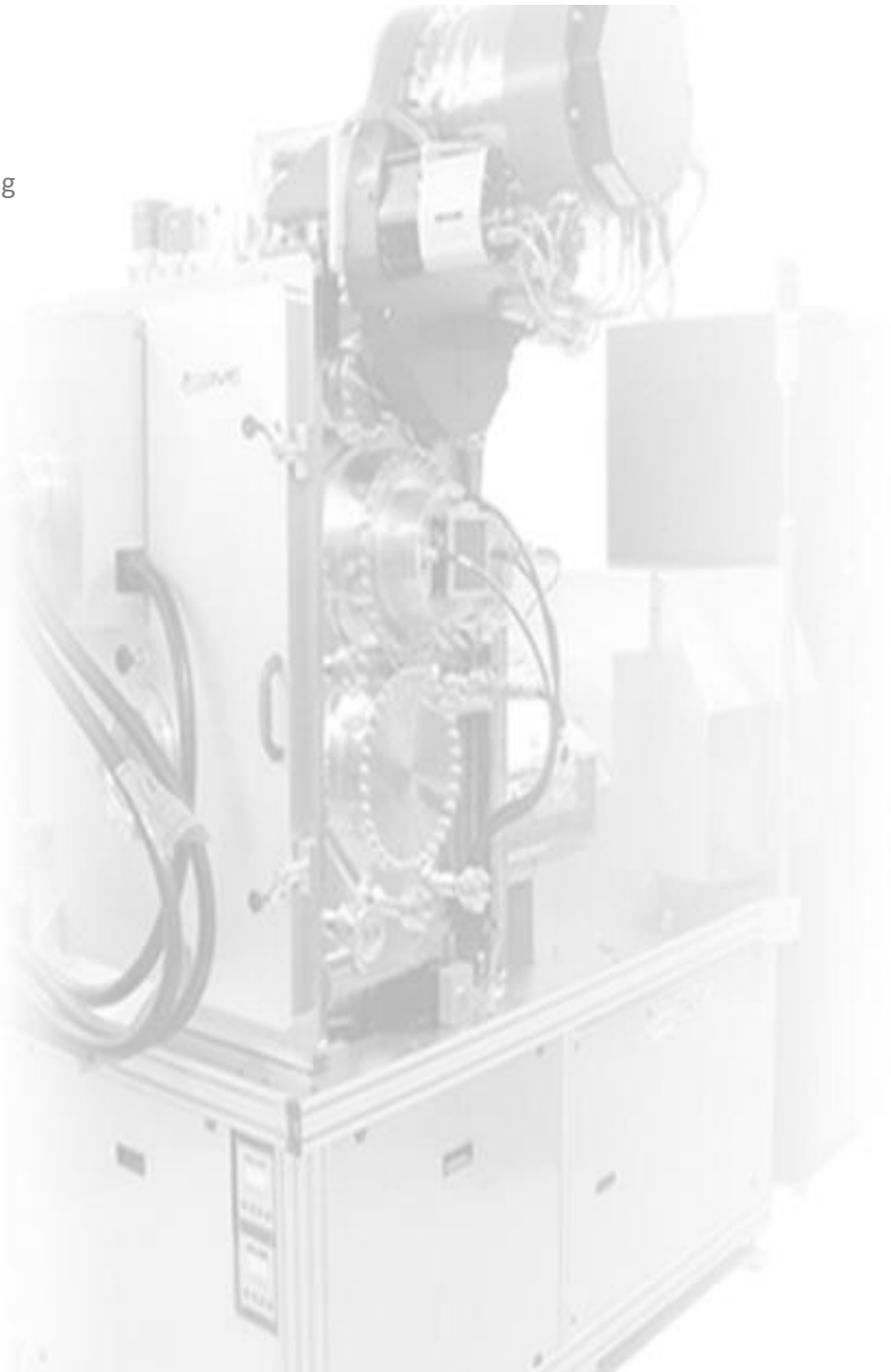
### ***Ion Beam Innovations***

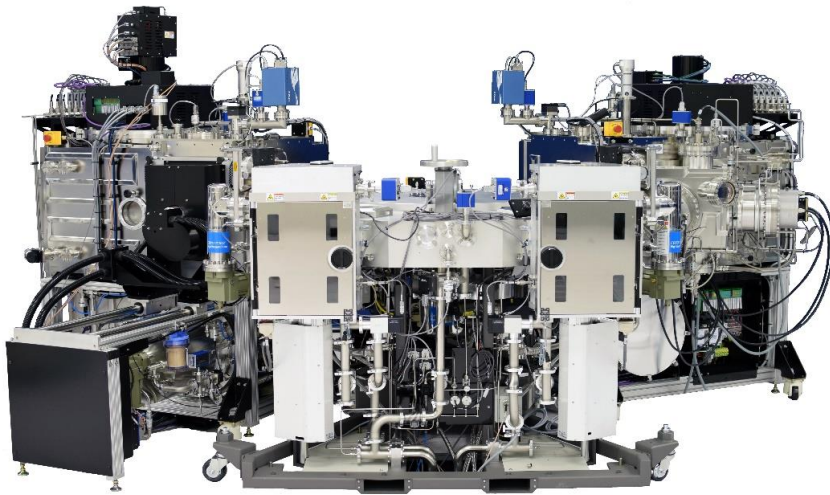
- Ion Beam Etching / Milling (IBE)
- Ion Beam Sputtering (IBS)
- Biased Target Sputtering (BTS)
- Magnetron Sputtering
- Pilot production and wafer manufacturing overflow



### **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.





#### Markets:

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

#### Materials:

- |                                     |                       |
|-------------------------------------|-----------------------|
| ✓ Ti /TiO                           | ✓ Hf /HfO             |
| ✓ Au                                | ✓ Si/SiO <sub>2</sub> |
| ✓ Pt                                | ✓ Mg/MgO              |
| ✓ Cu                                | ✓ VO <sub>2</sub>     |
| ✓ Ag                                | ✓ SiC                 |
| ✓ VO <sub>x</sub>                   | ✓ Nb/NbO <sub>2</sub> |
| ✓ Ta/Ta <sub>2</sub> O <sub>5</sub> | ✓ Ru/RuO              |

4Wave's cluster tool is the premier Sputtering system. The platform incorporates the most advanced engineering for performance and uptime. It is fully computer controlled featuring advanced wafer scheduling and LOT management. The 4Wave cluster tool addresses the highest performance in markets including MEMS, Thin film optics, Semiconductor and Data Storage.

Specifications	Technology (modules)	Integration
<ul style="list-style-type: none"> <li>▪ 6" and 8" wafer processing</li> <li>▪ Multiple processing modules on a robot and cassette front end</li> <li>▪ Can accommodate up to three (3) processing modules</li> <li>▪ Advanced wafer management system</li> <li>▪ Excellent MTTR / MTBF performance</li> <li>▪ Reactive and non-reactive sputtering and etching</li> <li>▪ Advanced process control</li> <li>▪ Highest performance thin films</li> <li>▪ 12 or more sputter targets</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> <li>▪ Ion Beam Sputtering               <ul style="list-style-type: none"> <li>○ Metal and reactive sputtering</li> </ul> </li> <li>▪ Biased Target Sputtering <sup>™</sup> <ul style="list-style-type: none"> <li>○ High rate Metal sputtering</li> <li>○ Reactive sputtering</li> <li>○ Compositional Nano-technology <sup>™</sup></li> </ul> </li> <li>▪ Z-Flex – Etch and dep combination module</li> </ul>	<ul style="list-style-type: none"> <li>▪ Full computer control</li> <li>▪ Profibus distributed architecture</li> <li>▪ SECS / HSMS</li> <li>▪ Fabguard integration</li> <li>▪ CE certified</li> <li>▪ Clean room bulkhead installation</li> </ul>

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).

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