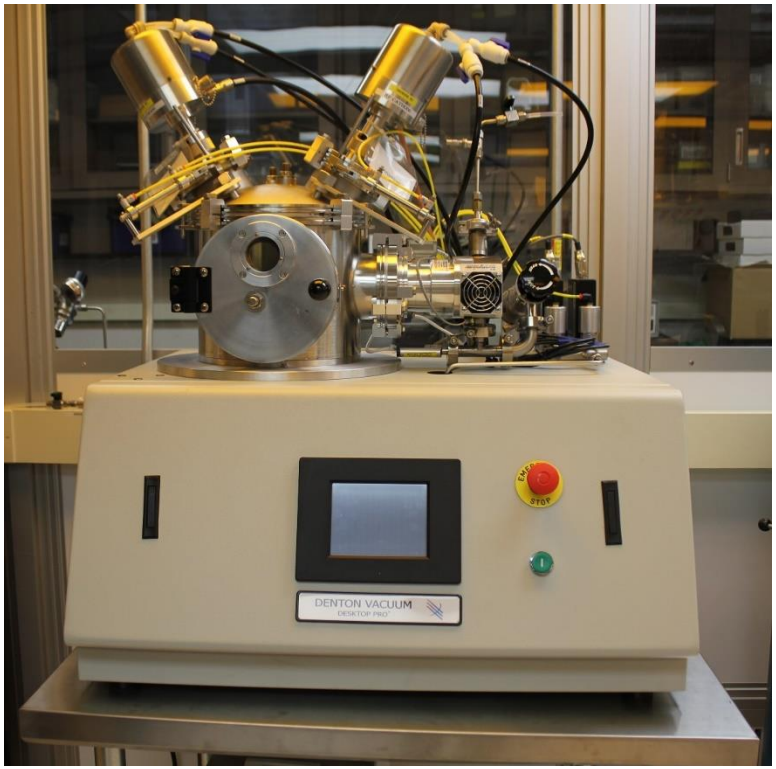
PennState College of Engineering

CENTER FOR NANOTECHNOLOGY EDUCATION AND UTILIZATION

Sputtering Tool



How It Works:

High energy ions are accelerated into a solid target causing atoms to break free from the target surface and be deposited on the sample. This is a momentum transfer operation, analogous to billiard ball impacts.

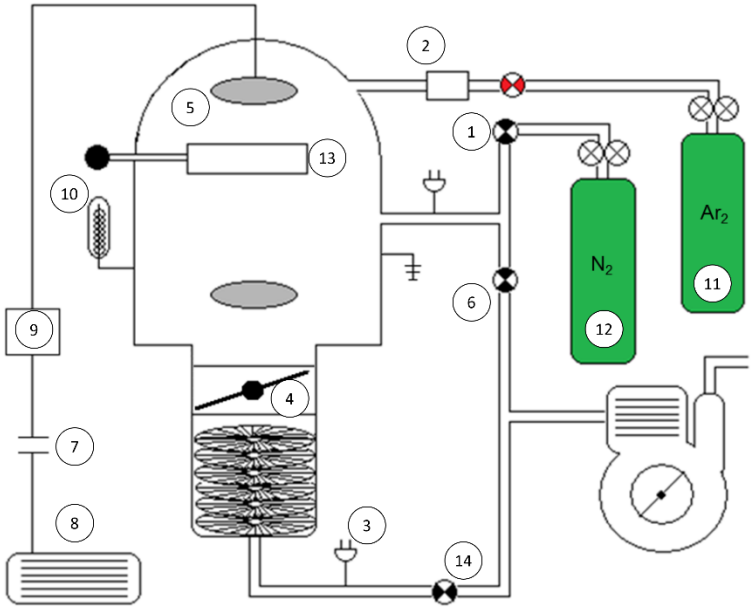
Tool Operation:

Magnetron Sputtering: RF Field around target traps electrons causing more ionizing collisions to form a plasma around the target. This produces a fast sputtering rate resulting in rapid film growth.

High Target Utilization Sputtering: Plasma generated in a side chamber and introduced to sputter target. This system uses more of the target and allows more control of the film characteristics.

Material / Applications:

Sputtering is good for depositing many film coatings. It is particularly good for depositing films, including alloys and dielectrics, that cannot be evaporated since it does not require that the target be melted as in evaporation.



1 Vent valve
2 Mass flow controller
3 TC gauge
4 Throttle valve
5 Magnetron cathode
6 Rough valve
7 7 blocking capacitor
8 RF power supply
9 50 Ω impedance match
10 Ion gauge
11 Process gas
12 Vent gas
13 Shutter
14 Foreline valve

Denton Vacuum Desktop Pro Specifications

Chamber:	Steel Chamber with view port
Gas Capabilities:	Argon, Oxygen (reactive)
Vacuum Pumps:	Mechanical and Turbo
Targets:	Au, Pt, Al, Cr, Ni, Si, SiO_2
Options:	Film Thickness Monitor, Rotation, Tilt Manual or Timed Operation