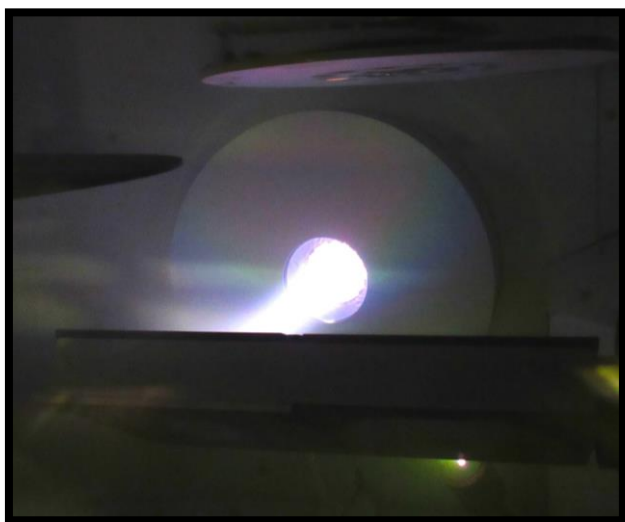


Ion Beam Sputtering

OCRICOM's primary deposition method for optical coatings is ion beam sputtering (IBS), which is summarized in this technical note. We can readily deposit SiO_2 , TiO_2 , Al_2O_3 , Ta_2O_5 , SiN_x , and AlN_x .

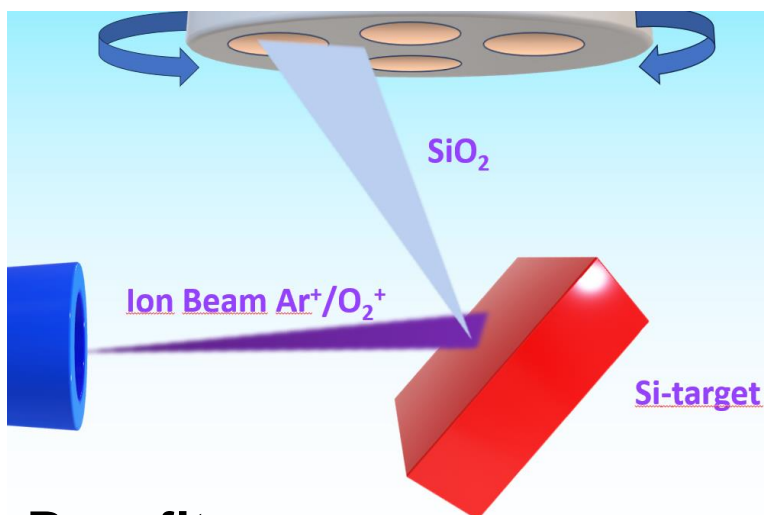
Principle

- ❖ Sputtering takes place in a high vacuum system.
- ❖ Radiofrequency-generated gas ions, in an ion source, are accelerated with a voltage to bombard a target. Typically used sputtering gases are argon (Ar) and xenon (Xe).
- ❖ The sputtered target material is knocked off the target surface and condenses on a substrate surface, forming a thin film.
- ❖ For oxides, the process contains oxygen to reactively form the dielectric thin film and to ensure the film stoichiometry.



Applications

- ❖ Precision **optical filters**, from narrow bandpass filters to notch, and edge filters.
- ❖ Precise **antireflection coatings** and **highly reflective mirrors**.
- ❖ High-power **laser** applications from intracavity elements to external cavity optics.
- ❖ Ruggedized optical coatings for **aerospace** and **defense**, providing durability in extreme environments.



Benefits

- ❖ Energetic process forms **dense and uniform** layers with **very low absorption and scattering losses**.
- ❖ Coatings have **high durability** and a **high optical damage threshold**.
- ❖ The process has **high controllability**, as the parameters can readily be defined for a specific process with **high repeatability**.
- ❖ The kinetic process **does not require additional** substrate **heating** making it suitable for heat-sensitive samples.

