# Instrumental Technique

## The DAR 400  X-Ray Source

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# S instrument working on Fundamental technique and basic pr

## Technique

When highly energetic electron beam hit  metals surface X-rays will be produced

## Principle: PHOTO ELECTRIC EFFECT

### EINSTEIN'S PHOTOELECTRIC EQUATION

hɤ(X-rays) = Threshold Energy(Binding Energy) + kinetic Energy(1/2mv2)

I wish to remind one point

This basic principle is useful, to provide experimental proof for theoretical value(Plank’s constant=h)

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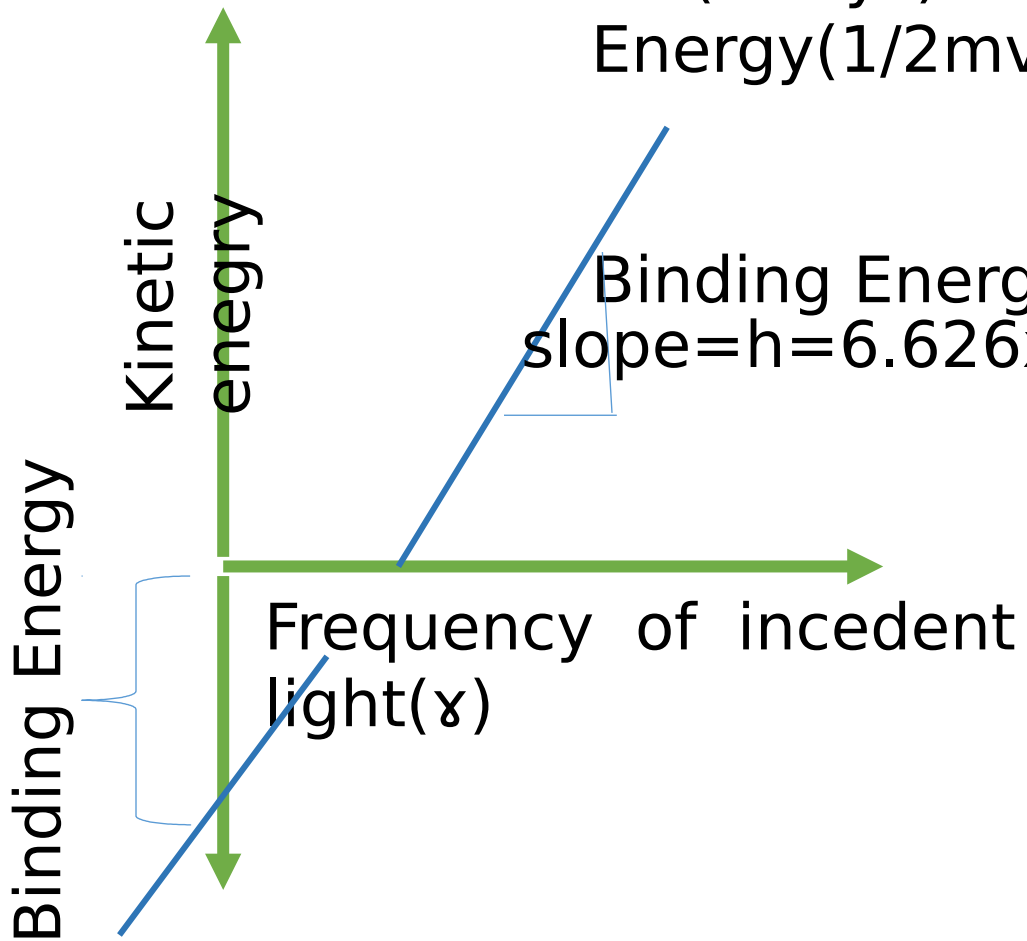
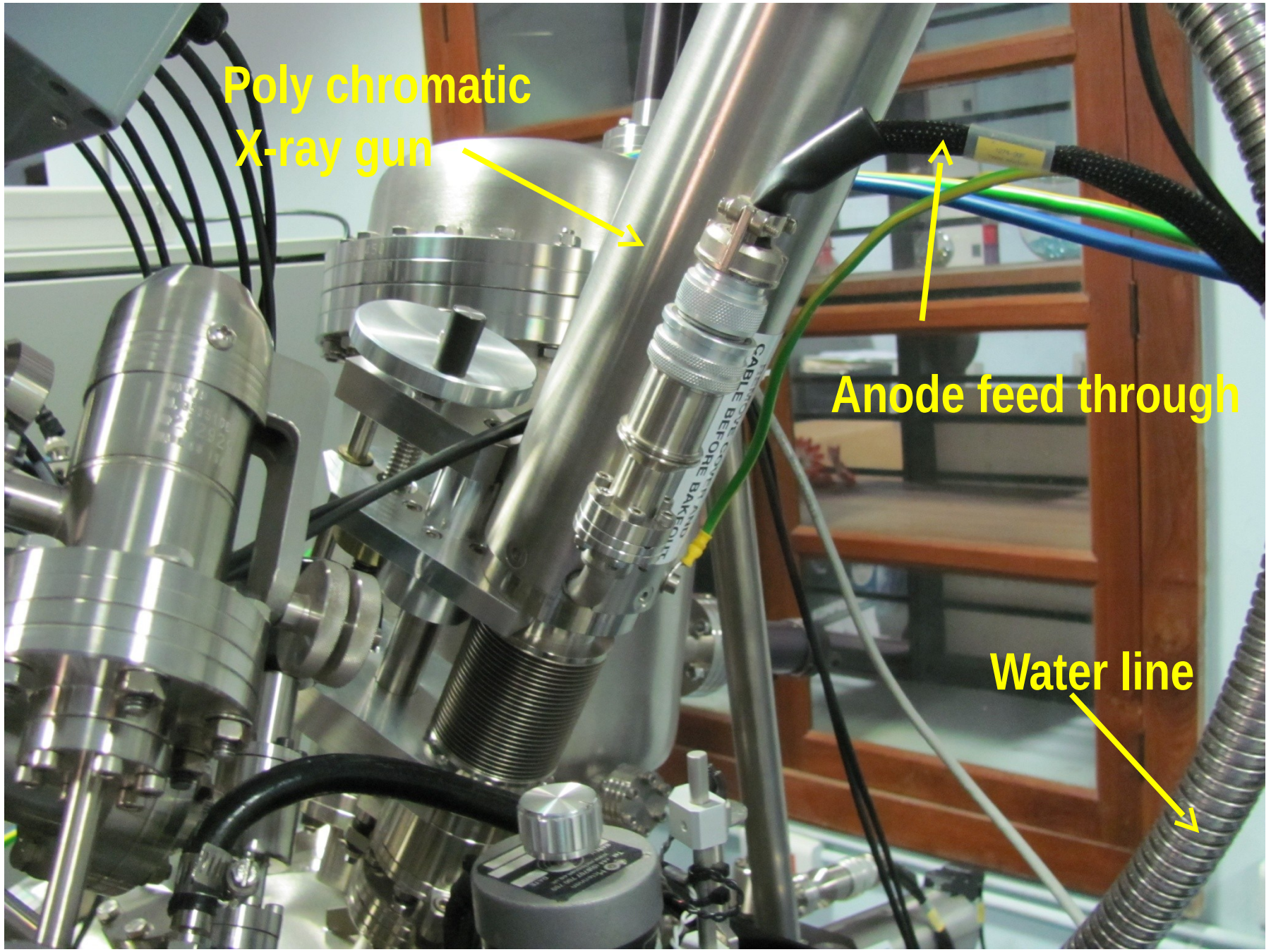



KE = hɤ -

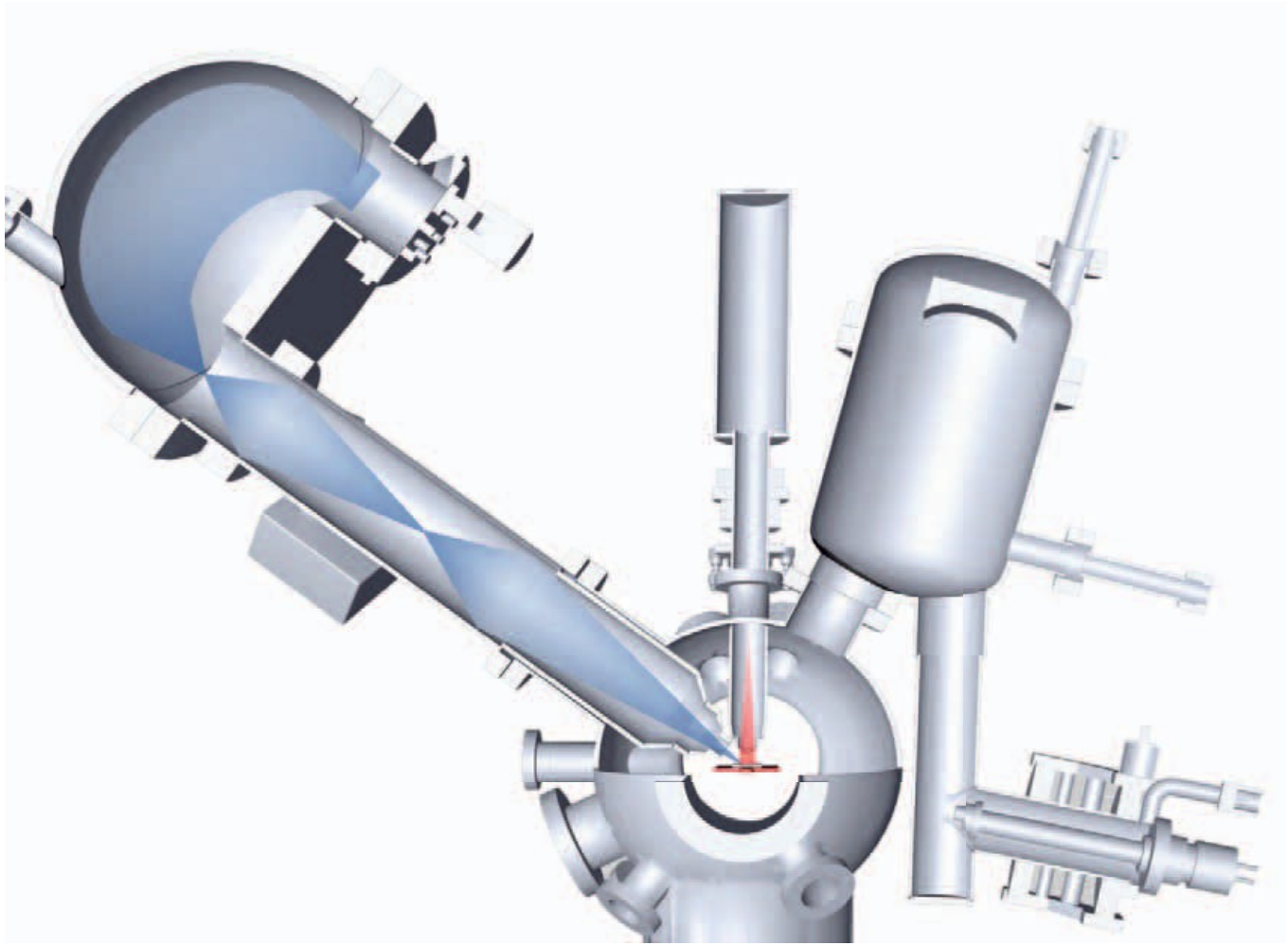
Y = mx - c

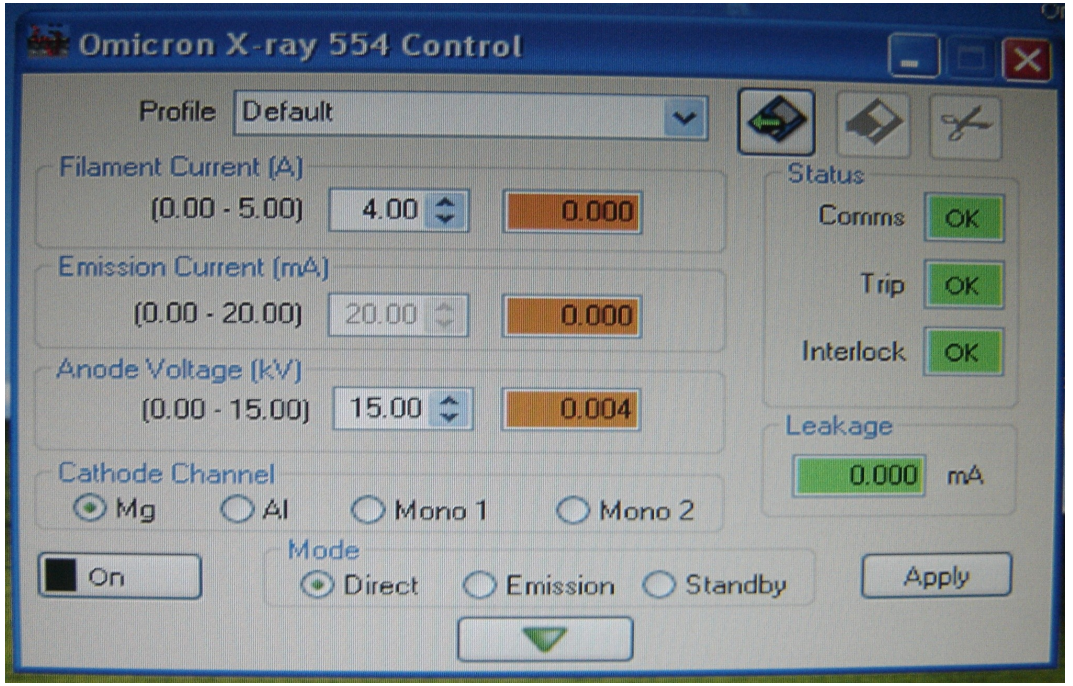
# The DAR 400  X-Ray Source Features

- The DAR 400 is a twin-anode high intensity x-ray (flood)source
- High x-ray flux for fast sample analysis
- Linear drive for optimum working distance (optional)
- Fully software controlled


Poly chromatic
X-ray gun
Anode feed through
Water line
Water Outlet
Water Inlet

# Omricon X-ray 554 control(software)



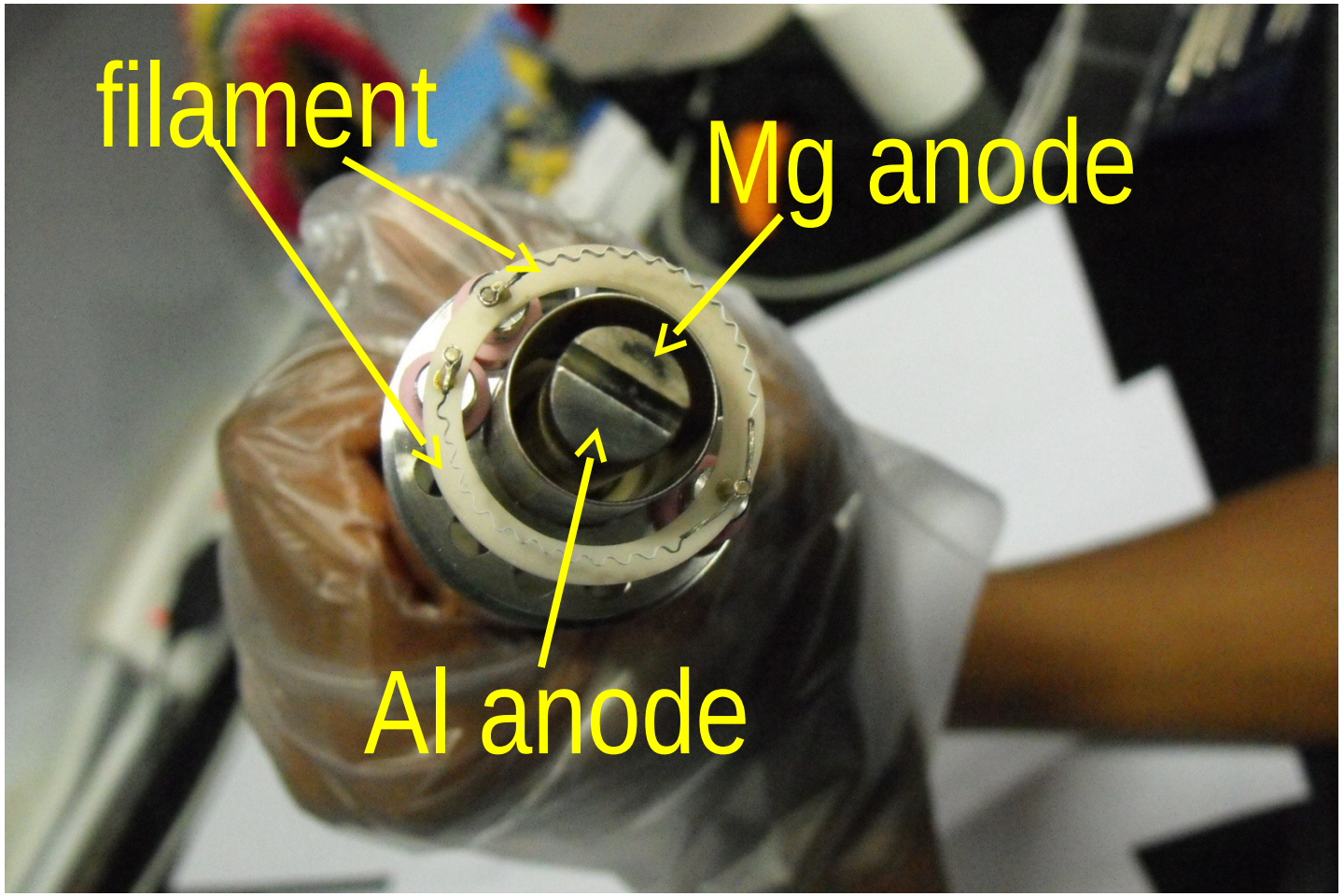


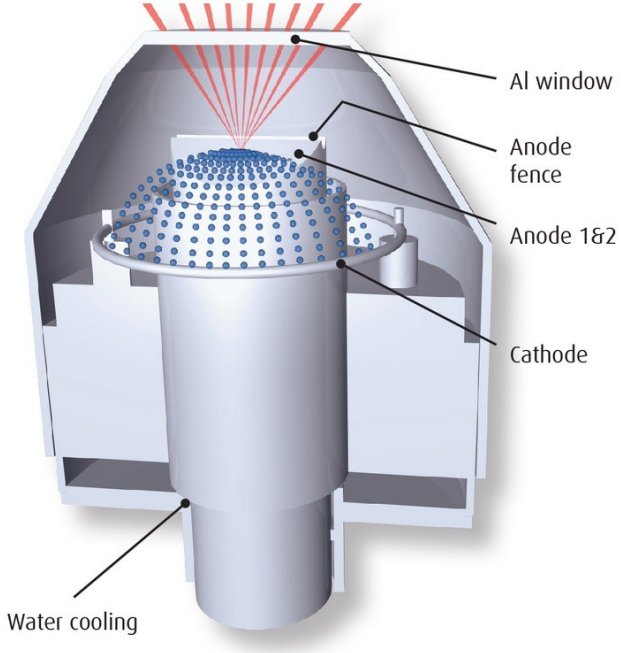

**Technical Data DAR 400**

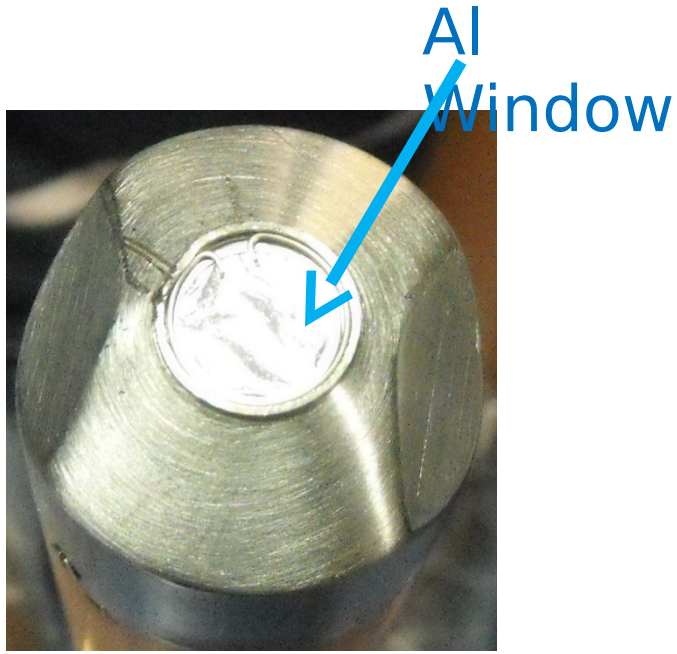
**Maximum X-ray power:** Al: 400 W / Mg: 300 W

**Anode voltage:** 0.3 - 15 kV

**Filament emission:** 0 - 27 mA




*Tungsten cathode* is *used* in *x-ray tube* because of it's high melting point of 3410°C

Mg Anode : Kα(X-ray) , Photon Energy=1253.6 eV
Al Anode : Kα(X-ray) , Photon Energy=1483.6 eV

*Tungsten cathode* coated with Thoria(ThO2)

The anode internal design creates turbulent water flow conditions,

1. To prevent evaporating of sample

2.To minimize sample heating via the source.

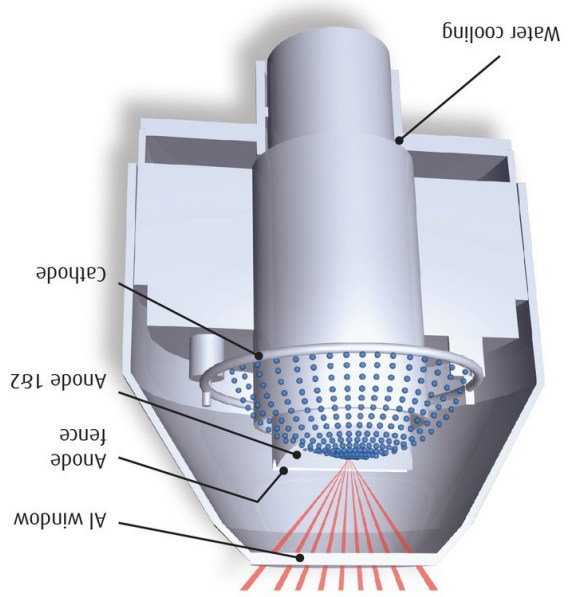
The X-rays generated at the anode surface pass through a thin Aluminium window

1.This is designed to maintain a partial vacuum barrier between source and sample.

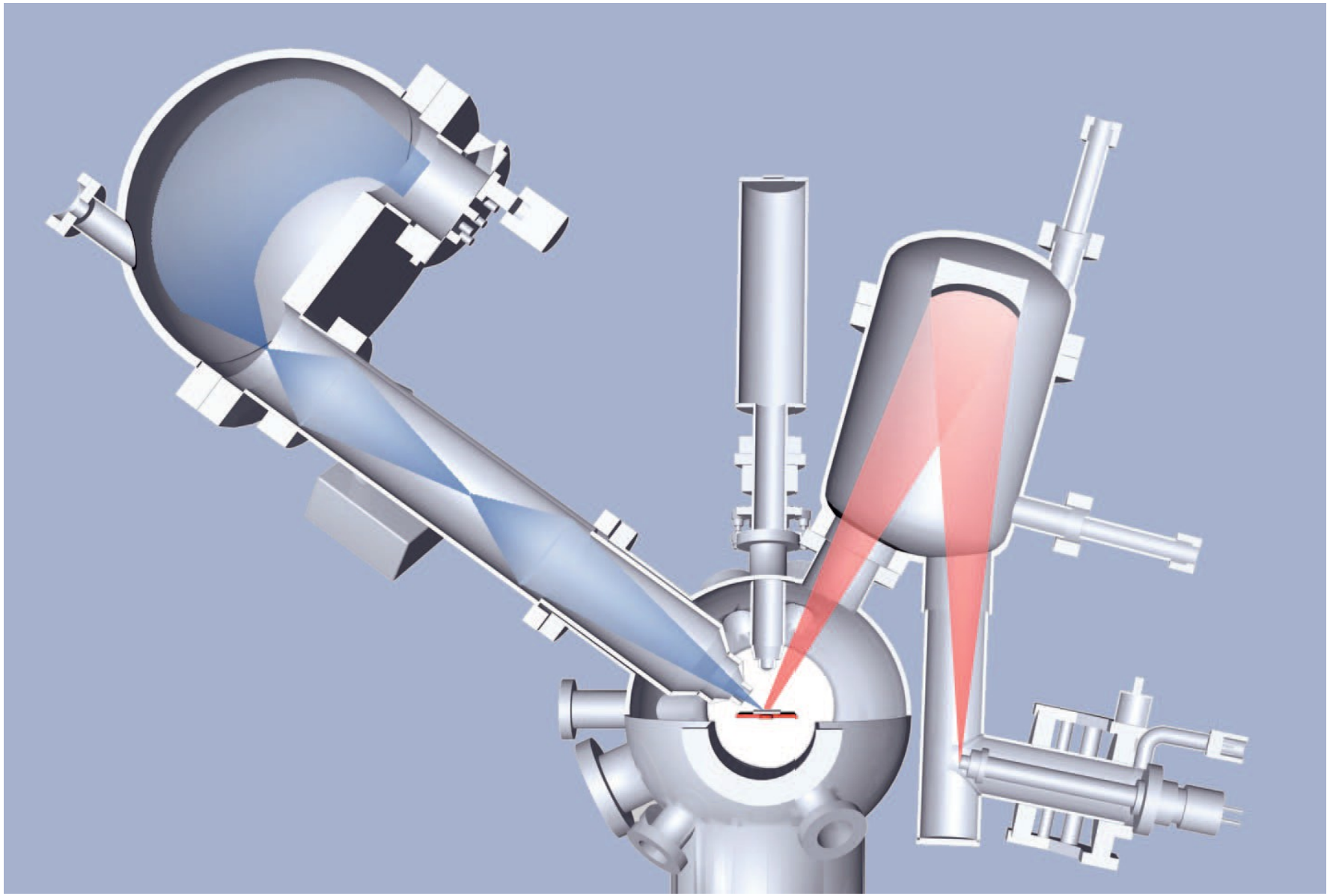
2.The window allows

2(a).The source to be differentially pumped

2(b).To reduce Bremsstrahlung radiation.



## Future plan
## Monochromatic Alignment( for X-Ray Source)



Silly Question

**In our lab all sophisticated instrument measurements depends on electric current (directly or indirectly) If [illegible] is no power(electricity)?**

Production of Photo electrons