

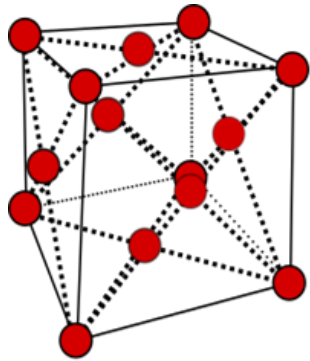
# Design and Construction of an X- ray Diffractometer

Margaret Kirkland

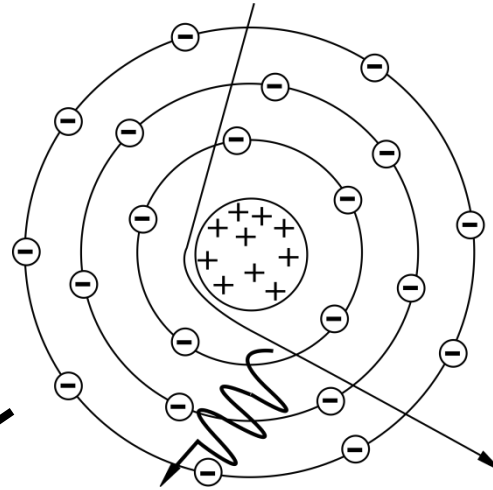
Brandon Hoffman



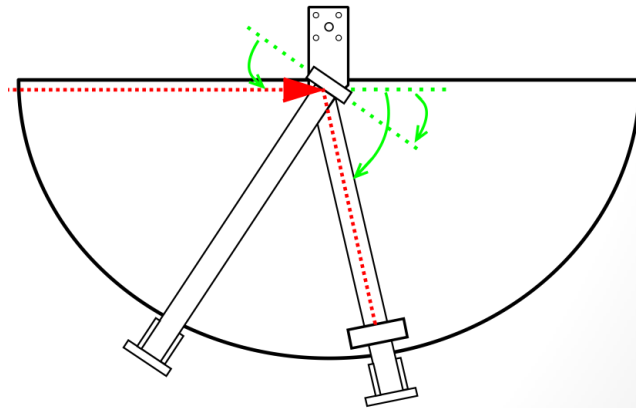
# Outline



(fcc)

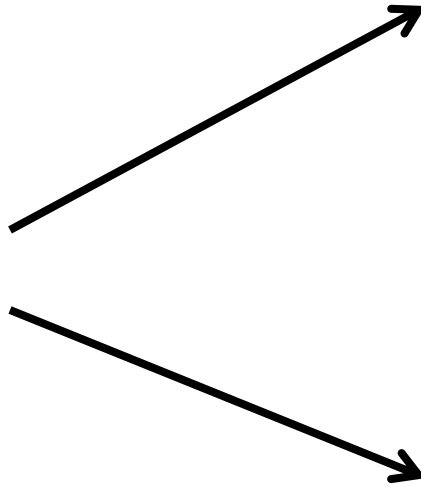


$$2d\sin\theta = n\lambda$$

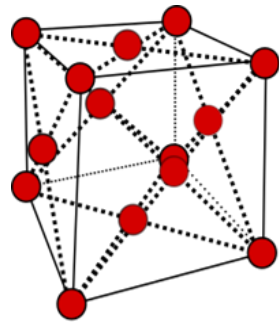


# Motivation

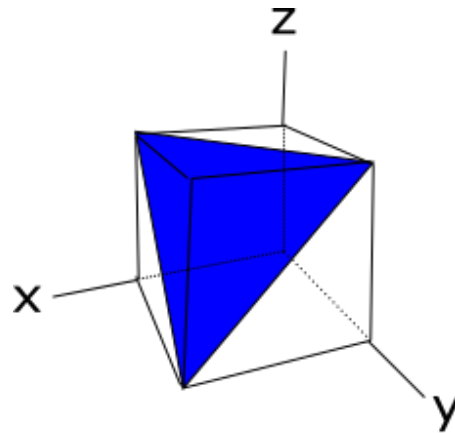
**XRD**



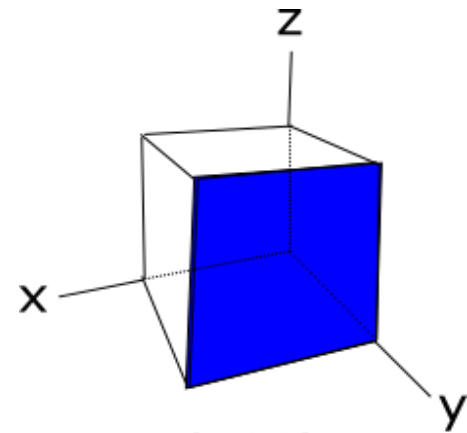
# Structure of Thin Films



(fcc)

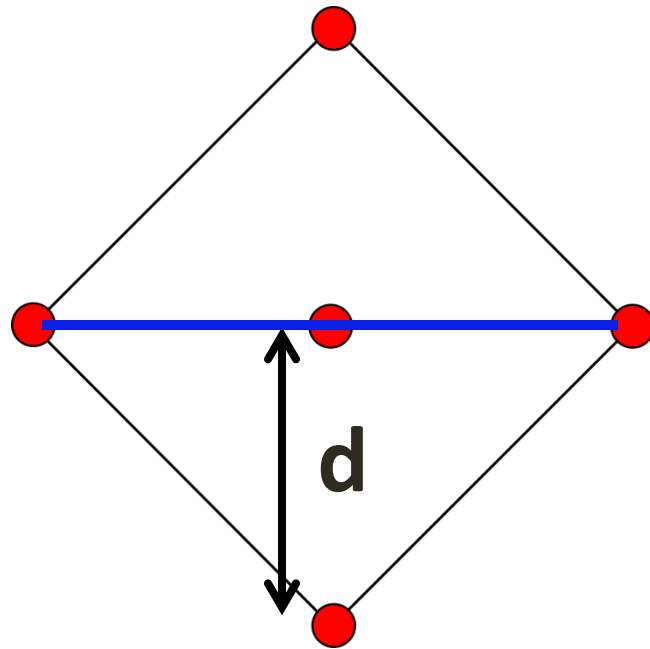


(111)

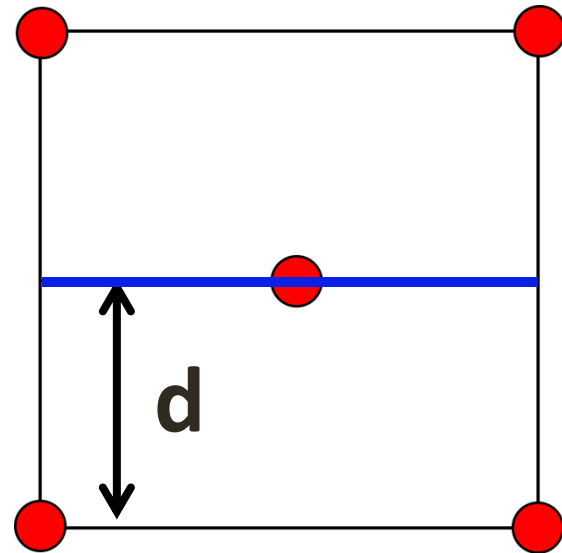


(100)

# Sideview of Crystal Planes



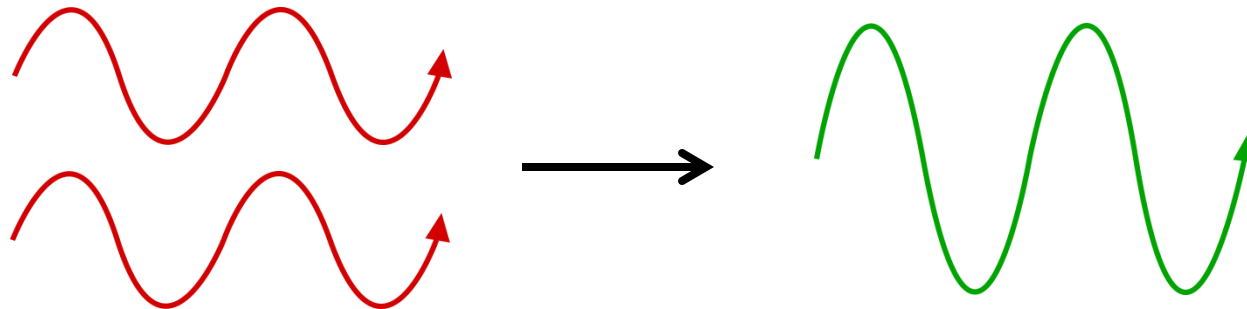
(110)



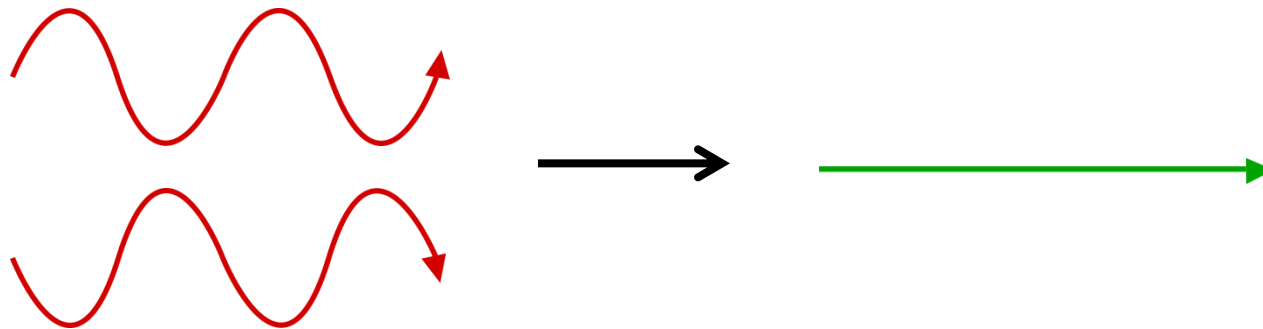
(100)

# Wave Interference

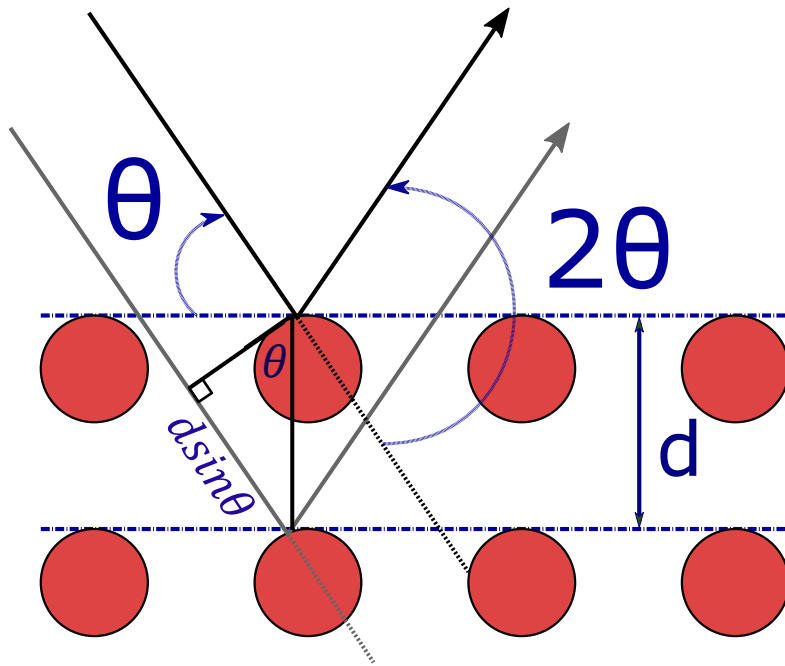
Constructive:



Destructive:

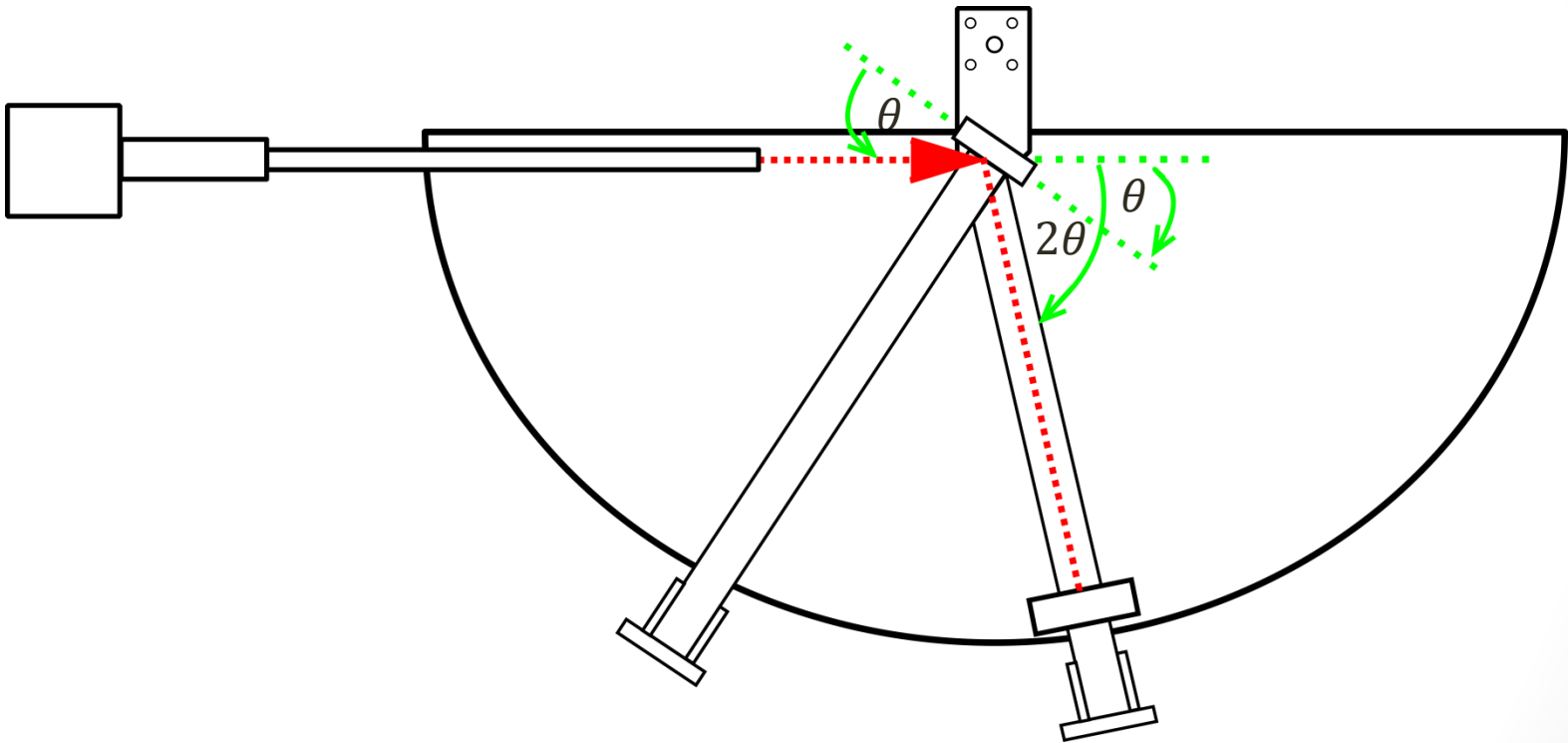


# Bragg's Law



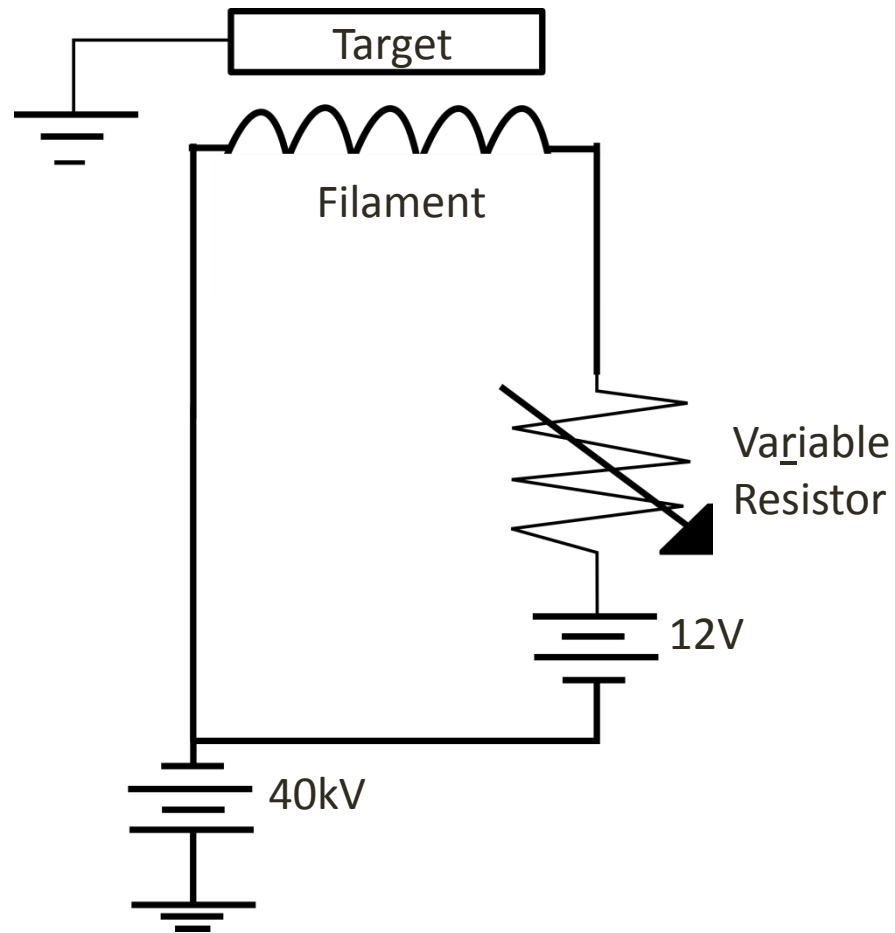
$$2d \sin \theta = n\lambda$$

# Apparatus

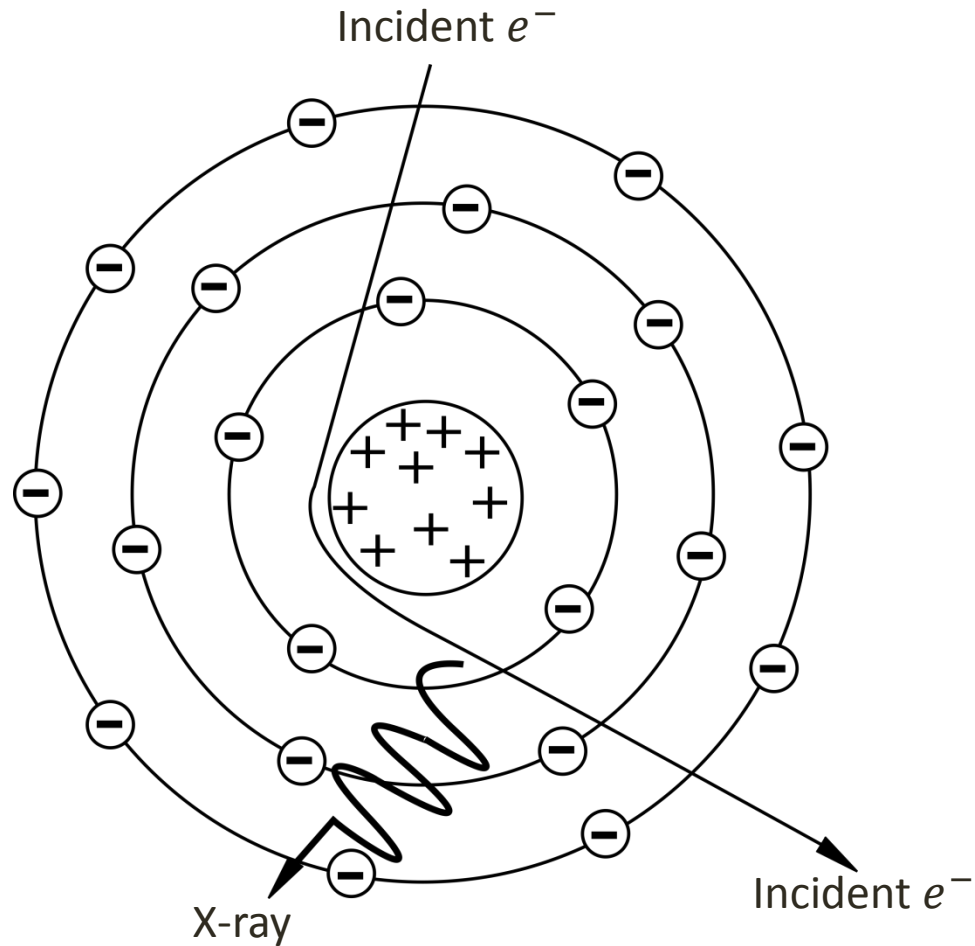




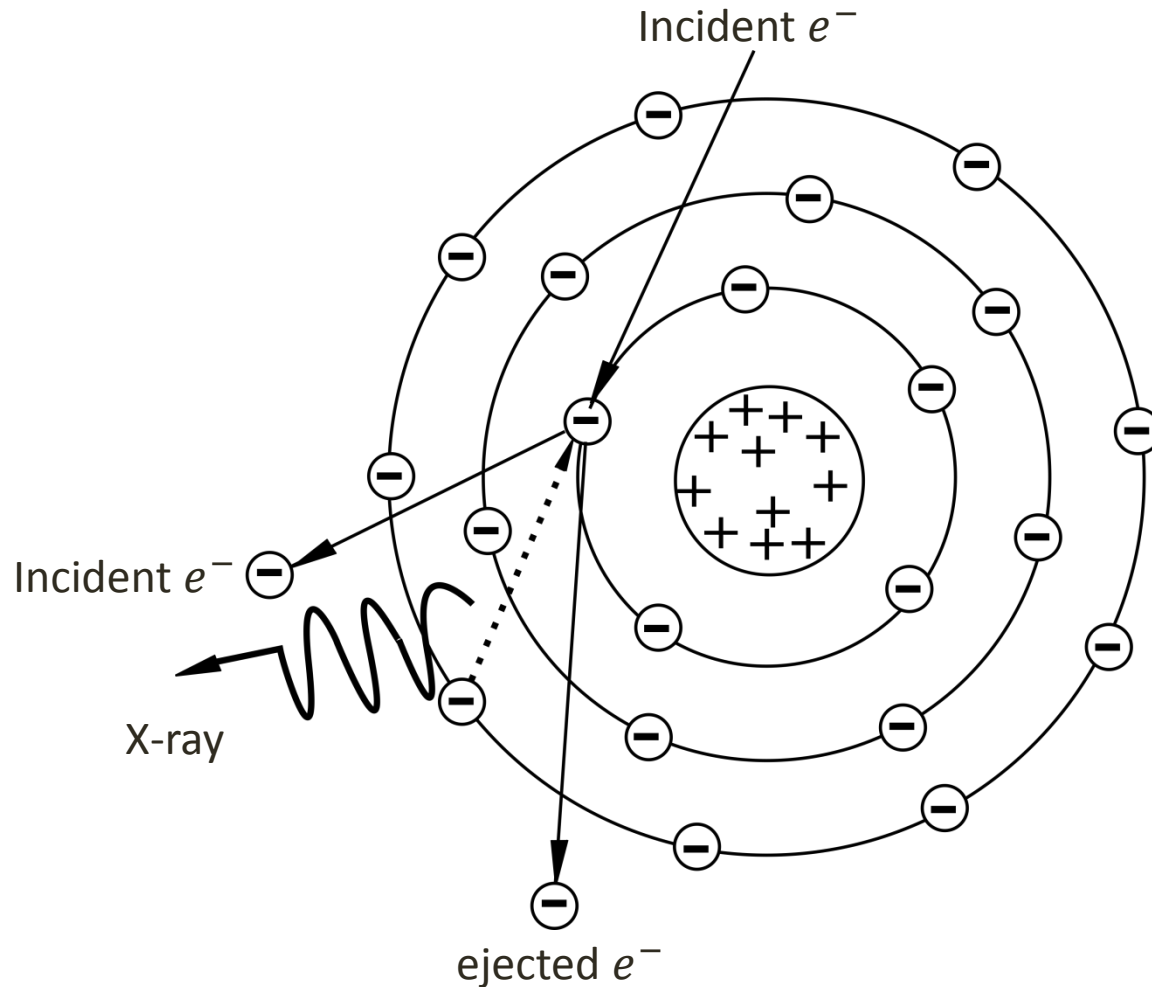
# X-Ray Circuit



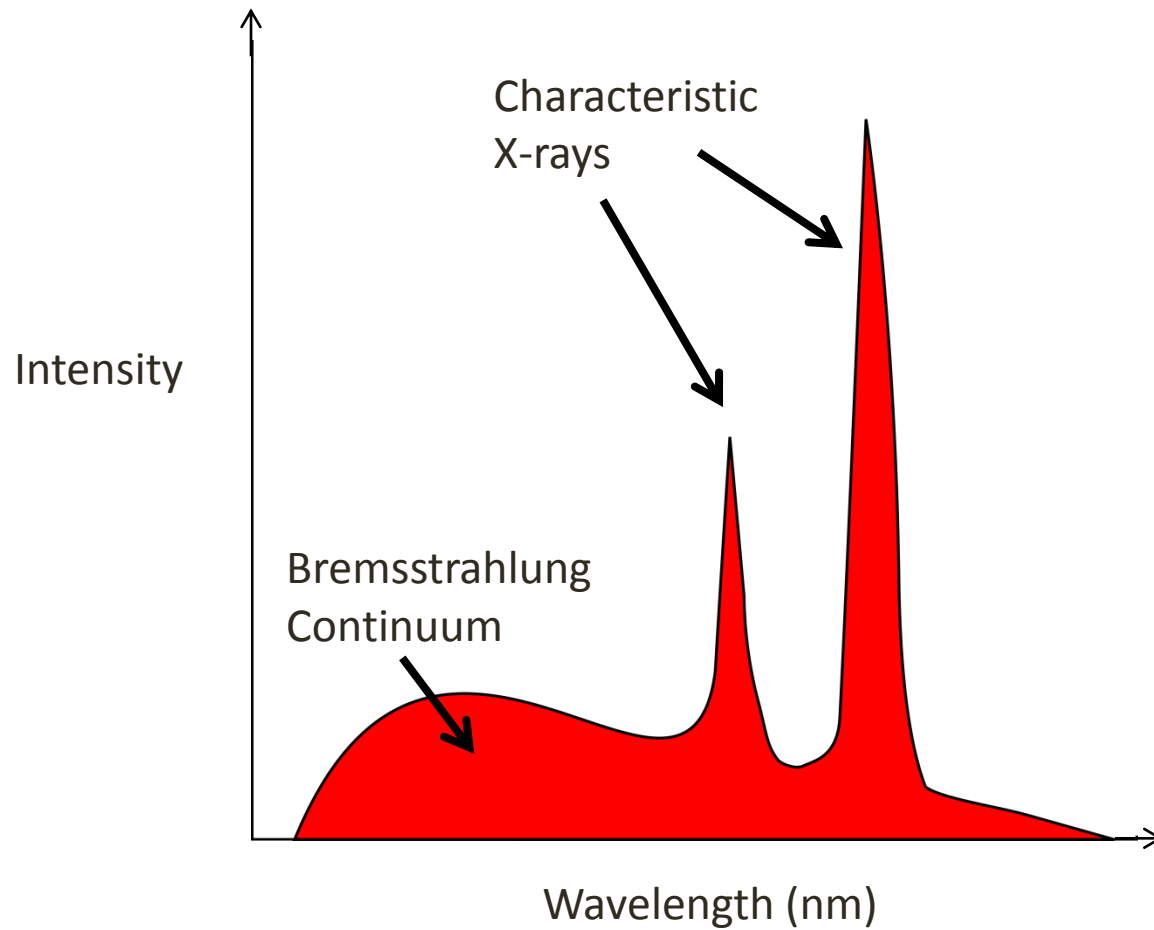
# Bremsstrahlung X-rays



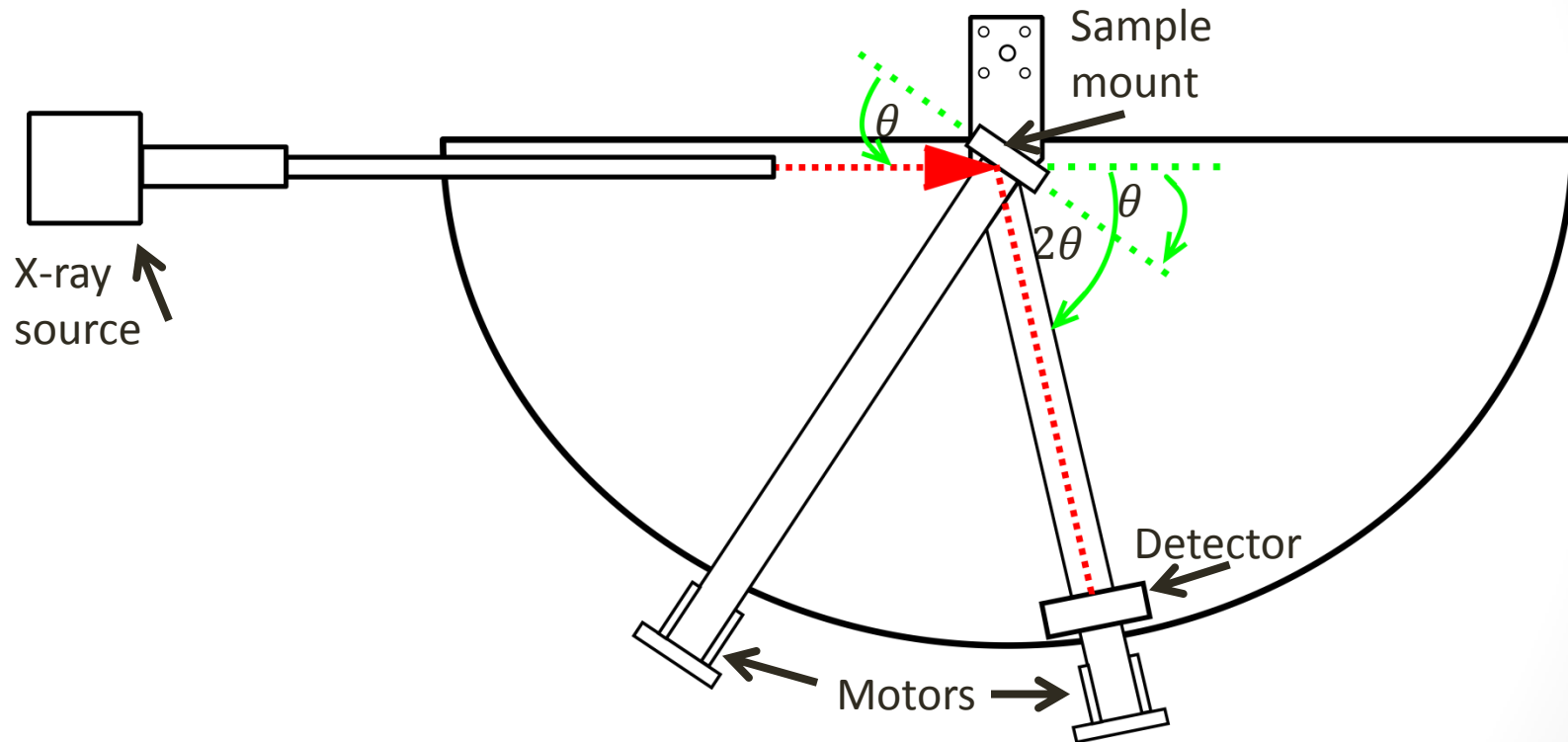
# Characteristic X-rays



# X-ray



# XRD – Top view



# XRD – Side view

