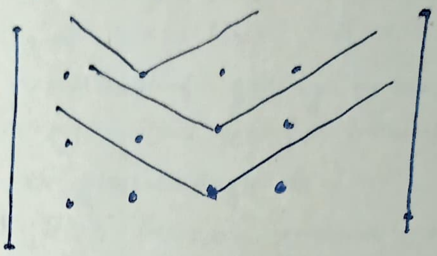
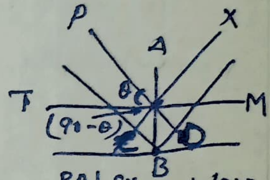
X - ray Crystallography.

William H. Bragg (1913) used PolyChromatic light.
William Lourence Bragg (son) elaborated the work of his father. He found that Crystal Can be utillised as reflaction, deffaction and grating.

He established a very simble and useful relation Co-relating the wave length of X-ray and distance between Consecutive lattice Planes and this serves as a very powerful tool for study of crystal structure and Nature of X-ray.



Derivation of Bragg's Equation :→



PA ⊥ CX and $\angle PAT = \theta$

$\therefore \angle TAC = 90-\theta$

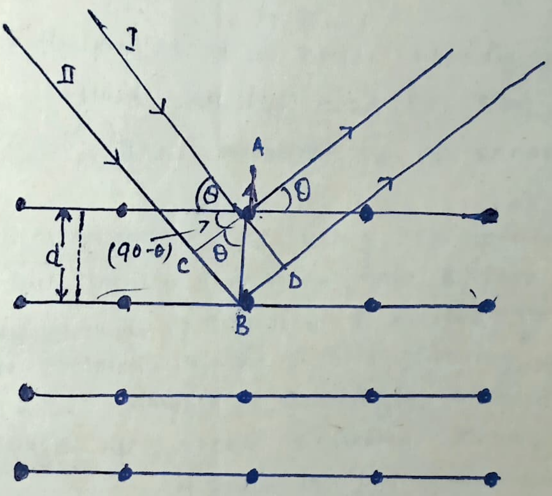
AB ⊥ TM and $\angle TAB = 90^\circ$

$\therefore \angle CAB = \theta$

In ΔACB

$\sin\theta = \frac{CB}{AB}$

$\therefore CB = AB.\sin\theta$



Consider a beam of mono chromatic X-rays incident on a set of parallel and equidistance lattice Called Bragg's plane's in the Crystal Substance.

Let d cm be the distance between successive plane and θ be the glacial angle i.e angle betmen the direction of incident angle and the plane.

The two Parallel rays I and II are reflected by two atoms A and B in two adjacent Plane, B is exactly below to A. The ray reflected from B travels a longer distance than that reflected from A. Draw AC and AB Perpendicular to the direction of the incident and reflected rays. each of these line makes angle θ with AB, whose length is given by d.

Further $CB = BD = AB\sin\theta$

$= d\sin\theta$

[illegible]

$$(CB + BD) = n\lambda$$

$$[illegible] = n\lambda \quad [\because \ldots]$$

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

Where n = simple integer i.e. 1, 2, 3 ———

[illegible]

[illegible]

The reflection is of second order.

Experimental result — [illegible]

[illegible]