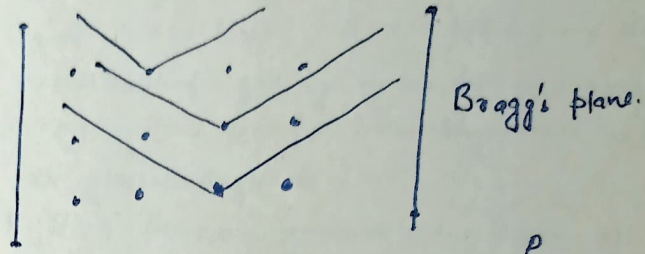


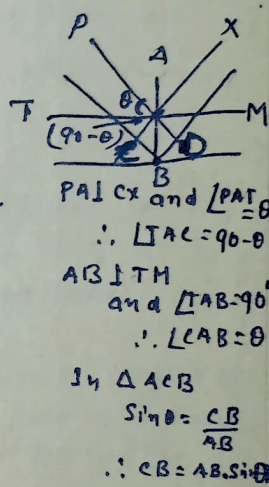
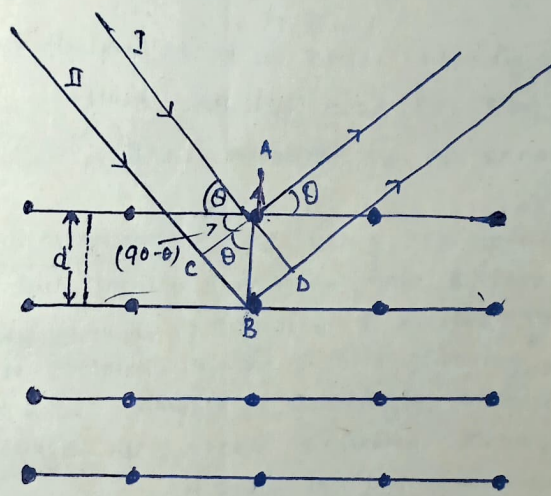
# X-ray Crystallography

William H. Bragg (1913) used Polychromatic Light.  
 William Lawrence Bragg (son) elaborated the work of his father. He found that crystal can be utilised as reflection, diffraction and grating.

He established a very simple 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: →



Consider a beam of monochromatic X-rays incident on a set of parallel and equidistance lattice called Bragg's plane's in the crystal substance.

Let  $d$  am be the distance between successive plane and  $\theta$  be the glacial angle  
 i.e angle between 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  $\theta$  with AB, whose lengths is given by  $d$ .

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

The distribution function is given by the very definition  
 from the second day to month (10-10)  
 And the condition for continuous distribution is  
 continuous for any  $x$   
 $f(x) = 0$

Method-1)  
 $d = \frac{m}{n}$   
 $\frac{m}{n} = \frac{1}{1000}$   
 $m = \frac{n}{1000}$   
 and  $n$  must  
 be  $\frac{1}{1000}$

$f(x) = 0$   
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When  $x$  is large integer is 1.1

If continuous function, we can see the different value  
 for a given value of  $x$  - it also varies along with  
 time for the possibility of getting maximum probability  
 (Probability of getting maximum value is same for all the values  
 depending upon the given angle  $\theta$  -

If  $\theta$  is increase gradually, the number of  
 particles will be found to reach the maximum value of maximum  
 value for any  $x$  -

$f(x) = 1$   
 The probability is  $\frac{1}{n}$  when  $\theta = 0$  to  $\theta = 1$   
 when  $\theta = 1$  to  $\theta = 2$   
 The probability is  $\frac{1}{n}$  when  $\theta = 2$  to  $\theta = 3$

Experimental result - In using distribution, the graph is  
 made for two particles that  $\theta$  is equal to 1000 and 10000  
 of particles number is registered at regular intervals of  
 angles is recorded in small angle intervals  $\theta = 1$   
 The probability distribution is plotted for  $\theta = 1$   
 from the graph of relative probability  $\frac{1}{n}$   
 and frequency of particles - the graph is  $\frac{1}{n}$   
 Very apparent, the peaks are  $\frac{1}{n}$  at  $\theta = 1$   
 intervals -

