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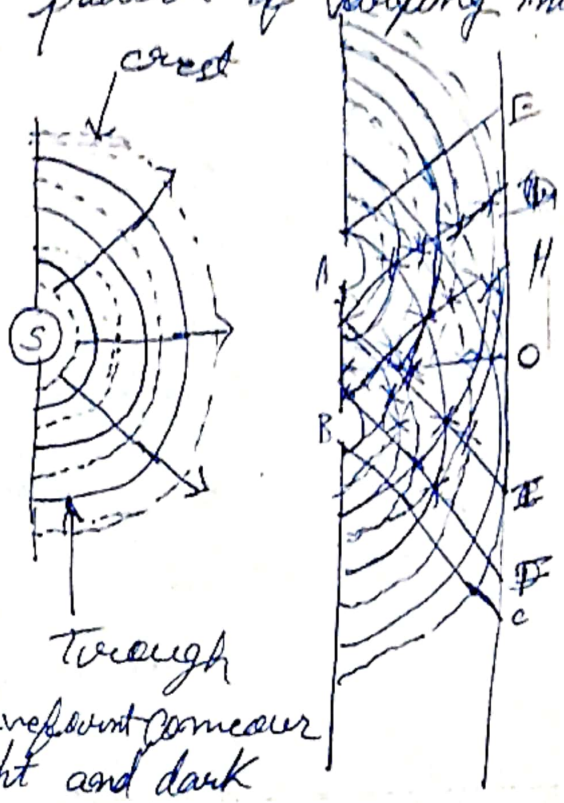
Unit-I/Wave Optics
MJC/Physics/Sem II

Interference by division of wave front

Two slits illuminated by light coming from a single slit, a narrow source and its virtual image or two virtual images of a narrow source can be used as coherent sources of light to produce interference. In these cases a wave front is divided into two parts. by utilising the phenomenon of reflection, Refraction or, differection in such a way that after traversing slightly different optical paths the light from the ~~the~~ coherent sources so producted finally unites to produce interference bands. for example —

In young's double slit ~~illuminated~~ by light coming through a single slit serve as two coherent sources. Young's allowed ~~Sulv~~ Sunlight to fall on a pin hole 'S' in a darked room and then at some distance away from S on the two pin holes. A and B. ~~As~~ The pin holes A and B are equidistant from S. Spherical waves spread out from A and B. These waves are of the same amplitude and wavelength, As they are derived from the

same wavefront. The two sets of spherical waves coming out of A and B interfere and form a symmetrical pattern of varying intensity on the screen. If the pin holes are replaced by narrow slits held perpendicular to the plane of paper and are illuminated by mono-chromatic light, cylindrical wave fronts. Instead of spherical wavefront concave and evenly spread bright and dark



fringes parallel to the length of the slit in a direction at right angle to AB are produced on the screen. When the distance between the slit A and B is increased the bands become narrow and finally disappear. In the case of Fresnel's bi-prism two virtual image of single point source produced by ~~refer~~ refraction at a bi prism serve as two coherent sources. In the case of Lloyd's single mirror a source and its ~~virtual~~ virtual image formed by reflection in a mirror and in fresnel double mirror two virtual images formed by reflection in the two mirrors serve as two coherent sources of light.