PHYSICS
UNIT-2
OPTICS

B.SC (SEM-IV)
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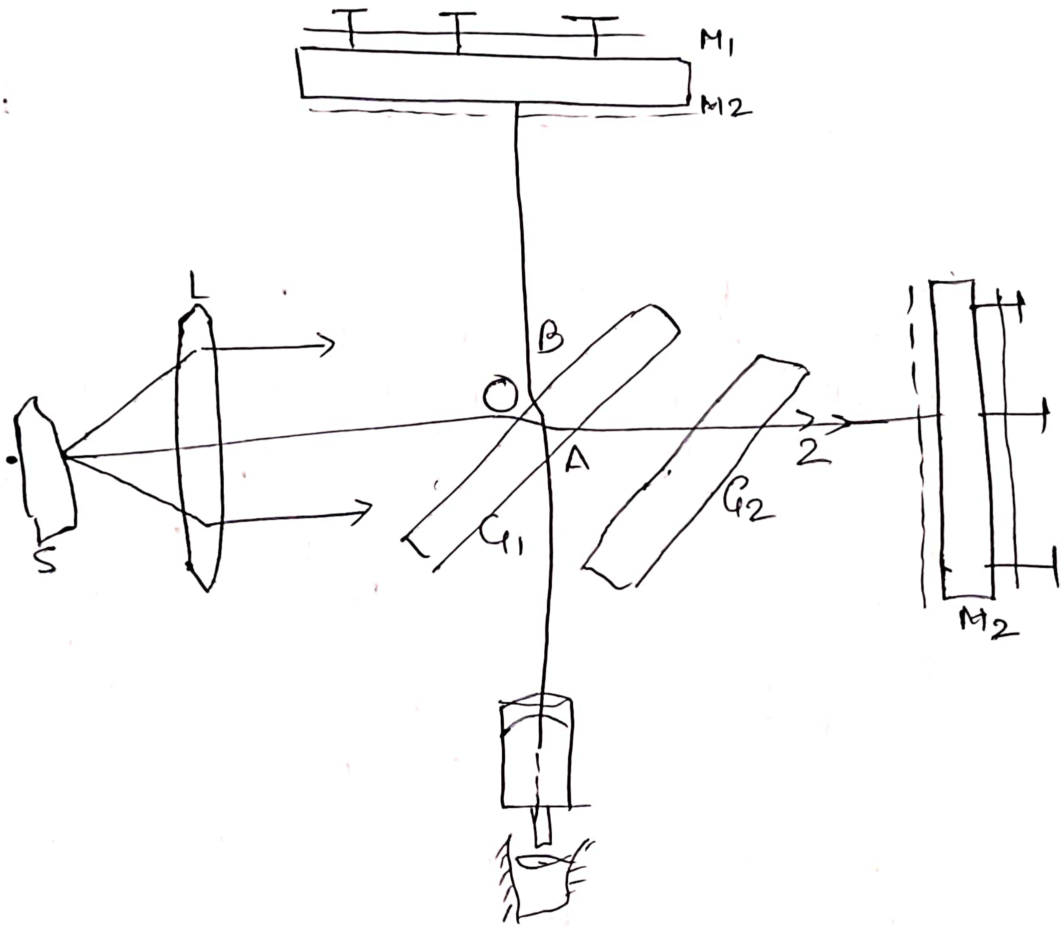
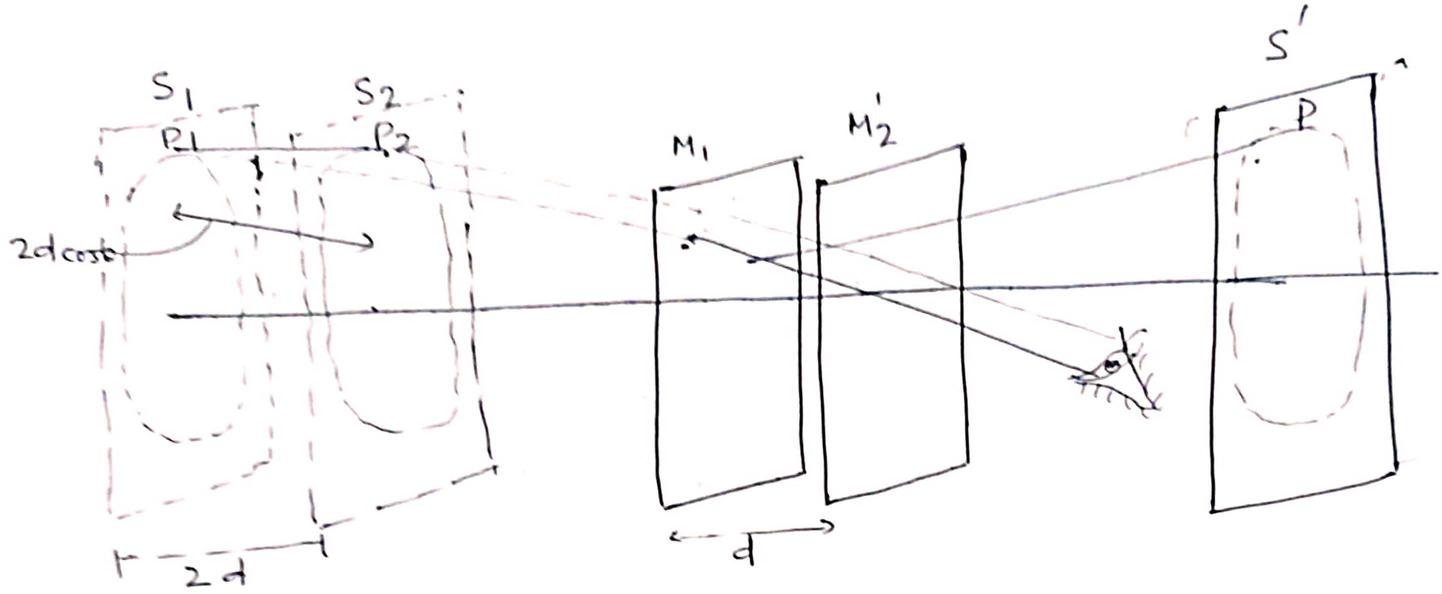
TITLE :- Michelson's interferometer can be used to obtain circular fringe.



When M_2 is exactly perpendicular to M_1 the flim M_1M_2' of uniform thickness, and we obtain circular fringes localised at infinity, as explained below:

· In the figure M_1 and M_2 are the parallel reflecting surfaces. The actual source has been placed by its virtual image S' formed by reflection in the partially-silvered surface. S' from two virtual image S_1 and S_2 in M_1 and M_2'. The light from a such as P on the extended source to the eye



to come from the corresponding coherent points P_1 and P_2 on S_1 and S_2. If d is the seperation between M_1 and M_2', the 2d is the seperation between the virtual sources S_1 and S_2. Therefore, the path difference between the two parallel rays coming from the corresponding points P_1 and P_2 at the eye is equal to 2d cos θ. When the telescope is focussed to receive parallel rays, the the rays will reinforce each other to produce maxima for those angles θ which satisfy the relation.

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

Now. for a given n, λ and d angle θ is constant and the locus of point on the source which substend the same angle θ at the axis is a circle passing through P with its centre on the axis. Hence the fringes are concentric circle and are called the fringes of constant inclination. they are situated at infinity The order of the fringes decreases as θ increase

Now the Mirror M is moved so the d is decrease steadly, then in View of the relation $2d\cos\theta = n\lambda$ θ decrease more and more steadly, then, in view of the relation $2d\cos\theta = n\lambda$. the central fringe spread out to cover the entire field of view which becomes uniform in intensity.

x —— x