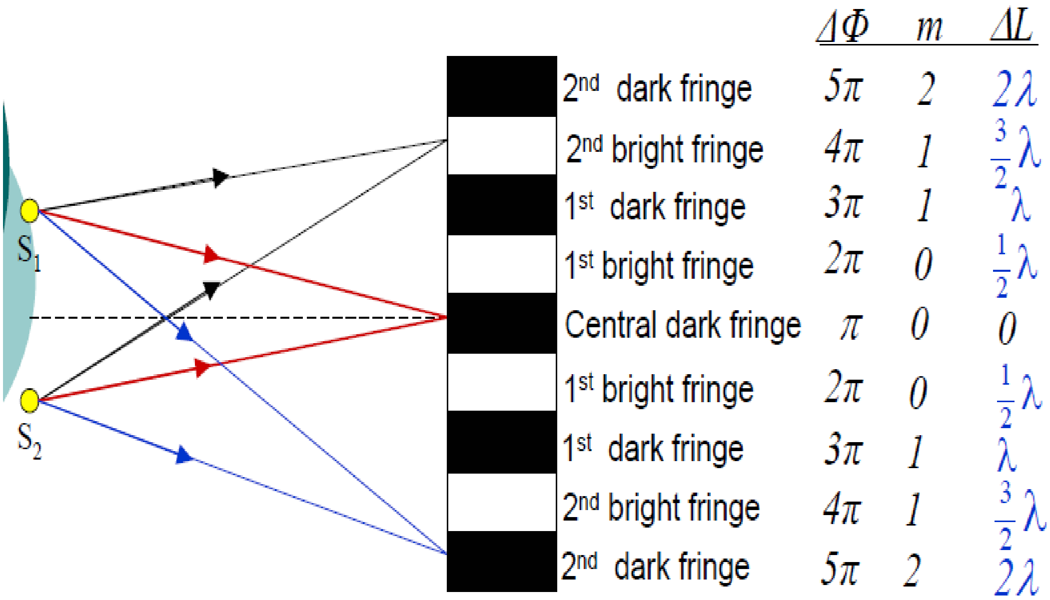
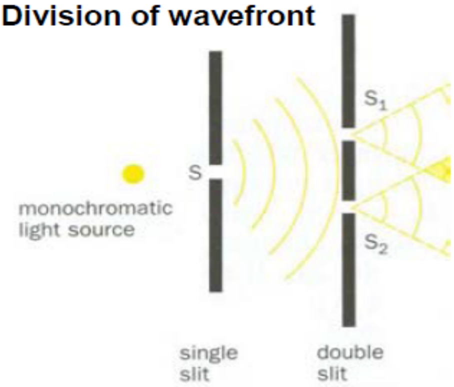
- ### Interference pattern for two coherent sources in antiphase



2 Coherent sources	Bright fringe	Dark fringe
In phase	$\Delta L = m\lambda$ $m = 0,1,2,.....$ $\Delta\Phi = 2m\pi$ $m = 0,1,2,...$	$\Delta L = \left(m + \frac{1}{2}\right)\lambda$ $m = 0,1,2,.....$ $\Delta\Phi = (2m+1)\pi$ $m = 0,1,2,...$
Antiphase	$\Delta L = \left(m + \frac{1}{2}\right)\lambda$ $m = 0,1,2,.....$ $\Delta\Phi = 2m\pi$ $m = 1,2,...$	$\Delta L = m\lambda$ $m = 0,1,2,.....$ $\Delta\Phi = (2m+1)\pi$ $m = 0,1,2,...$

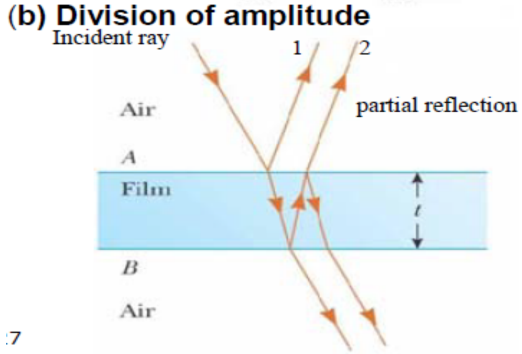
1.8. Methods of obtaining two coherent sources

(a) Division of wavefront



- A slit S is placed at equal distance from slits S_1 and S_2 as shown in figure.
- Light waves from S that arrived at S_1 and S_2 are in phase.
- Therefore, both slits S_1 and S_2 are two new coherent sources, e.g. in Young's double slit experiment

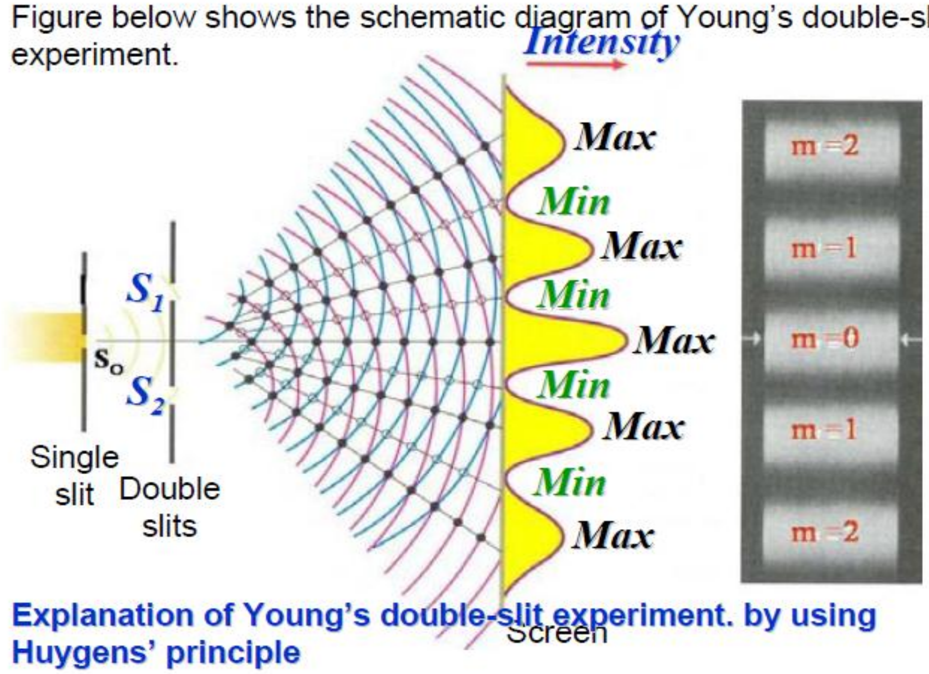
(b) Division of amplitude



- The incident wavefront is divided into two waves by partial reflection and partial transmission.
- Both reflected waves 1 and 2 are coherent and will result in interference when they superpose.
- e.g. Newton's ring, air wedge fringes and thin film interference.

1.9. Interference by Young's Double- Slit

- Figure below shows the schematic diagram of Young's double-slit experiment.



- **Explanation of Young's double-slit experiment. by using Huygens' principle**
  - Wavefront from light source falls on S_O and diffraction occurs.
  - Every point on the wavefront that falls on S_O acts as sources of secondary wavelets that will produce a new wavefront that propagate to slits S_1 an S_2 .