**Micheloson interferometer**

**Group 12**

**Samyak jain and Chirag Deshpande**

Aim:- To calculate the wavelenght of laser and refractive index of glass using michloson interferometer.

Apparatus:- bread board, diode laser, laser mount, beam splitter, three mirrors, rotating stage with a glass mount, screen.

Procedure:-

Experiment part 1

1. We aligned the laser so that the beam is parallel to the base.
2. Then we introduced a beam splitter between the two mirrors and simultaneously aligned the third mirror on which the light reflected from the beam splitter was incident normally.
3. Then we obtained two bright spot on the screen, each with some other dots surrounding it of lower intensity.
4. Then we brought these two bright spots as closer as possible and then with fine adjustments we made them coincide each other.
5. Then we introduced a lens in the path to magnify the focused fringes.
6. Then we calculated the fringe width and then we calculated the wavelength of light emitted by the laser.

Experiment part 2

1. Then we introduced a glass slide between the third mirror and beam splitter.
2. We rotated the glass slide by 10 degrees and counted the number collapsed.

**Observation:-**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| part 1 | For measuring wavelength |  |  |  |  |  |
| no. of fringe shift | | reading |  |  |  |  |
| 0 |  | 1 |  |  |  |  |
| 100 |  | 2.34 |  |  |  |  |
| 100 |  | 3.75 |  |  |  |  |
| 100 |  | 5.15 |  |  |  |  |
| 100 |  | 6.4 |  |  |  |  |
| 100 |  | 7.6 |  |  |  |  |
|  |  |  |  |  |  |  |
| part 2 | for RI of glass slide | |  |  |  |  |
| no. of fringe shift | | angle |  |  |  |  |
|  | 3 | 0 |  |  |  |  |
|  | 18 | 10 |  |  |  |  |
|  | 19 | 20 |  | thickness of glass plate 0.8mm | | |

**Calculations:-**

wavelength= 2d/n { d:- average of the reading in part 1}

**=**2\*{[2.34-1]+[3.75-2.34]+[5.15-3.75]+[6.4-5.15]+[7.6-6.4]}/100\*0.035

=0.000924mm

RI of glass slide=



=(2\*0.8-18\*0.000924)(1-cos(10))/2\*0.8(1-cos(10))-18\*0.000924

RI=1.61

**Error Analysis:-**

d(w.l)=w.l \* d(D)/D (w.l =wavelength)

error in wavelength = 0.01 \*0.0264/1.32

error = 0.0002mm

**Precaution:-**

1. The mirrors should be aligned properly and parallel.
2. Place the lens properly and make sure the fringes are focused well.
3. Do not put your hand near the apparatus because the apparatus are highly vibration sensitive.

**Result:-**

hence the wavelength of laser is 0.0264mm and the R.I of glass is 1.61.