كليه المستقبل الجامعة

قسم الفيزياء الطبية

مختبر الليزر

تجربة محزز الحيود

مرحلة ثالثة

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Experiment (5)

Measuring The Number of Lines Grating by Diffraction of Laser Radiation.

Apparatus:

Laser diode, diffraction grating, ruler and screen.

Theory:

A laser: is a unique light source that emits a narrow beam of light of a single wavelength (monochromatic light) in which each wave is in phase of a single wavelength with the others near it (coherent light). normally consists of a long narrow tube with a fully reflective mirror at one end and a partially reflective mirror at other.

Laser properties:

I- Monochromatic
2- Coherent
3- Directionality
4- Very bright

Diffraction of Light

Diffraction refers to various phenomena that occur when a wave encounters an obstacle or a slit. **It is defined as the bending of light around the corners of an obstacle or aperture into the region of geometrical shadow of the obstacle.**

Diffraction Grating

Diffraction grating is a thin film of clear glass or plastic that has a large number of lines per (mm) drawn on it. When light from a bright and small source passes through a diffraction grating, The very thin space between every two adjacent lines of the grating becomes an independent source.

Types of Diffraction Grating:

1-transmission grating.
2-reflection grating.
3- film grating or Membranous groove.

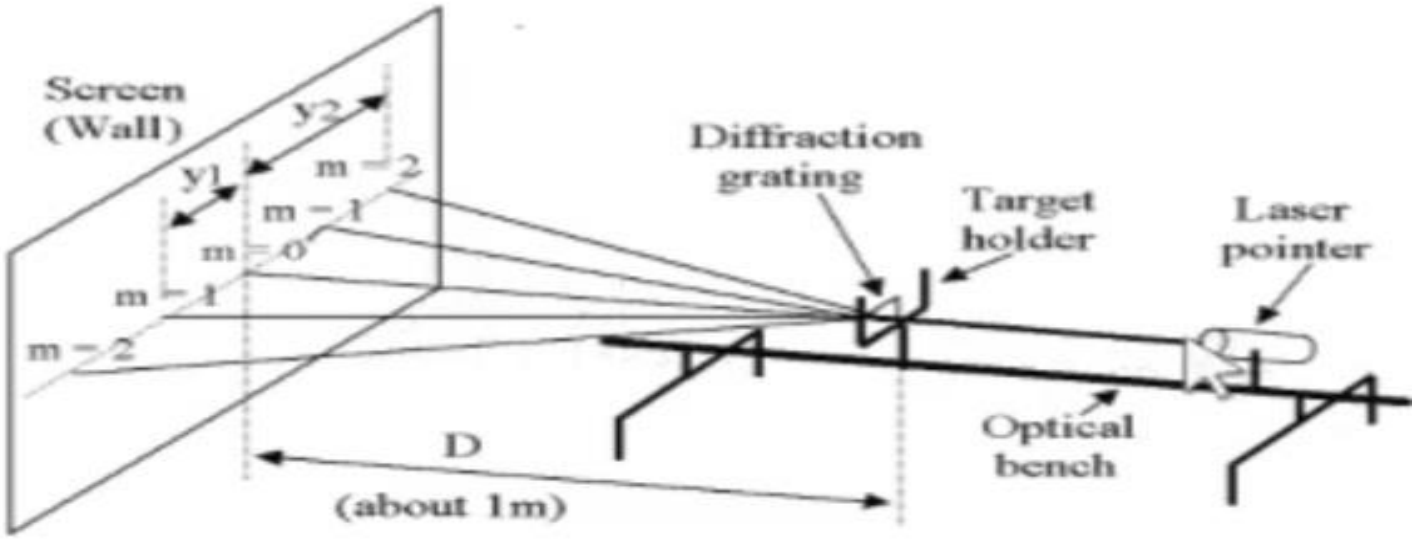
Procedure

1- Laser light shines on a diffraction grating

2_ When the laser light passes through the notch, each slit of the notch will emit a wave, as a result of the interference between the waves, light and dark fringes will be obtained

3- We note that when the distance between the diffraction notch and the laser is 40 cm, the fringes will be obtained clearly

4- We calculate the distance between the fringes, y, from the middle of the central fringe to the middle of the required fringe



Data sheet

m	y	tanφ	φ	sinφ	d=mλ/ sinφ	N=1/d
1	3.6					
2	7.**4**					

D=**4**0cm λ=360nm

d sinφ =mλ

Where (m) the order of diffraction; m= 1,2,3,.... (d) the spacing between every two lines of the grating

If there are (5) lines per mm of the grating (n), then (d) the space between every two adjacent lines is:

N=1/d