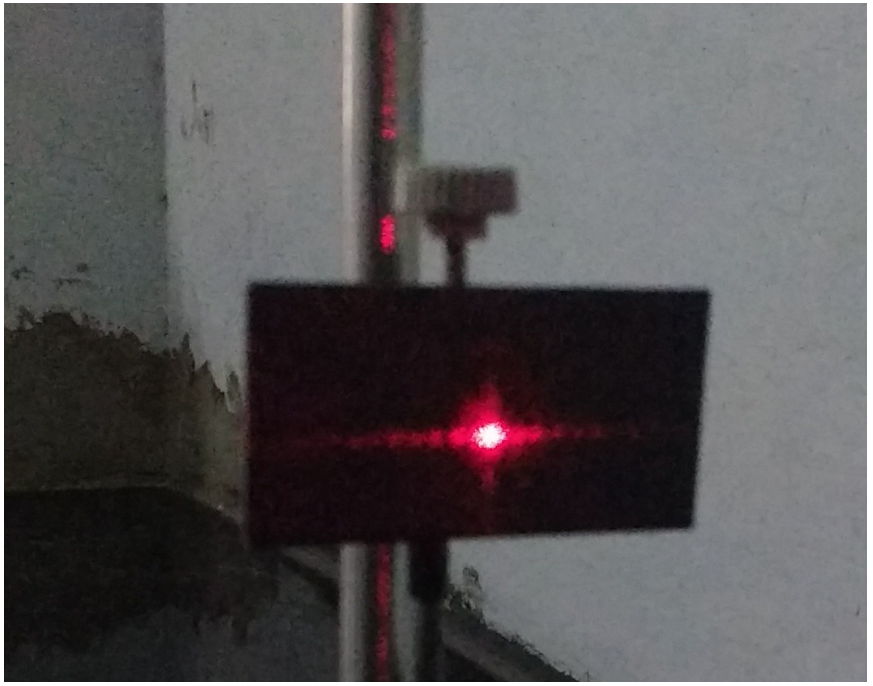
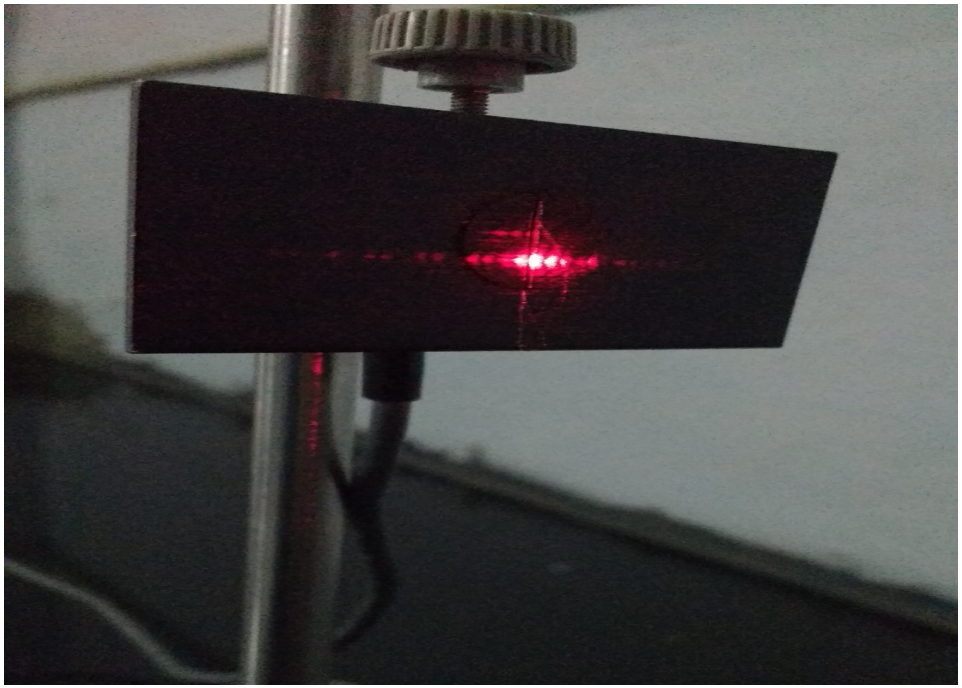
Experiment # 7

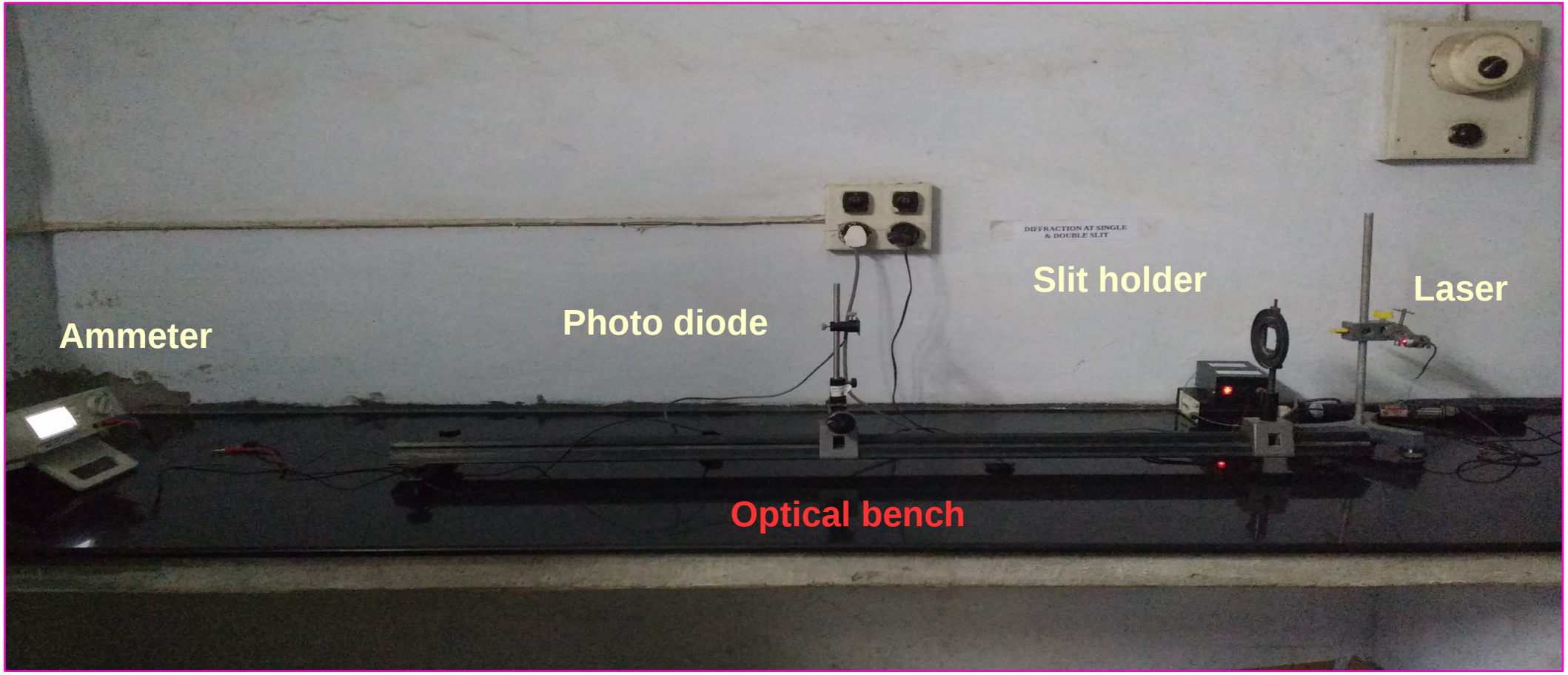
Diffraction through single and double slits





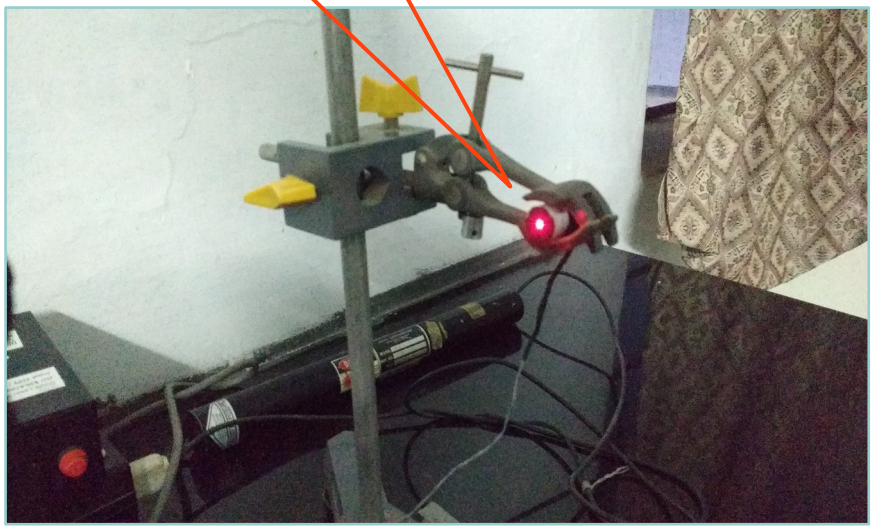
OBJECTIVES

- To measure the intensity distribution due to diffraction due to single and double slits
- To measure the slit width (*d*) and slit separation (*a*).



The components

Laser as a source



Slits to be used for diffraction

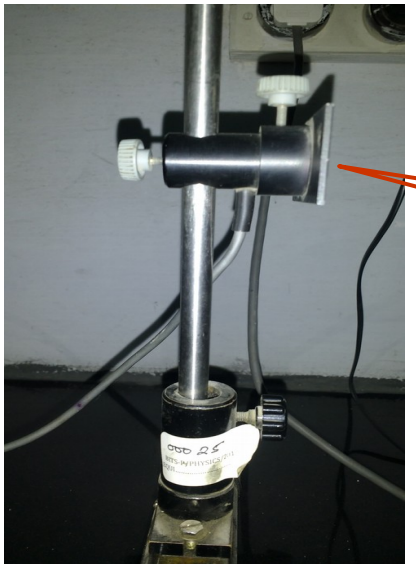
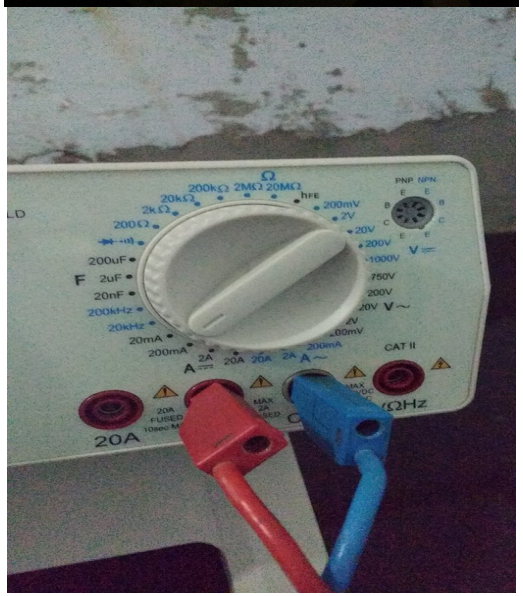


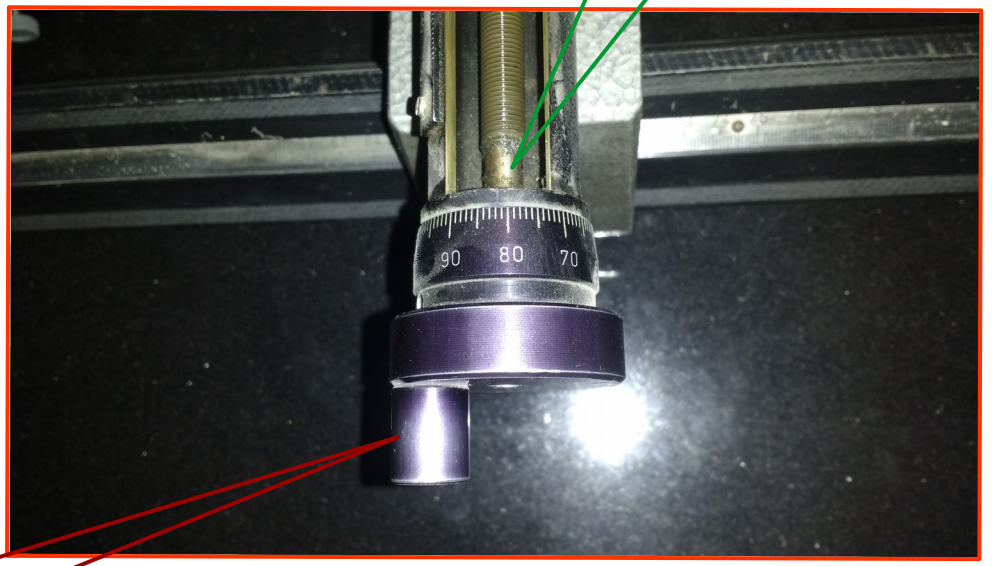
Photo diode

The components

Ammeter to record the photo current



Scale to measure the location of photo cell



Knob to adjust the location of cell

Procedure

- Switch on the laser source about 15 minutes before the experiment to ensures the intensity of light from the laser source is constant.
- Allow the laser beam to fall on a single slit formed in the screen provided.
- The intensity distribution in the diffraction pattern is measured with the help of a photocell.
- The photocell is secured to a mount and is kept as far behind the slit as possible.

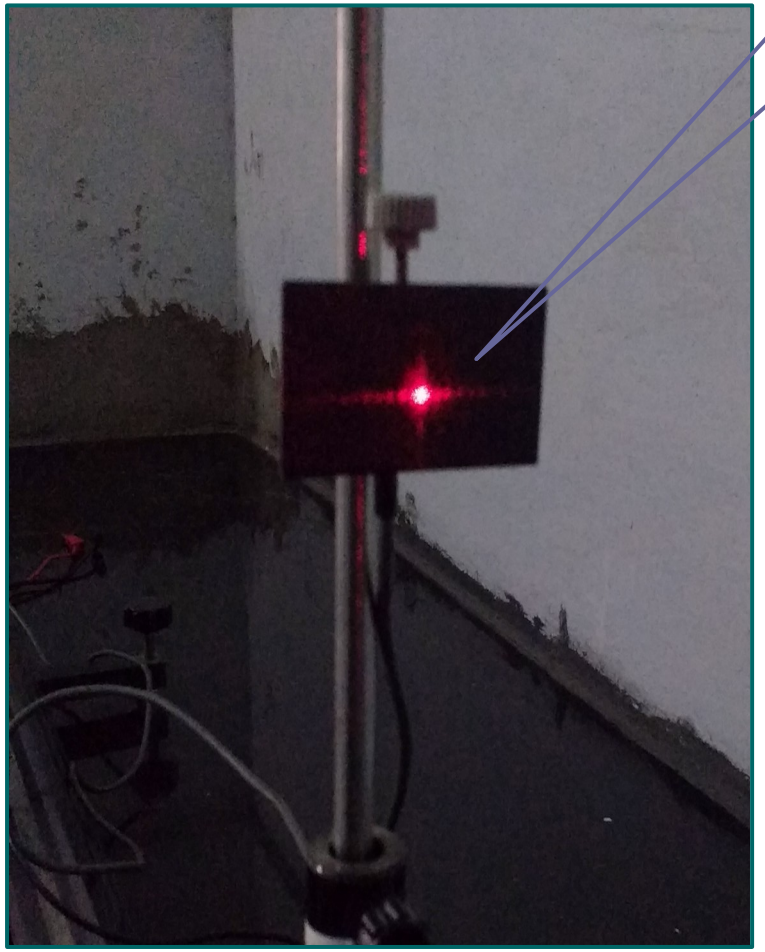
Procedure

- A screen with a slit (0.3 mm wide) is fitted in front of the photocell.
- The photocurrent is measured with a multimeter (μA) range and is approximately proportional to intensity of the incident light.
- Repeat the same procedure for double slit and record the diffraction pattern on both the sides of central maximum.
- The interval between two consecutive minima position of the photocell should be small enough, so that adjacent maxima/minima of the intensity distribution are not missed.

Precautions

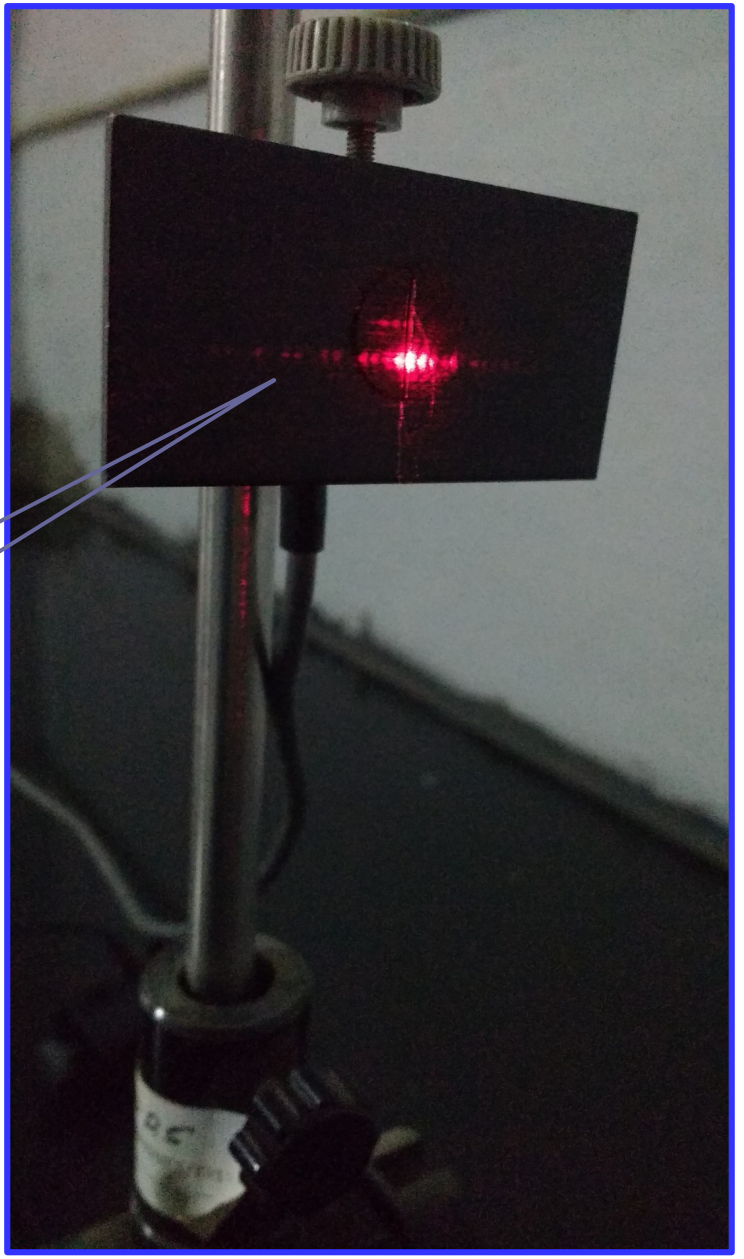
- The laser beam should not penetrate into eyes as this may damage the eyes permanently.
- The photocell should be as away from the slit as possible.
- The laser should be operated at a constant voltage 220V obtainable from a stabilizer. This avoids the flickering of the laser beam.

The patterns



Diffraction from single slit

Diffraction from double slit



Follow your lab manual and discuss with course instructor to know more about the experiment!!