Figure 19: Experimental set-up for the investigation of the diffraction intensity of slits. (Component locations on the optical bench: laser = 2.5 cm; lens f/20 mm = 14 cm; lens f/100 mm = 27 cm; slits = 32.5 cm; slide mount lateral adjustm, calibr. = 139.5 cm) [8]

T.C.

GEBZE TECHNICAL UNIVERSITY

PHYSICS DEPARTMENT

OPTICS LABORATORY

EXPERIMENT REPORT
DOUBLE SLIT DIFFRACTION

DATA and RESULTS

Name:_____   TA:_____

Department:_____

Partners:_____

diaphragm with b; slit width, g; distance between slits	$b =$	$g =$	$b =$	$g =$	$b =$	$g =$
L; *distance between slits and screen*(m)						
$\overline{\Delta y}$; *Average distance between two bright fringe of interference pattern*						
$\overline{\Delta x}$; *Distance between minima and center of diffraction pattern*						
$b_{exp} = \frac{m \lambda L}{\Delta x}$						
$g_{exp} = \frac{m \lambda L}{\Delta y}$						
$(P.E.\ of\ b) = \% \frac{|b_{exp} - b|}{b} \times 100$						
$(P.E.\ of\ g) = \% \frac{|g_{exp} - g|}{g} \times 100$						

1. Plot diffraction intensity vs position x for each of the specimens.

2. why does the intensity of the light fade out as you move from the central maximum

3. By using graph, find Δx, between minima of diffraction pattern and center, for all diaphragms, record your value in Table above.

4. By using graph, find Δy, between two bright fringe of interference pattern, for all diaphragms, record your value in Table above.

5. How is the double-slit pattern different from the single-slit pattern? Also, what causes the difference in the pattern?

6. How does the slit width b affect the double-slit pattern? How does the slit spacing g affect the pattern? Discuss what you expect to happen to the double-slit pattern based on relevant equations.

x(mm)	I(mA)	x(mm)	I(mA)	x(mm)	I(mA)	x(mm)	I(mA)	x(mm)	I(mA)	x(mm)	I(mA)

x(mm)	I(mA)	x(mm)	I(mA)	x(mm)	I(mA)	x(mm)	I(mA)	x(mm)	I(mA)	x(mm)	I(mA)

DISCUSSION & CONCLUSION

1. What are the possible errors in the experiment?

2. What kind of approximations did you take into consideration while you were obtaining the physical quantities and how do they affect your results?

3. What discrepancies did you encounter between the calculated quantities and theoretical or literature values?

4. What is your overall conclusion?