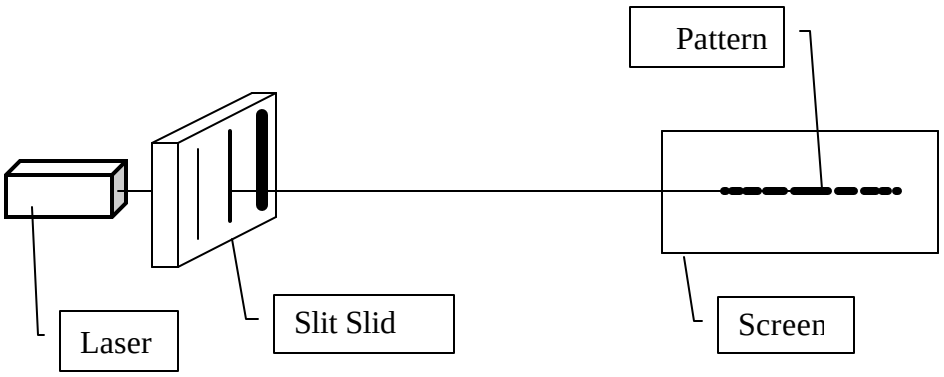
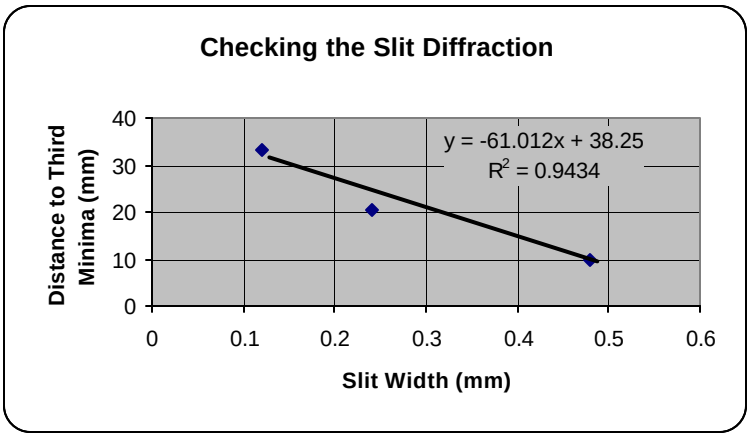
Scott Greenberg

DIFFRACTION OF LIGHT
Thursday, October 19, 2000

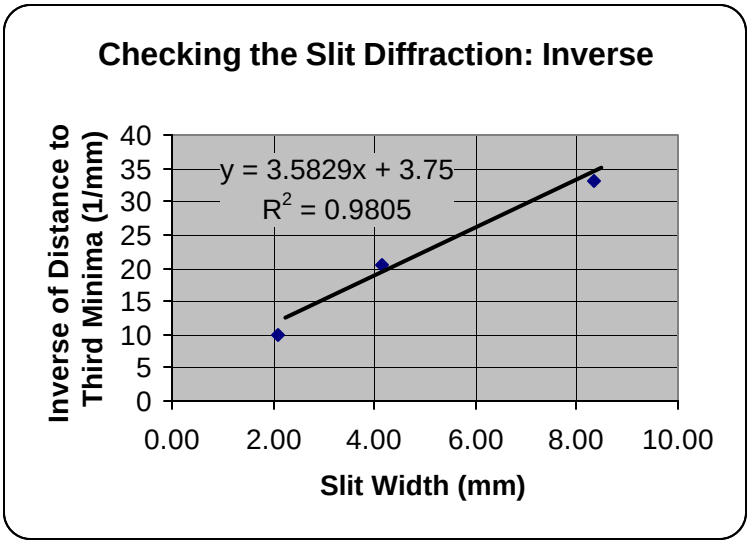


[redacted]

	w (mm)	Y (mm)
+/-	0.01	5
	0.12	33
	0.24	21
	0.48	10



1/w (mm)	Y (mm)
8.33	33
4.17	21
2.08	10



	slope	
	3.582857143	m = 3
+/-	0.504769092	L = 2270mm

	slope	λ (mm)
+	4.09	0.0006
-	3.08	0.0005

When a light ray passes through a thin slit, the ray separated and bent. Given that these light rays separated and bent, the image crates a pattern on light. This phenomenon is analyzed like all other phenomena with a mathematical model. We know that there is a correlation between the distance from the center of the pattern to the nodes and the width of the slit.

We use a laser to shine monochromatic light through a slit and project on a screen. We will then measure the distance between the slit and the screen, L. We measure the distance from the central band to the third minima, Y, for three different slit widths given, w. From the results, we plot “Checking the Slit Diffraction.” From this plot, we do not get a convincing straight line. We then plot “Checking the Slit Diffraction: Inverse.” From this plot, we can see that it is in close proximity to a straight line. The empirical equation for the linear graph is: $y = m x + b$, this compare to the theoretical equation is: $Y = mL \lambda / W$. “LINEST” is then completed for the “Checking the Slit Diffraction: Inverse” plot and not the other plot because it was found to have a R^2 value closest to one. Based on our theoretical equation the slope should be equal to $mL \lambda$. We then re-write the slope as: $\lambda = \text{slope} / mL$. Where m is 3 and L is 2270 mm. From this we find the wavelength to be between 0.005 and 0.0006. This is an agreeable

number though the other lab groups. We thus have proven that Y = mL λ / W is a valid equation.