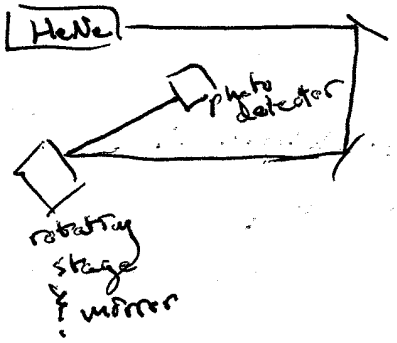
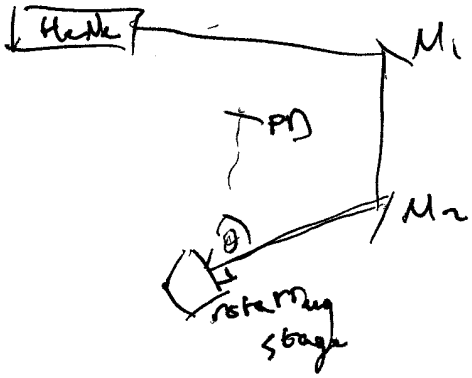
Lab #2 1/23/14

1. Set up rotating stage, photodetector, & optical path

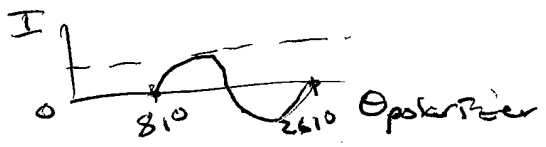


2. Plugged stage in & connected PD to scope.
3. Placed polarizer in path to determine polarization of beam.
4. Moved stage off track for better angle sweeping & realigned



5. Placed iris in path to make beam smaller for PD
6. Placed polarizer between M_1 & M_2
7. Polarizer at 261° – almost no reflection (polarizer
   No reflection again at 81°

8. Light intensity at glass angle 56°



Sort of

800 mV average signal from PD (background ~ 800mV)

Lights off. θpolarizer @ 261° (perfect extinction)

Background: 0V

θglass	PD Voltage
56°	0 mV
54°	150 mV
52°	250 mV
50°	650 mV
45°	1600 mV
40°	2800 mV
35°	4000 mV
30°	5000 mV
25°	5200 mV
20°	5000 mV
15°	5200 mV
10°	5400 mV

~~56° 0 mV~~

Experiment #2

Next we did the other polarization

$\theta_{polarizer} = 171^\circ$

θ_{glass}	PD Voltage
56°	11,300 mV
54°	11,900 mV
52°	

Realized PD was at V_{sat}, placed resistor (brown black black)

θ_{glass}	PD Voltage
56°	200 mV
54°	150 mV
52°	150 mV
50°	50 mV

Needed ~~smaller~~ different resistor; 10^3 kΩ

θ_{glass}	PD Voltage
56°	330 mV
54°	300mV
52°	260 mV
50°	241 mV
45°	200 mV
40°	165 mV
35°	137mV
30°	120 mV
25°	105mV
20°	93mV
15°	81 mV
10°	77mV ✓

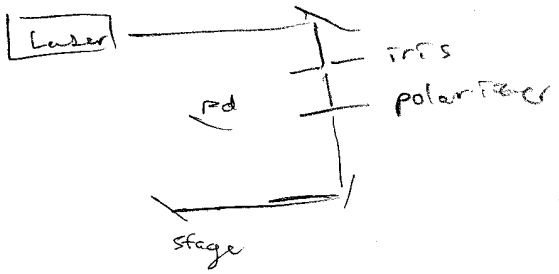
Experiment #2

$\theta_p = 261°$ ← minimal

$R = 10^3\ k\Omega$

Photodetector on rail behind glass for transmission

θ_{glass}	PD Voltage
56°	2600 mV
~~55~~ 54°	2660 mV
52°	2740 mV
50°	2740 mV
45°	2700 mV
40°	2740 mV
35°	2580 mV
30°	2500 mV
25°	2500 mV
20°	2450 mV
15°	2440 mV



$\theta_p = 171°$ max

θ_{glass}	PD Voltage
56°	1850 mV
54°	2100 mV
52°	2100 mV
50°	2,160 mV
45°	2200 mV
40°	2420 mV
35°	2500 mV
30°	2500 mV
25°	2500 mV
20°	2500 mV
15°	2580 mV

Experiment #3

Plastic slab thickness: 1.7 cm

Deflection: 1.3 cm

Experiment #4

$f_1 = 25.4$ mm
$f_2 = 200$ mm
} lenses

Furthest: 1.75 m

Next: 49 cm