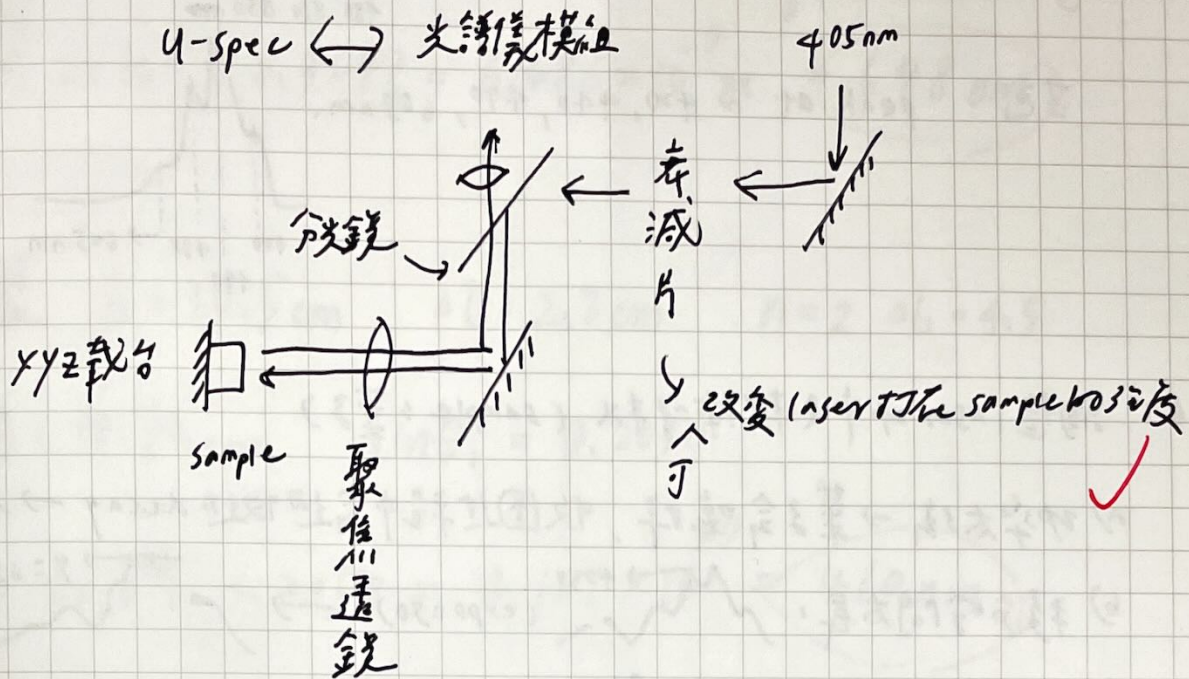


Group A. 1. 雷射光譜 (405nm laser)

Q1.



Q2. 調整 X 軸 可改變亮斑的形狀及強度. 若沒調好, 光沒有聚焦在 sample 上.
(平行入射光的方向)

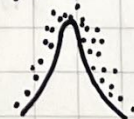
光斑會較大且強度較弱 (光發散)

Q3. 光點樣貌是一個不發散的亮圓點
因為成功聚焦

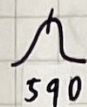
Q4. a) exposure 50ms $\rightarrow$ 500ms : 強度從 950 $\rightarrow$ 6000, Zntensity $\uparrow$.

b) avg 1 $\rightarrow$ 50 : 訊雜比降低, 圖形較穩定不跳動.

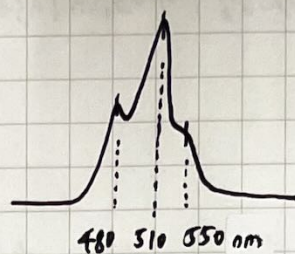
c) boxcar 0 $\rightarrow$ 50 : 圖形曲線較平滑



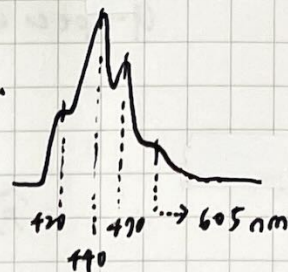
Q5: 橘色: peak at ~ 590 nm.



亮黃色: peak at 480, 510, 550 nm



藍色: peak at $\sim 420, 440, 470, 605$ nm.



Q6: 調整 laser 功率 & 軟體參數 (sample: 筆子)

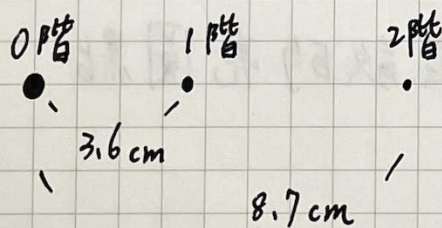
a) 功率太強 $\rightarrow$ 筆子會噁掉, 收圖過程中會造成 decay $\rightarrow$ 不准

b) 積分時間太長: $(expo=50) \rightarrow (expo=1000)$ 飽合 (過曝)

c) 波形平滑度太大: $Boxcar=5 \rightarrow Boxcar=500$ 太大會導致峰不見失真

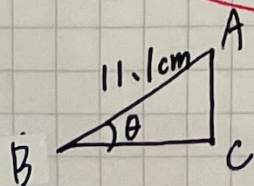
2, 穿透式光柵的干涉 & 繞射 (R/G/B laser)

Q1, 紅光 (綠光壞了 ==)



理論狹縫寬 $d = 2 \times 10^{-6} m$

Q2. 紅光線寬 500-600 nm 取 550 計算



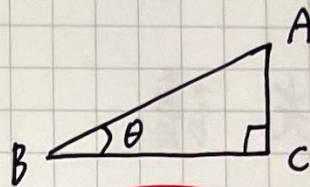
$$\sin \theta = 0.324 \quad n=1 \quad d = \frac{\lambda}{\sin \theta} = \frac{550 \text{ nm}}{0.324} = 1695 \text{ nm} = 1.6 \times 10^{-6} m$$

$$n=2 \quad AB=13.6 \quad \sin \theta_2 = 0.638 \quad d = \frac{550}{0.638} = 862.0 \text{ nm}$$

Q3 紅: $L = 10.5 \text{ cm}$ $\Delta L = 3.6 \text{ cm}$

$n\lambda = d \sin \theta_n$

$\sin \theta_1 = 0.324$



$\lambda = 2 \times 10^{-6} \times 0.324 = 6.486 \times 10^{-7} \text{ m} = 648 \text{ nm}$

藍 $L = 10.5 \text{ cm}$ $\Delta L = 2.2 \text{ cm}$ $n = 2$ $\Delta L = 4.5$

$\overline{AB} = 10.72 \text{ cm}$ $\sin \theta_1 = 0.2050$

$\lambda = 2 \times 10^{-6} \times 0.2050 = 4.101 \times 10^{-7} = 410 \text{ nm}$