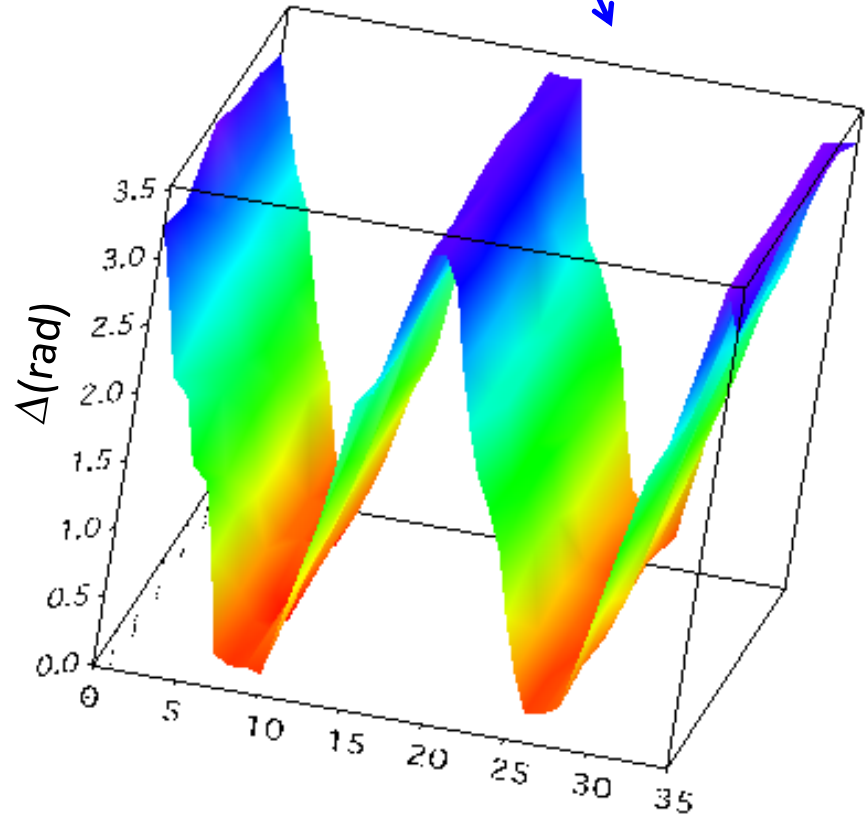
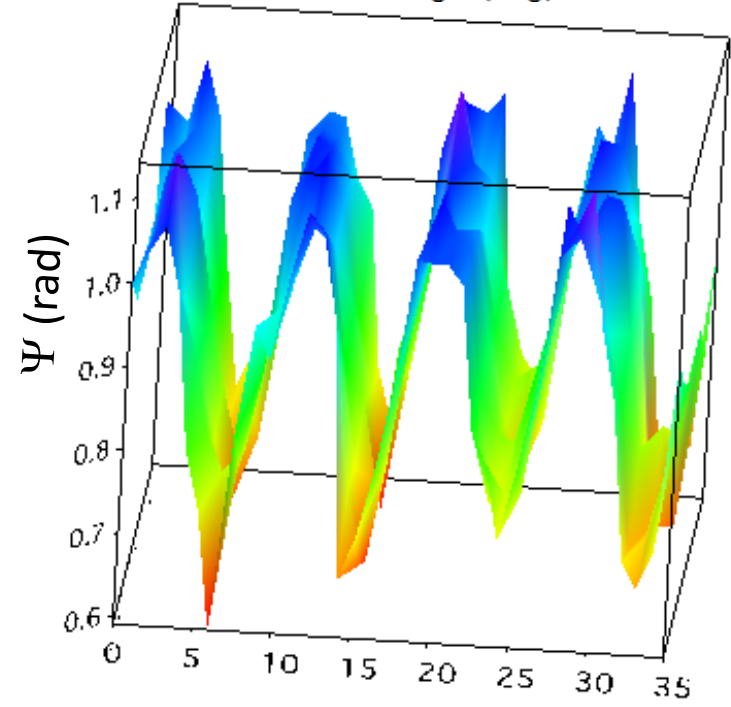
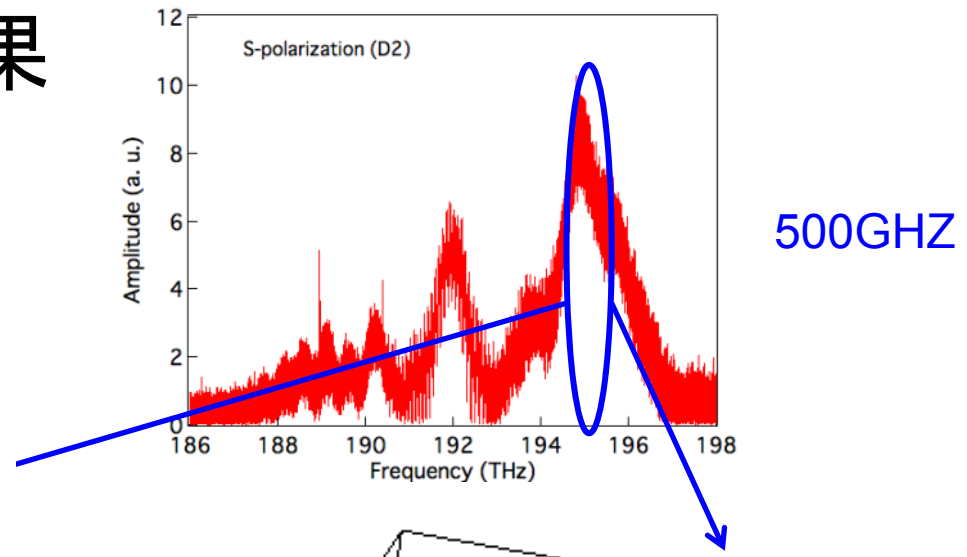
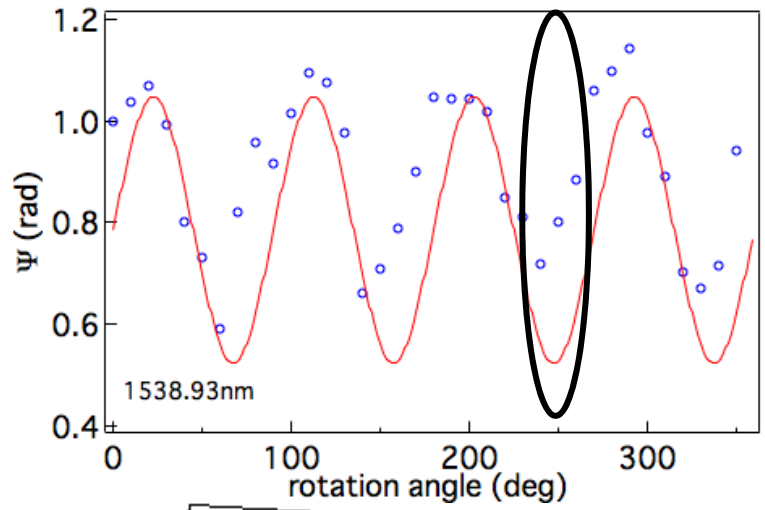


# 研究の進捗状況

謝 宜達

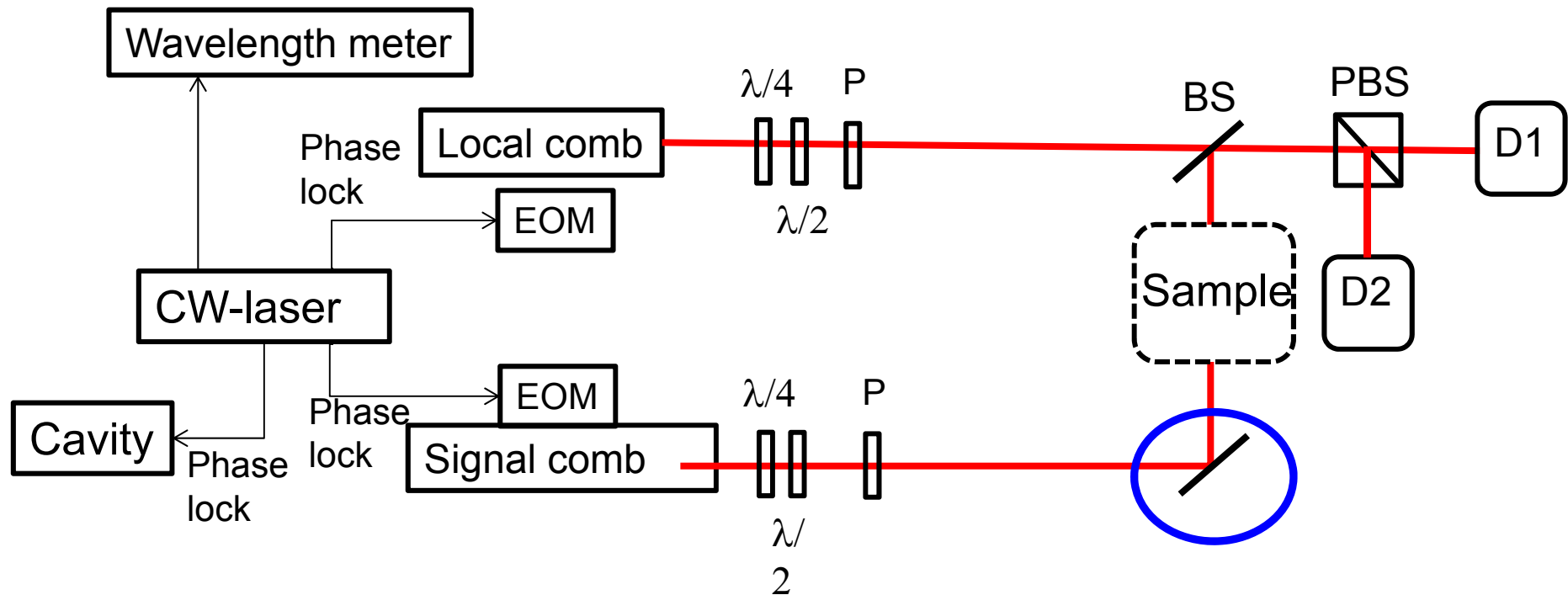
# • 前回までの実験結果



# 實驗裝置(透過配置)

$f_{\text{rep(sig)}}: 48350213.0043859\text{Hz}$ ,  $f_{\text{rep(LO)}}: 48350179.9817047\text{Hz}$

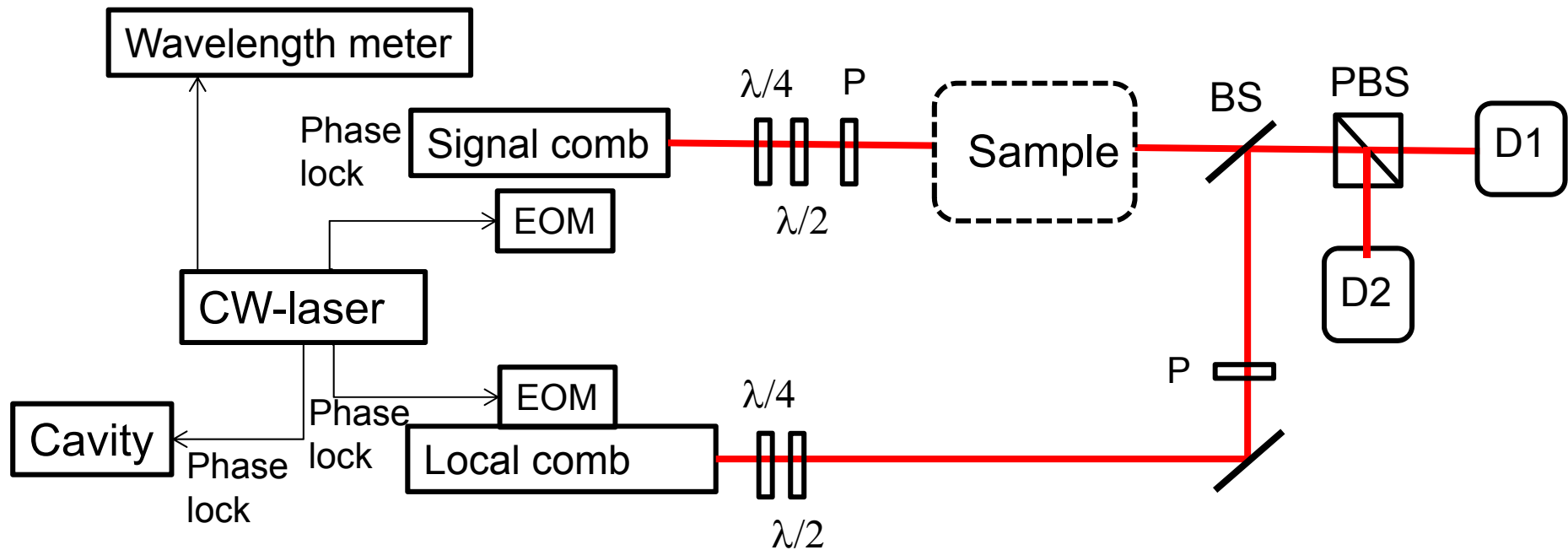
$\Delta f: 33.0239362757913\text{Hz}$ ,  $f_{\text{CEO(sig,LO)}}: 30\text{MHz}$



# 實驗裝置(透過配置)

$f_{\text{rep(sig)}}: 48350213.0043859\text{Hz}$ ,  $f_{\text{rep(LO)}}: 48350179.9817047\text{Hz}$

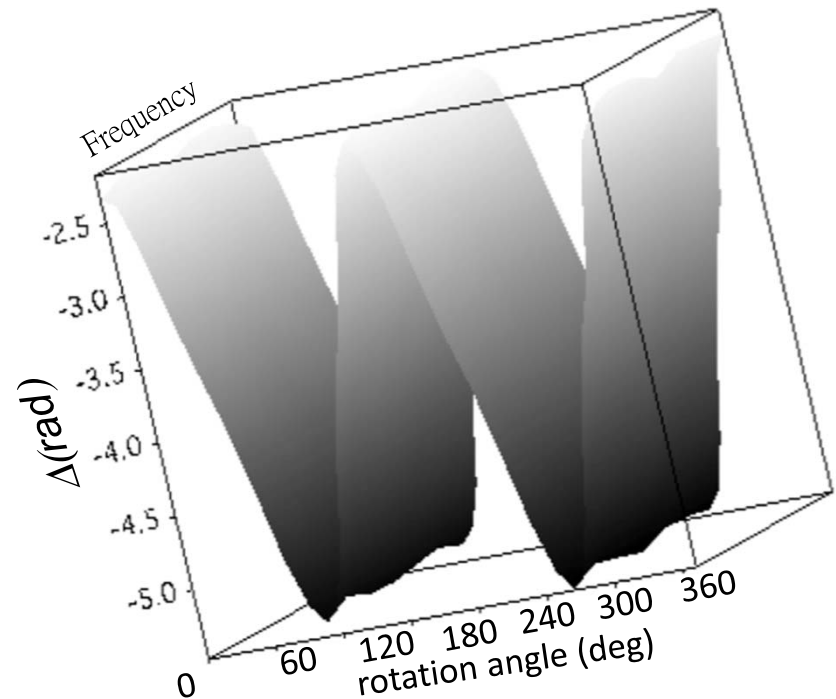
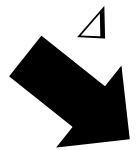
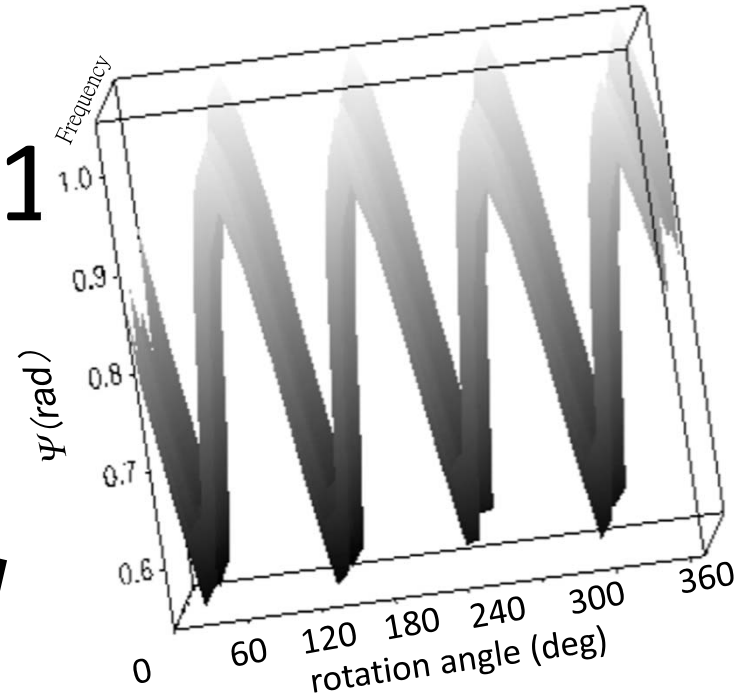
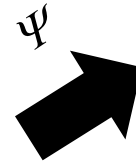
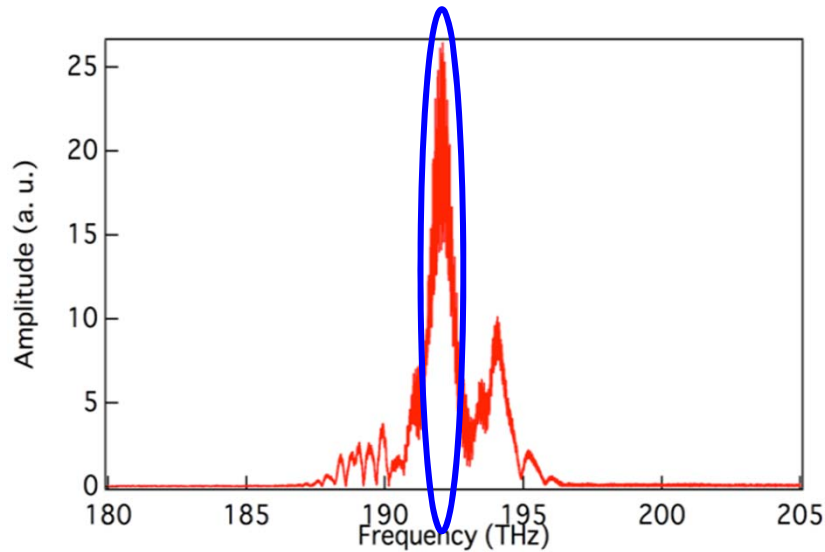
$\Delta f: 33.0239362757913\text{Hz}$ ,  $f_{\text{CEO(sig,LO)}}: 30\text{MHz}$



# ゼロオーダー1

Tower Optical製、設計波長：1.55 $\mu\text{m}$   
測定角度：0~360度

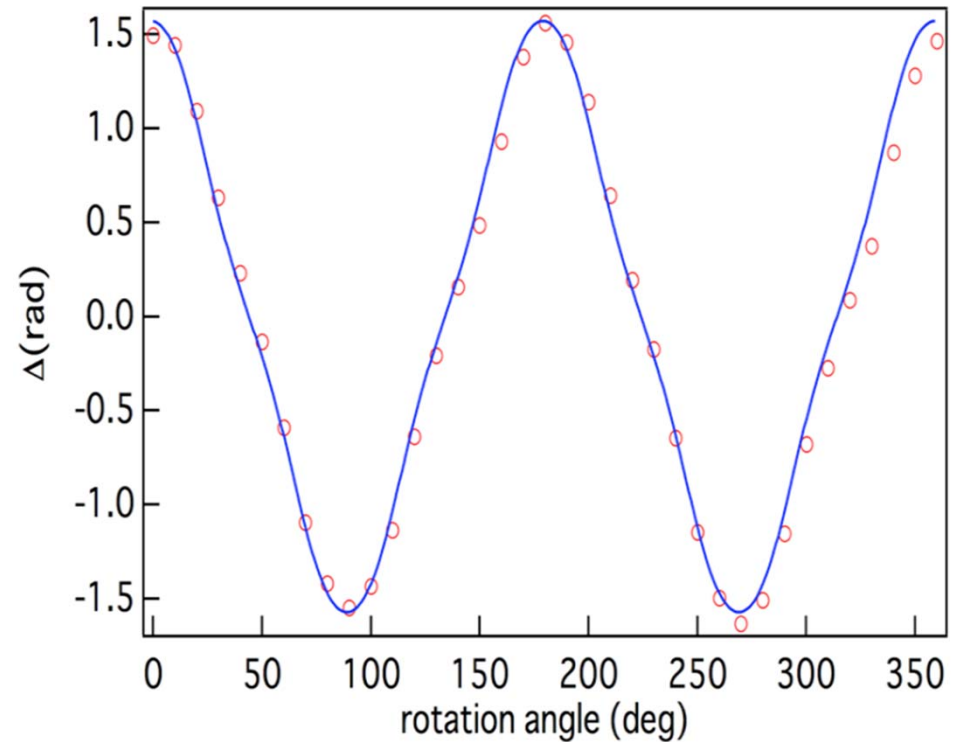
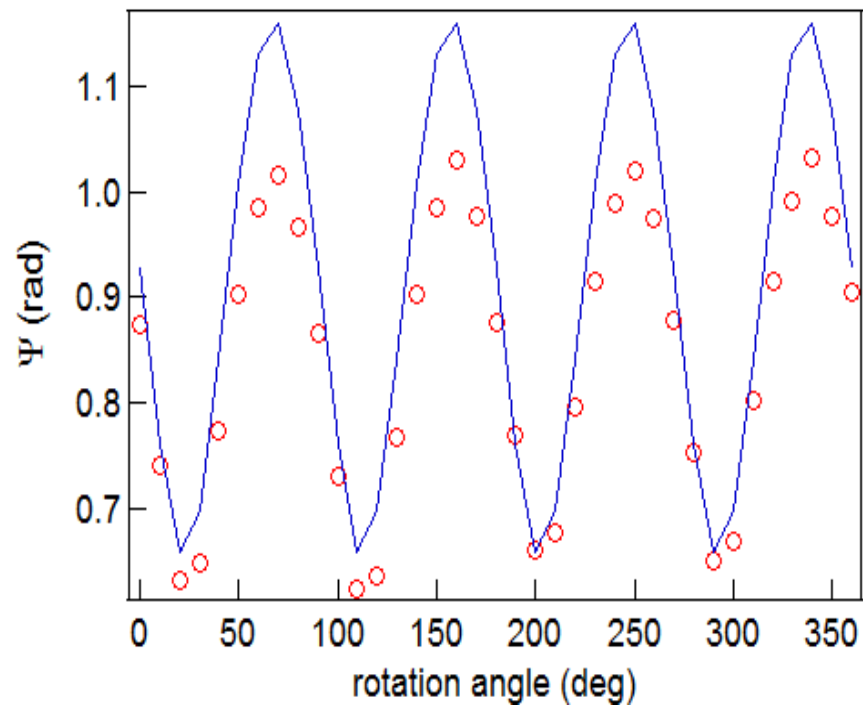
192THz付近



複数の波長成分から  
エリプソパラメータが得られる

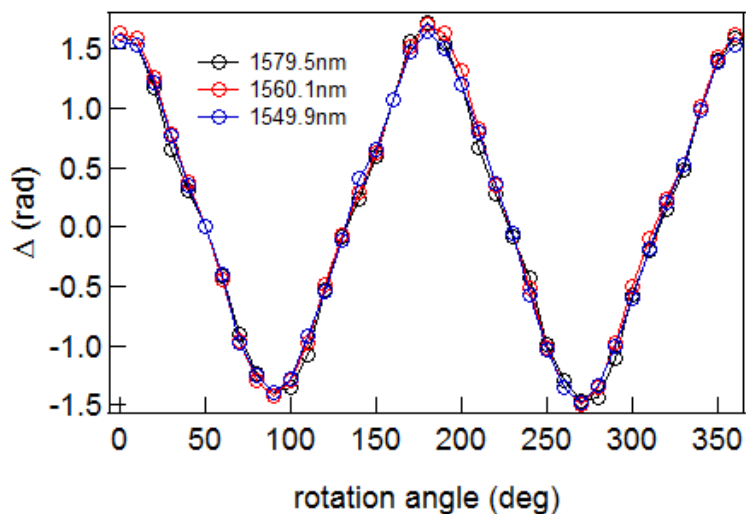
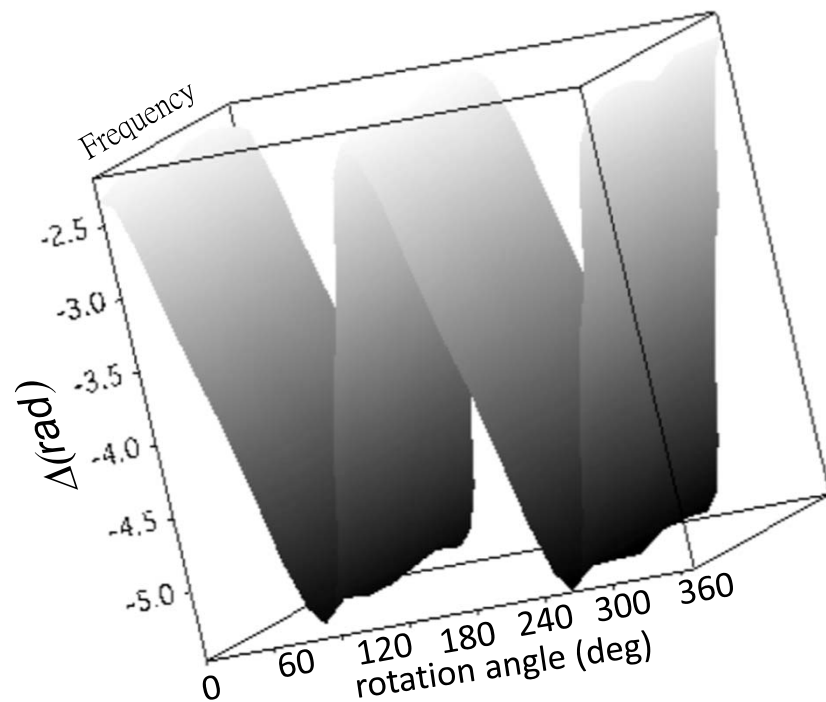
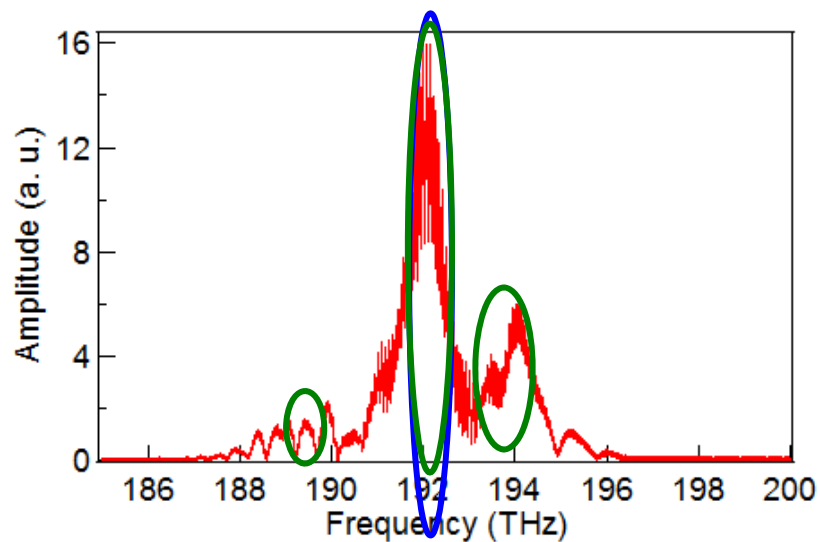
# ゼロオーダー1/4波長板

192.0834THz (1560.74nm)



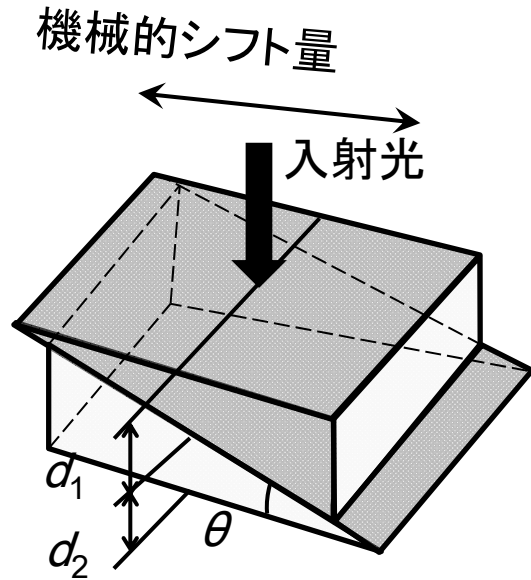
# ゼロオーダー1/4波長板

192THz付近(1560NM)



QWPの波長依存性が確認できない

# バビネソレイユ補償板



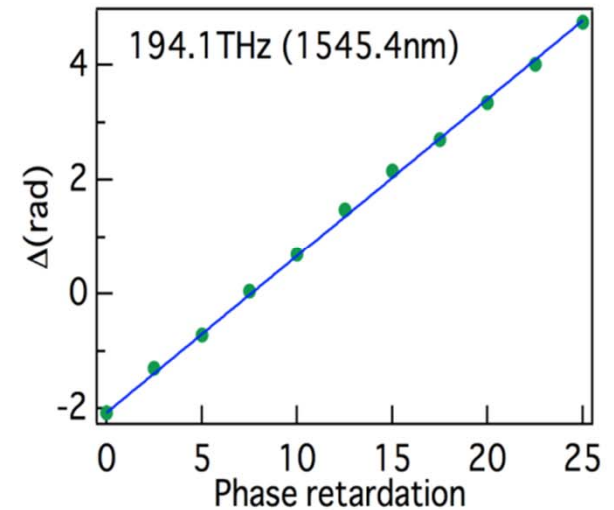
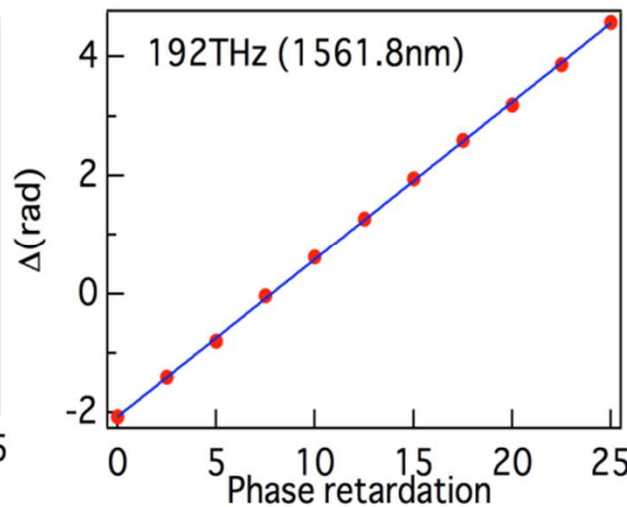
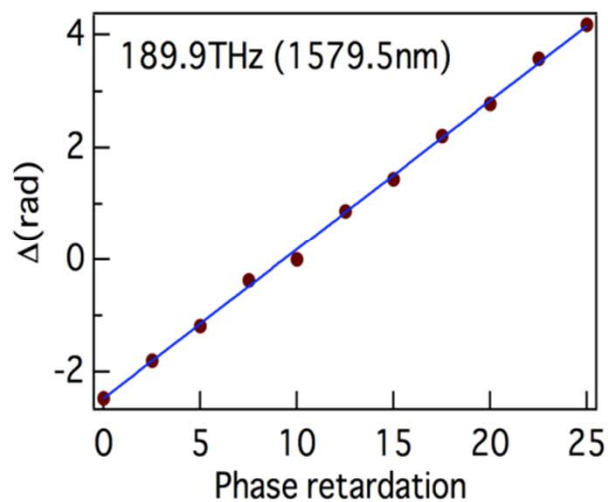
複屈折位相差  $\delta$

$$\delta = \frac{2\pi}{\lambda} (d_1 - d_2) |n_e - n_o| = \frac{2\pi}{\lambda} (x \tan \theta) |n_e - n_o| + \delta_0$$

$\delta_0$ は初期の位相差

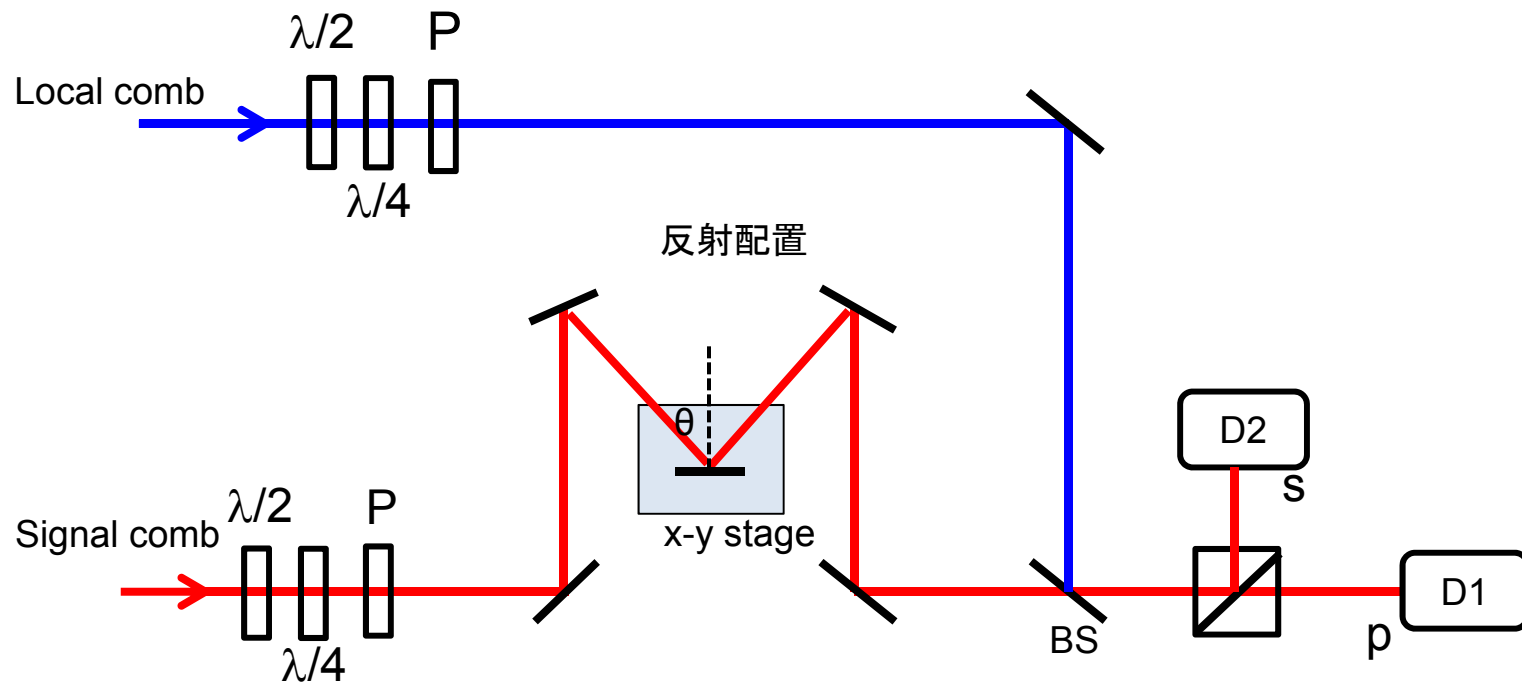
ソーラボ SBC-IR

バビネ補償器の楔角  $\theta = 0.475^\circ$



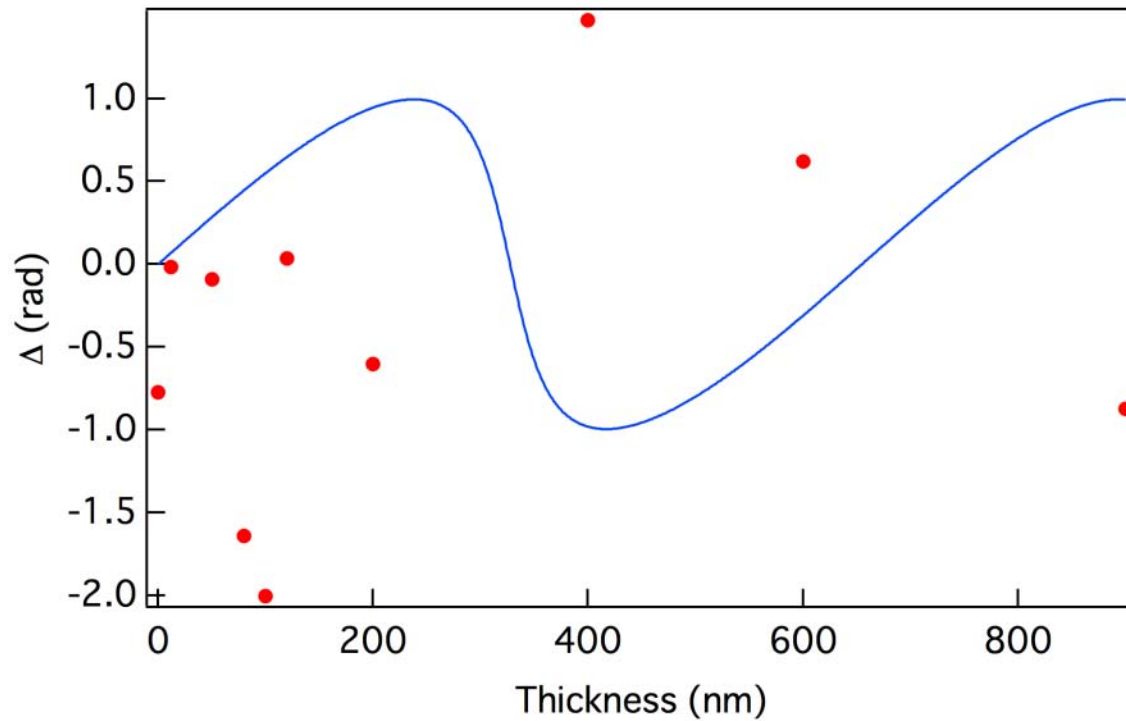


# 実験装置(反射配置)



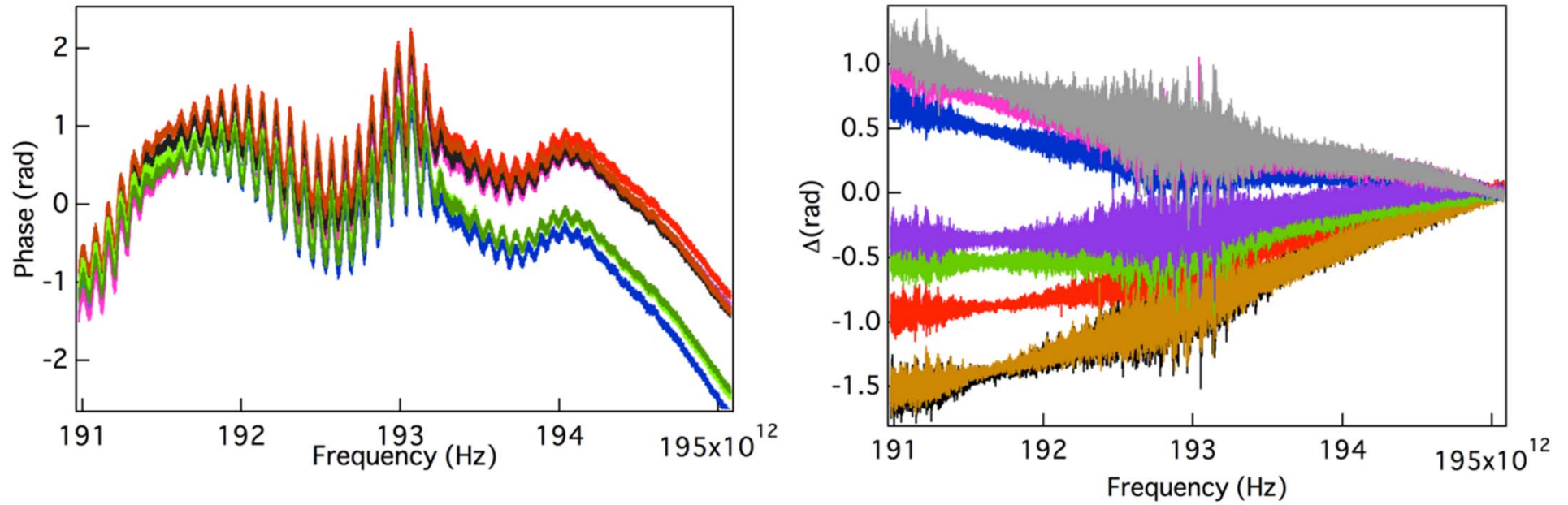
Sample	SiO <sub>2</sub> layer on Si substrate
Incident angle [deg.]	≒ 56

# 実験結果



SiO <sub>2</sub> (nm)	Delta(rad)	Delta(rad)	Delta(rad)	Average	S.D
0	-0.8298	-0.7874	-0.699	-0.772066667	0.05448849
12	-0.05726	-0.01054	0.01709	-0.016903333	0.030684954
50	-0.08603	-0.09018	-0.09865	-0.09162	0.005251749
80	-1.603	-1.489	-1.83	-1.640666667	0.141737629
100	-1.881	-1.993	-2.138	-2.004	0.105207731
120	0.002513	0.03538	0.06888	0.035591	0.027094625
200	-0.6111	-0.5895	-0.605	-0.601866667	0.009092243
400	1.506	1.427	1.486	1.473	0.03353605
600	0.6118	0.6697	0.5778	0.619766667	0.037938576
900	-0.8808	-0.8754	-0.8602	-0.872133333	0.008721366

# 膜なし10回計測



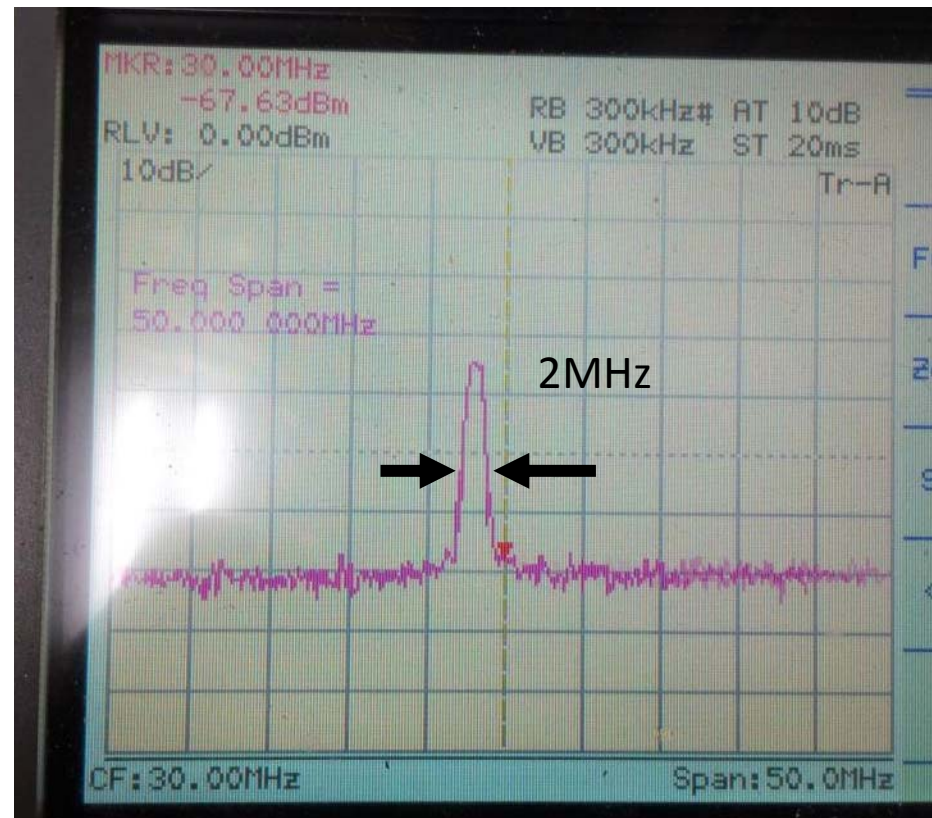
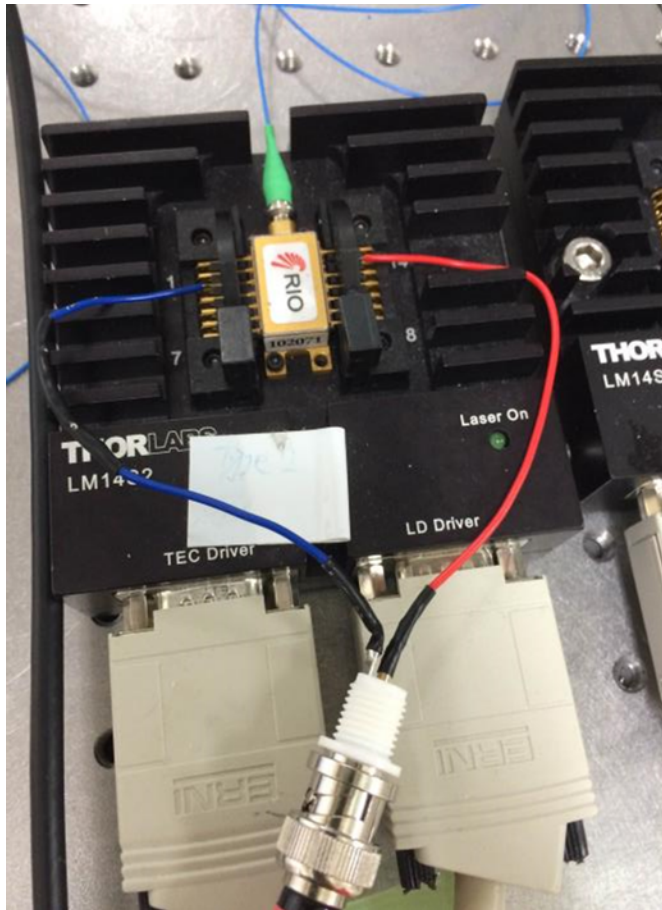
反射配置において、位相スペクトルの再現性なし



# CWレーザーの高速制御

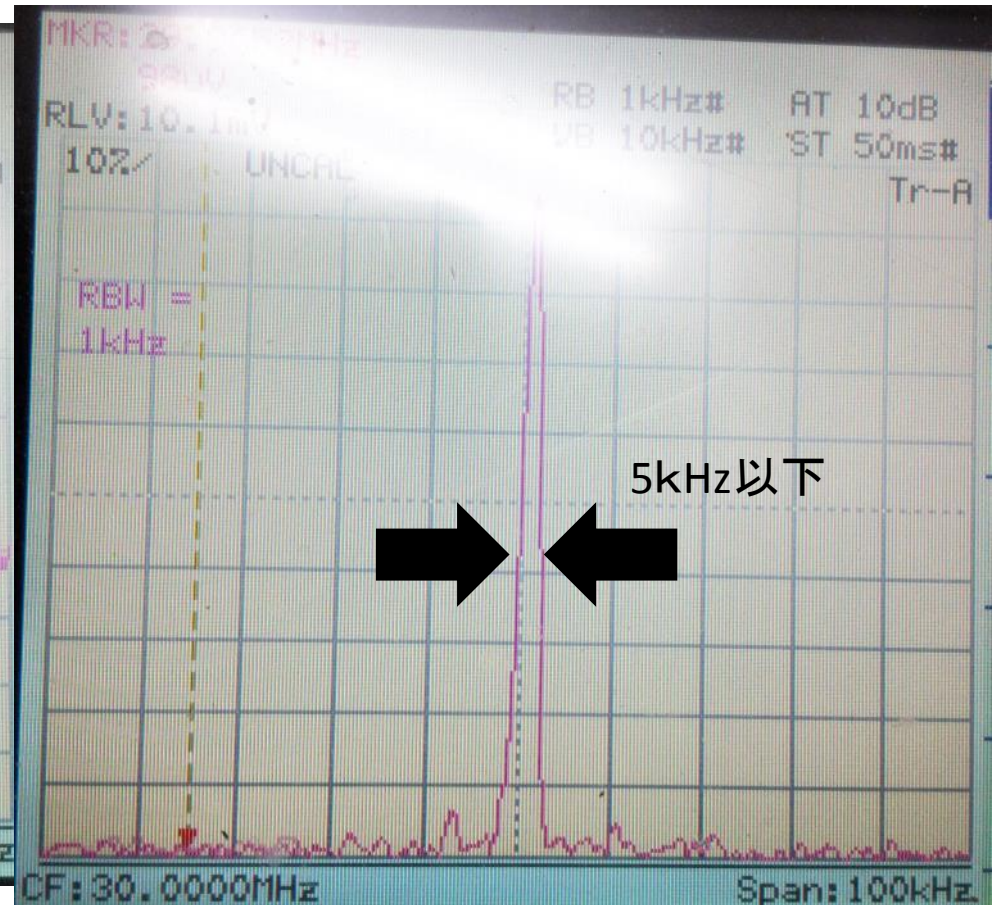
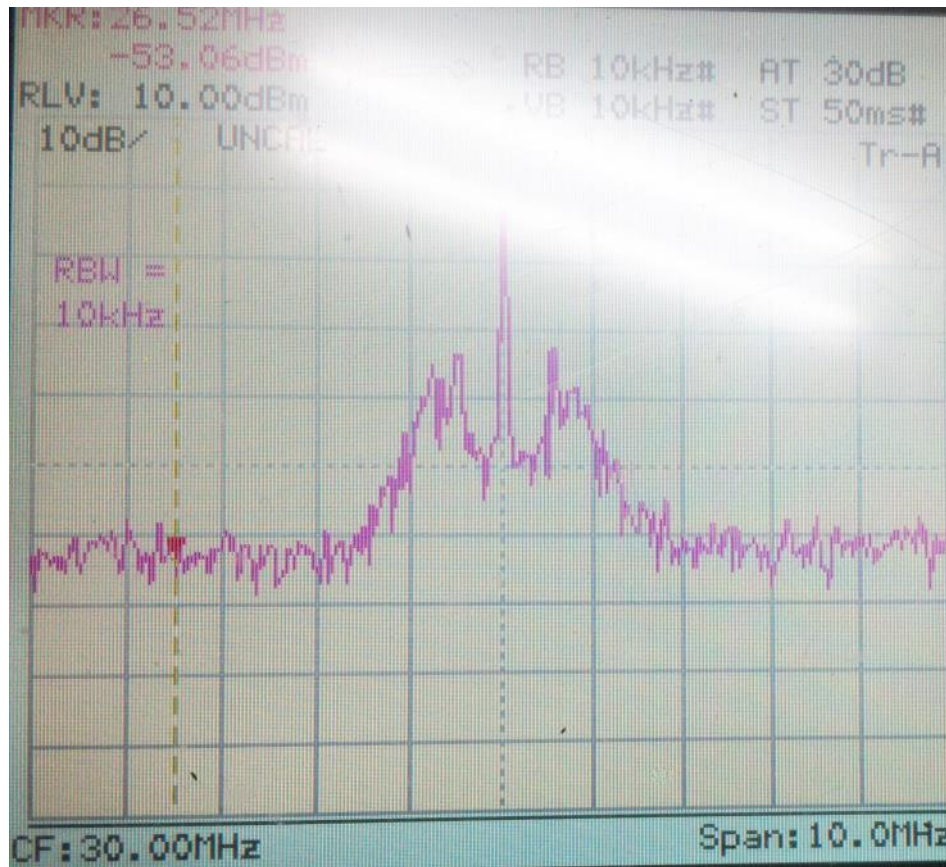
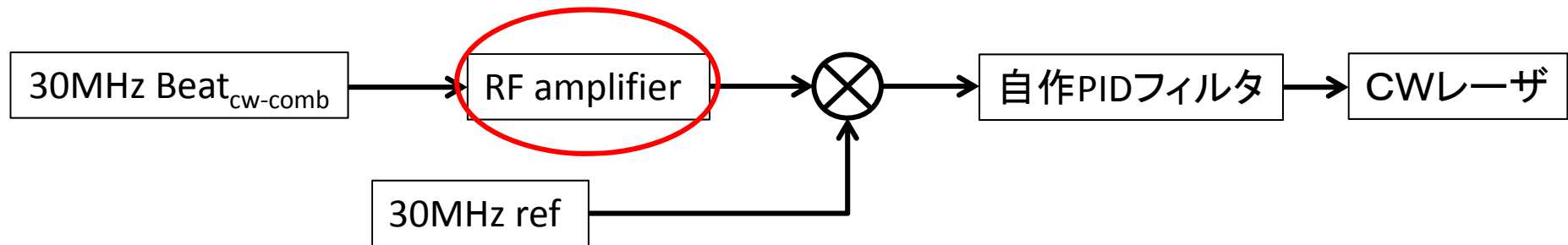
- LDに直接フィードバックする

\*CWレーザー、コム:フリーランニング





# CWレーザーの高速制御



# まとめ

- エリプソの位相遅延は実験値と理論値が一致しているが、振幅比角は誤差がある
- 反射配置の位相スペクトルは再現性がないため、膜厚計測できなかった
- CWレーザとコムの一ビート信号が高速安定化制御できた