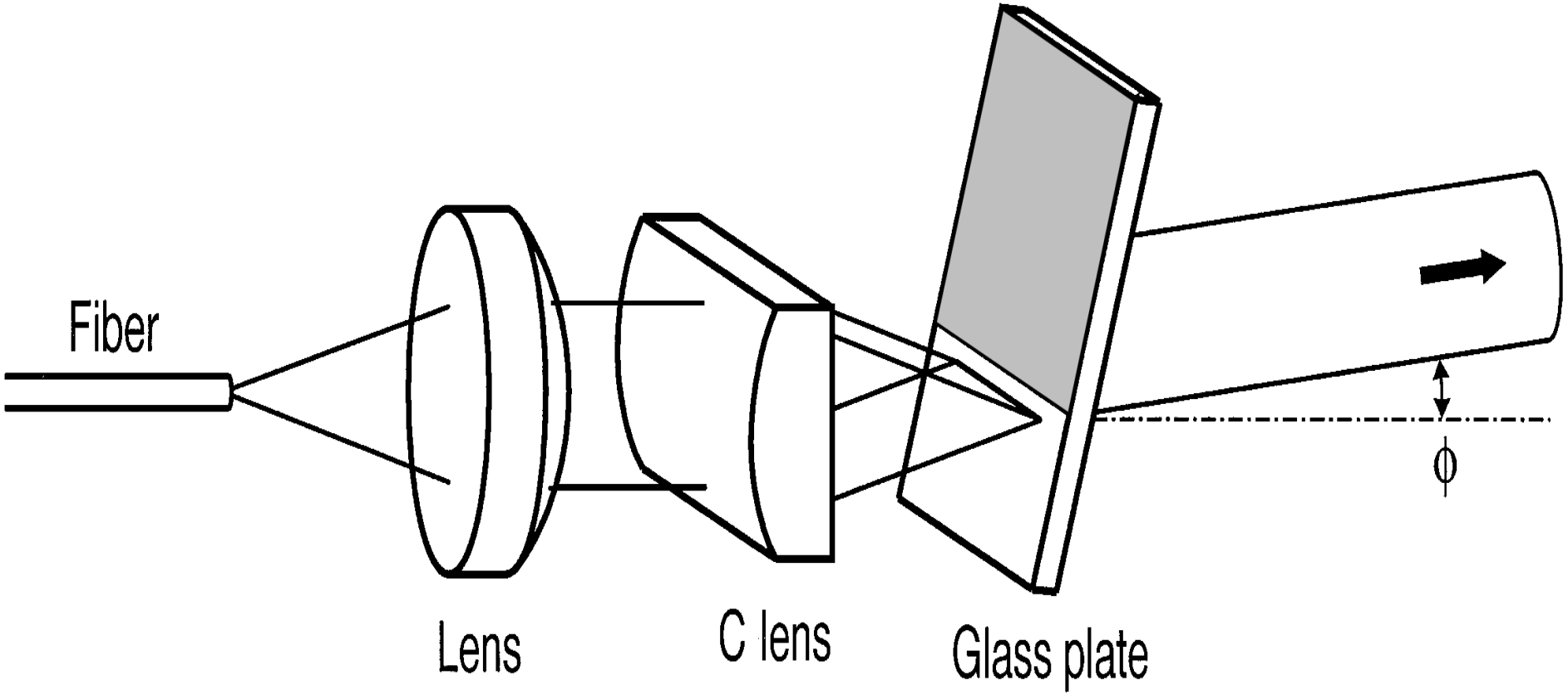
VIPA-grating 2D imaging

2015/01/30

B4 宮本

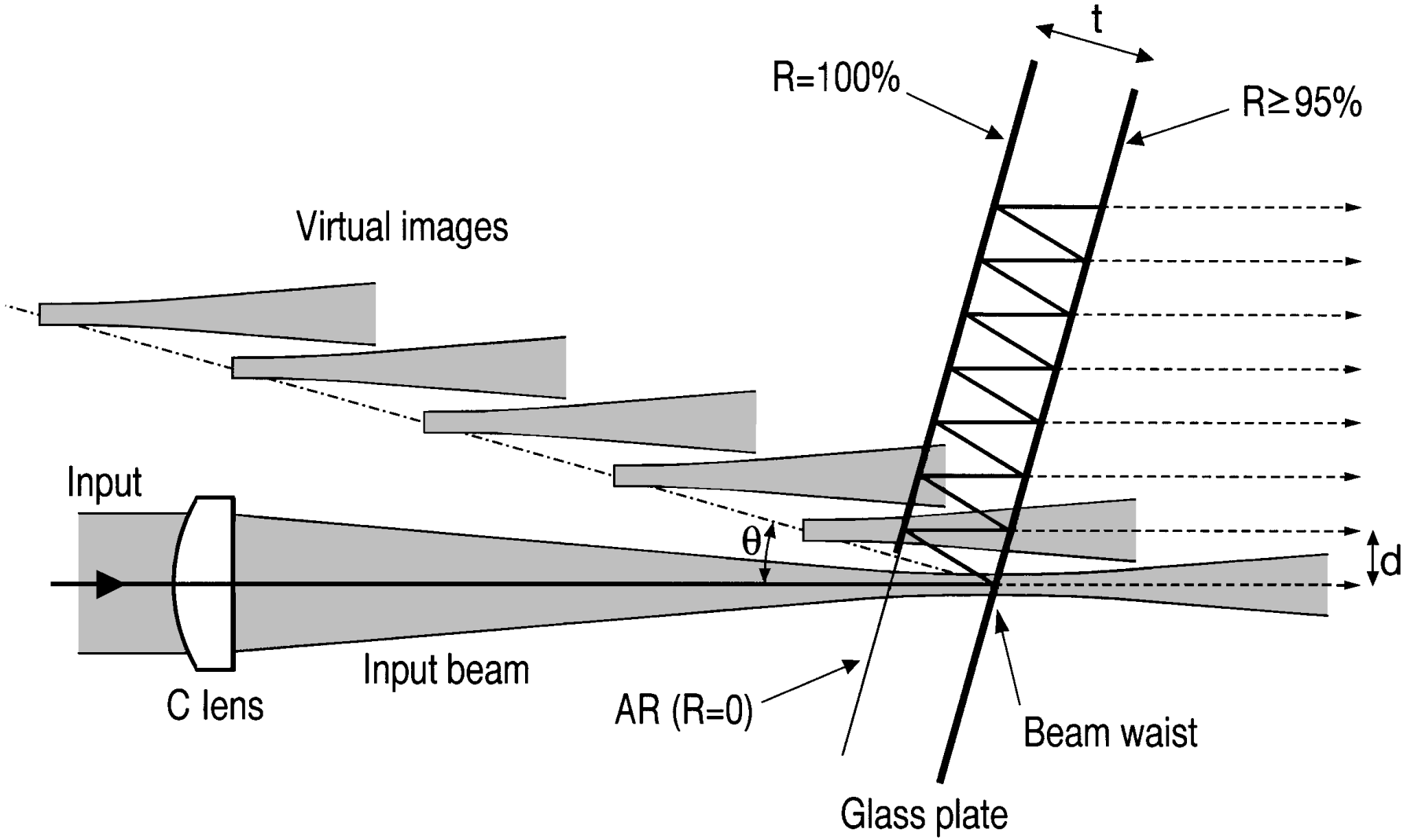
VIPAの概略図

位相の異なる複数のビーム源が配置されたphased array

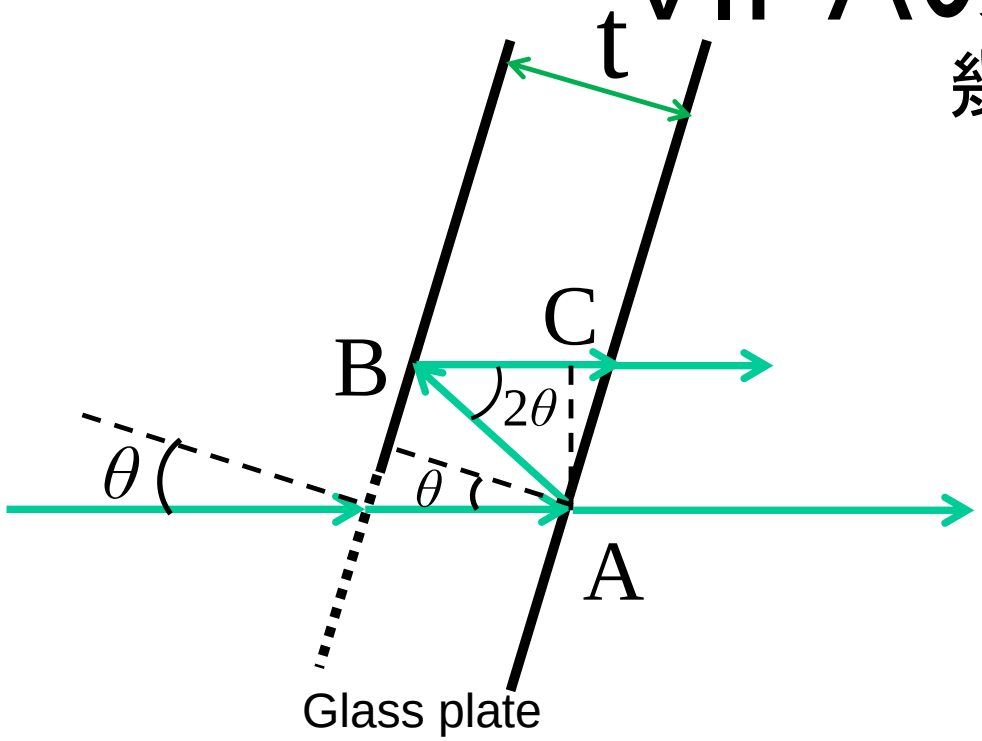


VIPAの概略図

位相の異なる複数のビーム源が配置されたphased array



VIPAの原理



幾何学的距離差＝AB + BC

$$\mathrm{AB} = \frac{t}{cos\theta}$$

$$\frac{BC}{AB} = cos2\theta$$

$$AB + BC = \frac{t}{cos\theta} + \frac{tcos2\theta}{cos\theta}$$

$$= 2t\cos\theta$$

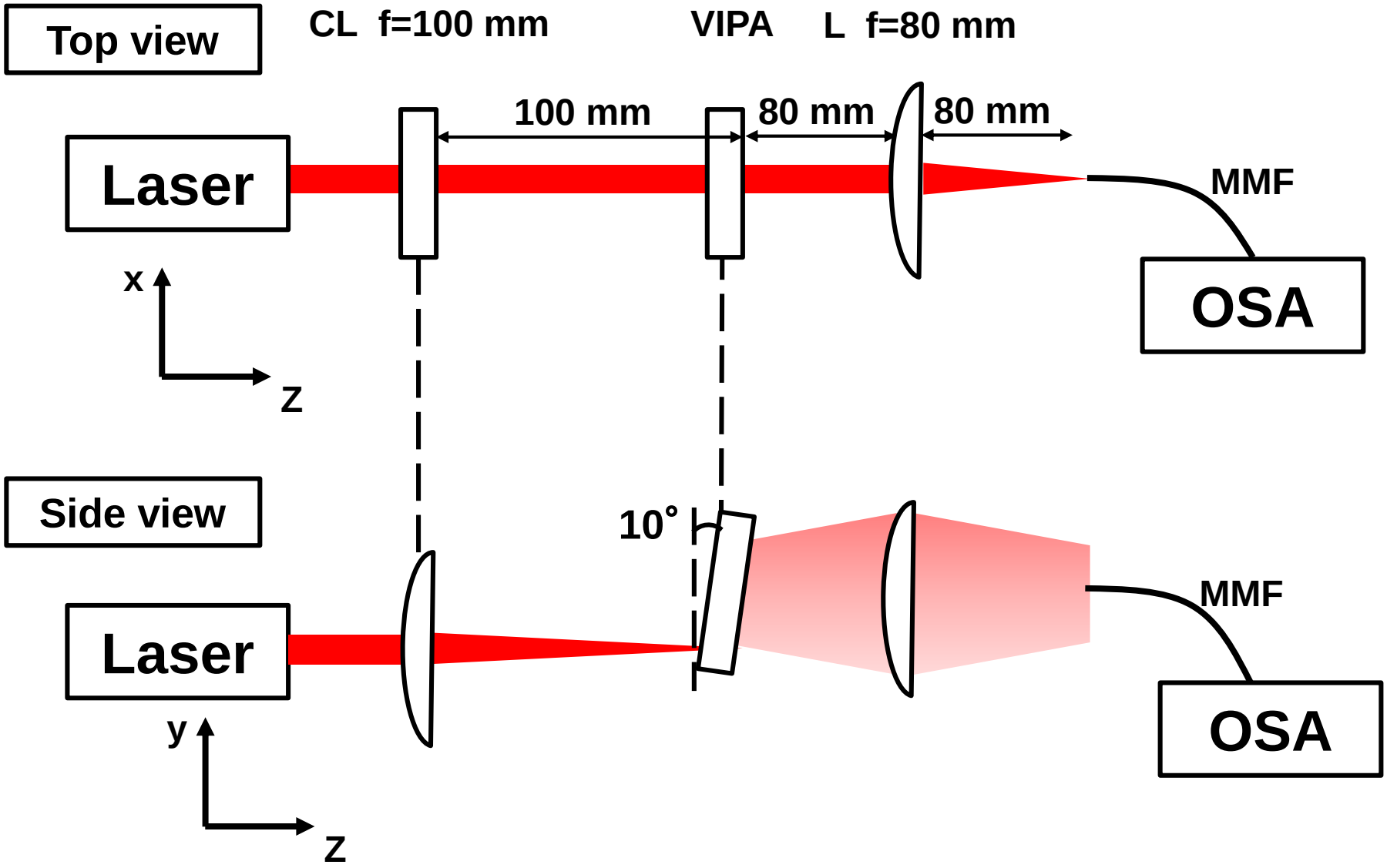
$2ntcos\theta = m\lambda$：この条件を満たす方向に伝搬していく

角度分散を計算するために θ を λ の関数として微分

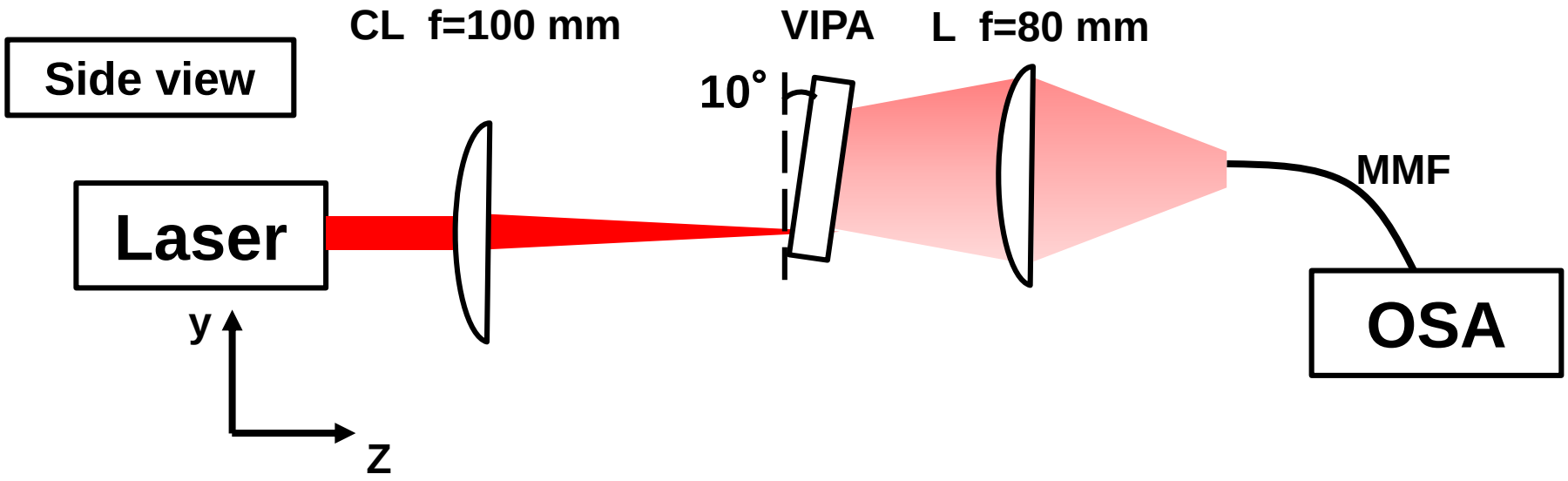
$$\frac{d\theta}{d\lambda} = \frac{-m\lambda}{2ntsin\theta}$$：角度分散

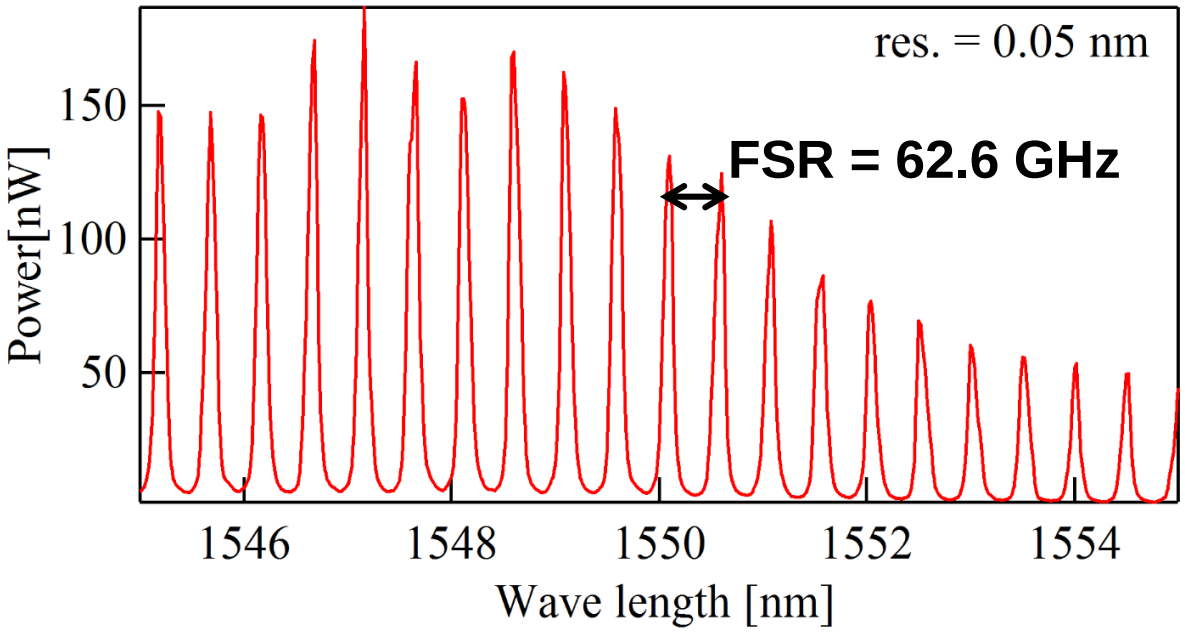
波長がdλ 変化したときの、回折角の変化量

確認実験

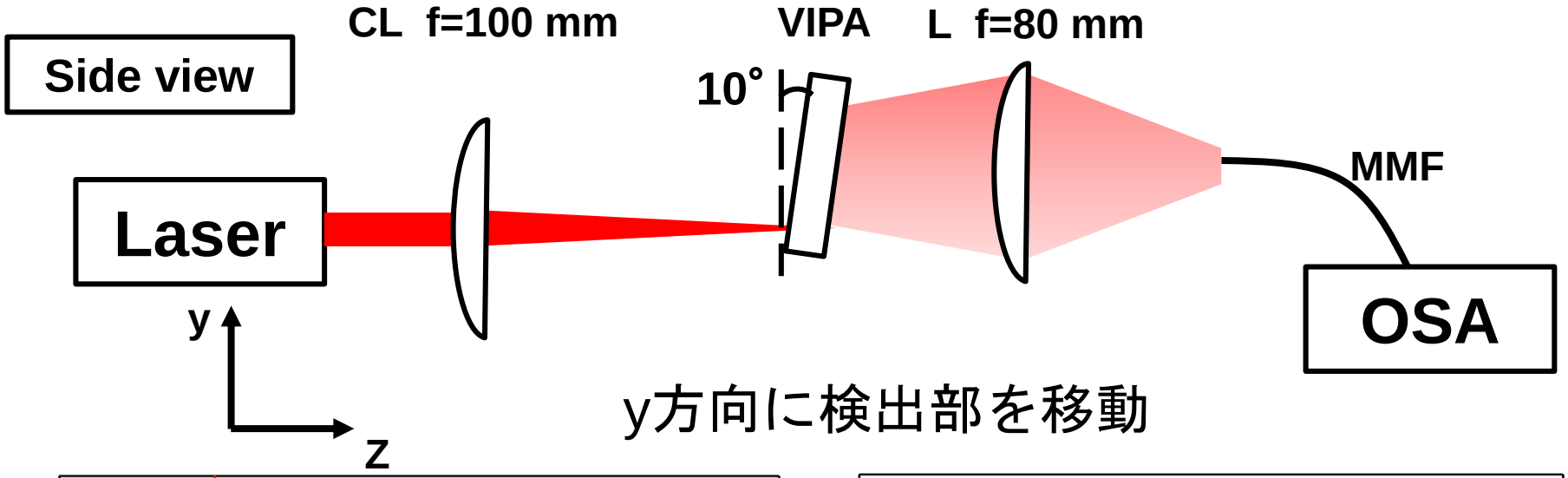

Top view
CL f=100 mm
VIPA
L f=80 mm
100 mm
80 mm
80 mm
Laser
MMF
OSA
x
z
Side view
10°
Laser
MMF
OSA
y
z

確認実験

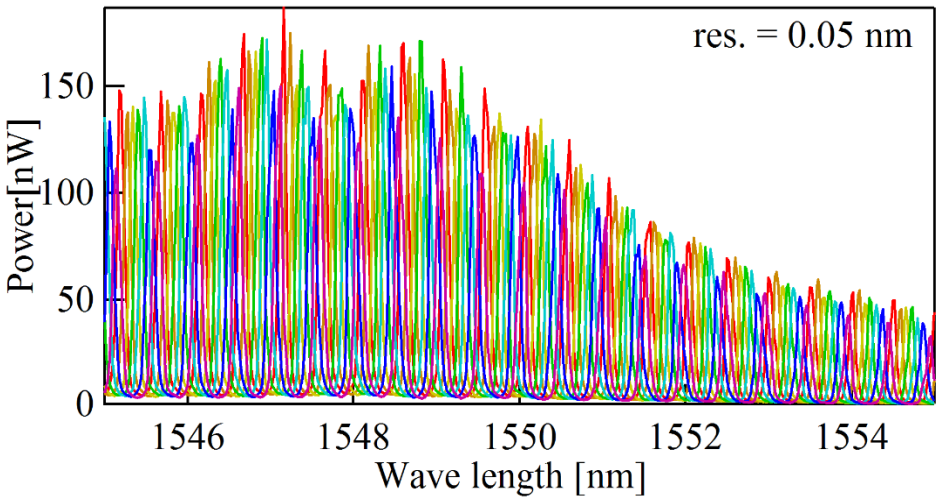

CL f=100 mm
VIPA
L f=80 mm
Side view
10°
MMF
Laser
OSA
y
z

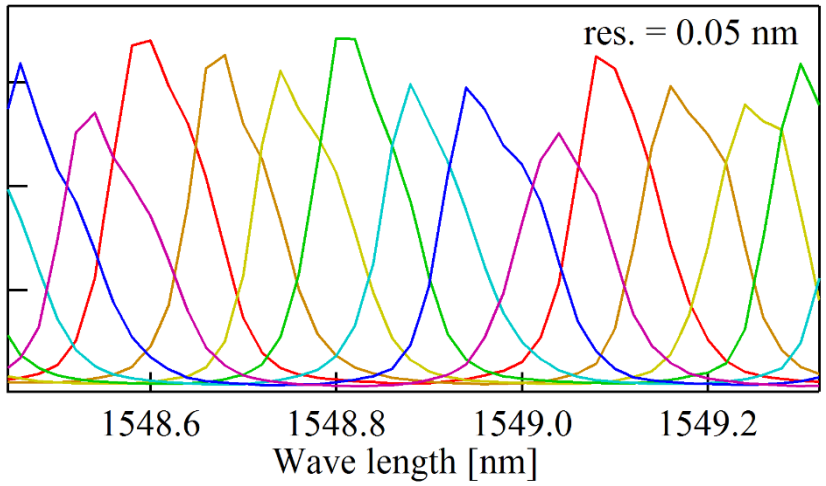

res. = 0.05 nm
FSR = 62.6 GHz
Power[nW]
150
100
50
1546
1548
1550
1552
1554
Wave length [nm]

確認実験



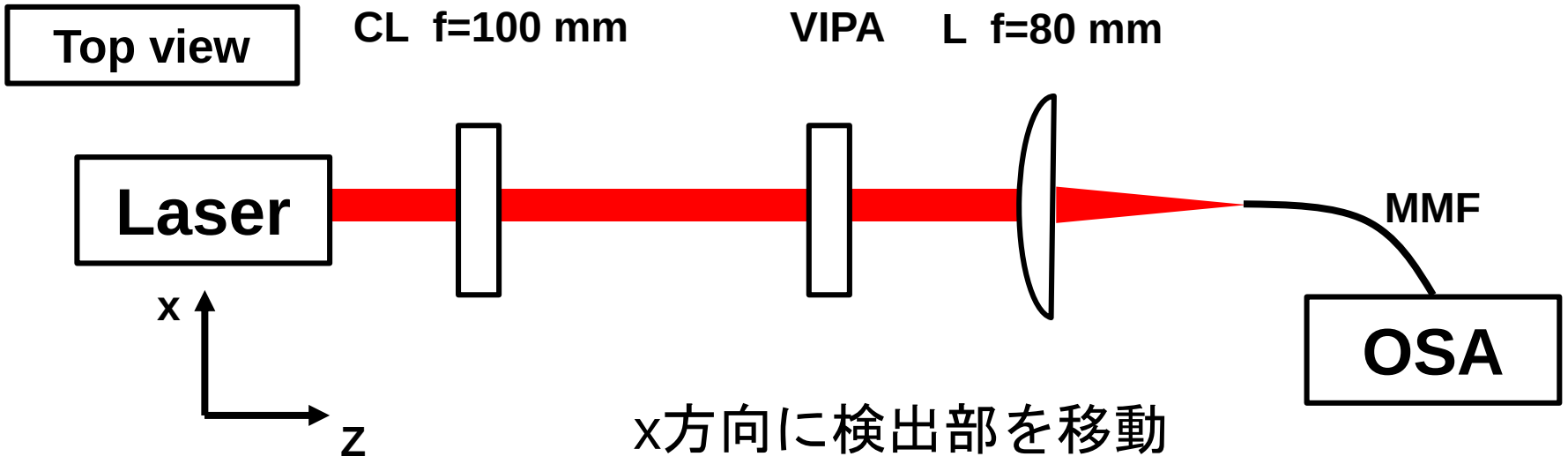
y方向に検出部を移動



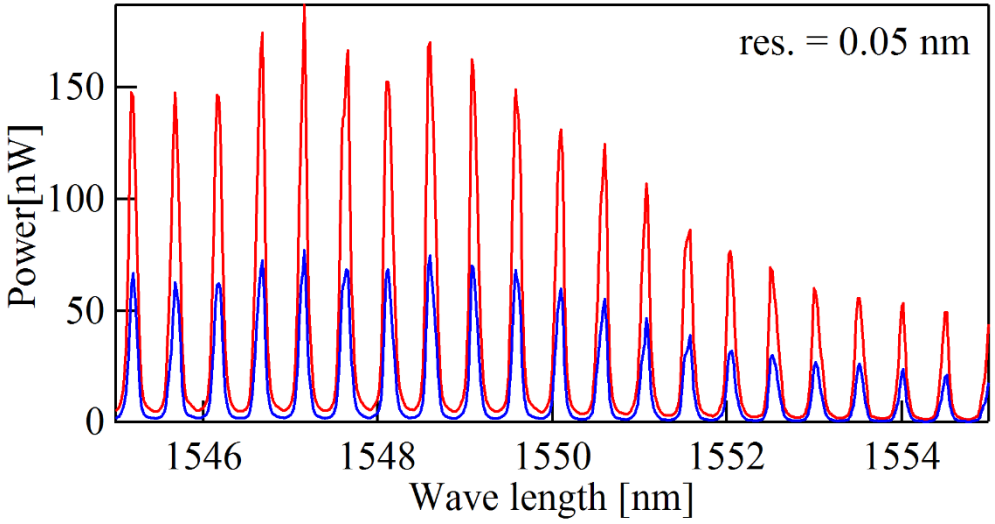


高さ方向に波長分布を持つ

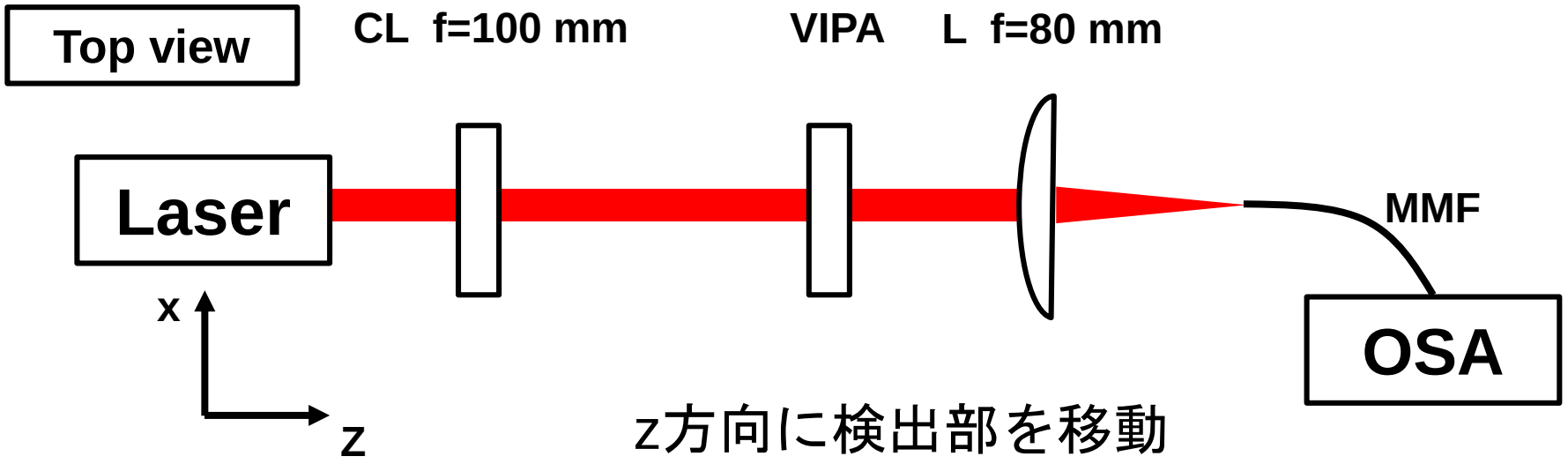
確認実験



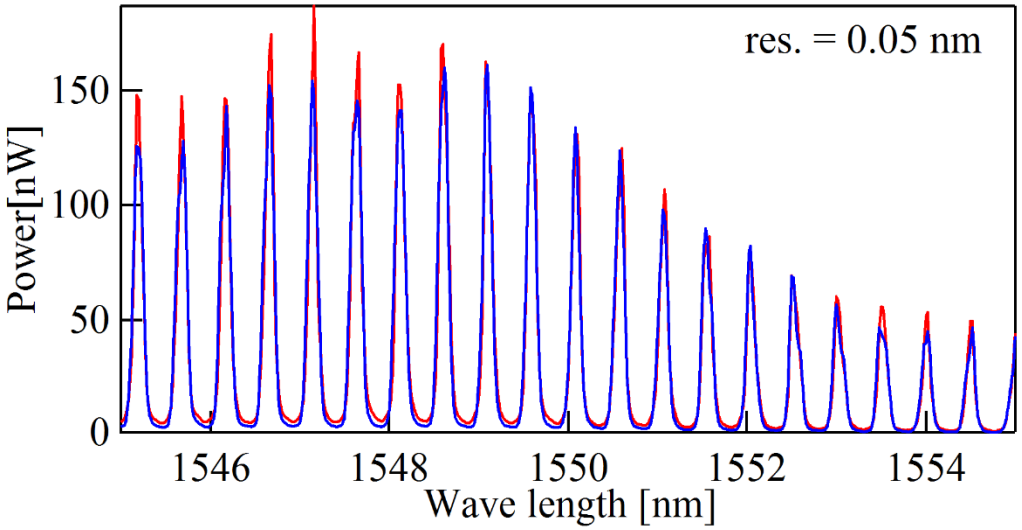
x方向に検出部を移動



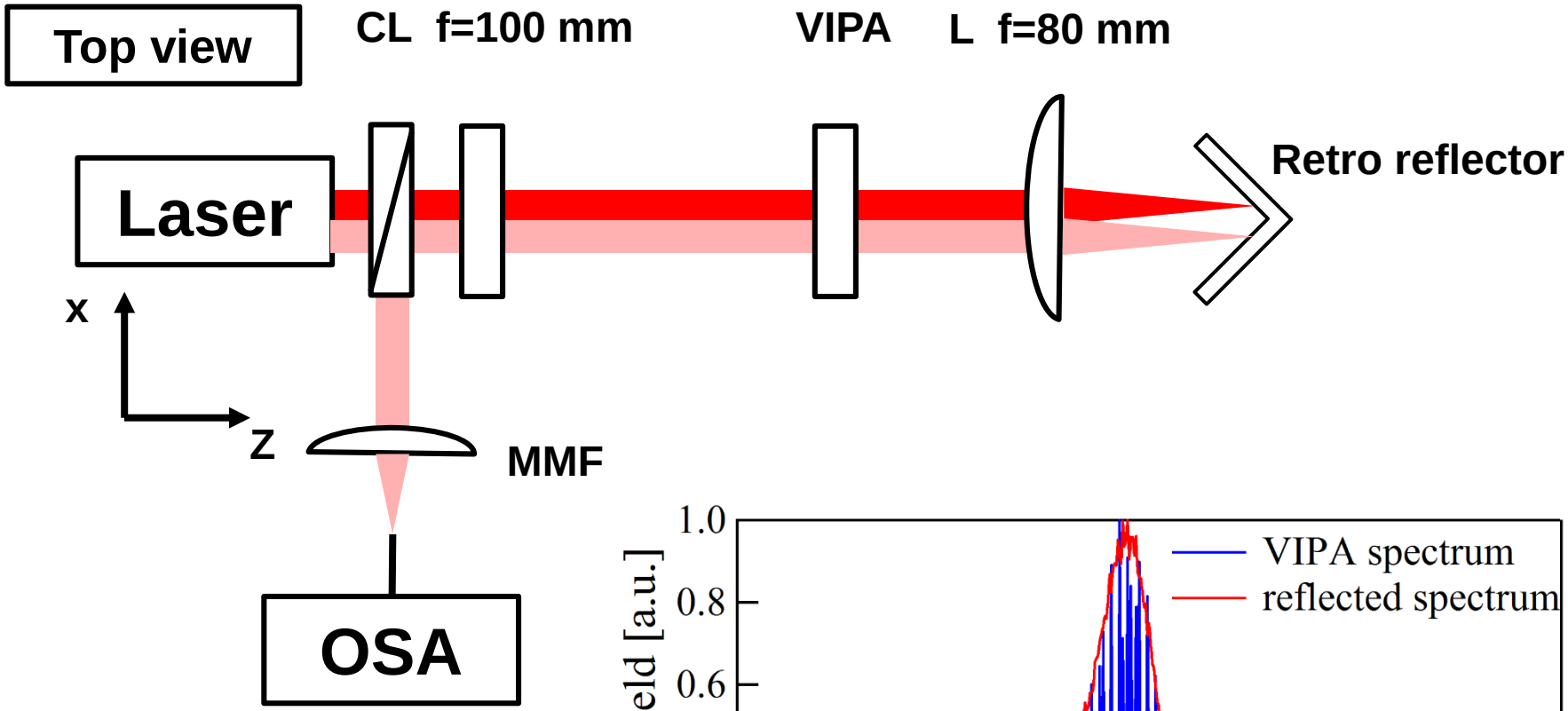
確認実験

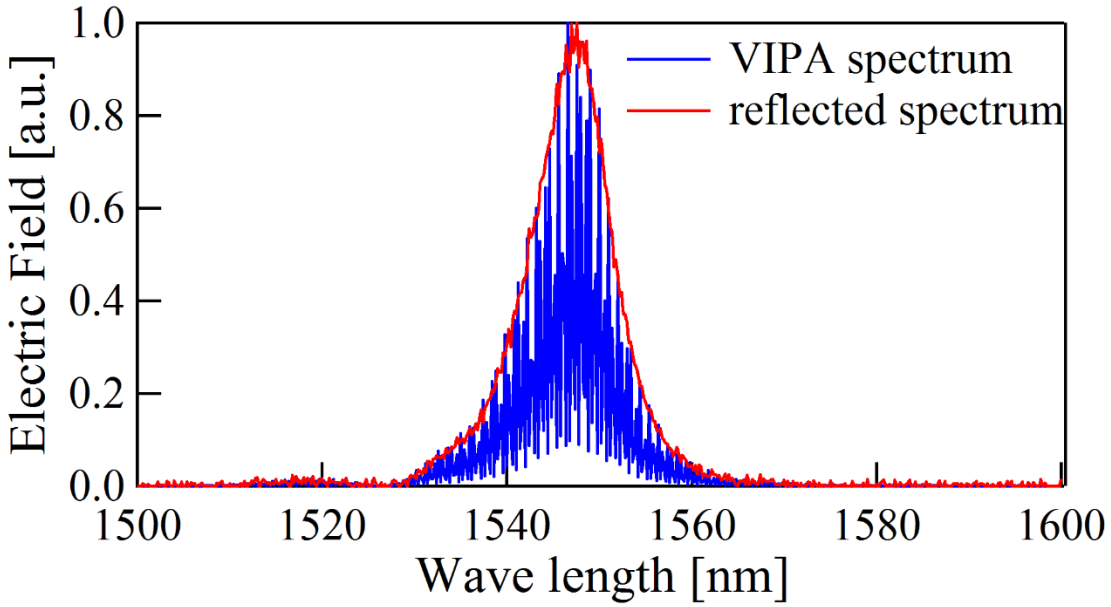


z方向に検出部を移動

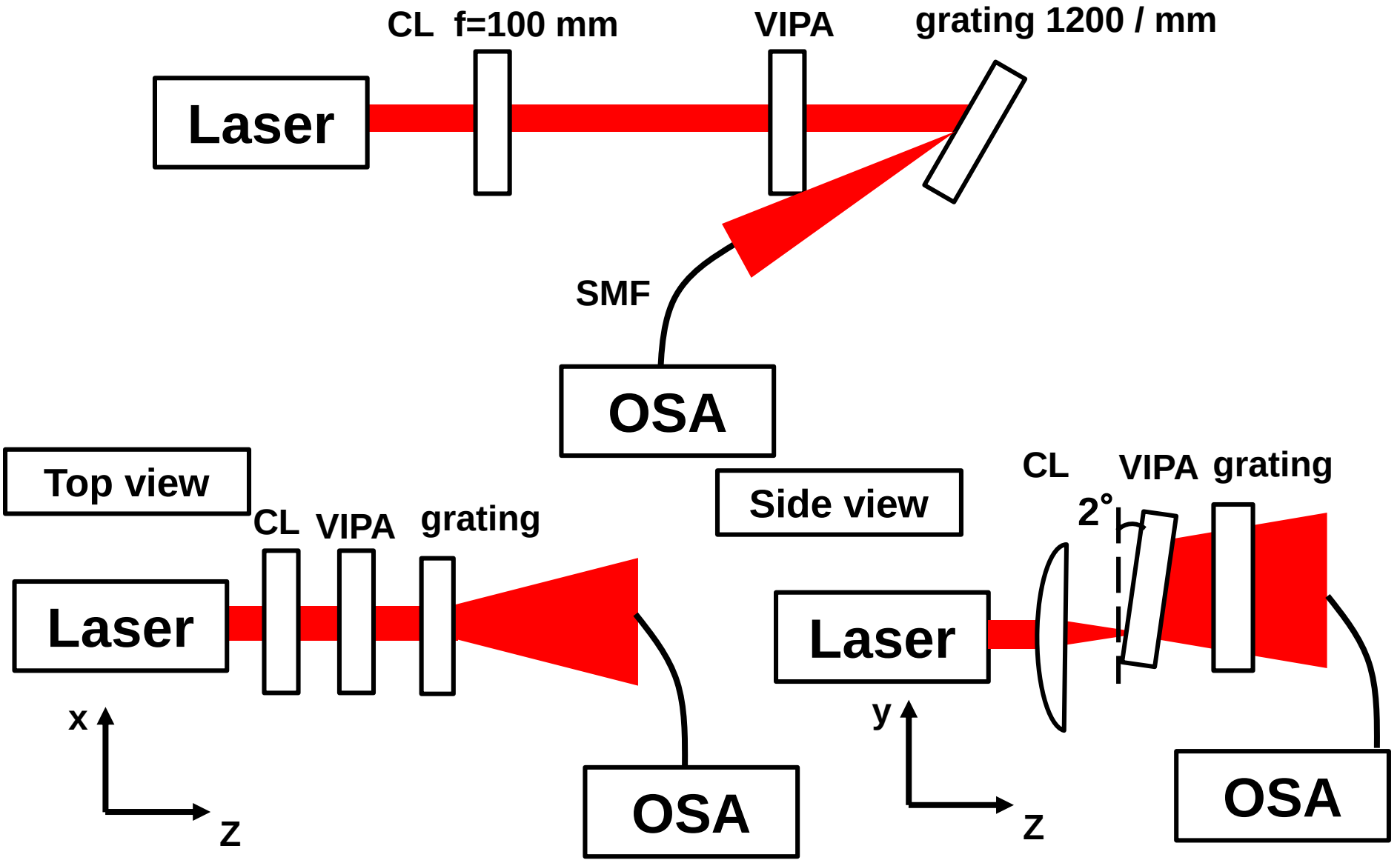


確認実験

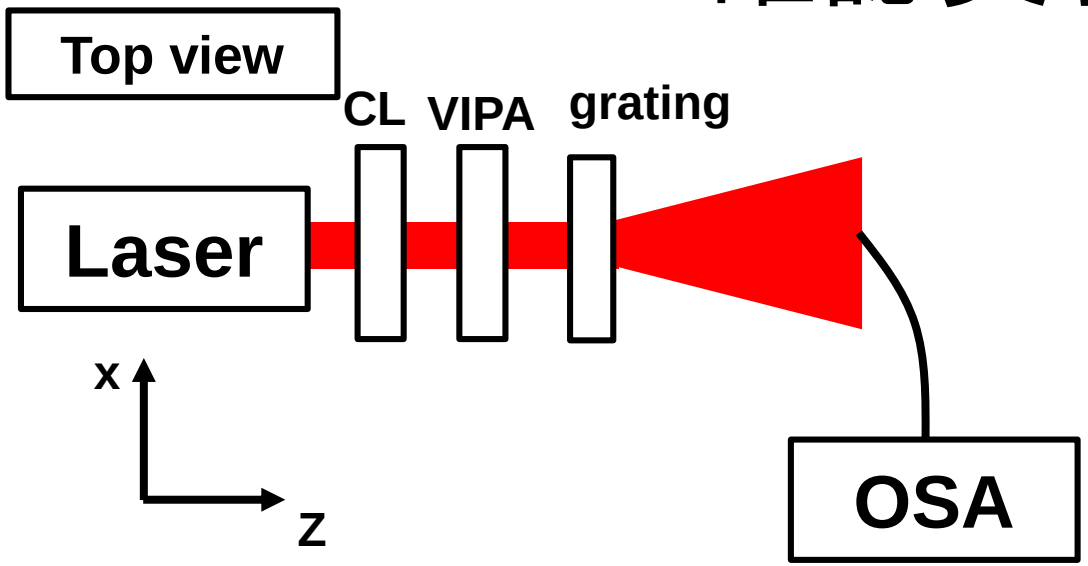

Top view
CL f=100 mm
VIPA
L f=80 mm
Laser
Retro reflector
x
z
MMF
OSA

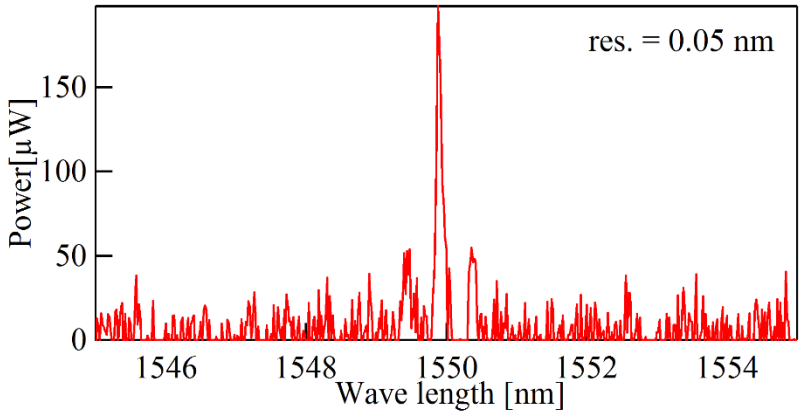

VIPA spectrum
reflected spectrum
Electric Field [a.u.]
1.0
0.8
0.6
0.4
0.2
0.0
1500
1520
1540
1560
1580
1600
Wave length [nm]

確認実験

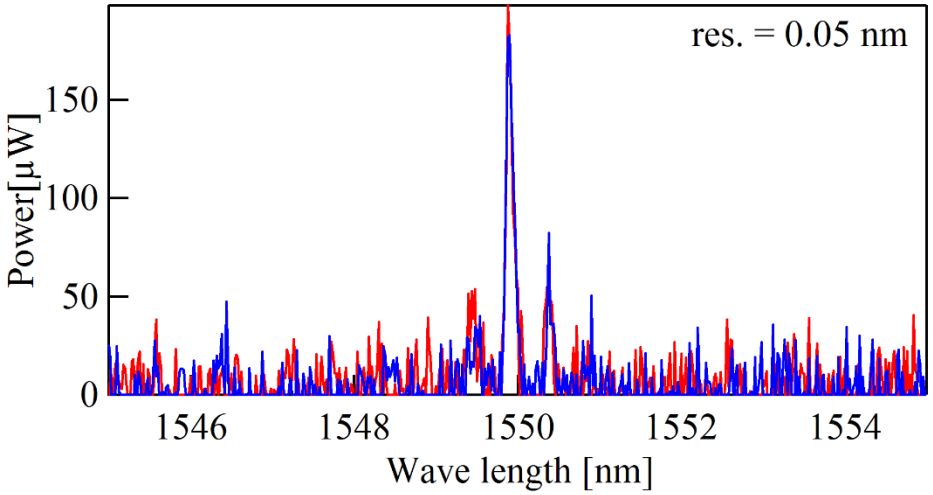

CL f=100 mm
VIPA
grating 1200 / mm
Laser
SMF
OSA
Top view
CL
VIPA
grating
Laser
x
z
OSA
Side view
CL
VIPA
grating
2°
Laser
y
z
OSA

確認実験

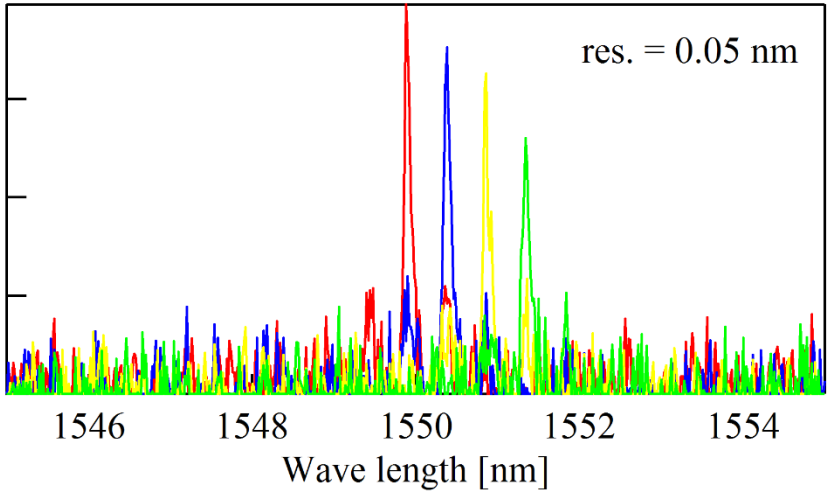




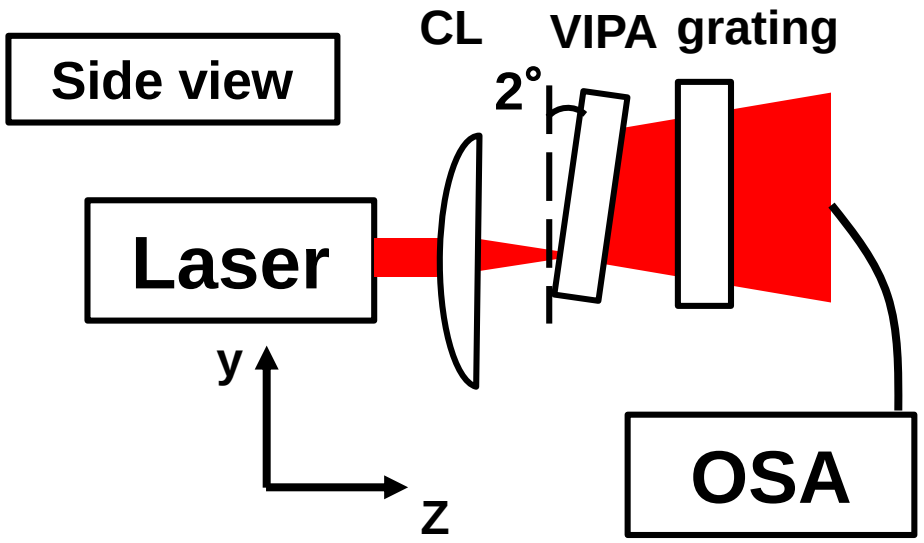
z方向に検出部を移動

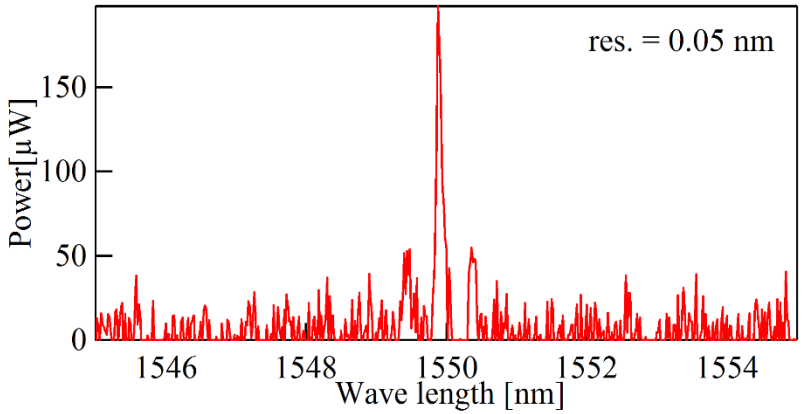


x方向に検出部を移動



確認実験





y方向に検出部を移動