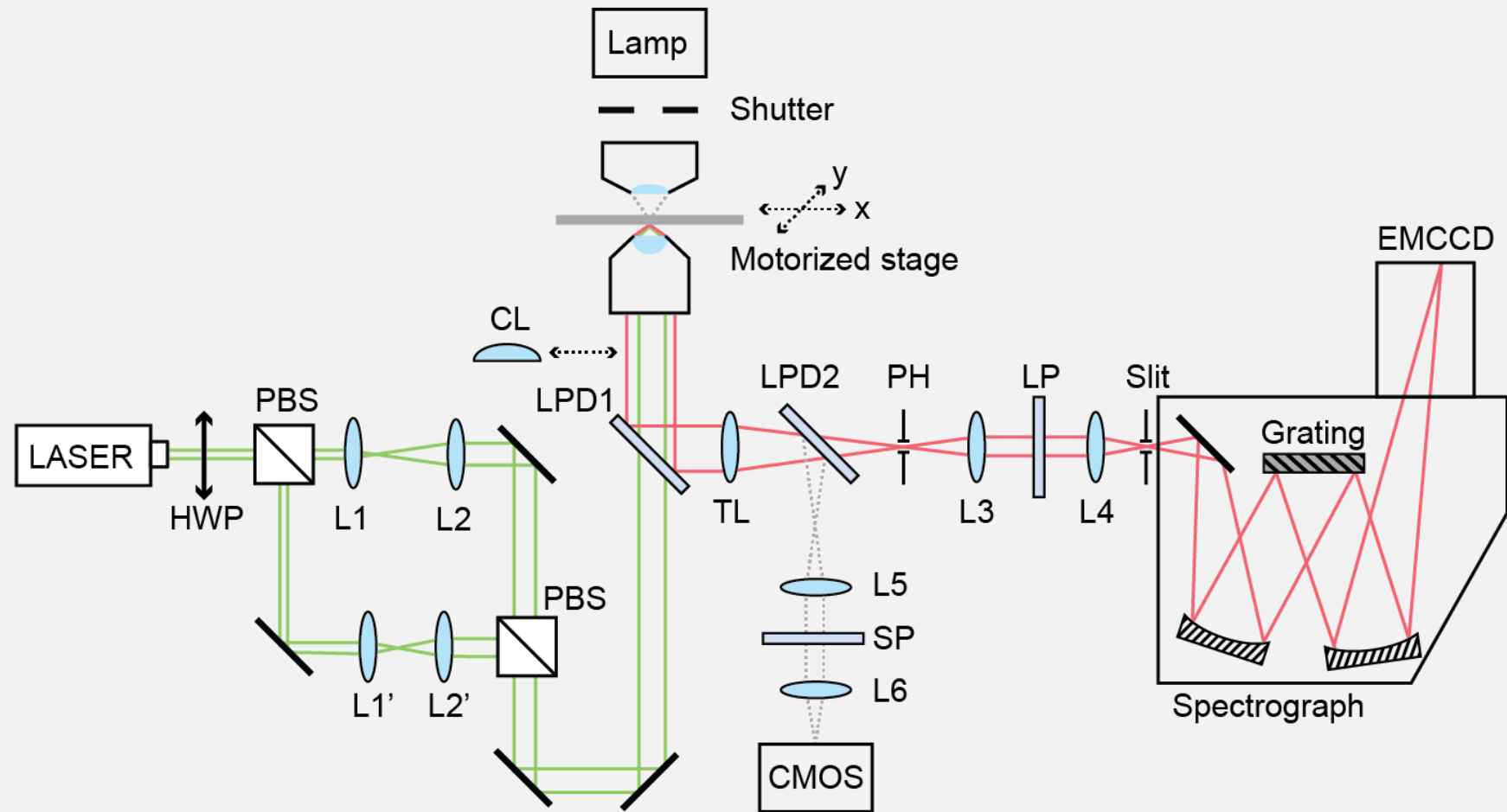
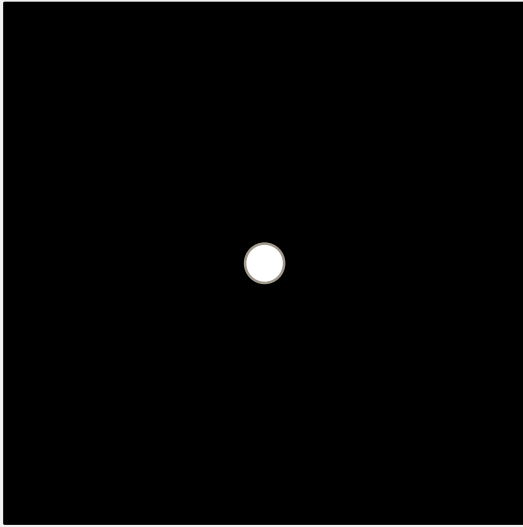


OPTICS SCHEMATICS

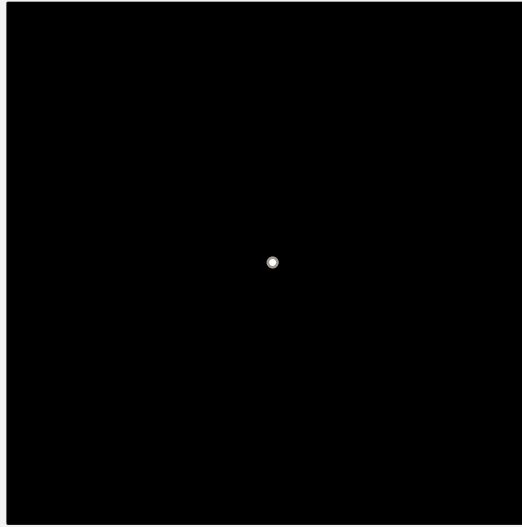


THREE ILLUMINATION PATTERNS



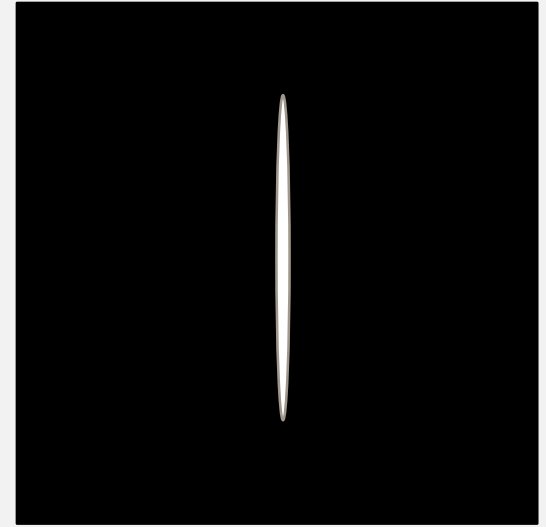
Single cell illumination

- ~8um
- Ideal for single cell measurement
- covers 1/3 of a cell
- 300um pinhole



PSF illumination

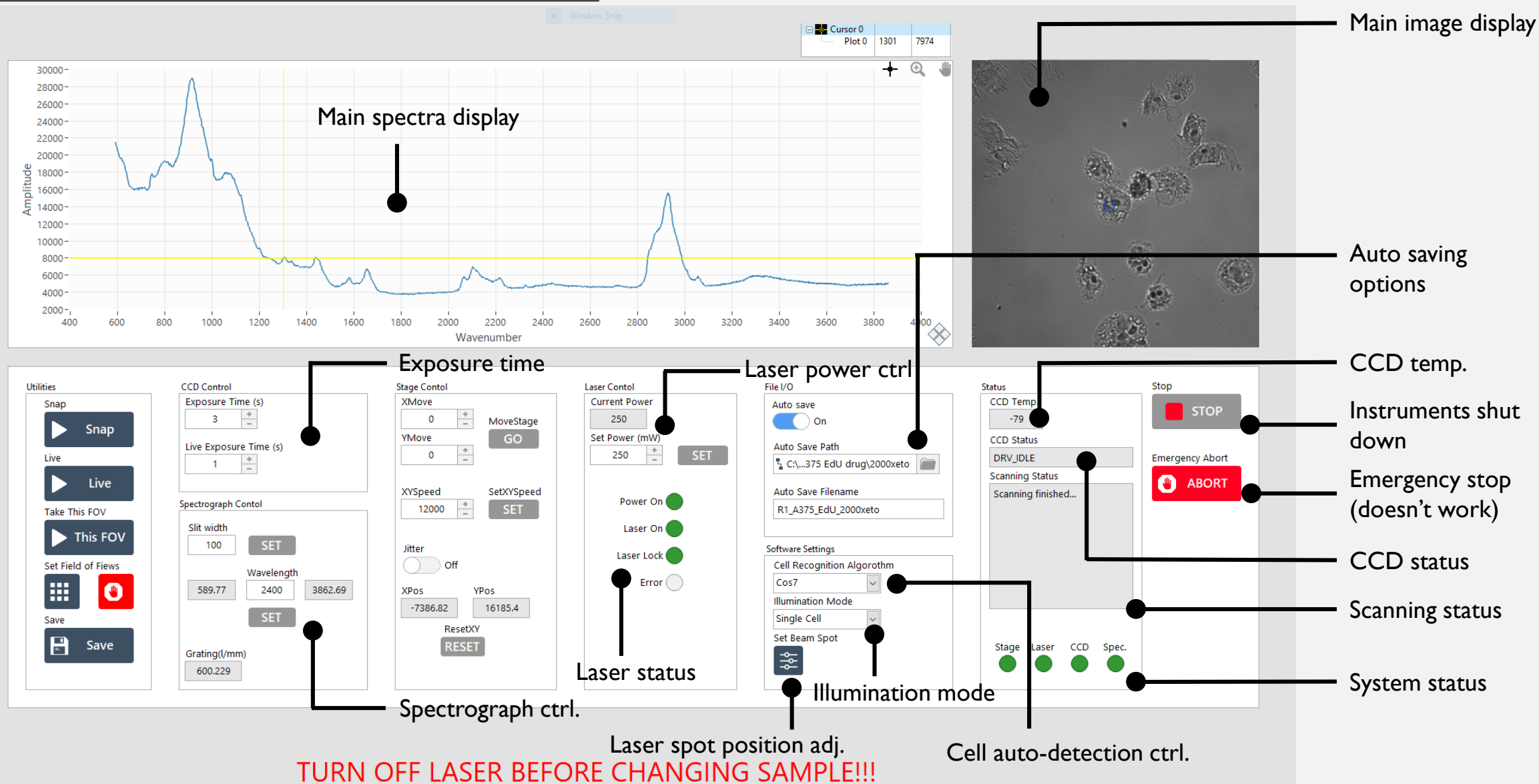
- ~300nm
- Ideal for scanning



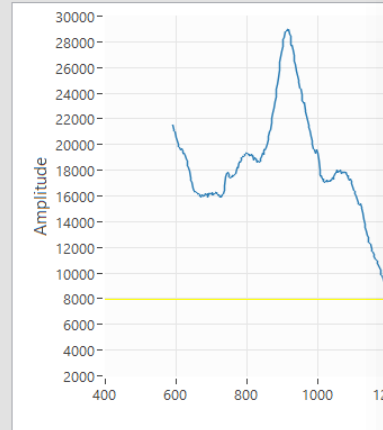
Linear illumination

- ~8 by 80um
- Ideal for bulk measurement
- Optically 'averages' multiple cells
- Without pinhole

RASPECTRA FRONT PANEL



RASPECTRA SETTING SCANNING RANGE



Register Northwest corner

13109.3

SET

16957.2

Register Southwest corner

16935.5

SET

15114.5

Register Northeast corner

12262.4

SET

16957.3

Register Southeast corner

12262.1

SET

15131

Choose Objective

UPLSAPO 20X N.A. 0.75



50X



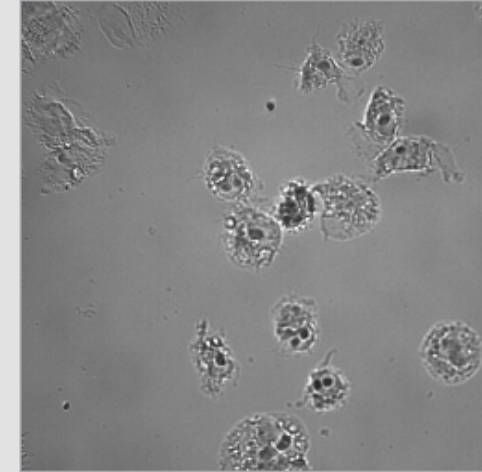
Current X Position

10081

Current Y Position

10750.7

Image Display



Utilities

Snap



Snap

Live



Live

Take this FOV



This FOV

Set field of view



Save



Save

CCD Control

Exposure Time (s)

3

Live Exposure Time (s)

1

Spectrograph Control

Slit width

100

Wavelength (nm)

589.77

Grating (l/mm)

600.229



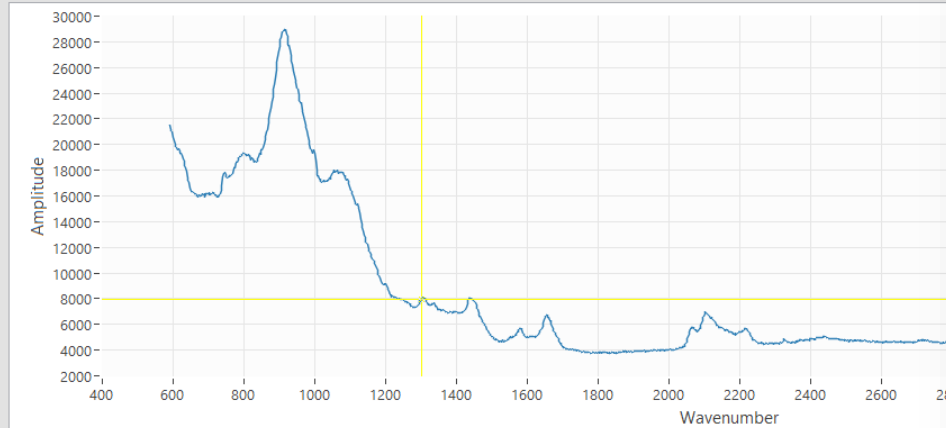
Confirm



Cancel

TURN OFF LASER BEFORE CHANGING SAMPLE!!!

RASPECTRA SETTING BEAM POSITION






Utilities

Snap
▶ Snap

Live
▶ Live

Take This FOV
▶ This FOV

Set Field of Views
 

Save
 Save

CCD Control

Exposure Time (s)
3

Live Exposure Time (s)
1

Spectrograph Control

Slit width
100 SET

Wavelength
589.77 2400 3862.69 SET

Grating(l/mm)
600.229

Stage Control

XMove
0 MoveStage

YMove
0 GO

XYSpeed
12000 SetXYSpeed

Jitter
Off

XPos
-7386.82 YPos
16185.4


ResetXY
RESET

Laser Control

Current Power
250

Set Power
250

Power
250

Laser Lock



Error


Image Display

Illumination Mode
Single Cell

PSF X
428

PSF Y
506

Single Cell X
491

Single Cell Y
523

Single Cell Radius
20

Linear X
334

Linear Y
394


Linear Height
200





Linear Width
20

OK Cancel

Cell Recognition Algorithm
Cos7

Illumination Mode
Single Cell

Set Beam Spot


Stage Laser CCD Spec.
   

TURN OFF LASER BEFORE CHANGING SAMPLE!!!

SPECR 3.0 CLASS

Class specr

-properties

```
.data
    .wavenum    %wavenumber
    .spc        %spectral data
    .bgcor      %fitted bkgrd
    .removed    %removed data
.label
    .propertyName
    .propertyValue
    .filename
    .cellType
    .probes
    .treatment
    .history
.stats
    .spcMean
    .spcStd
    .spcResolution
    .spcSNR
    .cellNum
```

Class specr

-methods

```
% data management
.specr()
.importdata()
% plots
.plot()
.plotMean()
% preprocessing
.removeBg()
.removeOutliner()
.removeLowSNR()
.trim()
.normalize()
.calibrate()
.delete()
% utilities
.setLabel()
.getMean()
.getSNR()
.getNum()
```

SPECR 3.0 FUNCTIONS

Auxiliary functions:

```
% core functions
spcinitialize() %initialize properties fields
spcuimport()   %select data with GUI
spcuopen()     %open files with GUI
spcsort()      %sort spectra
spcgetid()     %find ID using regexp
spcisfield()   %if input is a valid field
spcfindregion() %find index given wavenumber
spcnormalize() %basic function for normalization
spctrim()      %basic function for trimming
spcknneval()   %evaluate accuracy with knn model

%% data management
spcmmerge()    %combine two specr objects
spcmmergedata() %combine two specr objects
spcsplitdata() %split data for training and testing
spcstack      %stack arrays

%% bkgrd correction
spcbgsub()     %fit baseline with various model

%% plots
spcplot()      %plot spectral data
spcmarkpeaks() %mark common peaks on the plot
spcploterrorellipse() %mark 2D error bar

%% calibration
spcpksfit()    %fit peaks with various model
spccalibstd()  %calibrate with standard samples
spcfindstdpks() %detect peaks with parameters
```