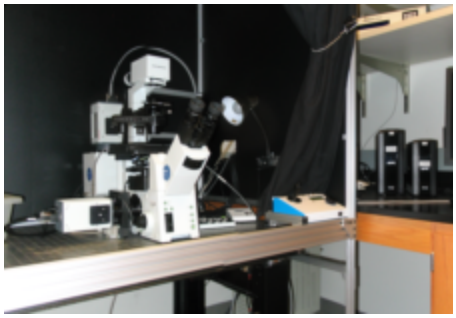
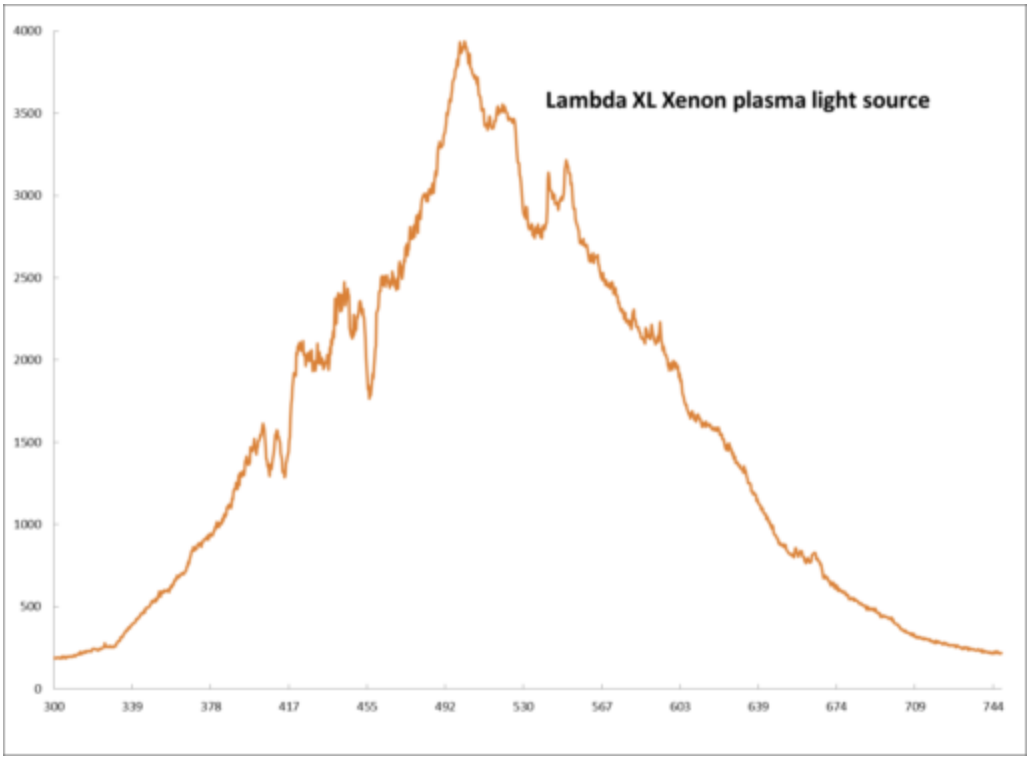
DSU: Olympus DSU spinning disk confocal microscope, PAA A065



Illumination

- Sutter Lambda XL: a stable Xenon plasma light source with built-in filter wheel for exciters



Exciter	Center Wavelength/Bandwidth (nm)	Excitation Band (nm)
DA	387/11	381.5–392.5
FI	485/20	475–495
TR	560/25	547.5–572.5
TR-P	556/20	546–566
Cy5	650/13	643.5–656.5
GFP	472/30	455–485
Texas Red	575/25	562.5–587.5

- CoolLED pE-100 Wh2 (white) for transmitted light

Rear light path for confocal, with DSU attachment, and widefield imaging

- DSU with three disks of different slit widths and density
  - D1: low magnification, thick preps
  - D2: low magnification, thin preps (default)
  - D3: high magnification
- Hamamatsu ImageEM Enhanced high dynamic range EM-CCD camera
  - 16-bit ADC, monochrome
  - 16 μm×16 μm cell
  - min. exposure time: 30.5 mS
  - transfer time: 32 mS at 512×512 pixels
  - readout noise: 1 electron max. at 1200× EM gain (11 MHz)
- filters for epifluorescence

beamsplitters installed in the DSU filter turret

Beamsplitter	Reflection Band (nm)	Edge Wavelength (nm)	Transmission Band (nm)
quad-band	381.5–392.5 475–495 547–572 643–656	410 504 582 669	420–460 510–531 589.5–623.5 677–722
GFP	350–488	495	502–950
Texas Red	350–585	593	601–950

emitters Installed in the DSU filter wheel (Sutter Lambda 10-3)

Emitter	Center Wavelength/Bandwidth (nm)	Emission Band (nm)
quad-band	440/40 525/30 607/36 684/24	420–460 510–540 589–625 672–696
GFP	520/35	502.5–537.5
Texas Red	641/75	603.5–678.5

Front light path for widefield imageing

- Hamamatsu Orca-flash2.8 CMOS camera
  - 12-bit ADC, monochrome
  - 3.63 μm×3.63 μm cell
  - min. exposure time: 20 μS
  - transfer time: 22 mS at 1990×1440 pixels
  - readout noise: 3 electrons at 8× analog gain
- epifluorescent beamsplitter and emitter
  - a quad-band set similar to the rear camera is used for the front camera
    - beamsplitter in front filter turret
    - emitters in front filter wheel (Sutter Lambda 10-3)
  - a triple-band set in the front filter turret for observation through the binocluar

Beamsplitter	Reflection Band (nm)	Edge Wavelength (nm)	Transmission Band (nm)
triple-band	386–393 466–490 546–565	403 497 574	414–450 505–528 584–645

Emitter	Center Wavelength/Bandwidth (nm)	Emission Band (nm)
triple-band	432/36 516.5/23 614.5/61	414–450 505–528 584–645

Microscope

Olympus IX81: inverted stand, infinity optics with epifluorescence and DIC, motorized objective and condenser turrets

- objectives
  - UPlanSApo 4×, NA 0.16, WD 13 mm
  - UPlanSApo 10×, NA 0.4, WD 3.1 mm
  - UPlanSApo 20×, NA 0.75, WD 0.65 mm
  - UPlanSApo 20× oil, NA 0.85, WD 0.20 mm
  - UPlanSApo 60× oil, NA 1.35, WD 0.15 mm, BFP1
  - UApo N 340 20× water, NA 0.70, WD 0.35 mm
  - UApo N 340 40× water, NA 1.15, WD 0.25 mm, correction collar for cover glass thickness (0.13 mm to 0.25 mm), BFP1
  - UPlanSApo 60× water, NA 1.2, WD 0.28 mm, correction collar for cover glass thickness (0.13 mm to 0.21 mm)
- ASI XYZ motorized stage with piezo insert (350 μm travel)
- MetaMorph Premier (7.7) for hardware control and image acquistion