Carl Zeiss AxioObserver.Z1 with confocal module LSM 880 NLO and MP excitation

Multi-functional fluorescence inverted confocal microscope with single- or multi-photon excitation, internal spectral detection and non-descanned detection with FLIM option.

Applications

- Fast and multi-color confocal imaging
- Various measurement options: z-stack, time series, tile scan, multi positions and regions
- Spectral detection, spectral unmixing and fingerprinting
- Deep imaging of thick biological samples with multiphoton excitation and non-descanned detection
- Label free imaging: Coherent anti-Stokes Raman Scattering (CARS) and higher harmonic generation (SHG and THG)
- FLIM with multiphoton excitation
- Long term live-cell imaging available

Microscope

Motorized inverted fluorescence microscope Carl Zeiss Axio Observer.Z1 with confocal module LSM 880 NLO equipped with the following**:**

Software

ZEN 2.1 Black with following modules and functionalities:
Spectral Unmixing, 3D visualization, Tiles & Positions, FRAP, Experiment designer

Illumination

- Transmitted Light Illuminator HAL 100
- Epifluorescence Illuminator HXP 120 V
- Lasers (CW)
  405 nm Laser 30 mW
  Argon Laser (458, 488, 514 nm) 25 mW
  561 nm Laser 20 mW
  633 nm Laser 5 mW
- Lasers (pulsed)
  Ti:Sapphire femtosecond laser Chameleon Ultra II (Coherent), 690-1080 nm, > 3.5W
  Optical parametric oscillator (Chameleon Compact OPO, Coherent), 1100-1300 nm
  Delay line with LMS-270 precision liner stage (PI) in the Chameleon beam path

Confocal scanning module LSM 880

13 fps for 512x512, zoom 0.6 - 40x, max. resolution 8192 x 8192

Twin Gate main beamsplitters:

Main beam splitters 1 (visible)	Main beam splitters 2 (invisible)
MBS 458	MBS 405
MBS 458/514	MBS 445
MOBS 458/561	MBS 690+
MBS 488	MBS 760+
MBS 488/561	MBS 405/760+
MBS 488/561/633	MBS 445/760+
MBS T80/R20	MBS T80/R20
Plate	Plate
None	None

Filter cubes (turret with 6 positions)		
Filter set 49 DAPI	EX 365, BS 395, EM 445/50	exchangeable
Filter set 38 GFP	EX 470/40, BS 495, EM 525/50	exchangeable
Filter set 43 Cy3	EX 545/25, BS 570, EM 605/70	exchangeable
	BS-MP 355/690+(R)	fixed position
	BS-MP-760	fixed position
Rear (100% mirror)		fixed position

On request (instead of one of the sets above):

Filter set 50 Cy5: EX 640/30, BS 660, EM 690/50

Objectives

Type	Immersion	Magnif.	NA	WD [mm]	DIC/Correction Ring
EC Plan-Neofluar 420330-9901	Air	5x	0.16	18.5	-
Plan-Apochromat 420640-9900	Air	10x	0.45	2.1	-
LD LCI Plan-Apochromat 420852-9871	Oil, Water, Glycerine	25x	0.8	0.57*	DIC, Corr (CG=0-0.17mm)
C-Apochromat 421867-9970[1]	Water	40x	1.1	0.62*	DIC, Corr (CG=0.14-0.19mm)
C-Apochromat 421787-9970[1]	Water	63x	1.2	0.28*	DIC, Corr (CG=0.14-0.19mm)
Plan-Apochromat 420782-9900[1]	Oil	63x	1.4	0.19	DIC

* at CG = 0.17

Detection

- 2x transmitted light detector LSM T-PMT
- Internal spectral detection unit
  - 2 standard PMTs („blue“ and „red“ 371-740 nm)

- Spectral detector 32-channels GaAsP PMT (410-695 nm)
- Spectral GaAsP detector and „red“ PMT enables photon counting mode

- Non-descanned detection unit (reflected geometry)
  - Spectral detector 32BiG.2 unit (containing 2 detectors)
  - High Speed Hybrid Detector for TCSPC HPM-100-40 (Becker & Hickl), IRF 120 ps
  - Filter cubes with following mirrors and filters can be used to select the light reaching individual non-descanned detectors:

Mirrors	Filters
DM 490	485 SP
DM 555	525/50
DM 600	545-590
DM 625	590/40
50/50 beamsplitter	570-640
100 % mirror	645-710

FLIM option

BiG.2 and TCSPC HPM-100-40 non-descanned detectors can be on request attached to a TCSPC card (TimeHarp 260 Nano, PicoQuant).