

AvaSpec-ULS2048XL-EVO

SensLine Back-thinned CCD Spectrometer

AvaSpec-ULS2048XL-EVO



Combining exceptional quantum efficiency with high speed is the value proposition of the AvaSpec-ULS2048XL-EVO spectrometer.

Unlike many back-thinned CCD spectrometers with two dimensional arrays, the AvaSpec-ULS2048XL-EVO has large, monolithic pixels of 14x500 microns with exceptional efficiency in the UV range, from 200 to 400 nm, and the NIR range, from 950 to 1160 nm.

The instrument has an electronic shutter, which enables integration times as low as 2 microseconds.

To further enhance sensitivity, a detector collection lens is available to improve sensitivity up to 60% when combined with larger core fibers.

Options include an order-sorting filter to reduce second-order effects and purge ports for deep-UV measurements. The AvaSpec-ULS2048XL-EVO comes with a wide range of slit sizes, gratings and may be configured with SMA or FC/PC fiberoptic entrance connectors.

Connection to your PC is handled via a USB3-connection or Ethernet, delivering a scan every 2 milliseconds.

Technical Data

Optical bench	ULS, Symmetrical Czerny-Turner, 75 mm focal length
Wavelength range	200 - 1160 nm
Resolution	0.09 -20 nm, depending on configuration (see table)
Stray light	< 0.5%
Sensitivity	460,000 counts/ μ W per ms int. time
UV quantum efficiency	60% (200-300 nm)
Detector	Back-thinned CCD image sensor 2048 pixels
Signal/noise	525:1
AD converter	16-bit, 1 MHz
Integration time	2 μ s - 20 seconds
Interface	USB 3.0 high speed, 5 Gbps Gigabit Ethernet 1 Gbps
Readout noise	9.8 cnt RMS
Dark noise	4.5 cnt RMS
Dynamic range	13,700
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 3 Digital in, 12 Digital out, trigger, synchronization
Power supply	Default USB power, 700 mA. Or external 12VDC, 360 mA
Dimensions, weight	175 x 127 x 44,5 mm (1 channel), 1180 grams

Timing and Triggering

Sample speed with on-board averaging	2.44 ms/scan
Data transfer speed	2.44 ms/scan (USB3)
Min. Delay / Jitter	0.37 / 25 ns

Detector Specifications

Sensitivity photons/count @ 600 nm	Sensitivity in cts/ μ W per ms int. time	QE (%) @ peak	Signal/noise	Dark noise (counts RMS)	Dynamic range
4	460,000	78%	525:1	5	13,700

Grating Selection Table

Use	Useable range (nm)	Spectral range (nm)	Lines/mm	Blaze (nm)	Order code
UV/VIS/NIR	200 - 1160**	960**	300	300	UA
UV/VIS/NIR	200 - 1100**	900**	300	300/1000	UNA-DB
UV/VIS	200 - 850	520	600	300	UB
UV	200 - 750	250 - 220*	1200	250	UC
UV	200 - 650	165 - 145*	1800	UV	UD
UV	200 - 580	115 - 70*	2400	UV	UE
UV	200 - 400	70 - 45*	3600	UV	UF
UV/VIS	250 - 850	520	600	400	BB
VIS/NIR	300 - 1160**	860**	300	500	VA
VIS	360 - 1000	500	600	500	VB
VIS	300 - 800	250 - 200*	1200	500	VC
VIS	350 - 750	145 - 100*	1800	500	VD
VIS	350 - 640	75 - 50*	2400	VIS	VE
NIR	500 - 1050	500	600	750	NB
NIR	500 - 1050	220 - 150*	1200	750	NC
NIR	600 - 1160	350 - 300	830	800	SI
NIR	600 - 1160**	560**	300	1000	IA
NIR	600 - 1160	500	600	1000	IB

* depends on the starting wavelength of the grating; the higher the wavelength, the bigger the dispersion and the smaller the range to select.

** please note that not all 2048 pixels will be used for the useable range.

Resolution Table (FWHM in nm)

Grating (lines/mm)	Slit size (μm)					
	10	25	50	100	200	500
300	1.40	1.50	2.5	4.8	9.2	21.3
600	0.70 - 0.80*	0.75 - 0.85*	1.2	2.4	4.6	10.8
830	0.42 - 0.48*	0.50 - 0.58*	0.93	1.7	3.4	8.5
1200	0.25 - 0.31*	0.37 - 0.43*	0.52 - 0.66*	1.1	2.3	5.4
1800	0.17 - 0.21*	0.26 - 0.32*	0.34 - 0.42*	0.8	1.6	3.6
2400	0.12 - 0.18*	0.18 - 0.24*	0.26 - 0.34*	0.44 - 0.64*	1.1	2.7
3600	0.09 - 0.12*	0.11 - 0.15*	0.19	0.4	0.8	1.8

* depends on the starting wavelength of the grating; the higher the wavelength, the bigger the dispersion and the better the resolution.

Options

-RS	• Replaceable slit
DCL-UV/VIS-200	• Quartz detector collection lens (200 - 1100 nm)
SLIT-XX	• Slit size, please specify XX = 10, 25, 50, 100, 200 or 500 μm
SLIT-XX-RS	• Replaceable slit with SMA connector, specify slit size XX = 25, 50, 100, 200 or 500 μm. Only available with AvaSpec-ULS2048XL-EVO-RS
SLIT-XX-RS-FCPC	• As SLIT-XX-RS, but with FC/PC connector
OSF-YYY	• Order-sorting filter for reduction of second-order effects, 1 mm thick, please specify YYY= 305, 395, 475, 515, 550 or 600 nm
OSC	• Order-sorting coating with 600 nm long-pass filter for BB (>350 nm) and VB gratings, recommended with OSF-305
OSC-UA	• Order-sorting coating with 350 and 600 nm linear variable filter for UA, VA gratings
OSC-UB	• Order-sorting coating with 350 and 600 nm long-pass filter for UB or BB (<350 nm) gratings
-FCPC	• FC/PC fiber-optic connector