

FESCA-100

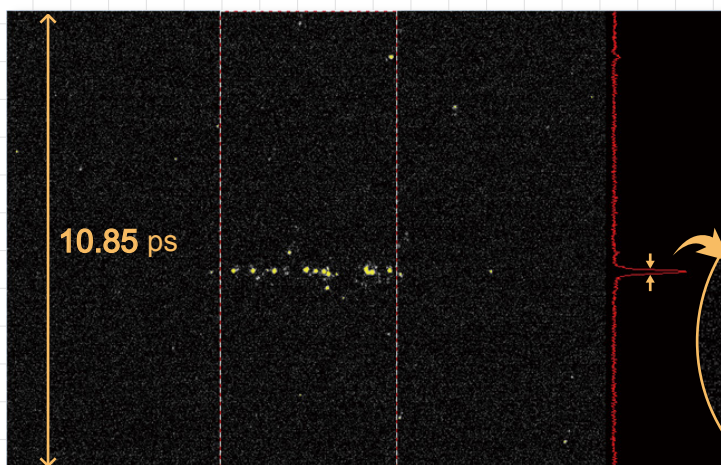
Femtosecond streak camera

C11853-01

NEW

Temporal
resolution

100 fs
(Typ.)



Measurement of single ultrafast phenomena with high temporal resolution 100 femtoseconds.

▲ Streak image and intensity profile of light pulse from Ti:Sapphire laser measured with the FESCA-100

Measurement of light phenomena with 1×10^{-13} second (100 femtoseconds) is possible!

Femtosecond streak camera C11853-01 has two times higher temporal resolution than the conventional streak camera C6138 (FESCA-200).

C11853-01 can measure light pulse phenomena in femtoseconds time period with the real time analyzing.

Ultra fastest optical measuring instrument with direct measuring method.

The streak camera is an ultrahigh-speed detector which captures light emission phenomena occurring in extremely short time periods. In addition to superb temporal resolution, the streak camera captures spatial (or spectral) data simultaneously.

The streak camera is the direct measuring method with the streak tube. Therefore it is possible to measure the phenomena of the single and asymmetry in terms of time.

Feature

- 100 femtosecond temporal resolution
- Simultaneous measurement of light intensity and spatial (wavelength) axis
- Real time analyzing is possible with the dedicated readout system

Application

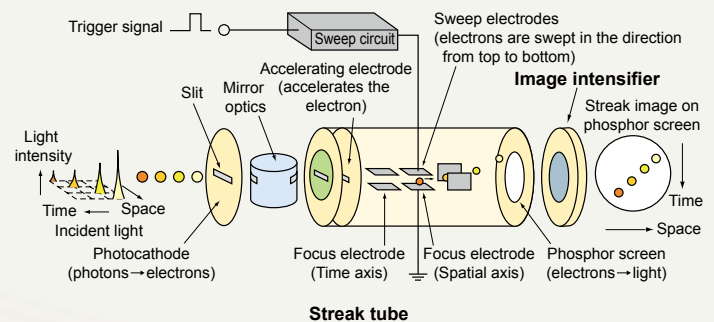
- Measurement of electron bunch for synchrotron and LINAC applications
- Analysis of the ultrastructure of laser waveform along optical waveguides
- Diagnosis of femtosecond laser

Operating principle

The light pulse to be measured is focused onto the photo cathode of the streak tube through the slit, where the photons are converted into a number of electrons proportional to the intensity of the incident light. These electrons are accelerated and conducted towards the phosphor screen, and a high-speed voltage which is synchronised to the incident light is applied.

The electrons are swept at high speed from top to bottom, after which they are bombarded against the phosphor screen of the streak tube and converted to an optical image.

When the light intensity of the streak image is very weak, an image intensifier amplifies the low light level streak image.



System configuration



Specifications

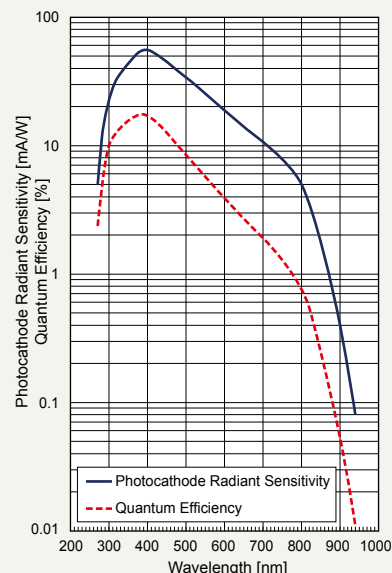
Main unit, Optics, Readout camera, Data analyzer

1 Streak camera

Femtosecond streak camera C11853-01

Type number		C11853-01	
Streak tube	Photocathode	S-20	
	Spectral response characteristic	280 nm to 850 nm	
	Effective photocathode size	0.01 mm×3.0 mm	
	Phosphor screen	Phosphor characteristic P-22, Effective phosphor screen size φ18 mm	
	Image enhancement part	Image Intensifier (I.I.)	
Main unit	Temporal resolution		
	100 fs Typ. at 800 nm < 150 fs FWHM * At the center of window at 800 nm wavelength		
	Sweep range		
	10 ps, 20 ps, 50 ps, 100 ps, 200 ps, 500 ps, 1 ns		
	Trigger jitter		
	less than ±20 ps		
	Trigger delay		
	Approx. 30 ns at 10 ps range		
	Maximum sweep repetition frequency		
	100 Hz		
	Operation Mode		
	FOCUS/OPERATE		
	Streak trigger input	Maximum input voltage	± 5 V/50 Ω
		Trigger level	± 4 V
	Gate mode		
NORMAL/GATE (only GATE when OPERATE)			
Gate method			
II gate, Shift gate			
Maximum Gate repetition frequency			
100 Hz			
Gate delay time			
1.5 μs			
Interface			
USB 2.0			
Line voltage, Power consumption	Power supply	AC 100 V to AC 240 V	
	Frequency	50 Hz/60 Hz	
	Power consumption	Approx. 120 VA	
Operation environment	Ambient operation temperature	0 °C to +40 °C	
	Ambient storage temperature	-10 °C to +50 °C	
	Ambient operating humidity	30 % to 80 % (With no condensation)	
	Ambient storage humidity	90 % or less (With no condensation)	

Spectral response of the streak tube (Typ.)



2 Input optics

Input optics A6856

Type number	Mirror optics A6856
Spectral transmittance	200 nm to 1600 nm
Image magnification	1 : 1
Effective F number	4.0

3 Output optics

Output optics 50:35

Type number	A11695-11
Image multiplication ratio	1:0.7 (50 mm:35 mm)
Effective F value	2.0
Lens mount	F-mount
Corresponding camera	ORCA [®] -Flash4.0 V3 Digital CMOS camera C13440-20CU

4 Readout camera

ORCA-Flash4.0 V3 Digital CMOS camera C13440-20CU

Type number	C13440-20CU
Working area	1344(H)×1016(V)
Cell size	6.5 μm(H)×6.5 μm(V)
Effective area	8.74 mm(H)×6.60 mm(V)
Working area on phosphor screen	17.48 mm(H)×13.2 mm(V)
Exposure time	1 ms to 10 s
Readout speed	> 100 frames/s (Camera Link, 1344×1016)
A/D converter	16 bit

5 Data analyzer

Data analyzer

Type number	C6760-60	C6760-61
Supported camera	ORCA-Flash4.0 V3 Digital CMOS camera C13440-20CU	
Component	PC	
	Liquid crystal display	
	Frame grabber board	None
	Cables	
System	Windows 10 (64 bit)	
Interface	Camera Link	USB 3.0
Frame rate	100 frames/second or more (*)	60 frames/second or more (*)

*In case of working area 1344(H)×1016(V).
Depends on setting of exposure time, subarray and binning.

<Control & readout software HPD-TA> *Included in the data analyzer.

Data acquisition	Live mode, analog integration Photon counting, Sequence recording
Device control	Streak camera, Readout camera, Spectrometer, Delay units
Profile functions	Real-time display, min/max, FWHM, Gauss fit
Data corrections	Background, Sensitivity, Curvature, Jitter
Axis calibration	Channel, Time, Wavelength
File formats (images)	Binary (up to 32 bit), TIFF, ASCII
File format (profiles)	ASCII

Specifications

Option

Delay unit C1097-05

A jitter-free delay unit that can be used for single-sweep.

Type number	C1097-05
Variable delay range	0 ns to 31.96 ns
Delay setting range	30 ps, 60 ps, 120 ps, 250 ps, 500 ps, 1 ns, 2 ns, 4 ns, 8 ns, 16 ns
Minimum delay time	Approx. 12 ns
Maximum input voltage	30 V
Interface	USB 2.0
Power supply	AC 100 V to AC 240 V
Power consumption	Approx. 30 VA
Dimensions/weight	(W)215 mm×(D)350 mm×(H)102 mm/3.2 kg

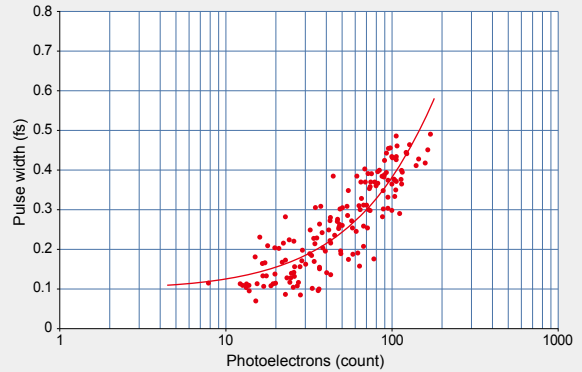
Operating environment

Power supply	AC100 V to AC240 V, 50 Hz/60 Hz
Power consumption	Approx. 100 VA
Operating temperature	0 °C to +40 °C
Operating humidity	30 % to 80 % (with no condensation)

The temporal resolution of FESCA-100

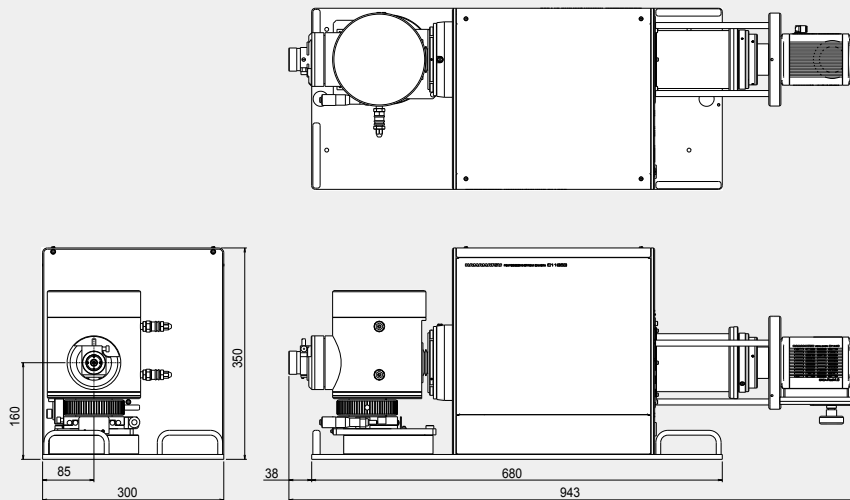
The temporal resolution of FESCA-100 can be limited depending on input light intensity.

The photoelectron from photocathode spread spatially, each photoelectron bound back while traveling inside streak tube if a number of photoelectron is increased. Thus, the temporal resolution can be limited.



Dimensional outline (unit:mm)

FESCA-100 Femtosecond streak camera C13410 Main unit (Approx. 30 kg)



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