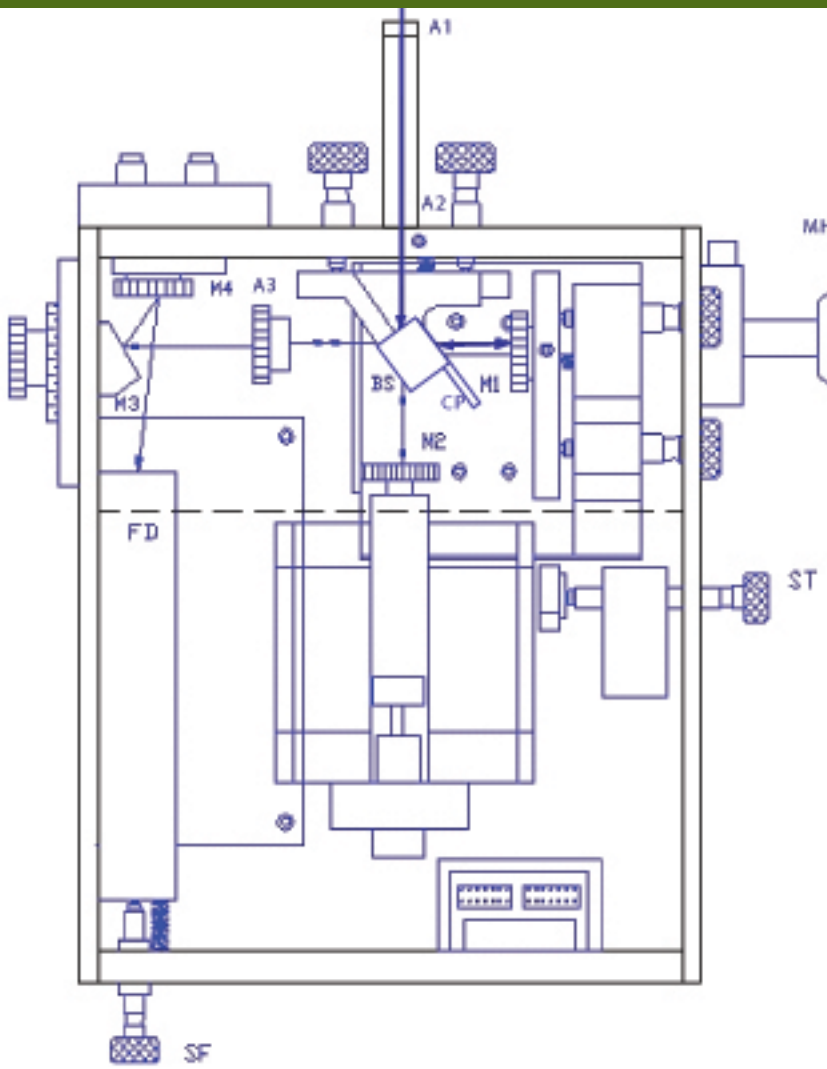
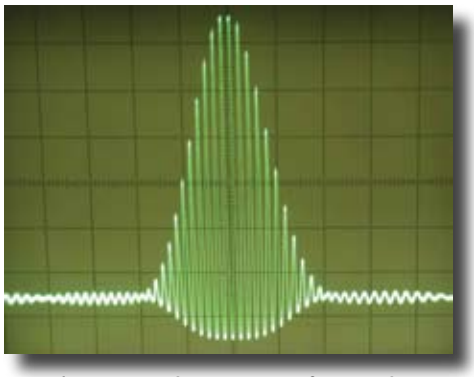
Reef Femtosecond Autocorrelators

Pulse Measurement Systems



INTERFEROMETRIC
Autocorrelation



Autocorrelation trace for mode-locked Ti:sapphire laser pulse.

The autocorrelation technique is the most common method used to determine laser pulse width characteristics on a femtosecond time scale. Del Mar Photonics autocorrelators have been specifically designed to measure the width of pulses from femtosecond lasers. For the measurement of laser pulses the only other item you need is an oscilloscope. Although not necessary, a storage oscilloscope is convenient when operating in the interferometric mode since it allows you to calibrate the display directly using the interference fringes that make up the pulse envelope. Easy to setup and align, our real time scanning autocorrelator is an invaluable tool for any femtosecond lab.

Scanning Real Time Autocorrelator

- USB PC interface
- PC based control software
- Horizontal input polarization
- Control Unit
- Simple Setup
- Variable Delay line
- Focusing mirror
- Collinear two photon absorption (TPA)

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The basic optical configuration of the autocorrelator is similar to that of an interferometer. An incoming pulse train is split into two beams of equal intensity. An adjustable optical delay is inserted into one of the arms. The two beams are then recombined within a nonlinear material (semiconductor) for two photon absorption (TPA). The incident pulses directly generate a nonlinear TPA photocurrent in the semiconductor, and the detection of this photocurrent as a function of interferometer optical delay between the interacting pulses yields the pulse autocorrelation function. The TPA process is polarization-independent and non-phasematched, simplifying alignment. The two beams propagate in a collinear fashion (interferometric configuration). This configuration results in an autocorrelation signal that is on top of a constant background. This background is produced by TPA photocurrent resulting from the portions of the scan during which the pulses are not overlapped.

	Reef-RT
Type	Scanning Real-Time Autocorrelator
Detection Method	Diode with Two Photon Absortption
Pulse Width	10fs - 6ps
Input Pulse Repetition Rate	10kHz to CW Mode-Locked
Minimum Average Power	1mW at 100MHz
Scan Nonliearity	<1%
Scan Rate, (variable)	0.1 - 20Hz
Input Polarization	Linear-Horizontal (vertical optional)
Wavelength Range	700-1000nm (other ranges optional)
Readout	External Oscilliscope
Dimensions (mm)	Optical Unit: 170 x 134 x 105 Control Unit: 250 x 190 x 80
Weight (kg)	4
Power Supply	100-110V/60Hz (220V/50Hz)

Additional Pulse Measurement devices include the Reef-SS single shot autocorrelator and the Avoca-30/120 phase measurement systems.

The single shot autocorrelator is similar to the multiphase system but it will produce an autocorrelation trace at low input repetition rate. Phase measurement with Spectral Interferometry for Direct Electric Field Reconstruction (SPIDER) is a method for characterizing ultrashort optical pulses. SPDIER not only allows you to measure the pulse duration, but also allows the extraction of the spectral phase from a femtosecond pulse.

	Reef-SS	SPIDER	
		Avoca-30	Avoca-120
Type	Single Shot Autocorrelator	Spectral Analysis	
Pulse Width	20-500fs	10-30fs	30-120fs
Input Pulse Repetition Rate Single Shot Multipe Shot	 1-10Hz >10Hz	Single Shot 1kHz to CW Mode-Locked	
Input Pulse Energy at: 1-10Hz >1kHz >10MHz or Minimum Power	 >500nJ >50nJ >50pJ	Single Shot: 0.01mJ Minimum Average Power: 100mW at 100MHz	
Input Polarization	Linear-Horizontal (vertical optional)	Linear-Horizontal (vertical optional)	
Wavelength Range	700-1000nm (other ranges optional)	740-880nm (other ranges optional	
Readout	CCD	CCD	
PC Interface	USB	USB	
Dimensions (mm)	320 x 160 x 160	600 x 350 x 180	
Weight (kg)	3.5	9	
Power Supply	From PC Interface	From PC Interface	

Reef-SS Features:
- Non-collinear SHG in non-linear crystal
- Input polarization linear horizontal (vertical – optional)
- Readout CCD
- Power supply from PC
- USB PC interface
- 320x160x160 mm

Avoca-30/120 Features
- Linear input polarization
- Readout CCD
- Power supply from PC
- USB PC interface
- 320x160x160 mm

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4119 Twilight Ridge | San Diego, CA 92130 | Tel::(858) 876-3133 Fax::(858) 630-2376
E-mail::sales@dmphotonics.com URL::www.dmphotonics.com