

CHAPTERS

Frequency Stabilization

Atomic Force Microscope

Optical Tweezers

Optical Delay Line

Supercontinuum

SECTIONS

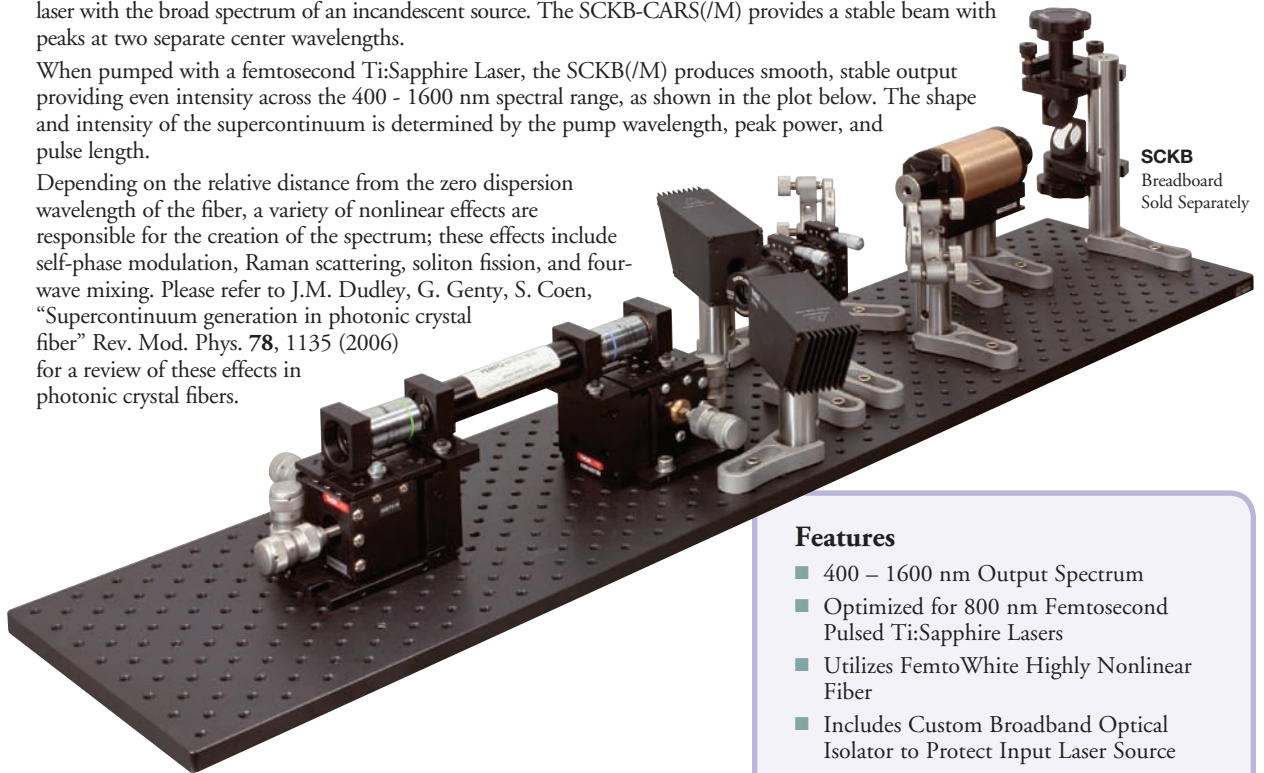
Supercontinuum

Supercontinuum Generation Kit

Thorlabs' Supercontinuum Generation Kits use FemtoWhite highly nonlinear fibers to spectrally broaden femtosecond pulses near 800 nm. The SCKB(M) produces an output beam that combines the high power and spatial coherence of a laser with the broad spectrum of an incandescent source. The SCKB-CARS(M) provides a stable beam with peaks at two separate center wavelengths.

When pumped with a femtosecond Ti:Sapphire Laser, the SCKB(M) produces smooth, stable output providing even intensity across the 400 - 1600 nm spectral range, as shown in the plot below. The shape and intensity of the supercontinuum is determined by the pump wavelength, peak power, and pulse length.

Depending on the relative distance from the zero dispersion wavelength of the fiber, a variety of nonlinear effects are responsible for the creation of the spectrum; these effects include self-phase modulation, Raman scattering, soliton fission, and four-wave mixing. Please refer to J.M. Dudley, G. Genty, S. Coen, "Supercontinuum generation in photonic crystal fiber" Rev. Mod. Phys. **78**, 1135 (2006) for a review of these effects in photonic crystal fibers.



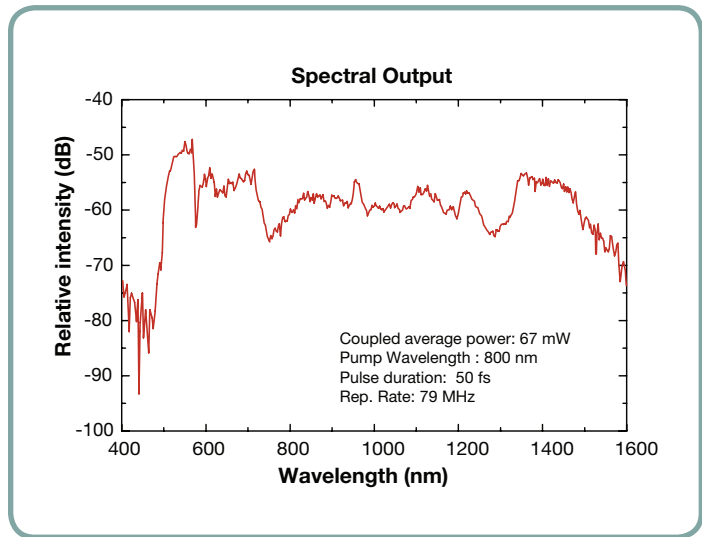
Features

- 400 – 1600 nm Output Spectrum
- Optimized for 800 nm Femtosecond Pulsed Ti:Sapphire Lasers
- Utilizes FemtoWhite Highly Nonlinear Fiber
- Includes Custom Broadband Optical Isolator to Protect Input Laser Source
- CARS Version Available

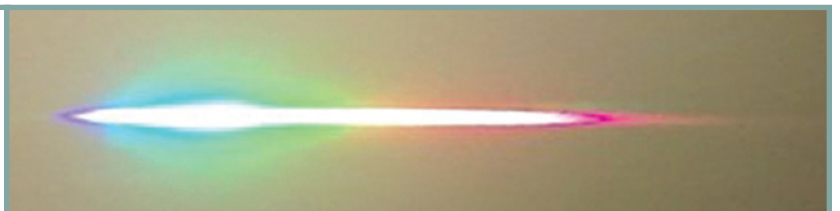
Major Kit Components*

- Nonlinear Fiber Cell (SCKB-FW800 or SCKB-FWCARS)
- Custom Free Space Isolator (See Page 927)
- MicroBlock 3-Axis Stage (MBT616D, See Page 545)
- Olympus Objectives (RMS20X and RMS40X, See Page 960)
- Periscope Assembly (RS99, See Page 262)
- Polaris™ Ultra Stable Mirror Mounts (POLARIS-K1, See Pages 244 - 246)
- Glan-Laser Calcite Polarizer (GL10-B, See Page 902)
- Mounted Achromatic Half-Wave Plate (AHWP05M-980, See Page 916)
- Beam Traps (BT610, See Page 1513)

*All items shown in the picture are included, except for the breadboard.



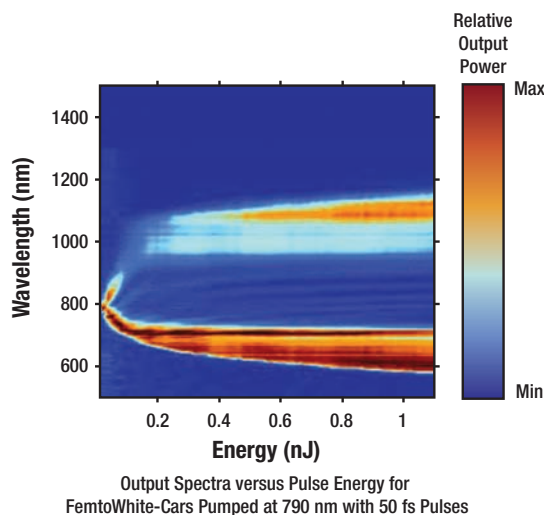
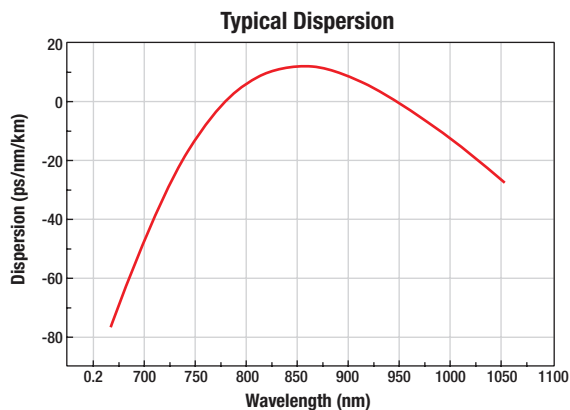
Dispersed Supercontinuum Generated with Coherent's Chameleon Ti:Sapphire Laser and the SCKB Supercontinuum Generation Kit.



The SCKB-CARS(M) contains a fiber with two zero-dispersion wavelengths for generation of an output with two distinct peaks, suitable for Coherent Anti-Stokes Raman Scattering applications. When pumped at a wavelength between the two zero-dispersion wavelengths, more than 99% of the light is converted into two spectral peaks.

The peak wavelengths are a result of the two zero-dispersion wavelengths that are determined solely by the design of the nonlinear PCF fiber. Due to this, the output wavelength is insensitive to changes in pump wavelength, pulse energy, pulse width, and spectral bandwidth. However, the relative intensity of the two peaks can be adjusted by varying of the pump wavelength.

For more information, please see K. M. Hilligsøe, T. V. Andersen, H. N. Paulsen, C. K. Nielsen, K. Mølmer, S. Keiding, R. E. Kristiansen, K. P. Hansen, and J. J. Larsen, "Supercontinuum Generation in a Photonic Crystal Fiber with two Zero Dispersion Wavelengths" Opt. Express **12**, 1045 (2004).



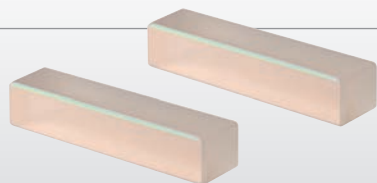
ITEM #*	\$	£	€	RMB	DESCRIPTION
SCKB	\$ 14,490.00	£ 10,432.80	€ 12,606.30	¥ 115,485.30	Supercontinuum Generation Kit
SCKB/M	\$ 14,490.00	£ 10,432.80	€ 12,606.30	¥ 115,485.30	Supercontinuum Generation Kit - Metric
SCKB-CARS	\$ 16,200.00	£ 11,664.00	€ 14,094.00	¥ 129,114.00	CARS-Suitable Supercontinuum Generation Kit
SCKB-CARS/M	\$ 16,200.00	£ 11,664.00	€ 14,094.00	¥ 129,114.00	CARS-Suitable Supercontinuum Generation Kit - Metric

*Please contact our technical support group if you wish to order the kit preassembled.

Have you seen our...

Dispersion-Compensating Optics

Mirror Sets

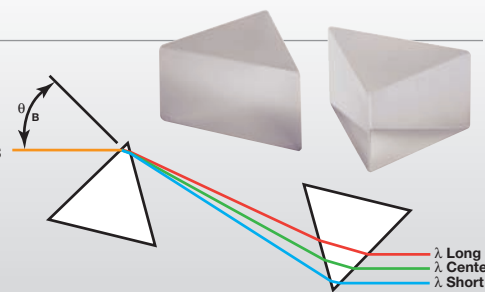


- ◆ Operating Wavelength Range: 700 - 1000 nm
- ◆ Reflectivity: >99.5%
- ◆ Dispersion per Reflection (@ 800 nm): -175 fs²

Thorlabs' dispersion-compensating mirror sets are specifically designed so that longer wavelengths experience larger group velocity delay than shorter wavelengths, thereby negating the pulse broadening caused by other optical elements.

See page 780

Prism Pairs



- ◆ Group Velocity Dispersions (@ 800 nm):
 - CaF₂: -5 fs²/cm
 - Fused Silica: -16.5 fs²/cm
 - SF10: -97.5 fs²/cm
 - N-SF14: -113.5 fs²/cm

To achieve the specified Group Velocity Dispersion while maximizing transmission, light should be incident on the first prism at Brewster's Angle (θ_B). As shown in the schematic, the first prism is used to separate the various wavelength components. Then, a second prism is positioned such that the various wavelengths of refracted light will propagate parallel to each other upon exiting the second prism but with a wavelength-dependent position referred to as spatial chirp.

See page 872