

## White Light Continuum Generator

Ready to jibe? If you are not familiar with this sailing term see comment at the end of the brochure. Del Mar Photonics white-light continuum generator, Jibe, is a powerful coherent light source. Due to its amazing wide spectral band, the white-light continuum is being applied in different areas such as optical parametric amplification, optical metrology, optical coherence tomography, materials characterization, etc.

The white-light continuum is naturally suitable for ultrafast time-resolved spectroscopy. Since it covers broad spectrum, a CCD detector can be used to record it at once. Since it originates from a subpicosecond laser pulse, its pulse width is subpicosecond too. Therefore, pump-probe measurement scheme can be successfully implemented.

The white-light continuum is generated by focusing a small fraction of the output from a femtosecond laser into transparent materials such as water, sapphire,  $\text{CaF}_2$ , etc. As a result of the interplay between self-focusing and ionization of the material, self-modulation of the short pulse occurs which produces a substantial broadening of the spectrum (continuum generation). Most of the energy is centered around the fundamental frequency of the femtosecond laser, but a broad intensity distribution of the light generated covers the wavelengths from 450 nm to 900 nm (in sapphire, Figure 1), or from 350 to 800 nm (in  $\text{CaF}_2$ ), and equally wide wavelength range that extends from the fundamental frequency into near IR.

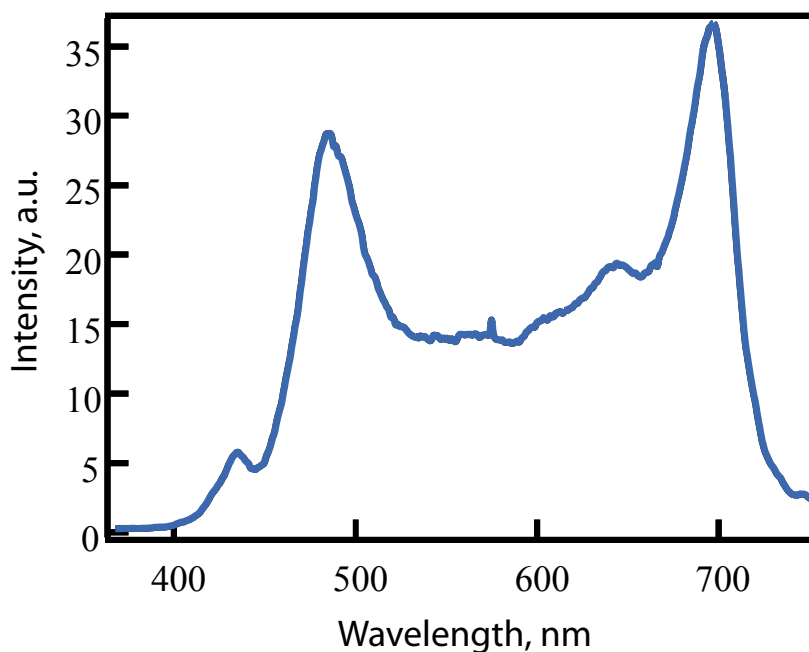


Figure 1. Spectrum of white light continuum.



During the propagation through transparent medium, red wavelengths of the white-light pulse travel faster than blue wavelengths. This phenomenon is called group velocity dispersion and such a pulse where the red wavelengths are in the leading edge of the pulse and the blue wavelengths are in the trailing edge is said to be chirped. Typically, the white light continuum is substantially chirped (ca. 0.6 ps between 350 and 900 nm) due to dispersion of the sapphire or CaF<sub>2</sub> crystals, and collimating optics (Figure 2). When used for time-resolved spectroscopy, this chirp is usually been taken care of by the data acquisition program to produce chirp-free transient spectra.

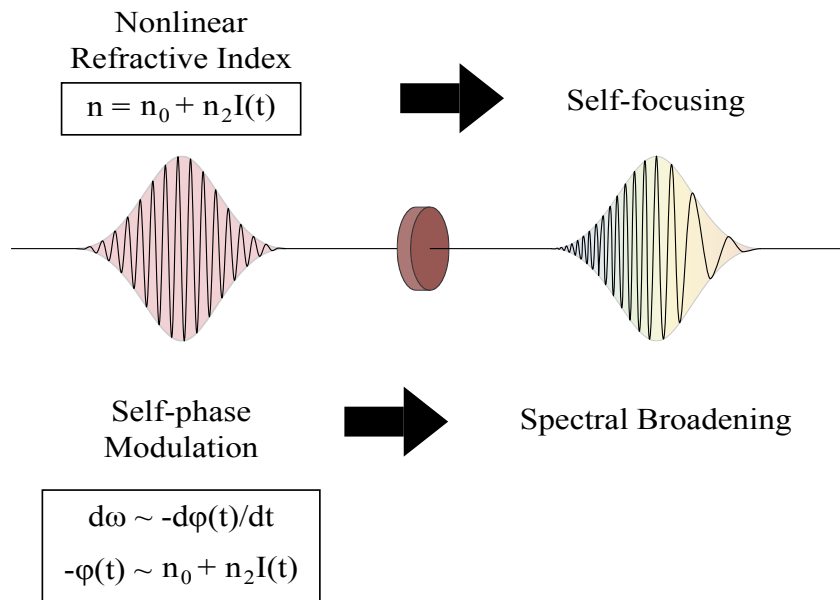


Figure 2. White Light Continuum Generation

	Jibe S	Jibe C
Spectral Coverage	450-900 nm	350-750 nm
Nonlinear material	Sapphire plate	CaF <sub>2</sub>



Where Del Mar Photonics product's names come from? Del Mar means "by the sea", and Photonics is all about optical waves. So we decided to choose terms popular in surfing and sailing communities. Our femtosecond lasers, amplifiers and system are named after popular surf breaks around the world, and many other products named after sailing and nautical terms. A JIBE is when a sailing boat turns its stern through the wind, such that the direction of the wind changes from one side of the boat to the other.

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