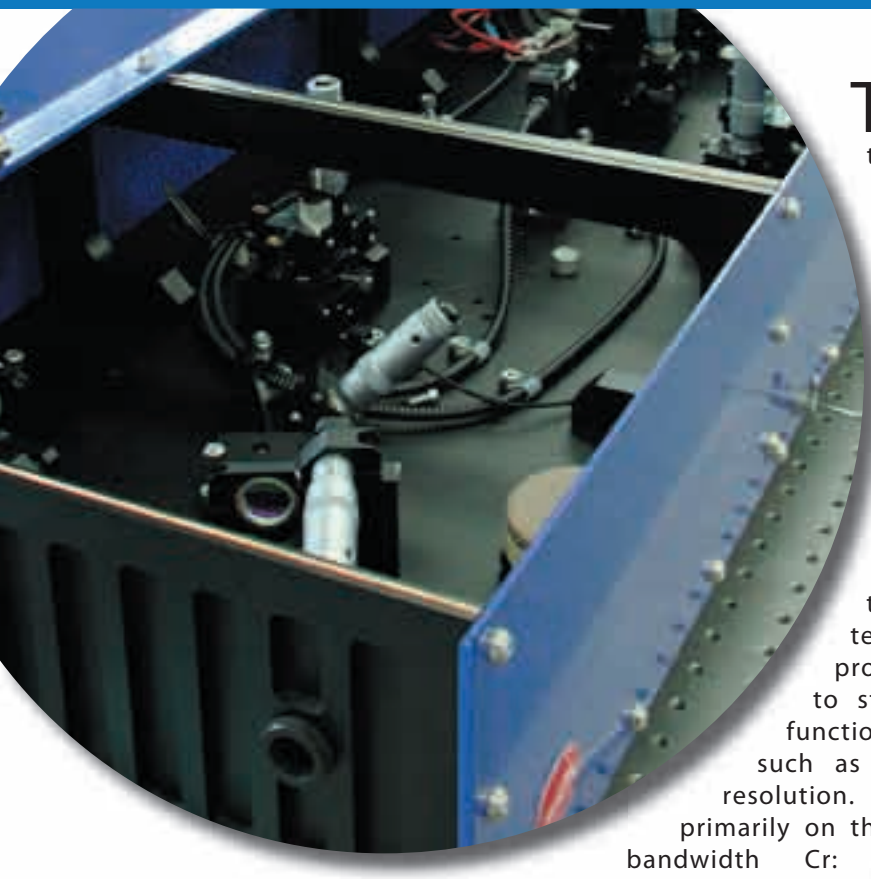
# Mavericks Cr:forsterite Lasers

## 65 Femtosecond Near IR Oscillators



The Mavericks-65 Cr:forsterite laser is tunable over wavelengths from 1230 to 1270 nm, making it ideal for imaging, condensed matter and biomedical applications. These wavelengths are less damaging to biological samples than the shorter wavelengths produced by Ti:sapphire and other femtosecond lasers. This allows in vivo imaging of cells and other biological samples. With wavelengths above 1200nm it is possible to image tissue samples that are non transparent at shorter wavelengths. Cr:forsterite lasers are an attractive alternative to other ultrafast laser mediums for optical coherence tomography (OCT) and other imaging techniques. OCT employs the coherent properties of the Cr:forsterite light source to study the morphological structures and functions of biological samples on micron scale, such as cellular development, with very high resolution. Because the axial resolution depends primarily on the bandwidth of the light source, high bandwidth Cr:forsterite lasers can give superior image resolution and imaging depths.

With high bandwidth and short pulse duration Cr:fosterite femtosecond lasers are being used in a growing number of applications, including ultrafast photochemistry, photophysics, photoablation, micromachining and other areas.

Mavericks-65 Cr:forsterite laser system is a Kerr lens mode-locked femtosecond laser producing ultrafast pulses in the near infrared region centered at 1250 nm. The Cr:forsterite gain medium is pumped by a 6-10 W Ytterbium fiber laser that is included with the Mavericks ultrafast oscillator, giving an all solid state laser system that is an affordable source of femtosecond pulses in the 1230 - 1270 nm region.

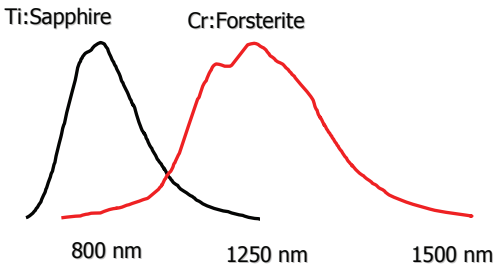
The pump laser is included in the Mavericks-65 making it a complete source of femtosecond pulses that is available at a price well below that of competing systems.

- Center wavelength of 1250 nm
- Tunable from 1230—1270 nm
- Sub 65 femtosecond pulses
- Fiber pump laser included
- Amplified systems available
- High resolution Imaging
- Broadband absorption
- Material processing

DEL MAR VENTURES

www.femtosecondsystems.com

Frequency doubling can produce wave lengths in the visible at ~630 nm and super-continuum generation produces pulses in the infrared and visible range. A wide range of wavelength conversion modules are available from Del Mar Ventures. The combination of an Ytterbium fiber laser and a Cr:forsterite oscillator allows the Mavericks-65 to produce sub-65 femtosecond pulses at a repetition rate of 76-120 MHz and deliver power between 180 mW and 250 mW. Pulse energies are on the order of 3 nJ.



Cr:f lasers offer an attractive alternative to Ti:s for many applications. Frequency doubling reaches the 600-650 nm visible range.

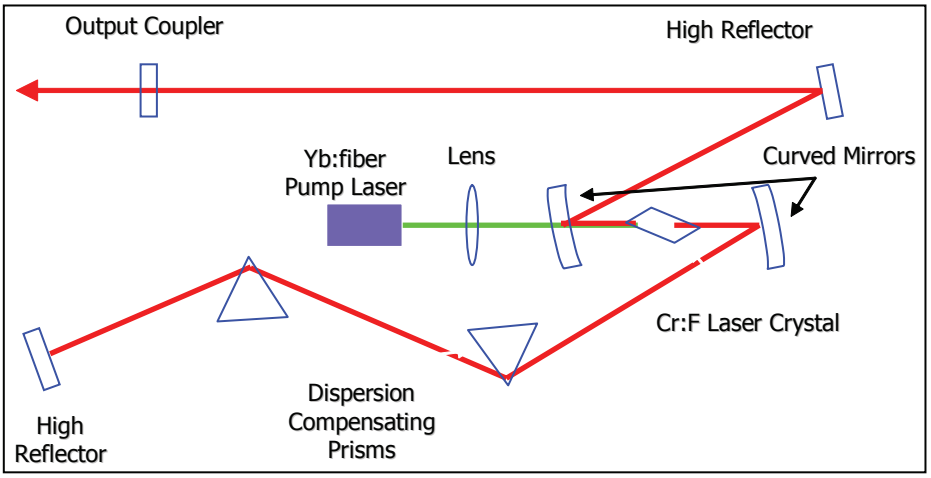
The Mavericks-65 is available with complete installation and training from a Del Mar Ventures engineer or as a pre-aligned and tested customer installed kit. Each system can be custom built to meet customer needs and specific applications. Systems can be coupled with multipass or regenerative amplifiers to give complete high power systems for material processing and other high energy applications.

The femtosecond pulse duration is very short making even low energy pulses produce extremely high peak power. This limits low energy threshold thermal and mechanical side effects. The high peak power of the femtosecond pulse allows multiple photons to be absorbed, creating an electron plasma in the material. As the plasma expands material is ejected from the target area. Because this material ablation is not a thermal effect, cavitations and laser induced pressure transients are reduced.

Femtosecond lasers are used to produce micro-gratings and multi-dimension periodic nano-structures in a variety of materials including dielectrics, semiconductors, metals, plastics and resins. Multiphoton absorption allows for processing of materials that are not very photosensitive. Below the ablation threshold the high pulse energies introduce structural changes resulting in a change in the index of refraction of the material. All optical wave guides and photonic devices are manufactured using these techniques.

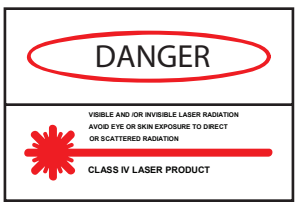
Complete amplified terawatt Cr:forsterite systems are also available, delivering peak output power from 1-2 terawatts at 1250 nm. Typical pulse duration for the Terra-Watt system is 60 fs. Pulse energies are over 120 mJ per pulse.

## CAVITY SCHEMATIC




## PRODUCT FEATURES

| Parameter | Mavericks-65P |
|---|---|
| Pulse Width (FWHM) | <65 fs |
| Tuning Range | 1230-1270 nm |
| Output Power | 180-250 mW* |
| Pump Laser | Ytterbium Fiber Laser |
| Pump Power | 6-10 W |
| Repetition Rate | 120/76 MHz |
| Output Stability, Typical | <2% RMS |
| Beam Quality | $TEM_{00}$ |
| Polarization | Linear (Horizontal) |
| Beam Divergence | <2 mrad |
| Crystal Cooling | Thermoelectric |

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