

# Synergy™

Ultra-Broadband Sub-10 fs  
Ti:Sapphire Oscillator

**mks** | Spectra-Physics

The Synergy family is a range of Ti:sapphire oscillators generating pulse durations from sub-10 to sub-20 fs. With a large variety of models available on the market, there is a suitable Synergy oscillator for your ultrafast application with average powers ranging from 500 mW to 1.2 W and peak powers of up to MW level. Low cost of ownership is ensured with superior efficiency at lower pump power levels as compared to competitive systems.

## Reliability and Ultra Low Noise

At the heart of every Synergy, the Dispersive Mirror (DM) based oscillator cavity rests on a thermally-stabilized base plate. Highest quality ultra-low loss optics and compact mechanical components offer unsurpassed pulse duration, power levels and efficiency. The Extra Cavity Dispersion

Control (ECDC) unit guarantees ultrafast pulses arrive at the output undistorted. The DM cavity exhibits rock-solid passive stability, ultra-low noise and superior performance due to the radical reduction in the number of components.

## High Performance and Flexibility

For applications where shortest laser pulses or highest peak power are required, Spectra-Physics offers the unique Synergy M1 system. Our proprietary DM technology enables the M1 models to sustain the largest bandwidth with a near Gaussian shape and the highest level of peak power. To ensure this outstanding performance over its lifetime, Spectra-Physics is dedicated to providing the highest level of customer care for your Synergy ultrafast oscillator.

## The Synergy Advantage

- Ultrafast pulses
- Extreme peak power
- Dispersive mirror cavity
- Ultra low noise
- Ease of operation
- Outstanding pulse quality



## Applications

- Amplifier and OPCPA seeding
- THz spectroscopy and imaging
- Optical coherence tomography
- Ultrafast spectroscopy
- Pump-probe measurements
- Materials processing
- Two-photon polymerization
- Thin-film metrology
- Nonlinear optics
- Multiplex CARS
- Surface enhanced HHG

## Synergy Specifications<sup>1, 2, 7</sup>

	Synergy PRO <sup>(3)</sup>	Synergy M1 <sup>(4)</sup>	Synergy 20 <sup>(3)</sup>	Synergy 20 UHP <sup>(4)</sup>
Pulse Duration	<10 fs	<10 fs	<20 fs	<20 fs
Bandwidth (FWHM)	>100 nm	>100 nm	>40 nm	>40 nm
Average Power	>500 mW	> 1000 mW	>500 mW	>1200 mW
Pulse Energy	>6.6 nJ	>13.3 nJ	>6.6 nJ	>16 nJ
Peak Power	>660 kW	>1250 kW	>330 kW	>800 kW
Central Wavelength (standard) <sup>5</sup>	800 ±10 nm			
Repetition Rate (standard) <sup>5</sup>	75 MHz			
Noise (9 Hz– 3 MHz)	<0.05% rms			
Power Stability <sup>3</sup> (peak-to-peak) <sup>6</sup>	±1%			
Beam Diameter (1/e <sup>2</sup> )	<2 mm			
Beam Divergence	<2 mrad			
M <sup>2</sup>	<1.3			
Polarization	>100:1 (horizontal)			
Femtolock™ 2	Optional			

1. Due to our continuous improvement program, all specifications are subject to change without notice.

2. Specifications apply to standard wavelength and standard repetition rate.

3. Pumped with Millennia® eV™ 5.

4. Pumped with Millennia eV 10.

5. For other values, please contact Spectra-Physics.

6. Measured over two hours after 30 minute warm up at constant environmental conditions.

7. The Synergy is a Class IV – High Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to direct and reflected beams. Diffuse as well as specular reflections can cause severe skin damage.

## Synergy Dimensions

