RAEA Series: Unprecedented Performance from a Single-Box Ultrafast Amplifier

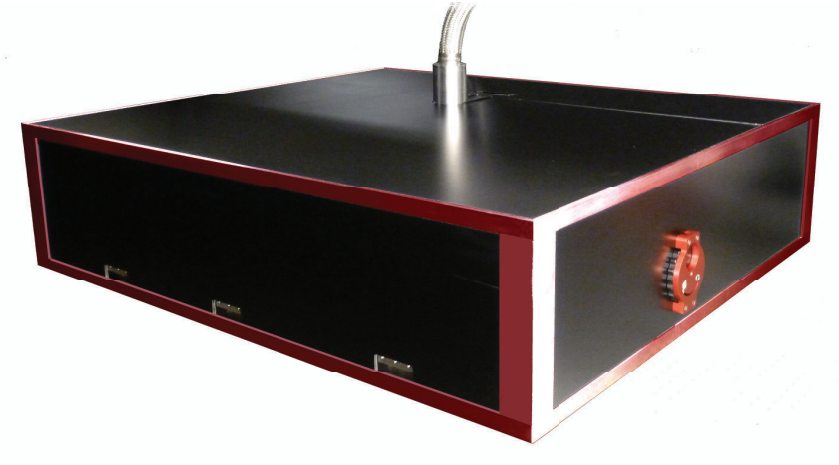
Ultrafast Ti:sapphire amplifier- 20W average power over a wide range of repetition rates

Applications

- High harmonic generation (HHG)
- Frequency conversion, OPA pumping
- Materials research
- Femtochemistry
- Laser particle acceleration
- Spectroscopy
- THz generation
- Ultrafast Imaging
- Pump probe experiments

Features

- Cryogenic cooling enables highest average powers on the market
- Average power 20W from a single box configuration
- Pulse energies up to 20 mJ
- Software based tuning of repeition rate
- Pulse duration of < 35 or < 25 fs
- Excellent beam quality: M^2 typically 1.1-1.2
- Intuitive control GUI including wavelength, bandwidth, power, and repetition rate control with integrated diagnostics
- One-box configuration with integrated pump lasers and oscillator
- Combination of clean (low pedestal), short pulses and high energies gives higher peak intensities to drive nonlinear processes



Preliminary Specifications

RAEA ™ sub-25 fs, single-box amplifier is a fully engineered and integrated commercial source based on a single rugged optomechanical platform. It employs KMLabs' patented cryogenically-cooled amplifier technology, allowing for a continuous trade-off between pulse energy and repetition rate flexibility, optimizing the laser to utilize its full output power while also optimizing pulse energy for the experiment. It offers often more than an **order of magnitude** increase in experimental throughput.

RAEA Unique Features

Optimized for pumping HHG using KMLabs' XUUS™ extreme UV ultrafast source

Systems Built to Perform

Sealed modular components for plug and play upgradeability

- Hands-free, software-based operation including repetition rate adjustments, and real-time power and spectrum monitoring and tuning
- Next-generation oscillator
- Unprecedented output power for a single-stage Ti:sapphire system
- 2nd-generation Permacell™ cryocell technology for improved performance and temperature-cycling capabilities, and ultra-low maintenance

The Cryo-cooling Advantage

Cooling a Ti:sapphire crystal to 50-80K results in greater than a 200x decrease in thermally-induced distortions in the beam being amplified. At 90W pump power, the thermal lens of several meters is easily managed, while a room temperature crystal would exhibit a catastrophic < 1 cm thermal lens effect.

This capability underpins KMLabs' unique ability to offer versatile repetition rate and power-scalable systems.

KMLABS™ inc.
LEADING IN ULTRAFAST

RAEA Preliminary Specifications

RAEA: Single box, single stage Ti:sapphire amplifier	
Tunable Repetition Rate Ranges	1-5 kHz, 5-10 kHz, 5-30 kHz, 30-200 kHz
Average Power	up to 20 W
Center Wavelength	790 +/- 10 nm
Pulse Width	<25fs or <35 fs *measured using FROG*
Spatial Mode	TEM_{00}, M^2<1.25
Pulse Energy Stability	<0.5% or <1% RMS *measured single shot over 100,000 shots*
Power Stability	<0.5% RMS over 24 hours[2], <0.5% / °C
Pointing Stability	<10 µrad RMS over 24 hours[2], <10 µrad / °C
ns Pre Pulse Contrast	>250:1
ns Post Pulse Contrast	>100:1
Sub ps Contrast	>500:1
Footprint (LxW)	50"x42"
Environmental Conditions	Temperature: 15-30C Stabilized to +/- 3 °C Humidity: <50%

RAEA Example Performance Data at 10 kHz