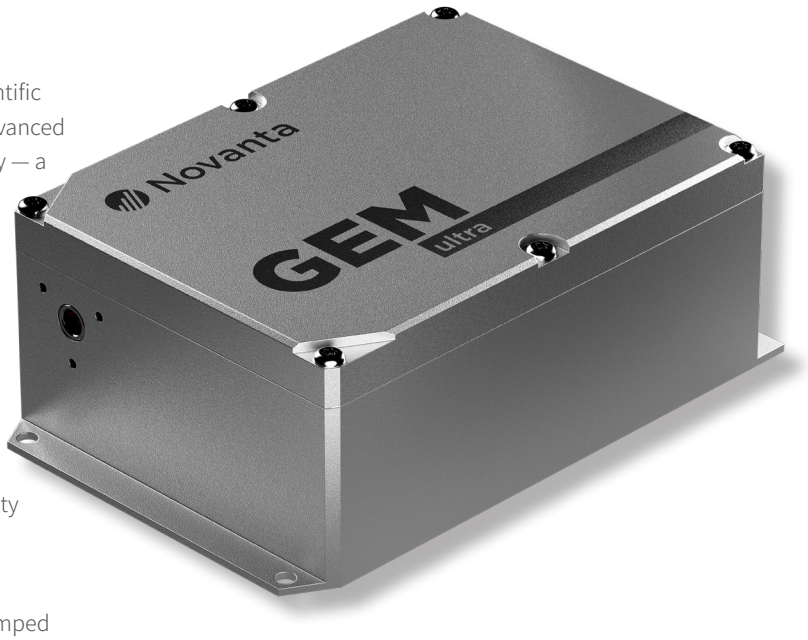
Novanta

GEMultra DPSS CONTINUOUS WAVE LASER

RE-DEFINING STABILITY, FLEXIBILITY & PERFORMANCE

Novanta continues to drive innovation, delivering substantial value to the Life Sciences, Semiconductor, and Industrial Scientific sectors. The new GEMultra laser represents the pinnacle of advanced photonic design, featuring proprietary ULTRALOQ™ technology — a cutting-edge material system engineered to maximize the stability and robustness of laser systems while supporting automated build processes.



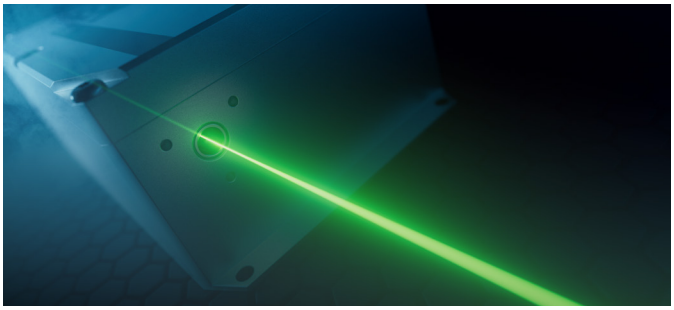
The NEW GEMultra platform offers:

- Enhanced nominal power of 2 Watts
- Onboard variable optical attenuator, with up to OD2 attenuation levels while maintaining peak performance
- Highly stabilized laser output across wide operating and ambient temperatures, ensuring unparalleled power stability
- Unparalleled uptime with extended reliability and quick, effortless integration

Novanta features an impressive line-up of advanced diode pumped solid state lasers for integration into OEM instruments and analytical systems.

BUILT WITH ULTRALOQ™ TECHNOLOGY FOR ACCURACY, RELIABILITY, & EASY INTEGRATION

GEMultra overcomes common performance challenges found in most DPSS 532 nm lasers. Unstable power output caused by variable operating temperatures, excessive cooling requirements that complicate integration, and increased RMS noise that result in false positives and reduced measurement resolution are no longer an issue.



GEMultra is built with Novanta's proprietary ULTRALOQ™ technology ensuring extremely high stability of the optomechanical design. This increased stability ensures constant performance specifications at extreme operating temperatures or through variable ambient temperature conditions.

The onboard Variable Optical Attenuator (VOA) featured in every GEMultra brings flexibility in output power management to meet specific application needs. GEMultra is able to operate across a broad range of output powers whilst maintaining its performance specifications, removing complexity and reducing integration costs.

UNIQUE FEATURES

Stable Performance – "Industry-leading power and noise stability, enabled by integrated VOA and ULTRALOQ™ technology, delivers over 8x improved RMS noise specification compared to the standard GEM platform. This results in increased resolution and the elimination of false positives

OD2 Attenuation range – Integrated power control via a Variable Optical Attenuator enables flexibility in laser operation while maintaining peak performance

Insensitive to Temperature Fluctuations – ULTRALOQ™ Technology delivers a highly stable platform that expands the operational environment and maximizes uptime.

Impressive output power from a compact platform – Applications are enabled and throughput is maximized through the integration of a compact laser platform with up to 2W power."

Air-Cooled Option – Exceptional wall plug efficiency enables air cooling, simplifies integration and enables operation in water-free environments.

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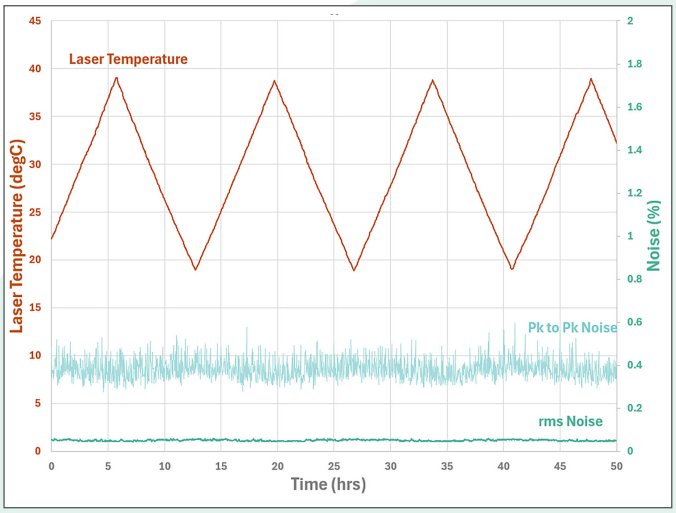
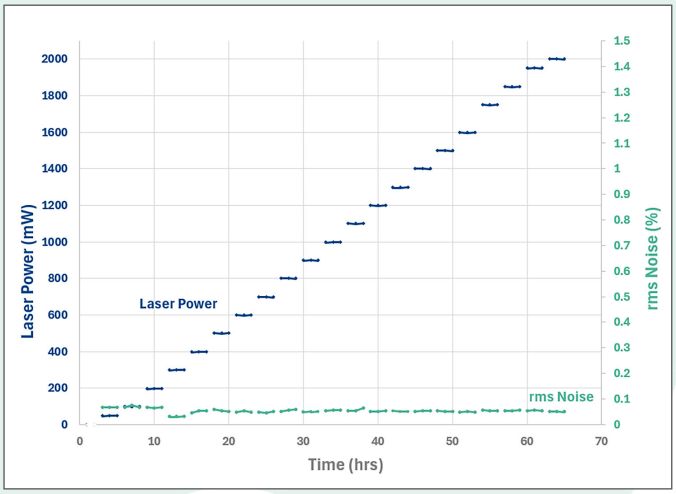
KEY TECHNOLOGY ADVANCEMENTS

GEMultra includes two (2) key technology breakthroughs that sets it apart from other 532 nm wavelength DPSS lasers…



ULTRALOQ

Rapidly changing ambient temperatures can stress laser cavities, causing unstable laser output, resulting in false positives, unplanned downtime and reduced lifespan. Novanta's ULTRALOQ™ technology features a meticulously engineered material system designed specifically to endure extreme temperatures and rapidly changing environments while supporting fully automated manufacturing processes. The result is a consistent, ultra-stable laser platform that maximises uptime, enhances quality and minimises long term ownership costs.



INTEGRATED VARIABLE OPTICAL ATTENUATOR (VOA)

Meeting high performance specifications across a wide range of power levels, is challenging, and often requires separate attenuators, leading to added cost and integration challenges for OEMs. GEMultra addresses these challenges by incorporating an onboard VOA, achieving a maximum attenuation of OD2. This ensures stability and adherence to performance specifications, even during power changes, enhancing operational flexibility while reducing integration complexity and cost.

FLEXIBLE DESIGN

Available options to optimize GEMultra to fit the application need.

- **Fiber coupling:** Multi or single mode fiber delivery options which allows the beam to be delivered to the point of need.
- **Intelligent control unit:** Easy setting and monitoring of the laser parameters. Incorporating PowerLoQ™ technology, GEMultra lasers demonstrate extreme power stability over extended periods of use.
- **1200 g drop-test:** All GEMultra lasers undergo a drop test to check that all components are correctly fitted prior to their extended 300-hour test period. This rigorous testing regime ensures long operational lifetimes.
- **RemoteApp**™: Dedicated software enabling the laser to be remotely controlled locally avoiding service center shipping and downtime. GEMultra is able to connect directly to our support team to monitor laser performance, diagnose performance opportunities, and perform laser optimization.

SPECIFICATIONS

Specification	GEMultra
Wavelength	532 nm
Power	2 Watts
Amplitude Noise[1] (rms)	< 0.1%
Amplitude Noise[1] (pk-to-pk)	< 1%
Power Stability[1] (pk-to-pk)	< 1%
Attenuation Range	OD0-OD2
M^2	< 1.1
Ellipticity	< 1:1.2
Bandwidth	~30 GHz
Beam Diameter[2]	0.9 ± 0.1 mm
Polarization Ratio	> 100:1
Polarization Direction[3]	Horizontal
Beam Angle[4]	< 1 mrad
Beam Pointing Stability	< 10 µad/°C
Operating Temperature	15 - 40° C

** Novanta operates a continuous improvement program which can result in specifications being improved without notice.*

1 – Tested for up to 8hrs at constant temperature (±1degC, ΔT within ±1degC/hr)

2 - Beam diameter defined as the average of major and minor $1/e^2$ beam size measured at 25 cm from exit port, at specified power.

3 - Vertical polarization is available upon request.

4 - Tolerance relative to head orientation.

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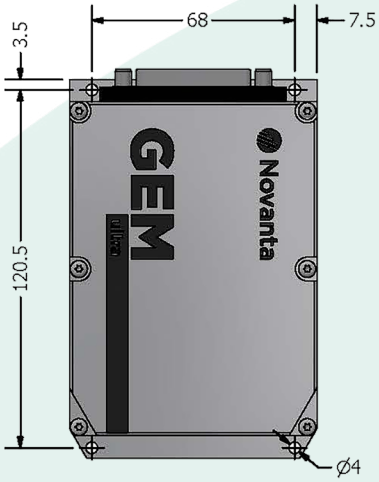
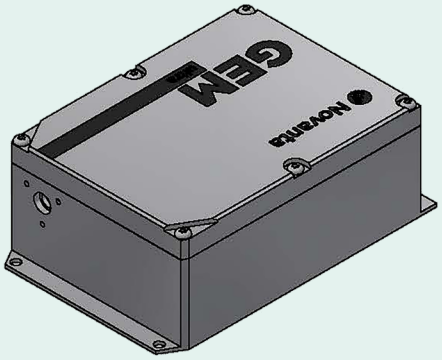
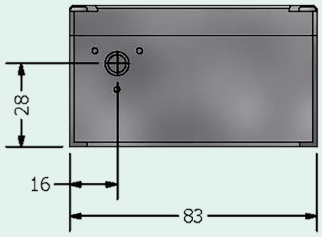
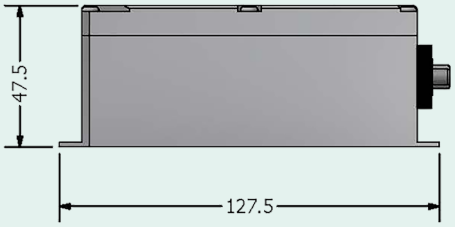
DIMENSIONS (mm)

Drawings are for illustrative purposes only, please contact us for complete engineer's drawings.





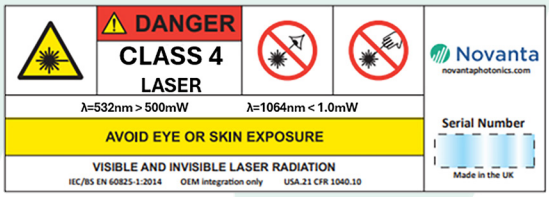




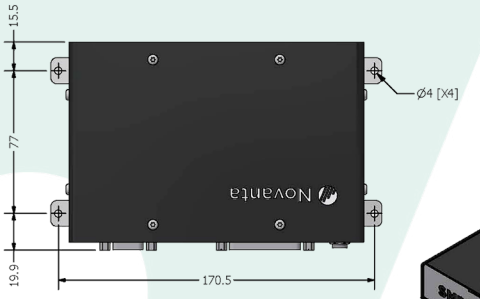
ADDITIONAL INFORMATION

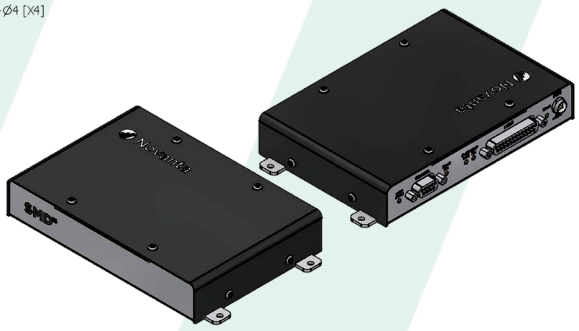
Customizable options available for GEMultra to meet your application needs.

- SM/PM or MM Fiber coupling available
- Patented spectral shaping capability – Talk to us for more details
- Vertical polarization is available on request
- Cooling options available
- Umbilical length: 1.5 m
- Fiber coupling available
- LabView (remote analysis and troubleshooting) drivers available
- 2 years unlimited warranty for scientific users



SMD16 POWER SUPPLY UNIT DIMENSIONS (mm)





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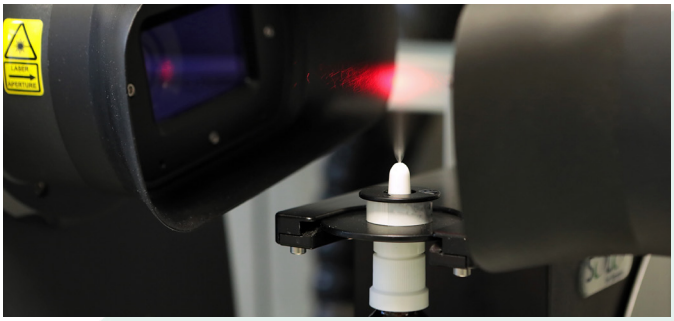
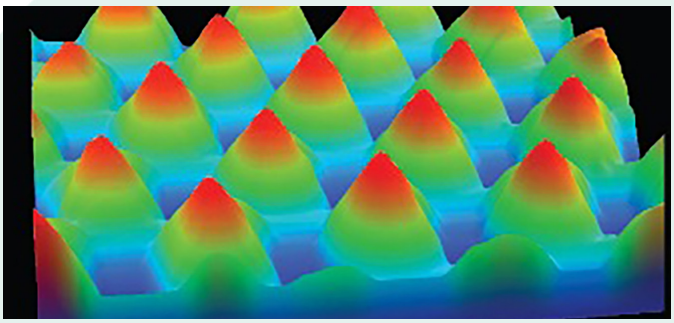
GEMultra DPSS CONTINUOUS WAVE LASER KEY APPLICATIONS



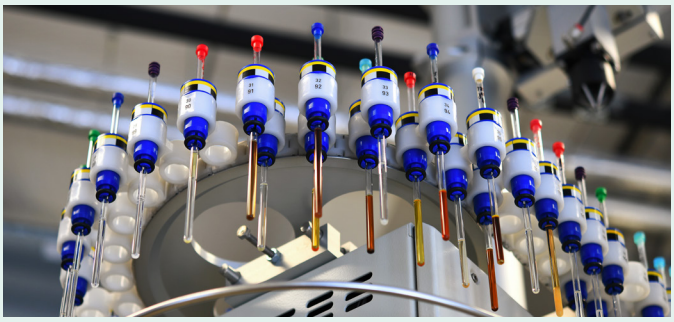
PARTICLE ANALYSIS IN LIQUIDS

High-performance illumination sources are essential to address the challenges in particle analysis in liquids. These sources must combine several key characteristics: high power output to enhance resolution and throughput, low amplitude noise and high power stability to prevent false positives, and a compact, air-cooled platform to reduce integration complexity. GEMultra meets all these requirements, enabling the next generation of liquid particle counters



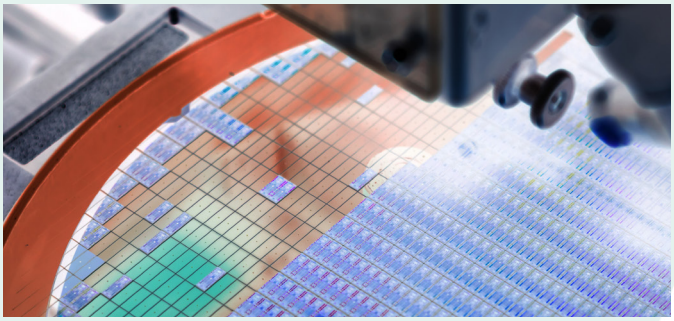
METROLOGY

Optimizing metrology systems requires a deep understanding of contrast ratio requirements at specific optical path differences (OPD) within the optical system. Novanta's proprietary technology allows for shaping the spectral output of DPSS lasers, to match contrast requirements at key OPDs, enabling fully optimized optical systems for metrology applications. The GEMultra platform benefits from this technology, which alongside its unparalleled stability of power and noise makes it ideal for industrial metrology applications.



IN-LINE RAMAN SPECTROSCOPY

Upcoming applications of Raman Spectroscopy such as in-line quality control in industrial environments, demand illumination sources of specific characteristics. Maximum throughput is enabled by high output power, while lasers combining high power, spectral stability and low amplitude noise are essential to eliminate false positives. GEMultra excels in all these performance aspects, and through its compact form factor and exceptional wall plug efficiency facilitates easy integration into even the most complex systems.



SEMICONDUCTOR WAFER PROCESSING

From inspection to alignment, processing wafers is a key part of the lithography process in semiconductor industry. The GEMultra incorporates unique technologies that can positively affect throughput while maximizing uptime and minimizing integration costs. ULTRALOQ™ technology, integrated VOA & Spectral Shaping capabilities enable the GEMultra to excel in the most demanding wafer processing applications

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