# Q-SPARK

# AIR-COOLED SHORT PULSE Q-SWITCHED LASER

**NEW!** Sub-nanosecond pulses with **~750 ps** duration and **>5 mJ** pulse energy

## FEATURES

- Up to **10 mJ** pulse energy at **1064 nm**
- **Air cooled** (water-free)
- Short pulse duration down to **750 ps**
- Up to **100 Hz** repetition rate.
- Optional build-in 2nd, 3rd or 4th harmonic generator
- **> 2 Gshot** lifetime of pump diodes
- Built-in sync pulse generator for triggering of user equipment
- Remote monitoring and control via built-in **Ethernet** interface
- Optional attachable PC controlled motorized attenuator
- Optional attachable pulse energy monitor
- Optional fiber coupled output

## AUXILIARY EQUIPMENT

- Attachable PC controlled motorized attenuator
- Attachable pulse energy monitor with analog and/or digital output
- Auxiliary exit port for residual harmonic generator wavelength access

## APPLICATIONS

- Light Induced Breakdown Spectroscopy (LIBS)
- Light Detection And Ranging (LIDAR)
- Laser ablation / micromachining
- Time-of-Flight Spectroscopy (TOFS)
- Time Resolved Spectroscopy (TRS)
- Raman spectroscopy
- Dermatology (tattoo removal etc.)
- Ophthalmology


Q-SPARK is diode pumped, water-free, Q-switched laser designed for wide range of applications that require sub-nanosecond or nanosecond pulses with up to 10 MW peak power.

We optimized our innovative water-free laser crystal end-pumping technology to produce Gaussian-like, low divergence, sub-nanosecond pulses in compact and energy-efficient package. Passively Q-switched Q-SPARK version can be configured to produce pulses as short as 750 ps and with more than 5 mJ pulse energy. E-O Q-switched version delivers up to 10 mJ with <1.5 ns pulse duration. Models with pulse repetition rates in 10 –100 Hz range are available.

Laser is monitored and controlled trough Ethernet port via build-in web-server. API is provided for integration with user devices.

Laser functionality can be further extended by wide selection of auxiliary equipment:

- Up to fourth harmonic output wavelength can be produced by build-in harmonics generator. See datasheet for pulse energy specifications.
- Pulse energy can be adjusted with our attachable motorized attenuator for fundamental or harmonic wavelength beam.
- Pulse energy can be monitored by our attachable pulse energy monitor with analog and/or digital output.
- Residual harmonic generator wavelengths can be accessed with optional auxiliary exit port.
- Fiber coupled output is available by request. Please inquire for detailed specifications.

*Quantum Light Instruments*

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## SPECIFICATIONS [1]

| MODEL | Q-SPARK | | | | | |
|---|---|---|---|---|---|---|
| | -100PS | -20PS | -A10PS | -A100 | -A50 | -B20 |
| Wavelength | 1064 nm | | | | | |
| Q-Switch type | passive, Cr:YAG | | | active, Pockels cell | | |
| Pulse repetition rate [2] | 100 Hz | 20 Hz | 10 Hz | 100 Hz | 50 Hz | 20 Hz |
| Pulse energy | 1 mJ | 2 mJ | 5 mJ | 2 mJ | 5 mJ | 10 mJ |
| Typical pulse duration [3] | < 2 ns | | < 800 ps | < 2 ns | | < 1.5 ns |
| Pulse to pulse energy stability [4] | < 1.5 % RMS | | | < 1.2 % RMS | | |
| Linewidth | SLM [5] | | | <0.8 $cm^{-1}$ | | |
| Power drift [6] | ± 3.0 % | | | | | |
| Beam profile | nearly $TEM_{00}$, > 85 % fit to Gaussian | | | | | |
| Beam divergence [7] | < 1.5 mrad | | | | | <1 mrad |
| Polarization | linear, horizontal | | | | | |
| Typical beam diameter [8] | 1.2 mm | | 2.0 mm | | | |
| Jitter [9] | 1 µs RMS | | | < 0.5 ns RMS | | |
| **OPTIONAL BUILD-IN HARMONICS GENERATOR [10]** | | | | | | |
| Pulse energy | | | | | | |
| 532 nm | 0.5 mJ | 1 mJ | 2.5 mJ | 1 mJ | 2.5 mJ | 5 mJ |
| 355 nm | 0.25 mJ | 0.5 mJ | 1.6 mJ | 0.5 mJ | 1.6 mJ | 2.5 mJ |
| 266 nm | 0.1 mJ | 0.2 mJ | 0.8 mJ | 0.2 mJ | 0.8 mJ | 1.5 mJ |
| **OPTIONAL ATTENUATOR [11]** | | | | | | |
| Transmission range | 0.5 – 95 % | | | | | |
| **DIMENSIONS** | | | | | | |
| Laser head ( W×L×H) | 140 × 277 × 135 $mm^3$ | | | | | |
| Controller unit (W×L×H) | 108 × 191 × 59 $mm^3$ | | | | | |
| Power adapter (W×L×H) [12] | 50 × 125 × 32 $mm^3$ typical (for +12 VDC output) | | | | | |
| **OPERATING REQUIREMENTS** | | | | | | |
| Cooling requirements | air cooled | | | | | |
| Ambient temperature | 15 – 30 °C | | | | | |
| Relative humidity | 10 – 80 % (non-condensing) | | | | | |
| Mains voltage | 90 – 230 VAC, single phase, 47 – 63 Hz [13] | | | | | |
| Average power consumption | 40 W | 30 W | | 50 W | 40 W | 30W |

[1] *Due to continuous improvements all specifications are subject to change. Unless stated otherwise all specifications are measured at fundamental wavelength and maximum pulse repetition rate. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture.*

[2] *Factory-set pulse repetition rate is fixed at max repetition rate shown in the table.*

[3] *At FWHM level at fundamental wavelength, measured with 350 ps rise time photodiode.*

[4] *Measured during 30 seconds operation after warm-up.*

[5] *SLM pulses are produced for >95% of operating time.*

[6] *Over 8 hour period after 20 minutes of warm-up when ambient temperature variation is less than ±2 °C.*

[7] *Full angle measured at the 4σ level.*

[8] *Beam diameter is measured 20 cm from laser output at the 4σ level.*

[9] *In respect to falling edge of pump diode triggering pulse.*

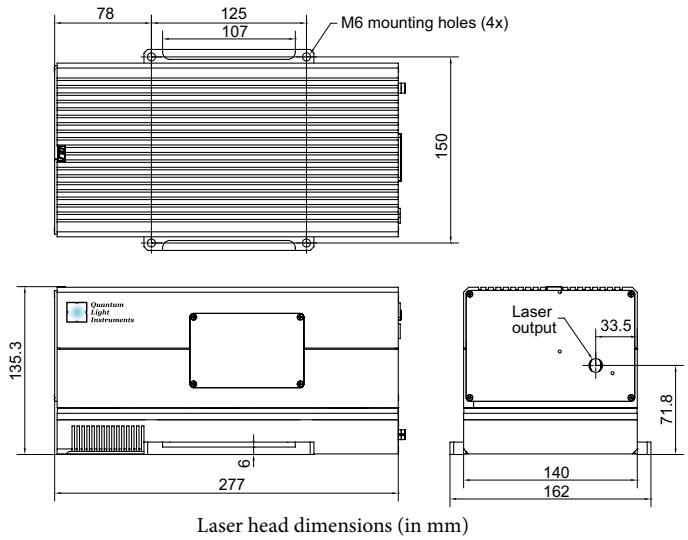
[10] *Q-SPARK can be configured with build-in harmonics generator and beam separators for selecting single wavelength at the exit port. Two port configuration is available by request.*

[11] *Motorized attenuator intended to be attached to the laser housing. Transmission can be changed remotely trough laser web-server control interface.*

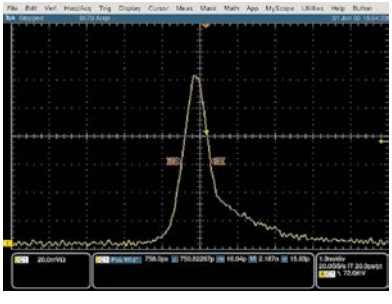
[12] *Power adapter dimensions might differ from indicated here, depending on model.*

[13] *Laser can be powered from appropriate 12 VDC power source. Please inquire for details.*

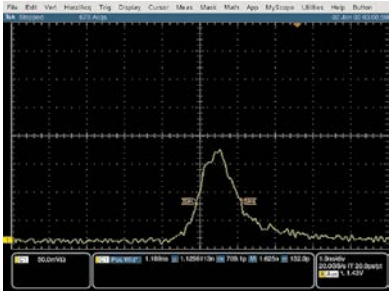

## DRAWINGS




Laser head dimensions (in mm)



Typical temporal waveform of Q-SPARK-A10PS laser



Typical temporal waveform of Q-SPARK-B10 laser



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