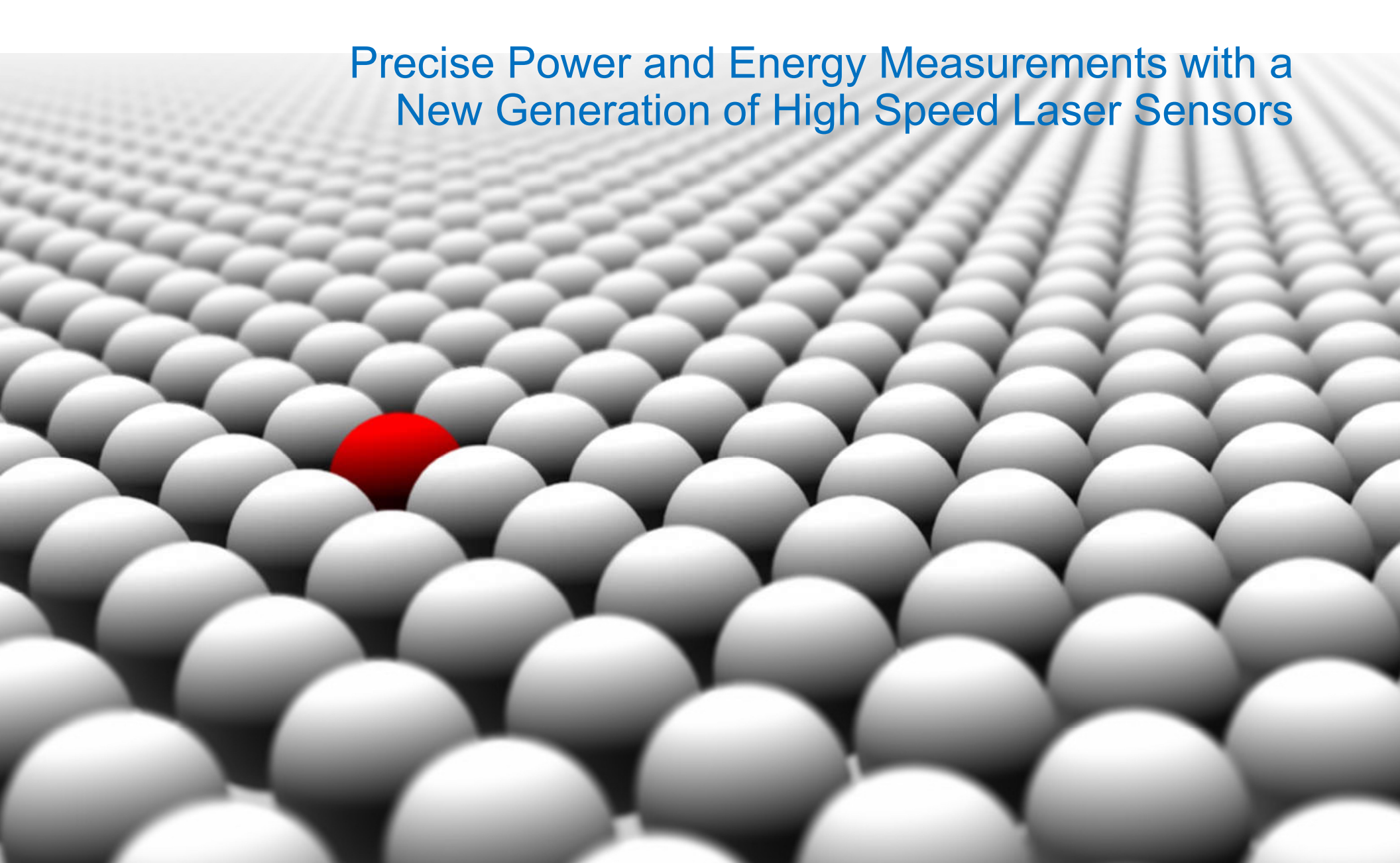


Precise Power and Energy Measurements with a New Generation of High Speed Laser Sensors



LASERPOINT



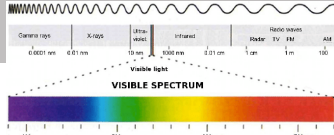
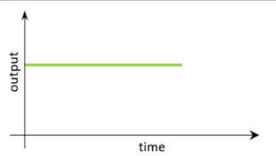
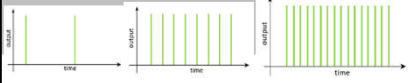



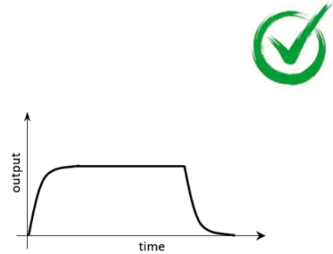





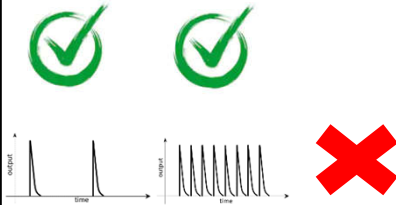



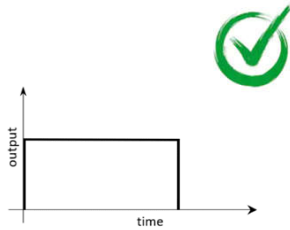
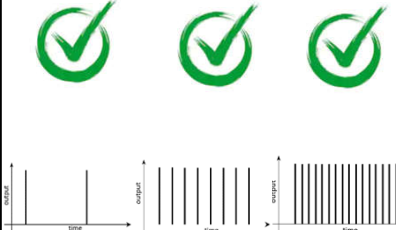
THE POINT OF DIFFERENCE IN PHOTONICS

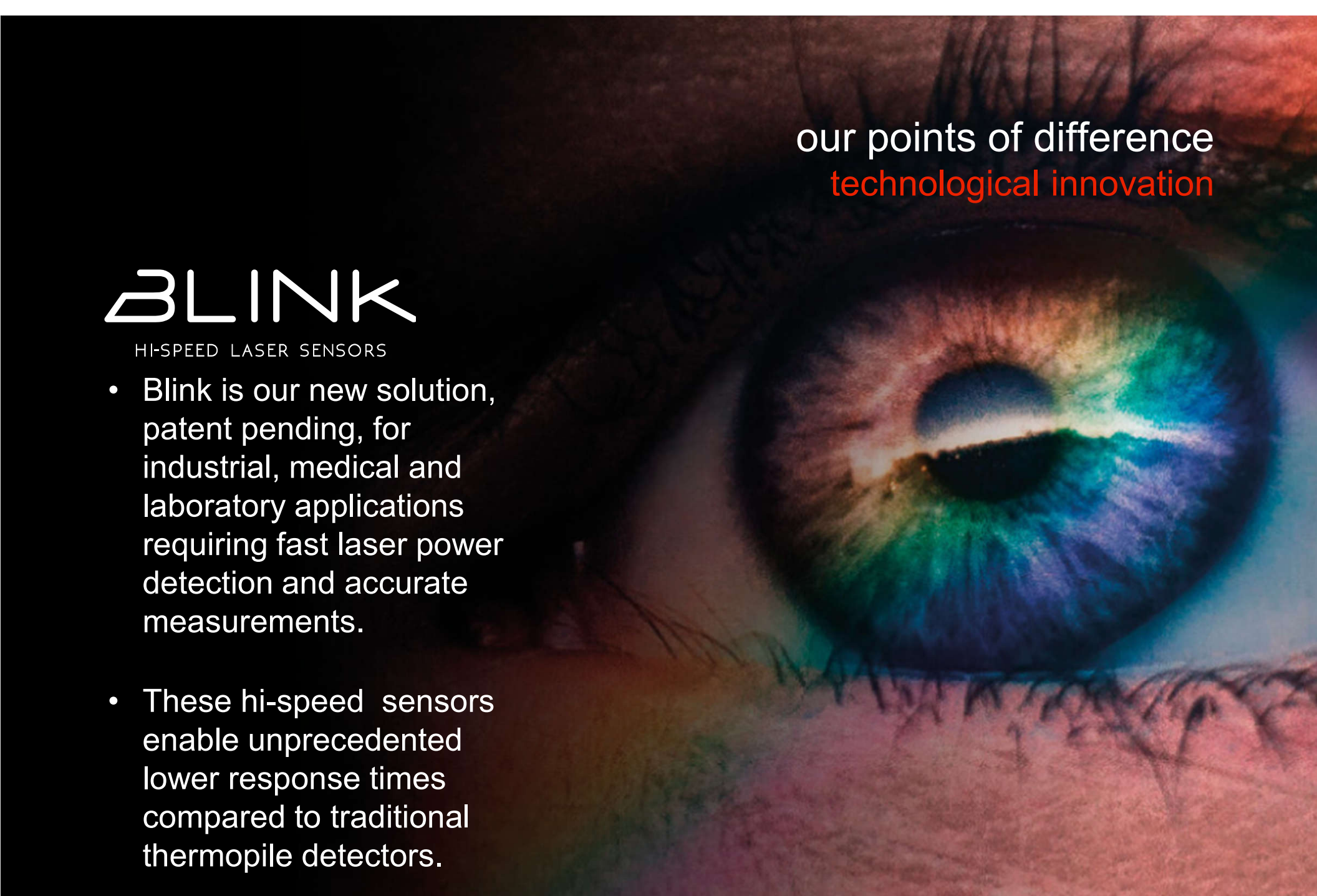
LASER 2000

☎ +44 (0) 1933 461 666 | ✉ sales@laser2000.co.uk | 🌐 www.laser2000.co.uk

Laser 2000 (UK) Ltd, Unit 9, Avro Court, Ermine Business Park, Huntingdon, Cambridgeshire, PE29 6XS, UK

Power and Energy Sensors: STATE OF THE ART

<p>Type of laser OUTPUT</p> 	<p>Power > 1W</p> 	<p>Broadband spectrum</p> 	<p>CW Laser</p> 	<p>Pulsed Laser</p>  <p>-Low Max 10Hz -medium Max 10kHz -high >50kHz</p>
<p>Thermopiles</p> 				<p>Average Power</p> 
<p>Pyro</p> 				
<p>Photodiodes</p> 	<p>-Low saturation threshold (mW)</p> 		 <p>-Strong temperature dependence -Small active area</p>	



our points of difference
technological innovation

BLINK

HI-SPEED LASER SENSORS

- Blink is our new solution, patent pending, for industrial, medical and laboratory applications requiring fast laser power detection and accurate measurements.
- These hi-speed sensors enable unprecedented lower response times compared to traditional thermopile detectors.

LASER 2000

+44 (0) 1933 461 666 | sales@laser2000.co.uk | www.laser2000.co.uk

Laser 2000 (UK) Ltd, Unit 9, Avro Court, Ermine Business Park, Huntingdon, Cambridgeshire, PE29 6XS, UK

BLINK[®]

HI-SPEED LASER SENSORS

our points of difference
technological innovation

BLINK[®]HS

BLINK[®]FR



**Repetition
rate:
up to 1 MHz**



Up to 20W



**Active Area
16x16mm**



**Broadband
working
range**



**Dozens of
times faster
than a
thermopile**



Up to 50W



**Active Area
16x16mm**





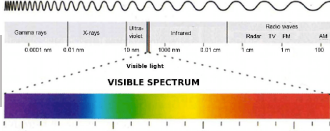
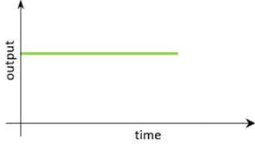
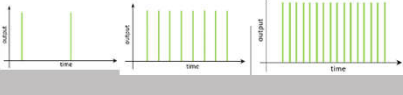






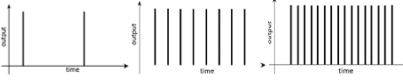




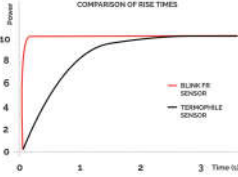

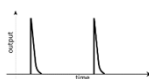

**Broadband
working
range**

LASER 2000

+44 (0) 1933 461 666 | sales@laser2000.co.uk | www.laser2000.co.uk

Laser 2000 (UK) Ltd, Unit 9, Avro Court, Ermine Business Park, Huntingdon, Cambridgeshire, PE29 6XS, UK

THE NEW STANDARD

<p>Type of laser OUTPUT</p> 	<p>Power > 1W</p> 	<p>Broadband spectrum</p> 	<p>CW Laser</p> 	<p>Pulsed Laser</p>  <p>-Low Max 10Hz -medium Max 10kHz -high >10kHz</p>
<p>BLINK^{HS}</p> 	<p>- 20 W</p> 		 	 
<p>BLINK^{FR}</p> 	<p>- 50 W</p> 		 	<p>-max laser rep.rate 8 Hz -high damage threshold for single pulses</p>   

FROM SECONDS TO A TENTH OF A SECOND



**THE (R)EVOLUTION OF
THERMOPILES**

LASER 2000

+44 (0) 1933 461 666 | sales@laser2000.co.uk | www.laser2000.co.uk

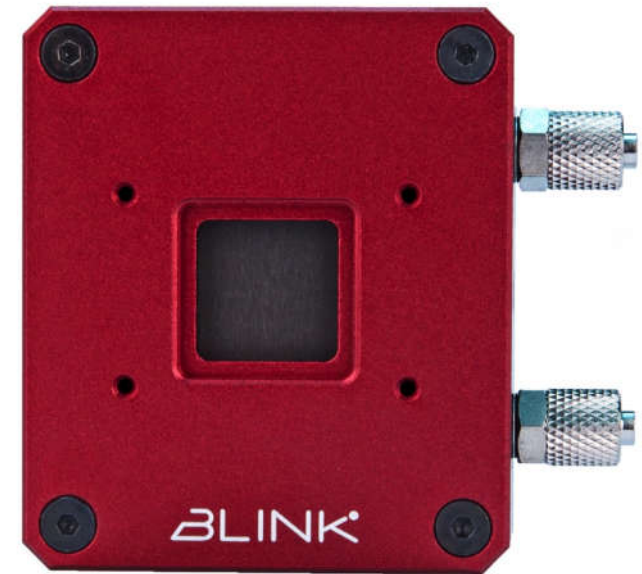
Lasert 2000 (UK) Ltd, Unit 9, Avro Court, Ermine Business Park, Huntingdon, Cambridgeshire, PE29 6XS, UK



Fast Response Sensor: BL-W-50W-16-K

Power Mode	
Max. average power	50 W
Max. Intermittent power (1)	60 W
Min. power	30 mW
Noise equivalent power (NEP)	1.5 mW
Natural response time (0-90%)	Typ. 90ms (min. 50 ms – max. 120 ms)
Power calibration uncertainty	± 3 %
Power linearity	± 2 %
Absorber Specs	
Aperture	16 mm x 16 mm
Spatial uniformity	± 3 %
Absorber spectral range	0.2 - 25 μ m
Calibration spectral range	0.25 - 1.1 μ m ; 10.6 μ m
Max power density (2)	1.5 KW/cm ²
General Characteristics	
Cooling	Water (a)
Weight	130 g
Head dimensions	56 x 56 x 18.5 mm
Cable length	1.5 m
Notes	
(1) 2 sec max. (2) Measured at 1064 nm, 10 W. Damage thresholds depend on power level.	(a) Water min. 1 L/min, max. 4 L/min (@ 10 - 25 °C); admissible rate of water temperature variation

our points of difference
technological innovation

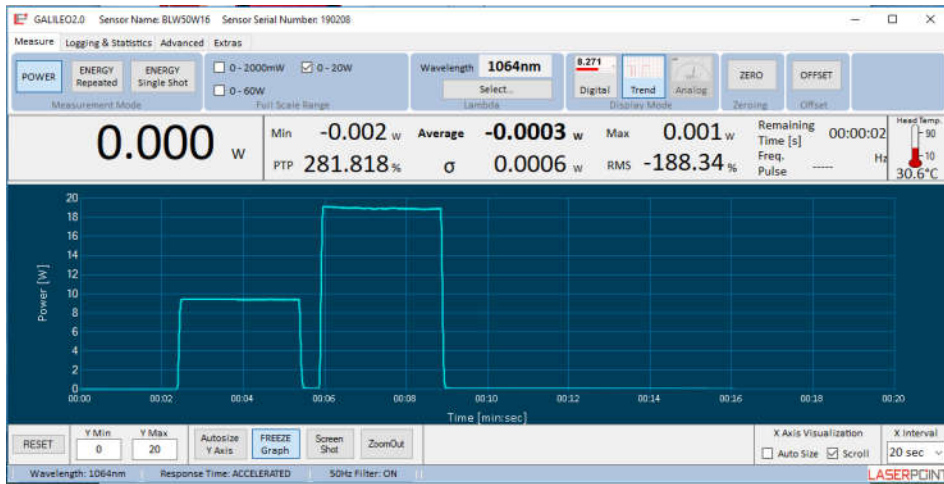


Available Electronics:

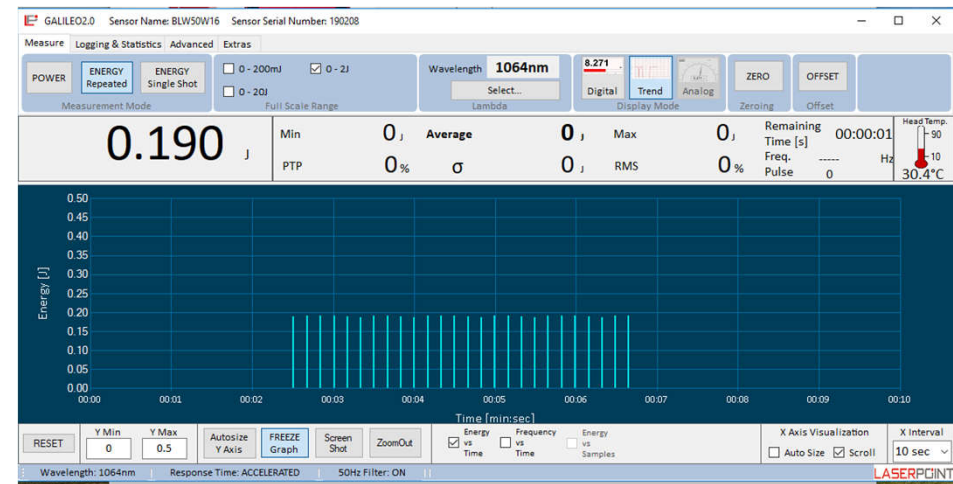
- With PLUS 2 electronics
- With USB interface and Galileo software for pc
- Bare sensor for OEM integration
- SOON AVAILABLE: amplified 0-5V with analog output and 30W air-cooled



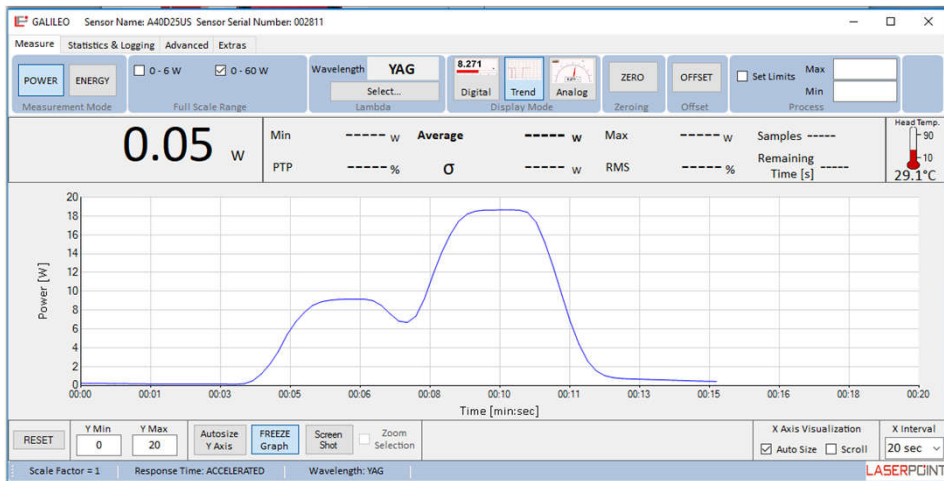
BLINK FR power mode - response to cw radiation



BLINK FR Energy meter mode (5Hz)



40W thermopile - response to cw radiation



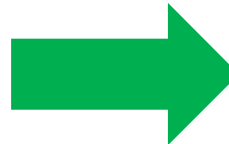
BLINK^{FR}

Fast Response Sensor



PROS Compared to Termopiles:

- Faster and precise power measurement (natural $\tau_{0-90} < 100$ ms, accelerated $\tau_{0-90} < 60$)
- Low cost electronics
- High single pulse energy damage threshold
- ROHS compliant



Advantages for industry (and laboratory):

- Better process control
- Faster alignment time
- Higher production yield (lower dead times) and product quality

From mW to dozens of W



THE FASTEST BROADBAND LASER ENERGY METER ON THE MARKET TODAY

VERSATILE & USER FRIENDLY AS A THERMOPILE AND FAST AS A PHOTODIODE

LASER 2000

+44 (0) 1933 461 666 | sales@laser2000.co.uk | www.laser2000.co.uk

Laser 2000 (UK) Ltd, Unit 9, Avro Court, Ermine Business Park, Huntingdon, Cambridgeshire, PE29 6XS, UK

BLINK^{HS}

High **S**peed Sensor

HIGH SPEED SENSOR HEAD

Power and Energy measurements
Suitable for ps and fs pulse laser
measurements

Natural Response time: 10ns

Repetition Rate: **1MHz**

Wavelength Range: 0.25 – 11 μm

Max average Power: 20W

Cooling: water

P/N: BM-W-20W-14-T



our points of difference
technological innovation

ELECTRONICS:

HSE - High Speed
Electronics for Power and
Energy measurements



LASER 2000

+44 (0) 1933 461 666 | sales@laser2000.co.uk | www.laser2000.co.uk

Laser 2000 (UK) Ltd, Unit 9, Avro Court, Ermine Business Park, Huntingdon, Cambridgeshire, PE29 6XS, UK

Available Electronics:

- Dedicated electronics
- Possibility to use 2 channel oscilloscope (50Ω balanced output)



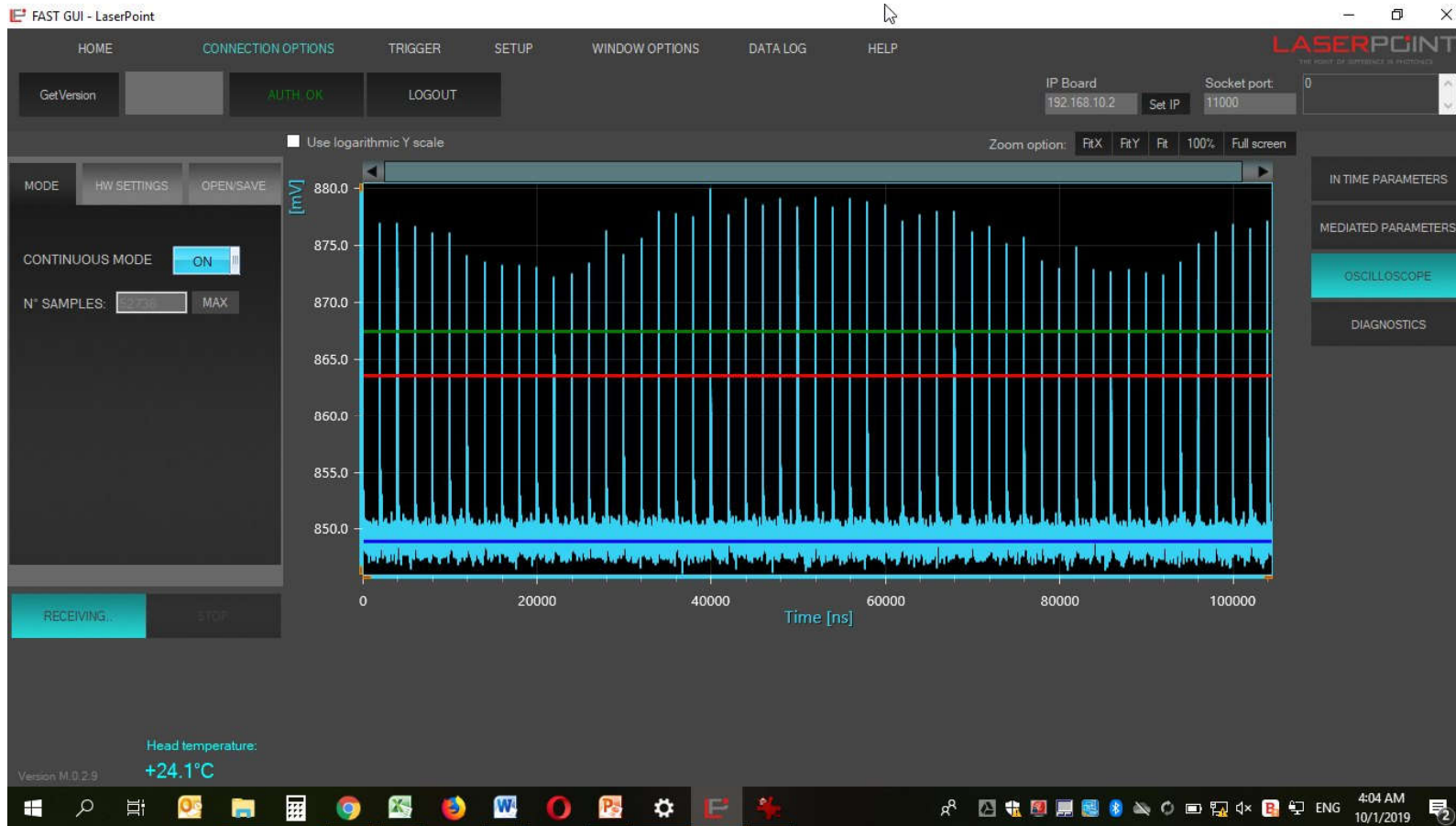
Features:

- 500-MSample/s
- 250-MHz BW
- Ethernet connection for data transfer
- Trigger-in and out for looped process control
- Oscilloscope mode
- Metrologic mode (E_P vs. time, F_{rep} vs. time) with statistics
- Data export and report available
- User-friendly GUI

BLINK^{HS}

High Speed Sensor

our points of difference
technological innovation



Laser type	ps, UV
λ	355 nm
Rep. Rate	500 kHz
τ_p	10 ps

Blink HS: suitable for peak to peak energy stability

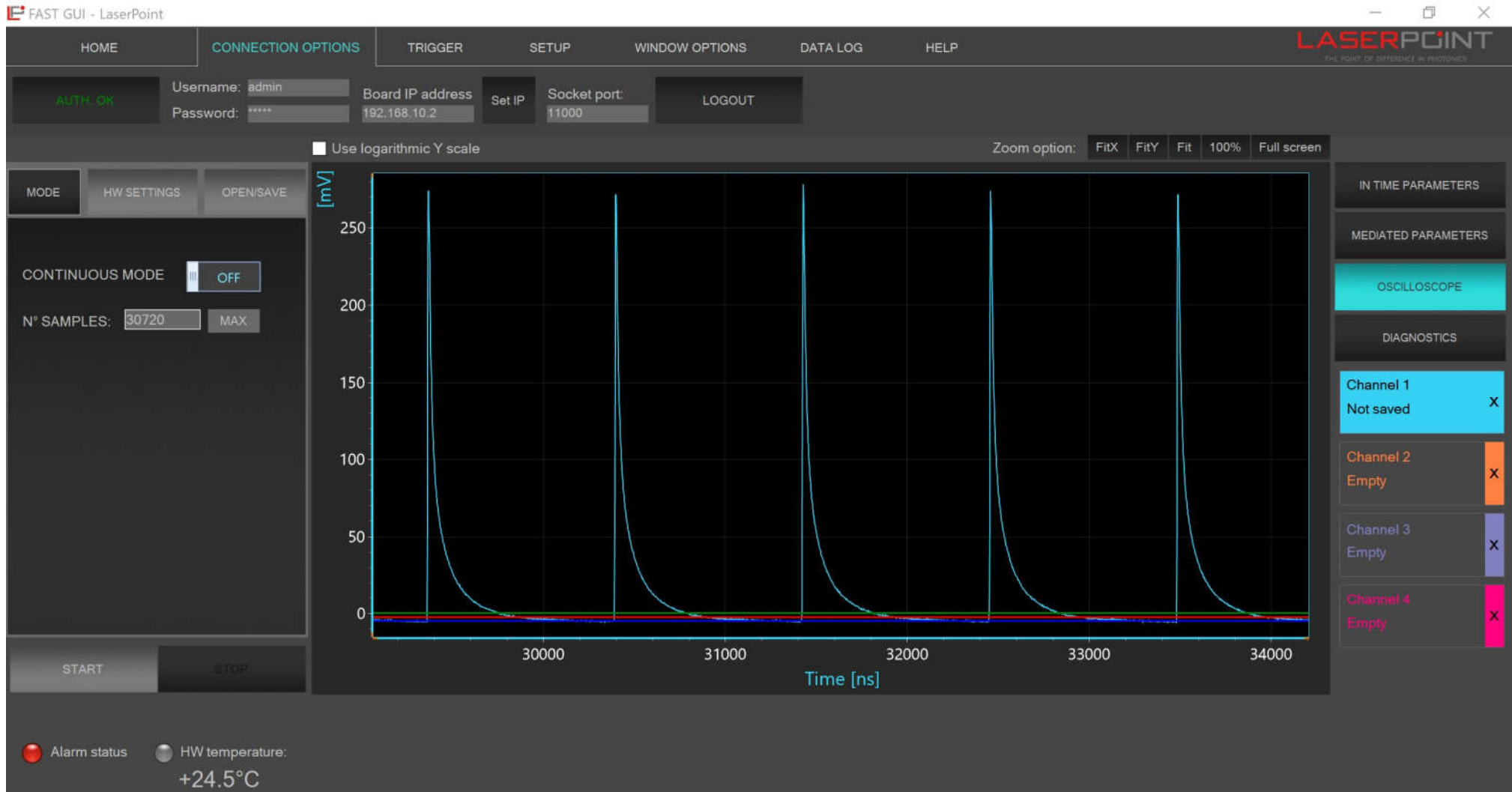
LASER 2000

+44 (0) 1933 461 666 | sales@laser2000.co.uk | www.laser2000.co.uk
 Laser 2000 (UK) Ltd, Unit 9, Avro Court, Ermine Business Park, Huntingdon, Cambridgeshire, PE29 6XS, UK

Laser type	Fiber
λ	1 μm
Power	20 W
Rep. Freq.	1 MHz
τ_p	0.94 ps

**RESPONSE TO FEMTO SECOND 1MHz
LASER
20W WITHOUT BEAM ATTENUATION**

BLINKHS
High Speed Sensor



LASER 2000

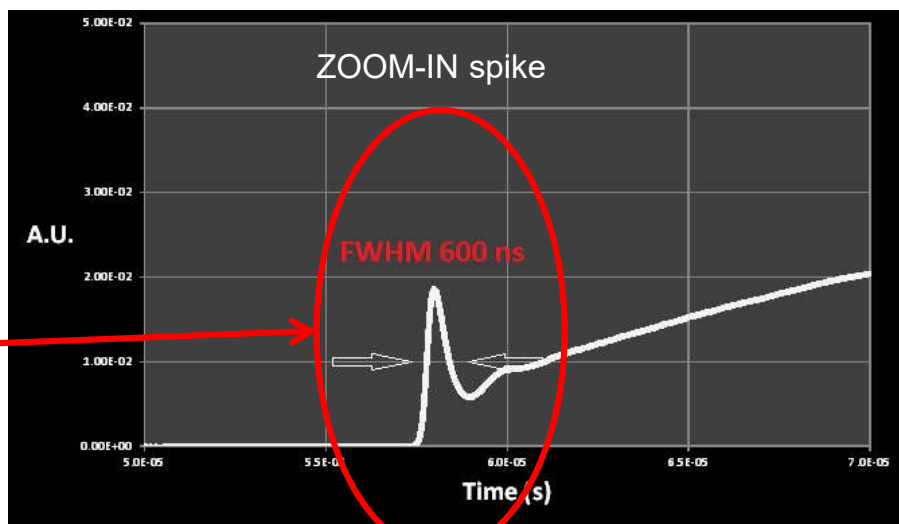
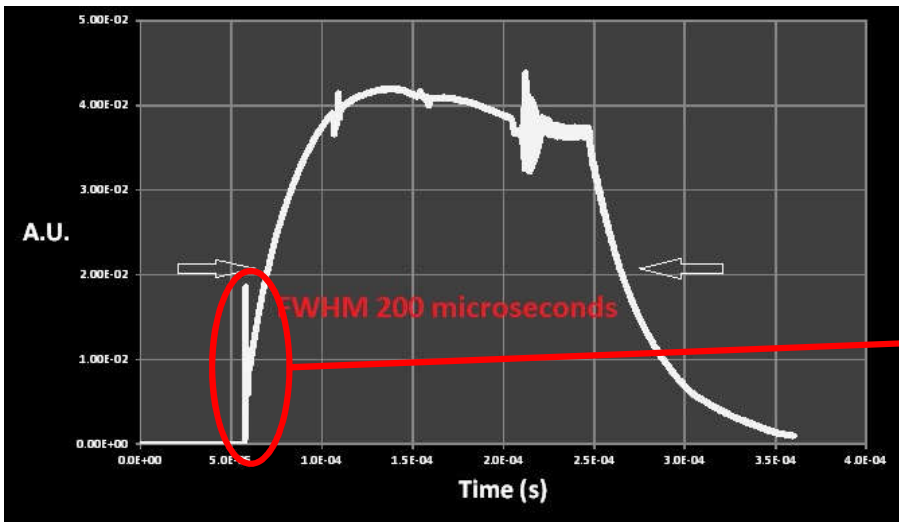
+44 (0) 1933 461 666 | sales@laser2000.co.uk | www.laser2000.co.uk
Laser 2000 (UK) Ltd, Unit 9, Avro Court, Ermine Business Park, Huntingdon, Cambridgeshire, PE29 6XS, UK

BROADBAND WORKING RANGE RESPONSE TO THULIUM AND CO₂

Laser type	Thulium
λ	1950 nm
Power	5 W
Rep. Freq.	20 kHz
τ_p	250 ns



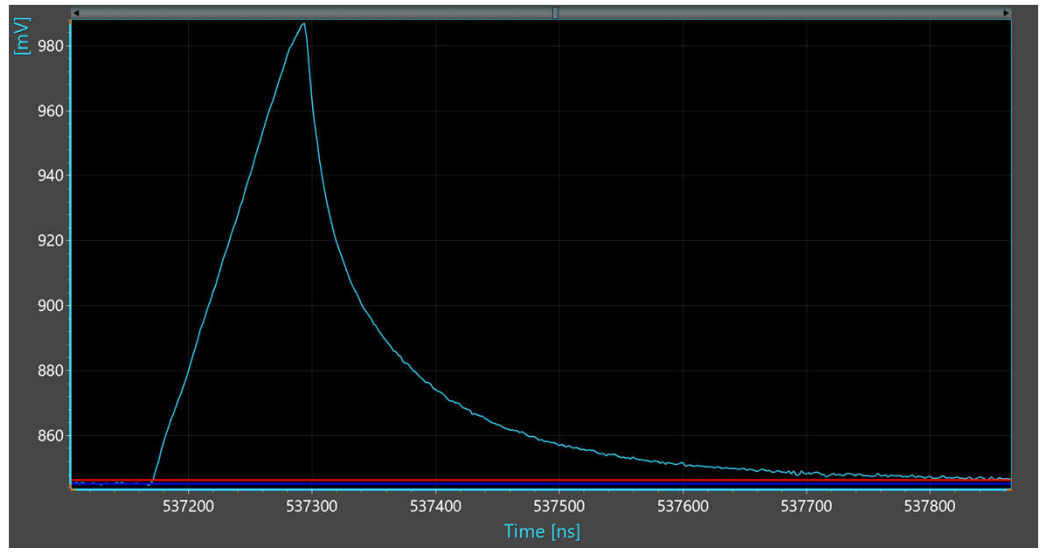
Laser type	CO ₂
λ	10.6 μm
τ_p	200 μs



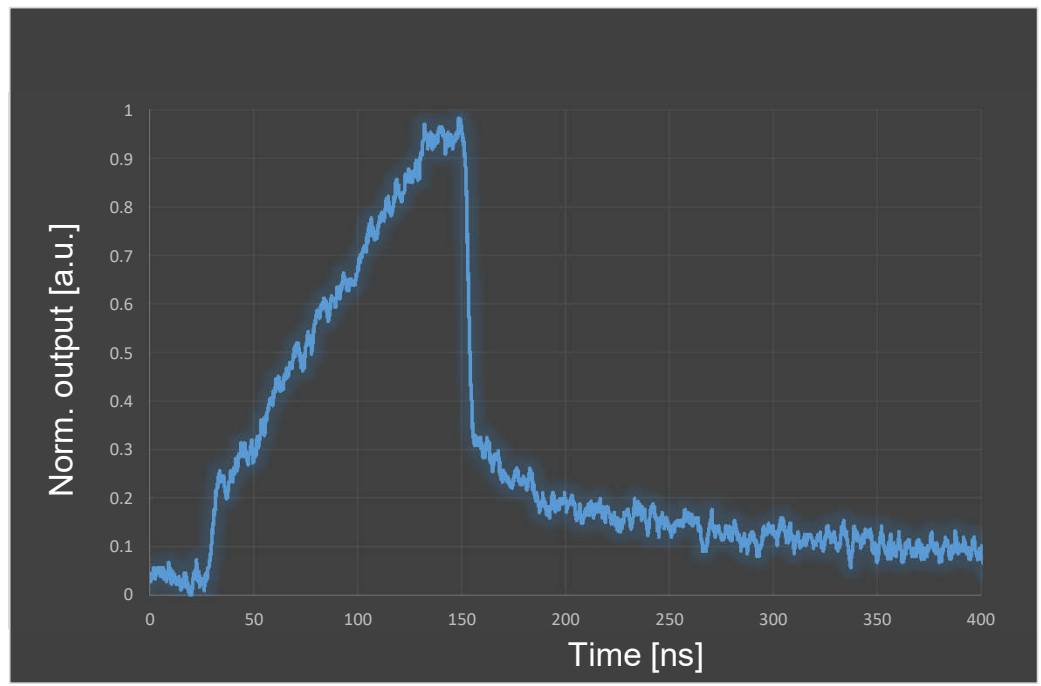
TEMPORAL PULSE ANALYSIS WHEN $\tau_p > 4 \text{ ns}$

Laser type	Fiber with variable pulse shaper
λ	1 μm
Pulse	saw teeth shaped pulse 150 ns rise

BLINK HS response



Photodiode with fast response (175ps)





VS



BLINK^{HS}
High Speed Sensor



Advantages:

- Fast as a photodiode and broadband
- Up to 20 W
- Control of pulse to pulse stability
- Laser ON- Laser OFF control
- Monitor of missing pulses during process
- Control of Spikes in long pulses
- Continuous metrologic monitor of E_p and F_{rep}
- Process report
- Ability to measure pulse duration when $\tau_p > 4ns$
- User friendly interface
- 14x14 mm active area
- ROHS compliant



Advantages for industry and laboratory:

- Higher production yield
- Higher product quality
- Increased quality control
- Better control of laser parameter in R&D environment
- Versatile and Easy to set and use