

Test data

Laser model *MPL2510 (passive Q-Switching)*

Serial Number *N121*

Parameter	Specified	Measured	Equipment/Notes
Pulse repetition rate	10 Hz	10 Hz	
Pulse energy @1064 nm	2 mJ	2.6 mJ	Ophir Power & Energy detector – PE10-C
Pulse duration @1064 nm	500 -700 ps (FWHM)	620 ps (FWHM)	Tektronix TDS6604, 6GHz, 20GS/s Thorlabs PD DET08CFC (included apparatus function 120 ps)
Energy stability	1.0 % RMS	0.5 % RMS	Ophir Power & Energy detector – PE10-C Averaged from pulses emitted during 30 sec time intervals in 5 series
Beam diameter	1 mm at 1/e ² level	1 mm	Gentec Beamage 3.0 20 cm from laser output aperture
Beam divergence	< 6 mrad	4 mrad	
Beam pointing stability	< 50 µrad RMS	3.75 µrad	Gentec Beamage 3.0 Full angle
Polarization @1064 nm (at laser output)	linear, horizontal	linear, horizontal	
Optical pulse jitter w.r.t. external triggering pulse	~ 2 µs (RMS)	~ 300 ns (RMS)	Digital signal detector TTI TGF4042, Oscilloscope SDS1202X-E

Test officer: *Saulius Frankinas*

Date of test: *2024 April 3rd*

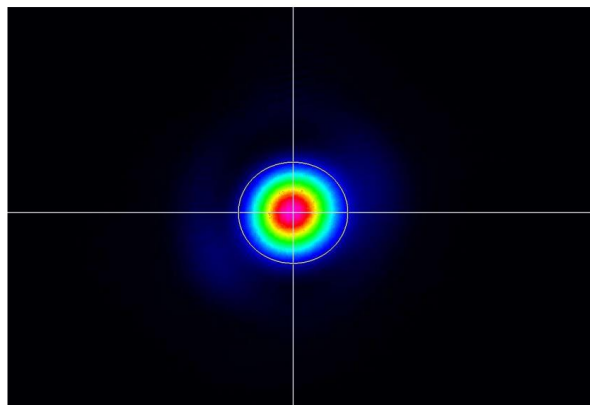
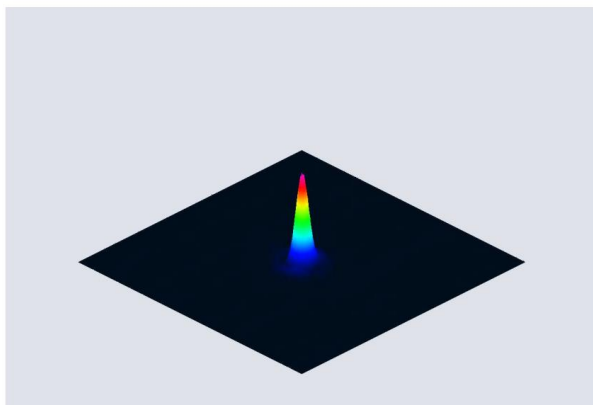
Output beam parameter Near Field:



BEAMAGE-4M

Wednesday, April 03, 2024

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PARAMETERS

Beam Diameter : 1/e2 along crosshair (13.5%)

Crosshair Center: Centroid

Orientation Crosshair: Zero Degrees

Exposure Time: 200.00 ms (MANUAL)

Image Orientation: 0 degrees

Image Averaging: None

Active Area: 2048 x 2048

Pixel Addressing: None

Camera Gain: 1.00

ADC Level: 12 bit

Relative Position (X,Y): (0.0,0.0) μm

MEASURES

Axis (dSigma X, dSigma Y): (1001.0,924.0) μm

Effective Diameter: NA

Ellipticity: 92.3 %

Orientation: 0.0 degrees

Centroid (X,Y): (-57.3,-103.3) μm

Peak (X,Y): (-82.5,-121.0) μm

Peak Saturation Level: 85.3 %

Peak to Average Ratio (X,Y): (1.8,1.7)

Relative Centroid (X,Y): (-57.3,-103.3) μm

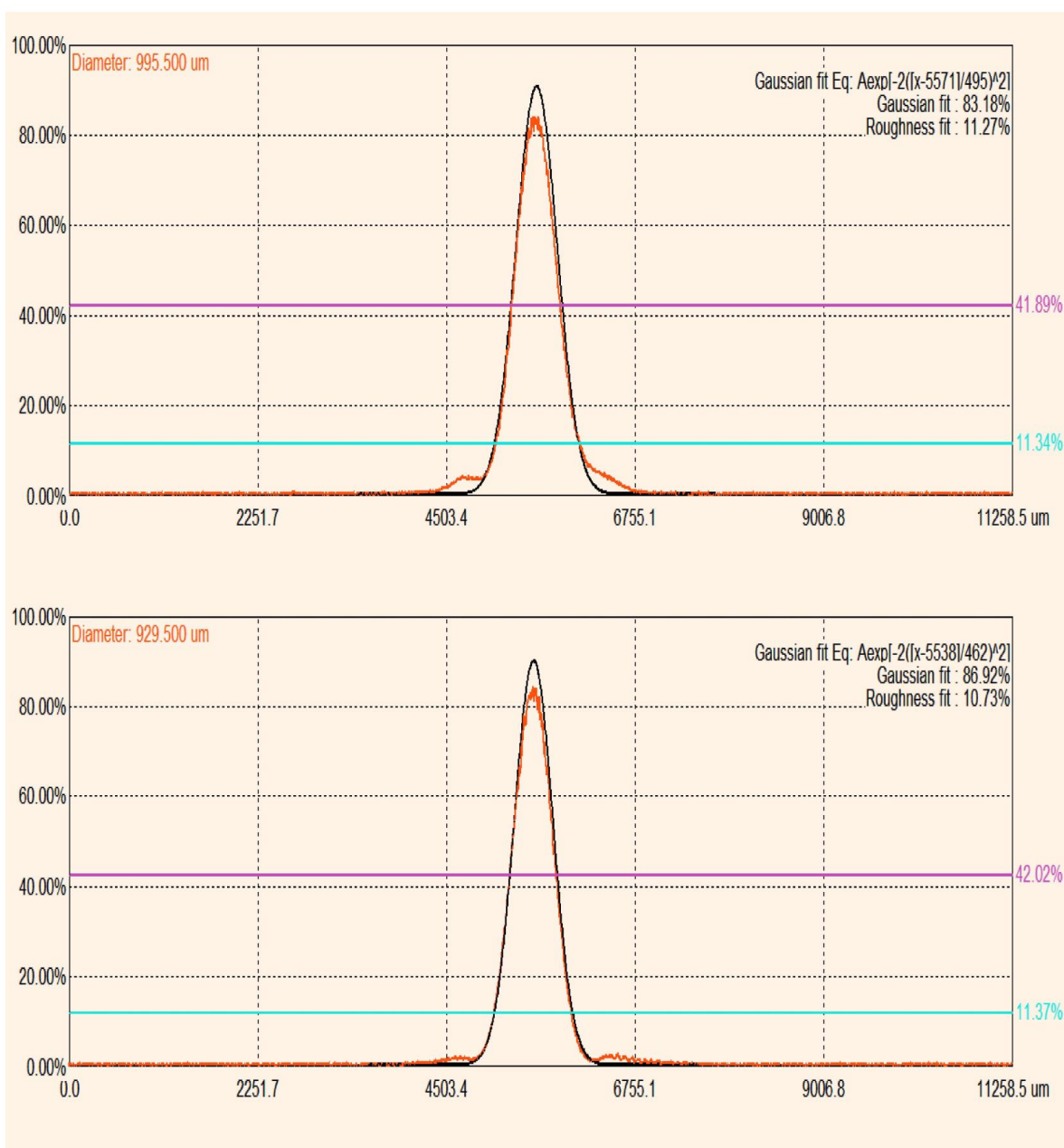
Relative Peak (X,Y): (-82.5,-121.0) μm

Pic. 1. Data measured at 20 cm from laser output.



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Pic. 2. Data measured at 20 cm from laser output.

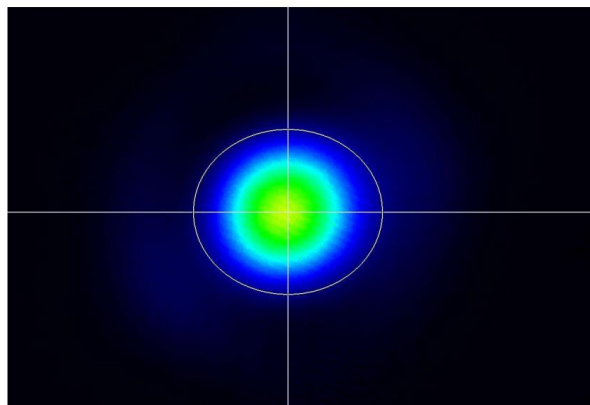
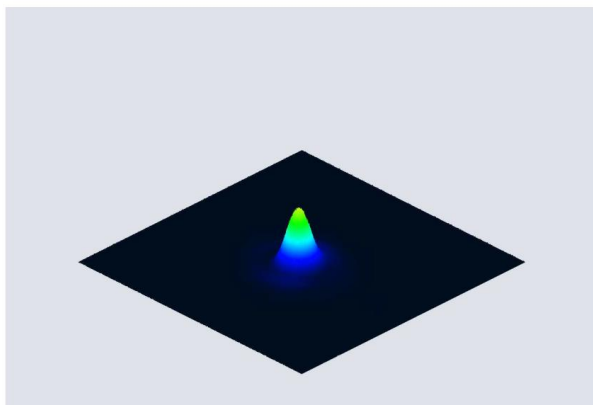
Output beam parameter Far Field:



BEAMAGE-4M

Wednesday, April 03, 2024

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PARAMETERS

Beam Diameter : 1/e2 along crosshair (13.5%)

Crosshair Center: Centroid

Orientation Crosshair: Zero Degrees

Exposure Time: 200.00 ms (MANUAL)

Image Orientation: 0 degrees

Image Averaging: None

Active Area: 2048 x 2048

Pixel Addressing: None

Camera Gain: 1.00

ADC Level: 12 bit

Relative Position (X,Y): (0.0,0.0) μm

MEASURES

Axis (dSigma X, dSigma Y): (1892.0,1650.0) μm

Effective Diameter: NA

Ellipticity: 87.2 %

Orientation: 0.0 degrees

Centroid (X,Y): (-253.4,-121.7) μm

Peak (X,Y): (-302.5,-88.0) μm

Peak Saturation Level: 55.3 %

Peak to Average Ratio (X,Y): (1.8,1.6)

Relative Centroid (X,Y): (-253.4,-121.7) μm

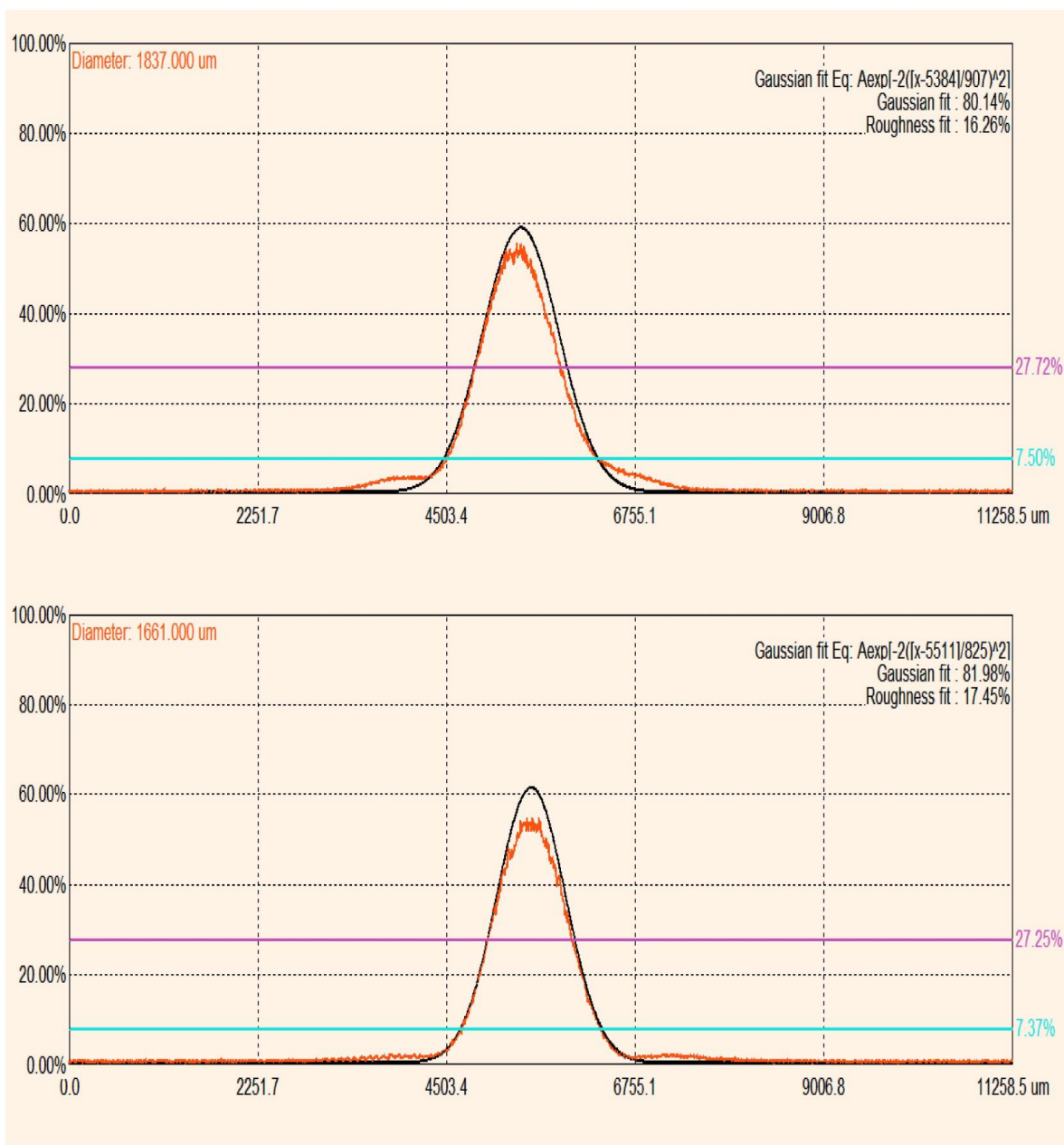
Relative Peak (X,Y): (-302.5,-88.0) μm

Pic. 3. Data measured at 40 cm from laser output.



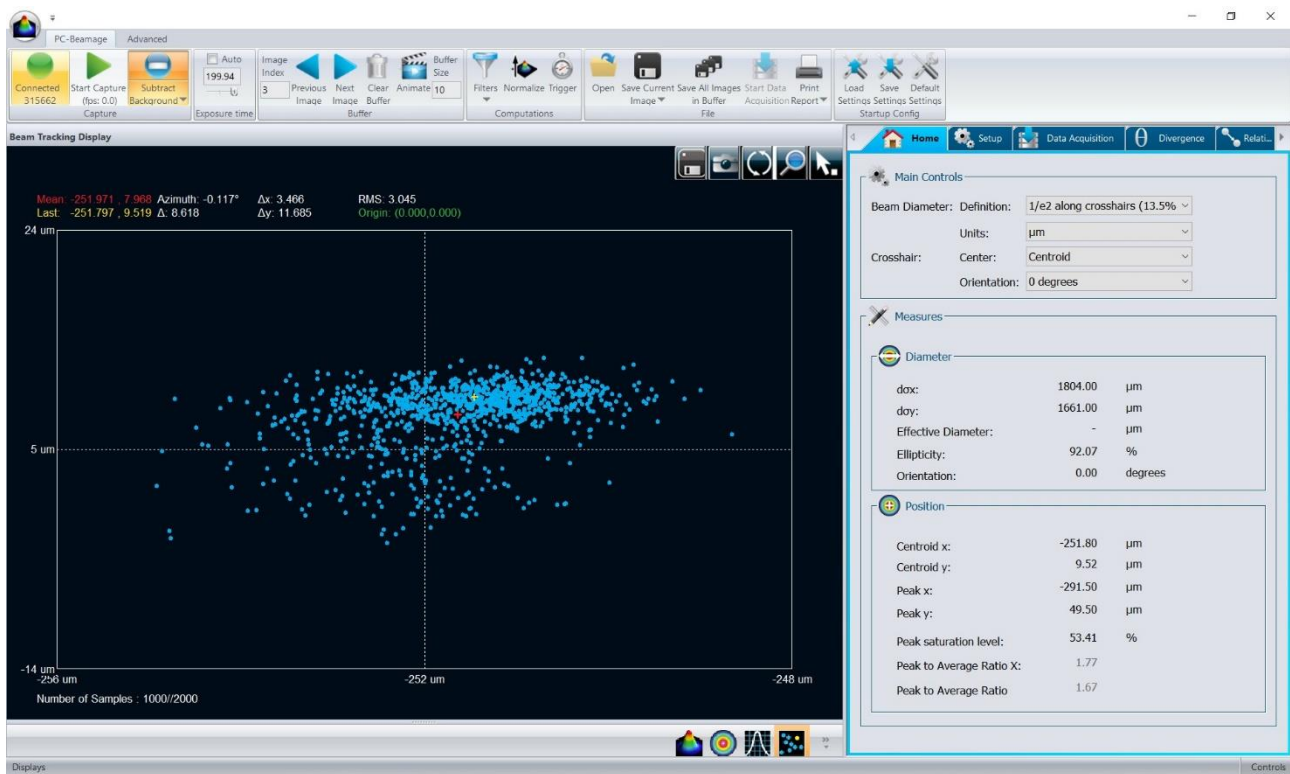
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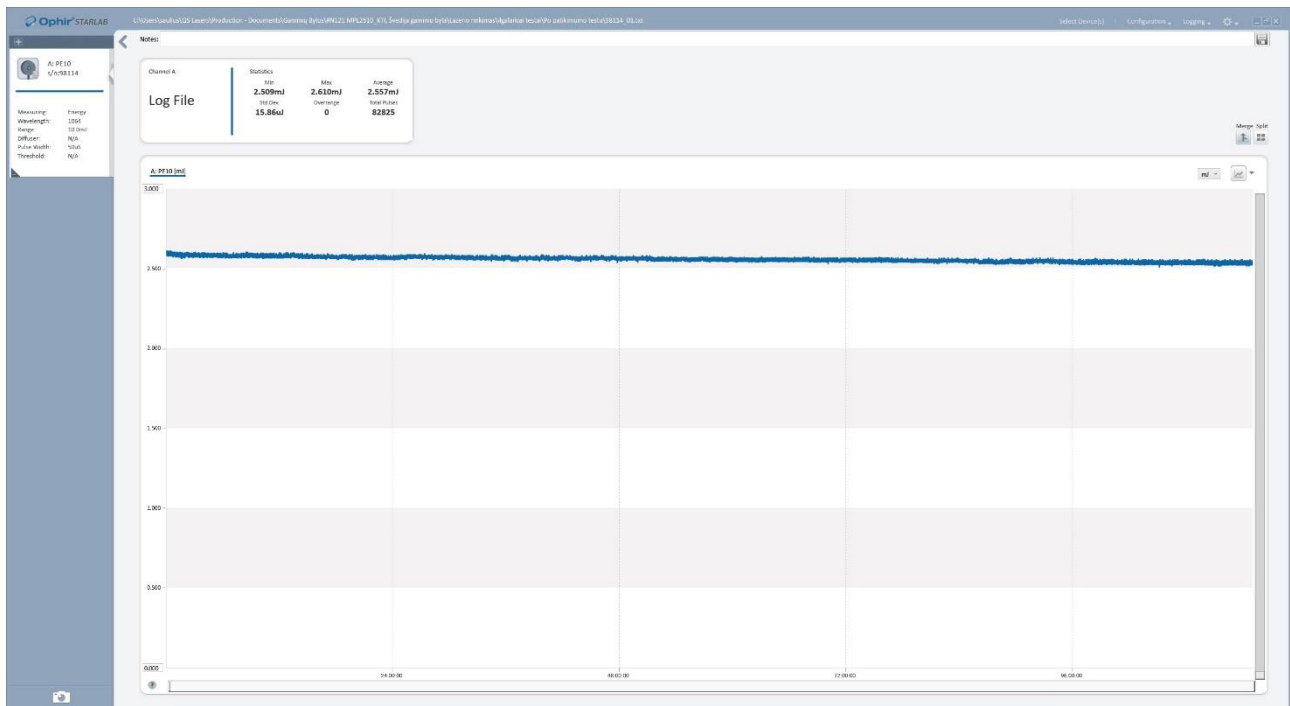
Pic. 4. Data measured at 40 cm from laser output.

Beam pointing stability (measured at 40 cm from laser):



Pic. 5. Data measured at 40 cm from laser output.

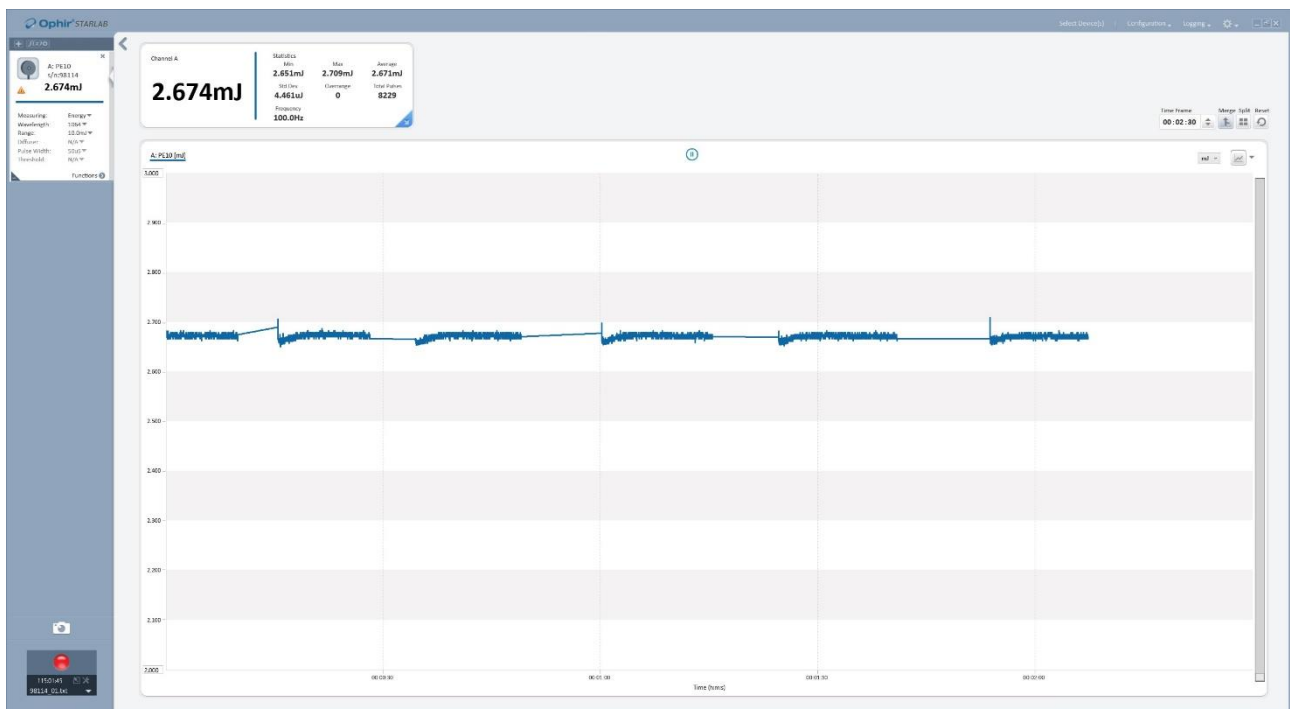
Pulse energy stability tests:



Pic. 6. Measurement of long-term energy stability. Energy stability ~0.5 % RMS over 112 hours.

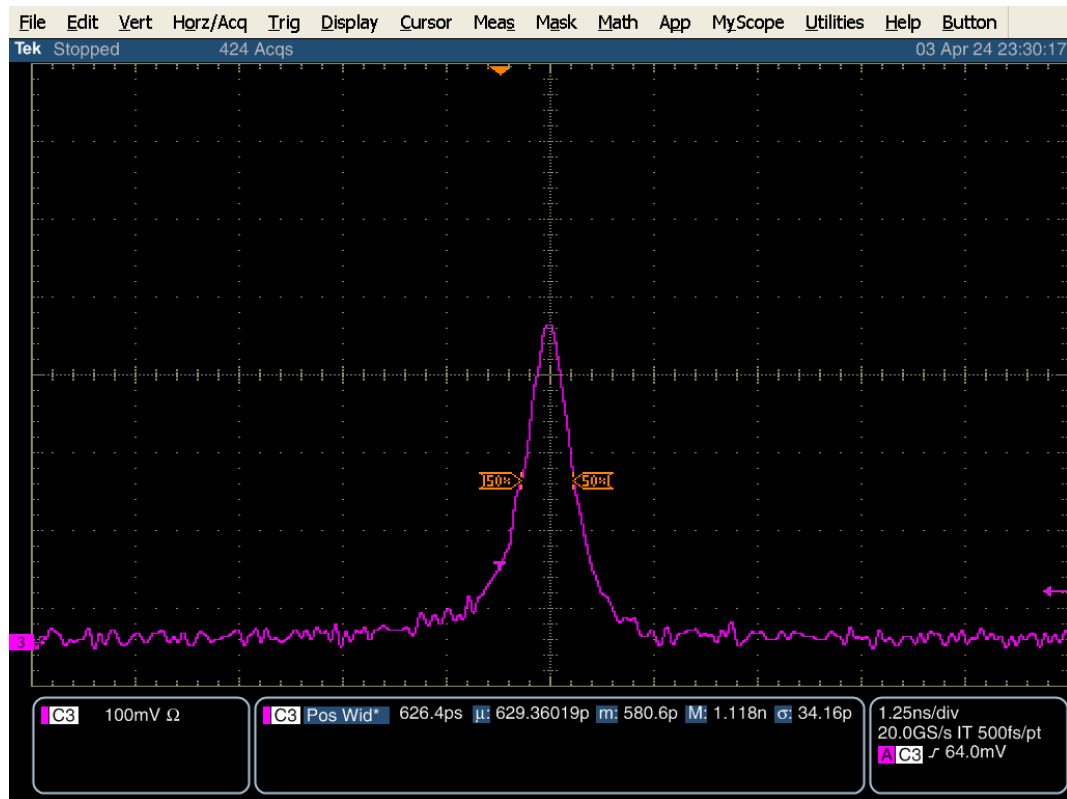


Pic. 7. Measurement of short-term energy stability. Energy stability $\sim 0.25\%$ RMS over 6 hours.

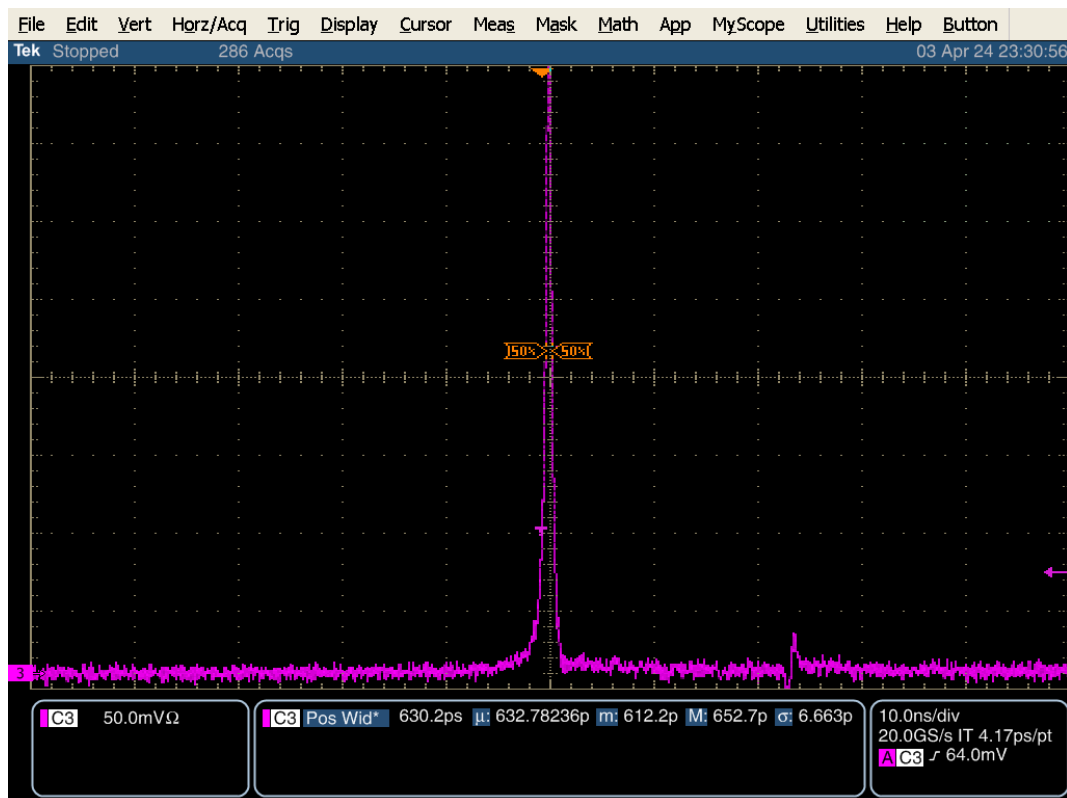


Pic. 8. Measurement of energy stability in turn off/on operation.

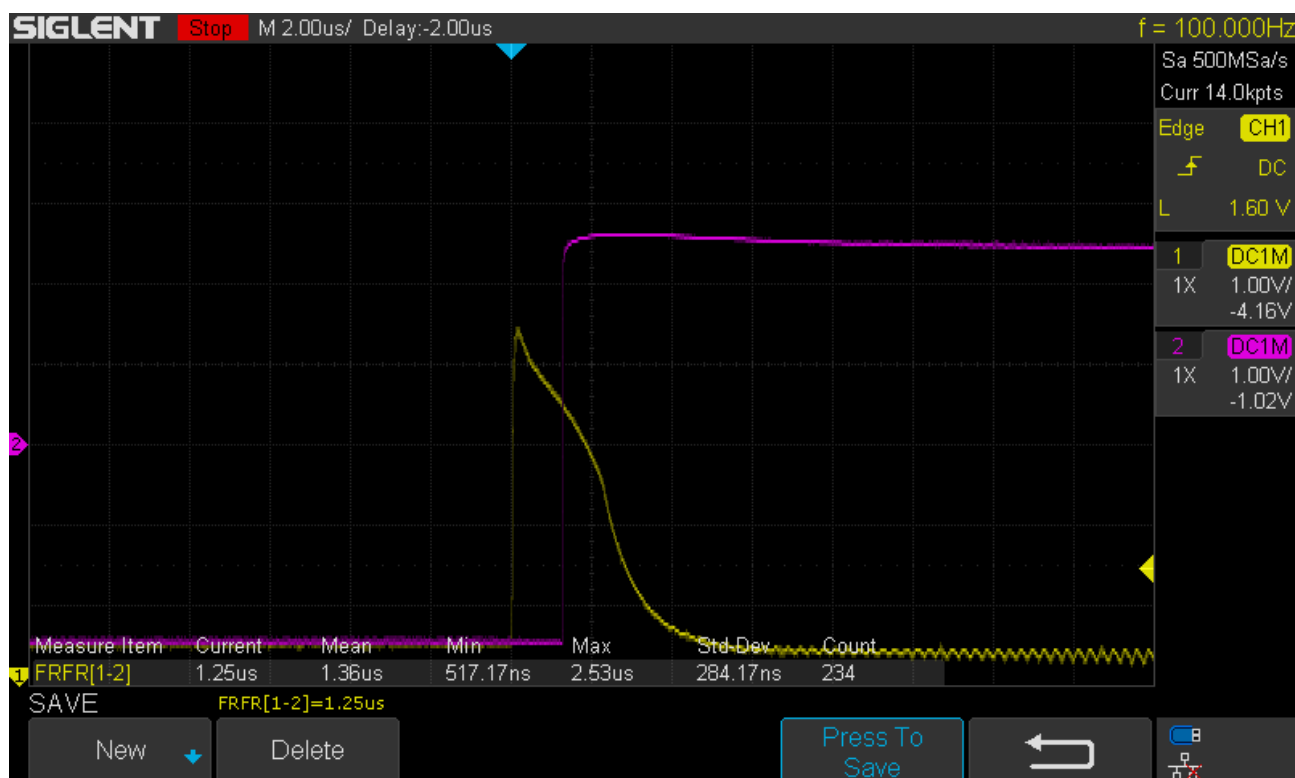
Temporal characterization of laser pulses:



Pic. 9. Measurement of pulse duration. The pulse duration is 265 ps. (at FWHM level, included apparatus function).



Pic. 10. Measurement of pulse temporal quality.



Pic. 11. Measurement of optical pulse jitter.

Factory settings

Laser model *MPL2510 (passive Q-Switching)*

Serial Number *N121*

Parameter	Measured
Operating LD Pump current	200 A
Simmer pulse current	132 A
Operating regime	Passive Q - switching
Pump pulse duration	300 μ s
Simmer pulse duration	300 μ s
Ambient temperature	26 $^{\circ}$ C
Preset TEC1 temperature	20.5 $^{\circ}$ C
Preset TEC2 temperature	30 $^{\circ}$ C
Max preset temperature	45 $^{\circ}$ C
Min preset temperature	10 $^{\circ}$ C
Repetition rate	100 Hz
Max current set limitation	250 A
Passive q-switch #	PO20221020-01JM, 6cm-1
Pulse count	44317520
Laser diode serial number	CN: 111527
Laser driver serial number	SN: QSL 1097
Laser driver model	LDX220C

Test officer: *Saulius Frankinas*

Date of test: *2024 April 3rd*