GRENOUILLE MODEL 8-50-ECO

THE WORLD'S MOST POWERFUL AND CONVENIENT ULTRASHORT-LASER-PULSE MEASUREMENT DEVICE FOR UNDER US$10K

Swamp Optics now offers the re-engineered very economical (ECO) GRENOUILLE.

Like all other Swamp Optics' **FROG** devices, it yields the **pulse intensity and phase vs. time** and the **spectrum and spectral phase** with high accuracy and reliability **in real-time**, making no assumptions about the pulse or its shape. It measures the actual pulse, not the coherent artifact.

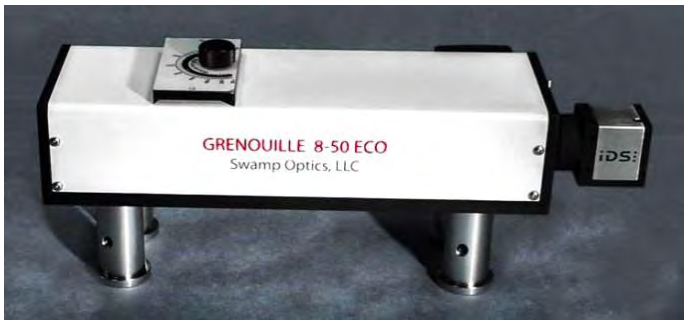
The Model 8-50-ECO qualitatively indicates, but does not measure, the **spatial chirp** and **pulse front-tilt**. It can measure one single pulse, but it can't be triggered to measure a specific single pulse in a train of pulses. However, all of these features are available in the Model 8-50-USB.

GRENOUILLE also reveals possible pulse-shape instability in a pulse train.

Its accompanying pulse-retrieval software is very easy to use, elegant, and free!

Remarkably, all GRENOUILLEs **require no alignment—ever!** Even placing one in the beam is remarkably easy.

And weighing only about 1 kg, it's light and compact, with a footprint smaller than a foot!



GRENOUILLE AT A GLANCE

- **The pulse intensity and phase vs. time**
- **The pulse spectrum and spectral phase vs. wavelength**
- **Measures the actual pulse, not the coherent artifact**
- **The beam spatial profile**
- **The autocorrelation**
- **No assumptions**
- **No alignment**
- **Very easy to use**
- **High sensitivity**
- **Real-time operation**
- **Minimal weight and size**
- **Laptop and USB compatibility**

A single GRENOUILLE can measure pulses from a wide variety of sources, from the lowest-power oscillator to the highest-intensity amplifier.

Voted one of the year's 100 most technologically significant inventions in 2003 and one of the top 25 new optics products of 2004, GRENOUILLE represents a huge leap forward in ultrashort-pulse-measurement technology.

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GRENOUILLE 8-50-ECO SPECIFICATIONS

FROG/GRENOUILLE model	Model 8-50-ECO
Center-wavelength range	700 – 1100 nm
Pulse-length range @ 800 nm	~50 - ~500 fs
Pulse-length range @ 1050 nm	~30 fs – ~100 fs
Delay increment (resolution)	1.15 fs / pixel
Temporal range[1]	1.9 ps
Spectral resolution @ 800 nm	0.7 nm
Spectral resolution @ 1050 nm	2 nm
Spectral range[1] @ 800 nm	50 nm
Spectral range[1] @ 1050 nm	125 nm
Pulse complexity	Time-bandwidth product <~10
Intensity accuracy	2%
Phase accuracy	0.01 rad (intensity-weighted phase error)
Single-shot operation?	Yes
Sensitivity (single-shot)	1 μJ
Sensitivity (at 10^3 pps)	100 μJ (100 nJ)
Sensitivity (at 10^8 pps)	10mW (100 pJ)
Spatial-profile accuracy	<0.2 % (Camera has true 8 bits and 480 x 640 pixels)
Spatial-chirp accuracy (dx/dλ)	NA
Pulse-front tilt accuracy (dt/dx)	NA
Required input polarization	Horizontal
Desired input-beam diameter	2 - 4 mm
Input-beam lateral-displacement tolerance	>1 mm
Number of alignment knobs	zero
Time to set up	15 minutes
Dimensions (L x W x H)	33 mm x 12 mm x 8 mm
Weight	1 kg

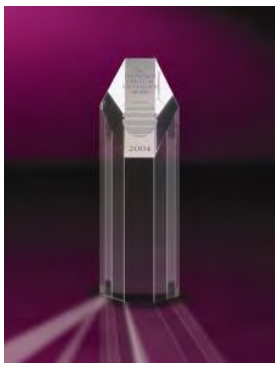
1. Temporal and spectral ranges are the full-scale ranges, not the pulse FWHM (which is typically a factor of 3 smaller).

ADDITIONAL NOTES

- Absolute wavelength is determined to a few nm by the calibrated crystal-angle dial.
- GRENOUILLE is a second-harmonic-generation (SHG) FROG and hence has an ambiguity in the direction of time, but this one-bit ambiguity can be removed easily. (In contrast, other techniques have infinitely many non-removable ambiguities.)
- Feedback on measurement quality is obtained from comparison with the retrieved trace. Indeed, it has recently been shown that alternative pulse-measurement techniques suffer from "coherent artifact" problems and so under-estimate the pulse length significantly when pulse-shape instability is present. GRENOUILLE does not suffer from this problem and has recently been shown to reveal pulse-shape instability better than any other method.
- Input-beam mode quality should be at least fair (single transverse mode is not required).
- Just connect the USB cable to your laptop or desktop; no power supply needed.

R&D 100 Award Winner

Circle of Excellence Award Winner



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