NIREOS

GEMINI 2D

INTERFEROMETER

for time-resolved measurements

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The GEMINI 2D is the advanced model of the GEMINI interferometer.
It is a compact and ultra-stable interferometer, capable of generating a pair of **collinear and phase-locked replicas of ultra-short pulses**, with unrivaled stability and robustness.

The GEMINI 2D is specially designed to:

- keep constant the **dispersion** introduced during the scan of the delay between the two replicas
- keep fixed the **absolute arrival time** of one of the two replicas (with attosecond stability)

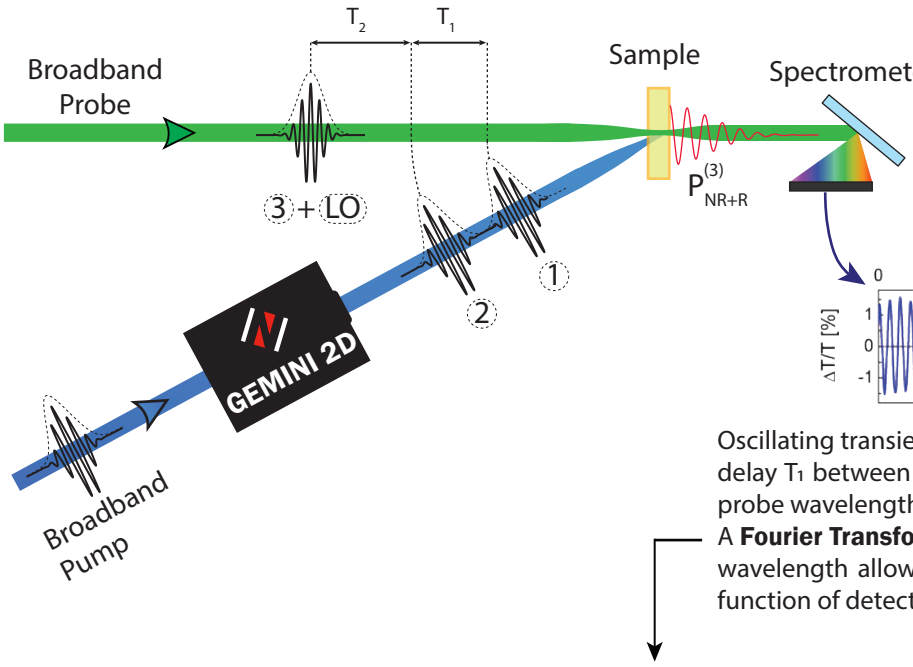
- High throughput
- 1 attosecond stability
- Scan range selectable by the user
- Compact and insensitive to vibrations

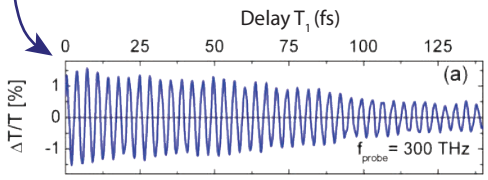
Main Applications

The GEMINI 2D is the ideal device for **time-resolved measurements**,
where it is crucial to preserve the pulse duration and the synchronization with other light pulses.

Perfectly suitable for **two-dimensional (2D) spectroscopy experiments**,
to generate a pair of collinear and phase-locked pump pulses

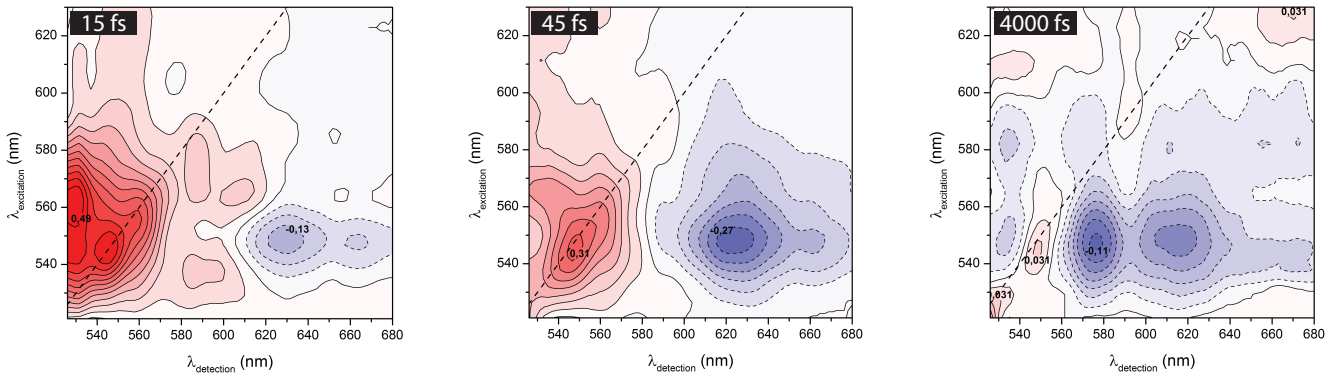
Two-dimensional Spectroscopy (in pump-probe geometry)





Oscillating transient signal as a function of the relative delay T_1 between the two pump pulses at a selected probe wavelength and at a fixed population time T_2. A **Fourier Transform** as a function of T_1 for each probe wavelength allows one to retrieve the 2D maps as a function of detection and excitation wavelengths.

Bidimensional maps of 2D Electronic Spectroscopy measurements obtained on a Light Harvesting (LH1) complex of a sample of Rhodospirillum Rubrum for three different population times T_2 (15 fs, 45 fs, 4000 fs).



• The GEMINI 2D interferometer is placed in the pump beam before the sample, allowing one to generate two collinear and phase-locked pump pulses (1 and 2) with a relative variable delay T_1 (coherence time).

• The absolute arrival time of pulse 2 is kept fixed in order not to change the delay T_2 (population time) during the scan of T_1.

• In the pump-probe geometry, the rephasing and non-rephasing signals - P_{NR+R} - are emitted in the same direction as the probe (3), which also acts as a local oscillator (LO) that heterodynes them on the detector.

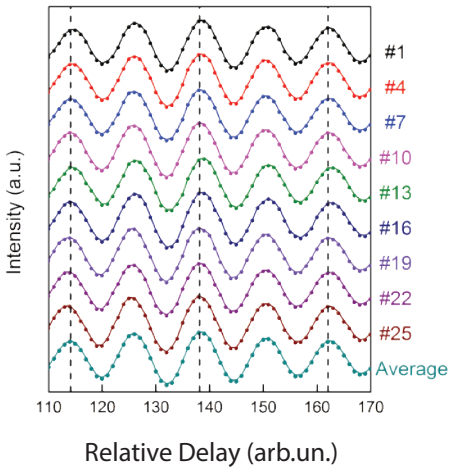
D. Brida et al., Opt. Lett. 37, 3027-3029 (2012).

J. Réhault et al., Rev. Sci. Instrum. 85, 123107 (2014).

R. Borrego-Varillas et al., Opt. Express 24, 28491-28499 (2016).

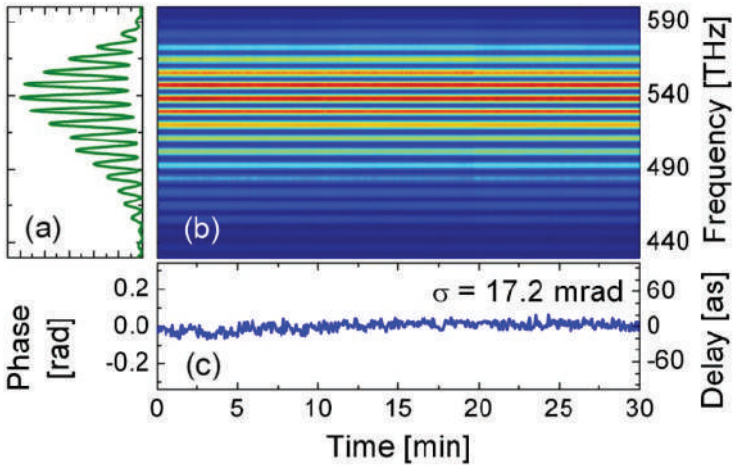
Performances

REPEATIBILITY TEST



Interference patterns between the two replicas generated by the GEMINI 2D Interferometer, measured for different scan number indicated on the right. The lower one is the average of 40 scans. The measurements show an exceptional repeatibility!

STABILITY TEST

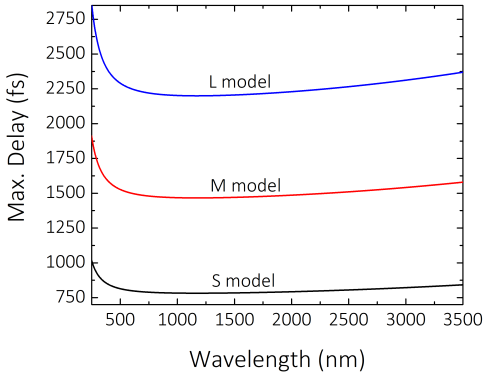


(a) Fringe pattern generated by the interference of the two replicas created by the GEMINI 2D Interferomter; (b) sequence of fringe patterns acquired by keeping the relative delay fixed for 30 min; and (c) corresponding phase fluctuations. The phase jitter is less than 1/360th of the optical cycle.

Technical Specifications

VERSION		S	M	L
Spectral range [nm]		250 - 3500		
Max. Delay τ [fs @ λ=600 nm]	SYM	± 500	± 850	± 1225
	ASY	-200 → 800	-200 → 1500	-200 → 2250
Delay τ Stability		< 1 attosecond		
Modes of Operation		Continuous Scan or Step Scan*		
Dimensions [mm]		180 x 180 x 90		
Weight [kg]		3		

*In step scan mode, the user can select the dwell time for each delay via software



Maximum delay relative to the asymmetric (ASY) configuration achievable with the three different models (S, M and L) as a function of wavelength.

Specifications can be subject to change without notice.
For more information, please contact us via e-mail at **info@nireos.com**
or visit our website **www.nireos.com**

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