

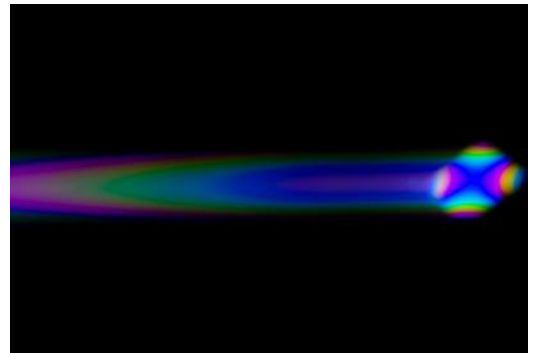
GEMINI *an ultra-stable interferometer*

GEMINI is a novel and compact interferometer that can guarantee very high robustness and stability between the two generated replicas of light.

The exceptional performances of this device can be exploited in many different applications, such as time- and frequency-resolved fluorescence, coherent Raman, pump-probe, two-dimensional spectroscopy and studies on single molecules.

Key Features

- High throughput that allows high sensitivities
- ≈ 1 attosecond stability between the two replicas of light
- Fast scans (<1 sec.)
- Scan range selectable by the user
- Compact and low-cost
- Insensitive to vibrations



Applications

- Interferometry
- Generation of pulse pairs

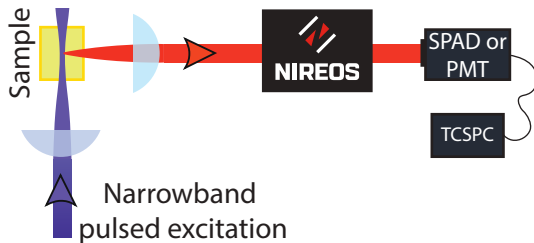
GEMINI IN DETECTION PATH

- Time- and frequency- resolved fluorescence
- Pump-probe spectroscopy
- Coherent Raman spectroscopy

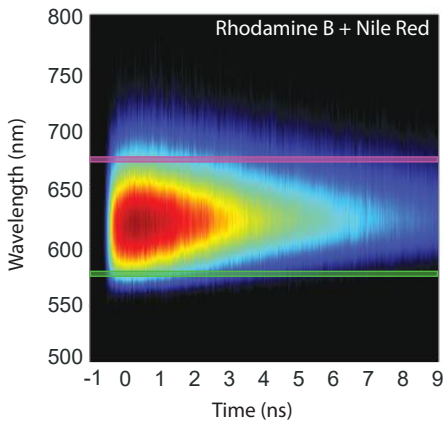
GEMINI IN EXCITATION PATH

- Characterization of single molecules

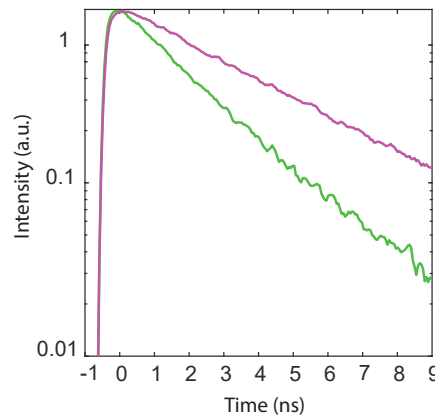
Time- and frequency-resolved fluorescence with a single TCSPC detector



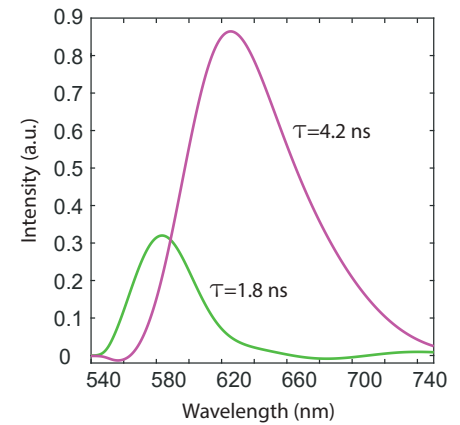
Experimental setup: GEMINI interferometer is placed in collection before the detector (a SPAD or PMT) connected to a TCSPC. This allows one to resolve the fluorescence wavelength axis while preserving the temporal resolution.



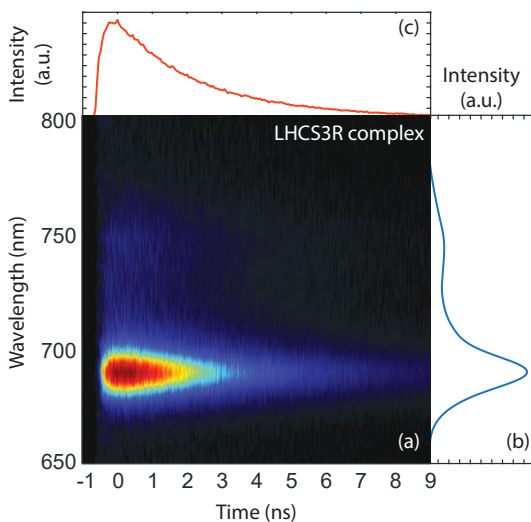
Fluorescence maps as a function of detection wavelength and emission time for a mixture of Rhodamine B and Nile Red in acetone solution.



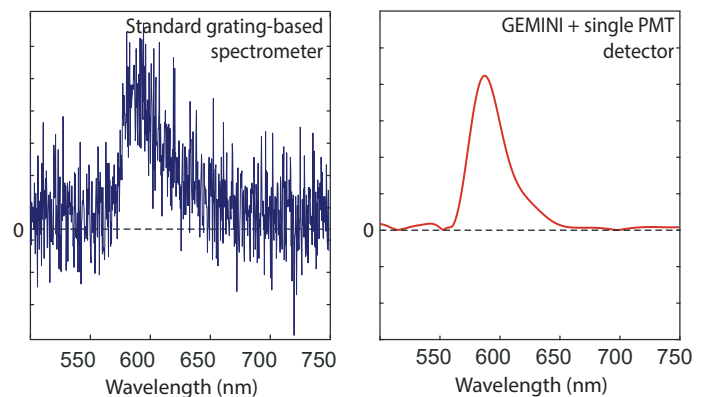
Semi-log plots of fluorescence decay traces at ≈ 575 nm (green curve) and ≈ 675 nm (purple curve).



Integrated spectra of the two fluorophores computed from the correspondent Decay Associated Spectra (DAS) and lifetimes.

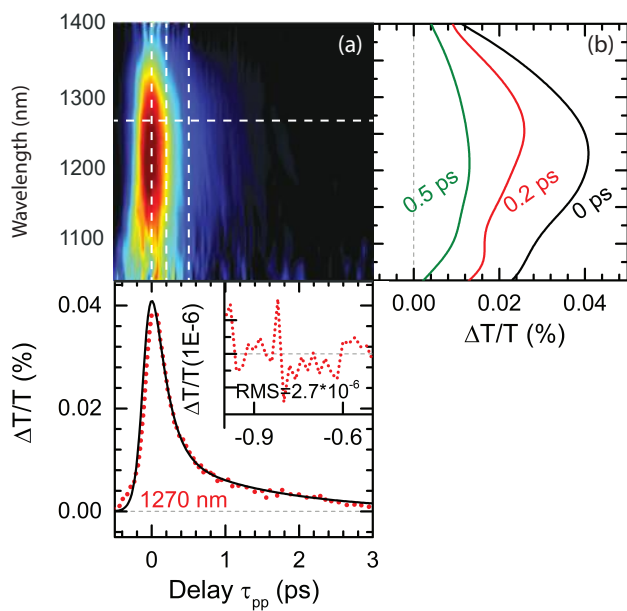
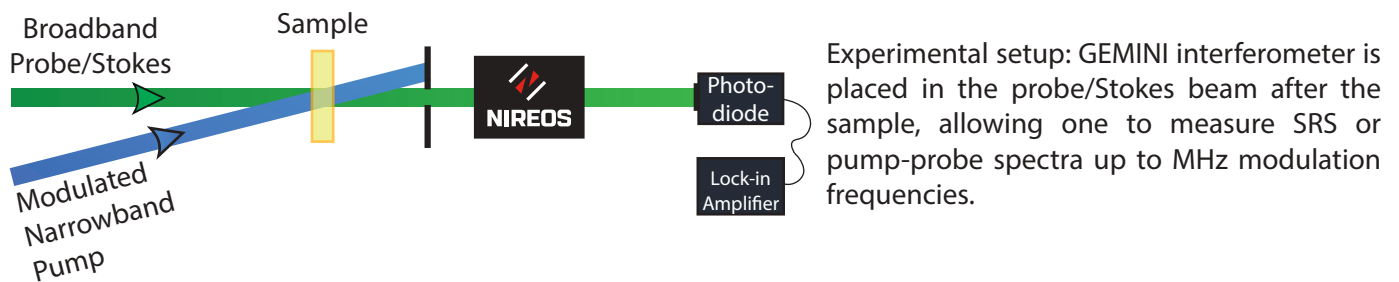


(a) Fluorescence map of the LHCSR3 complex from *C. reinhardtii*; (b-c) Marginals of (a), obtained by integrating the map along the horizontal and vertical directions, respectively, showing the overall fluorescence spectrum and decay dynamics.

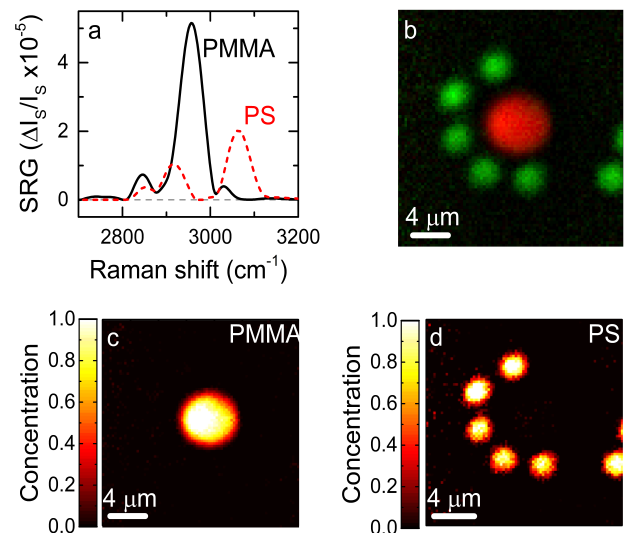


Comparison of fluorescence emission spectra of Rhodamine B, measured in the same experimental conditions. Excitation laser: $\lambda = 530$ nm, $P = 1 \mu\text{W}$.

Coherent Raman (Stimulated Raman Scattering - SRS) and Pump-Probe Spectroscopy

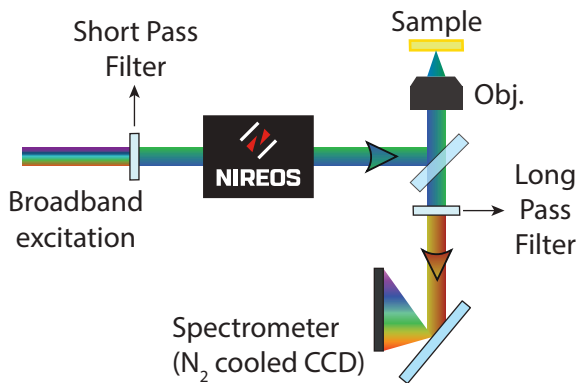


(a) Two-dimensional $\Delta T/T(\lambda, \tau)$ map for a graphite sample prepared by liquid phase exfoliation. (b) $\Delta T/T$ spectra at selected probe delays; (c) $\Delta T/T$ dynamics at 1270-nm probe wavelength (red circles) together with a bi-exponential fit (black solid line). Inset: zoom of the signal for negative delays.



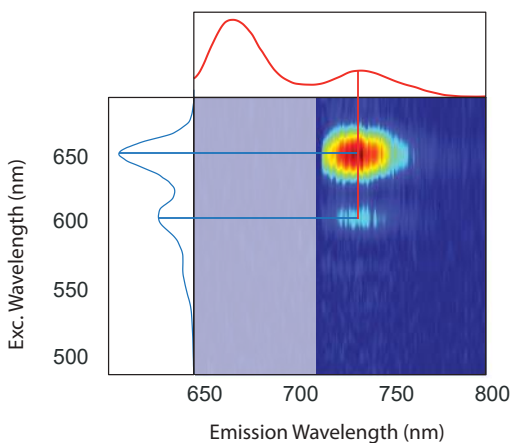
Chemometric analysis of the acquired dataset. (a) SRS spectra for PMMA (solid black line) and PS (dotted red line). (b) False-color image of the sample, showing a central bead of PMMA (in red), surrounded by smaller beads of PS (in green). (c) and (d): concentrations maps of PMMA and PS.

Excitation-Emission Maps (EEMs) of Single Molecules

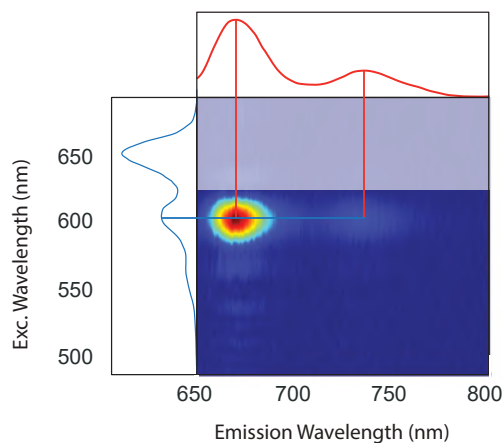


GEMINI interferometer allows the characterization of single molecules with **low acquisition times** and **exceptional accuracy and sensitivity**

SINGLE MOLECULE EEM (FULL EXCITATION MAP)



SINGLE MOLECULE EEM (FULL EMISSION MAP)

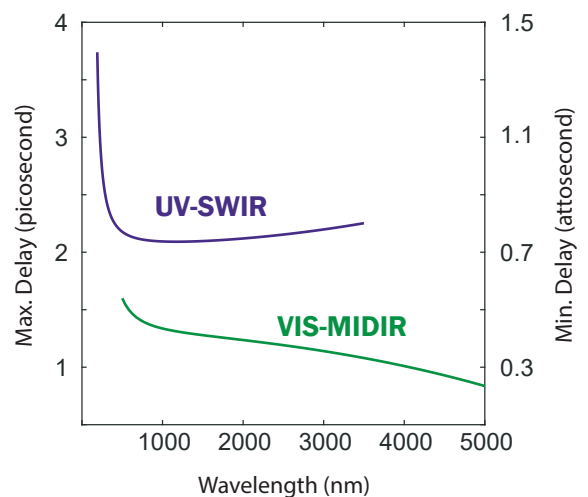


Sample: Terrylene diimide molecules (TDI) embedded in Polystyrene

Acquisition Time: 5 minutes

Technical Specifications

	UV-SWIR	VIS-MIDIR
Spectral Range	200-3500 nm	500-5000 nm
Delay Stability	Below 1 attosecond	
Modes of Operation	Step Scan or Continuous Scan	
Dimensions	10 x 8 x 8 cm	
Weight	750 g	



Specifications can be subject to change without notice.
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 or visit our website www.nireos.com