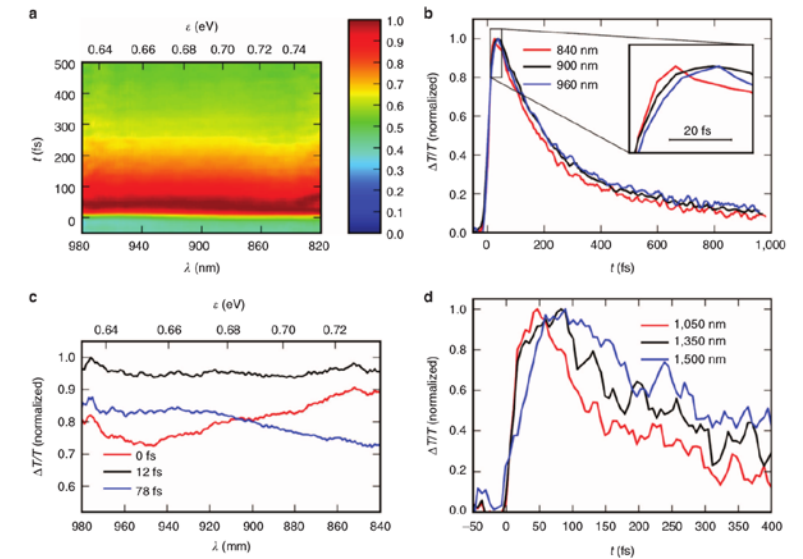
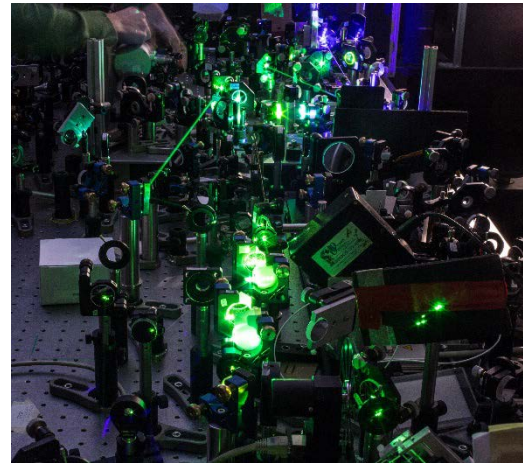
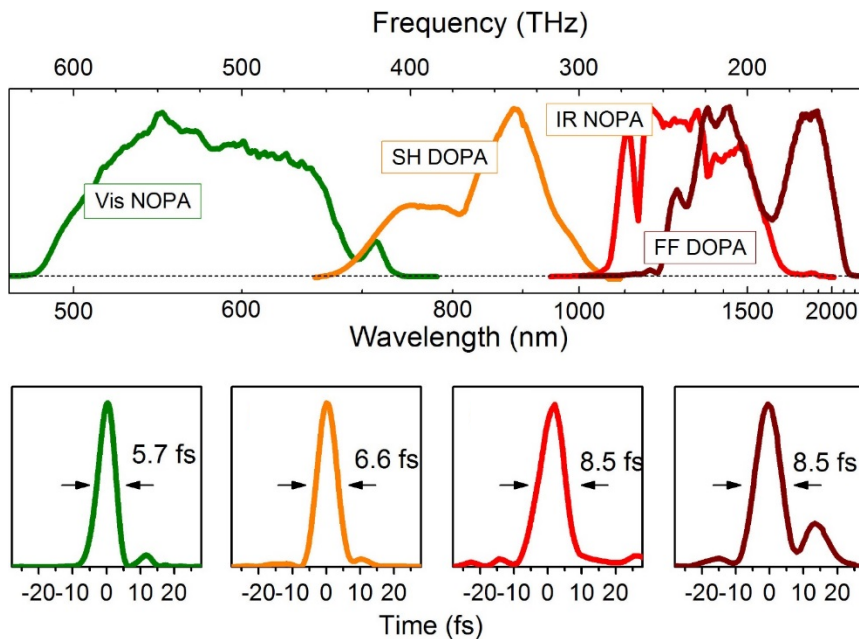


The institution



Institute for Photonics and Nanotechnology | CNR | Headquarters: Politecnico di Milano

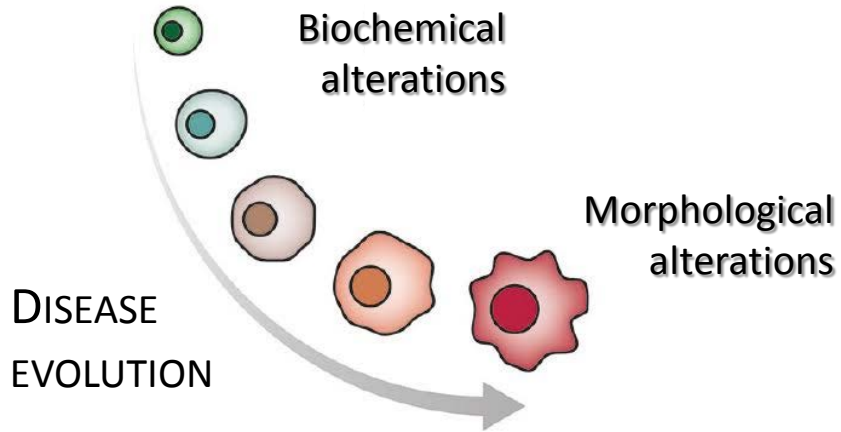
- leader in fs laser science, **ultrafast nonlinear optics**
- Generation and characterization of **tunable femtosecond light pulses**
- state-of-the-art time-resolved spectroscopic systems
- developing new strategies for **hyperspectral imaging**



D. Brida et al. , Ultrafast collinear scattering and carrier multiplication in graphene, DOI: 10.1038/ncomms2987

Imaging in the MIR Spectral range

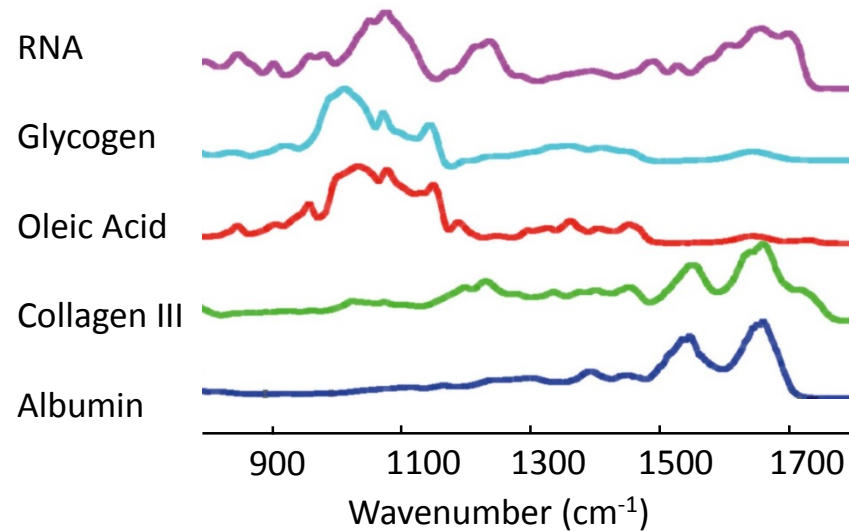
Detection of biochemistry at tissue level



HOW TO **DETECT** BIOMOLECULES?



vibrational spectrum in the **MIR** (Fingerprint region 5-10 μm)
RAMAN: Low cross-section



O. J. Old et al. "Vibrational spectroscopy for cancer diagnostics."
Analytical Methods 6, 3901 (2014)

Imaging in the MIR Spectral range

Current technologies:

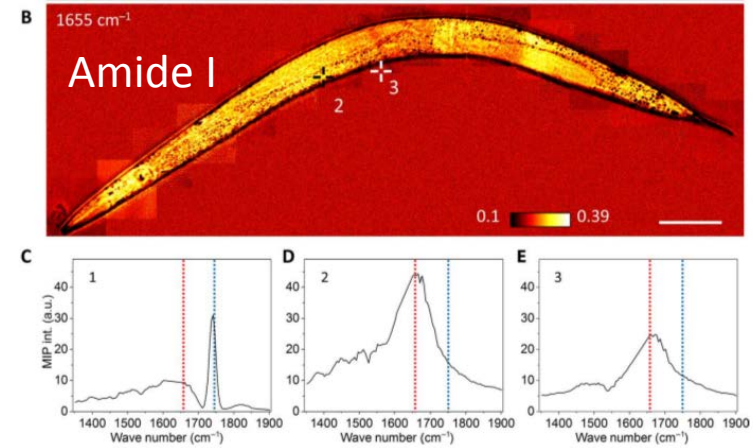
Frequency sweeping

QCL lasers:

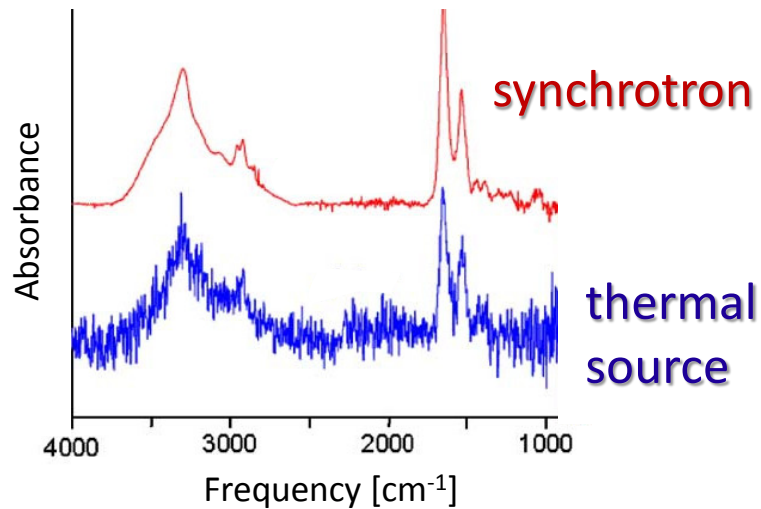
CW, narrowband, measurement at selected frequencies

Time scan:

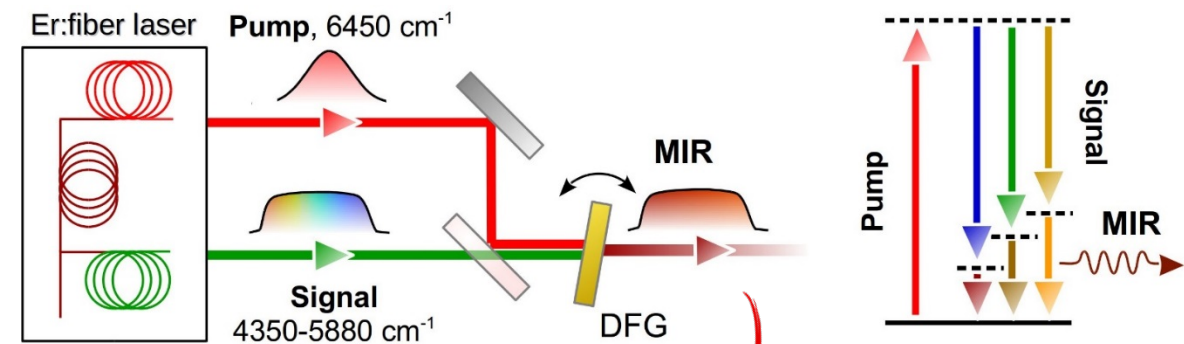
Broadband sources, collection of full spectrum



Zhang et al. Sci. Adv. 2016; 2 : e1600521



Need of a **compact, high-brightness** MIR source comparable to a synchrotron source



- High average power (5-10 mW)
- Broadband (1000-1800 cm^{-1})