

The Femtoscopy Laboratory for Ultrafast Spectroscopy @ Physics Department, Sapienza University of Rome

is looking up to a

Postdoctoral fellow in the area of

Ultrafast Raman spectroscopy.

Femtosecond Stimulated Raman Scattering (FSRS) and an Impulsive Vibrational Scattering (IVS) setups are available at our laboratory for performing **pump-probe vibrational spectroscopy** with a time precision of ~ 10 fs and a $\sim 10\text{cm}^{-1}$ energy resolution, in both frequency and time domain. Combined with our sub-picosecond transient absorption setup they represent the ideal tools to **address the dynamics** of intermediates involved in **chemical reactions** of **biomolecules** or the ultrafast **photocarrier dynamics** in **solid-state compounds** induced by a femtosecond optical trigger.



The following research lines are currently available:

- Photoinduced relaxation in Lead Halide Perovskite: [lattice dynamics upon photocarrier injection probed by impulsive Raman spectroscopy](#).
- [Ultrafast processes in biomolecules](#): time-resolved Raman spectroscopy of Hemeproteins, conjugated molecules, nucleoside and photosynthetic complexes.
- Development of novel time-resolved Impulsive Vibrational spectroscopy: wisely shaped pump and probe pulses for [dissecting vibrational signatures with innovative experimental protocols](#).
- [Multidimensional Coherent Raman spectroscopy](#): development and the application of a 2D-Raman apparatus, with wisely shaped pump and probe pulses for dissecting vibrational mode couplings in electronic excited states.
- [Time-resolved Raman spectroscopy of low-dimensional materials](#): graphene and transition metal dichalcogenides.
- [Deep Learning assisted ultrafast spectroscopy](#): interpreting nonlinear and time-resolved vibrational experiments via neural networks.

Available Laser Sources:

- 10W Pharos: Diode-pumped Yb medium source at 1030 nm, repetition rate from single shot to 1 MHz, 200 fs time duration;
- 20W Pharos: Diode-pumped Yb medium source at 1030 nm, repetition rate from single shot to 200 kHz, 200 fs time duration;
- Coherent Legend Elite: Ultrafast Ti:Sapphire Amplifier pumped by a Coherent Micra Modelocked Oscillator, covering sub-50 fs operation at 800 nm, 1 kHz repetition rate;
- FemtoFiber pro Toptica: 80MHz repetition rate, wavelength tunable 780 nm - 1560 nm source.

The available instrumentation includes several commercial and home-made Optical Parametric Amplifiers for spectral shaping/tuning, **assembled in fully operating FSRS/IVS/TA setups.**

Initial appointment is for 1 year with possible extension upon mutual consent.

Your profile:

Candidates with hands on background in linear and non-linear optics are encouraged to apply. Previous experiences with ultrafast lasers and/or resonance Raman spectroscopy and/or transient absorption are highly appreciated. Excellent communication skills and team spirit are required.

Your task:

Prepare and carry out FSRS/IVS/TA experiments together with our team. **Develop your own research within the areas of interest of the group.** For an overview of our current research see: <https://sites.google.com/uniroma1.it/femtoscopia/publications>

Applications (including CV, list of publications and coordinates of at least two referees) should be addressed by email to: Tullio Scopigno (tullio.scopigno@uniroma1.it) and Giovanni Batignani (giovanni.batignani@uniroma1.it).