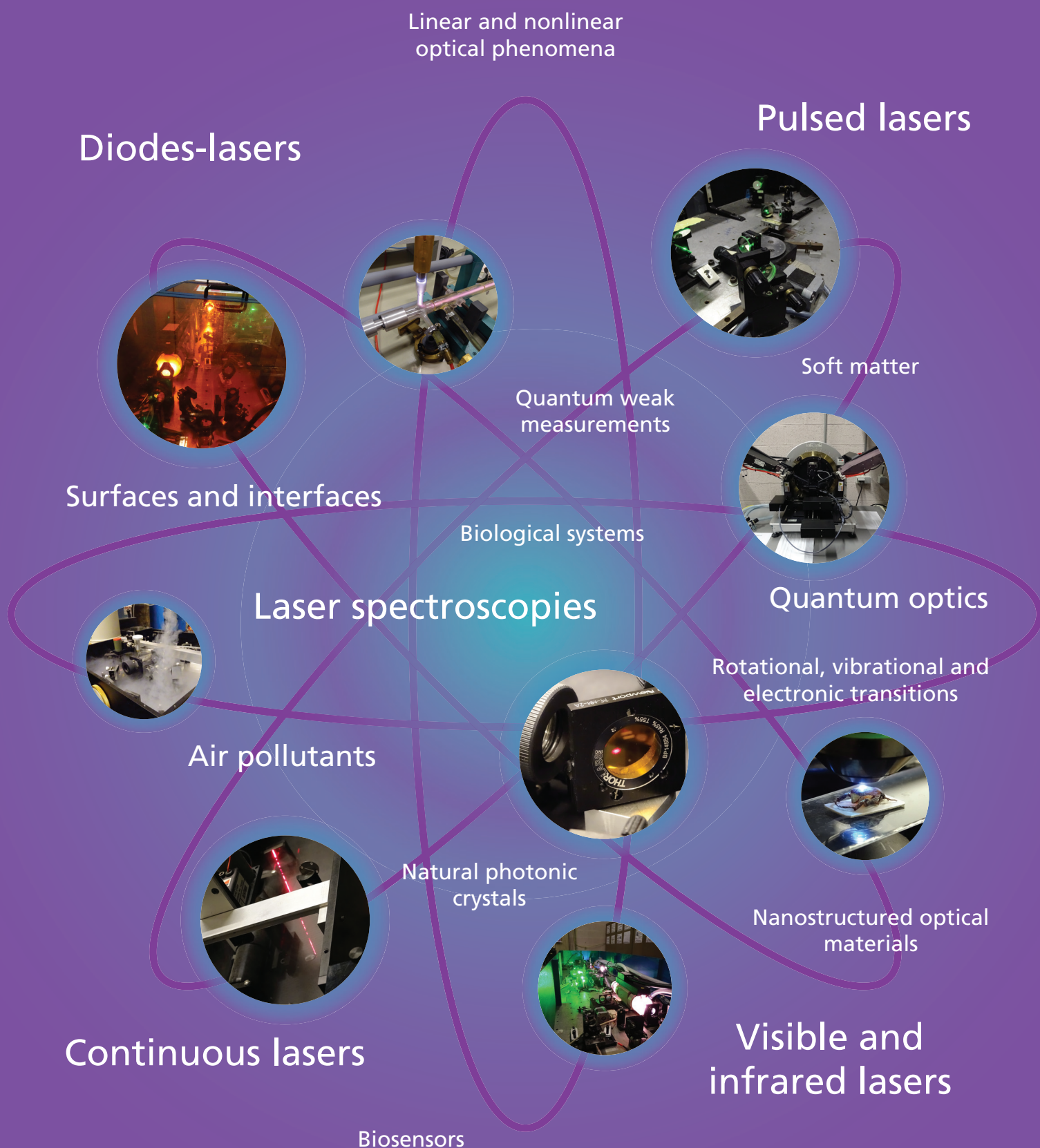




Our research is supported by

DESCRIPTION

The Lasers, Optics & Spectroscopies platform (LOS) applies advanced optical measurements to the characterization of matter, light, and light-matter interactions for fundamental or applied researches.

Optical phenomena are used to investigate matter in the gas and solid-state phases, with target topics related to the study of air pollutants, Earth and planetary atmospheres, surface/interface/nanostructured materials properties, biological and bio-inspired systems and biosensor devices.

EXPERTISE

The platform provides a unique expertise in the spectroscopic study of the rotational, vibrational, electronic, and scattering properties of matter as probed in linear and nonlinear optical processes generated by dedicated lasers and optical sources. The platform allows the analysis of gas traces, molecular films at interfaces, biological systems, 2D and 3D nano-systems. Together with experimental skills, the platform develops analytical and computational models to interpret the measured photon-matter interactions.

EQUIPMENT

- Ellipsometry (SOPRA GES-5E)
- Dynamic Light Scattering (HORIBA NANOPARTICA SZ-100)
- Scatterometer (ELDIM EZ Contrast XL80MS) equipped with ELDIM EZ Reflex Source 300 W light source
- Double-beam spectrophotometer (PERKIN ELMER LMABDA 750S) equipped with integrating spheres, variable angle reflectance/transmittance accessory
- Fiber-optic spectrophotometers and accessories (ADVANTES)
- Diode-laser Infrared spectrometer cooled by cryostat (500-1500 cm^{-1})
- Diode-laser dual beam Infrared spectrometer cooled by liquid nitrogen (1500-3000 cm^{-1})
- Fourier Transform Infrared (FTIR) spectrometer equipped for bulk and surface reflection-absorption measurements (BRUKER V70)
- Sum-Frequency Generation (SFG) spectrometer (doubly resonant electronic/vibrational nonlinear optical spectrometer for solid and liquid surfaces) (Home-made)
- Second-Harmonic Generation (SHG) spectrometer (electronic nonlinear optical spectrometer for solid and liquid surfaces) (Home-made)
- Optical and fluorescence microscope (ZEISS Axio Imager Z1m)
- Optical microscope (OLYMPUS BX61) equipped with white light source and UV lamp (for hyperspectral imaging)
- Deuterium-halogen light source (OCEAN OPTICS DH 2000 BAL)
- CO₂ laser
- Picosecond Nd:YAG laser, 1064 nm, 532 nm, 355 nm (Home-made)
- Infrared tunable (1000-4000 cm^{-1}) Optical Parametric Oscillator (OPO) (Home-made)
- Visible tunable (400-700 nm) Optical Parametric Oscillator (OPO) (Home-made)
- Femtosecond laser, 1560 nm, 50 fs, 140 mW, 100 MHz (TOPTICA FemtoFERb)
- Electron-multiplying EM CCD Camera (HAMAMATSU C9100-13)
- Ultra-high vacuum chambers Compatible with SFG, FTIR and Auger spectroscopies
- Entangled photon source and a 4-head photon counting module

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