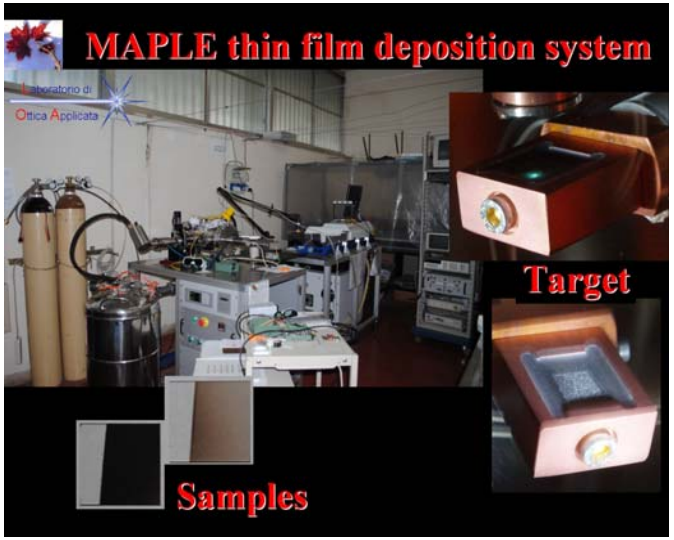
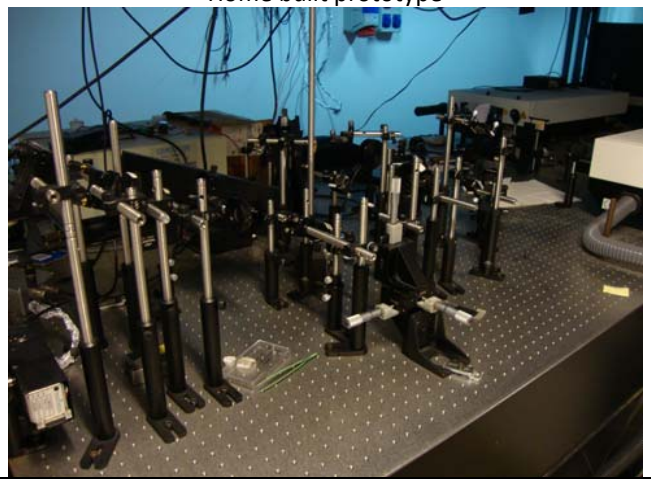
SPIN Equipments – Optical properties and characterization

Optical properties and characterization					
	Name	**Picture**	**Description**	**Site**	**Responsible**
1	Laser Nd:YAG		MAPLE (Matrix Assisted Pulsed Laser Evaporation) system for biomaterials and polymeric thin film deposition composed by a vacuum chamber (pressure down to 10^{-7} mbar) and a Q-switched Nd:YAG pulsed (7ns, 0.5-10Hz) laser operating in IR (1064nm, 1.17eV, 500mJ/pulse) VIS (532nm, 2.33eV, 100mJ/pulse) or UV (355nm, 3.49eV, 90mJ/pulse) with in place target refrigeration (liquid nitrogen, 77K) and substrate heating (up to ~470K	NA	Bloisi
2	Surface Second Harmonic Generation Apparatus	Home built prototype 	Experimental apparatus for phase-resolved second harmonic generation from surfaces for characterization of surfaces and buried interfaces. The set-up is based on a Nd:YAG laser system delivering pulses of 30 ps of duration at a repetition rate of 10 Hz and energy per pulse up to 60 mJ. The laser is provided with crystals for frequency duplication and triplication. The apparatus is completed with acquisition electronics based on a Gated Integrator for increasing the signal-to-noise ratio and permitting, hence, operation in the photon-counting regime.	NA	Paparo

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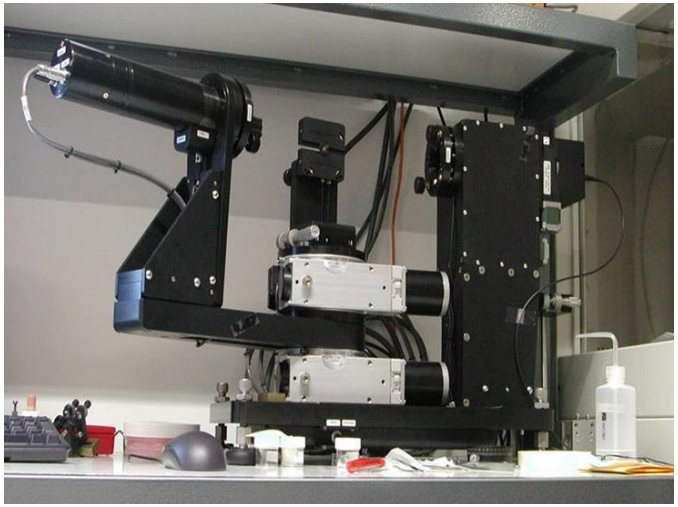
3	Spectroscopic ellipsometer		Spectroscopic ellipsometer for linear optical characterization of thin films and multi-layers (spectral range 270-1700nm)	NA	Tkachenko
4	Time-resolved photoluminescence spectroscopy system		Self-realized system composed of: Dispersing spectrometer + Streak Camera + Optical table and optical setup for excitation beam control and signal detection. Allows to perform time-resolved photoluminescence (TRPL) analysis in both wavelength and time domain (resolution of about 0.5 nm and 30 ps, respectively)	NA	Lettieri
5	Nonlinear microscopy and spectroscopy system	Home built prototype system	Self-realized system for second harmonic generation spectroscopy and nonlinear microscopy (SHG and electric-field induced SHG). Composed of: picosecond optical parametric oscillator (EKSPLA) + optical table and optical setup for polarization control + motorized monochromator + self-realized microscope setup + EMCCD camera for non-linear imaging. Self-realized system for second harmonic generation spectroscopy and nonlinear microscopy (SHG and electric-field induced SHG). Composed of: picosecond optical parametric oscillator (EKSPLA) + optical table and optical setup for polarization control + motorized monochromator + self-realized microscope setup + EMCCD camera for non-linear imaging.	NA	Lettieri

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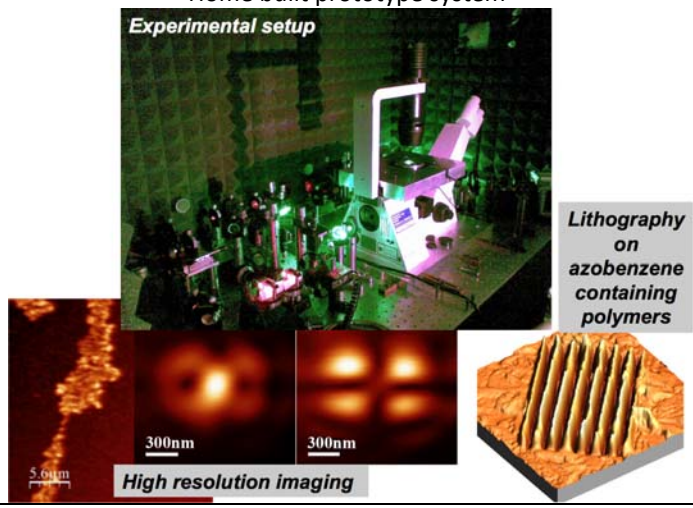
6	UV-VIS-NIR Spectrophotometer		Optical spectrophotometer operating in the UV-VIS-NIR range (190 nm - 2000 nm), allowing measurement of reflectivity, transmission and absorption spectra of liquids, and solid samples (approximately 5*5 mm^2 area or larger)	NA	Lettieri
7	Controlled environment electro-optical spectroscopy system	Home built prototype system	Self-realized system for electro-optical characterization, integrating photo-luminescence, absorbance and photocurrent spectroscopy at variable environment composition. Composed by monochromatized light source (tuning range: 250-900 nm), He-Cd laser (emission: 325 nm e 442 nm), CCD-based spectrometer, gas flow-meter.	NA	Lettieri
8	High-resolution Confocal Optical Microscope	Home built prototype system 	Home-made Confocal Microscope equipped with a high-resolution 3D piezo-scanner and a spectrograph. Two light sources are included, an Ar^+ laser (514 and 488nm wavelengths) and a Helium-Neon laser (632.8nm). So far, the system has been used for high-resolution spectral imaging of different samples; lithography on azobenzene-containing polymers; high-resolution imaging, by means of gold nanoparticles, of the field distribution in the focal plane of high numerical aperture aplanatic lenses.	NA	Ambrosio

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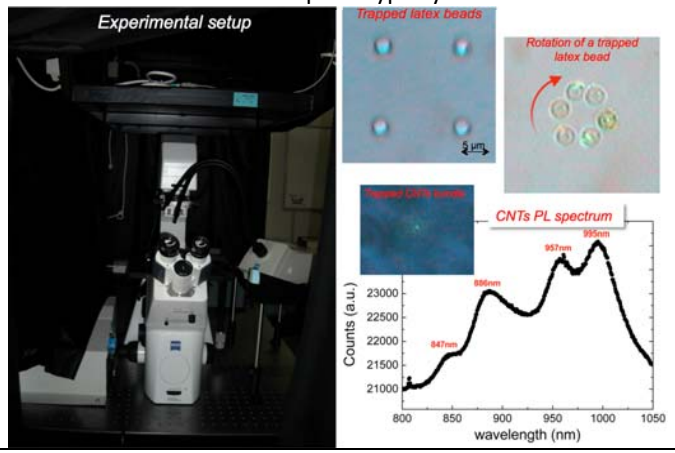
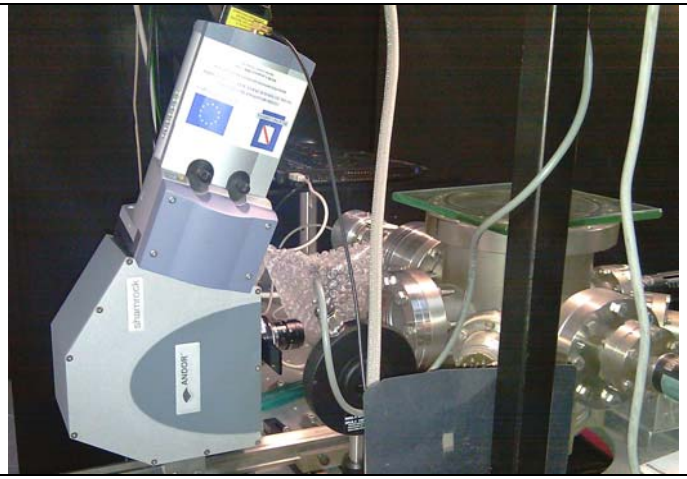
9	Holographic Optical Tweezers	Home built prototype system 	Home-made Holographic Optical Tweezers (HOT) equipped with a Nd:YAG laser (532nm wavelength). In this system, the laser beam passes through a hologram displayed by means of a dynamically addressable Spatial Light Modulator. This procedure is used to obtain multiple trap positions as well as to provide a laser beam carrying angular momentum, thus suitable for rotating trapped particles. The system can also provide the spectral analysis (Raman and Photoluminescence) of the trapped micro-objects.	NA	Ambrosio
10	FTIR Spectrophotometer		Fourier Transform IR spectrometer (FTIR) operating in the spectral range 1.6-20 micron and equipped with a IR microscope.	NA	Maddalena
11	Fast Optical Spectroscopy for PLD		Apparatus for fast optical spectroscopy for PLD based on a CCD camera intensified for ultrafast imaging (minimum exposure time: 2 ns), and a imaging monochromator for space- and time-resolved optical emission spectroscopy.	NA	Wang

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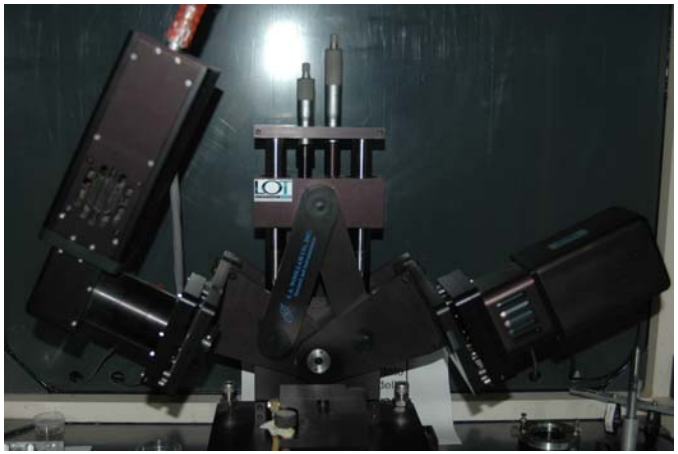
12	Ultrafast pump-probe optical spectroscopy system		Apparatus for optical pump-probe spectroscopy in reflection geometry based on a femtosecond laser system. The laser system is a regenerative amplified Ti:Sa by Spectra Physics delivering pulses at a repetition rate of 1 kHz, 1 mJ of energy and 130 fs of duration.	NA	De Lisio
13	UV-Visible spectrophotometer		UV-visible spectrometer with double beam suitable for measurements of transmittance, reflectance and photoconductivity of solid samples. The photoconductivity measurements on thin-films and/or interfaces can be performed at room temperature through a Lock-in acquisition technique.	GE	Bellingeri
14	Spectroscopic Ellipsometer		Rotating-compensator, variable-angle spectroscopic ellipsometer/reflectometer (Woollam M-2000X). Spectral range 245-1700 nm, angular range 45°-90°. Capable of measuring ellipsometry, reflectivity and transmission spectra. Complete with WVASE32 software for modeling and analysis of ellipsometric spectra. Equipped with home-built optical cell for performing in-situ measurements under liquid environment.	GE	Bisio

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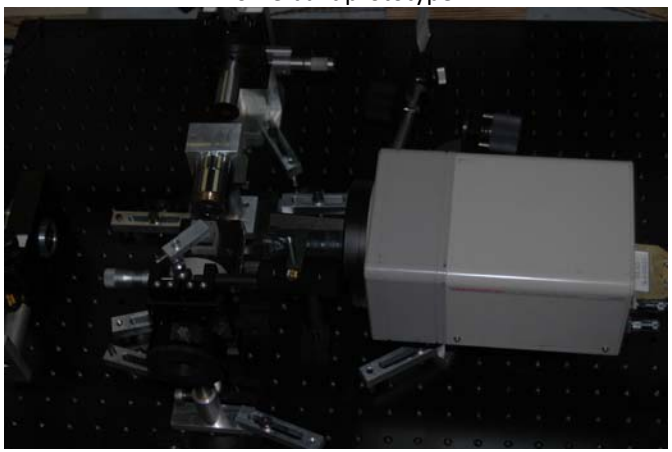
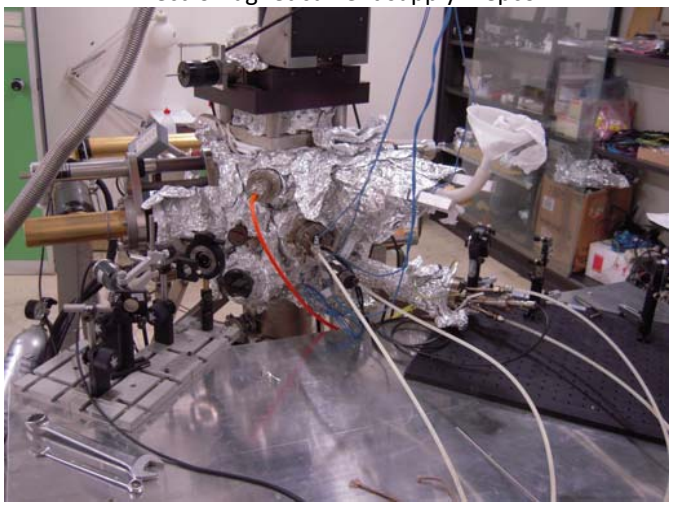
15	MOKE microscope (microMOKE)	Home built prototype 	Magneto-optical microscope based on the Kerr effect, dedicated to the measurement of the magnetic properties of thin and ultrathin magnetic films and nanostructures. In-plane and out-of-plane magnetization detectable. Maximum applied field 0.5 T. Target lateral resolution: 1 micron. NOTE: protoype stage.	GE	Bisio
16	Variable temperature UHV MOKE magnetometer	Homemade prototype Laser diodes: RS (670 nm) and Global laser (532 nm) Lock-in amplifier: EG&G Electromagnet current supply: Kepco 	In-situ UHV magneto-optical Kerr effect (MOKE) magnetometer working with laser diodes at 670 and 532 nm. Lock-in detection of the Kerr signal to achieve extreme sensitivity. Longitudinal and polar MOKE configurations can be implemented for the measurement of the in-plane and out-of-plane components of the magnetization. Sample temperature from 130 to 800 K. Maximum magnetic field 1000 Oe.	GE	Moroni

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17	MicroRaman apparatus		Micro-Raman spectroscopic apparatus based on a Ar-ions laser (488 nm wavelength), He-Ne laser (633 nm) and diode laser (785 nm). The apparatus is interfaced with an optical microscope (LEYCA, with magnification from 5x to 100x). The instrument can be equipped with two thermal cells for temperature control in the ranges 80 -800 K and RT – 1700 K.	GE	Martinelli
18	Interferometer for Infrared Spectroscopy		Acquired in 1985, at that time it was the most advanced instrument in its category, thanks to the dynamical alignment of the moving mirror in real time, to the sample compartment under vacuum, and to the vertical structure which reduces the occupied area in the laboratory. It is equipped with cryogenics from 300 to 6 K, and with a high-temperature cell working up to 500 K. It allows for reflectivity measurements with a remotely driven mirror set and for transmittance measurements, both from 20 to about 30000 cm^{-1}, with spectral resolution up to 0.03 cm^{-1}.	Roma	Calvani
19	Interferometer for Infrared Spectroscopy (2)		BRUKER 66V model, equipped for measurements under vacuum of reflectivity, diffuse reflectivity, and transmittance, from 30 to about 20000 cm^{-1}, with spectral resolution up to 0.2 cm^{-1}. It is also equipped with a cryostat working between 8 and 300 K, and an infrared microscope BRUKER IRscope I with lateral resolution 10 microns.	Roma	Calvani

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20	Interferometer for Infrared Spectroscopy		Bruker interferometer 66V for measurements in the infrared region 50-6000 cm^{-1}, maximum spectral resolution 0.2 cm^{-1}. Equipped with DTGS room temperature detectors, for far-infrared (with mylar beam splitter) and mid-infrared (with KBr beam-splitter) range. Only room temperature transmittance measurements are possible, on samples with dimensions of (at least) 2-3 millimiters.	Roma	Dore
21	Monochromator for the visible and the UV		It is equipped with two gratings, polarizers, CCD detector, optic fibers and optical table, upon which a closed-cycle cryostat is mounted, which allows for cooling samples down to 10 K.	Roma	Nucara