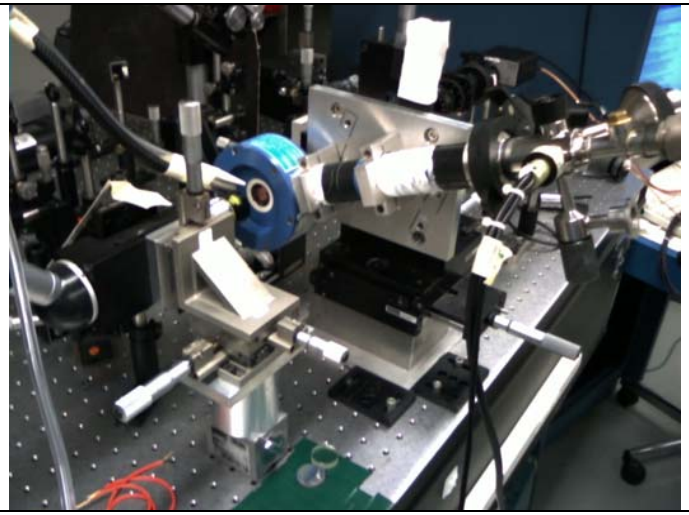
SPIN Equipments - Electronic and transport properties

	Electronic and transport properties				
	Name	**Picture**	**Description**	**Site**	**Responsible**
1	Experimental apparatus for cryogenic surface impedance measurements		Vectorial network analyser with microwave circuitry and test bench for cryogenic microwave measurements from 300 down to 1.5 K. It includes a temperature stabilised cryostat with a manostat and a rotative pump. Operational frequency range: 1-20 GHz.	NA	Andreone
2	Nonlinearity cryogenic testing system for microwave devices		Spectrum analyser with average noise level -150 dBm and two continous wave (CW) microwave sources (max power 10 dBm). Operational frequency range: 1-26 GHz.	NA	Andreone
3	Experimental apparatus for transport characterizations and photoresponse measurements		Cryostat operatine in the temperature range 2-500 K equipped by optical windows, low noise RF front-end electronics, couplet to a femtosecond laser for pump-probe ultrafast spectroscopy	NA	Pepe
4	Vibrating sample magnetometer		Apparatus for magnetometric measurements in the temperature range 4k-1000K (magnetic field up to 9T).	NA	Ausanio

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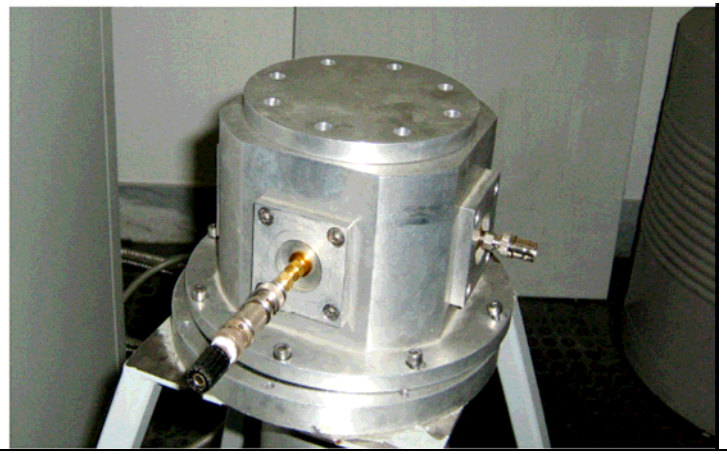
5	Cryogen free magnet with cryogenic insert	(Custom tailored)	Cryogen free superconducting magnet in a shielded room. Room temperature bore 15 cm, max magnetic field 10 T. With a Variable Temperature Insert (VTI) and manual control of pressure and temperature	NA	Andreone
6	Shielded room for electromagnetic measurements		Dimensions: 200x200x220 cm3. Shielding: 1GHz 100db, 10KHz 80db, 100Hz 20db	NA	Valentino
7	Probe station for room temperature transport and electronic noise measurements		Low frequency probe station for transport measurements at room temperature and electronic noise measurements on high impedance sample.	NA	Valentino
8	System devoted to the analysis of the magnetic response of macroscopic object		Eddy current analysis system for X-Y sample scanning equipped with magnetic and electric sensors, such as SQUID magnetometers and gradiometers, flux gate probes, hall probes, GMR probes, search coil. Spatial resolution 1 micron.	NA	Valentino
9	Cryocooler Station		This apparatus is composed of a closed-cycle liquid Helium compressor system and of a measurement chamber with a 2-inces diameter cold finger. It is possible to carry out measurements in the temperature range between 40K and room temperature. The temperature of the samples can be monitored by a Cernox thermometer. Five electrical wires are available for measurements in DC regime, while two further electrical wires are directly connected to the top of the vacuum chamber by SMA connectors for frequency measurements up the microwave region.	NA	Barra

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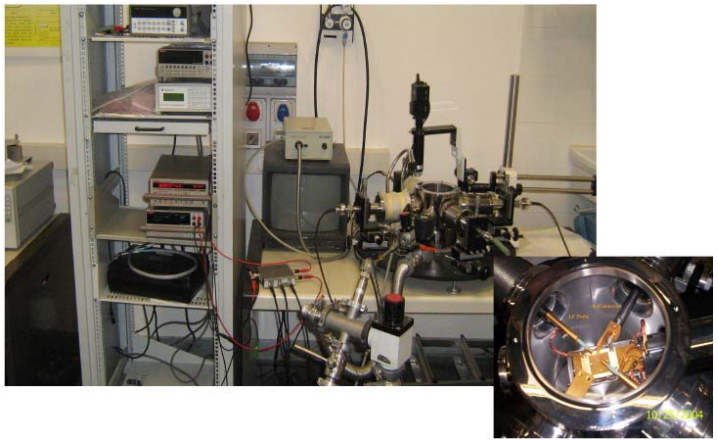
10	Cryo-Probe		The Probe station system is suited for electrical measurements both in DC and AC regimes (up to 1 MHz). Electrical contacts are realized by three metallic tips mounted on micrometric slides. Probe station is equipped with a vacuum chamber to perform measurements in controlled atmosphere. It is possible to carry our variable temperature measurements in the range between 5K and room temperature by using cryogenic liquids. The temperature of the samples is monitored by two thermometers.	NA	Barra
11	Ultra-low temperature cryogenic system		Diluition cooler for measurements at low noise to 10 mK.	NA	Tafuri
12	3He cryogenic system for optical irradiation of Josephson-based superconducting devices		Lowest feasible temperature 0.3K in the presence of laser pulses. The system is equipped with front-end low noise electronics for characterization of superconducting devices and for signal analysis.	NA	Tafuri
13	Station for measurements of low frequency electric transport properties		Station for measurements of electric transport, dedicated to thin film and device characterization, in the temperature range 10K-400K	NA	Scotti di Uccio

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14	He liquefaction system and recovery		A complete system for liquefaction and recovery of Helium, is installed into laboratories at Università di Genova - DIFI within frame collaboration agreement. The system is composed by a pistons cold box (Koch brand), with a screw compressor and allows to produce 20 litres of liquid He per hour. A complex system, provided of a balloon, is present for the recovery of Helium and a Bauer compressor to compress it in an interlocked set of bottles.	GE	Ferdeghini
15	SQUID Magnetometer		Quantum Design commercial system suitable for magnetization measurements in the range 1.8-350K up to 5.5T. The system, at running condition, is always mantained cold.	GE	Lamura
16	Manual wedge bonder		Ultrasonic bonding machine for semiautomatic operation; it works with Al(Si) and Au wires of ∅ 25μm	GE	Pallecchi

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17	PPMS		Physical Properties Measurement System:The system allows the characterization of Electrical (Resistivity, magnetoresistivity and Hall Effect), Thermal (thermal conductivity) and Thermoelectrical (Seebeck and Nernst effect) transport properties at temperatures ranging from 1.7 to 400K and in magnetic fields up to 9 Teslas.	GE	Marré

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18	System for resistance R(T) measurements		System for the measurement of resistivity as a function of temperature T from 4.2 to300 K, in T-sweeping mode and zero magnetic field	GE	Pallecchi
19	CRIOUHV		Cryostat for electrical transport measurements from 4.2 to 300 K up to 7 T magnetic field. Suited also for high impedance systems and devices. Sample is mounted on a home-built sample holder and connected to pads by ultrasonic bonding. Pads (6) are then tin-soldered to coaxial cables. Each signal is ground shielded. Software-based temperature control. Note: To be completed due to breaking of the magnet power-supply.	GE	Pellegrino
20	Thermal Transport		Cryostat for Seebeck effect and thermal conductivity measurements from 4.2 to 300 K, also in field effect condition.	GE	Putti

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21	Apparatus for the critical current measurements in the range 4.2-40K		This home made apparatus is devoted to the critical current measurements on wires and tapes. The temperature range is 4.2<T<40K and the applied magnetic fiield , generated by a split-coil magnet, is up to 7T. The maximum feeding current for the testing sample is 500 Ampere. For all these characteristics the system is particularly useful for MgB2 wires and tapes.	GE	Ferdeghini

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22	Nanovoltmeters and current generators	   	Instrumentation with Labview remote control, which can be used either as a part of cryostat equipments or as stand alone instrumentation: - three current generators (mod. 220) with range 1nA-100mA; - four nanovoltmeters (mod. 182) withn range 1nV-30V; - two nanovoltmeters (mod. 2182) with range 1nV-100V	GE	Pallecchi
23	Femtoammeter and picoammeter	  	Instrumentation with Labview remote control, which can be used either as a part of cryostat equipments or as stand alone instrumentation: - one picoammeter (mod. 6287) with current range 20fA-20mA and voltage generator 200μV-500V; - one femtoammeter (mod. 6430) for currents down to 0.4fA, with voltage generator 200mV-200V and current generator 1pA-100mA;	GE	Pallecchi

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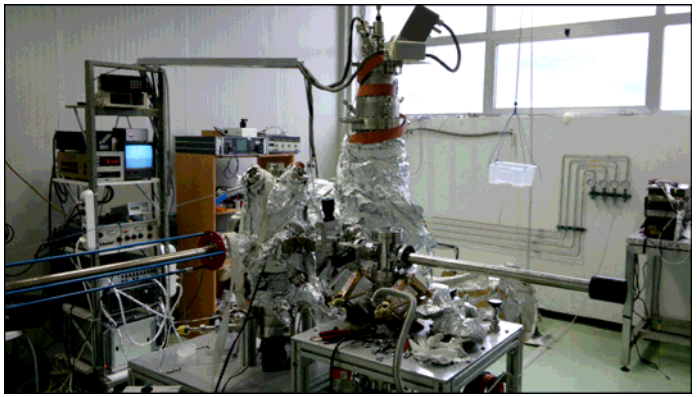
24	Cryogenic STM	 	STM for the morphological and spectroscopic characterization of conductive samples under UHV at ambient temperature and cryogenic temperatures (80K – 140K and 5K-65K). Tunnelling current varies in the range 5pA -300nA. Scanning area is 10 um x 10um x 1um at room temperature and 1.8um x 1.8um x 0.2um at 5K. A tailored samples holder allows to perform in situ 4-wires transport measurements on the studied specimens. AFM with 50um x 50um or 5um x 5um maximum scanning-sample capabilities. It is equipped with an optical microscope with lateral resolution of 5um. It operates under ambient conditions or within a liquid cell - with temperatures up to 150°C - in standard contact mode and dynamic modes. Control unit allows to acquire 2 simultaneous maps. STM, Kelvin, conductive, capacitive and force-volume modes are readily available. AFM can also be used for constant-current electrochemical nanolithography	GE	Buzio
25	16 T VSM		Vibrating sample DC magnetometer and AC susceptometer (fundamental + higher harmonics), in field up to 16 T and temperature [3.5-300]K	SA	Gambardella
26	Transport NMR		NMR magnet with 89 mm hot hole reconverted for transport measurements in field up to 5 T and current up to 200 A (continue) with variable temperature.	SA	Gambardella

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27	Cryorefrigerator 0.7 W @ 4 K		Measurement vacuum chamber equipped with a cryorefrigerator 0.7 W @ 4 K for transport properties measures up to 120 A and stability in adiabatic conditions.	SA	Gambardella
28	PPMS – Physical Properties Measurement System		PPMS is a system for modular measurements, that schematically is constituted by a 9 Tesla superconducting magnet, a cryostate for the sample temperature control, electronics needed to manage through PC all present sensors and devices, and a series of interchangeable inserts appropriately designed to measure different physical quantities. In its present configuration available inserts allow the measurements of: 1) DC magnetization under variable: - DC magnetic field (up to 9 T), - temperature, from 2.2 K to 300 K - time 2) AC magnetic susceptivity, from the fundamental to the VII harmonic, under variable: - amplitude up to 10 Oe - AC field frequency from 10 Hz to 10 kHz - DC magnetic field up to 9 T, - temperature, from 2.2 K to 300 K 3) Electric resistivity and V-I characteristics, both in DC current and AC, as well as Hall effect measurements under variable: - DC magnetic field up to 9 T, - temperature, from 2.2 K to 300 K	SA	Polichetti

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29	Cryo-SA (Cryocooler 10 K for transport measurements)		Measuring station for R (T): standard station with Janis cryocooler able to reach temperatures of 10 k. The temperature is controlled through a lakeshore controller. The system is equipped with a pair of Nano-voltmeters and current generator up to pico-amps (keithley).	SA	Orgiani
30	Station for transport and noise measurements		Measurements station for characterization of I-V e V noise at low frequency and variable temperature from 10 to 330K by means of a closed cycle cryostate. Possibility of pulsed measurements till 100mA and 100V and of low frequency noise measurements with $10^{-17}V^2/Hz$ background	SA	Pagano
31	Station for fast photoresponse and transient measurements		Station for fast photoresponse measurements and for ultra fast transition phenomena, composed by a cryostate in 3-300K flux, Waveform analyzer LeCroy SDA9000 with 9 Ghz band width, 25 ps acquisition time, pulsed laser source of 100 ft and 1550 nm wavelength and optical laying systems	SA	Pagano

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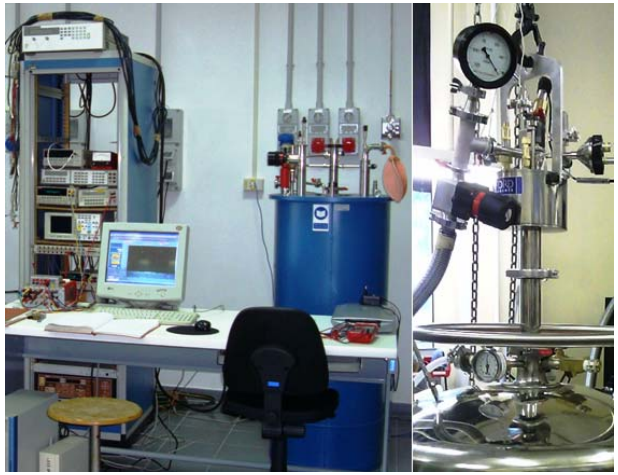
32	Cryomagnet + 300 mK insert High magnetic field 3He-4He cryostat		The cryostat consists in a nitrogen shielded 4He low loss dewar, equipped with a superconducting magnet up to 11 Tesla. The system operates in the temperature range 1.8 - 300 K. A HelioxVL vacuum loaded 3He insert enables temperatures down to 300mK to be achieved.	SA	Cirillo
33	MR-SA (Station for magnetoresistance measure)		7 Tesla superconducting magnet with cryogenic insert from 1.8 to 400 K in/without magnetic field. Data acquisition electronics (resistance, temperature, etc.) are by Keithley. In particular, the couple Nanovoltmetro and Current Source 6220 2182A allows 4-probe pulse-reverse DC/AC resistance measuremetns. The system is also equipped with a custom-designed deep-stick, which also allows for sample heating at temperatures above the Oxford variable temperature insert (up to about 500 k).	SA	Orgiani

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34	Systems for measurements of electrical transport properties		Two cryocoolers able to go down to 15 K. One of the two systems is equipped with an electromagnet able to produce a magnetic field up to 1 T, along an arbitrary crystallographic direction.	Roma	Di Castro
35	CFMVTI=Cryogen Free Magnet Variable Temperature Insert		Cryomagnet system equipped with a superconducting magnet and a variable temperature insert cooled by means of a cryorefrigerator able to operate in the temperature range from 1.6 K to 300 K under magnetic field up to 9T.	SA	Grimaldi