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CIVIS call for researchers MSCIF 2020

PANEL: Physics (PHY)

Co-funded by the Erasmus+ Programme of the European Union

AIX MARSEILLE UNIVERSITE - France				contact person: civis@univ-amu.fr	
SUPERVISOR	**RESEARCH LAB/GROUP**	**AREA OF EXPERTISE**	**LINES OF INVESTIGATION**	**KEY FACILITIES**	**WEBSITE**
Georges Aad	Physics	Experimental particle physics, machine learning and data acquisition	The ATLAS group of the Centre de Physique des Particules de Marseille (CPPM) is deeply involved in the LHC scientific program, in particular linked to its expertise of the electromagnetic calorimeter. The latter is a key component for the identification and energy measurement of electrons and photons, which were at the core of the Higgs boson discovery. Moreover, for the upgrade of the accelerator performances foreseen in 2025, this calorimeter has a major ongoing development program to dramatically upgrade its trigger and readout to which the CPPM group actively contributes. The CPPM has a leading role in the ongoing effort to develop artificial intelligence and machine learning techniques to dramatically improve big data processing effectiveness such the one needed in high pileup environment at the LHC. The main challenge is to efficiently implement these techniques into the dedicated data acquisition electronics, based on FPGAs, which are used for signal processing in particle physics detectors such as the ATLAS Liquid Argon (LAr) calorimeter and which are under construction by the ATLAS CPPM group.	The CPPM have a long lasting experience in building electronic boards, based on FPGAs, designed for big data processing on the fly for data acquisition systems. The CPPM lab is equipped for designing and testing these boards. In addition the CPPM have access to large computing facilities needed for data processing and training artificial intelligence algorithms used for data processing in particle physics.	https://www.cppm.in2p3.fr/web/en/index.html

NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS – Greece					
SUPERVISOR	RESEARCH LAB/GROUP	AREA OF EXPERTISE	LINES OF INVESTIGATION	KEY FACILITIES	WEBSITE
PAPATHANASSIOU Antonios	DielDielectrc Spectroscopy and High Pressure Lab.	Experimental Condensed Matter Physics and Materials Science	Electron conducting polymers ,carbon-allotrope-filled polymer or oxide nanocomposites, hybrid piezoelectric composites, high pressure	Broadband frequency response analyser, Novocontrol pressure-temperature dielectric spectrosc opy apparatus, cryostats for electric and dielectric measurenets (17-320 K and 90-400 K), svera high pression electromters, Metrohm Potentiostat for diffrent modes of cyclic volatammetry and other, shared facilities for sample preperation, materials engineering and characterization.	http://scholar.uoa.gr/antpapa/home
SIMSERIDES Constantinos	Physics of nanostructures and biomaterials (http://users.uoa.gr/~csimseri/physics_of_nanostructures_and_biomaterials.html)	Nanostructures, Biomaterials Biophysics: - Spintronics. - Biophysics. - Quantum Optics in nanostructures. - Semiconductors. - Ab initio calculations.	Physics of nanostructures and biomaterials: - Spintronics. Magnetic properties of diluted magnetic semiconductors and of their nanostructures. - Biophysics. Charge transfer and transport in DNA and other organic systems. Molecular structure. - Biomaterials: novel carbon - nitrogen - oxygen oligomers and polymers - Quantum Optics (in nanostructures). Optical properties (absorption, photoluminescence etc) of quantum dots with or without magnetic field. Optical properties of quantum wells: intersubband transitions. - Semiconductor nanostructures with or without magnetic impurities (thermodynamics, spintronics, transport) - Ab initio calculations.	We have a cluster of 13 computers for simulations plus a few other computers, a room devoted to the computers and cluster, office for PhD students and PostDoc. Network etc fine. We also apply regularly for computer time in supercomputers.	http://users.uoa.gr/~csimseri/physics_of_nanostructures_and_biomaterials.html
STEFANOU Nikolaos	Section of Condensed Matter Physics	Theoretical and Computational Condensed Matter Physics. Photonic and Phononic Nanostructures	Our current research interests include: Periodically driven Floquet time crystals, complex acousto-optic and optomagnonic nanostructures, dynamical metasurfaces, emerging and novel wave phenomena	Local and remote access to computer facilities; e-libraries; commercial and In-house-developed computational software	http://old.phys.uoa.gr/cwim/ and http://scholar.uoa.gr/nstefan/home

UNIVERSITY OF BUCHAREST - Romania				contact person : Filuta Ionita filuta.ionita@cdi.unibuc.ro	
SUPERVISOR	RESEARCH LAB/GROUP	AREA OF EXPERTISE	LINES OF INVESTIGATION	KEY FACILITIES	WEBSITE
Cristian George Panaiotu	Paleomagnetic Laboratory	Earth Physics	Environmental magnetism, paleomagnetism, rockmagnetism, arheomagnetism	See https://erris.gov.ro/Paleomagnetic-Laboratory	https://sites.google.com/a/g.unibuc.ro/paleomag/
Anca Dumitru	Faculty of Physics -Laboratory of Advanced Materials for Energy Conversion and Environmental Applications	Advanced carbon and ceramic materials; Nanocomposite polymer materials; Fuel cells and biological fuel cells; Wastewater treatment and remediation	Chemical and electrochemical synthesis of conducting polymers, polymer nanocomposites, and electrocatalysts (for oxygen reaction reduction and microbial fuel cell) Synthesis and characterization of advanced carbon and ceramic materials from polymer precursors;; Applications of these materials for wastewater treatment, oxygen reduction reaction, bioelectrochemical systems.	Our lab include the following facilities related to the synthesis, processing and characterization of materials: oven with operating temperature range 30 - 1200°C, including the module for operation under control atmoshere- Nabertherm GmbH; laboratory centrifuge (max 13000 rpm/min); Origa Flex Potentiostat 1A, Origa Flex Galvanostat, OrigaTrod Kit - Rotating Disk Electrode, testing line of microbial fuel cell systems (standard MFC cells, a multiparameter instrument (multi 340i) with DO sensors and pH electrode). All the facilities are presented on the following website: https://erris.gov.ro/Laboratory-of-Advanced-Mate The other facilities required for the characterizations can be accessed through our collaborations with the other groups form our faculty or university.	https://erris.gov.ro/Laboratory-of-Advanced-Mater and http://www.psg.unibuc.ro

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SUPERVISOR	RESEARCH LAB/GROUP	AREA OF EXPERTISE	LINES OF INVESTIGATION	KEY FACILITIES	WEBSITE
Bortolo Matteo Mognetti	Dpt of Physics - Complex Systems and Statistical Mechanics	Soft and biological materials, numerical and theoretical modeling	Multivalent interactions, self-assembly, host-pathogen interactions		http://homepages.ulb.ac.be/~bmognett/index.html

UNIVERSIDAD AUTÓNOMA DE MADRID (UAM) - Spain					
SUPERVISOR	RESEARCH LAB/GROUP	AREA OF EXPERTISE	LINES OF INVESTIGATION	KEY FACILITIES	WEBSITE
ISABEL J. FERRER	FÍsica de Materiales (Facultad de Ciencias)	Hydrogen production, Hydrogen storage and hydrogen compression. Thermoelectricity	MIRE group is an ensemble of physicists and chemists whose research extends from the preparation of materials (bulk, films and 2D materials) to their fundamental characterisation and further optimisation in experimental devices to be used in energetic applications. Main investigated compounds belong to next families: sulfides, BCN compounds and hydrides which are focused in following research topics: (i) Hydrogen production (photo-electrocatalysts). (ii) Solid hydrogen storage and hydrogen compression. (iii) Thermoelectric materials Mire group has a wide expertise to supervise students from undergraduate to postdoctoral level. During last five years more than 15 students have acquired formation in the previous research topics. This training is framed under different national/ international supported projects as well as networks such as COST or IEA. Moreover, the group coordinates a Master related to energy (bit.ly/2VoymRS)	Main experimental techniques for material synthesis are the following: Thermal/ flash evaporation and e-beam deposition equipment to prepare thin films which are sulfided into quartz ampoules by controlled temperature furnaces. CVD synthesis by using furnaces with different regions and H2/Ar gas lines to prepare films and 2D-compounds. RF generator for plasma treatment (cleaning with oxygen plasma and plasma enhanced chemical vapor deposition). Planetary and Spex ball mill systems, hydraulic press (up to 15 Ton) to prepare bulk alloys. Arc furnace machine used for the synthesis of intermetallic bulk compounds. Glove box (mod. Jacomex) to handle materials under inert conditions (< 2 ppm 02 and H20) In relation to the characterization of the materials, several experimental techniques are provided by our laboratory: DSC-TDS system to investigate the decomposition of metal hydrides. Three volumetric systems based on Sieverts method that provide absorption/desorption kinetics and thermodynamic information of the hydride (0-60 bar and -196ÂºC-500ÂºC) Metal hydride-based compressor facility able to deliver pressures higher than 100 bar Optical microscopy system comprising a high temperature/gas controlled stage for â€œin situâ€ measurements of hydride formation and decomposition in films. Photo electrochemical characterization facility (electrochemical cells, potentiostats, electrochemical impedance system and solar simulator) linked to a mass spectrometer system. Profilometer system of thickness measurement for thin films. Near Room temperature characterization of transport properties: Resistivity and Seebeck measurement systems (solid and liquids) and thermal conductivity measurement (bulk). Experimental system for in situ measurement of the electrical and thermoelectric parameters during the film sulfidation process (RT-500ÂºC). Moreover, MIRE group has easy access to different characterization techniques: XRD, SEM-EDX, FEG TEM, FTIR, TGA-MS which are available in the University Research Services. Our group also usually performs other techniques (mainly Micro-Raman and XPS) by collaborations with other groups into the UAM Excellence Campus. As regards medium-size facilities, the group is a habitual user of Ion Beam techniques (RBS, ERDA) placed the CMAM (Centro de MicroanÃ¡lisis de Materiales) located at UAM Campus as well as transmission microscopy techniques (HR-TEM, EELSâ€¦) located at CNME in UCM. Finally, the group works also with scientific software to analyse the obtained data: structural	http://www.uam.es/Ciencias/GrupoINV_MIRE/1446790244478.htm?language=es&nodepath=MATERIALES%20DE%20INTER?S%20EN%

				data by Fullproof and Carine and physics modelling by COMSOLâ€¦	
HERMANN SUDEROW	Fisica de la Materia Condensada	Quantum materials, superconductivity, scanning tunneling microscopy, Josephson effect, very low temperatures	Quantum visualization of advanced materials using scanning tunneling microscopes at very low temperatures. Applies to Digital and Technological transformation, technologies and engineering.	Direct visualization of macroscopic quantum phenomena (Josephson effect, tunneling spectroscopy) Synthesis and growth of advanced quantum materials (topological material, superconductors, hybrid magnetic systems, 2D materials). Cryogenics and advanced electronics.	Active and international environment, www.uam.es/ifimac , www.uam.es/inc www.uam.es/lbtuam https://arxiv.org/search/cond-mat?searchtype=author&query=Suderow%2C+H https://scholar.google.es/citations?user=Ei1OhusAAAAJ&hl=en https://orcid.org/0000-0002-5902-1880
ISABEL GUILLAMÓN	Condensed Matter Physics	Scanning tunneling microscopy at low temperatures and high magnetic fields	Study of electronic properties of potencial materials for future technologies such as superconductors, topological materials and systems with strong electron correlations. Use of very high magnetic fields and low temperatures to measure Landau quantization at microscopic scale.	Dilution refrigerator scanning tunneling microscopes in magnetic fields up to 22 T and ultra low noise environment. Direct visualization of electronic properties using Landau quantization and quasiparticle interference imaging.	www.uam.es/lbtuam https://scholar.google.es/citations?hl=es&user=RMLoQaAAAAAJ&view_op=list_works&sortby=pubdate https://www.ifimac.uam.es/
MANUEL ALCAMÍ	Chemistry	Expert in the ab initio quantum mechanical treatment of complex molecules and surfaces	- Theoretical studies of the interaction of molecules of biological interest with metal cations. - Reactions of interest in atmospheric chemistry. - Structure and properties of fullerenes. - Fragmentation of highly charged and excited clusters. - Interaction of molecules with surfaces.	MolPM group guarantees enough computational resources to carry out the project through its Computing Center (CCC-UAM), the Spanish Supercomputing Network (RES). Prof. Alcamí is the Coordinator of the Erasmus Mundus Master TCCM (www.emtccm.org), and is involved in the CA18212 COST Action (MDGAS) and the IRP-LIA-DYNAMICS.	https://molpm.qui.uam.es/
SERGIO DIAZ-TENDERO	Chemistry	Density functional theory in gas phase and solid state. Methods based on statistical mechanics applied to the fragmentation dynamics of excited molecules. Wave packet propagation methods applied to study electron dynamics in surface physics.	Fragmentation dynamics of highly excited clusters and biomolecules. - Electronic and vibrational excitation in molecules and nanostructures deposited on metal surfaces. - Theoretical description of reactivity in organic chemistry.	MolPM group can access computational resources of the UAM Computing Center (CCC-UAM) and the Spanish Supercomputing Network (RES). In addition, Dr. Díaz-Tendero is the WG leader of CA18212 COST Action (MDGAS), and is involved in the IRP-LIA-DYNAMICS.	https://molpm.qui.uam.es/

ANTONIO PICÓN	Chemistry	Attosecond and ultrafast optics	We are involved in the development of new theoretical approaches to describe ultrafast experiments at advanced research laboratories that are able to produce attosecond X-ray pulses. Our main fundamental interest is the understanding of electron dynamics in complex systems and its role in the optical response and energy transfer.	Access to high-performance computing resources, collaboration with international leading laboratories in attosecond science, including front free-electron lasers, and access to a European network formed by the main experts in our field	https://campusys.qui.uam.es
FLORENTINO BORONDO	Química and Instituto de Ciencias Matemáticas (ICMAT)	Deep Learning, Reservoir Computing, Quantum Chaos, Molecular Vibrations	Deep Learning andResevoir Compting applied to the solution of Schrödinger Eq.; Quantum Manifestation of Classical Chaos in Vibrations	Excellent access to computing facilities and libraries at the group and ICMAT	https://portalcientifico.uam.es/ipublic/agent-personal/profile/iMarinaID/04-260097
JOHANNES FEIST	IFIMAC & Física Teórica de la Materia Condensada	Quantum nanophotonics, polaritonic chemistry & molecular polaritonics, attosecond physics	Our research lies at the intersection of quantum optics, nanophotonics, and materials science & chemistry. In particular, we are interested in modifying the structure and dynamics of matter by embedding it inside a nanophotonic structure in such a way way that the vacuum fluctuations of the electromagnetic field have a strong influence on the material properties.	We are part of IFIMAC, the Condensed Matter Physics Center funded by the MarÃa de Maeztu Spanish program for centers of excellence, which gives access to state-of-the-art facilities and possibilities for collaboration with a wide range of leading scientists. For supporting the theoretical and numerical research of the group, we have modern computing facilities, including a local medium-sized GPU-based cluster, as well as access to large-scale computational resources through the Spanish Supercomputing Network.	https://mmuscles.eu

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SUPERVISOR	**RESEARCH LAB/GROUP**	**AREA OF EXPERTISE**	**LINES OF INVESTIGATION**	**KEY FACILITIES**	**WEBSITE**
Stefano Lupi	TERALAB@Sapienza	Materials Science, Optical Spectroscopy, Biophysics; Acoustics; Ultrafast lasers;	Novel electronic materials (graphene, Weyl systems, X-nes) for photonics and plasmonics applications; Novel imaging techniques for biomedical applications on skin patalogies; Acoustic devices based on Graphene;	Optical spectroscopy systems: Michelson interferometers, optical spectrometers, time-domain terahertz spectroscopy; ultrafast lasers, Raman spectrometer	https://sites.google.com/a/uniroma1.it/teralab/
Irene Di Palma	Virgo group, KM3NeT group	Multi-messenger astronomy, gravitational wave data analysis, core-collapse supernovae, black holes, neutron stars, high energy neutrinos, pulsar wind nebulae.	1) Multi-messenger Astrophysics of Core-Collapse Supernovae; 2)Data analysis for joint search of gravitational waves and high energy neutrinos; 3) Stacking analysis of GRBs to detect high energy neutrinos; 4) Acoustic monitoring of whales and dolphins off Catania.	Virgo laboratory, KM3NeT laboratory for electronics, GPU server	http://www.roma1.infn.it/amaldicenter/home.html
Fabrizio Frezza	Laboratory of Electromagnetic Fields II	Electromagnetics, Microwaves, Optics	Waveguides, antennas, electromagnetic resonators; mathematical and numerical methods; electromagnetic scattering, optics, free electromagnetic propagation, anisotropic materials, artificial materials and metamaterials, plasmonics, biomedical applications, cultural-heritage and environmental applications, artificial-intelligence applications to sensing and diagnostics, magnetic-resonance applications, electrical transmission lines, electromagnetic compatibility, spectroscopy, terahertz applications, thermonuclear-plasma heating; technology transfer; history of science and technology.	PNA Agilent E8363B (10 MHz-40 GHz), with time-domain option, calibration kit for rectangular waveguide WR-90 (8.2-12.4 GHz) Agilent X11644A, electronic calibration kit Agilent N4691B (3.5 mm, 300 kHz - 26.5 GHz). Vector network analyzer, model HP8530A, suitable for antennas measurements. Portable field meters PMM 8053A (with probes EP330, EP33M, EHP50C) and Wandel & Goltermann EMR 300 (with probe Type 18), covering the whole band 5 Hz - 3 GHz. Mixed analog-digital oscilloscope Tektronics MSO 2012. Agilent 85071E, software for measuring the dielectric properties of materials. Keysight N1501A Dielectric Probe Kit 10 MHz to 50 GHz. Comsol Multiphysics, with RF, AC/DC, optical, acoustic modules. Mathematica Personal Grid. MatLab. Intel Visual Fortran with IMSL Numerical Library. Ansys HFSS, Designer. CST Studio Suite. FEKO. LabVIEW. Radar GPR GSSI (Geophysical Survey Systems, Inc.) SIR 2000 with an antenna Radar Team SUB-ECHO HBD 300. Indoor and outdoor experimental facilities for underground measurements (at Cisterna di Latina site). Shielded anechoic chamber Emerson&Cuming with automatic positioning system for antenna measurements.	https://www.researchgate.net/profile/Fabrizio_Frezza
Stefano Giagu		High Energy Physics, Machine Learning, Deep Learning AI, Deep Learning in medical Imaging and Medicine	Machine Learning and Deep Learning applications in particle physics experiments and detector in real time and offline applications, applied AI in medical imaging, AI and simulation of complex processes, data analysis	computing farm, HPC for AI, HEP laboratory, young students and post-docs	http://www.giagu.it
Carlo Mariani	Lotus - Nanostructures at Surfaces	Condensed Matter Physics, Surface Physics, Interfaces, Nanostructures, Surface Chemical Structure and Composition	Hydrogen up-loading in nanoporous graphene, Alkali metal adsorption in nanoporous graphene	Electron Spectroscopy facilities: XPS, ARPES, Auger / Low-medium energy (0.5-5 keV) Ion Sputtering / Low Energy Electron Diffraction (LEED) / Deposition facilities in ultra-high-vacuum (UHV): Physical Vapour Deposition (PVD), Chemical Vapour Deposition (CVD)	https://sites.google.com/uniroma1.it/nano-surface-physics/home?authuser=0

EBERHARD KARLS UNIVERSITY OF TÜBINGEN- Germany				contact person: christian.voehringer@uni-tuebingen.de	
SUPERVISOR	**RESEARCH LAB/GROUP**	**AREA OF EXPERTISE**	**LINES OF INVESTIGATION**	**KEY FACILITIES**	**WEBSITE**
Dieter Kölle	Physics Department -- Physikalisches Institut	experimental solid state physics with focus on electric transport properties of superconducting and magnetic layered structures	Our group (Prof. Reinhold Kleiner, Prof. Dieter Kölle, Prof. Edward Goldoibn) has a long standing expertise in research on superconducting and magnetic layered structures, in particular with respect to cuprate superconductors, Josephson effects, SQUIDs, manipulation of magnetic flux quanta, and magnetic tunnel junctions. The focus of recent activities is on SQUID-based ultra-low-field NMR/MRI, and nanoSQUID sensors for the investigation of small spin systems. For example, the group uses FIB-patterned ultra-low noise YBCO nanoSQUIDs for studies of magnetization reversal in magnetic nanoparticles. Recently, the group started to develop YBCO Josephson junctions and SQUIDs based on focused He ion beam irradiation. In collaboration with the group of Jozsef Fortagh we work on hybrid quantum systems combining cold atoms and superconductors.	1. Thin film nanofabrication & analytics: State-of-the-art thin film technology (incl. pulsed laser deposition of cuprate films, e-beam evaporation and magnetron sputtering), micro-/nano-patterning (reactive ion & plasma etching, optical lithography, electron-beam lithography, dual-beam Ga FIB and He/Ne Ion Microscopes, both with gas injection sources for FIBD) and surface analysis techniques (x-ray diffraction, AFM, SEM), including Ga-FIB lamella preparation and TEM analysis at NMI Reutlingen (partner institute â€œAn-Institutâ€ of EKUT). 2. Low-noise electric transport instrumentation: Integral measurements of electric transport and noise properties at frequencies from dc to THz, temperatures from 10 mK to 300 K and magnetic fields from <1 nT to 7 T. 3. Low-temperature scanning electron & laser microscopes for investigating spatially resolved electric transport and magnetic properties. 4. Numerical simulation tools for superconducting thin films, JJs and SQUIDs.	http://www.physik.uni-tuebingen.de/fkp