PARTNER PRESENTATION AND INTEREST IN HORIZON EUROPE PARTICIPATION

Name of the organisation	NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT OF ISOTOPIC AND MOLECULAR TECHNOLOGIES - ITIM
Country	Romania
Type of organisation	NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
Short description	With more than 70 years of tradition in research, ITIM is nowadays involved in a wide area of micro- and nanotehnologies. The main focus of our developements is on graphenes, nano/micro-porous materials, magnetic micro/nanogels, thin films, micro/nano-patterned surfaces, magnetic / semiconducting nanoparticles and clusters, novel polymers / copolymers and micro/nanocompozites based on them, or hybride nanosystems built on such platforms. The envisaged major practical applicability domains are: environement protection / depolution, health – including nanomedicine, energy and combating climate changes, nanoelectronics, safety and security, information and communication technology.
Laboratory/ Department	***Quantum engineering team*** CETATEA – Center of Advanced Research and Technology for Alternative Energies (http://en.itim-cj.ro/research/research-teams/quantum-engineering/)
Contact person	Dr. Liviu Zarbo
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E-mail	liviu.zarbo@itim-cj.ro

Short description of Research Group involved

The Quantum Engineering team focuses its research on: Majorana modes for quantum computation; Modelling the operation of superconducting qubits; Ab initio investigation of the properties of granular aluminium used in the fabrication of superinductors used in qubits with fluxonium architecture; Optical systems for quantum key distribution; Non-Hermitian Quantum Mechanics; Quantum software; Two-dimensional transition metal dichalcogenides.

Additionally, the quantum engineering team has worked in the field of energy storage:

Research on improving the lead-acid accumulators, in collaboration ROMBAT S.A, Bistriţa, Romania, the study and management of energy storage systems, the study of Li-ion batteries, in collaboration with Universite Catholique de Louvain - Institute of Condensed Matter and Nanosciences, Louvain, Belgium.

The Quantum Engineering team is building a new Quantum Optics Lab for research in quantum communications.

Expertise

- Ab initio simulations of solid and molecular systems (SIESTA, ABINIT, TURBOMOLE, etc.)
- Computer modeling and simulation of condensed matter systems, both bulk and low dimensional (2D materials, heterostructures quantum dots), interfaces.
- Computer modeling of various types of phenomena in solid state systems: quantum transport, magnetic effects, topological effects, applicable to nanoelectronic devices.
- Modeling of superconducting circuits for quantum computation.

Experimental

- design, manipulation and maintenance of experimental equipment specific for photothermal techniques in both front and back configurations, using modulated 532 nm laser radiation
- Experience with TiSapphire and Q-switched Nd-YAG lasers: polarization control, beam shaping, pulse stretching, Second Harmonic Generation, Sum Frequency Generation
- Impedance spectroscopy in lead acid batteries, Two-photon and confocal microscopy, UV-VIS-NIR Spectrometry, Spin-coating technique, Micro fluidic channel fabrication

Involved persons. Short CV

Dr. Liviu Zarbo (http://en.itim-cj.ro/portfolio/zarbo-liviu-petre/) received B.Sc. and M.Sc. degrees in physics from Babes-Bolyai University of Cluj Napoca, and a PhD degree from University of Delaware. He is a Senior Scientist at National Institute for Research and Development of Isotopic and Molecular Technologies – ITIM Cluj Napoca and leader of the Quantum Engineering Team at ITIM. His research interests include quantum transport at nanoscale, quantum computation, superconducting circuits and topological devices for quantum computing. He was the coordinator (PI) of 4 research projects obtained in national competitions. He has published 24 papers in ISI journals (h index = 12)..

Dr. Cristian Morari (http://en.itim-cj.ro/portfolio/morari-ioan-cristian/) works as senior researcher at INCDTIM since 2006; PhD in Physics since 2001; has expertise in numerical simulations of structural and electronic properties for surface, molecule-surface and interface states, ab-initio study of electronic structure and electronic transport at nanoscale. He is the author of 55 research papers (h-index = 15) Referee for J Phys Chem A-C, Phys Chem Lett, Phys Rev., Phys Chem Chem Phys; Scientific officer in Material Science in competition PN-III-P1-1.1-TE-2021. He has coordinated as a PI 5 national research projects.

Dr. Luiza Iarinca (http://en.itim-cj.ro/portfolio/buimaga-iarinca-luiza-tania/) obtained her Ph.D. degree in 2004 at Babes-Bolyai University in 2011; her work addresses computational issues related to material science. In particular she is focused on the phenomena that occur at the surface / interface of metals. Leader of the QuCos Workgroup. Main author/co-author for 31 indexed publications and 23 scientific communications at international conferences according to WoS (2 awarded, 8 oral communications); 2 Invited Lectures; Co-author for 1 book and 3 book chapters; Co-author for 3 patent requests indexed in Darwent Patent Index. PI in 2 national research project and one Quantera project. External expert evaluator for European Commission, competition HORIZON-EUROHPC-JU-2021-COE and HORIZON-EIC-2022-PATHFINDEROPEN-01, Expert evaluator for UEFISCDI (Material Science) competition PN-III-P2-2.1-PTE-2021

If you are interested in a particular call, please indicate the Reference of the call/ Topic of interest. Potential contribution.

Have you already participated in an EU funded project? If so, provide some references.

ERANET-QUANTERA-2019-QuCos (2019) - Quantum Computation with Schrödinger cat states Funded by UEFISCDI through program P3-3.2 Horizon 2020-Quantera H2020