welcome to the European Microkelvin Collaboration

Application Form for MICROKELVIN Transnational Access Project

1. General Information

Project number:	CNRS12	
Project Title:	**Electron Transport Through Superconductor to Quantum Dot junctions**	
Lead scientist:[1]	**Title:**	Dr.
	First name:	Luis
	Last name:	Hueso
	Home institution:	CIC Nanogune
Host scientist:[2]	**Title:**	Prof.
	First name:	Hervé
	Last name:	Courtois
	Home institution:	CNRS Grenoble
Project scientist:[3]	**Title:**	MSc
	First name:	Emmanouil
	Last name:	Masourakis
	Scientific Field:	Quantum nano-electronics
	Home institution:	CIC Nanogune
	Is your home institution MICROKELVIN partner?	No
	Business address:	CIC nanoGUNE Consolider
	Street:	Tolosa Hiribidea, 76 E
	PO Box:	
	City:	Donostia – San Sebastian
	Zip/Postal Code:	20018
	Country:	Spain
	Telephone:	0034-943574000
	Fax:	0034-943574001
	E-mail:	e.masourakis@nanogune.eu
	Curriculum vitae (18 lines max): E. Masourakis *Undergraduate Degree:* BEng in Electrical Engineering (5 years) University of Edinburgh, June 2009 *Graduate Degree:* MSc in Bioelectronics (1 year) University of Edinburgh, November 2010 *Grants and Contracts:* CIC Nanogune, Nanodevices Group, Ph.D. work in progress Electron Transport Through Molecular Devices. Year: 2011-2014	
	Five most recent publications:	
	1- no publications yet	
	2-	
	3-	
	4-	
	5-	

[1] The lead scientist indicated here is expected to participate in the campaign as a user of the infrastructure.

[2] The host scientist is supervising the work of the visiting project scientist at the infrastructure.

[3] The project scientist is the person who will be visiting the infrastructure.

Other participating scientists:[4]	**Name:**	**Position:**	**New User:**
	1-		
	2-		
	3-		

[4] Please list all participating user group members. Expand the table, if necessary.

2. Project Information

Name of host infrastructure:	CNRS Grenoble			
Access provider / Infrastructure Director:	**Name:** H. Godfrin		**E-mail address:** henri.godfrin@grenoble.cnrs.fr	
Planned project dates:	**Start date:**	02/05/12	**Completion date:**	30/05/12

Project description (12 lines max):

This joint project between the Courtois group at CNRS and the Hueso group at Nanogune aims at investigating electron tunnelling through single molecules or nanoparticles in three terminal devices. Electrodes with few-nanometer separation are bridged by gated nanoparticles. At low temperatures, the devices benefit from the quantization of the energy states in these. While the Spanish group is focusing on the study of the molecular properties themselves, the French group's focus is on the integration of such junctions into superconducting circuits. The aim of the visit of E. Masourakis (first year PhD student at Nanogune) to Grenoble is to both learn the technique of electromigration for the formation of ultra-small gaps in nanofabricated wires as well as their measurement techniques at dilution refrigerator temperatures.

Scientific objectives of the project (12 lines max):

On the CNRS side, the objective of the project is to embed a single gold nanoparticle between two superconducting contacts as to reproduce a superconductor-insulator-normal metal-insulator-superconductor (SINIS) structure, with N having quantized energy levels and a large Coulomb charging energy. These structures will be used as electron turnstiles and coolers (collaboration Aalto-CNRS).

The Nanogune group is aiming at exploring the interplay between molecular vibrations and spin transport in the single molecular regime so as to observe the current enhancement in spin tunnelling current. The interplay of the spin transport with mesocopic effects such as Kondo correlations will be investigated.

Technical description of work to be performed (20 lines max):

One central goal of the visit is the training of E. Masourakis for the operation of cryogenic systems and measurement setups for mesoscopic transport. The visitor will contribute to the fabrication of electromigration junctions with superconducting leads. By inserting a single gold nanoparticle into the electromigrated gap, SINIS junctions will be obtained that can be used as micro-coolers or single electron turnstiles. The measurements will be performed in a dilution refrigerator. The work involves clean-room nanofabrication, cryogenic operation, and quantum transport measurements of mesoscopic devices.

3. Joint Proposals / Funding

Is this project in collaboration with other (concurrent) projects at the infrastructure?	No
If yes, please specify:	

Is this proposal submitted to any funding programmes?	No
If yes, please specify:	

The completed Application Form should be submitted to MICROKELVIN Management Office (Sari.Laitila@aalto.fi, fax +358-9-47022969)