welcome to the European Microkelvin Collaboration

CAPACITIES

Application Form for MICROKELVIN Transnational Access Project

1. General Information

Project number:	AALTO23	
Project Title:	**Charge and heat transport in quantum dots coupled to superconducting leads**	
Lead scientist:[1]	**Title:**	Prof.
	First name:	Herve
	Last name:	Courtois
	Home institution:	Institut Neel
Host scientist:[2]	**Title:**	Prof.
	First name:	Jukka
	Last name:	Pekola
	Home institution:	LTL, Aalto University
Project scientist:[3]	**Title:**	MSc.
	First name:	David
	Last name:	Van Zanten
	Scientific Field:	Nanoscience
	Home institution:	Institut Néel
	Is your home institution MICROKELVIN partner?	Yes
	Business address:	
	Street:	5 Avenue des Martyrs
	PO Box:	BP 166
	City:	Grenoble
	Zip/Postal Code:	38042 CEDEX 9
	Country:	France
	Telephone:	0033476887818
	Fax:	
	E-mail:	David.van-zanten@grenoble.cnrs.fr
	Curriculum vitae (18 lines max): **Education** 2011 – Today: PhD Nanoscience, Institut Neel (University of Grenoble) 2008 – 2011: MSc. Applied Physics, Delft University of Technology 2004 – 2009: BSc. Applied Physics, Delft University of Technology 2003 – 2004: Physics, University of Leiden 1997 – 2003: Gymnasium, Profile Nature & Technology and Nature & Health, Baudartius College, Zutphen **Professional Experience** 2010 – 2011: R&D Internship Polymer Vision 2003 – 2011: Web and computer related work (Network, Graphic and web design) 2001 – 2002: Math tutor for HAVO3	
	Five most recent publications:	
	1-	
	2-	

[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-Ville Maisi MIKES	**PhD student**	

2. Project Information

Name of host infrastructure:	Low Temperature Laboratory, Aalto University			
Access provider / Infrastructure Director:	Name: Matti Krusius		E-mail address: mkrusius@neuro.hut.fi	
Planned project dates:	Start date:	05/02/2012	Completion date:	11/02/2012

Project description (12 lines max):

Performing analysis of the electron and heat transport through SINIS structures where the normal island is weakly coupled quantum dot. This work will be compared to numerical calculations done on SINIS structures where the normal island does not have a significant level spacing.

Scientific objectives of the project (12 lines max):

The aim is to understand and ultimately measure charge and heat transport through quantum dots coupled to superconducting leads. The dots are metallic and their size of the order of 10 nm or smaller. The discrete energy levels of the dot will influence transport, but also energy relaxation within the dot. The system provides an interesting object where the single-electron turnstile and an electronic cooler can be realized on the smallest possible scale.

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

The aspect of discrete energy levels in the dot will be included in the otherwise familiar picture of transport analysis based on a master equation approach. This new aspect will be investigated first by modelling, including in the rate equations the theoretical input on what is known about different relaxation mechanisms. The results will be compared to those from larger metallic islands where the density of states is practically uniform. The experiment will ultimately measure directly the energy relaxation rates, which determine the degree of non-equilibrium in a dynamic situation. The discreteness of the energy levels may provide a way of faster operation of a single-electron turnstile, and suppression of its transfer errors.

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)

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