



Application Form for MICROKELVIN Transnational Access Project

1. General Information

Project number:	AALTO 12	
Project Title:	Microrefrigerator with enhanced cooling power	
Lead scientist: ¹	Title:	Professor
	First name:	Hervé
	Last name:	Courtois
	Birth date:	December 2, 1967
	Passport number:	07BD14584
	Research status/Position:	Professor
	New User: ²	yes
	Scientific Field:	
	Home institution:	Institut Néel, CNRS, Grenoble
	Is your home institution MICROKELVIN partner?	yes
	Business address:	
	Street:	25 Avenue des Martyrs
	PO Box:	
	City:	Grenoble
	Zip/Postal Code:	38042
	Country:	France
	Telephone:	(+33) 0 476881151
	Fax:	(+33) 0 456387087
	E-mail:	Hervé Courtois <Herve.Courtois@grenoble.cnrs.fr>
	Curriculum vitae (18 lines max):	
		Professor at Université Joseph Fourier (U.J.F.) - Grenoble 1 (2005-), Full Professor since 2010. ULTI Invited Scientist, TKK, Helsinki, Low Temperature Laboratory, with J.P. Pekola, Feb. - Aug. 2008. Research activity at Institut Néel, département Nanosciences, team Champ Proche. Junior member of Institut Universitaire de France (2004-2009). Habilitation (HDR) defended on Sept. 2000. PhD UJF Grenoble, Dec. 1994.
		Scientific output: 32 published publications parues excepting proceedings, including 9 Physical Review Letters, 11 Physical Review B, 1 Applied Physics Letters, 1 Europhysics Letters. 20 conference proceedings. About 800 citations, Point H equal to 13.
		Director of the summer school ESONN, European School On Nanoscience and Nanotechnologies since 2005.
	Five most recent publications:	
		1- Subkelvin tunneling spectroscopy showing Bardeen-Cooper-Schrieffer superconductivity in heavily boron-doped silicon epilayers, F. Dahlem, T.

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

² Indicate 'Yes' only if the user has never visited the infrastructure before this specific project, otherwise write 'No'.

	Kociniowski, C. Marcenat, A. Grockowiak, L. Pascal, P. Achatz, J. Boulmer, D. Débarre, T. Klein, E. Bustarret, H. Courtois, Physical Review B Rapid Communication 82 , 140505(R) (2010), distinguished as "Editor's choice": 4 pages.		
	2- Spatially-Correlated Microstructure and Superconductivity in Polycrystalline Boron-Doped Diamond, F. Dahlem, P. Achatz, O. A. Williams, D. Araujo, E. Bustarret and H. Courtois, Physical Review B 82 , 0333006 (2010) : 4 pages.		
	3- Electron cooling by diffusive normal metal - superconductor tunnel junctions, A. S. Vasenko, E. V. Bezuglyi, H. Courtois, and F. W. J. Hekking, Physical Review B 81 , 094513 (2010): 9 pages.		
	4- Quasiparticle diffusion based heating in superconductor tunneling micro-coolers, S. Rajauria, H. Courtois and B. Pannetier, Physical Review B 80 , 214521 (2009): 4 pages.		
	5- Spin-valve effect of the spin accumulation resistance in a double superconductor-ferromagnet junction, P. S. Luo, T. Crozes, B. Gilles, S. Rajauria, B. Pannetier and H. Courtois, Physical Review B Rapid Communications 79 , 140508(R), distinguished as "Editor's choice": 4 pages.		
<u>Other participating scientists:</u> ³	Name:	Position:	New User: ²
	1- Nquen Hung	post-doctoral researcher	yes
	2-		
	3-		

³ Please list all participating user group members. Expand the table, if necessary.

2. Project Information

Name of host infrastructure:	Aalto University		
Access provider / Infrastructure Director:	Name: Mikko Paalanen Jukka Pekola	E-mail address: paalanen@neuro.hut.fi pekola@boojum.hut.fi	
Planned project dates:	Start date:	1.11.2010	Completion date: 14.11.2010
Project description (12 lines max): Dr. Hung Nguyen is a post-doctoral researcher currently working in the Néel Institute at CNRS Grenoble on the Microkelvin project. The arrangement is such that he works one year, till the end of March 2011, in Grenoble and thereafter he continues his post-doctoral assignment at AU in Helsinki for another year. His current task is to fabricate and measure large area tunnel junctions for electronic cooling, which would then be adapted to the platform refrigerator in JRA2. He has successfully developed the photolithographic fabrication method for junctions of large area (1500 μm^2), which were described in the 18-month Microkelvin Periodic Project Report. Now he plans to measure these junctions at the Low Temperature Laboratory in Helsinki in a dilution refrigerator over a fortnight period (November 1 - 14, 2010). We propose this visit to be covered by the Microkelvin TA programme.			
Scientific objectives of the project (12 lines max): The objectives of this visit is first to measure the cooling properties of large-area coolers at very low temperatures down to about 50 mK. This will complement previous studies performed down to 300 mK in Grenoble. The results would determine the relevance of the present design and fabrication process, and indicate what modifications are to be implemented for the second generation. In addition, Dr. Hung Nguyen will take the opportunity of this visit to discuss the practical implementation of such coolers to the membrane platforms developed in Helsinki.			
Technical description of work to be performed (20 lines max): Dr. Hung Nguyen will bring two sets of samples fabricated in Grenoble to Helsinki facility, microbond them on a dedicated sample holder and cool down the system to 50 mK. The measurements to be done are transport measurements of both the cooler junctions and the attached thermometer junctions. The behavior of heat transport properties will be extracted from the electron transport data and analyzed as a function of sample process and bath temperature.			

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 (Katariina.Toivonen@neuro.hut.fi, fax +358-9-47022969)