



Application Form for MICROKELVIN Transnational Access Project

1. General Information

Project number:	Lancaster 21	
Project Title:	Ultralow temperature properties and thermometry in mesoscopic structures	
Lead scientist: ¹	Title:	Ph.D.
	First name:	Stefan
	Last name:	Ludwig
	Home institution:	LMU University Munich
Host scientist: ²	Title:	Professor
	First name:	George
	Last name:	Pickett
	Home institution:	Lancaster University
Project scientist: ³	Title:	Dipl. Phys.
	First name:	Florian
	Last name:	Forster
	Birth date:	16.10.1986
	Passport number:	LF08ZFKMG
	Research status/Position:	PhD-student
	New User: ⁴	no
	Scientific Field:	Nanophysics, Solid State Physics
	Home institution:	LMU Munich
	Is your home institution MICROKELVIN partner?	no
	Business address:	Fakultät für Physik, Ludwig-Maximilians-Universität
	Street:	Geschwister-Scholl-Platz 1
	PO Box:	
	City:	München
	Zip/Postal Code:	80539
	Country:	Germany
	Telephone:	0049-89-2180-3586
	Fax:	0049-89-2180-3182
	E-mail:	f.forster@physik.uni-muenchen.de
	Curriculum vitae (18 lines max):	
	- October 2009	B. Sc. in Physics RWTH Aachen University
	- October 2011	M. Sc. in Physics RWTH Aachen University
	- since April 2012	PhD-student at the LMU Munich

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

⁴ Indicate 'Yes' only if the user has never visited the infrastructure before this specific project, otherwise write 'No'.

	Five most recent publications:		
	F. Forster, A. Molina-Sanchez, S. Engels, A. Epping, K. Watanabe, T. Taniguchi, L. Wirtz, C. Stampfer "Confocal Raman spectroscopy of graphene on hexagonal boron nitride" arXiv:1212.3993 (2012)		
Other participating scientists: ⁵	Name:	Position:	New User: ²
	1- Stefan Ludwig	Group leader	no

2. Project Information

<u>Name of host infrastructure:</u>	Ultra Low Temperature laboratory, University of Lancaster, Lancaster, United Kingdom		
<u>Access provider / Infrastructure Director:</u>	Name: Prof. S.N. Fisher Prof. G.R. Pickett	E-mail address: s.fisher@lancaster.ac.uk g.pickett@lancaster.ac.uk	
<u>Planned project dates:</u>	Start date:	15/9/13	Completion date: 30/9/13
<u>Project description (12 lines max):</u>			
<p>A major goal of the MICROKELVIN project is to develop technology to better enable the cooling of electronic devices and nanocircuits to temperatures below 1mK. For this purpose a new EU Access Facility machine was recently built at Lancaster. A major obstacle to cooling electronic devices is heat generated by noise transmitted through electrical leads. To address this, sophisticated wiring/filter protocols and designs developed by Stefan Ludwig's group in Munich are being implemented in the new machine at Lancaster. The Ludwig group have also developed high quality low temperature measurement techniques for nanostructures which they produce in-house. This project aims to perform the first ultralow temperature measurements on nanostructures built in Munich. To achieve this, Stefan Ludwig and Florian Forster require several visits to the Lancaster Access Facility to further develop the necessary measurement techniques and thermometry and to perform the preliminary measurements.</p> <p>This application is for the third visit of Florian Forster to Lancaster under this project.</p>			
<u>Scientific objectives of the project (12 lines max):</u>			
<p>The primary scientific and technological objective of this collaborative project is to investigate nanoelectronic circuits in a hitherto unrivalled range of ultralow temperatures. This will allow us to reach lower energy scales and go well beyond the present state-of-the-art to investigate collective and phase sensitive quantum phenomena such as: mesoscopic interferometry effects; quantum Hall phases; the Kondo effect in coupled quantum dots; the 0.7 anomaly in quantum point contacts; and the hyperfine interaction between confined electrons and many nuclear spins. One of our main efforts will be to study coherent dynamics and entanglement in semiconductor-based quantum information circuits at ultralow temperatures. The combination of expertise in ultralow temperature physics in Lancaster and low temperature nanoelectronic measurements in Munich provides the framework for a successful collaboration. Nanostructures are being produced and initially characterised in Munich, while the final ultralow temperature measurements will be performed in Lancaster.</p>			
<u>Technical description of work to be performed (20 lines max):</u>			
<p>Presently we are installing cables, filters and samples for measurement in the newly built dilution unit at the University of Lancaster, and we are exchanging skills and technology between Munich and Lancaster, with visits in both directions. This includes sets of room temperature filtering and measurements devices that have been transported to Lancaster from Munich.</p> <p>This is the third visit of Florian Forster to Lancaster, and is essentially a continuation of his second visit, which ends on the 8th September when he returns to Germany for a vacation. Florian brought to Lancaster a mesoscopic sample containing nanostructures for investigation, as well as several of the filtering and measurement setups. During this third visit Florian's time in Lancaster will overlap with his supervisor</p>			

⁵ Please list all participating user group members. Expand the table, if necessary.

Stefan Ludwig, Florian and Stefan will be working on experiments that have been set up by Florian and the Lancaster team during Florian's second visit.

This work is important for demonstrating the successful investigation of nanoelectronic circuits at ultralow temperatures at the new Lancaster facility.

3. Joint Proposals / Funding

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

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

The completed Application Form should be submitted to MICROKELVIN Management Office
(Katariina@neuro.hut.fi, fax +358-9-47022969)