

Report on the Transnational Access Activity carried out within MICROKELVIN

The eligibility of transnational access to a MICROKELVIN TA site implies the submission of the following:

1) **The Certification of visit**

The form "Certification of visit" must be completed and signed by the access provider in charge of the infrastructure and the leader of the project.

2) **A TA project report**

The form for the TA project report is contained within this document. It should be completed after project end by the group leader of the project. You must respect the limited number of words specified, longer descriptions will be rejected. Figures/tables may be attached at the end of the document. The document must be submitted in an editable format (doc, rtf).

3) **A User group questionnaire**

To enable the Commission to evaluate the Research Infrastructures Action, to monitor the individual contracts, and to improve the services provided to the scientific community, each project leader of a user-project supported under an EC Research Infrastructure contract is requested to complete a "user group questionnaire". The questionnaire must be submitted once by each user group to the Commission as soon as the experiments on the infrastructure come to end.

The user group questionnaire is not part of this document and must be completed on-line. It is accessible at:

http://cordis.europa.eu/fp7/capacities/questionnaire_en.html.

► **Please note that any publications resulting from work carried out under the MICROKELVIN TA activity must acknowledge the support of the European Community:**

“The research leading to these results has received funding from the European Community’s Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 228464 (MICROKELVIN).”



MICROKELVIN Transnational Access Project Report

1. General information

Project number:	AALTO 30	
Project Title:	Nonequilibrium transport through nanodevices	
Lead scientist: ¹	Title:	Professor
	First name:	Iouri
	Last name:	Galperine
	Home institution:	University of Oslo, Norway
Host scientist: ²	Title:	Professor
	First name:	Nikolai
	Last name:	Kopin
	Home institution:	Low Temperature Laboratory, Aalto University
Project scientist: ³	Title:	Professor
	First name:	Iouri
	Last name:	Galperine
	Birth date:	March 8, 1944
	Passport number:	28816635
	Research status/Position:	Professor of Physics
	New User: ⁴	No
	Scientific Field:	Theory of Condensed Matter
	Home institution:	
	Is your home institution MICROKELVIN partner?	<input checked="" type="checkbox"/> No
	Business address:	Department of Physics, University of Oslo
	Street:	Sem Saelends vei 24, Nedre Blindern
	PO Box:	1048
City:	Oslo	
Zip/Postal Code:	0371	
Country:	Norway	
Telephone:	+4722856495	
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E-mail:	louri.galperine@fys.uio.no	

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.

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

2. Project information

<p><u>Please, give a brief description of project objectives:</u> (250 words max)</p>	<p>The main objective is the development of a theoretical framework for systematic studies of statistical thermodynamics of mesoscopic systems at low temperatures. This task requires understanding of the interplay between entropy, work and information balance in nanodevices under manipulation of bias and gate voltages. In particular, we suggest a novel protocol optimizing performance of a Maxwell's Demon device based on a single-electron pump.</p> <p>We plan to work out different theoretical approaches allowing us to analyse thermodynamics in mesoscopic devices and optimize their performance.</p>
<p><u>Technical description of work performed:</u> (250 words max)</p>	<p>During the 13-day visit of Iouri Galperine, we have arranged a meeting between experimentalists and theorists. Based on the results of this meeting, we have formulated the main problems and chosen the order in which they will be addressed in order to use our expertise in the best way. We have discussed leading approximations allowing obtaining concise results for the problem under consideration. We have formulated the basic set of equations, which we have solved for a minimal model. We expect to move along the planned route.</p>
<p><u>Project achievements</u> (and difficulties encountered):⁵ (250 words max)</p>	<p>This is an intermediate point of the project, which we expect to be fruitful.</p>
<p><u>Expected publications and dates:</u></p>	<p>We are preparing a publication, which will be finished and submitted during the coming summer or fall.</p>
<p><u>Submission date of user group questionnaire:</u></p>	<p>3 June, 2013</p>

Completed Project Reports should be returned to MICROKELVIN Management Office (Sari.Laitila@aalto.fi, Fax: +358 9 47022969).