

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:	Aalto21	
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:	Kopnin
	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:	27132407
	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 type="checkbox"/> Yes <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:	Iouri.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 development of a theoretical framework for systematic studies of nonlinear stationary and time-dependent transport through hybrid devices consisting of normal and superconducting parts. This task requires understanding the interplay between Coulomb interaction (Coulomb blockade effects) and coherent phenomena related to the dynamics of the superconducting condensate. The latter requires full account of quantum dynamics in confined superconductors involving several specific features. Among the unusual non-equilibrium properties of hybrid systems are the so-called branch imbalance - asymmetry in populations of electron- and hole-like branches of the excitation spectrum, specific electro-neutral interface modes, non-traditional heat release and transport, etc. We plan to work out theoretical approaches allowing for the above-mentioned phenomena.</p>
<p><u>Technical description of work performed:</u> (250 words max)</p>	<p>During the 7-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 from the general theory of quantum transport. We have done our best to review and formulate the basic set of equations to be analyzed and solved, either analytically or numerically. We expect to move along this planned route.</p>
<p><u>Project achievements (and difficulties encountered):</u>⁵ (250 words max)</p>	<p>This is a starting point of a new project, which we expect to be fruitful.</p>
<p><u>Expected publications and dates:</u></p>	<p>It is hard to specify a definite date for results at the present stage.</p>
<p><u>Submission date of user group questionnaire:</u></p>	

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