

## 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](http://cordis.europa.eu/fp7/capacities/questionnaire_en.html).

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► **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

|  |  |                               |
|--|--|-------------------------------|
| <b>Project number:</b>                 | LANCASTER 17   |                               |
| <b>Project Title:</b>                  | Ultra-low temperature MEMS                           |                               |
| <b>Lead scientist:</b> <sup>1</sup>    | <b>Title:</b>  | Dr                            |
|  | <b>First name:</b>                                   | Eddy                          |
|  | <b>Last name:</b>                                    | Collin                        |
|  | <b>Home institution:</b>                             | Institut Néel - CNRS          |
| <b>Host scientist:</b> <sup>2</sup>    | <b>Title:</b>  | Prof.                         |
|  | <b>First name:</b>                                   | Shaun                         |
|  | <b>Last name:</b>                                    | Fisher                        |
|  | <b>Home institution:</b>                             | Lancaster University          |
| <b>Project scientist:</b> <sup>3</sup> | <b>Title:</b>  | Dr                            |
|  | <b>First name:</b>                                   | Eddy                          |
|  | <b>Last name:</b>                                    | Collin                        |
|  | <b>Birth date:</b>                                   | 26/08/1975                    |
|  | <b>Passport number:</b>                              | ID061138101374                |
|  | <b>Research status/Position:</b>                     | Chargé de recherche           |
|  | <b>New User:</b> <sup>4</sup>                        | yes                           |
|  | <b>Scientific Field:</b>                             | Ultra-low temperature physics |
|  | <b>Home institution:</b>                             | Institut Néel - CNRS          |
|  | <b>Is your home institution MICROKELVIN partner?</b> | Yes                           |
|  | <b>Business address:</b>                             | 25                            |
|  | <b>Street:</b>                                       | Rue des Martyrs               |
|  | <b>PO Box:</b>                                       | BP166                         |
|  | <b>City:</b>   | Grenoble                      |
| <b>Zip/Postal Code:</b>                | 38042  |                               |
| <b>Country:</b>                        | France   |                               |
| <b>Telephone:</b>                      | +33476887831   |                               |
| <b>Fax:</b>                            | +33456387087   |                               |
| <b>E-mail:</b>                         | Eddy.collin@grenoble.cnrs.fr                         |                               |

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

<sup>2</sup> The host scientist is supervising the work of the visiting project scientist at the infrastructure.

<sup>3</sup> The project scientist is the person who will be visiting the infrastructure.

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

## 2. Project information

|  |  |
|--|--|
| <b><u>Please, give a brief description of project objectives:</u></b><br>(250 words max)           | In this project we investigate micro-electro-mechanical devices (MEMS) at ultra-low temperatures. We want to measure their mechanical properties (dissipation and nonlinear characteristics) in vacuum and immersed in a bath of ultra-cold liquid $^3\text{He}$ , to learn about the interactions in the superfluid environment.  |
| <b><u>Technical description of work performed:</u></b><br>(250 words max)                          | A MEMS sample from Grenoble has been installed on a demagnetization cryostat in Lancaster. It has been placed in an experimental container filled with superfluid $^3\text{He}$ cooled down to 100 $\mu\text{K}$ . The interactions of the MEMS with the surrounding bath of quantum excitations have been characterized.  |
| <b><u>Project achievements (and difficulties encountered):</u></b> <sup>5</sup><br>(250 words max) | <p>The device damping in ultra-cold superfluid <math>^3\text{He}</math> has been measured. Following predictions, it has been found to be a sensitive and efficient quasi-particle detector, about 5 times more sensitive than a usual vibrating wire device.</p> <p>However, strong nonlinearities and a low pair-breaking velocity have been discovered, which deserve further investigations.</p> |
| <b><u>Expected publications and dates:</u></b>   | <ul style="list-style-type: none"><li>▪ One paper within a year on: the coldest and most efficient MEMS thermometer</li><li>▪ One paper later on technical issues &amp; further applications</li></ul>   |
| <b><u>Submission date of user group questionnaire:</u></b>   | 26 September, 2013   |

Completed Project Reports should be returned to MICROKELVIN Management Office

([mari.kaarni@aalto.fi](mailto:mari.kaarni@aalto.fi) , Fax: +358 9 47022969).

## CERTIFICATION OF VISIT at MICROKELVIN Transnational Access Site

I herewith confirm that the following project was carried out at our Transnational Access Site

(Name of the Site) *Lancaster*

in the context of MICROKELVIN Transnational Access:

(Name of the Project) *Ultra-low temperature NEMS (lanes 17)*

The amount of access<sup>1</sup> delivered to the project group (project users) is as follows:

|   | Participant name | Duration of stay (start – end date) | Amount of access <sup>2</sup> |
|---|------------------|-------------------------------------|-------------------------------|
| <b>Project leader:</b>                                    | Eddy Collin      | 17/06/13-22/06/13                   | 6                             |
| <b>Project user 1:</b>                                    | Martial Defoort  | 17/06/13-22/06/13                   | 6                             |
| <b>Project user 2:</b>                                    | Henri Godfrin    | 19/06/13-23/06/13                   | 5                             |
| <b>Project user ...<sup>3</sup></b>                       |                  |                                     |                               |
| <b>Total amount of access delivered to project group:</b> |                  |                                     | <b>17</b>                     |

Lancaster University, 25 September 2013

Location and date



Shaun Fisher

Signature of access provider

*Grenoble, Institut Neel, 26/09/2013*

Location and date



Eddy Collin

Signature of project leader

Completed Certification of Visit should be returned to MICROKELVIN Management Office  
([sari.laitila@aalto.fi](mailto:sari.laitila@aalto.fi), fax: +358 9 47022969)

<sup>1</sup> TKK Helsinki, CNRS Crenoble, or Lancaster University

<sup>2</sup> The amount of access is defined as the time, in days, spent by the user at the infrastructure for this project, including weekends and public holidays (e.g., a scientist who spent 5 days at the infrastructure must indicate '5'). The total amount of access of the project group is the sum of access days of each project user.

<sup>3</sup> Please, expand if necessary.