welcome to the
European Microkelvin Collaboration

CAPACITIES

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).”**

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MICROKELVIN Transnational Access Project Report

1. General information

Project number:	AALTO12A1	
Project Title:	**Microrefrigerator with enhanced cooling power**	
Lead scientist:[1]	**Title:**	Professor
	First name:	Hervé
	Last name:	Courtois
	Home institution:	Institut Néel, CNRS, Grenoble
Project scientist:	**Title:**	Dr.
	First name:	Hung
	Last name:	Nguyen
	Birth date:	July 19, 1980
	Passport number:	N1283208
	Research status/Position:	Postdoctoral researcher
	New User:[2]	Yes
	Scientific Field:	Low temperature
	Home institution:	Institut Néel
	Is your home institution MICROKELVIN partner?	☒ Yes ☐ No
	Business address:	Institut Néel
	Street:	25 avenue des Martyrs
	PO Box:	
	City:	Grenoble
	Zip/Postal Code:	38042
	Country:	France
	Telephone:	
	Fax:	
	E-mail:	hung@ltl.tkk.fi

[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'.

2. Project information

Please, give a brief description of project objectives: (250 words max)	This work is corned with the development of a SINIS cooler platform with large junction area and a suspended normal metal part based on photolithography and over-etching techniques. The cooler should provide a large cooling power and will be implemented on a membrane for application purposes. This project is part of the JRA2 research activities of the Microkelvin Collaboration.
Technical description of work performed: (250 words max)	Two sets of samples fabricated in Grenoble were measured in Helsinki. The junction area was 1500 nm square with RN~15 Ohm for each sample. The two sets of samples differed in the copper-etching process: one used ion beam etching, the other used wet etching with HNO_3. Cooler characteristics (IV) and cooling of the samples were measured in a dilution refrigerator down to 50 mK. We also discussed the data and future continuation of the present plan.
Project achievements (and difficulties encountered)**:**[5] (250 words max)	The measurements agree with those performed earlier in Grenoble in a ^{3}He refrigerator at 300mK which we conclude to confirm the reproducibility of the fabrication technique and the robustness of the samples. Our heat transport analysis suggests that the junction was overheated and its geometry needs to be optimized for better thermalization of the heat dissipation. Based on this measurement, we redesign the junction to have smaller width. Other possibilities, like introducing a quasiparticle trap placed directly under the junction area or a more transparent oxide layer between the quasiparticle trap and the overheated superconductor, are being discussed and might be implemented next.
Expected publications and dates:	▪
Submission date of user group questionnaire:	

Completed Project Reports should be returned to MICROKELVIN Management Office (laitila@neuro.hut.fi, Fax: +358 9 47022969).