welcome to the European Microkelvin Collaboration

CAPACITIES

MICROKELVIN Transnational Access Project Report

1. General information

Project number:	**CNRS 06**	
Project Title:	**Micro- and nano- sensors for probing quantum turbulence**	
Lead scientist:[1]	**Title:**	Dr.
	First name:	David
	Last name:	Schmoranzer
	Home institution:	Charles University, Prague, Czech Republic
Host scientist:[2]	**Title:**	Prof.
	First name:	Henri
	Last name:	Godfrin
	Home institution:	CNRS Grenoble, France
Project scientist:[3]	**Title:**	Dr.
	First name:	David
	Last name:	Schmoranzer
	Birth date:	November 28th, 1981
	Passport number:	39058252
	Research status/Position:	young researcher
	New User:[4]	YES
	Scientific Field:	Low temperature physics, superfluidity
	Home institution:	Charles University, Prague, Czech Republic
	Is your home institution MICROKELVIN partner?	☐ Yes ☒ No
	Business address:	
	Street:	V Holesovickach 2
	PO Box:	
	City:	Prague
	Zip/Postal Code:	180 00
	Country:	Czech Republic
	Telephone:	+420 22191 2716, +420 777 586 939
	Fax:	
	E-mail:	david.schmoranzer@gmail.com

[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

Please, give a brief description of project objectives: (250 words max)	The aim was to develop and manufacture sensitive micro-oscillators for probing turbulence in cryogenic helium liquids, emphasizing usage in He superfluids at very low temperatures. Sensors in the form of wires, cantilevers and spheres were proposed, with emphasis on goal-post oscillators developed in CNRS Grenoble. The produced devices are to be characterised and used to study quantum turbulence within a research project at the Charles University in Prague, as well as for future experiments performed on-site at CNRS Grenoble. One of the objectives of the project was also to provide the user with sufficient training in microfabrication technologies so that the work on the development of various micro-oscillators can continue after the visit is concluded.
Technical description of work performed: (250 words max)	The first steps involved preparation of the oscillators using microfabrication technologies such as optical lithography (UV, deep UV), laser lithography, selective wet etching, reactive ion etching, physical vapour deposition and related characterisation techniques (microscopy, interferometry, profilometry). During this time, new designs of micro-oscillators were also produced and the corresponding lithographic masks made. An experimental setup for testing the produced samples in cryogenic conditions was assembled and tested successfully. Several different goal-post oscillators were produced, which are available for future tests and measurements.
Project achievements (and difficulties encountered)**:**[5] (250 words max)	Achievements: - Training in microfabrication - Micro-oscillators produced - New designs proposed, masks made - Cryogenic testing setup assembled and characterised Difficulties: - Delicate manipulation of samples during fabrication and installation - Long waiting times for some microfabrication technologies
Expected publications and dates:	- publications will follow measurements in low and very low temperatures to be performed in Prague/Grenoble in the rest of 2011 or early 2012 - suitable publication medium – Phys. Rev. B / Phys. Rev. E
Submission date of user group questionnaire:	November 2nd, 2011

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