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:	**CNRS14-1**	
Project Title:	**Time-dependent heat capacity measurement at very low temperatures**	
Lead scientist:[1]	**Title:**	Privatdozent, Dr. rer nat. habil.
	First name:	Sven
	Last name:	Sahling
	Home institution:	TU Dresden, Germany
Host scientist:[2]	**Title:**	Dr.
	First name:	Gyorgy
	Last name:	Remenyi
	Home institution:	Institut Néel, CNRS
Project scientist:[3]	**Title:**	Privatdozent Dr. rer. nat. habil
	First name:	Sven
	Last name:	Sahling
	Birth date:	12/04/1951
	Passport number:	CCJ2CK5ZC
	Research status/Position:	Privatdozent
	New User:[4]	
	Scientific Field:	
	Home institution:	
	Is your home institution MICROKELVIN partner?	No
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	PO Box:	
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[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)	- Investigation of the thermodynamic properties (heat capacity, thermal relaxation) of a high quality Fe_3O_4 single crystal at very low temperatures and high magnetic field. - Determination of the relaxation time spectrum of low energy excitations.
Technical description of work performed: (250 words max)	- Calibration of AuGe thermometers at very low temperatures. - Calibration of heat capacity measurement at low temperatures. - Development of experimental methods (hardware and software elaborated in Institute Néel) for long and short time thermal relaxation. - The heat capacity, thermal relaxation and magnetization of Fe_3O_4 was investigated at very low temperatures and magnetic fields up to 10 T. Special thermometers and measuring techniques allowed us to measure the time dependence of the sample temperature after a short heat pulse (between 1 ms and 10000 s) even at very low temperatures and high magnetic fields.
Project achievements (and difficulties encountered)**:**[5] (250 words max)	The experimental equipment (thermometers, software, and hardware) for the investigation of relaxation processes in solids at very low temperatures and high magnetic field was finished. Test measurements with gold demonstrate that we are able to register relaxation times between 1 ms and 10000 s. The heat capacity, thermal relaxation and magnetization of Fe_3O_4 were investigated at very low temperatures and magnetic fields up to 10 T. The broad relaxation time spectrum was determined as a function of temperature and magnetic field for zero field and magnetic field cooling with different cooling rates. The analysis of the heat capacity and magnetization data of $Sr_{14-x}Ca_xCu_{24}O_{41}$ was finished for x = 0 and x = 12. The heat capacity is complex. For the Ca doped sample we found four contributions to the heat capacity, for the undoped sample even eight. A part of these contributions is strongly time dependent. The separation of the different contributions was possible due to the detailed measurements of the heat capacity at constant field as a function of temperature and at constant temperature as a function of magnetic field for short (30 ms) and long relaxation time. The relaxation time spectrum for the time dependent contributions was obtained as a function of temperature and magnetic field. It is expected that a part of these contributions depends on the direction of the magnetic field. This will be examined in the next experiments.
Expected publications	One paper is finished and will be published in the next month,

and dates:	three others are in progress.
Submission date of user group questionnaire:	25 April, 2013

Completed Project Reports should be returned to MICROKELVIN Management Office

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