

## 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 03	
<b>Project Title:</b>	Q-balls in Superfluid 3He-B and Magnetic Relaxation in Limit T-0
<b>Lead scientist:</b> 1	
Title:	RNDr., CSc.
First name:	Peter
Last name:	Skyba
Birth date:	16.6.1958
Passport number:	ST 249 255
Research status/Position:	Physicist/senior research fellow
New User:2	No
Scientific Field:	Quantum fluids, NMR, ULT Physics and techniques
Home institution:	Institute of Experimental Physics, SAS
Is your home institution MICROKELVIN partner?	Yes
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## 2. Project information

<b><u>Please, give a brief description of project objectives:</u></b> (250 words max)	Our objective was to study further the dissipation mechanisms which operate on the PPD at very low temperatures, and in particular to consider whether Andreev (Majorana) bound surface states may have any influence on these decay mechanisms. We will reanalyse existing experimental data and supplement this by taking new measurements as required. On the basis of our findings, we hope to prepare a draft of an article on the low temperature properties of the PPD with emphasis on the magnetic relaxation mechanisms.
<b><u>Technical description of work performed:</u></b> (250 words max)	Measurements of the properties of the PPD as a function of temperature were re-analysed to provide extra details which were not previously considered. We have compared the results to current ideas on the nature of the PPD and we have analysed the data to compare possible dissipation mechanisms. We have also considered how the PPD might be influenced by the current ideas on Andreev (Majorana) bound surface states in superfluid $^3\text{He-B}$ . Based on results of our analysis and using recent experimental and theoretical works on spin precessing structures, we have built a better physical picture of the PPD based on the spin-wave scenario, although the exact understanding of the PPD remains a theoretical challenge. We were not able to perform any additional measurements as the experiment at Lancaster was interrupted due to a leak of the helium-3 system of the experimental cell, but the existing data is sufficient for our current needs. A draft of the article is currently in preparation.
<b><u>Project achievements (and difficulties encountered):</u></b> <sup>5</sup> (250 words max)	Based on data re-analysis and recent theoretical works on spin wave modes in superfluid $^3\text{He-B}$ we were able to form a better physical picture of the PPD and how it might be related to spin wave modes observed at higher temperatures. The data analysis of the measurements of magnetic relaxation (PPD life time) clearly show the presence of an additional surface mechanism although neither the frequency of the PPD signal nor its frequency - amplitude dependences seem to be affected by this mechanism.
<b><u>Expected publications and dates:</u></b>	We plan to submit the paper which presents the results achieved during this project early next year.
<b><u>Submission date of user group questionnaire:</u></b>	Kosice 15 Dec 2010

Completed Project Reports should be returned to MICROKELVIN Management Office ([katariina@neuro.hut.fi](mailto:katariina@neuro.hut.fi), Fax: +358 9 4512969).