



Application Form for MICROKELVIN Transnational Access Project

1. General Information

Project number:	Lancaster03	
Project Title:	Q-balls in Superfluid 3He-B and Magnetic Relaxation in Limit T-0	
Lead scientist: ¹	Title:	Dr.
	First name:	Peter
	Last name:	Skyba
	Birth date:	16.6.1958
	Passport number:	ST 249 255
	Research status/Position:	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
	Business address:	Institute of Experimental Physics, SAS
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	City:	Košice
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	Country:	Slovakia
	Telephone:	++ 421 55 6228158
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	Curriculum vitae (18 lines max):	<p>Co-chairman with A. Feher: CRYO 2010 conference, Maria Curie Cryo-course, Myto pod Dumbierom, September 2010, Slovakia Member of Selection Panel ULTI IV (Helsinki University of Technology) 2004-2008 Visits at Lancaster University ULT laboratory - 1997/2009 Prize of Presidium of Slovak Academy of Sciences for development of experimental infrastructure for low temperature physics - 2008 Prize of Ministry of Education of Slovakia for Science - 2005 Chairman of COSLAB workshop, Smolenice, Slovakia - 2005 Member of Steering Committee of COSLAB ESF 2003-2006 Scientific secretary IEP SAS 1999-2003 Head of department of low temperature physics, IEP SAS 1995-1999 PhD in Condensed Matter Physics - 1994 - -</p>
	Five most recent publications:	
		1 D.I. Bradley et al, Magnetic Phase Transition in a Nanonetwork of Solid 3He in Aerogel, PRL 105 125303 (2010).
		2. P. Skyba: Notes on Measurement Methods of Mechanical Resonators used in Low Temperature Physics, JLTP, 160 219 (2010).
		3. D.I. Bradley et al, Probing Andreev Reflection in Superfluid 3He-B using a quartz tuning fork, JLTP 152 148 (2008).

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'.

	4. M. Clovecko et al, New non-Goldstone Collective Mode of BEC of Magnons in Superfluid 3He-B, PRL 100 155301 (2008).		
	5. M. Blazkova et al, Vibrating quartz fork- A tool for cryogenic helium research, JLTP 150, 525 (2008).		
<u>Other participating scientists:</u> ³	Name:	Position:	New User: ²
	1-		
	2-		
	3-		

³ Please list all participating user group members. Expand the table, if necessary.

2. Project Information

Name of host infrastructure:	ULANC		
Access provider / Infrastructure Director:	Prof. George Pickett, FRS, Prof. Shaun Fisher	E-mail address: g.pickett@lancaster.ac.uk s.fisher@lancaster.ac.uk	
Planned project dates:	Start date:	25.11.2010	Completion date: 5.12.2010
Project description (12 lines max): <p>As a long-term collaborator of the Lancaster ULT group I have participated in various experiments at Lancaster, for more than 10 years, on spin and quasiparticle dynamics in superfluid 3He-B at very low temperatures. In particular, we have studied the persistently precessing domain (PPD), which is considered as a condensed matter analogue of Q-balls. Many exotic features of PPDs were found experimentally: off - resonant excitation of the PPD using cw-NMR, a spin-laser like behaviour, the stabilising affect of a local field minimum. We have recently made measurements of the magnetic relaxation of the PPD, where an unexpected temperature independent magnetic relaxation mechanism was observed when PPD was pushed toward the wall of the experimental cell. Recent theoretical work on Andreev (Majorana) bound surface states in superfluid 3He-B shed light on a possible mechanism for this temperature independent magnetic relaxation. The aim of this project is to re-analyze old experimental data, and to take further measurements as needed, to investigate whether such a mechanism may be responsible.</p>			
Scientific objectives of the project (12 lines max): <p>Our objective is to determine whether Andreev (Majorana) bound surface states may have any influence on the decay mechanisms operating on the PPD at very low temperatures. We will re-analyse 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 anomalous magnetic relaxation and discuss the possible role of Andreev surface bound states.</p>			
Technical description of work to be performed (20 lines max): <p>Measurements of PPD magnetic relaxation in dependence on temperature will be re-analysed in veiw of the new emerging ideas on Andreev (Majorana) bound surface states in superfluid 3He-B. We are very fortunate that an experimental cell which can be used to study the PPD is currently running at Lancaster, so we have the opportunity to take further measurements as required. Lancaster has a unique capability for studying ultra-long lived PPD and for spatially manipulating them with versatile magnetic field profiles. Based on our findings we will start writing a draft article for publication.</p>			

3. Joint Proposals / Funding

Is this project in collaboration with other (concurrent) projects at the infrastructure?	No
If yes, please specify:	
Is this proposal submitted to any funding programmes?	No
If yes, please specify:	

The completed Application Form should be submitted to MICROKELVIN Management Office
(Katariina@neuro.hut.fi, fax +358-9-47022969)