

## European Microkelvin Collaboration

### MICROKELVIN

**General Assembly Meeting 16.3.2011**  
**Midterm meeting (half-way point of the 4-year programme)**  
**Red Saloon, Smolenice Castle, 16:15 – 19:00**

#### **Members present at General Assembly meeting:**

George Pickett ULANC (Chair)  
Christian Enss HEID  
Henri Godfrin CNRS  
Matti Krusius AALTO (Acting Coordinator)  
John Saunders RHUL  
Thomas Schurig PTB  
Peter Skyba SAS  
Dominik Zumbuhl BASEL

**Not represented:** Bluefors, DELFT, UniLeiden, SNS (Pisa)

#### **AGENDA**

1. **Membership matters.** Owing to continued unavailability of our coordinator, prof. Mikko Paalanen, who suffered a severe stroke six months ago, a new coordinator has to be appointed. Such a replacement is normally required within three months.
2. **Discussion of possible changes in JRA tasks,** as detailed in Microkelvin Annex I. It is expected that after more than 3 years of drafting the Microkelvin plan for the JRA tasks there might appear a need for one or two changes.
3. **Discussion of possible changes in funding plan.**
4. **Discussion on how to step up the use and accessibility of TNA services.** Our user groups ask for access in order to acquire know how and experience in low-temperature techniques and measurement practices, to set up and carry out their own measurements, or to prepare samples and equipment. These demands concern both the cryogenic laboratories and the clean-room facilities of the access providers. Some of the JRA Tasks require consultation and construction work which is performed by different user groups at an access providing site, to achieve the goals of the specified JRA Task. Typically such commitments require more than 3 months of access by a particular user group. The longer duration of access time is consistent with our goal in Annex I to establish a European-wide “Laboratory without Walls” for microkelvin research.
5. **Discussion of upcoming networking programme:** The plan for review meetings, user meetings, meetings with industrial partners, training courses, scientific workshops, and topical conferences has to be discussed for the final 2-year grant period.
6. **Discussion of possible new commercialization projects.**

7. **Decision on whether to submit an amendment proposal to Annex I at our mid-term point.**
8. **Proposal to request an extension of MICROKELVIN for one further fifth year.**
9. **Proposal to investigate the possibilities to apply for a new grant after March 2013**, in order to continue our programme of making  $\mu\text{K}$ -temperatures available for nanoscience and other condensed matter research.
10. **Any other business.**
11. **Closing of meeting.**

## MINUTES OF GENERAL ASSEMBLY

1. **Membership matters.** The General Assembly proposes that the present acting coordinator, Matti Krusius, should be appointed as new Microkelvin Programme Coordinator.
2. **Changes in JRA tasks.**

***JRA1:*** It was noted that we are behind in the deadlines for the construction work in Tasks 2 and 3. In both cases delays are caused by unexpected absence of man power or problems with equipment deliveries. It was also noted that in Task 2 the second nuclear cooling installation with pulse-tube based dilution refrigerator precooling is not constructed for AALTO, but was already during the first grant year decided to be delivered to BASEL. This situation is in contradiction with the wording in Annex I. Since then a second similar compact refrigeration installation has been ordered by AALTO from BLUEFORS, but with resources outside the Microkelvin contract. Since the delays or changes in the execution of Tasks 2 and 3 are not major, no amendment of plans or deadlines will be put forward.

***JRA3 Task 3:*** The plan to investigate a superfluid analogue model of the black-hole horizons rests on a profound understanding of the dynamics of quantized vortex lines in the zero temperature limit. Owing to new developments in vortex dynamics research (Tasks 1 and 4) it has been found necessary to extend this latter work, before the black-hole analogue experiment is built. This means that the black-hole analogue is postponed to later in the work schedule of the rotating nuclear cooling refrigerator at AALTO. The change causes delays in **Milestone M6**. We propose to replace M6 with a new milestone in Task 4 which calls for measurements on surface relaxation in the Q-ball state and possible connections to zero-energy surface states (Majorana fermions). These changes call for an amendment of Task 3.

***JRA3 Task 4:*** The plan to construct a dark-matter observatory ULTIMA in the Canfranc underground laboratory has met with difficulties: 1) The project proposal received the first step of French funding for the required measuring equipment, but not the second step for man power to set up and operate the observatory in Canfranc. Moreover the price of the target material of the detector, helium-3, has increased 20-fold since drafting the plans for ULTIMA. 2) The second reason is that the Canfranc underground laboratory suffered a serious collapse of its roofing, which during the first two grant years prevented access to the laboratory. Since then French under-

ground research has been directed mainly to Modane where the ULTIMA plan should now be accepted and relocated. For these “force majeure” reasons ULTIMA is delayed and will play no major role during the present grant period. We propose to substitute it with other research and therefore submit an amendment to Annex I.

3. **Changes in funding plan.** Difficulties are envisaged in covering the expenses of researchers from Basel and SAS (Kosice) who participate in consultation and construction at the Lancaster advanced cooling facility (JRA1 Task 3). The proposal was put forth to divert part of the TNA3 funding for this purpose. This could be carried out in the form of an amendment to Annex I. However, after discussions the General Assembly came to the conclusion that the possibilities to use TNA3 funds directly for this purpose under the present rules should be clarified as a first step.
4. **Improve access to TNA services.** It was decided that the selection rules for TNA visits should be clarified. ANNEX III states: "The access provider shall seek written approval of the Commission for the selection of user groups requiring access exceeding 3 months, unless such longer access is foreseen in ANNEX I." This rule has proven untenable for the Microkelvin consortium, although such a situation could have been avoided with a more appropriate definition in ANNEX I. We can now propose (1) to change the rule to "The access provider shall seek written approval of the Commission for the selection of user groups requiring access exceeding 3 months for a particular research project" or (2) supply a list of some of our user groups who ask for permission to exceed the 3-month restriction or (3) submit a query for approval in each case where the 3-month restriction is going to be exceeded. In the last case queries will be submitted as needed.
5. **Future meeting programme.** The recommendation was accepted to monitor more closely the current situation of the meetings budget and to step up efforts to fix as soon as possible the entire meeting plan for the coming final 2-year grant period.  

The next (36-month) Review and User Meeting will be organized 19 – 23 March, 2012, with 3 full meeting days (arrival Monday, 19 March; departure Friday, 23 March). The venue is again the Smolenice Castle and the organizer Peter Skyba.
6. **New commercialization projects.** The proposition to include new commercialization projects was supported. However, the two current suggestions, thermalized high frequency rf cabling (related to JRA1 Task 1) and a ready-to-use Coulomb-Blockade-Thermometer package down to 10 mK temperatures (related to JRA4 Task 3c), require further planning. Also other possibilities for commercialized products exist and should be included in the planning process. The source of funding for the design, construction, and testing of these products has to be found. The task of preparing a new improved plan for the General Assembly was left to John Saunders.
7. **Amendment proposal.** Decide to submit an amendment proposal, which includes the proceeds made on #1, #2, and #3.
8. **Extension of MICROKELVIN for fifth year.** The decision was formed not to apply for an extension of the 4-year grant period for one extra fifth year, since this approach is not favoured by the EU Commission.
9. **Grant application for new grant period after March 2013.** The suggestion was accepted unanimously and it was decided that Microkelvin will start investigating the possibility to prepare for a new grant application.

10. **Any other business.** The recommendation was accepted to establish a Distributed European Microkelvin Laboratory without Walls in a formalized manner. The task to develop this plan further was left to the chairman George Pickett.

No further formal decisions were made.

11. **Closing of meeting.**

Smolenice 17.3.2011



Matti Krusius  
Secretary



George Pickett  
Chairman