

SUMMARY of the  
1<sup>st</sup> MEETING OF THE LSC SCIENTIFIC COMMITTEE  
Hotel Santa Cristina, Canfranc, Spain  
January 25-26, 2008

The meeting began in closed session. Committee members attending were Elena Aprile, Frank Avignone (Chair), Laura Baudis, Yves Declais, Juan Fuster, Andres Gadea, Belen Gavela, and Chang-Kee Jung. Also attending were Professor Allesandro Bettini, Director of LSC and Professor Jose Angel Villar, adjoint director

Following introductions and brief personal statements, Director Bettini briefly described how signs of rock instability had appeared since beginning of 2007, the rock fall event of March and the subsequent actions made by the Saragossa University that is responsible of the infrastructures. He gave also a brief analysis of the causes and an overall plan for the repair.

This session started at 08:45 and ended at 09:15 at which time the open session started.

At 09:15 the open session began with a presentation of the overall view of the LSC by the Director. This included a complete description of the Laboratory as well as the status and plan of the repairs necessary. Even if the latter is not completely defined, the Director estimates in one year the time delay to have the laboratory operational since now. Following a brief question session, there were nine presentations, six of which were in the form of proposals to perform experiments in the LSC.

The experimental proposals presented were:

1. The ANAIS sodium iodide dark-matter search using annual modulation
2. The ROSEBUD cryogenic R&D project focused on the EURECA project
3. The Argon Dark-Matter Search experiment using a two-phase Ar TPC, using both scintillation light and ionization for event recognition
4. The R&D of the BiPo detector to support the development of a SuperNemo double-beta decay experiment
5. The ULTIMA ultra-low temperature liquid dark-matter experiment employing very new and unique techniques involving quantum effects
6. The NEXT gas time-projection chamber for the double-beta decay of  $^{136}\text{Xe}$ .

There was also a lecture on Nuclear Astrophysics by Carlo Brogini. This contained some results from the LUNA and LUNA2 underground accelerator project in LNGS and a description of a potential future underground accelerator experimental program. In later closed session discussions, the committee found the concept very interesting; however, the nuclear reactions involved would produce neutrons that would interfere with Dark Matter and other ultra-low background experiments. Accordingly, this would require a dedicated cavity, the excavation of which might not be immediate. The science, however, is of the highest quality.

Another general science and technology lecture was given by David Nygren on the Gas Time Projection Chamber (TPC) as a possible tool for neutrino less double-beta decay. Dr. Nygren, the inventor of the TPC technique, focused on R&D that could lead to vastly improved energy resolution. The NEXT proposal is based on these concepts.

Following a break, there was a discussion period, which focused on the principles of operation of the gas time-projection chamber. Many detailed questions were answered. The TPC presentations separate into two parts, one as R&D to optimize the energy resolution and control background, and the actual experimental proposal NEXT.

The final lecture was given by Chang-Kee Jung on “Opportunities for geo and bio sciences in underground laboratories”. The Director and the committee should be aware that there is a larger scientific community with needs for underground facilities other than those making application at this time.

Following that there was a discussion in executive session of the history of the earlier versions of the Canfranc Laboratory, the development of LSC, and actions of the previous Committee chaired by Professor Jose Bernabeu. In particular the discussion centered on the special status of the University of Saragossa.

During an interruption of the scientific session the Mayor of Canfranc, Fernando Sánchez declared the full support of the Administration to the LSC activities and his will to contribute to its success.

## **January 26<sup>th</sup>, 2008**

### **09:00 Executive Session.**

The session was opened with a presentation by Director Bettini concerning the actions taken by the previous committee. In particular, some members of the committee were concerned that in the cases of ANAIS, ROSEBUD, and Bi-Po, decisions have already been made based on the use of the word “approved” by the previous committee. After a detailed discussion and clarification the committee and Director agreed that these three proposals were approved in principle and would move forward with the others by presenting their logistical needs to the Director. The committee agreed that the Director would make the final approval of the details of space, location, time period of the experiments, etc.

The chairman and Director were given the task of writing to the principal investigators of each of the proposed experiments requesting, within March 31st 2008, the following information: the space required (foot print) and for which duration, electrical power requirements, liquid gas needed, required technical support, and proposed time of the experiment. The information should also include an execution plan including the definition of the relevant milestones and stating the personnel supplied by the experimental group, and a complete statement of safety issues and how they would be addressed.

It was decided that each of the proposed experiments would be reviewed by two referees of the LSC Scientific Committee, as follows:

1. ANAIS: Elena Aprile and Frank Avignone.
2. ROSEBUD: Laura Baudis and Yves Declais.
3. ArDM: Elena Aprile and Yves Declais.
4. BiPo. Juan Fuster and Frank Avignone.
5. ULTIMA: Andres Gadea and Belen Gavela.
6. NEXT: Laura Baudis and Chang-Kee Jung.

These assignments will be carried out when the Principal Investigators respond to the letters requesting complete information on the requirements of the experiments.

A call for new expressions of interest will be announced soon. The EoIs which will reach LSC before March 31<sup>st</sup> will be considered in the April meeting (see below) of the Committee.

The final item was the establishment of a schedule for future meetings of the Committee. It is now fixed that there will be a meeting in late April and again in the autumn.

The meeting was adjourned soon after the scheduled time of 13:00.