

# LSC Scientific Committee – 28<sup>th</sup> Meeting

9-10 September 2021

Virtual Meeting Online, with some participants in-person at LSC

## Summary, Conclusions and Recommendations

### Introduction

The 28<sup>th</sup> meeting of the Canfranc Underground Laboratory (LSC) Scientific Committee was held on the 9<sup>th</sup> and 10<sup>th</sup> of September 2021. Due to the ongoing pandemic, the meeting was again held online using Zoom videoconference in conjunction with some in-person participants (from the experiments) at LSC. The hybrid meeting ran smoothly thanks to the efforts of LSC staff.

The report presented from the Director contained excellent news that the budget plan for LSC has been approved for 2022-2031. The plan includes new strategic activities in Biology and Cryogenics (quantum technology), as well as support for Low Radioactivity Techniques such as RITA and electroformed copper. The Committee was very pleased to hear this news and convey our congratulations to the Director and staff of LSC.

The Committee heard presentations from ANAIS, CROSS, DArT, NEXT and TREX-DM. One week prior to the meeting, a subset of the Committee met with members from TREX-DM (by videoconference) to have a more detailed discussion of scientific and technical issues related to that experiment.

The written reports submitted by the experiments utilized a template this time. This helped focus the Scientific Committee members on the important highlights, progress, and changes since the last meeting and was much appreciated. The Committee recognizes that the experiments are requesting more flexibility in the template in order to facilitate including figures (for example) and we agree this would be beneficial.

### **NEXT            EXP-05-2008**

The NEXT experiment reported on the progress of both the data analysis of NEXT-White and the status of construction of NEXT-100. Regarding the data analysis, the collaboration presented the final result of the NEXT-White detector on the two-neutrino double-beta decay ( $2\nu\beta\beta$ ) half-life. This detector will be decommissioned in the next months after 4 years of almost continuous operation.

Several aspects of the NEXT-White data analysis were improved including an expansion of the analysis volume and the use of the Richardson-Lucy deconvolution method (presented in previous meetings). Most important is, however, the new data acquired with  $^{136}\text{Xe}$ -depleted xenon (Run-VI). The simultaneous fit of the  $^{136}\text{Xe}$ -enriched data (Run-V) with this new run allows to disentangle the  $2\nu\beta\beta$  spectrum from the bismuth-214 beta spectrum which has a similar spectral shape. This new data has therefore allowed the collaboration to make a new measurement of the  $^{136}\text{Xe}$   $2\nu\beta\beta$  lifetime clarifying the previous disagreement with other published results. The new preliminary result gives a half-life of  $(2.3 \pm 0.6) \times 10^{21}$  yr which is compatible with the literature values within 1 sigma error. The Committee congratulates the collaboration for this result and looks forward to the upcoming publication. NEXT-

White operations and its results constitute a very important milestone of the project as long-term stable operation has been clearly demonstrated and the goals have been achieved.

The Committee heard as well about the status of NEXT-100 including the developments in the energy and tracking planes, the mechanics, slow control and TPC. The various components are progressing well, and the Committee is very satisfied that the schedule presented in the last SC meeting is maintained.