

MINUTES of the 113th Meeting of the SPSC
Held on Tuesday 8 April and Wednesday 9 April 2014

OPEN SESSION

- | | |
|---|-------------------|
| 1. WA104-ICARUS Report | Claudio Montanari |
| 2. WA104-Nessie Report | Laura Patrizii |
| 3. WA105 Report | Andre Rubbia |
| 4. Status and plans of the RD52 experiment | John Hauptman |
| 5. Status and plans of the NA62 experiment | Ferdinand Hahn |
| 6. Status and plans of the AEGIS experiment | Michael Doser |
| 7. Status and plans of the GBAR experiment | Patrice Perez |

CLOSED SESSION

Present:

S. Bertolucci²⁾, M. Diehl, R. Forty, L. Gatignon, A. Ianni, I. Irastorza, A. Jokinen, M. Kowalska, G. Lanfranchi, T. Lasserre, B. Panzer-Steindl, C. Rembser (scientific secretary), E. Rondio, M. Rozanska, R. Saban¹⁾, G. Salam, F. Sikler, A. Specka, R. Steerenberg, R. Thompson²⁾, C. Vallée (Chair), H. Wilkens, M. Wing

¹⁾ Present on Tuesday only

²⁾ Present on Wednesday only

Apologies: S. Schönert

1. MINUTES OF THE 112th MEETING OF THE SPSC HELD ON 14 JANUARY AND 15 JANUARY 2014

The minutes of SPSC112 were approved (CERN-SPSC-2014-006, SPSC-112).

2. CHAIRMAN'S REPORT FROM RB207

The Chairman reported on the Research Board (RB) meeting, RB207.

The following points were presented and, where necessary, discussed.

- 1) The Committee summarised the physics breakthroughs performed by ASACUSA, ALPHA and ATRAP before the long shutdown, the improvements achieved on their apparatus during 2013 and their plans for new measurements in 2014 and later;
- 2) The Committee presented the experimental improvements obtained by the BASE Collaboration in Mainz as well as the steady progress in installing the beam line and apparatus at CERN for first data taking in 2014;
- 3) The progress of the ACE Collaboration in understanding its sources of systematic errors was summarised, and the recommendation to proceed steadily towards a combined analysis of all data samples reiterated;
- 4) The SPSC summarised the results of its review of the IAXO LOI (SPSC-I-242. - 2013) and expressed its recommendation to proceed towards a technical proposal within a MOU covering the necessary R&D;
- 5) The Committee summarised the results of its review of the SHIP EOI (SPSC-EOI-010-2013) and, while supporting the physics goal of the project, expressed the need for a wider physics scope, a more detailed technical design and the expansion of the Collaboration to further review the project;
- 6) The Committee presented the proposal for an electron beam dump experiment for light dark matter search (SPSC-P-348-2013), as well as the points under review;
- 7) The progress of NA63 in understanding their new detectors to study positron production in crystals was presented, and adequate data taking recommended for 2015.

The Research Board noted points 1) to 6) and endorsed point 7). Concerning point 4), the expected contribution of CERN to the IAXO R&D towards a TDR will be discussed between the CERN departments and the Collaboration. Concerning point 5) a study group was formed to evaluate the feasibility of a proton beam dump at CERN.

3. STATUS OF ACCELERATORS

R. Steerenberg reported on the ongoing long shutdown (LS1) activities, which are coming to an end for most of the machines in the injector complex.

All the general services such as cooling, ventilation compressed air are available and hardware re-commissioning and testing has started in the LINAC, PS Booster, PS. The work for the SPS is on schedule although the BA1 cable campaign remains on the critical path.

As in LS1 work has been carried out on major components of the entire accelerator complex, the re-commissioning of the machines will be challenging, but for the moment no show stoppers are identified.

The AD suffers from a problem with the strip line that is used to guide the required current of 400 kA to the focusing horn behind the target. A clamp connection that connects the fixed strip line with the movable horn cart has been damaged due to electric arcing as a result of a bad contact. Major part will have to be replaced and other part will have to be cleaned which will delay the restart of the anti-proton production. Initially it was planned to deliver beams to the anti-proton target on 10 July 2014. With the current repair scenario, beam might be expected on target on 1 August 2014, however it is not excluded that extra testing might be required, resulting a later start, 29 September 2014.

To these dates additional time to setup the AD accelerator with beam is required before delivery of anti-protons to the experiments can start.

One of the many major work sites was the consolidation of the TT10 tunnel, between the PS and the SPS, where the concrete had cracks on more than 90m of the tunnel. These cracks would present a serious danger for the structural strength of the tunnel. For the repair work, all beam line equipment had to be removed over 190m length and large steel beams have been mounted on the tunnel wall to compensate for the outside pressure exerted on the tunnel. Today all beam line equipment is back in place, but remains to be realigned.

Concerning the plans of the Bio-LEIR project, it was confirmed by the project leader S. Myers that all efforts are made to set up the Bio-LEIR project without compromising the present LEIR programme which provides ions to the LHC and the NA61 experiment. The idea is that Bio-LEIR should run for five to six months per year.

4. STATUS OF EXPERIMENTAL AREAS

Lau Gatignon described the ongoing shutdown activities in the East, North and AD experimental areas as well as in the AWAKE cavern.

In the East Area the construction of the Irradiation zones is progressing. However, there is a delay with the order of the control rooms due to the receivership of the company. A new company has been contracted, but there will be some delays in the facility start-up. As planned, the commissioning of the Irradiation facility will start without ventilation at low flux.

The work on the T9, T10 and T11 beams is on track for a timely start-up. The two broken magnets in the primary proton line have been repaired. The two beam stoppers in the primary line could not be replaced but have been refurbished. A magnet patrol will take place on end of April 2014.

For the “Beam line 4 Schools” competition, 296 proposals were received. With help from the SPSC one winning team will be selected to perform a small experiment in the T9 beam line in autumn 2014.

The consolidation program in the North Area target cavern TCC2/TDC2 is progressing according to schedule. Civil engineering work has been completed, now CV consolidation is under way. In the framework of the primary target consolidation, alignment checks will be made around the targets. The GIF++ construction is well underway, the concrete shielding is completed and the facility should be ready for commissioning by autumn 2014.

The design of the shielding for the primary ion beam for NA61 is now available and installation will be in time for the 2014 beam start-up in autumn. This will allow uninterrupted experimental operation switching from protons (2014) to ions (2015). The crane consolidation in TCC8 (the target cavern upstream of NA62) is almost completed and soon the reinstallation of a few beam elements will start. The required infrastructure work (shielding and access door modifications, some small civil engineering works) for the COMPASS Drell-Yan run has been completed.

In the AWAKE cavern the removal of CNGS equipment is well under way and new infrastructure installation for AWAKE has started. The civil engineering work for the laser core and electron beam tunnels should be completed by November.

In the AD hall the BASE installation is progressing according to schedule. BASE will be in a position to start physics in 2014 immediately at AD start-up. The concrete shielding that was removed for the BHZ06 repair has been reinstalled and ATRAP can reinstall their positron source. The infrastructure modifications required for ATRAP due to space reallocations to BASE are in progress.

5. PS AND SPS USER SCHEDULES

H. Wilkens presented the AD user schedule for 2014 and summarised the first draft version of the PS/SPS users schedule for 2014 and the foreseen changes to it. The injector schedule for the 2015 Argon ion run at the SPS was also shown. The call for beam time request to possible users of the ion beams in H4 and H8 beam line will be announced soon.

6. DISCUSSION OF THE OPEN SESSION

6.1 NA62

The SPSC **congratulates** NA62 for the progress achieved towards the installation and commissioning of the detector components.

The SPSC **encourages** the Collaboration to take all required measures towards the timely installation of the systems for the first physics run in 2014 and **recognises** the importance of testing the experimental setup at full beam intensity.

The SPSC **is pleased** with continuous publication of physics results by the NA62 Collaboration.

6.2 RD52

The SPSC **notes with pleasure** the progress made by the RD52 Collaboration in publishing results from the previous data taking at the SPS and in implementing detailed detector simulations.

The SPSC **is looking forward** to refined test results from the 2014 data taking with the

existing modules.

The SPSC **acknowledges** the plans for building enlarged Lead and Copper hadronic modules and **requests** a detailed description of the setup foreseen by the Collaboration for the 2015 beam data taking.

The SPSC **encourages** the RD52 Collaboration to strengthen their contacts in current and future experiments for further development and application of the dual readout calorimetry.

6.3 WA104

The SPSC **received with interest** the document describing the technical WA104-NESSiE programme (SPSC-SR-133-2014). The Committee **supports** the R&D on air core magnets and associated detectors that could be used for future neutrino projects, and **encourages** synergy with the Liquid Argon (LAr) R&D programmes.

The SPSC **requests** a document quantifying the human and financial resources needed for all aspects of the project, including the requests to CERN.

The SPSC **acknowledges** the WA104-ICARUS LAr R&D programme envisaged. The Committee **requests** a technical document describing the activities foreseen at CERN, including the novel features to be developed. The Committee **emphasises** the necessity to quantify the financial and manpower resources needed, including the requests to CERN.

The Committee **notes** with interest the ongoing discussions with US institutes and laboratories regarding a short baseline neutrino experiment at Fermilab using the ICARUS technology. The Committee **looks forward** to the official conclusion of the discussion process.

6.4 WA105

The SPSC **received with interest** the technical proposal describing in detail the CERN WA105 R&D programme (SPSC-TDR-004-2014). The Committee **supports** the technical goals of the Double Phase Liquid Argon (DLaR)-TPC programme and considers it as the WA105 priority for the forthcoming years.

The Committee **requests** clarification of the interplay between the $6\times6\times6\text{m}^3$ demonstrator and the $3\times1\times1\text{m}^3$ prototype, in term of technical goals, schedule and resources.

The Committee **requests** further information on the human and financial resources requested from CERN and **encourages** the Collaboration to secure the necessary external resources to build the $6\times6\times6\text{m}^3$ DLaR-TPC demonstrator.

The Committee **welcomes** the possible use of the WA105 facility in synergy with LBNE towards defining the best technical solutions to design a 10-20 kt-scale LAr TPC. The SPSC **notes with pleasure** the official support of the LBNE management to the project.

6.5 AD6-AEGIS

The SPSC **appreciates** the progress achieved in the performance of components of the baseline apparatus. The Committee **is pleased** with the plans for the next steps of the experiment.

The SPSC **is looking forward** to the first H-bar formation in 2014.

6.6 AD7- GBAR

The SPSC **notes with pleasure** the progress of many sub-systems of the GBAR experiment. The Committee also **notes** the progress made by the Collaboration in investigating solutions to the critical aspects of the setup.

The SPSC **is looking forward to** receiving a detailed schedule and organisation plan for the development of key components and their commissioning at the AD.

7. FOLLOW-UP ON EXPERIMENTS AND PROPOSALS

7.1 P348

The SPSC **received with interest** the answers to the referees' questions on the document, P348, describing the search for light dark matter using the SPS.

The Committee **recommends** that the Collaboration place more focus on the invisible channel, the more competitive of the two channels.

The SPSC **recommends** a test run of two weeks at the SPS for the measurement of backgrounds, a study of the performance of the apparatus and an initial search for light dark matter.

The Committee also **recommends** that the results of the test run, as well as detailed simulation studies, should serve as input for a technical design report to be submitted to the SPSC.

7.2 AD4-ACE

The SPSC **welcomes** the close and productive Collaboration between the FLUKA and AD-4/ACE teams necessary for assessing the radiobiological effectiveness of antiproton beams. The Committee **encourages** the ACE Collaboration to implement the best possible description of the experimental apparatus into these studies.

7.2 AWAKE

The SPSC **notes with pleasure** the progress made on all components of the experiment and **welcomes** the CERN involvement on the electron injector.

7.3 OPERA

The Committee **congratulates** the OPERA Collaboration for the observation of the 4th tau neutrino candidate which leads to a significance for tau neutrino appearance at 4.2 sigma C.L..

7.4 OSQAR

The SPSC **takes note** of the plans of the OSQAR Collaboration for 2014.
The Committee **looks forward to** the results on the search for axion like particles.

8. DOCUMENTS RECEIVED

- DRAFT Minutes of the 112th meeting of the SPSC, Tuesday 14 and Wednesday 15 January 2014, CERN-SPSC-2014-006, SPSC-112;
- WA104 - NESSiE R&D Plan; CERN-SPSC-2014-007, SPSC-SR-133– 2014;
- Agenda of the 113th Meeting of the SPSC, Tuesday and Wednesday, 8-9 April 2014, CERN-SPSC-2014-008, SPSC-A-113-2014;
- 2014 NA62 Status report to the CERN SPSC, CERN-SPSC-2014-009; SPSC-SR-134-2014;
- RD52 Status Report 2014 - Dual-Readout Calorimetry for High-Quality Energy Measurements, CERN-SPSC-2014-010, SPSC-SR-135-2014;
- AD-7/GBAR status report for the 2014 CERN SPSC, CERN-SPSC-2014-011, SPSC-SR-136-2014;
- OSQAR Plan for 2014, CERN-SPSC-2014-012, SPSC-M-784-2014;
- Technical Design Report for large-scale neutrino detectors prototyping and phased performance assessment in view of a long-baseline oscillation experiment, CERN-SPSC-2014-013, SPSC-TDR-004-2014;
- Status report for the AD-6/AEgIS experiment, 2013, CERN-SPSC-2014-014, SPSC-SR-137-2014.

CERN Document Server (CDS):

<http://cdsweb.cern.ch/search?sc=1&p=SPSC>

Christoph Rembser

E-mail: Christoph.Rembser@cern.ch