MINUTES of the 116th Meeting of the SPSC
Held on Tuesday 13 January and Wednesday 14 January 2015

OPEN SESSION

1. Status and plans of the BASE experiment Stefan Ulmer
2. Status and plans of the AEGIS experiment Michael Doser
3. Status and plans of the GBAR experiment Patrice Perez
4. Status and plans of the ASACUSA experiment Ryugo Hayano
5. Status and plans of the ALPHA experiment Jeffrey Hangst
6. Status and plans of the ATRAP experiment Gerald Gabrielse

CLOSED SESSION

Present:

1) Present on Tuesday only

Apologies: S. Bertolucci, T. Lasserre, J. Monroe, R. Saban
1. DRAFT MINUTES OF THE 115th MEETING OF THE SPSC HELD ON 21 OCTOBER AND 22 OCTOBER 2014

The minutes of SPSC115 were approved (CERN-SPSC-2014-038, SPSC-115).

2. CHAIRMAN’S REPORT FROM RB210

The Chairman welcomed the new members of the Committee, and thanked the outgoing members for their dedication and contributions over the past years.

The Chairman reported on the Research Board (RB) meeting, RB210. The following points were presented and, where necessary, discussed.

1) The SPSC summarised the experimental progress and instrumentation developments performed by the CAST Collaboration and expressed its support to their 2015 data taking plans.
2) The Committee reported on the successful OSQAR 2014 run and improved limits on axion production, and presented their plans for chameleon searches in 2015, which are currently under review.
3) The progress of the AWAKE Collaboration in designing and implementing their experimental set-up was summarised and positively acknowledged.
4) The SPSC presented the experimental progress and plans of the UA9 Collaboration and recommended dedicated collimation runs at the SPS in 2015 within the overall injectors users constraints.
5) The Committee presented the first DIRAC results on metastable pion atoms and expressed its encouragements for a timely finalisation of the DIRAC analyses.
6) The SPSC summarised the many NA61 detector upgrades recently performed or in preparation, it presented the physics results obtained from the beryllium-beryllium energy scan, and expressed its positive recommendation for a short lead-lead test run during the LHC lead ion run in 2015. The Committee also presented the proposal for extending the NA61 physics programme with hadron production measurements, which are of interest for the US neutrino programmes, and the SPSC expressed its positive recommendation for this extension.
7) The Committee presented the LBNF Expression of Interest for testing a full size single-phase LAr TPC readout plane (SPSC-EOI-011-2014) within the CERN neutrino platform. The SPSC expressed its positive appreciation of the project as well as its encouragements to proceed towards a technical proposal for its further review.

The Research Board noted points 2), 3), 5) and 7) and endorsed points 1), 4) and 6). We were also informed that, following RB209, an agreement has been reached between CERN and the CLOUD Consortium, allowing the experiment to go on data taking in the coming years. Finally, the neutrino platform PLAFOND was presented. This will be opened to R&D neutrino projects, which will have to be submitted to the SPSC and further reviewed by the Committee after approval.

3. STATUS OF ACCELERATORS

Rende Steerenberg reported on the status of the accelerators and gave an overview on the plans and schedules for 2015.
In 2014, all injector accelerators, LINAC2, PS Booster, PS and SPS, operated very well and efficiently provided protons to the experiments and beam tests. Also LINAC3, LEIR and the PS were successfully running with Argon ions and all preparations of the Argon ion run of the SPS were done, i.e. Argon ions were successfully accelerated through transition up to 150 AGeV/c with over $2 \times 10^9$ ions on the flat top, which validated the strategy for the 2015 ion operation.

For the AD in 2014 there have been initial problems with transverse position fluctuations of the ejected beam, to which the ASACUSA and ALPHA experiments are quite sensitive. These fluctuation could be reduced to allow the experiments to operate, in addition studies were done to identify their sources and to further reduce the effects. Three issues were identified, an orbit corrector problem, a solenoid fringe field from the neighbouring experimental AEGIS experimental area and ejection septum fringe field fluctuations. For 2015 a strategy is in place to mitigate the effect of these sources.

Main consolidation activities for the AD in 2015 are manifold. The beam diagnostics will be improved to upgrade the orbit measurements, the beam current transformer will be renovated and a cryogenic current comparator for low intensity beams will be installed. In the AD target area additional beam current transformers and Beam TV screens will be installed and the electronics of the kicker and septa magnets will be renewed. For the power converters, a general upgrade programme will start and several magnet units will be refurbished. The preparations for ELENA are continuing and all electronics of the kicker magnets will be moved to the new building 393, which requires a re-commissioning of the system.

Also the other injector accelerators and zones during early January 2015 are in the yearly maintenance mode. All work is progressing well and on schedule. Hardware restart of LINAC2, LINAC3, LEIR, PS and SPS will be in the next days and for a re-commissioning with beam, it is planned to start with Argon ions first to be ready for Argon beam delivery in February 2015.

4. STATUS OF EXPERIMENTAL AREAS

Lau Gatignon summarised the operation of the experimental areas in 2014, focussing on the months after the last meeting of the SPSC, and explained the plans for this year.

In 2014 the East Area test beams and the T11 beam for CLOUD were operating efficiently. After the CLOUD run, the T11 beam line was successfully used by the new experiment P349, which aims to measure the polarisation of antiprotons produced in proton nucleus collisions. The CHARM and IRRAD facilities were commissioned with low intensity beams and, starting from 11 November 2014, these facilities have been operated at nominal intensity and with the expected performance. The Cesar control system, the same as for North Area, has been extended to facilitate operation of the secondary beams, e.g. by implementing the use of beam files.

The North Area run in 2014 has been successful, in spite of the many changes and interventions during the long shutdown. The test beam programme in EHN1 was performed without major problems. The new Gamma Irradiation Facility (GIF) is now operational. NA61 profited from good and stable beam in the H2 beam line. COMPASS had a difficult start-up, due to liquid Helium delivery problems, followed by a problem with the cold box for the polarised target. This was solved just before the scrubbing run in early November,
allowing the experiment to fill their polarised target and installing their beam monitoring station during the scrubbing run. From then on the beam was commissioned for the Drell-Yan physics programme, which went well but indicated that minor shielding modifications need to be made in 2015. The beam for NA62 was re-commissioned after improvements and alignment checks. Now the K12 beam has the nominal transmission and characteristics. However, there are still losses upstream of the T10 target that need further study in 2015. These losses were not an issue during the 2014 run as NA62 was mostly running at low intensity for detector commissioning. Both NA62 and COMPASS suffered from 50 and 75 Hz ripples on the beam intensity. A mitigation procedure exists, but it is time consuming and needs to be repeated after each change of the super-cycle, which needs to be followed up in 2015. The preparations for the primary Argon beam in early 2015 are well on track.

In 2014, the AD physics run served six experiments, including ACE. The nominal beam intensity was reached after quite some initial difficulties. However, sometimes the radiation protection limits imposed some reduction of the beam intensity, due to lower alarm limits, weak points in the shielding and beam losses when position monitors were used in the beam. Work is ongoing to mitigate these problems. After the repair of a major helium leak in the ground piping, the helium consumption by the experiments can now just be covered as long as there are no major anomalies.

AWAKE has made good progress during 2014. The cleaning out of the CNGS facility has been completed as well as the civil engineering for the electron and laser tunnels. The design of the proton and electron beam lines has been finished. The plans for 2015 include design and component preparation for AWAKE, the integration of the electron source area, prototype tests of a plasma cell in EHN1 and installation of the new proton beam line and the laser clean room, as well as infrastructure in the CNGS/AWAKE area.

5. PS AND SPS USER SCHEDULES

H. Wilkens presented the first version of the AD, PS and SPS users schedules for 2015.

The injector accelerator run with Argon ions with the NA61 experiment as a main user is scheduled for 8 February 2015 until 6 April 2015. Protons are scheduled to the PS, AD and SPS users up to mid November 2015, the SPS will start with beam to the users on 27 April 2015, the PS on 4 May 2015 and the AD on 22 June 2015. The later start of the AD is due to preparatory work for Elena. The NA62 experiment, which takes beam from the SPS, will start beginning of July 2015, as there is work ongoing to complete the ventilation system in the experimental hall.

As in the previous years, many experiments and beam tests applied for beam time in 2015. However most requests could be fulfilled for the 2015 users schedule, e.g. the overbooking of more than 60% of the H4 beam line was mitigated by moving users to the PS, as beam tests for SHIP, and to other North Area beam lines. The PS/SPS User schedules will be made public in the next days after this meeting.

6. DISCUSSION OF THE OPEN SESSION

6.1 BASE

The Committee congratulates the BASE collaboration for the rapid progress of the experiment at CERN. The SPSC notes with pleasure the good prospects for a new measurement of the antiproton magnetic moment during 2015.
6.2 ATRAP

The SPSC notes with pleasure the successful commissioning of the new ATRAP Ioffe trap and the improved magnetic moment apparatus at CERN. The Committee looks forward to the first antihydrogen and magnetic moment results in 2015.

6.3 ASACUSA

The Committee is pleased with the completion of the measurements of the one-photon transitions in spectroscopy of antiprotonic helium and the inclusion of the result in the value of the antiproton-to-electron mass ratio issued by the collaboration on “Data for Science and Technology” in 2014 (CODATA14).

The SPSC congratulates the collaboration for successfully commissioning the hyperfine structure spectroscopy apparatus with hydrogen and for detecting antihydrogen in the final experimental setup. The Committee looks forward to the first attempts of antihydrogen spectroscopy, to the studies of two-photon transitions in antiprotonic helium and to antiproton collision experiments at 5.3 MeV.

6.4 ALPHA

The SPSC congratulates the ALPHA collaboration on the successful commissioning of the ALPHA2 setup with improved performance and for its successful operation with antihydrogen trapping. The SPSC looks forward to the demonstration of resonant laser excitations of trapped antihydrogen.

6.5 AEGIS

The SPSC acknowledges the progress achieved by the AEGIS collaboration since the last annual review. The Committee is looking forward to the first antihydrogen formation in 2015.

6.6 GBAR

The SPSC appreciates the progress in the development of components of the GBAR apparatus and encourages the collaboration to continue their efforts to solve remaining issues including those related to the ELENA beam divergence.

The SPSC is pleased with the recent agreement for the funding and construction of the positron LINAC. The SPSC is looking forward to receiving a resource plan and detailed schedule for the development and installation of the key components of the apparatus.

7. FOLLOW-UP ON EXPERIMENTS AND PROPOSALS

7.1 NA62

The SPSC congratulates the NA62 collaboration on their progress and the successful initial
data-taking period in 2014.

7.2 WA105

The SPSC received with interest the answers to the referees’ questions on the project.

7.3 OSQAR

The Committee received with interest the answers to the referees’ questions on the planned search in 2015 for matter-coupled scalars, which acquire large effective masses (chameleons). The SPSC requests a more detailed document which describes the different aspects of the setup and their quantitative impact on the sensitivity to various chameleon models.

7.4 P349

The SPSC is pleased with the efficient use of the beam time by the P349 experiment in 2014 and supports additional two weeks of beam time in 2015 to complete the data taking.

8. DOCUMENTS RECEIVED

- Draft Minutes of the 115th meeting of the SPSC, Tuesday 21 and Wednesday 22 October 2014, CERN-SPSC-2014-038, SPSC-115;


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