Minutes on the 106th Meeting of the SPSC
Held on Tuesday 26 June and Wednesday 27 June 2012

OPEN SESSION

1. Status and plans of the COMPASS experiment Andrea Bressan
2. Status and plans of the ICARUS experiment Jan Kisiel
3. Status and plans of the OPERA experiment Mitsuhiro Nakamura
4. Expression of interest for a very long baseline neutrino oscillation experiment (LBNO) André Rubbia
5. Direct high-precision measurement of the g-Factor of a single Antiproton stored in a cryogenic penning trap Stefan Ulmer

CLOSED SESSION

Present:
S. Bertolucci1, P. Bloch1, H. Breuker, O. Cremonesi, A. Denig1, M. Diehl, E. Falk, L. Favart, L. Gatignon, I. Irastorza, A. Jokinen, T. Lasserre1, S. Maury, B. Panzer-Steindl, L. Ramello, M. Rozanska, C. Rembser (scientific secretary), E. Rondio, N. Severijns, C. Touramanis1, C. Vallée (Chair), U. Wiedemann, I. Wingerter-Seez, M. Wing1

1) Present on Tuesday only

Apologies:
P. Collier
1. MINUTES OF THE 105th MEETING OF THE SPSC HELD ON 3 APRIL AND 4 APRIL 2012

The minutes of SPSC105 were approved (CERN-SPSC-2012-016, SPSC-105).

2. CHAIRMAN’S REPORT FROM RB200

The Chairman reported on the 200th meeting of the Research Board held on 30 May 2012.

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

1) The SPSC presented the final measurement from NA62 of the RK ratio as well as the good progress in hardware developments for the $K \rightarrow \pi \nu \nu$ measurement.

2) The SPSC reported the problems affecting the DIRAC 2011 data sample as well as remedies implemented in 2012 to circumvent them, and expressed its encouragements to proceed on a timely analysis and publication of the 2008-2010 data.

3) The Committee congratulated the CLOUD collaboration for their widely recognised results from 2010 and 2011, and presented the prospects for the 2012 run.

4) The SPSC showed the results obtained by the RD52/DREAM calorimetry Collaboration in 2011, as well as their plans for further beam tests in 2012.

5) The Committee presented the positive spin filtering results obtained by the PAX Collaboration with protons at COSY. It however expressed its recommendation not to install the experiment on the AD, to avoid disruptive interference with the increased activities scheduled on this facility in the coming years.

6) The SPSC presented the combined ICARUS+NESSIE proposal (P347) for a neutrino short baseline experiment on the SPS. The Committee expressed its recognition of the physics potential of the project, encouraged the Collaboration to strengthen and asked CERN to further study the design of the beam.
The Research Board noted points 1) to 4) and 6) and endorsed point 5). The Research Board also approved the GBAR experiment and the extension of the AD hall, with a workload adapted such that the ELENA construction will be longer by one year.

3. STATUS OF ACCELERATORS

S. Maury summarised the operation and performance of the injector accelerators.

Both accelerators, the LINAC2 and the PS Booster, are efficiently delivering beams to all injectors and facilities with high intensity since the beginning of this year.

Also the PS is operating very well in 2012. High intensity beams from the LINAC and the Booster were causing frequent radiation alarms when producing PS beams for the CNGS and nTOF facilities. Thus, to keep the radiation level below the accepted limit, the number of PS cycles for CNGS was reduced and the intensity kept below $2 \times 10^{13}$ protons per extraction. However, by significantly reducing the appearance of fluctuations of the field of a vertical recombination septum magnet, the intensity of the nTOF beam could be increased again keeping the dose rate acceptable below the limit. So, it was decided to reduce the number of nTOF cycles in order to increase the CNGS performance. The number of trips of the new PS power supply was significantly reduced, indicating that the start-up problems of the device, which also hampered operation in 2011, are understood and were fixed during the shutdown.

The availability of SPS beams in 2012 for the fixed-target and neutrino programmes was high, 86% for the fixed-target and 77% for the CNGS experiments. The main problems, which were causing losses of available beam time, were a defect in a sextupole magnet, which needed 1 day of repair and ventilation problems in the CNGS target area, which needed about 3 days to be fixed. During 10 days the CNGS beam was operated in bunched mode to provide 100ns beam to the neutrino experiments at LNGS for the measurement of the neutrino time-of-flight from CERN to Gran Sasso.

The start-up of the AD was successful and the machine is delivering high quality beams to the experiments.
4. STATUS OF EXPERIMENTAL AREAS

L. Gatignon reported on the operation of the experimental facilities at the PS (East Area), AD and SPS (North Area and CNGS).

The various magnet repairs have been completed in time and the East Area operation for the test beams has started as scheduled on Monday 16th of April. Since then the operation of experiments and beam tests in the area is smooth.

The T9 and T10 beams served already a multitude of users, in particular CLIC-BPM, CALICE SDHCAL and WHCAL, CRYOBLM, TWICE and ALICE FOCAL in T9 and several ALICE groups (TOF, VHMPID, FARICH), NA61-TESTS and SCINTFIB in T10.

The DIRAC experiment has suffered from delays in the delivery of their new permanent magnet, which was installed mid-June only but allowed DIRAC to start on 21 June 2012.

The CLOUD experiment started data taking with beam on 20 June, about two weeks later than scheduled. Reason was the intensive commissioning of the expansion system on their reaction chamber, which is now in full operation. CLOUD now has a system to produce ultra-clean water from Oxygen and Hydrogen gasses to ensure that the purity of the water added to the chamber gas is excellent.

Some resources have been allocated for the East Area upgrade during 2013 and 2014 to proceed with the crane upgrade, the migration to a new radio protection control system (RAMSES), the dismantle DIRAC experiment and to move and upgrade the IRRAD irradiation facility to the present DIRAC location.

All shutdown work and preparations for the SPS beam-lines and experimental facilities were successfully done and beams were sent to the users without major delays.

The motors of the tables of the main beam dump collimators (TAX, Target Attenuators experimental areas) behind the T2 and T4 targets were repaired and the radiation dose to which the workers were exposed, was measured to be well below the dose limit agreed by the ALARA L3 Committee. Thus in view of overall dose and work optimisation it was decided to also repair the tables behind the T6 target. This work also went very smoothly and all 12 TAX'es were fully operational in the beginning of May. The extra workload put additional strain on the teams involved and other shutdown work was delayed. In particular the detection and
repair of vacuum leaks in the M2 beam line for COMPASS, as well as the preparation and installation of two new critical collimators in TCC2, also in the COMPASS beam. As a consequence, the beam lines were operational only in the evening of Monday 7 May 2012. However, the beam permit was signed only a day later, due to problems with the Beam Imminent Warning panels, for which compensatory measures had to be introduced.

For the safe operation of the H4IRRAD facility in the H4 beam-line there is now an agreement in place to operate with beam intensities up to $3 \cdot 10^9$ particles per pulse, which is three times higher than last year. The repair of the TAX tables allows to switch to attenuated primary beam mode and to reach this intensity.

The COMPASS experiment has commissioned its apparatus and has started to take data for the Primakoff programme, which involves regular switching between hadron and muon beam operation. The EHN1 beams have been operating smoothly and served a multitude of users, in particular CALICE SDHCAL, ATLAS MMEGAS, CMS, CREAM and NA61 tests in the H2 beam-line, CMS-ECAL, H4IRRAD and RD51 in H4, MEDIPIX, XSECT, ATLAS IBL, CERF and BELSVD-DEP in H6 and AIDA, TIMEPIX, LHCB, ATLAS, CALICE WDHCAL, UA9 and TOTEM in the H8 beam.

The work for the NA62 experiment had to be slowed down significantly during the TAX repairs, but has taken up at full speed again since mid May. The beam line installation is well under way and most of the magnets are in place and the collimators are being prepared. A copper TAX block delivered from a company did not meet the specifications and had to be refused. New, forged, Copper blocks have been ordered and their delivery is expected for the middle of October 2012, just in time for installation before the first technical run of the experiment. However an alternative scenario has been prepared for the technical run in case the collimator for the beam line would not be ready in time. All other preparations are on track for the technical run.

The AD started as planned on 27 April 2012 and achieved good beam quality very quickly. Compared to last year the ejected beam emittance from the PS has been improved, both transverse and longitudinal. An optics improvement campaign is ongoing, taking advantage of the improved beam diagnostics (GEM detectors) in the beam-lines. The goal is to optimise the transfer efficiency mainly for the ASACUSA radio-frequency-quadrupole and also to gather more precise optics understanding in view of the ELENA transfer line design.
During the week 18 June to 24 June 2012 the ACE run took place with excellent uptime and beam quality.

The ASACUSA experiment profited from the ACE run and installed a new trap. ATRAP are about to start their physics run, this year using both experimental zones after only having used one for several years. The ALPHA experiment will start up with a new version of their trap.

AEGIS has completed their first run and will now continue installation work.

The work on infrastructure of the AD hall is progressing and the first part of the new user barracks installation is completed, including a covered entrance and new access point to the hall.

For the CNGS facility the number of delivered protons is less than expected. In addition to the reduction of delivered protons because of the bunched beam measurement for the neutrino time-of-flight, there were several issues causing this, the vacuum window at one end of the primary proton beam line, two ventilation units cooling the first He-tube and parts of the reflector developed problems which were repaired in situ or which will be fixed in the coming technical stop of the accelerators end of June. Also the number of protons sent onto the CNGS target (p.o.t.) per extraction is limited to $1.5 \times 10^{13}$ p.o.t. (in 2011: $2 \times 10^{13}$ p.o.t.) because of radiation limits which otherwise will be exceeded at a location close to the PS extraction into the SPS.

5. PS, SPS AND AD SCHEDULES

H. Breuker presented the changes in the 2012 PS, AD and SPS users schedules.

The time for the fixed-target physics in 2012 was reduced by one week with respect to the schedule, which was presented at the 105th meeting of the SPSC and ends on 26 November 2012.

6. DISCUSSION OF THE OPEN SESSION

6.1 NA58 (COMPASS)

The SPSC congratulates the COMPASS collaboration for timely publication of new results on several aspects of the nucleon spin structure.
The SPSC **acknowledges** the progress in the analysis of the hadron beam data and **is looking forward** to publications in this subject area.

The SPSC **notes with pleasure** the successful start of the Primakov data taking and the progress on the experimental setup for the DVCS run, and **is looking forward** to results of the 2011 and 2012 data-taking periods.

### 6.2 CNGS1 (OPERA)

The SPSC **congratulates** the OPERA collaboration on the announcement of the second tau neutrino candidate event.

The Committee **is looking forward** to completion of the analysis of the 2010 and 2011 data and to the publication of the results.

The Committee **acknowledges** the effort and successful collaboration between CERN, LNGS, OPERA, ICARUS, LVD and Borexino to bring the neutrino time-of-flight measurement to a conclusion. The SPSC **is looking forward** to the publication of the final results.

### 6.3 CNGS2 (ICARUS)

The SPSC **appreciates** the smooth operation and efficient data collection by ICARUS and the contribution of the collaboration to the neutrino time-of-flight measurements. The committee **acknowledges** the progress in automated event filtering and reconstruction. The committee **is looking forward** to first physics results.

### 6.4 DISCUSSION OF THE EXPRESSION OF INTEREST SPSC-E-007

The SPSC **welcomes the received** Expression of Interest for a very long baseline neutrino oscillation experiment (LBNO), SPSC-E-007. The Committee **will further review** the project.

### 6.5 DISCUSSION OF THE LETTER OF INTENT SPSC-I-241

The SPSC **welcomes** the Letter of Intent SPSC-I-241 to perform a measurement of the antiproton magnetic moment with a $10^{-9}$ precision in a two-stage approach.
The committee recognises the physics motivation and the opportunity offered at the Antiproton Decelerator.

The SPSC invites the collaboration to submit a technical proposal. In view of the stringent stability requirements of the experiment, the Committee advises to optimise the insertion of the setup at the AD in close collaboration with the accelerator and experimental area experts and the other AD experiments.

7. FOLLOW-UP ON EXPERIMENTS AND PROPOSALS

7.1 DISCUSSION OF THE PROPOSAL SPSC-P-347

The SPSC acknowledges the progress and first feedback by the collaboration addressing the questions by the referees on technical and organisational issues of the proposed experiment. The Committee will continue reviewing the proposal including remaining open questions.

The committee recommends a joint effort between the collaboration and the CERN beams department to carry out the studies necessary to define the experimental setup and to assess the costs and possible schedule for a new neutrino beam line and the experimental infrastructure.

7.2 AD4 (ACE)

The Committee encourages the ACE collaboration to perform in 2012 the last measurements necessary to complete their programme. The SPSC asks the SPS and PS Coordinator to schedule a maximum of three days for theses measurements and to minimise impact on other experiments.

8. DOCUMENTS RECEIVED

- Minutes of the 105th Meeting of the SPSC held on Tuesday and Wednesday, 3 and 4 April 2012
  CERN-SPSC-2012-016; SPSC-105 - 2012
• COMPASS Status Report 2012
  CERN-SPSC-2012-017; SPSC-SR-102 - 2012
• ICARUS report to the June 2012 meeting of SPS-C
  CERN-SPSC-2012-018; SPSC-SR-103 - 2012
• Direct High-Precision Measurement of the g-Factor of a Single Antiproton Stored in a Cryogenic Penning Trap
  CERN-SPSC-2012-019; SPSC-I-241 - 2012
• OPERA Status report (June 2012)
  CERN-SPSC-2012-020; SPSC-SR-104 - 2012
• Expression of Interest for a very long baseline neutrino oscillation experiment (LBNO)
  CERN-SPSC-2012-02; SPSC-EOI-007 - 2012.

CERN Document Server (CDS):