

CERN/SPSC-2007-016  
SPSC-081  
17-18 April 2007

MINUTES of the 81st Meeting of the SPSC  
Held on Tuesday and Wednesday 17th and 18<sup>th</sup> April 2007

OPEN SESSION:

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|--|-------------------------|
| 1. Status Report of DIRAC                            | L. Nemenov, L. Tauscher |
| 2. Status Report of CLOUD                            | J. Kirkby               |
| 3. Status Report of CAST, and proposal for extension | B. Lakić                |

CLOSED SESSION

Present:

S. Baird (part time), J.J. Blaising, B. Bloch-Devaux, T. Carli, J.B. Dainton (Chair), J-P. Delahaye (part-time), M. Doser, J. Engelen (part time), M. Erdmann, A. Ereditato, L. Gatignon, L. Kluberg, J. Knobloch, M. Mannelli (Secretary), P. Marage, C. Rembser, G. Ridolfi, U. Wiedemann

Invited for the presentation of the COMPASS hadron physics program:

A. Magnon, G. Mallot, S. Paul

Apologies: H. Abramowicz, P. Kooijman, P. Newman, P. Schleper, U. Klein, J. Fuster Verdu, D. Wark

1. MINUTES OF THE 80th MEETING OF THE SPSC, HELD ON FEBRUARY 6 and 7, 2007

The Minutes were approved with minor comments.

2. REPORT FROM THE CHAIRMAN

The chair reported back from the last Research Board meeting, RB179. The following points were presented to RB179:

- i) appreciation by the SPSC of the shutdown work on CERN accelerator and beam delivery systems,

- ii) the strong support of the SPSC for the continuation of the AD physics programme in 2007 and in years to come,
- iii) the strong support of the SPSC for the completion of the COMPASS muon programme (both longitudinally polarised, hydrogen target, data-taking and transversity measurements), which, if North area beam delivery goes well, should be possible in 2007,
- iv) the continuing request by the SPSC for clarification by the COMPASS collaboration on the contemporary impact of the approved hadron programme,
- v) the recommendation by the SPSC for the approval of the NA49\_future (now NA6?) *pC* pilot data taking,
- vi) progress in the detailed consideration by the SPSC of the substantial NA49\_future (now NA6?) physics programme involving hadron measurements for  $\nu$  physics and for cosmic ray physics, and a programme for the next stages in fixed-target heavy ion physics at CERN in forthcoming years,
- vii) progress in the detailed consideration by the SPSC of the proposal for QED tests by means of magnetic birefringence of the vacuum (OSQAR), with new sensitivity for the discovery of axions, and the possibility to perform a photon regeneration test at CERN to examine a recent, interesting, result (PVLAS),
- viii) the strong opinion of the SPSC that final commissioning of the CNGS beam following first operational experience in 2006 is vital before high intensity delivery of neutrinos to LNGS begins,
- ix) the concern of the SPSC that the OPERA target mass will not be complete until at the earliest the beginning of 2008,
- x) the recommendation by the SPSC for approval of the measurement by the P326 R&D programme of the  $K$ -decay ratio  $R_K = K \rightarrow e \nu / \mu \nu$ ,
- xi) the strong support by the SPSC for the continuation in 2007 of the approved P326 R&D work,
- xii) the recommendation by the SPSC for the approval of test beam work by the CALICE (ILC calorimetry) and RD22 groups in 2007, and
- xiii) the policy of the SPSC to give a final opinion on the specific nature of data-taking in 2007 only after a satisfactory outcome of on-going discussions concerning the impact of the COMPASS hadron programme (iv above), and on a better assessment, based on further reported experience, of the schedule for the completion of the OPERA target brick assembly.

The Research Board noted all but v), x), xii) and xiii) above, confirmed the recommendations in v), x) and xii), and endorsed the policy in xiii).

### 3. STATUS OF ACCELERATORS

S. Baird reported on the status of the Accelerators, in preparation for operations in 2007.

The full program of maintenance of consolidation for the Accelerator Complex is mostly completed as planned.

The recently discovered water infiltration in the TT2 line requires larger than expected civil engineering work to repair it.

The PSB received beam from LINAC2 as scheduled, on April 10th. First beam was delivered to the PS from April 13th and initial set up for ISOLDE is scheduled to start of April 16th. The AD is scheduled to start with beam on the 7th of May.

**The SPSC expresses its appreciation** for the successful completion of the repair and consolidation activity scheduled for this 2006 – 2007 shutdown, and the readiness to start-up the accelerator complex on schedule.

As previously reported, the AD has suffered from poor reliability, due to the lack of consolidation funds.

**The SPSC notes with satisfaction** that some funding is now explicitly set aside for regular consolidation of the AD complex, in view of improving the reliability of its operation until at least 2010.

#### 4. STATUS OF EXPERIMENTAL AREAS

L. Gatignon reported on the status of the East, North, CNGS and AD Experimental Areas.

##### **EAST AREA**

Installation of the MCB magnet, to replace the broken MNP23 magnets servicing the South Branch of EAST AREA has been completed as scheduled. The new vacuum chamber was installed on April 2<sup>nd</sup>, and the magnet is ready to receive beam as planned.

A number of magnet repairs have been carried out in the EAST AREA, including some due to water leaks detected during as magnets were being switched back on in view of this year's start-up.

The EAST AREA will be ready for operation as scheduled, with some operational restrictions, namely that simultaneous North and South Branch cycles are no longer possible, due to the replacement of the failed MNP23 magnet with the MCB magnet mentioned above.

**The SPSC appreciates** the successful effort to ensure efficient operation of both the North and South Branches of the East Area, following the repeated magnet failures that cut short the DIRAC run in 2006. This should now ensure timely and reliable availability of beam for DIRAC in 2007.

It was pointed out, that the very large number of different magnet types in the EAST AREA complicates maintenance. Studies for the reorganization of the EAST AREA to provide for easier maintenance are ongoing.

A new layout of the T11 zone for the CLOUD experiment has been agreed.

In view of the changes to the CLOUD schedule, relocation of the CLOUD apparatus will be considered in the broader context of the ongoing studies for the reorganization of the EAST AREA for easier maintenance.

## **NORTH AREA**

Preparations for the 2007 operation of the NORTH AREA continue as planned.

These include work for P326, the 2007 NA49 run, and COMPASS, including some preparatory work in anticipation of COMPASS running with hadron beams, as well as the large number of detailed modifications to accommodate the various requests for beam in 2007.

## **CNGS**

As previously reported, a number of details in the cooling systems of the CNGS Reflector drain connections, as well as in the water inlet bellows in both the Reflector and the Horn, are being implemented in order to ensure the long term reliability of the CNGS beam line.

A detailed schedule for the full program of improvements, installation and tests exists, which aims to have the CNGS facility ready to start the final commissioning at nominal intensity by mid-September.

## **AD**

A major modification has been made to the main power supplies, replacing active filters with passive ones, which should simplify both operations and maintenance.

It has been decided to start the hardware tests for AD one week early, increasing from four to five weeks the testing period, in order to provide additional time to test the modified power supplies.

Four weeks are allocated to setting up with beam, considerably longer than last year, with the aim of ensuring efficient physics operations.

## PS AND SPS SCHEDULES

C. Rembser presented the detailed Accelerator Schedule for 2007.

A feasibility study is underway for extending PS operation for DIRAC beyond November, during the operation of the accelerator complex as injector for the LHC, in order to ensure completion of the proposed physics program by the end of 2008.

**The SPSC supports** plans to include a high intensity CNGS commissioning run, once repairs to water-cooling circuits are completed.

**The SPSC also supports** the proposed modification of the time-sharing among the AD experiments, moving from 8 hour to 12-hour shifts, which will allow more efficient operation of the AD program.

### 5. DISCUSSION OF THE OPEN SESSION

#### 5.1 DIRAC

**The SPSC notes with pleasure** the progress on the analysis of the existing DIRAC data set, and the prospects obtaining the expected improvement, by about a factor of two, in the error on the  $A\pi\pi$  life time measurement.

**The SPSC congratulates** the DIRAC collaboration on the progress towards completing the upgraded apparatus.

In the light of the aborted run 2006, it is particularly important for DIRAC to take substantial data in 2007.

On the basis of the 2007 run, **the SPSC looks forward** to better understanding the prospects and schedule for completing the proposed physics program.

#### 5.2 CLOUD

**The SPSC congratulates** the CLOUD collaboration on successful tests in 2006, during which a number of different measurement techniques, critical to the viability of the experiment, were integrated and operated together.

**The SPSC now looks forward** to further analysis of beam-induced effects in the prototype CLOUD chamber.

Finally, **the SPSC takes note** of the plans for a second prototype CLOUD chamber to continue developing the design of the final apparatus, and the request to postpone next running period until 2008.

### 5.3 CAST

**The SPSC congratulates** the CAST collaboration on the excellent progress towards He3 operation in 2007.

**The SPSC finds** that the aims of the proposed program with He3 are well motivated and well worth pursuing, **and welcomes** the possibility to further extend the experiments sensitivity to lower energy axions.

However, in the light of the three-year extension requested to complete this program, **the SPSC looks forward** to a clarification of the availability of resources.

## 6. FOLLOW UP ON EXPERIMENTS AND PROPOSALS

### 6.1 CNGS1-OPERA

**The SPSC notes with pleasure** that brick production is now ongoing as a routine operation.

There is a plan for gradually increasing the currently established rate of 1,000 bricks per week to 3,000 bricks per week, in order to complete production and installation of the currently funded 150,000 bricks in time for the start-up of the 2008 run.

The SPSC will continue monitoring the progress of brick assembly with respect to the schedule presented.

### 6.2 COMPASS

In view of the good prospects for completing the remaining physics program with polarised muon beams in 2007, **the SPSC strongly recommends** that COMPASS focus on achieving this goal, before then concentrating their resources on the hadron program in 2008 and beyond.

**The SPSC notes** that preliminary results on the pion polarisability from the Primakoff effect, using data from the 2004 pilot run with hadrons, are now available, **and looks forward** to timely publication of these results.

**The SPSC notes** the progress in updating the potential impact and useful scope of the proposed program of glueball and hybrid spectroscopy, **and looks forward** to this being further developed and presented to the Committee.

### 6.3 P-331 Proposal for QED tests and search for Axions by optical techniques (CERN-SPSC-2006-035/P-331)

The SPSC **took note** of a recent measurement (PVLAS) of vacuum magnetic birefringence (VMB), where the observed signal is 4 orders of magnitude larger than expected in QED. The existence of a light, neutral, spin-zero, particle (axion) has been suggested as one possible explanation of this finding. The existence of such a particle could be checked in a photon regeneration experiment. On the other hand, alternative explanations have been advocated which may account for an anomalously large VMB in the absence of photon regeneration.

The SPSC **recognizes** a fundamental interest in obtaining an independent measurement of the VMB, and in performing the complementary photon regeneration measurement.

The SPSC appreciates the elegance of the methods presented in the full proposal P-331. This proposal aims at a measurement of both the VMB and photon regeneration, by exploiting the availability of spare LHC test magnets, which provide one of the largest optical path-lengths in a high magnetic field available world-wide.

The SPSC **recommends approval of the 2007 programme** of P-331, which aims at performing a photon regeneration experiment with a sensitivity largely sufficient to prove or disprove an axion-like interpretation of the recent VMB measurement PVLAS. The SPSC looks forward to a timely physics data analysis.

The SPSC recognizes that the physics case for the long term programme of P-331 is very strong, and it **strongly encourages** the OSQAR Collaboration to follow its proposed timeline towards preparation of all aspects of a competitive VMB experiment, and to report on its progress in due course.

### 6.4 HARP

The SPSC has received a copy of a report, commissioned by CERN and by the major funding agencies of HARP, into issues related to the analysis and publication of HARP data. Two members of the SPSC, T. Carli and J. Fuster, who are lead SPSC referees for HARP, were members of the committee which carried out the investigation of the status of the HARP data analysis, and which produced the report.

**The SPSC wishes to put on record its thanks** to the funding agencies for initiating the report and for supplying a copy to the SPSC for its consideration. The SPSC also wishes

to express its thanks and appreciation to all members of the review committee for the substantial time and effort, which has so clearly been necessary for them to complete their valuable work.

After due consideration of submitted information, and after exhaustive discussion with members of the collaboration, the review committee concludes in its report that there is most likely a bias, due to distortions in HARP TPC data, in reconstructed momentum beyond the quoted systematic uncertainties in one of the two independent analyses of the “large angle data” currently underway.

The SPSC HARP referees also reported that, following the completion of the report by the HARP review committee and its submission to the funding agencies, those members of the HARP collaboration, whose analysis was considered to suffer from the momentum bias quoted above, now find themselves in disagreement with the conclusions of the report.

On the basis of the evidence which is considered by the review committee, and which is recorded in the report, **the SPSC endorses the conclusions of the report. It therefore strongly recommends that the HARP collaboration takes advantage from the work of the review committee, recorded throughout the report in its findings, to progress as expeditiously as possible the analysis of all its data to a reliable conclusion, and thence to publication.** The SPSC will follow progress to this end, with the conclusions of the report in mind.

## 7. OTHER REQUESTS FOR BEAM IN 2007

**The request by the SiILC group for 3 weeks test-beam run, which can be accommodated with no significant impact to other users, and minimal resources required of CERN, is supported by the SPSC.**

## 8. DOCUMENTS RECEIVED

- Minutes of the 80th meeting, held on 6-7 February 2007; [CERN-SPSC-2007-010](#); [SPSC-080](#).

- Status Report of the CAST experiment and Request to run beyond 2007  
[CERN-SPSC-2007-012/SR-018](#).

- Status Report of PS215/CLOUD; [CERN-SPSC-2007-014/ SR-019](#).

- The COMPASS Hadron Programme ; [CERN-SPSC-2007-015/M-755](#).