SPS AND PS EXPERIMENTS COMMITTEE

Decisions taken at the 58th meeting
held on 21 May 2002

OPEN SESSION

2. Status Report on WA103: R. Chehab

CLOSED SESSION


Apologies: A. Schäfer, C. Wyss

1 INTRODUCTION

The Chairman introduced J. Feltesse, chairman of the SPC, who will occasionally participate in the SPSC meeting.

2 MINUTES OF THE LAST MEETING

The minutes were approved without amendments.

3 MATTERS ARISING

The chairman informed the Committee that paper copies of documents for the SPSC would no longer be distributed. The documents are available on the web site of the Committee as soon as “Fulltext” is marked after the title.
REPORT FROM THE 158TH MEETING OF THE RESEARCH BOARD

The chairman reported on the 158th meeting of the Research Board. The RESEARCH BOARD took note with satisfaction of the progress of AD3, ASACUSA. The RESEARCH BOARD discussed at length the status and outlook of HARP. A panel of three referees will judge the potential for reaching the goals of the experiment this year. The RESEARCH BOARD stressed that HARP has to complete data taking this year. The RESEARCH BOARD concurred with the SPSC decision not to approve NA45, CERES for further running. The RESEARCH BOARD requested detailed information on manpower and financial implications of an extension of running by NA49 in 2002. The RESEARCH BOARD took note of the status of NA57. The RESEARCH BOARD took note of the difficult progress of NA60. The RESEARCH BOARD discussed the proposed savings plan and its impact on the fixed target programme. CERN will resist a stop of the SPS in 2006 in view of LHC detector calibrations, CNGS and start-up of the LHC machine.

The SPSC discussed considerations to stop not only the SPS but also the PS in 2005. The SPSC judged a stop of the PS detrimental for the three high precision experiments at the AD, which have a programme extending beyond 2005.

STATUS OF THE SPS

P. Grafström informed the Committee about the status of the SPS machine. The shutdown work terminated on schedule. Preparations for LHC have taken place in many transfer tunnels. Two experiments have been installed in the SPS to study vacuum conditions for LHC. “Beam scrubbing” seems to work and has resulted in improved vacuum in the SPS. Nominal LHC bunch intensities have been achieved. Lack of consolidation has led to precarious operational conditions and an increased risk of break-downs: failures in the 18 kV distribution, radiation damaged cables in LSS6, leaking roofs in auxiliary buildings, no spare 400 kV transformer, corroded beam splitter in the north area.

No funds have been made available yet for the modification of the beam line of NA48/2, an approved experiment. Funds have to be committed by mid June to keep the schedule for the 2003 run.

The Committee appreciated the amount of work during the shutdown. The Committee is increasingly worried about the mounting failure rate of equipment and the resulting danger to operations for physics and LHC test beam activities.

STATUS OF THE PS

J-P. Riunaud reported on the status of the PS machine. A water leak on 3 May led to damage of a transformer for the extraction septum to the East Area of the PS. As a consequence the beam energy is limited to 20 GeV, which hurts DIRAC. The number of cycles is also limited and affects DIRAC, HARP and all test beam users, almost all being LHC experiments. Ingenious, temporary repairs during the meeting seemed to work and allow more cycles to be delivered. A real repair of the equipment will take at least till July.

The AD started a bit later than planned due to work on LHC tests. Antiproton flux and cycle time are expected as last year.
The Committee thanked the PS Division for the clever repair limiting the damage due to the transformer breakdown. The Committee reiterated its great concern about the marginal operating conditions.

7 STATUS OF THE PS AND SPS EXPERIMENTS

M.Hauschild commented mainly on the PS experiments. HARP had a very fast start and runs with an improved set-up. With the temporary repair of a transformer and its full repair in July HARP will loose about 5% of the expected data. DIRAC has improved the detector and beam line. The expected loss for DIRAC is about 7% of the signal events. At the SPS the experiments prepare for the start of the physics programme. Scheduling for the H2 beam line is somewhat difficult because of a decision awaited on the NA49 run from the Research Board.

8 STATUS REPORT OF NA58, COMPASS

The referee summarized the achievements during the 2001 run. The target, using the SMC solenoid, works very well with record polarization. However, the acceptance with respect to the planned magnet is reduced. Plans are being elaborated to bring the planned target magnet into operation. Optimistically it could be available for the 2004 run. All foreseen types of detectors have been, at least partially, installed and commissioned. The production of the straw detector has made good progress and the final plane should be available by August this year. Problems with the RICH have been identified and the actions undertaken should improve the performance in 2002. DAQ and reconstruction are in good shape. Most of the 2001 beam time has been devoted to commissioning and only a short period to data taking. First results from the analysis show promising detector performance. The plans for 2002 concentrate on the \( \Delta G/G \) measurement. A workshop in autumn will elaborate the future muon and hadron programme beyond 2005.

The Committee congratulated the collaboration to the successful commissioning of the phase I detector and the first data. The Committee encouraged the collaboration to complete the spectrometer as laid out in the proposal in order to take data after 2005 for the muon and hadron programme.

9 STATUS REPORT OF WA103

The chairman presented the report from the former referee of the experiment, now no longer member of the Committee but who had agreed to review the final status report from WA103. The chairman expressed his gratitude to the referee.

The experiment aimed to measure positron production using an electron beam incident on a tungsten crystal and to compare the measurement with simulation and amorphous targets. WA103 was designed to measure positrons in a phase space region envisaged for positron sources for linear colliders. Data analyzed so far show clear evidence for an up to three-fold increase of positron production from a crystal as compared to an amorphous tungsten target of the same thickness. The collaboration is encouraged to complete the data analysis including the calorimeter data and comparison to simulations of electron interactions in crystals.

The Committee congratulated the collaboration on these results and looks forward to the publication of the complete data.
10 STATUS REPORT OF CAST

The referee explained the physics aim and the experimental technique employed by CAST to search for axions produced in the sun. Three different detectors are being prepared to detect the X-rays, which are produced by Primakoff conversion in a LHC prototype magnet. The detectors include a TPC, two Micromegas and a CCD. The hardware of the experiment nears completion and first data taking will start in summer. The experiment has substantially higher sensitivity than other axion searches in laboratory experiments. Three years of data taking are foreseen, with vacuum and Helium gas in the magnet bore.

The Committee expressed its thanks to the LHC Division for their help and support in the cryogenics installations of the experiment. The Committee congratulated the collaboration to the progress in installing the experiments and looks forward to first data dating in late summer this year.

11 PROGRESS REPORT OF HARP

The Research Board had asked a three person review panel to ascertain the 2001 data quality and investigate the potential 2002 data quality of HARP. The chairman of the review group gave a summary of the report; the written version will be distributed shortly. He recalled briefly the commissioning and data taking in 2001. Many subdetectors work well: RPCs, Cherenkov, TOF, and calorimeter. The cryogenic targets for 2002 are commissioned. The few problems with the beam in 2001 have been corrected. Some problems with the TPC have been solved, like broken cables and noisy pads. The superfluous headers of the TPC data cannot be suppressed and will continue to inflate the data volume. The cross talk between TPC channels is inherent to the front-end motherboard and cannot be solved hardware wise. Its final influence on spatial and dE/dx resolution is not clear yet. It has and will require a big software effort to limit its adverse effect on the data. The drift chambers work with a somewhat limited efficiency and still need a better alignment. Improvements in the trigger should reduce substantially the number of spurious triggers recorded in 2001. A problem with scaling of beam events has been solved. In 2001 about 25% of the total, envisaged data set has been collected. The data analysis is still in early stages and it is difficult to assess fully their quality. However, the first signs are good. The improvements of the setup during the shut down promise increased data quality and quantity in 2002. The collaboration should be able to collect the envisaged data sets, but there is no margin.

The chairman thanked the review committee for its work. The SPSC appreciated the large amount of work done by HARP to improve the hardware performance. The Committee hopes that the remaining hardware problems, in particular the cross-talk in the TPC, can be overcome by software treatment. The Committee is convinced that the data quantity and quality will allow for a substantial improvement in the knowledge of cross-sections for ν-factories and atmospheric ν-interactions. The Committee stressed that data taking cannot continue in 2003.

12 STATUS REPORT OF NA50

The referee reviewed the status report of NA50. The collaboration has completed data taking and is analyzing the data. The collaboration has published several papers since the last status report and further papers are in preparation. It is expected that the analysis will be completed within a year.
The Committee **congratulated** the collaboration on the high quality of data, in particular on the observed $J/\psi$ suppression and its implication for the understanding of heavy ion collisions. The Committee **looks forward** to the concluding publications from the experiment.

13 PROGRESS REPORT OF NA60

The referee reported on the progress of NA60. The proton run will start in the next days. The Silicon microstrip detector should be almost complete for the beginning of the run. 16 out of 18 modules will be installed from the start. Among other things, scheduling in the bonding workshop produced some delays. For the beam scope, change in personnel caused significant delays. One module still has to be repaired, but all detectors should be available when needed during the proton run. One 4-chip pixel plane is ready and will be installed for the proton run. The pixel detector has been optimized following detailed simulation of the experiment. The full pixel detector will employ more 4-chip planes, which are simpler to produce, and fewer 8-chip planes as compared to the proposal setup. The overall number of pixel chips stays unchanged. Components for the pixel planes will arrive over the coming months and be assembled and tested. Probably six 4-chip planes and six 8-chip planes will be available for the heavy ion run. However, the schedule is very tight. The collaboration has suffered from many small delays and depends critically on services from support groups at CERN.

The Committee **expects** good data from the proton run since the beam scope will be complete. The Committee **is worried** about the very tight schedule for the pixel telescope and **asks** the collaboration to investigate the impact of a pixel telescope with fewer planes. The Committee **asks** for a status report in the open session during the September meeting.

14 MEMORANDUM FROM DIRAC

The referee recalled the physics goal of the experiment, the experimental technique and analysis method employed. The most recent result has a 22% error on the lifetime of $\pi\pi$ atoms but does not use all collected data. Given the losses in beam time due to the failure of a magnet in the beam line in 2001 and the present limitations in beam energy due to power supply problems it is expected that the combined data at the end of 2002 will lead to an error of 15% on the lifetime compared to the 10% error goal in the proposal. In order to better understand the background subtraction technique, two months in 2002 will be devoted to running with a beryllium target. The collaboration asks for an extension of the running time in 2003 in order to achieve the 10% goal.

The Committee **supports** the request of DIRAC for collecting sufficient data in order to reach the goal of a 10% error on the lifetime of $\pi\pi$ atoms.

15 STATUS REPORT OF AD2, ATRAP

The referee commented on the written status report from AD2, ATRAP. The experiment achieved first cooling of antiprotons by positrons and published a paper on it. The experiment trapped cold antiprotons and positrons in the same trap and observed ‘intriguing signals’. These signals could either be a sign of anti-Hydrogen or a neutral, ultra cold plasma. Unfortunately no quantitative results are presented in the status report. The status report outlines the installation of an improved apparatus in 2002, however with no timelines.
The Committee took note of the status report answering some of the questions, which came up after the oral presentation during the January meeting. The Committee asks for more information on how the collaboration intends to distinguish between a cold plasma and anti-Hydrogen and the installation schedule and testing of the new apparatus.

16 PS AND SPS SCHEDULES

The coordinator gave a short overview of the schedules. At the PS more beam time has been allocated to OPERA after cancellation of some tests. At the SPS all beam time is booked, mainly by tests for LHC experiments. The heavy ion run will start with 30 A-GeV and then switch to 20 A-GeV with the high energy run at the end.

17 A.O.B.

- A note from AD3, ASACUSA states that a stop of the PS in 2005 would disintegrate the collaboration.

- OPERA has submitted a memo on a modification of the apparatus. This will be discussed together with the status report in the September meeting.

18, DOCUMENTS RECEIVED

- Minutes of fifty-seventh meeting on 26 March 2002 (SPSC 2002-015/SPSC57).
- Status of WA103 (SPSC 2002-016/M683).
- Memorandum from PS212/DIRAC (SPSC-2002-018; M-684).
- The Changeable Sheet detector in OPERA (SPSC 2002-021/M687).
- Status report of the CAST Experiment (SPSC 2002-023/M688).
- Status Report on the NA60 Pixel Detector Project (SPSC 2002-024/M689).

Hans Taureg
Hans.Taureg@CERN.CH
Tel.: 72674; GSM 160359