



EUROPEAN LABORATORY FOR PARTICLE PHYSICS

CERN/SPSC 99-37
SPSC 45
6 December 1999

SPS AND PS EXPERIMENTS COMMITTEE

Decisions taken at the 45th meeting held on 1 December 1999

OPEN SESSION:

1. Status report from NA59: M. Velasco
2. Status report from PS212 / DIRAC: L. Nemenov
3. Solar Axion Search using a Decommissioned LHC Test Magnet (SPSC 99-21/P312): K. Zioutas
4. Proposal to Study Hadron Production for the Neutrino Factory and for the Atmospheric Neutrino Flux (SPSC 99-35/P315): F. Dydak

CLOSED SESSION:

Present: P. Bagnaia, M. Cavalli-Sforza, S. Dalla Torre, A. De Roeck, Y. Déclais*, C. Détraz, R. Forty, P. Grafström, U. Heinz, K. Hübner, K.-H. Kissler, B. Koene, K. Königsmann (Chairman), W. Kühn, A. Magnon, L. Maiani, M. Pennington, A. Pich, J.-P. Riinaud, L. Robertson (replacing M. Delfino), T. Ruf, D. Simon, H. Taureg, E. Tsismelis (Secretary), R. Voss (replacing G. Goggi), C. Wagner, H. Wahl*, D. Websdale, A. Zalewska.

* Part-time

Apologies: W. Braunschweig, N. Pavlopoulos, J. Stachel, M. Tyndel.

1. INTRODUCTION

The Chairman presented apologies from four members of the Committee.

2. APPROVAL OF THE MINUTES

The minutes of the 44th SPSC meeting (SPSC 99-23 / SPSC 44) were approved without modification.

3. REPORT ON THE 142nd MEETING OF THE RESEARCH BOARD

The Chairman of the SPSC reported on the status of CHORUS and NOMAD, the two experiments searching for neutrino oscillations in the CERN wide-band neutrino beam. The two collaborations were **congratulated** on their careful search for neutrino oscillations. It was also noted that their two complementary search methods will be beneficial to the future Long Base Line (LBL) programme.

He also presented proposal P311/I216 which addresses $\nu_{\mu} \rightarrow \nu_e$ oscillations in the region of the LSND result. The Research Board **concurred** with the decision of the SPSC **not to recommend** P311 for approval.

The SPSC Chairman also reported on the CERN to Gran Sasso neutrino beam (CNGS) and on the two proposed LBL experiments, ICANOE and OPERA. The SPSC considers that both experiments are suitable to observe $\nu_{\mu} \rightarrow \nu_{\tau}$ oscillations down to the lowest values of Δm^2 suggested by the Super-Kamiokande results. The SPSC had requested detailed time-lines and cost estimates for its meeting of 1 December 1999 and a special meeting of the Research Board will be convened on 9 December 1999 to consider this additional information.

4. STATUS REPORT ON THE SPS

The SPS has been running well. Beams of Pb-ion at 40 A GeV/c have been accelerated with the same supercycle as in previous years. The availability of the machine at the beginning of the Pb-ion run was very good, but was lower later in the run due to the six critical days. As a result of the time lost from the critical days, an extension of 24-hours was granted to the Pb-ion run.

The Chairman of the SPSC thanked the outgoing SL Division Leader Karl-Heinz Kissler for the magnificent job he has done successfully guiding the SPS over the past years.

5. STATUS REPORT ON THE PS

The PS Complex fault rate for protons and Pb⁵³⁺-ions was 6.6%, while that for protons to the East Hall (and leptons to the SPS/LEP) was 5.8%.

The first antiproton beams (at 100 MeV/c) have been extracted from the AD on 27 November 1999. First extracted beams have also been sent to the experiments. Some months of delay have been accumulated but the problems leading to this are now understood. Work will continue during the shut-down period to optimise the machine.

The Chairman of the SPSC thanked the outgoing PS Division Leader Daniel Simon for the magnificent job he has done in successfully guiding the PS Complex over the past years.

6. STATUS REPORT ON THE SPS AND PS EXPERIMENTS

The Coordinator presented the status of the experiments, concentrating on the SPS Pb-ion programme at 40 A GeV/c. In general, the experiments were satisfied with the performance of the accelerator complex in terms of intensity, stability and overall beam quality. The NA49 experiment performed well, collecting central and peripheral Pb+Pb events as well as data with the fragmentation beam. NA57 performed according to expectations. By the time of the SPSC meeting, 180 million events had been collected, which due to the number of critical days is on the low side of expectations. Because of problems with its read-out, NA45 had a late start to data-taking. Stable operation was soon reached, however. The NA50 experiment performed a number of studies, including tests of a new target box, studies on improving the trigger electronics, tests of a microstrip hodoscope prototype for a possible future heavy-ion experiment, and physics studies of flow, fission and multiplicity in Pb+Pb interactions at 40 A GeV/c. The NA53 experiment, which is studying the electromagnetic dissociation of target nuclei by Pb projectiles, also ran.

The Coordinator also reported on the activities at the PS Complex. The PS East Hall run for 1999 stopped on 29 November. Moreover, a number of users have performed tests in 1999 at the Lepton Pre-Injector (LPI): CMS, LHCb, NEG, PHOTOYIELD, PHOTOSCRUBBING, LHC Skin Effect and COLDEX.

7. DISCUSSION ON THE OPEN SESSION

7.1 NA59:

The Committee heard a report on the status of NA59, which is studying the use of crystals as 'quarter-wave plates' for high-energy photons. The experiment collected data in 1999 with the main objective of measuring the linear polarisation. Results from the preliminary analysis of the linear polarisation with the pair production method, as measured in the Pb-glass calorimeter, were presented, and show that the measured asymmetry is consistent with expectations. The Committee **appreciates** the work performed in measuring the linear polarisation. The analysis has not yet but will be extended to the measurement of the pair production asymmetry using the spectrometer and to the $\rho^0 \rightarrow \pi^+\pi^-$ channel to calibrate the pair production asymmetry.

The SPSC **encourages** the collaboration to continue the analysis and to provide results to the committee by its session in March 2000. Approval for running in 2000 is subject to the satisfactory progress in the analysis, especially that on the ρ^0 study.

7.2 PS212 (DIRAC):

The Committee heard a report on DIRAC, which is measuring the lifetime of $\pi^+\pi^-$ atoms to test low energy QCD predictions. The Committee **congratulates** the collaboration on their excellent progress. The 1999 running period concentrated on commissioning the experiment and on taking calibration data. Some physics data were also taken towards the end of the run and are being presently analysed with the aim of obtaining first results on the atomic pair production before the 2000 data-taking period. A measurement of the lifetime down to a 20% uncertainty is deemed to be feasible for 2000 and the collaboration is encouraged to continue their efforts. Attempts will be made to maximise the number of PS cycles delivering beam to DIRAC.

7.3 PROPOSAL SPSC 99-21 / P312:

The Committee heard a report on the proposal to search for solar axions down to the astrophysical limit, obtained from stars on the Horizontal Branch, by using a decommissioned LHC test magnet. The Committee **recognises** the interest of the proposed scientific programme and considers the proposed experimental technique to be feasible. The collaboration is asked to provide further clarification of the financing of the experiment, of other possible experiments attempting to make a similar study, and of the integration and operation scenario of running at Point 4 of the LEP/LHC tunnel. In view of the above, the SPSC **recommends** P312 for approval to the Research Board, subject to the satisfactory resolution of the above questions.

7.4 PROPOSAL SPSC 99-35 / P315:

The Committee heard a report on the proposal to measure secondary hadrons produced on various targets by using proton beams at the PS East Hall. The Committee **recognises** the interest of studying the hadron production as it has important applications in the field of neutrino physics: to optimise the design of an intense neutrino source based on muon decay in a muon storage ring (as part of a neutrino factory) and to improve the atmospheric neutrino flux calculations. Moreover, the Committee considers that the proposed experimental design is sound. The SPSC **recommends** Stage I (proton and pion beams in the range 2 to 15 GeV/c) of P315 for approval to the Research Board, subject to the clarification of the funding of the experiment.

8. EXPERIMENTS FOR CNGS:

8.1 ICANOE:

The collaboration has submitted to the satisfaction of the SPSC the requested documents detailing their schedule, with a list of milestones for the construction and running of the experiment, and the experiment's funding and manpower profiles. The Committee is impressed by the quality and amount of work presented. The realisation of the T600 module remains an important milestone to prove the viability of the ICARUS technique. The proposed modular structure should allow for useful data-taking with the CNGS beam in 2005. The collaboration is **encouraged** to continue their experimental design and to further strengthen their collaboration with international members.

8.2 OPERA:

The Committee appreciates the progress made in optimising the baseline detector design and the improved cost estimates and schedule of the experiment. Good progress was shown on the sharing of responsibilities in the collaboration and further strengthening of the collaboration with international members is **encouraged**. A full proposal is expected during the summer of 2000. Data-taking in 2005 with a completed detector is deemed feasible.

9. STATUS OF P309:

The Committee recognises the interest of the experimental study proposed by P309 to develop a positron source using channeling. The work might later lead to its application as an intense positron source for future e^+e^- linear colliders.

The collaboration has provided details of results from Monte Carlo simulations on the positron reconstruction efficiency and of an optimised measurement programme. All components of the detector are on schedule. In view of the above, the SPSC **recommends** P309 for approval to the Research Board for a run as shown on the schedule of the 2000 SPS fixed target programme.

10. COMPARISON OF NA56 RESULTS WITH FLUKA PREDICTIONS

The completed NA56 experiment has provided precise data on hadron production from 450 GeV/c protons impinging on various beryllium targets. The results on both the momentum and angular dependence of the yields and yield ratios have been compared to the predictions from the FLUKA simulation package and are found to be in better agreement than those of earlier versions of the model. Such models are used extensively in predicting the neutrino flux at future neutrino facilities. In view of this, the experimental measurement of the production yields is imperative in verifying and improving the predictions.

11. SCHEDULES OF THE MACHINES

The Coordinator showed the PS (East Hall, AD, and LPI) and SPS (proton and heavy-ion) machine schedules for 2000. The schedules were approved by the Research Board at its meeting on 18 November 1999.

He also presented the draft schedules of the PS and SPS physics programmes for 2000, which are to be discussed with the users in December 1999. He indicated that, in general, requests for beam-time exceeded that available and that there is not much spare time left for late requests.

12. ANY OTHER BUSINESS

H. Wahl informed the Committee of the NA48 accident in early November in which the carbon fibre beam pipe imploded resulting in serious damage to the drift chambers of the charged particle spectrometer. The NA48 Steering Committee has stated that further running is needed in order to complete their measurement of CP-violation in the kaon system. This would require the repair of the chambers and the construction of a new beam pipe in time for the SPS proton run of 2001. The SPSC **takes note** of the status of NA48 and invites the collaboration to present to the January session of the Committee their strategy for repairing the detector and for future running to measure $\text{Re}(\epsilon'/\epsilon)$, together with their plans to study rare decays.

The 46th meeting will be held on **Tuesday, 25 January and Wednesday, 26 January 2000**

The dates for the SPSC meetings in 2000 are:

25-26 January
28-29 March
23-24 May
5-6 September
31 October – 1 November

13. DOCUMENTS RECEIVED

Solar Axion Search using a Decommissioned LHC Test Magnet (SPSC 99-41/P312 Add.1).

Proposal to study Hadron Production for the Neutrino Factory and for the Atmospheric Neutrino Flux (SPSC 99-35/P315).

ICANOE: Imaging and CALorimetric Neutrino Oscillation Experiment (Preliminary Technical Design and Cost Estimates) SPSC 99-39/P314 Add.1.

ICANOE: Imaging and CALorimetric Neutrino Oscillation Experiment (Answers to Questions and Remarks Concerning the ICANOE Project) SPSC 99-40/P314 Add.2.

OPERA: Addendum to the OPERA Progress Report (SPSC 99-38/M641).

Proposal for PS test beam time for MINOS calibration module (UCL – Univ. of Sussex) SPSC 99-34/P313.

Status Report of the NA59 Experiment (SPSC 99-33/P308 Add.1).

Emmanuel Tsesmelis
Emmanuel.Tsesmelis@CERN.CH
Tel. 78949 or 164057

SPSC Secretariat: Monique Budel (Bldg. 14/4-014) Tel. 74270
Monique.Budel@CERN.CH