



## EUROPEAN LABORATORY FOR PARTICLES PHYSICS

CERN/SPSLC 96-44  
SPSLC 30  
17 September 1996

### SPS AND LEAR EXPERIMENTS COMMITTEE

Decisions taken at the 30th meeting on 10 September 1996

#### CLOSED SESSION

Present: P. Bagnaia, J.-P. Blaizot\*, F. Close\*, B. D'Almagne (Chairman), M. Doser, D. Drijard (Secretary), L. Foà, B. Gavela, G. Goggi, P. Grafström, K. Green, J.-F. Grivaz, K. Hübner, D. Jacobs, K. H. Kissler, R. Landua, J. Nassalski\*, A. Norton, J.-P. Riunaud, A. Schopper, D. Simon, J. Tuominiemi, M. Turala\*, M. Tyndel\*, G. Wilquet.

\* part-time

Apologies: M. Cavalli-Sforza, K. Jakobs, K. Königsmann, M. Neubert, K. Peters, L. Ristori, J. Stachel.

#### 1. New membership:

The chairman announced the nomination of a new member, Matthias Neubert from the TH Division, who could unfortunately not attend the meeting.

#### 2. Approval of the minutes:

The minutes of the 30th meeting were approved without modification.

#### 3. Report on the last meeting of the Research Board:

Both the heavy-ion programme examined by the SPSLC and the update of the LEAR schedule requested by CRYSTAL BARREL to modify the energy settings of its runs had been supported by the Research Board. The radiation facility requested by the LHC experiments had been agreed upon but its schedule will remain under the control of the SPSLC.

A letter from CRYSTAL BARREL to the Council to extend the life of LEAR had been considered but the Research Board had confirmed its earlier negative decision. The same conclusion was reached by the SPC.

#### 4. Status report on SPS:

The machine had reached a new record intensity of  $4.6 \cdot 10^{13}$  protons per pulse (ppp) at 440 GeV/c (to be compared to 4.2 in 1995). The integrated number of protons delivered on targets (p.o.t.) had been  $2.1 \cdot 10^{19}$ . A similar number had been reached for the whole of 1995 which had already established a dramatic increase with respect to the earlier years (and there are still 2 more weeks of operation before the end of 1996). The number of p.o.t. delivered to the  $\nu$  experiments had been already slightly larger than in 1995. The SPS had been again running with an exceptional average efficiency of 78 % (77 % in 1995). The committee wished to congratulate the teams responsible of such achievements, both from SPS and CPS.

The sustained high intensity had created some technical problems and for safety reasons the intensity will be limited to  $4.0 \cdot 10^{13}$  ppp until the end of 1996. A cure had been found which will be applied from 1997 onwards but there is a further limitation at about  $5 \cdot 10^{13}$  ppp. This limitation is given by the maximum power which the damping loops of the 200 MHz standing wave cavities used for lepton acceleration can take out of these cavities during proton operation.

#### 5. Status report on SPS experiments:

CHORUS (WA95) showed first physics results at Helsinki. NOMAD (WA96) expect to exceed the  $1.1 \cdot 10^6 \nu_{\mu}$  charged current interactions on which the proposal was based. Both experiments had run in excellent conditions and expressed their gratitude to all people involved for the superb performances of CPS and SPS both delivering  $1.2 \cdot 10^{19}$  protons on the neutrino target by the end of August. The experiment WA102 performed very well and collected more events than planned; the first results could be available by the middle of 1997. SMC (NA47) had reached their goals, reducing their statistical error by about a factor 2, reaching the level of systematical errors. The NA48 detector was fully installed on the beam line and 10% of the read-out electronics of the Krypton calorimeter was available. NA50 had a satisfactory run with protons and are ready for the heavy-ion run. Two periods of four days each were allocated in the H6 beam line to the "CERN-CEC reference field facility", an association of several groups from different countries, to calibrate dosimetric instrumentation. The goal is to monitor radiation fields at aviation altitudes which happen to be similar to those found around the shielding of the CERN facility. SL crystal tests were successfully conducted in H8, for seven days, to test beam deflection of Germanium crystals. Record deflection efficiencies of 60% were observed at 450 GeV/c and small angles; first analysis showed good agreement between measurements and models.

#### 6. Status report on PS and LEAR:

The PS Complex had extremely good performances as mentioned above. A new intensity record of  $2.9 \cdot 10^{13}$  ppp at 14 GeV/c was reached (the last record was 2.7 in 1993). There had been hardware improvements but the main reason for the enhanced performance was a human one, a lot of efforts and the motivation of the operation team. The average fault rate over the year at the PS Complex had been as low as 7.5% for protons delivered to the SPS and 8.1% for antiprotons for the South Hall physics.

This low fault rate had been obtained in spite of a water leak in a septum magnet (SMH74, injection of electrons in the PS). This created a bad vacuum and imposed a replacement of this septum by a spare unit – which unfortunately did not function properly. This had resulted in a loss of half a week for PS users and one week of electrons to the SPS. The problem had been cured and spares now exist.

## **7. Status report on LEAR and PS experiments:**

### **7.1 LEAR**

PS185/3 were globally ready and installing in parallel to PS197 at 1350 MeV/c. PS194 had successfully completed their data taking. CPLEAR (PS195) had achieved their requested statistics, this last run being devoted to systematic studies. CRYSTAL BARREL (PS197) had 2 weeks at 100 MeV/c, collecting  $15 \cdot 10^6$  events, and 3 weeks at high energy in the 0-prong channel, recording  $7.2 \cdot 10^6$  events at 1050 MeV/c and  $11.2 \cdot 10^6$  events at 1350 MeV/c. PS200 had the extraction from the trap now working. OBELIX (PS201) had completed their four weeks at 200 MeV/c, as well as the first 3-week block of their seven weeks at 100 MeV/c. PS207 had completed their data taking: they had their full statistics on  $L_\alpha$  and presented preliminary results at LEAP'96 but collected somewhat low statistics on  $K_\alpha$ .

### **7.2 PS**

PS211 had good results with the fast extraction but in slow extraction mode there were some problems (now fixed). DIRAC (PS212) had successfully tested the scintillating fibers prototype.

## **8. Discussion on the open session:**

### **8.1 P300**

The referee could not attend the meeting but he had submitted a written report. Both this report and the presentation in the open session convinced the committee of the relevance of the physics case and the feasibility of the experiment. It was decided to recommend the proposal for approval to the Research Board.

### **8.2 PS196**

The spokesman had been unavailable to present his report at the open session but the referee had all the information available. The relative precision on the comparison of  $q/m$  between proton and antiproton expected from the run in 1995 was about  $3 \cdot 10^{-10}$ . The run in 1996 had been delayed by unforeseen problems which have since been fixed. A 3-week run was starting in September which should allow to reach an increased precision.

The preparations to use the last 10-day run at LEAR for antihydrogen studies, and in particular the success in trapping a large amount of  $e^+$ , convinced the committee that the situation was under control and favourable. The committee agreed to allocate these 10 days to PS196. There is a possibility for PS200 to run parasitically during this time but full priority was given to PS196.

## **9. Other reports from the referees:**

### **9.1 COMPASS**

The assessment of the physics potential of COMPASS was summarized by the referees. The goals of the Deep Inelastic Muon scattering part were felt clear and of great interest. In hadronic physics, the experiment should be excellent for the search for gluonic states in central production as well as in Primakoff type reactions. The possible determination of  $f_{D_s}$  and first measurement of  $f_D$  were appreciated. The contributions to charm baryon spectroscopy require elaborate Monte Carlo studies in the detector to be fully evaluated.

On the experimental side, the work done in the last months had shown the feasibility of the apparatus. Reasonable compromises or fallback solutions were demonstrated possible for the items previously estimated critical.

Milestones will be defined at the one year level in order to freeze the final technical choices and quantify the physics objectives by the detailed study of several specific channels.

The committee recommended the approval of the experiment and will report to the Research Board as soon as the financial situation is clarified.

## 9.2 NA45/2

The improvement of mass resolution aimed for would allow to observe the  $\omega$  and  $\phi$  mass peaks. These measurements, necessary to understand the behaviour of resonances in dense matter, would provide key information on the related dynamics of the hot nuclear system.

The committee asked further clarification on technical aspects such as the effect of the material upstream of the TPC and the track matching. It requested a report from the referee at the November meeting in order to recommend the proposal.

## 10. SPS matters:

The co-ordinator presented the time available for physics in 1997. Calls for beam-time requests were sent to users for a draft of the schedule to be ready for the next meeting.

The experiments NA45/2 and NA52 agreed on the following time sharing of the 39 days of Pb-run this year. NA52 will run as main user during 2 days while being in a parasitic mode the rest of the time in order to test and cross-calibrate their new quartz-fiber calorimeter. NA45/2 will be main user during 37 days and wants to keep flexibility on the schedule of the 2 days devoted to the former experiment. The committee supported this organization.

There had been a request for a test-beam area at the SPS for LHC-B (SPSLC 96-38 / M586). The co-ordinator proposed an installation in X7 for an optimal beams utilization, leaving X5 for the irradiation facility. In order to keep the induced muonic background for the CHORUS experiment at an acceptable level this choice will place an upper limit of 50 GeV/c during 1997, which LHC-B accepted. Then the X7 beam should be upgraded to 200/250 GeV/c during the shutdown at the end of 1997. The committee decided to recommend this solution for approval by the Research Board.

## 11. PS matters:

The co-ordinator showed the schedule of the PS Complex for 1997.

The East Hall would have to be modified to accommodate DIRAC and the LHC test-beams. The layout of the area was presented. The beams T7, T8, T9 and T10 with momenta 10, 24, 15 and 7 GeV/c would be allocated to LHC-B, DIRAC and the irradiation area, ATLAS/CMS and ALICE respectively. T11 would remain as at present with momentum 3.5 GeV/c. Various beam-sharing situations would be possible. The installation would require an extended shutdown of 9 months – from October 1997 to June 1998 inclusively.

## 12. Any other business:

The 31st meeting will be held on **Tuesday 5 and Wednesday 6 November 1996**

The 32nd meeting will be held on **Tuesday 21 and Wednesday 22 January 1997**

## 13. Documents received:

*Proposal: Study of strange and multistrange particles in ultrarelativistic nucleus-nucleus collisions* (WA97 Collaboration); SPSLC 96-40 / P300.

*Memorandum from LHC-B: Request for a Test Beam Area at the SPS for LHC-B;*  
SPSLC 96-38/M586.

*Memorandum from COMPASS: Questions of the referees from July 19th;*  
SPSLC 96-41/M587.

*Memorandum from the TRAP Collaboration: Comparison of the Charge-to-Mass Ratios of*  
*Antiproton and Proton;* SPSLC 96-42/M588.

*Memorandum from CHORUS: 1997 data taking;* SPSLC 96-45/M589.

*Memorandum from ATLAS: SPS Schedule 1997;* SPSLC 96-46/M590.

D. Drijard