CERN/SPSC 2000-036
SPSC 49
12 September 2000

SPS AND PS EXPERIMENTS COMMITTEE

Decisions taken at the 49th meeting held on 5 and 6 September, 2000

OPEN SESSION

1. Status report on ICARUS: C. Rubbia.

2. Proposal: OPERA - An appearance experiment to search for $\nu_\mu \leftrightarrow \nu_\tau$ oscillations in the CNGS beam (SPSC 2000-028/P318, LGNS-P25/2000): K. Kodama, P. Migliozzi, P. Strolin.

1. Addendum to PS212/DIRAC: First observation of πK atoms and their lifetim measurement (SPSC 2000-032/P284 Add. 2): L. Nemenov.

CLOSED SESSION

Present: F. Bobisut, M. Cavalli-Sforza, S. Dalla Torre, Y. Déclais, C. Détraz, R. Forty, P. Grafström, U. Heinz, K. Hübner*, J. Knobloch, B. Koene, K. Königsmann (Chairman), W. Kühn, A. Magnon, L. Maiani*, J. May, S. Myers*, N. Pavlopoulos, M. Pennington, A. Pich, P. Riunaud, T. Ruf, H. Taureg (Secretary), R.Voss, A. Zalewska

* part time

Apologies: W. Braunschweig, J-P. Delahaye, A. De Roeck, G. Goggi, D. Websdale

1. INTRODUCTION

The Chairman and C. Détraz commented on the request by the Research Board to review all pending proposals. The SPSC shall establish scientific priorities for the next couple of years in view of a sustainable programme and the competition world-wide.

2. APPROVAL OF THE MINUTES OF THE LAST MEETING

The minutes of the 48th SPSC meeting (SPSC 2000-026/SPSC 48) were approved with the following amendments:

Under point 7, memorandum from P316, the following sentence should be added at the end of the first paragraph: "A special configuration can lead to an acceptance increase by a factor 5 to 10 at low masses and p_t which significantly extends the physics capabilities of the detector."

Under point 13, P317 / CLOUD, the last but one sentence "A Technical Design Report shall be submitted." should be deleted from the minutes.

3. REPORT FROM THE 147th MEETING OF THE RESEARCH BOARD

The Chairman reported on the 147th meeting of the Research Board. The Research Board approved P316 for a proton run in 2001. The experiment will be known as **NA60**.

The Research Board requested a review of all pending proposals.

4. SPS STATUS

P. Grafström reported on the status of the SPS machine. The efficiency of the machine has been very good, close to 90%, and better than in the previous year. There has been only one major problem with a septum in the North Area. The requested intensity has been rather modest for most of the year. The high efficiency has been maintained through the change of energy and cycle time in July and the intensity increase for NA58/COMPASS in August. There is one more week of proton running before the change-over to ions.

5. PS STATUS

J.P. Riunaud reported on the status of the PS complex. The availability of the beams has been very good, around 95%. The requested intensity has been modest but a new intensity record of 3.36 10^{13} protons has been achieved during high intensity tests. In the AD the beam parameters are very close to the design values except for the cycle time. The physics programme at the AD has started, interleaved with further commissioning of the machine. The RFQ-D for ASACUSA is under test in Aarhus and installation is planned for weeks 40 and 41.

6. STATUS OF THE EXPERIMENTS

T.Ruf recalled the beam schedule for the PS and SPS.

At the PS the users appreciate the refurbished Cerenkov counters. DIRAC has received all spare protons available and thus gained 30%. Operating three big magnets in the East Hall during the next period may be curtailed by limitations from the water cooling system.

At the SPS a few days are left in the proton run before the change to ions. A number of tests have been cancelled by LHC experiments. The available beam time has been rescheduled for other experiments/tests. WA103 has collected good data and a first look shows broad agreement with expectations. The experiment may request beam in 2001. NA59 had more beam time than requested as CMS had cancelled some tests. However, the ρ data could not be collected at the end of the running time because of a problem at the SPS with the north

septum. NA48 has collected good and plenty of data. COMPASS has a technical run and has solved many problems. The CERF facility, a reference field facility for neutrons, was operated for two periods. During the summer teachers from the outreach programme and summer students participated in practical sessions on beam control. These sessions are highly appreciated by the participants.

The AD experiments started with their physics programme. ATHENA achieved storage and electron cooling of antiprotons. ATRAP stored electron cooled antiprotons and positrons in the same trap at 4.2 K. ASACUSA has observed two new lines in antiprotonic Helium and improved the precision on known lines.

The Committee congratulated the AD and the experiments on the achievements.

7. DISCUSSION ON ICARUS

The referee briefly recalled the physics reach and design of the detector. He described the status of the T600 module being equipped in Pavia. Several technical problems have been solved without causing significant delays. Operation of the module should be expected by beginning of 2001. Running the 10 m^3 prototype at LNGS has shown that the critical parameters for ICARUS can be met with the employed technology.

The Committee congratulates the Collaboration on the significant progress during the last year in the construction of the T600 module and awaits recording long tracks in this module. The Collaboration should define a test programme for the T600 module and elaborate on the physics performance of the detector.

8. DISCUSSION ON P318 / OPERA

The referees described the evolution in the design of the detector. A lead/emulsion sandwich and a dipole based muon spectrometer form the baseline design. The schedule for construction of the experiment is very tight and there are no contingencies. An umber of technical issues are not yet solved or need further study. The aging of the emulsions and the temperature control in the cavern are a concern. Studies of the efficiencies for electron identification and for vertex finding should be carried out with simulated events and data from beam tests or other experiments. The performance of the automatic scanning system is critical for the experiment. The physics performance relies on the detection of charged single prong decays of the τ. With the present knowledge on ν oscillations and the expected detector efficiency 18 events are expected in 5 years of running.

The Committee considers the OPERA experiment to have a potentially large impact on the understanding of neutrino oscillations.
The Committee **recommends** P318/OPERA for approval under the condition of a number of technical questions like aging and temperature stability to be clarified, and a list of milestones and an appropriate time schedule which have to be established in common by the SPSC and LNGSC referees and in consultation with the Collaboration. In particular the Collaboration shall define the responsibilities of the participating institutes for the different components of the experiment. The Collaboration has to elaborate a strategy for, and organization of the software work and data analysis. A strengthening of the Collaboration seems essential.

9. DISCUSSION ON DIRAC, P284/Add. 2

The referee explained the experimental technique and the physics impact of the proposal. No πK atoms have yet been detected. The proposed measurement will test chiral pertubation theory predictions for the πK scattering length which are calculated with a 10% uncertainty. Only a modest modification of the set-up is required.

The Committee asks the Collaboration to demonstrate the detection of πK atoms during the already allocated beam time. The Committee will then consider the measurement of the lifetime of these atoms.

10. DISCUSSION ON NA48, P253/Add. 2 and P253/Add. 3

The referees reported on the repair of the drift chambers which progresses well within schedule. They described the upgrades and modifications of the detector for the charged Kaon programme. All technical and physics issues are well studied and under control. The main physics goal of the neutral and charged K programme is CP violation. The analysis of the Dalitz plot for charged K decays to three charged pions will substantially improve existing measurements. It will not reach the level of predictions of the Standard Model but can rule out other models and is therefore important. A number of other measurements on rare decays and chiral perturbation theory can be done with data collected at the same time. The measurement of the $K^0_S \rightarrow \pi^0 e^+ e^-$ decay is essential for the theoretical framework of CP violation. There is no real competition for this measurement. Other rare K decays and hyperon decays will be analyzed in the same data set. The referees were impressed by the motivation of the Collaboration and the speed of analysis. Results from last years test runs have been presented this year at conferences improving published data substantially. The NA48 programme is in competition for beam time with NA60.

The Committee reiterates its strongest support for the K^0_S programme. The measurement of the $K^0_S \rightarrow \pi^0 e^+ e^-$ is of very high importance since it allows to place a bound on the indirect CP violating term in the corresponding K^0_L decay.
The main interest in the charged K programme is the search for direct CP violation in the decay to three pions, albeit with a sensitivity at least two orders of magnitude above theoretical predictions in the Standard Model. The Committee considers this programme as important and **recommends** it for approval.

11. DISCUSSION ON NA49, P264/Add. 7

To study the transition region from confined to deconfined matter the NA49 Collaboration requests for this year a run at 80 A GeV. The Committee recognizes the interest in this study and **recommends** for approval a five days run at 80 A GeV within the allocated ion running. The SPS Coordinator should agree with all ion experiments on the scheduling.

The proposed continuation of NA49 after this year will be discussed during the next meeting.

12. DISCUSSION ON NA60

The referee described the proposed measurements of dimuons, charm and J/Ψ production. They will explore more carefully the region of phase transition with a new probe (open charm), with improved quality in the low mass region and improved systematics for J/Ψ suppression. No other experiment can and will do these measurements. The detector upgrade from the NA50 set-up is modest but depends on the ALICE chip. More work has to be invested into simulation of the experiment in order to prepare the data analysis. The NA60 programme interferes with the NA48 programme as concerns the available beam time.

The Committee recognizes the unique possibilities of the NA60 experiment to contribute to the understanding of the quark gluon plasma (QGP), in particular through measurements of open charm production and thermal dimuons. Given the importance of further investigations of the QGP, the Committee reiterates its **recommendation** for approval of the ion programme of NA60 with 35 days in 2002 and 2003, pending the availability of the ALICE chip. In addition, a detailed study of the systematic error due to the background subtraction procedure should be presented.

13. DISCUSSION ON P317/CLOUD

The referee explained the goal of the experiment and the changes in the set-up and programme as given in the addendum to the proposal. The requirements on the apparatus seem demanding but feasible and under control. The number of parameters for measurements is rather large and the programme will extend over many years. The experiment is a novel, interdisciplinary enterprise.

The Committee considers the proposal as an interesting way to investigate the suggestion of a possible link between the formation of cloud condensation nuclei and ionizing radiation. It appreciates the improved precision in the experimental design and the strategy of measurements as compared to the original proposal. It considers that the breadth of the experimental programme and the associated time span make CLOUD more a facility than an experiment. However, the Committee considers that the necessity to use the PS as the appropriate ionization facitity is not demonstrated by the proposal.

14. ACCELERATOR SCHEDULE FOR 2001

The Committee **recommends** for approval the proposed schedule for the PS and SPS in the year 2001.

15. A.O.B.

The Committee took note of the document from the MONOLITH collaboration.

The Committee was informed that CosmoLHC will submit a proposal.

The Committee took note of the proposed dates for its meetings in the year 2001:

January, 23-24
March, 20-21
May, 22-23
September, 4-5
October, 30-31

16. DOCUMENTS RECEIVED

OPERA - An appearance experiment to search for $\nu_\mu \leftrightarrow \nu_\tau$ oscillations in the CNGS beam (SPSC 2000-028/P318, LGNS-P25/2000).

Addendum to PS212/DIRAC: First observation of πK atom and its lifetime measurement (SPSC 2000-032/P284 Add. 2).

Additional Information Concerning Future NA49 Programme on Hadronic Physics with Proton and Pion Beams (SPSC 2000-033/P264 Add.6).

Study of the Onset of Deconfiment in Nucleus- Nucleus Collisions at Low SPS Energies (SPSC 2000-035/P264 Add.7).

CLOUD**:** A study of the link between cosmic rays and clouds with a cloud chamber at the CERN PS (SPSC 2000-030/P317 Add.1).

MONOLITH: A Massive Magnetized Iron Detector for Neutrino Oscillation Studies (SPSC 2000-031/M657).

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