CERN/EEC-75/19
7.4.75

M E M O R A N D U M

To: The EEC

From: The Omega Coordinator

Subject: Status of Omega Experimental Programme

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a) Charm search experiment (CERN/EEC-75/11).

The experiment was carried out in the first West Hall run (4.3.75 - 25.3.75). 3.2 million triggers were recorded using incident π^- of 19 GeV/c, triggering on a forward K^- or $\bar{p}$ with $p_y > 0.6$ GeV/c and $3 < p_L < 10$ GeV/c accompanied by 2 or more prongs. About 40% of the triggers were good (i.e. satisfied the trigger requirements and came from the target). The triggering rate was about 10 triggers per 10^5 incident particles. In parallel a 2 prong $\bar{p}p$ or $\bar{K}K$ trigger with $p_y > 0.6$ GeV/c was operated giving 2 triggers per 10^5. The experiment was run with an incident flux of about 1.8×10^5 giving about 10 triggers per pulse after dead time losses.

The analysis of 2% of the data (6 tapes) through pattern recognition and geometry gives the following results:

4 prongs	5243
6 prongs	2115

By requiring momentum balance in p_L and p_T the following number of 4-constraint (no missing neutrals) candidates are

4 prongs	177
6 prongs	118

Requiring in addition energy conservation allows an identification of the particle assignments to be made with the result that for both 4-prongs and 6-prongs about 1/3 of the events are fairly cleanly identified as $\bar{p}p\pi^-p$ or $\bar{p}p\pi^-\pi^+\pi^-p$ while the remaining 2/3 are $K^-K^+\pi^-p$ or $K^-K^+\pi^-\pi^+\pi^-p$

candidates but have a higher background of approximately 50%. Thus in good 4 prongs we expect about 2500 $K^-K^+\pi^-p$ events in the whole sample and in 6 prongs about 2000 $K^-K^+\pi^-\pi^+\pi^-p$ events. The sensitivity for charm events ($\bar{D}\bar{D}^0p$) is estimated to be 1-2 events/nb and the sensitivity of normal events about 5 times lower. Thus the observed numbers are consistent with the expected cross sections of $\sim$ 10 μb for normal events.

No events have been seen in this sample corresponding to associated charm production with masses $\geq$ 2.0 GeV/c^2 with a background of $\lesssim$ 0.1 event.

b) Exotic meson search (CERN/EEC-75/3)

This experiment was successfully tested on the last day of the charm search run (24.3.75), using 12 GeV/c π^- incident on deuterium. A trigger rate of 3.3 per 10^5 π^- was recorded and 20,000 test triggers were written on to tape. These are being analysed and the experiment should be ready to run in the next West Hall period (16.4.75 - 2.5.75). It will be preceded by a 3-day test of a drift chamber, the Cerenkov counter and "beam killers" for the optical chambers.

c) Plans for the final run (4.6.75 - 26.6.75)

There will be about 15½ days effective beam time available in this run. Thereare two existing proposals (K^+-interactions CERN/EEC-73/65, and a study of neutral mesons decaying to $K\bar{K}\pi$ CERN/EEC-75/2) with requests of 12 and 7 days. However it is proposed to extend the charm search in one of the following ways:-

a) If an indication of a signal is seen in the existing data, further data using the same trigger may be requested.

b) A more restrictive trigger is under active study using Monte Carlo programs and will be devleoped using actual data. This would allow higher sensitivity to be reached particularly if the beam killers are successful.

A report will be given on the status of the analysis at the May meeting of the EEC.