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ADDENDUM TO PROPOSAL P134

REQUEST TO MEASURE  $\pi^{\pm}$ ,  $K^{\pm}$  YIELDS IN 400 GeV PROTON COPPER COLLISIONS

Neutrino Beam Users and Experimental Areas Group

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Proposal SPSC/P134 was approved (as experiment NA20) to measure  $\pi^\pm$ ,  $K^\pm$  yields in 400 GeV proton beryllium collisions as the basic requirements for the determination of neutrino spectra in wide band neutrino beams.

Two neutrino collaborations (BEBC and CHARM) involved in the approved beam dump experiments [1] request that NA20 be extended to take data also with a series of copper targets. The analysis of the beam dump data in terms of prompt neutrino fluxes requires subtraction of the conventional neutrino flux arising from pions and kaons produced in the copper dump [2]. This background cannot at present be calculated with the precision required by the future experiments. The following measurements of particle production in copper are necessary to extrapolate particle fluxes and ratios ( $\pi^+/\pi^-$ ,  $K^\pm/\pi^\pm$ ) at production under dump conditions: 10 to 15 points in the  $p$ - $p_T$  plane (e.g. 20, 40, 60, 90, 160 GeV/c secondary momenta at  $p_T = 0, 0.333$  and 0.5 GeV/c) for three target lengths (4, 20 and 50 cm).

The targets should be as thick as possible within the existing target box (3 to 4 cm) such that the measurements include transverse cascade effects inside the lateral acceptance of the beam line. At the lower momenta (20 and 40 GeV/c)  $\pi^+/\pi^-$  ratios will only be measurable by changing repeatedly the beam polarity since the protons are beyond the North Area CEDAR pressure range. The measurements can be done either with 400 or 450 GeV protons according to scheduling possibilities. Extrapolation of the data from one to the other momentum should be safe and could - if necessary - be checked at a few points (at same x-values).

Time schedule. It is difficult to make the copper data taking compatible with other experiments in the same beam line. Therefore they should be taken as soon as possible, i.e. before the other experiments are in their data taking phase. It is therefore suggested that the Cu data are taken in period 1b (June 27-July 6, 1981). In order to speed up these measurements, it is also suggested that both beam lines (H2 and H4) be used simultaneously (with one CEDAR each). In this way most of the Cu data could be available before the beam dump experiments start.

It should be noted that the beryllium data are still not yet taken. In order to keep the overall measurement load for NA20 during 1981 in acceptable limits the number of beryllium data points requested in the proposal could be taken in two sets: 21 points per particle type going in larger steps across the  $p$ - $p_T$  plane could be taken during one SPS period in 1981, and the remaining 14 points at intermediate  $p$ - $p_T$  values during a period in 1982.

#### REFERENCES

- [1] M. Jonker et al., CERN/SPSC/80-31 (P142);  
H. Deden et al., CERN/SPSC 80-34 (P143).
- [2] H. Wachsmuth, CERN/EP 79-125.
- [3] H.W. Atherton et al., CERN yellow report 80-07.