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SUMMARY OF THE RESULTS ON THE EMULSIONS EXPOSED TO THE "NEUTRINO BEAM" WITH AND WITHOUT HORN DURING THE PERIOD 1963

A. Exposures

1) Several emulsions were exposed (one burst of reduced intensity) in the horizontal and vertical plane of the neutrino channel in front of the iron shielding. For the exposure, the ejected beam intensity was reduced by a factor of about 2000 (machine intensity reduced by a factor of 100 and extraction of only 1 of 20 bunches). Figure 1 shows the intensity distribution of charged particles in the "neutrino beam" in front of the iron shielding for negative Horn polarity and for Horn off. The calibration of the ejected beam under these special conditions is quite uncertain, thus only the relative fluxes shown in Fig. 1 are significant.

2) In a high magnetic field of about 180 ± 5kG, several pollicules were exposed in order to evaluate the momentum distribution of the incoming beam before the iron shielding. Iridium was used as target. Different stacks were exposed, for both polarities of the Horn as well as for the Horn off.

The intensity was reduced as for 1); the coil was placed on the axis of the beam. Results are given in Section B.

3) At different depths of the iron shielding (150 to 400 cm) emulsions were exposed in order to estimate the intensity of the muons. The plates were exposed to 3 bursts of full intensity. Copper was used as target. Results are given in Section C.

B. Momentum distribution

Figure 2 shows the angular distribution of the "neutrino beam" at the entrance of the emulsions in the coil. In Fig. 3 is given the momentum distribution for negative and positive focusing of the Horn as measured by angular deflection. In Fig. 4 is given the momentum distribution with Horn off.

Table 1 shows, for different momentum ranges, the percentage of particles with Horn (positive and negative focusing) as well as for Horn off. The momentum was determined not only by angular deflection of the beam, but also in some cases, by direct measurement of curvature on individual tracks. Because these two methods give compatible results, the data obtained by the two methods are combined in table 1. It should be remembered that all the measurements are done on the beam axis, and for the curvature measurements, only tracks of particles within $\pm$ 30 of the axis are accepted.

However, both types of measurement indicate that quite a large fraction of the beam has (positive) momentum which is on the order of the momentum of the protons incident on the target.

Table 1

	Percentage of Beam in 3 momentum bands (measured on beam axis, 0° - line)		
	2-10 GeV/c $+$	2-10 GeV/c $-$	24 ± 4 GeV/c $\pm$
Horn off	20 %	13 %	51 %
Horn +	26 %	5 %	41 %
Horn -	9 %	21 %	36 %

C. Percentage of muons at different depths of the iron

Figure 5 shows the track density as measured at different depths of iron with Horn focusing and Horn off. In this figure is included the attenuation of the strongly-interacting particles as calculated from the measured star density. Figure 6 shows the star density for stars with charged primaries within $\pm 5^{\circ}$ of the axial direction, as well as for stars without primaries in the axial direction.

Table 2 indicates the percentage of particles more than $\pm 5^{o}$ from the direction of the beam axis, and the percentage of neutral stars with more than 5 prongs. (For all the stars observed with primary in the axial direction N_{TOTAL} was more than 5).

Table 2

Depth of iron	% of tracks outside the beam axis $\pm 5^{o}$	% of n stars with $N_{TOTAL} > 5$
390 cm	18 %	-
340 cm	18 %	-
290 cm	9 %	-
240 cm	11 %	(27 ± 6) %
190 cm	6 %	(50 ± 13) %
140 cm	-	(40 ± 20) %

H.H. Bingham
L. Hoffmann
M. Nikolić