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A search for fractionally charged $Q=1/3$ ($2/3$) particles produced in (anti)neutrino-nucleus and in proton-nucleus collisions was performed using the scintillator system of the CHARM neutrino detector at the CERN SPS.

Events with low ionizing tracks have been searched for in (anti)neutrino induced events by selecting different event-topologies:

1. the quark is produced and detected in the CHARM detector. It is allowed to have visible secondary interactions (re-interaction case);
2. the quark is produced in the 1000 tons CDHS detector located immediately in front of the CHARM apparatus and is detected by the CHARM scintillator system. To escape from CDHS detector fractionally charged particles must on average traverse an amount of material corresponding to one interaction length for sigma-inelastic = 175 micro-barns.

No quark candidate has been found in this search and corresponding upper limits for quark production have been computed.

The result for case 1 is shown in Fig. 1 and 2 for $Q=1/3$ and $Q=2/3$ respectively. The two bands correspond Q masses of 1 and 10 GeV respectively and they indicate the 90% CL upper limits for the re-interaction case. The lower and upper limits of these bands correspond to different production models.

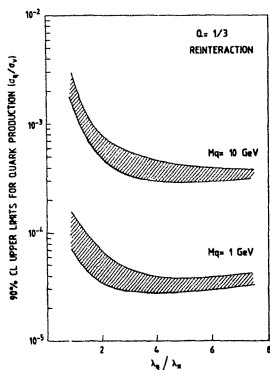


Fig. 1

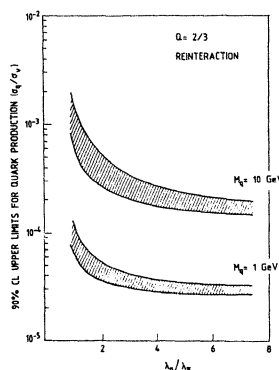


Fig. 2

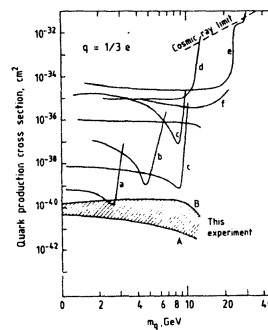


Fig. 3

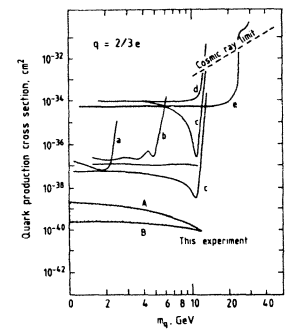


Fig. 4

The 90% CL upper limits for the production cross section of type 2 fractionally charged particles is given in Table 1.

TABLE 1

BEAM	CHARGE	90% CL UPPER LIMIT
NEUTRINO	1/3	$1.0 \cdot 10^{-5}$
	2/3	$2.7 \cdot 10^{-5}$
ANTINEUTRINO	1/3	$1.7 \cdot 10^{-5}$
	2/3	$3.0 \cdot 10^{-5}$

Fractionally charged particles were also searched for in p-Cu collisions using the experimental data collected in the 1982 beam dump exposure. The fractionally charged particle has to penetrate a muon shield corresponding to one interaction length for sigma-inelastic = 10 micro-barns before it is detected in the CHARM apparatus. The corresponding E-loss in the shield is 45 and 180 GeV for charge 1/3 and 2/3 respectively. No candidate for fractionally charged particle was detected in the CHARM apparatus. The corresponding 90% CL upper limits for quark production are shown in Fig. 3 and 4 for $Q=1/3$ and $Q=2/3$ respectively. The curves A and B refer to two different production models. Limits obtained in conventional experiments are also shown.