1. INTRODUCTION

The main hardware ingredients of the NA25 experiment are a heavy-liquid bubble chamber equipped for holography (HOBC) and a muon detector.

In HOBC the charm decays should be detected with a much higher efficiency than in more classical bubble chambers, mainly because of the increased spatial resolution. An improved pattern recognition possibility does not, however, depend only on the resolution, but also on the bubble density. The first holographic test with a bubble chamber filled with freon showed that high bubble densities (about 300 bubbles per centimetre) could be obtained.

With a one-muon trigger, the charm signal-to-background ratio is improved by a factor of about 15, which results in a rather small number of holograms to scan.

A sample of 75 holograms has been scanned on the CERN holographic scanning and measuring machine (HOLMES). The first, very preliminary results are discussed below.

The bubble chamber HOBC, the holographic set-up, and the scanning table HOLMES are described in detail elsewhere in this volume.

2. THE FIRST CHARM CANDIDATES

In a heavy liquid the topology alone is not a sufficient signature of a decay, as a secondary interaction with a neutron can give rise to the same kind of topology. However, the secondary activities which show clear evaporation tracks (slow protons) are uniquely identified as secondary interactions. For a charm candidate we demand two secondary activities, neither of them showing evaporation tracks. Up to now, two events out of thirty-five interactions seen in the bubble chamber fulfil this criterion. All four secondary activities are compatible with particle decays. The so-called transverse decay length is shown and described in Fig. 1. Both events fulfill the selection criterion used in the NA16 experiment, namely that the transverse decay length should be inferior to 0.6 mm.

In Fig. 2 is shown a photograph of a part of the event containing the charm candidates. The neutral decay into four charged particles is seen, but the charged particle decay into three charged particles is outside the photograph in the very forward direction.

Even though these events look very much like charm events, more of them have to be studied in great detail before one can be completely sure of their origin.

3. CONCLUSIONS

We have observed two charm candidates in HOBC. It is demonstrated that small transverse decay lengths can be detected under realistic data-taking and scanning conditions using the holographic technique.
REFERENCE


\[ \theta_p \quad \text{Production angle} \]
\[ L \quad \text{Decay length} \]
\[ L\sin\theta_p \quad \text{Transverse decay length} \]

Fig. 1
Fig. 2

Neutral decay to 4 charged particles

Primary vertex

1 mm