

Request for Extension

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A PROPOSAL TO STUDY MUON PAIR PRODUCTION IN π^{\pm} INTERACTIONS

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SLAC Proposal 123-B
December 1976

A PROPOSAL TO SEARCH FOR NARROW MASS STATES ASSOCIATED WITH
SINGLE MUON PRODUCTION IN π^{\pm} INTERACTIONS

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We request an extension of 300 hours at 180 pps.
This will allow us to double the number of dimuon
pairs we will obtain.

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on top.

We are requesting an additional 300 hours of data taking at 180pps for experiments E123/A and E123/B. The request is principally for E123/A, the study of muon pair production in the low mass region. As in the completed data taking, production of forward going muon pairs will be studied from interactions of 16GeV π^+ and π^- beams with a liquid hydrogen target in the streamer chamber. The requested time of 300 hours will allow us to double the number of events of our exposure.

During data taking on E123A we will also increase the number of events for E123/B, our narrow mass search. We will restrict our trigger in this experiment to single muons with a P_{\perp} greater than 300 MeV/c.

Status Report

During the May-June running period we obtained an exposure of about $2.2 \times 10^7 \pi p$ interactions in 200 hours of running. In the same length of run in October and November we doubled our interaction rate and now have a total of $6.6 \times 10^7 \pi p$ interactions.

In a previous request for extension we had proposed that a portion of our events be obtained with a deuterium target to enhance our data rate. Our reason for doing this was that the number of incident pions per pulse is limited in part by deterioration of picture quality due to delta rays. The number of delta rays from hydrogen and deuterium would be the same while the interaction rate in deuterium would be doubled. In those events in which there is a single missing neutral it is possible to make one constraint fits when a hydrogen target is used while this is not possible with deuterium. It will be of great interest to examine our data sample for such events as

$$\pi^- p \rightarrow \eta \pi^- p \rightarrow \mu^+ \mu^- \gamma$$

$$\pi^- p \rightarrow \omega \pi^- p \rightarrow \mu^+ \mu^- \gamma$$

$$\pi^+ p \rightarrow \eta \pi^+ p \rightarrow \mu^+ \mu^- \gamma$$

$$\pi^+ p \rightarrow \omega \pi^+ p \rightarrow \mu^+ \mu^- \gamma$$

Our interest in a search for such decay modes as a source of the dimuon pairs leads us to restricting our data taking to hydrogen.

Our experiment is sensitive to forward going muon pairs in the x region between 0.25 and 1. We are finding pairs at the level of 10^{-5} in this region. We are presently measuring frames with single events present which comprise about half of our total. It is clear, however, that the double events frames can be measured. This will bring us a total of 600 dimuon pairs from the data taking already completed and the 300 hours we are requesting will allow us to double this number.