

LIKE SIGN DIMUONS AT THE TEVATRON

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This is a brief note to point out that there is a piece of interesting physics that can be done in the bubble chamber at the Tevatron which is not mentioned specifically in our proposal 638. It is to determine the strange particle content of like sign dilepton events. Enclosed is a graph of the results of all the counter experiments as summarized in a recent CHARM preprint. These experiments are in fairly good agreement and about a factor 30 higher than the QCD prediction. Theorists are apparently unable to make theory agree with this result.

The strange particle content in like sign dilepton events should be twice as large as for unlike sign dilepton events if the gluon- $c\bar{c}$ mechanism is correct. Counter experiments cannot determine this important property. Only the bubble chamber can do this. At the Tevatron the dilepton production rate is about a factor two higher than at 400 GeV. This will help the background problem which has so far defeated bubble chamber attempts to see like sign dileptons.

If, in addition, we get an exposure which results in 70,000 charged current events as requested in proposal 638, then we would have a like sign dilepton signal of 50 events for each of $\mu\mu$ and μe . Fred Harris concurs that with this kind of signal we have at least a sporting chance of seeing the signal above background. It appears that at least some theorists believe that the experiments are all wrong. If theory is correct we would get a signal of 1-2 events. If we do see a 50 event signal with enhanced strange particle content, then current theoretical prejudice against the data is laid to rest

and we can send the theorists back to their drawing boards.

In any case this is an important problem that has arisen and the bubble chamber at the Tevatron has a good chance to help resolve it. Sandip Pakvasa concurs with this and that the strange particle content of the like sign dilepton events is indeed vital information. Fred Harris points out that we will probably find the like sign μe events more useful due to lower background. In order for the bubble chamber to make a contribution in this area it is crucial that the exposure should amount to the full 70,000 charged current events requested in the proposal.

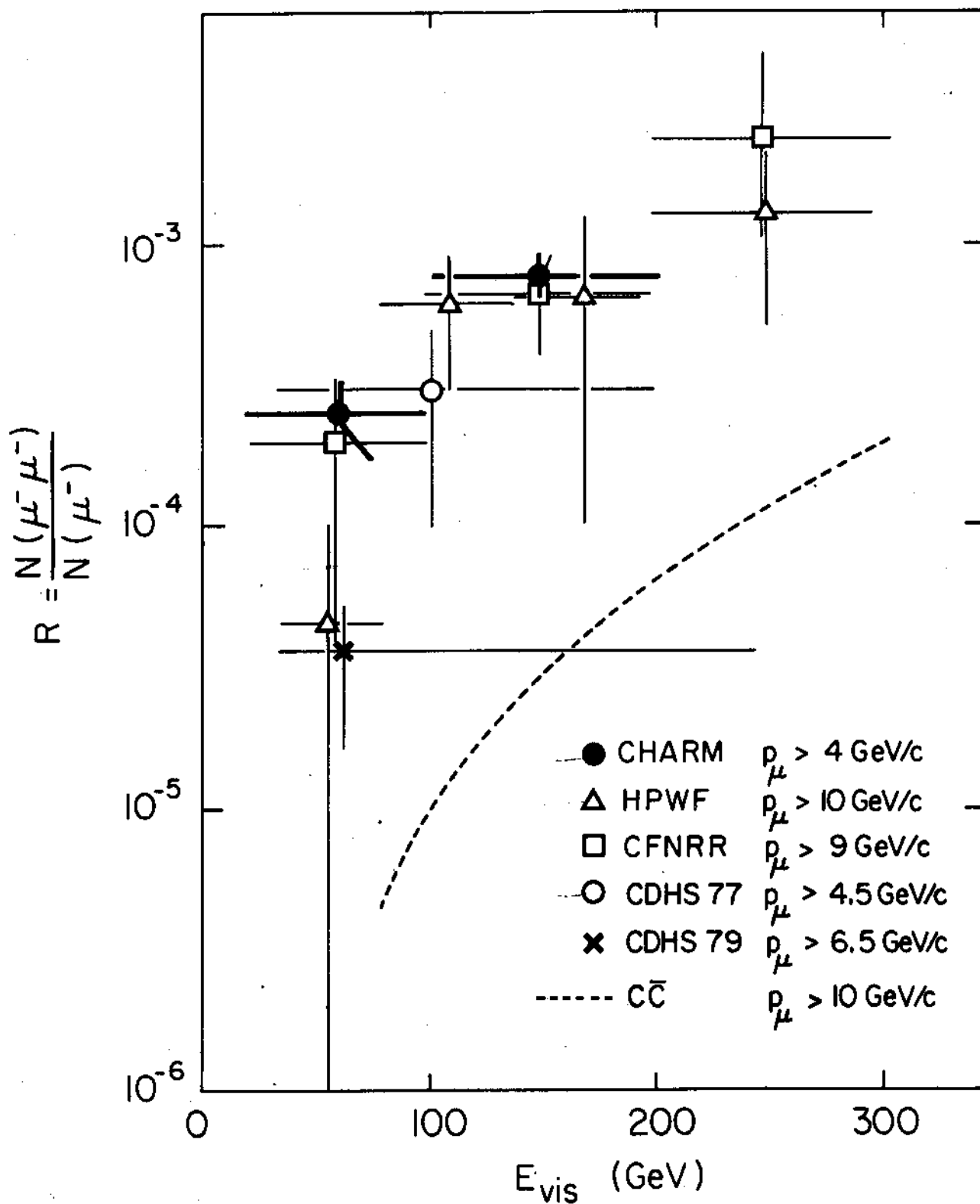


Fig. 4