

A HIGH-STATISTICS STUDY OF DIMUON PRODUCTION
BY 400 GeV/c PROTONS

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ABSTRACT

The reaction $p+W \rightarrow \mu^+ \mu^- + X$ has been measured in a high-statistics experiment using a 400 GeV/c proton beam, a magnetized beam dump, and a wide-acceptance detector. Abbreviated results and a comparison with the Drell-Yan Model are presented.

ABBREVIATED RESULTS

For explanations and details, see reference 1.

- 1) The dimuon mass spectrum was measured up to ~ 18 GeV, with the Ψ -family and the T-family clearly seen. No significant structure above the T is present.
- 2) The T-family is more centrally produced than the continuum, falling off more rapidly as $X_F \rightarrow 1$.
- 3) The $\langle p_t \rangle$ is independent of X_F , contradicting a simplistic t quark model which predicts a significant reduction in $\langle p_t \rangle$ as $X_F \rightarrow 1$.
- 4) The Drell-Yan Model predicts a relationship between the shape of the mass spectrum at $X_F = 0$ and the shape of the X_F distribution at fixed mass. Using the mass spectrum to fix the model parameters, we compare our X_F distribution with the model's prediction in Figure 1. The agreement is excellent, considering that there are no free parameters in the comparison. The Symmetric/Asymmetric Sea difference has to do with details of the tungsten nucleus which we cannot resolve.

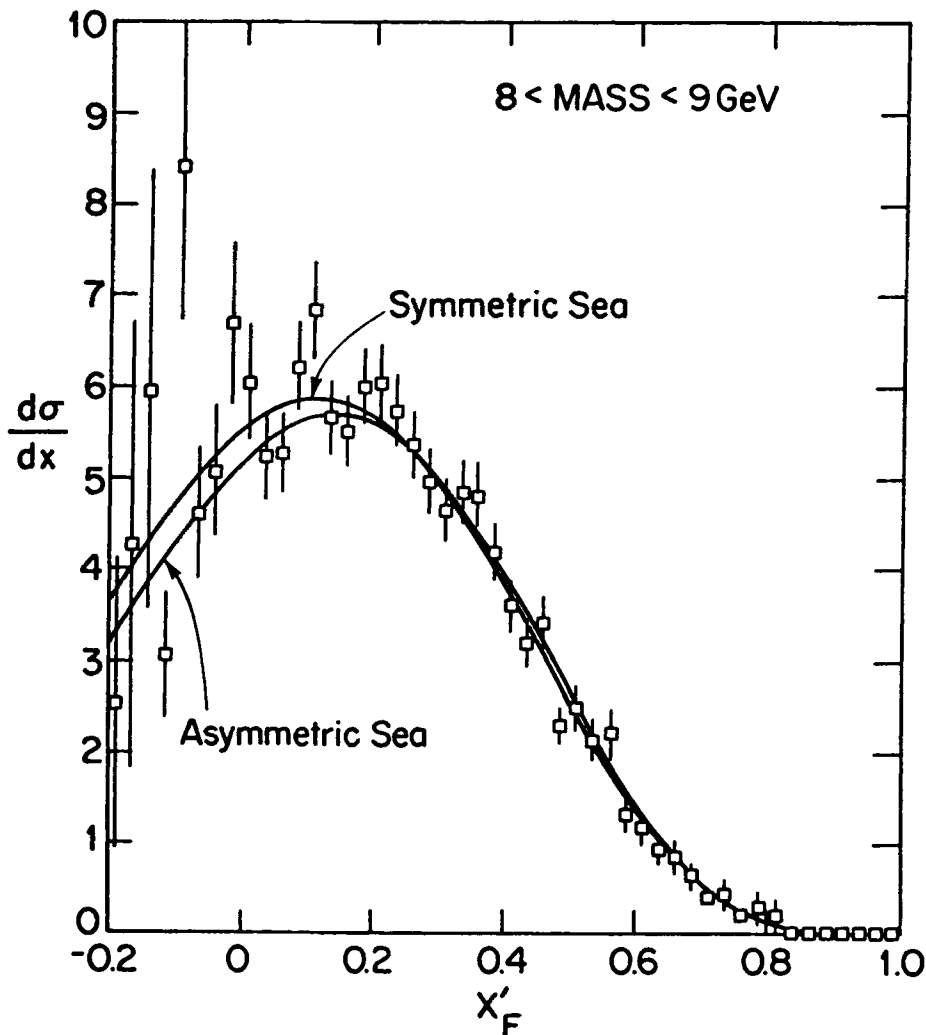


Fig. 1. Cross-section as a function of X'_F for dimuon masses between 8 and 9 GeV. The curves are Drell-Yan Model predictions with model parameters determined by the mass spectrum.

REFERENCES

1. W.P. Oliver, *et al*, Proc. 3rd Intl. Conf. on New Results in High Energy Physics, Vanderbilt, p 93. AIP Conf. Proc. No. 45 (1978).
 P.M. Mockett, *et al*, Proc. 19th Intl. Conf. on High Energy Physics, Tokyo, p 187 (1978).
 H.R. Gustafson, *et al*, paper submitted to this conference. Univ. of Michigan preprint UM HE 80-23.