PRELIMINARY RESULTS FROM THE SECOND PHASE OF THE WA91 EXPERIMENT

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First results are presented from data taken during the 1994 run of the WA91 experiment. In the $\pi^+\pi^-$channel, a substantial increase in the amount of $\rho(770)$ production is observed when compared with the 1992 data; a similar effect is observed in the K^+K^- channel for $f_2'(1525)$ signal. These effects are attributed to the new trigger in the 1994 run.

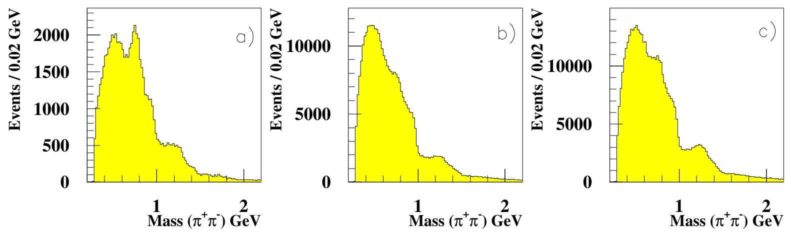

Figure 1: Evolution of DPE with $\sqrt{s}$. a) shows $\pi^+\pi^-$mass spectrum at $\sqrt{s}$ of 12.7 GeV, b) at $\sqrt{s}$ of 23.8 GeV, and c) the 1994 data at $\sqrt{s}$ of 28.0 GeV.

1 Introduction

The WA91 experiment at the CERN Ω Spectrometer is designed to search for non-q$\bar{\text{q}}$ mesonic states produced by Double Pomeron Exchange (DPE) in the central reaction

$$\text{pp} \rightarrow \text{p}_f X^0 \text{p}_s, \tag{1}$$

where X^0 represents the central system, and the subscripts f and s indicate the fastest and slowest particles in the laboratory frame respectively. The data discussed in this paper were taken during the 1994 run of the experiment, which, due to serious problems with the SPS, took only $\sim 25\%$ of the predicted number of interactions. However, in spite of this, enough data were taken to allow analysis to proceed. Details of the layout and trigger conditions have been given in previous publications [1]. An important difference between the 1992 and 1994 runs of the WA91 experiment is that, in the latter, new triggers were added. Figure 1 shows the evolution of the mass spectrum with energy [2]. As the centre-of-mass energy, $\sqrt{s}$, increases from 12.7 GeV to 23.8 GeV, the production of $\rho^0(770)$ decreases. Since this is produced by Reggeon-Reggeon exchange, this suggests that the DPE cross section dominates at high $\sqrt{s}$. However, in the 1994 $\sqrt{s} = 28.0$ GeV data, we see excess production of the $\rho^0(770)$. A similar effect is seen in the K^+K^- data from 1994, where there appears to be an excess of $\text{f}'_2(1525)$ production.

2 Trigger Type Analysis of $\pi^+\pi^-$and K^+K^- Data

We define the *trigger type* of a reaction in the following way. In any particular reaction, the slow proton may travel to the left of the beam direction and the fast proton to the right, and *vice versa*, or alternatively, both the slow proton and the fast proton may go in the same direction. In the former two cases, further trigger conditions are applied to ensure that the event is not

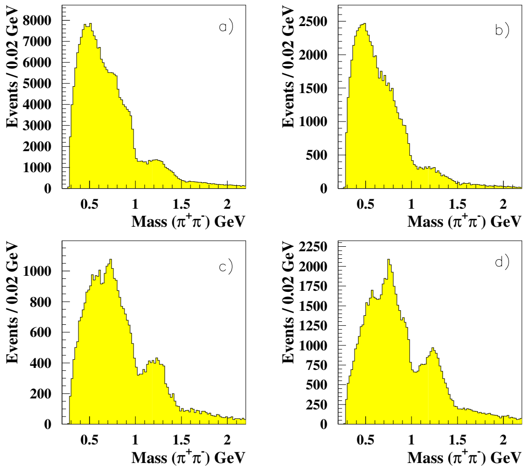

Figure 2: $\pi^+\pi^-$Mass Spectra for given trigger type. a) LL, b) RR, c) RL, d) LR

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elastic scattering (this cannot be true for the latter two cases since momentum could not be balanced). The four trigger classes may be labelled left-right (LR), right-left(RL), left-left (LL) and right-right (RR), where the first label refers to the direction of the slow proton, and the second to the direction of the fast proton, relative to the beam direction. The low energy data consists of LL triggers only; the 1994 data consists of a mixture of all four trigger types. Figure 2 shows the $\pi^+\pi^-$mass spectra when the events are selected by trigger type. We observe that the $\rho^0(770)$ signal is dominant in the RL and LR triggers, while the LL and RR triggers are consistent with an extrapolation of the amount of $\rho^0(770)$ production from the low energy data. This may be due to detector effects which are sensitive to the trigger type, or to a physical effect whereby the LR and RL triggers select more events from the tail of the diffractive background, and the LL and RR triggers select more of the central events. These effects require further investigation. Similar effects to those observed in the $\pi^+\pi^-$channel are seen also in the K^+K^- channel. Here, we observe a marked enhancement in the $f_2'(1525)$ signal in the RL and LR triggers, accompanied by a decrease in a threshold enhancement effect seen in the LL and RR triggers. Again, this requires further investigation.

References

1. F. Antinori *et al.*, *Nuovo Cimento* **107**, 1857-1865 (1991).
2. T.A. Armstrong *et al.*, *Z. Phys.* C **51**, 351-364 (1991).