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Study of wD^{++} and roD^{++} Production at 3.7 GeV/c

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Elementary Particles and
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Study of $\omega^0\Delta^{++}$ and $\rho^0\Delta^{++}$ Production at 3.7 GeV/c.*

G. S. ABRAMS, W. R. BUTLER, D. G. COYNE, G. GOLDHABER, B. H. HALL, J. MACNAUGHTON, G. H. TRILLING, Lawrence Radiation Laboratory, Berkeley.--A study of the reactions $\pi^+p \rightarrow p\pi^+\pi^+\pi^-$ (15 000 events) and $\pi^+p \rightarrow p\pi^+\pi^+\pi^-\pi^0$ (16 000 events) has been made using a separated π^+ beam at the Bevatron with momenta spanning the interval 3.7-4.0 GeV/c. The exposure in the LRL 72-inch hydrogen bubble chamber of 180 000 pictures has yielded 3000 $\rho^0\Delta^{++}$ and 2000 $\omega^0\Delta^{++}$ events. We find that $\rho_{00}(\frac{d\sigma}{dt})$ dominates both reaction cross sections, implying for the $\omega^0\Delta^{++}$ reaction the importance of amplitudes other than those expected from the leading Regge singularity (for the $\omega^0\Delta^{++}$ reaction the ρ trajectory). The decay distributions as functions of t' ($= t - t_{\min}$) are shown to be rich in structure; e.g., dips in $\rho_{00}(\frac{d\sigma}{dt})$ near $t' = 0$ and $t' = -0.18$ (GeV/c)² are found for the $\omega^0\Delta^{++}$ reaction, and a dip in $\sigma_1^+ = (\rho_{1,1} + \rho_{1,-1})/2$ near $t' = -0.2$ appears in the $\rho^0\Delta^{++}$ reaction. Accommodation of our results within various Regge models will be presented.

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¹G. Goldhaber et al., Phys. Rev. Letters 23, 1351 (1969).

Submitted by

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Abstract c.2