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PHYSICS I
ELECTRONICS EXPERIMENTS COMMITTEE

Letter of Intention

LARGE ANGLE-SCATTERING AT ≈ 7 GeV/c

by

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Besides other interesting features, our previous experiment at 5 GeV/c (S91) has shown:

- the existence of a "forbidden" backward peak in K^-p and good evidence for a similar peak in $\bar{p}p$.
- the presence of a structure at $t \approx -5 \text{ GeV}^2$ in $\pi^\pm p$ scattering and possibly at $t \approx -6 \text{ GeV}^2$ in π^-p .

Concerning the K^-p backward peak, there is some evidence, from the energy dependence of $(d\sigma/du)_{u=0}$, that we are concerned with the onset of a new mechanism such as the double Regge exchange suggested by Michael and others. Indeed, our point at 5 GeV/c is hardly compatible with a continuation of the exponential decrease S^{-9} observed at lower energy. The knowledge of the energy dependence of backward K^-p in the neighbourhood of 5 GeV/c is clearly of a crucial interest.

In $\pi^\pm p$ scattering the structures at $t \approx -0.6$ and -2.8 GeV^2 are now firmly established. The dip observed in both π^+p and π^-p at $t \approx -4.8 \text{ GeV}^2$ ($u \approx -3.4 \text{ GeV}^2$) as well as the more doubtful dip in π^-p at $t \approx -6 \text{ GeV}^2$ ($u \approx -2 \text{ GeV}^2$) call for more data, in particular one should try to determine whether they are t or u independent structures.

For these reasons, we request a prolongation of our experiment by a 6 week run after the next shut-down, in the d30 beam tuned on negative particles around 7 GeV/c.

The equipment will essentially be the same used in our previous experiments ($\pm 5 \text{ GeV/c}$ 1970 and $+ 10 \text{ GeV/c}$ presently under way). Minor modifications however are considered in order to cope with the reduction of the cross-sections as the incident energy is increased and to improve trigger efficiency.