



CM-P00073733

PROPOSAL BY THE BIRMINGHAM, IMP. COLLEGE AND OXFORD GROUPS

FOR A MEDIUM ENERGY π^- and π^+ BEAM

WITH THE ECOLE POLYTECHNIQUE 80 cm H_2 B C AT CERN.

The bubble chamber film analysis groups of Birmingham, Imperial College and Oxford, have recently completed a study of interactions of 16 GeV π^- particles in the 30 cm H_2 bubble chamber.

1. The experience gained in this work has lead to the conclusions outlined below, in which an experiment is proposed to study peripheral interactions i.e. π^+ - P interactions where one virtual pion is exchanged between the pion and the proton. In particular we hope to:
 - a) Check the dependence of $\frac{\partial \sigma}{\partial \Delta^2}$ on Δ^2 (four momentum transfer squared) for a fixed value of the masses of the $\pi\pi$ system, ($W_{\pi\pi}$) and of the πP system ($W_{\pi p}$). Determine the relative frequency of production of a $T_{3/2}\pi$ - nucleon state with respect to that of a single nucleon (ref. F. Salzman and G. Salzman to be published in Phys. Rev. Lett.).
 - b) Compare the reactions $\pi^- P \rightarrow \pi^- \pi^+ P$ with $\pi^+ P \rightarrow \pi^+ \pi^- P$ to determine the isospin dependence of $\sigma_{\pi\pi}$.
 - c) Examine the $Q_{\pi\pi}$ distribution for possible resonant states of the $\pi\pi$ system.
 - d) Use the Drell equation (Phys. Rev. Lett. 5, 342, 1960) to determine the $\sigma_{\pi\pi}$ energy dependence.
 - e) Derive the $\sigma_{\pi\pi}$ dependence on E using a Chew and Low extrapolation procedure; (We would like to point out here that except for point 1 b), all the others can be studied with either π^- or π^+ primaries).

2. In view of the above aims we propose to study those interactions which satisfy the following criteria:

- a) $\Delta^2 \leq 10 \mu_n^2$
- b) Charged multiplicity 2 with an associated neutron or charged multiplicity 4 (one of the visible prongs must be an identified proton) with one or no neutral particles.



