



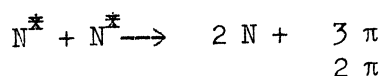
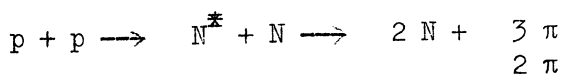
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EXPERIMENTAL PROPOSAL (4.2 GeV/c protons in HBC)

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We intend to study pion production (two or more) in proton-proton interactions at 3,2 GeV kinetic energy. The pictures needed are either 40 k, if taken with the 81 cm HBC, or 25 k, if taken with the 150 cm HBC.

The reactions we want to study are mainly:



where N^* may be any excited state of the nucleon of mass up to 1920 MeV (see (1) for references and symbols).

We want to study:

- 1) Cross section (if not negligible in this case) for the production of N_{13}^* , Z_1 , N_{15}^* , N_{11}^* , N_{37}^* , Z_3 .
- 2) Branching ratios for the decays of the same resonant states.
- 3) Influence of the peripheral mechanism in the production.
- 4) Production of meson resonances.
- 5) Since we start from a + parity state, an analysis of the angular distribution may give an indication of the parity if the states Z_3 and N_{37}^* are copiously produced.

The required number of photographs is evaluated on the basis of the measurements of ref. (2), where the same experiment was performed at 2,85 GeV.

Our estimate is that the number of useful events should be of the order of 0,2 events/picture in the 81 cm and of 0,4 in the 150 m HBC.

The experiment is possible only if the pion contamination is not too high, because we expect that bubble counting should be useful only for the secondary particles produced backward in the C.M.S.

Even with some loss of statistics caused by ambiguous events we should be able to improve the statistics of a factor of 4 with respect to ref.(2), while working above the threshold for Z_3 and N_{37}^* production, which was not attained in ref. (2).

References

- 1) Matts Roos - Elementary Particles and Resonant States - Revs. Mod. Phys. 35-2, p.315 (1963)
- 2) Hart et al. - P.R. 126, 747 (1962)