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M e m o r a n d u m

To : Professors W. Paul and P. Preiswerk, members of the NRPC and EEC PS co-ordinator, Dr. G.L. Munday, Dr. G. Petrucci, Dr. P. Standley and Dr. A.M. Wetherell.

From : M. Borghini, G. Coignet, L. Dick, L. di Lolla, P. Macq, A. Michalowicz and J.C. Olivier.

Subject : Request for a high intensity beam of pions, kaons and protons of both signs.

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In the momentum range from 5 to 13 GeV/c, the d_{23} beam can only yield negative particles^{1)*)}. On the other hand, the theoretical predictions²⁾ on elastic π -p scattering on polarized target must be checked by experimental data obtained with particles of both signs.

We require therefore a beam of high intensity and both signs:

- a) to extend to positive pions the measurements we are performing;
- b) to measure simultaneously and with the same geometry the polarization parameter for K^{\pm} , p^{\pm} and \bar{p} , which naturally will be present in the beam;
- c) to investigate spin effects in π -p scattering at higher [$\sim 1(\text{GeV}/c)^2$] momentum transfer.

The next step should be the measurement in the 5 to 15 GeV region of the Wolfenstein parameters (D,Cnn) in p-p elastic scattering and (A,R) in hadron-p elastic scattering on a target polarized in the scattering plane when such a target will be operative. A very intense beam ($\sim 10^6$ π /burst) is also imperative in this case.

*) In order to obtain a positive beam of ≈ 13 GeV/c, two special bending magnets, with a total excitation power of ~ 240 kW, should be built. The cost of these two magnets would be $\sim 20,000$ Sw. Fr. and their delivery time about five months. Moreover, the d_{23} line should be completely repositioned in the South Hall. Even in this case, however, the beam would contain only $\sim 5000 \pi^{\pm}/10^{11}$ protons on target 1, and 10 times more protons.

No solution exists to obtain positive particles from target 1 with momentum less than 13 GeV/c for the actual PS configuration.

In conclusion, the best solution to satisfy our requirements seems to be a secondary beam produced at small angle by the slow ejected beam in the East Area, with an external target.

REFERENCES

- 1) Memorandum 23 November 1965 from L. Dick et al.; G. Petrucci, **private communication.**
- 2) R.J.N. Phillips and W. Rarita, Phys.Rev. 139B, 1336 (1965); UCRL - 16185 (1965); H.G. Dosch and A. Fridman, Heidelberg University report, May 1965.
- 3) Proposal to measure possible spin dependent effects in (p-p) scattering at high energies using a polarized target, M. Borghini et al., November 1964.