

MEMORANDUM

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NP/Memo/386

7 November, 1962

To : Professor P. Preiswerk
NP Division Leader

From : A. M. Wetherell

Re : Experimental Programme - Period I, 1963

Experiment

The experiment currently in preparation is a study of p-p scattering at angles between 2 and 20 mrad and at 3-4 energies between ~ 8 and 24 Gev, using the scattered proton beam and sonic spark chambers. The physics which it is hoped will emerge from the measurements may be listed briefly as follows.

- 1) A verification and establishment at a higher confidence level of the shrinking of the diffraction peak.
- 2) An estimate of the contribution of the real part of the scattering amplitude from the very small angle behaviour.
- 3) Observation of the excitation of the pion-nucleon resonances with a view to a Regge pole analysis of the inelastic scattering.

The experiment is such as to test rigorously the sonic spark chamber system for a simple scattering events.

As the experimental technique is new, machine time for testing in the c_5 beam has been given in December. It is hoped to obtain experimental running time in January 1963 if the tests are successful, or otherwise time for extension of the tests. It is estimated that a total of 60 shifts of machine time is needed to take data at 4 energies.

In view of the difficulty of the experiment and of the importance of developing the technique, it is expected that these measurements will continue to form the central theme of our programme in Period I, 1963.

A high-energy proton beam and running time in it are, therefore, requested in this period.

Proton Beam

The status of the high-energy proton beam next year, relative to the scattering programme, has been considered in NP/Memo/361, 17 September, 1962. Further discussions indicate the merit of developing the scattered proton beam in the East Experimental Area and abandoning the present c_5 scheme during the time of the neutrino experiments. Various schemes and layouts for accommodating a scattered proton beam, together with the c_2 beam (British bubble chamber) and the proposed muon beam, are being studied by the MPS division.

Expenditure to provide for the use of a hydrogen target and for the normal services would of course be needed for an East Area project.