EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

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MEMORANDUM

To : The EEC

From : J.V. Allaby, G. Bellettini, G. Cocconi, A.N. Diddens, G. Matthiae, E. Sacharidis, A. Silverman, A.M. Wetherell

Subject : Letter of Intention

I. Intention for the present version of the slow extracted beam (e_2)

1) In a secondary beam, originating from an H_2 target at a production angle of 25 mr, a magnetic spectrometer has been set up with the characteristics $\Delta\omega = 10^{-5}$ sr, $\Delta p/p = 0.2\%$. Threshold Cerenkov counters (type Vivargent) and the DISC differential Counter (Meunier, Spighel, Stroot) are included. The aim of the experiment is to study the beam and background characteristics and to investigate production processes near the upper end of the momentum spectrum.

Examples : $pp \rightarrow pp$; $pp \rightarrow pp^*$, $pp \rightarrow \pi(NN)$;
$pp \rightarrow D(\text{boson})$; $pp \rightarrow K(N\Lambda)$.

It is in particular hoped to find evidence for resonant di-baryon systems.

2) When the above experiment is in a running state, we intend to make an extension to wide angle pp scattering ($\approx 75^\circ$ CM) in order to investigate in detail the angular distribution. The aim of this experiment is to learn something about the background at large angles, and search for oscillations in the angular distribution as predicted by Ericson, for a statistical process.

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3) We are investigating the possibility of performing a W (= intermediate vector boson of weak interactions) experiment along the lines of the recent Argonne and Brookhaven experiments. This involves a search for high momentum muons, emerging at large angles and originating from the decay of a W.

A lay-out has been discussed that has a target in the slow extracted beam in the machine target area and a range telescope on the East Hall. The W masses that can be explored lie in the region of 3 to 5 GeV.

II. Intentions for the future version of the slow extracted beam (straight section 62)

For the definite version of the slow extracted beam, to be built during the next shut down, the following lay-outs and experiments are under consideration.

1) A magnet set-up to bend the primary beam through various angles onto a Hydrogen target, followed by a fixed spectrometer, that, therefore, can look at a continuous range of production angles of secondary particles, for instance from 10 to 100 mr. This set-up can be used for the following experiments :

   a) A search for a second diffraction maximum in elastic pp scattering, as has been observed in π-p scattering.

   b) Measurement of angular distributions of 2 body processes that have been found interesting in the present range of experiments, e.g. pp $\rightarrow \pi$D.

   c) A study of pp $\rightarrow$ pp*, where p* is the 1400 MeV resonance found recently, with a second spectrometer measuring the p* decay with the aim of finding the decay modes and spin assignment of the 1400 MeV state (P_{11}?).

2) A search for the process $p + p \rightarrow d + W^+$ using a magnetic spectrometer and counter hodoscopes. This experiment would be sensitive to W masses in the region of 2 to 5 GeV.

3) The use of a denterium target for a series of studies similar to that presented under 1), but for states with T = o.