ADDENDUM TO THE PROJECT OF e_7 BEAM LAYOUT

The layout described in the NOTE/EP 69-30 (2.9.69) had to be altered due to the following requirements, which came up since the beginning of the shut-down.

1. In ss 64 space has to be provided for the HT connection for the future electrostatic septum.

2. Additional correction magnets (MTC 6 and 7) provide the possibility to correct small angular deviations from the geometrical ejection line. Variations up to 1 mr were observed during the last runs of slow ejection 62.

3. For emittance measurements a separate branch was asked for by the Machine Study Group, in order to be able to use a beam line further down-stream as the H_2 target containing no windows and material.

These requirements had to be incorporated in the existing layout without affecting the e_7 line behind the H_2 target and without modifying the s_5 experiment.

The layout proposed and adopted is sketched in Fig. 1. In consequence :

$\underline{e_7\ beam}$: The layout in front of the H_2 target is altered; it affects the optics of e_7. However, the requirements on the beam e_7 can still be met.

The divergence of the e_7 beam at the H_2-target is about 0.5 mr in the horizontal plane and 1.7 mr in the vertical plane. The image at the H_2 target is increased by a factor 1.2 and 2 in the horizontal and vertical planes, recpectively, if

compared with the p_3 target. The image at the p_4/p_5 is decreased by a factor 1.5 in both planes compared to the e_5 layout.

The instrumentation (hodoscope, TV 3 , miniscanner and IBS) planned to position in the "test zone" is displaced in the "test branch".

Test-Branch : The test beam is obtained by changing the polarity and current in M 211 (corresponding to the angles + 32.25 and - 37.75), which takes into account operation at 26.9 GeV/c. However, the imposed layout of s_5 implies production angle changes from 12.5 mr to 150 mr. For the large production angles the 20 cm $\emptyset$ vacuum tube passing on the backside of the two MNP-septa has to be dismounted, the estimation of time for demounting and restoring the vacuum is 30 min. (at the beginning and at the end of a machine development), if the test beam is required with a continuous vacuum.

The doublet in front of M211 allows for focal points between 7.60 m down-stream of M 211 and infinity (parallel beam) at an energy of 26.9 GeV/c. A 20 cm $\emptyset$ vacuum tube is provided in order to confine the beam inside the chamber, if a focal point near to M 211 is desired for low energies[≙].

The test branch extends over 19 m behind the M 211. For a focus in front of the beam dump the calculated beam size corresponds in the horizontal plane to the extension of the beam in front of the septum and by a factor 3 demagnified in the vertical plane.

The vacuum chamber following M 211 is in the state of design (W. Richter) and it is hoped that it can be mounted in January.

≙) E.g.: A beam at 19 GeV/c with a focal point 3 m up-stream of the H_2-target has the following dimensions, in front of the beam dump : $\pm$ 6 cm (in the vertical plane) and $\pm$ 1 cm in the horizontal plane.

Remark : It is understood, that the test branch lacks in
flexibility to be used with complete continuous
vacuum during normal operation of e_7 runs by switching the
magnet current. In order to restore the vacuum pipe over
7 m length, one has to enter the ring area.

We regret that no more emphasis has been given
to our proposal dated 30.6.69, which had the flexibility
to switch, any time, with the help of two magnets in the test
branch. Unfortunately the final decision to use the test
area in e_7, or a test branch for emittance measurements, was
taken late, as the installation work of e_7, inside the ring,
was already advanced.

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