

REVISED PROJECT OF e_7 BEAM LAYOUT

AFTER THE SHUT-DOWN 1969

Introduction

Since the June proposal for the layout, including a test beam for machine studies, further requirements and comments have arisen and modifications of the projects became necessary.

The s_{92} experimental team requires an additional branch to the s_5 spectrometer beam looking at the hydrogen target with probably a variable angle of 30° to 90° , and two telescopes at 20° and 140° production angles. These are shown on the figure at the present state of planning. This layout does not permit any type of separate test beam.

On the other hand, the machine study team does not feel that the test beam proposed in MPS/MU - Note/EP 69-8 offers a sufficient advantage over the present situation. Any more sophisticated test beam being unfeasible for the time being, due to lack of space, power and beam transport elements, the construction of such a beam is postponed.

The subsequently revised project is sketched in this note.

Basic assumptions and constraints

The first four assumptions quoted in MPS/MU - Note/EP 69-8 remain unchanged, so that

- 1) the present e_5 line must not be altered;
- 2) the first focal point for the H_2 target should be as near as possible to the machine;

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- 3) the optics should be planned for 26.9 GeV/c protons;
- 4) the production angle for the s_5 beam must go down to 12.5 mr in the first part and be 35 mr outside the ring area;
- 5) no test beam is accommodated for the time being, but the test section on the main beam should be at least as long as the existing one on the e_5 beam (c.a. 2.5 m);
- 6) no matter must be placed within 2 m upstream of the H_2 target during production of s_{92} experiment (s_5 beam).

Proposed layout

The proposed layout is shown on the attached figure, with the main characteristics as below.

e_7 line

The e_5 line is kept unchanged all along, except for some corrections on the first part to adjust the matching between the beam line coming out of the machine magnet fringing field and the present first straight part of e_5 . This affects slightly the position of the M211 magnet.

Optics

As compared to the previous proposal, the position of the H_2 target is moved upstream by 2 m, the focal point at TV4 by 1.4 m. The position of the p_4 / p_5 target remains unchanged.

The optics is planned for 26.9 GeV/c. The two first lenses are of the new 120 cm long, 10 cm diameter type.

Then come two doublets, consisting of one split pole and three 2 m standard quadrupoles.

Two vertical corrections are provided, one after the second lense, one as last element of the beam transport. There will be one horizontal

correction for the p_4/p_5 target, but no variation of the production angle is possible from this target for the existing secondary beams.

Targets and observations

They are as in the previous proposal:

TV2 : TV2 and screen box remaining unchanged

TV3 : special screen box with ϕ 10 cm. The vacuum will be common with the H_2 target

TV4 : television and screen box in vacuum

TV5 : p_4/p_5 targets, screens as present (TV7).

Monitors

The SEC 20 is used as main monitor, together with its associated "ring" measurement. The SEC 40 remains in front of the p_4/p_5 target.

Vacuum

ϕ 10 cm vacuum tube is used for the first part, down to the H_2 target. A special vacuum tank behind the hydrogen target is provided by NP. It will be connected directly to the target vacuum together with the last part of the test section. ϕ 20 cm vacuum tube extends behind the second MNP septum magnet down to the target p_4/p_5 .

Beam stoppers

The two beam stoppers are placed as indicated in the figure. They must have different remote controls since the first is open and the other shut during slow ejection tests. The only change expected to the safety conditions is that entering the p_4/p_5 target area (door 136) will become impossible during these tests.

Test section

It will be much longer than the present one, even taking account of the displacement of M211 mentioned above. The SEC 20 and the ISRHodoscope are planned to be located there.

The last part of the test section before the H₂ target should be reserved for the possibility of small beam size measurement. It is understood that this device should not imply any matter in the beam during normal operation of the s₅ beam.

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