ADDENDUM TO THE PROJECT OF THE e_9 BEAM LAYOUT

The layout described in the NOTE MPS/MU/EP 70-3 (20.2.1970) has not altered in principle, but in some detail due to requirements which came up in the mean time.

1) The optics proposed for the main beam as well as for the branches is altered slightly as shown in Fig. 1.

2) Magnets with larger vertical apertures are used in the South branch.

3) The beam line of the North branch is modified. The Hyperon beam line is deflected to the North with respect to the e_9 branch. Two different beam lines of the North branch are anticipated according to two different target positions for the Hyperon branch. Details are given in the Appendix.

4) We assume, after discussions, that ss 64 is not used for the electrostatic septum; if this is not so, then this layout has to be taken into consideration.

5) We assume further, no drastic changes of the present emittance of the slow ejected beam, in particular we assume the present ejection scheme with the use of the septum lens in ss 63 during 1971.

The proposed layout is shown on the attached plan. The installation of vacuum tubes, chambers and branches are given in the NOTE/EP 70-4 (4.3.1970). The altered layout anticipates to stop the vacuum of the machine with the SEC 1. In the South branch two additional chambers are required for the magnets MNP 08. In the North branch a chamber for M 200 in front of the target has to be provided.

Table 1 summarizes the elements required for the main beam and the two branches as well as observation and monitor stations.

The targets in both branches are special targets, delivered and mounted by the experimental teams. As target monitor we envisage a telescope directed at 90^{o} to the b_{19} target (in front of a special magnet in the South branch) and a charge measurement of the insulated target y_1 (mounted inside a 2 m magnet) .

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A P P E N D I X

Fig. 2 shows the possible changes of the production angles for the y_1 beam line 111 mr deflected to the North with respect to the e_{9n} branch. The central line corresponds to a production angle of 30 mr. In this case the y_1 target is mounted 50 cm inside (iron length) M 200 , as shown on the attached layout. We plan a second beam line of the e_{9n} branch with an angle of 143 mr with respect to the unaltered y_1 line. In this case the target y_1 is positioned at the entrance of the 2 m magnet.

T A B L E I

I. BEAM TRANSPORT ELEMENTS

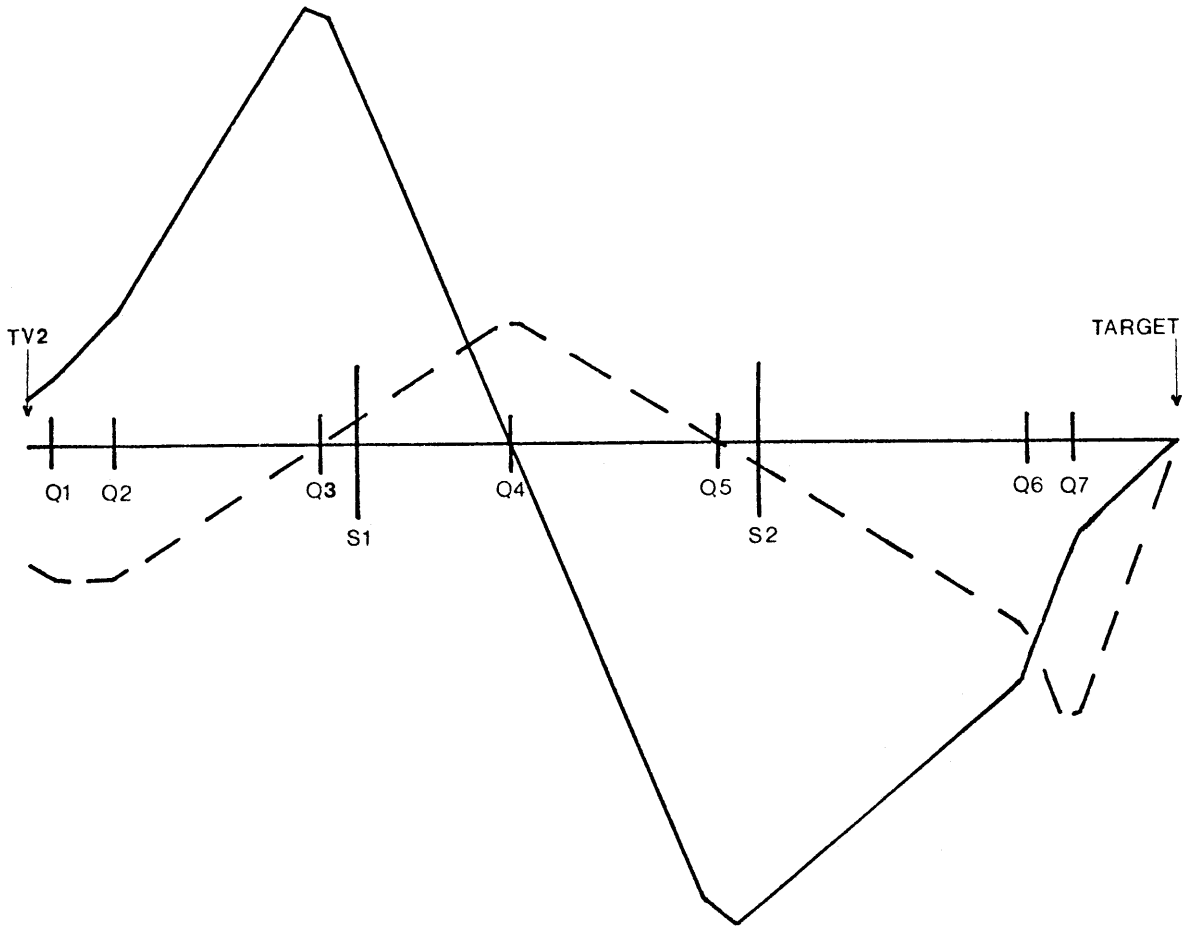
Main beam line	mrad	South branch	mrad	North branch	mrad
1 MNPA (H)		2 MNP 18	2 x (-13)	1 MNP 23	+49
2 Q 120		1 MV (spec.)		1 MV (spec.)	
1 MNPA (V)		1 MNP 19	-28	1 MC 200	+31.77
1 M 211	+32.25	2 MNP 08	2 x (-13)	1 MNPA (V)	
1 Q 600		1 Q 050		1 Q 100	
1 Septum (I)	0 /+18	2 ME 150	2 x (-37)	2 Q 200	
1 Q 600		2 Q 120		1 MNPA (V)	
1 MTC 06 (H)		2 MNPA (V/H)		1 M 100	(≙)
1 Q 200				1 M 200	+19.12 (≙≙)
1 Septum (II)	0 /-18				
2 Q 120					
2 MNPA (V/H)					

≙) used for changes of the production angle for both beam lines (see appendix)

≙≙) for 111 mr between e_{9n} and y_1 (30 mr production angle)

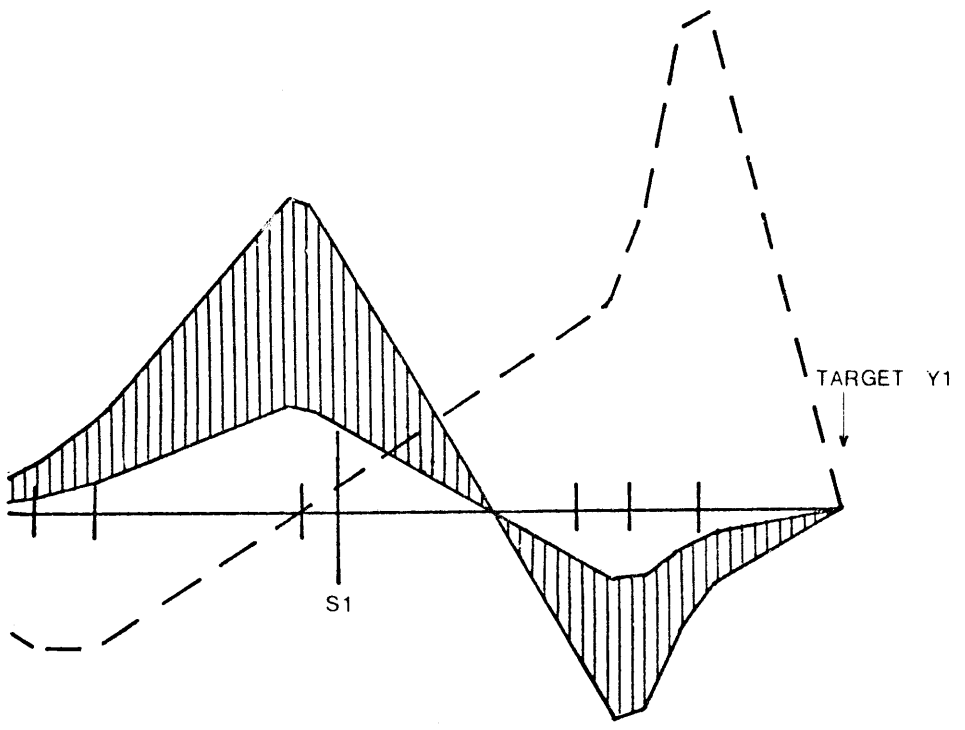
II. BEAM OBSERVATION AND MONITORS

Main beam line	South branch	North branch
a) Station for TV observations		
TV 2 screen box to be modified. TV 4 screen box connected to Ø20 cm vac. tube. Screen vert. ≳15 cm hor.~6 cm. TV 5 screen box connected to Ø20 cm vac. tube. Screens standard size. TV 6 screen box connected to Ø20 cm vac. tube. Screen Ø15 cm. TV 7 target station (as present)	TV 8 screen box connected to Ø20 cm tube. Screen Ø standard size. TV 9 screens in air (standard system.)	TV 10 as station 8 TV 11 as station 9
b) Monitor stations		
SEC 1(SEC+Rings) Ring (foils $Ø_e$ = 12 cm, $Ø_i$ = 7 cm) in construction TOPOSCOP (vert.) in construction SEC 2 (SEC 20 + rings)	SEC 3 in construction (Ø12 cm, 10 foils + 10 ring foils).	SEC 4 in construction as SEC 3
c) Targets		
at station TV 7 as present	y_1 target (special) and b_{19} target (special) delivered and mounted by experimental teams.	



OPTICS e9

(Beam size at the septum s 1 and s 2 variable)



OPTICS e9 NORTH

(vertical rays for 2 cm s 1 septum aperture outside medium plane)

(without correction of the optical axis by vertical bending)

OPTICS e9 SOUTH

(vertical rays for ± 1 cm s 2 septum aperture)

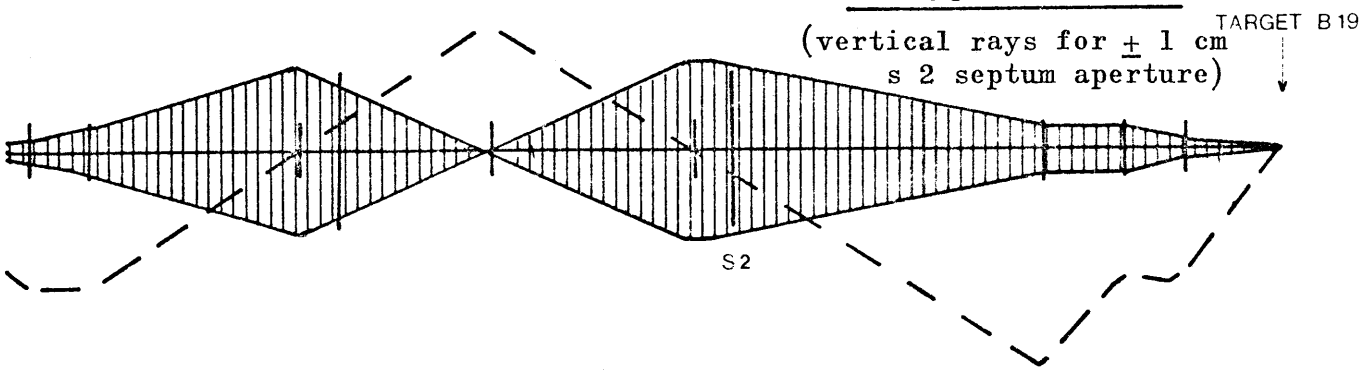


Fig.1

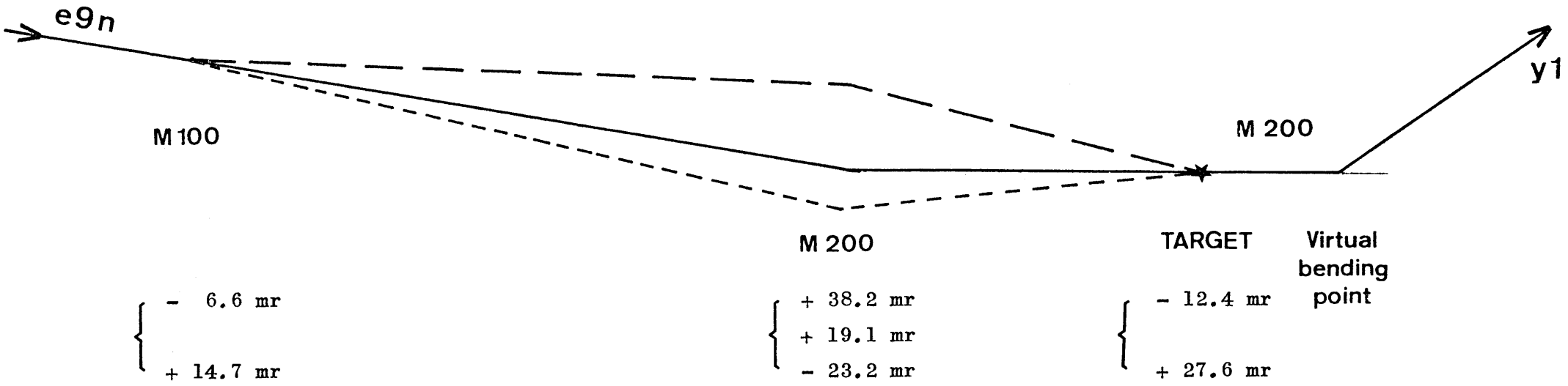
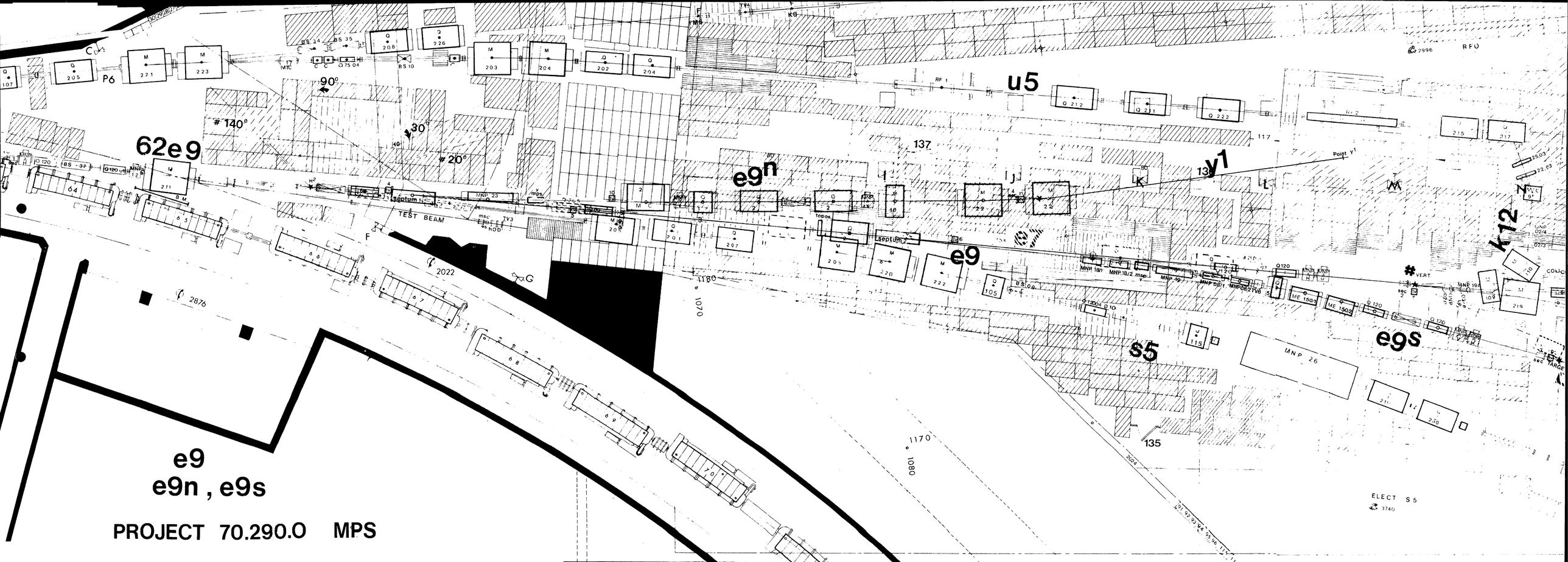


Fig.2

Change of production angle for y_1

Example for the y_1 line with a mean angle of 111 mr with respect to the incident protons (target position 50 cm inside the M 200.)


62e9
140°
90°
y 30°
20°
u5
e9n
137
y1
Point Y1
k12
e9
e9s
s5
TEST BEAM
Septum 1
Septum 2
MNP 23
MNP 26
MNP 18/1
MNP 18/2 msp
MNP 49
MNP 08/1
MNP 08/2 TV6
ME 1501
ME 1502
TV4
TV3
msc
mps
topos
VERT
ELECT S5
2022
2876
2996
3740
1180
1070
1170
1080
135
117
e9
e9n , e9s
PROJECT 70.290.0 MPS