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SPECIFICATION FOR THE THIN SEPTUM MAGNET

FOR SLOW EJECTION 16

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Introduction

The slow ejection system for the ejection to the West Area (SE 16) will comprise three septum elements:

1) electrostatic septum
2) thin septum magnet (TSM)
3) extractor septum magnet.

The studies for SE 16 are at present sufficiently advanced for a specification of the septum elements. This note deals with the specification of the TSM, its support, vacuum tank, power supply and auxiliary installations. It is based on a note of K.H. Kissler (1) and on various discussions mainly with Y. Baconnier, R. Bertolotto, K.H. Kissler, W. Kubischta and G. Plass.

The thin septum magnet

The TSM will deflect the beam entering the magnet gap, by 1.5 mrad max. towards the inside of the ring. The septum thickness has to be 1.5 mm, the free vertical aperture 25 mm, and the internal gap width 50 mm. One short straight section will be made available for the TSM. Approximately 30 mm upstream and downstream of the TSM have to be provided for miniscanners and a ZnS-screen. The total length of the TSM itself hence will be ~ 95 cm.

The TSM should, if possible, not limit the performance of the CPS. This means, the TSM should support a 700 msec pulse of maximum current (corresponding to 1.5 mrad kick at 28 GeV/c proton momentum) with a duty cycle of 1/3. The leakage field and field non-homogeneity is not specified, but should be kept to a minimum. R. Bertolotto will be responsible for construction, fabrication, measurements and tests. A draftsman should be allocated to him during the construction period.

Vacuum tank and magnet support

The position in the P.S. for the TSM is not yet defined. However, a short focusing straight section with free access from the outside will be chosen from the existing possibilities. This is sufficient to freeze all essential parameters for the construction of the vacuum tank and magnet support.

In general, the construction of the vacuum tank and magnet support should be as similar as possible to the construction of the tank in ss 16. It is important that the test and alignment support in Hall 169 can also be used for the TSM. As for SM 16, the alignment of the magnet should also be done outside the ring. The following remote-controlled movements are foreseen: radial from 50 to 90 mm, vertical $\pm$ 5 mm and angular $\pm$ 6 mrad with respect

to the PS-coordinates. Precision and reproducibility of the magnet position should be 0.1 mm and 0.1 mrad resp. or better. As for SM 16, rotation of the magnet around beam axis is necessary for fine adjustment of the magnetic vector in the magnet gap.

An effort should be made to provide a total free length in the vacuum tank of 1.05 m. The tank should fit to the usual enlarged vacuum chambers (105 mm). Special tools for fast change of a TSM are part of the project.

We would like to get soon a definite confirmation of the names of the mechanical design effort for this work, since it is very important to establish as soon as possible a tight collaboration between R. Bertolotto and the responsible for the tank construction.

Power supply for TSM

The specifications for the pulsed power supply SPG II foreseen for the TSM are being written. It is a 4500 A supply, delivering the maximum current for up to one second and having a maximum duty cycle of one third. Precision and stability will be $\pm$ 1 ‰ or better, including ripple and current droop. Output voltage will be 25 volts max., rise and fall time $\leq$ 30 msec. A servo-input will be foreseen. The SPG II will be placed in the new hall in the ring center.

Auxiliary installations

Power and control cables from the TSM in the ring to the SPG II and control cables from the SPG II to the MCR will be needed. The total resistance of the power cables has to be $\leq$ 2.5 mΩ, the inductance should be as small as feasible. All other details can

only be defined after the final choice of the straight section for the TSM. The same is true e.g. for the installation of demineralized cooling water. However, any additional requirements (e.g. miniscanners and ZnS-screens) have to be communicated as soon as possible to R. Bertolotto for the TSM and to D. Bloess for the power supply. It will be difficult or even impossible to introduce modifications after December of this year.

Schedule

The first ejection test to the West Hall is scheduled to start immediately after the shut-down early in 1972. At this date all installations have to be completed. To achieve this, the vacuum tank and magnet support have to be ready for the installation of the TSM at the beginning of September 1971. Life-test for the TSM will then start at the beginning of October in Hall 169 with the Miebach test supply. Any delay added to this schedule will most probably shift the starting up of SE 16 or even delay the 1972 shut-down.

Reference

(1) K.H. Kissler : Some considerations concerning the specification of septa for future slow ejection (Draft for comments) 28.5.70.

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