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SE 16 News (2)

I. SM 16 (R. Keizer) and tank (E. Boltezar, P. Mann)

An SM 16 module has been pulsed with maximum ratings over 3×10^6 times. No signs of fatigue have been observed. Also the fabrication is well advanced: the tank, the magnetic circuit and the coils for the first magnet ensemble are ready. The assembly has been started. All serious problems seem to be solved.

II. TSM 85 (R. Bertolotto) and tank (B. Szeless)

The TSM 85 prototype has been pulsed during the last months without interruption, also without signs of fatigue. The vacuum tanks for two units are under fabrication. One unit will be ready mid-September.

III. Vacuum chamber ss 82 - ss 85 (B. Szeless)

Drawings are finished. The last parts will arrive this month. The fabrication will start in the next weeks in the Stähli-Workshop.

IV. Power cables for ss 16 and ss 85 (H. Reitz)

Preparations in the tunnel for the central building - ss 16 connection are finished. Cable laying will start soon. The cabling from the central building to ss 85 has been studied.

V. ES 83 and tank (C. Germain)

Extensive observations of the electrostatic septum under operating conditions and tests during MD's are under way. The high voltage is held without problems up and above the specified values (120 kV over 1 cm) without beam. With beam sparking occurs sometimes during injection, transition and target operation. This might be explained by the rather inside position (+ 35 mm) of the septum, due to the insufficient bump amplitude at present. Screening of the cathode by a beam scraper might turn out to be necessary.

VI. Compatibility of FE 16 and SE 16

The compatibility of FE 16 and SE 16 has been studied (W. Kubischta). A number of corrections turned out to be necessary.

The mean radial position for FE 16 is ~ 0 mm whereas the hole starts at + 20 mm for SE 16. The bump amplitude must hence be ~ 50% bigger for a preceding fast ejection in ss 16. The bump supply is already delayed due to technical problems. For this reason it has been proposed not to modify that supply but to use two additional dipoles placed in ss 12 and ss 20 (IBS must go) and to pulse them with an additional supply (existing) (F. Rohner).

The maximum of KM 13's or KM 97's (FE 16) kick occurs in ss 17, whereas the maximum for SE 16 is in ss 15. This results in a difference of angle between the fast beam and the slow beam of ~ 3 mrad. The best and cheapest place to compensate for this difference would be the SM 16. One other solution: Compensation with the two bending magnets HB 101 and HB 102 (the first in the external beam line) would require two new power supplies (400 - 500 k fr.; possible delivery: within 1 year). Another solution would be to place the electrostatic septum and the thin septum magnet in ss 85 and ss 87 resp.

A disadvantage is that those elements cannot be used for SE 62. The SM 16 supply (SPG 1) has been studied with the following results:

1) An increase of voltage on the transistor bank to allow the 10% current programming at all energies is not possible due to stray inductances.

2) A programming of the thyristor firing angle (very slow) is possible, and would be the next cheapest solution, but the current ripple might become too big (additional measurements have to be made).

3) The safest solution would be to replace the 10-step input transformer by a stepless adjustable transformer.

The modifications of this SPG 1 supply might cause some delay to the program.

A servo-input to stabilize the position of the beam at the entrance of the beam diagnostics can be included in the other modifications if a limitation of the bandwidth to possibly 10 Hz is feasible and the <u>total</u> variation of the current does not exceed 10 %.

$$\left(|\Delta I_{servo}| + |I_{SE} - I_{FE}| \right) / I_{SE} \leq 10\ \%$$

The compensation of the momentum variation (concerns the big horizontal and vertical bends of the external beam line) will be handled by ISR (M. Hub).

VII. <u>Controls for SE 16</u> (contributed by A. Millich)

Options have been taken and work started for computer control of the following items:

1) <u>Timings</u>: 3 crates of 16 units each will be constructed. One crate will contain prepulse units, one postpulse units and the third preset counters. All units will be set by computers, no manual control is provided.

2) Programming of power supplies: The Tekelec power supplies used for SE 16 will be programmed by the VARIAN computer through function generators. 4 VARIAN channels are being modified to permit programming of current and tension simultaneously.

3) Beam loss monitors: 16 new beam loss monitors will be used to monitor ejection losses. Their signals will be acquired by computer 4 times in one cycle. Work has started to prepare the electronics.

4) Toposcopes: It has been decided to use toposcopes instead of miniscanners at the two ends of the magnetic septa used for SE 16. The mechanical problem is being investigated and the acquisition by computer of the signals from the 5 toposcopes (4 horizontal + 1 vertical) is being prepared.

VIII. Acquisition of septum parameters

An interface is being built to connect the STAR to the DTS, which will permit the acquisition by IBM 1800 of 16 parameters per cycle.

IX. Control of septum positions

A proposal will soon be made for control of the positions of 4 septa involved in slow ejection by the IBM 1800.
There is in fact a growing need to investigate losses in function of the septum alignment and computer control of septum movement would provide a powerful aid in this respect.

A list of the hardware needed in connection with the above mentioned controls developments will be edited soon.

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