

## MD REPORT OF 13TH AUGUST, 1991

1. INFLUENCE OF THE STRAY FIELD OF THE PS MAGNETS ON RF IN THE 114 MHz CAVITY (TEST for LHC) WITH SHIELDING
2. CHECK FOR FREQUENCY DRIFT BY TEMPERATURE RISE IN CAVITIES

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In the MD of 16th July, 1991 (without shielding) the nominal RF-power (15 kW for 500 kV at the gap) was obtained with up to 50% of the highest magnetic cycle. The highest stray field was 200 G close to the beam pipe (for 12.6 kG in the Magnet). (See PS/RF Note 91-15).

Now, iron plates (fig.1) were inserted between the magnets and the cavity in SS4. (removed after test).

The size was adapted to the restricted space (<30 mm) between cavity and magnet coils.

The signal of the magnetic cycle (4F, C, 2D, C, B, 4E) with the max. field of 12.6 kG was connected to a comparator and a gate, allowing RF only below a chosen limit.

Starting with continuous RF with fields below 2 kG showed no rise in reflection or pressure.

After an hour the cavity was conditioned to allow a field of up to 9.5 kG (cycle F).

One hour later the continuous RF covered fields up to 11,5 kG (cycle B).

Stepping back to 2 kW (approximately 180 kV at the gap) RF was possible over the whole supercycle including 12.6 kG without a pressure rise. Increasing the power towards 3.5 kW strongly deteriorated the vacuum (from 1E-8 to 5E-7), but this improved with time.

### Conclusion

1. Supporting 90% of the max. magnetic cycle with this simple shield of normal steel plates (Fe360) shows that shielding is efficient, the sites of discharges are confirmed to be in the gap region and conditioning with this reduced stray field is possible.  
A larger and thicker plate out of Armco steel may cover the max field.  
Negative influence of such a shield to the beam has to be studied.

2. A temperature check with continuous RF power (over 30 min.) showed for both cavities:

		SS4	SS10
Rise in water temp. (highest at Short)	deg. / kW	0.23	0.29
Decrease in frequency	kHz / kW	0.94	1.26

3. Cavity SS10 needs more conditioning (by RF pulses) for power above 10 kW.

A 30% increased waterflow would reduce frequency drift in respect to SS4.

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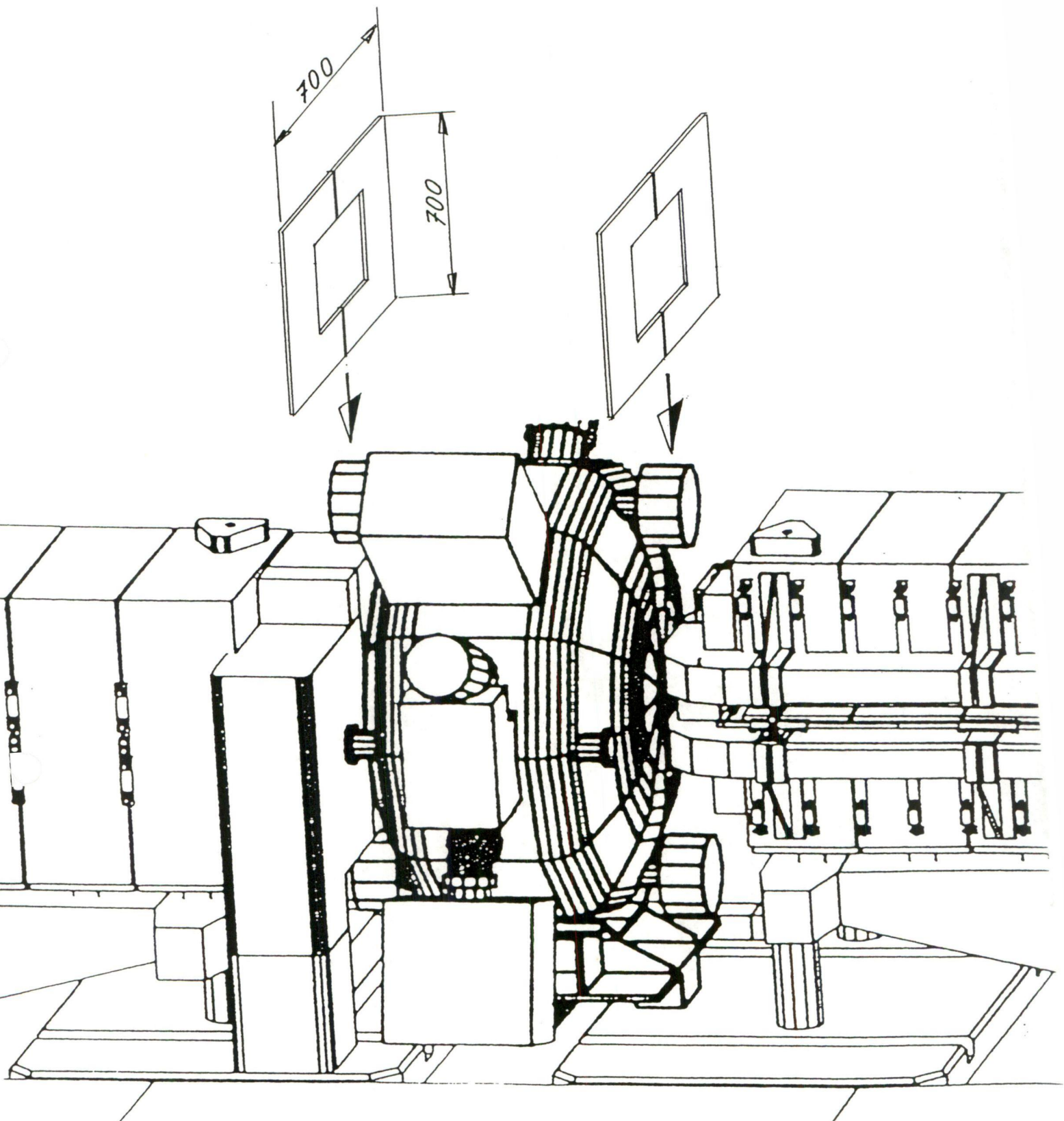


FIG 1 MAGNETIC SHIELD  
BETWEEN CAVITY SS4 AND MAGNETS 003/004