MINUTES OF THE RF-MEETING

25th July, 1962

(8)

Present : A. Cheretakis, H. Fischer, K. Gase, A. Garcia-Gonzales, P. Gottfeldt, H. Isch, U. Jacob, J. Jamsek, R.K. Kaiser, F. Ollenhauer, H. Pflumm, D. Zanaschi.

---

1. State of ejection equipment

The adopted method (originated by H.G. Hereward) is, to spill out the particles by energy-selective β-tron oscillations by means of a bending magnet at a suitable place. By going down of B the particles enter an unstable region in which large betatron oscillations are excited (see minutes of RF meeting of 31 December, 1961, MPS/RFM 61-17)and report AR/int. GS/61-5).

The requirements for this ejection scheme are :

a) stable radial position of accelerated beam;

b) smooth flat top (with electronic filter);

c) building-up of an unstable region by means of quadrupoles and sextupoles

d) a bending magnet .

The bending magnet is being tested by U. Jacob. This magnet was designed by F. Krienen and was made some two years ago. The magnet is a so-called septum magnet. Basically it is a $\sqcup$-yoke magnet lying on its side with current sheets from pole face to pole face. The dimensions of the space between the magnet legs and the current sheets are about 3 X 3 cm. The magnet is cast in an aluminium water-cooled bloc whose dimensions are 1,85 m in length, 16 cm in height and 9 cm in width.

The current sheets, i.e. the septum, are four copper sheets isolated from each other by mylar sheets.

By a suitable arrangement of the current through the magnet windings and the septum a homogeneous magnetic field within the magnet can be achieved by cancelling out the external stray field to a large extent.

For a field strength of 6 kG the outside field is of the order of 1%. This outside field is not constant but varies somewhat over the length of the magnet. This is due to improper machining of the slits in the septum.

A test at the limit of our power supply shows a stray field of 1% in the middle, and about 2% at the edges for a field strength of 8,8 kG.

The remanent field inside the magnet has been measured for some 30 cm from the edges. The value is less than 5 Gauss, with 16 Gauss in one specific point.

The magnet rises to a temperature of 70° C under these conditions, in air :

field : 6 kG
pulse : 30 msecs
cycle : 3 secs .

These conditions should not be exceeded as, at higher temperatures, the mylar foils start outgassing.

The temperature measurements are continued under vacuum.

The mechanical deformations of the septum are measured at 0.4 mm at 8 kG in the middle of the septum.

The power supply which was specified and ordered by the Engineering Division two years ago, has the following data :

current : 5000 A
voltage : 200 V
pulse length : 100 ms
cycle : 1 sec
ripple : 6 % at 200 V .

Both the septum magnet and the power supply were originally designed for a type of ejection system different from the one which we envisage to use. Therefore, both units are not quite what we need but they will nevertheless be used to gather experience.

By rearranging the cooling circuit, the magnet can be improved so that longer pulse lengths can be obtained without excessive heat dissipation.

The mechanical part of the ejection system has been designed by A. Garcia-Gonzales, L. Solinas, an engineering office in Zurich, and the group of A.H. Achermann.

In the meeting A. Garcia-Gonzales presents and explains the final drawings (for further information see RF minutes of 21 March, 1962, MPS/RF 62-4).

We envisage two types of operation :

1) with coupling and breaking of a clutch,

2) with a start/stop motor .

The motors for 1) and 2) have been ordered and these two operation possibilities will be tested.

Unfortunately, due to priority of the fast ejection, the mechanical construction can be assembled only after October 10th, and after this date the testing can proceed. All measurements and studies are made with a view to obtaining the best final construction for the East Area. H. Umstätter will be charged with the task of determining the design limits of a septum magnet for the East Area as far as mechanical forces, heat dissipation, stray fields, available space, etc. are concerned.

2. New components

1. A new French electric motor design has come to our attention. These motors have a radial air gap and a rather light, printed circuit. On the face of it, the moment of inertia should be rather low.

2. There is a Siemens transistor for 500 V, 10 A, and 50 W dissipation. 16 samples are ordered.

3. J.Jamsek informs us that a new greasing oil for vacuum up to 10^{-13} Torr is available in the U.S.A.

3. Other business

As Melle Lincke will join the office of Melle de Winter, Mrs. Townshend will maintain a small stock of stationery for our group.

The first shut-down period in 1963 may take place as early as January. However, as this depends on the installation dates for the fast ejection installation, no definite dates can be given yet but we should, where possible, be ready to start with the shut-down work as early as January.

Extra man-power from the SB pool for shut-down jobs have to be asked through G. Brianti, man-power from R. Stähli through F. Bonaudi, and man-power from SB West (J. Augsburger) through J. Augsburger (inform L. Solinas).

A student from Paris, Mr. M. Tassan, will join us on August 6th, and he will stay with us for some 7 weeks. M. Tassan and H. Umstätter will get the office which now houses the closed orbit computer. This computer will go to laboratory 2-306.

4. Jobs for ejection

We are charged with guaranteeing the operation of the ejection system which is being developed in NPA . Therefore, to some extent, we have to look into the instrumentation of this, e.g. an indicator of magnet position must be studied (M. Tassan, probably). A preselection unit for timing is to be delivered to NPA (H. Pflumm).

Programming might be done by using a logic system similar to the one J.J. Merminod proposed for the target system.

5. Operation

After the shut-down operation of the accelerator will be brought to 126 hours per week (without starting up) in contrast to the 103 ½ hours we have operated so far. The present proposition is to operate in a two-week run

and after that a two-day maintenance period. This means operation on alternate Sundays. The schedule will be : operation from Wednesday, 2 p.m. until the next Sunday morning but one, 6 a.m.

This means, among other things, that we have to do more weekend shifts.

Next meeting's programme

The next meeting will be held in two weeks. The shut-down programme will be discussed. Definite shut-down programmes should be handed to U. Jacob by then, (K. Gase and D. Zanaschi before they go on leave).

The new operation scheme will be discussed in the meeting after the next.

K. Gase

Distribution : (open)

MPS Committee
R Group

PS/3398/mt