

REPORT ON MY VISIT TO SACLAY

from 17 to 20 May, 1960.

The aim of the visit was to discuss with members of the Saturne Machine Group their experiences in the running of the targets and work done on the magnet. The results of these discussions will be given under the headings :

- 1) Target operation
- 2) Target development
- 3) Measurements on targets
- 4) Magnet operation
- 5) Shimming of the channel for external beam
- 6) Magnetic measurements.

1) Target operation.

The routine operation of the targets is controlled from the main control room by an automatic programme selector, which is basically similar to the one at present built by us. The machine cycle selector, originally of the electro-mechanical telephone exchange type, is now based on electronic counting with E₁T tubes. Instead of several complete counters only one counter is used with separate discriminator circuits for each channel, leading to the same advantages as the similar development of our target timing controls. This cycle selector is at present mainly used for the operation of the Wilson chamber, but other users also want occasionally single pulses at intervals of several machine cycles.

The target timing - as almost all other machine timing - is based on absolute time only. This is true for the target trigger signal as well as for the trigger signal for the decrease of the R.F. amplitude (the usual way of bringing the beam on the target).

The changing of the target heads now occurs less frequently than at the beginning of the operation of Saturne; once a month is an average figure. The contaminated head is stored by the Saclay Radiation Service until its activity has died down sufficiently.

2) Target development.

As the existing targets have given satisfactory service (with a certain spring being replaced after every 10^5 target cycles), no big new development is under way for the moment. The present system has however been modified to allow unscrewing of the target head from the outside of the vacuum chamber (The vacuum has still to be broken to take the head out).

Lately, the tendency has been to work with rather smaller and lighter targets. If continued, this may lead to the development of a lighter target moving mechanism.

3) Measurements on targets.

With the exception of some studies of the influence of the target height made by the physicists, no systematic studies on targeting have been made so far. Mr. Levy-Mandel now proposed such a programme, in order to clear up points like spiralling time needed for beam debunching, influence of the magnet ripple on the structure of the secondary beam and target efficiency.

4) Magnet operation.

So far the magnet operation did not give rise to big problems. The fixation of the pole face windings, which was originally not strong enough to prevent shifting of these windings, is being improved by putting sheets with a higher friction coefficient between the pole faces and the windings, and by pulling these windings in place with terylene bands.

It has not been found necessary to establish a regular routine for the tightening of bolts, etc. of the magnet. Some trouble is expected in the not too distant future on account of the aging of the rubber hose connections to the cooling system. A development of more accessible and more easily demountable joints is under way.

5) Shimming of the channel for the external beam.

Work concerning changes of the magnetic field distribution is either done by the old magnet group (who does not belong to the machine group) or by the physicists.

The first group is in charge of the Piccioni type ejection scheme. Their available effort is at present taken up by measurements on the magnets for this scheme; any work on the channel is to be done later.

The physicists have designed a channel for an external beam corresponding to our Bern beam. The size and the location of the shims was determined with the aid of the resistance paper method. Some difficulty was experienced in using this channel over a wide energy range on account of the difference in particle trajectories due to the relative changes in the energy loss in the target and the distribution of the magnetic field. It is envisaged to improve on this point by inserting a small bending magnet into the channel.

6) Magnetic measurements.

Measurements of the distribution of the corrected main magnetic field at injection are made by the old magnet group, using the beam itself as sensitive element. Observation occurs by direct inspection of the beam position on a fluorescent screen.

The field distribution in the bending magnets has been established by Mr. Stickel's group on individual charts, employing an automatic field plotter featuring a Hall plate.

Hall plates will also be used for the routine measurements of the instantaneous fields in these magnets. Results will be digitized and printed out at 3 minutes' interval.

K.H. REICH.

Distribution : (open)

Parameter Committee
Machine Group Committee
W. Richter
Th. Sluyters.

/sd