

Report on my visit to
the 6 GeV Electron Synchrotron DESY in HAMBURG

Introduction

At the invitation of Professor Jentschke I stayed at DESY from 1st to 3rd March 1961 to discuss the planning of the installation of the experimental areas. Though these discussions took up most of the time, I had an opportunity to see something of the rest of the laboratory. The main impression is that the stages of calculations of bremsstrahlung and associated developments are largely passed and that problems common to DESY and CPS are now much more in the foreground. Such problems are the respective location of control and counter rooms, standardization of electronic equipment and operation of experimental apparatus. For this reason, P. Germain has asked me to report briefly on the present state of the DESY project. In view of the nature of my visit this report is of course neither very systematic nor comprehensive. In particular, the theory (Dr. Wüster) and the preparation of experiments (Professor Staehlin) are left out completely.

Buildings (Dr. Beer)

Besides the already existing Office and Test Building at the Luruper Chaussee and the Guest House "Wonoatron" at the Flottbeker Drift (in which I stayed) the following new buildings are now under roof.

Ring building including Linac wing
Experimental Hall I
Experimental Hall II
Main Control Room (in Center of machine)
Power House.

The Ring Building impresses one by its spaciousness. This is partly due to the design of the octagonal points which are at the inside of the ring magnet. There is thus ample room between the straight inner wall and the cable trays for

placing special power supplies, condenser batteries for experimental equipment etc., (The condenser batteries of the main magnet supply will be located on top of the shielding embankment in the open air). In the Ring Tunnel the floors on either side of the magnet are at different levels which is supposed to facilitate the installation work.

The overall dimensions of the experimental halls are 75 m by 40 m, both halls being of equal size. The floor loading is 30 to / m², the crane capacity 2 x 25 to per hall. The main service tunnel runs along the long axis of the halls; it is of the cast-on-the-site type with fixed ceiling. Ample use is made of prefabricated concrete tubes for providing throughfeeds for cables etc., Normally 4 of these tubes are combined into one element of about 50 cm wide, 15 cm high and 80 cm long. It can e.g. be placed directly into the wall of the tunnels to serve as path for cable connections between parallel tunnels. Rows of these elements (which fit into each other) are used for the distribution of the signal cables in the floor of the Halls.

Linac (Dr. Timm)

The linac has arrived from Mct.Vick. and is being assembled. Next the first part of the inflector system will be mounted of which several parts have already arrived. The tests are expected to be finished before the linac is required for injection into the synchrotron. There may thus be the possibility of making some experiments with the high intensity 40 MeV electron beam.

R.F. (Dr. Schaffer)

The prototype r.f. cavity has been operated satisfactorily once the pumping problem was solved. At present the 45.7 cm x 22.85 cm waveguide components are being developed, which are not yet standardized in Europe. I saw an interesting design of 2 adjustable stubs for impedance matching, which have supported r.f. currents of the order of 2.5. kA (at about 500 MHz).

Magnet (Dr. Hardt)

The order for the magnet blocks has been placed, the coils and magnet girders will be ordered soon.

Modified car jacks costing about Fr. 300.- each will be used for supporting

the magnet girder. As at CERN the lifting of the magnet will be done hydraulically, the adjustment mechanically.

The magnet measurements showed that the end corrections (special shaping of end plates) have been successful. There is however need for correcting the effects due to the low permeability at the beginning of the cycle. Dr. Hardt considers the possibility of using ready made polystrip poleface windings provided they can be glued onto the polefaces.

Vacuum (Dr. Beer)

Extensive studies of various pumps are under way, in particular of the Varian and the C.E.C. titanium discharge version. Pfeiffer pumps are used as forepumps. A mass spectrometer is employed for studying the pumping properties for the various gases, in particular for those components which are undesirable in the r.f. cavities.

Good progress was made with the design of the home made vacuum chamber. This is now wound from stainless steel wire onto which a thin layer of alumina is applied for vacuum tightness (99 o/o). Complete tightness and mechanical strength is provided by a fabric reinforced plastic sheath.

Insertion of a prototype section of the chamber into the magnet (which was excited with 50 Hz) did not give rise to any measurable perturbation of the magnetic field.

The baking out of this chamber will simply be done by feeding a current through the stainless steel wire.

Power (Mr. Bothe)

Studies are in progress for comparing the 3 solutions proposed for the main magnet power supply : D.C. set, pulsed supply or inverters.

Various types of condensers were tested and a suitable one has been found for the magnet circuit.

Controls (Mr. Krolzig)

Some people of this group are busy building radiation security apparatus for

the linac. Another important activity concerns the standardization of electronic chassis. DESY has adopted the P.S. crate design and they also started with some printed cards which they received from us one year and a half ago.

In the meantime, they have put considerable effort into the development of the printed card system. All chassis are self-contained, the required voltages (6.3, 30, 150 and 300 V) being provided by fully transistorized printed card supplies. The geometrical filling factor of their chassis is as high as 0.5. The Hamburg group would be interested to order certain standard apparatus like these power supplies in common with other laboratories in order to reduce the design effort and cost. To this effect they would also be prepared to adopt any suitable design finalized elsewhere.

Apparatus Layout (Dr. Steffen)

Encouraged by the good results of the special design of the end plates of the main magnet, this group looks into the possibility of designing bending magnets (and lenses) with reduced end effects.

Dr. Brasse is at present staying at Cambridge (Mass.,) where he works on the ejector scheme of the CAP machine.

Considering the beam transport for DESY, it must be remembered that their standard secondary beams from internal targets consist of bremsstrahlung and therefore do not call for magnets or lenses. A very preliminary estimate for the first order foresees the following numbers (AGS and CPS for comparison).

	Magnets	Lenses
DESY	8	16
AGS	8	25 (+ 6 of the Panofsky type)
CPS	19	26.

K.H. Reich.

Distribution : (open)

Parameter Committee Members
MPS Division Committee Members.