MAGNETS OF INJECTOR SYNCHROTRON FOR UVSOR

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The injector for UVSOR is a 600 MeV synchrotron with a 15 MeV linac. The synchrotron is composed of six bending magnets and six straight sections. In each straight section, a doublet of quadrupoles are installed. Maximum repetition rate is 3 Hz. Cores are made of laminated silicon steel 0.35 mm thick (JIS-S09). In this report, results on the field and inductance measurements of these magnets are presented. The field was measured by DC method with a rotating coil of Rawson-Lush. The inductance was measured by using intentional ringings of a DC power supply.

The orbit radius of the bending magnet is 1.8 m, the gap is 48 mm and the width of the pole is 180 mm. The n-value is 0. Maximum central field is 12 kgauss. The end of the core is cut according to the Rogowski's curve. The shape of the pole tip is shown in Figure 1. The dependence of the integrated field along the orbit upon radial displacement (x) is given in Figure 2. The dependence of the inductance upon the exciting current is illustrated in Figure 3.

The core length of the quadrupole is 210 mm, the bore radius is 47 mm and maximum field gradient is 1 kgauss/cm. The shape of the pole tip is shown in Figure 4. The end of the core is cut linearly. The quadrupole has a main and a sub coils. The main coils of the quadrupoles and the coils of the bending magnets are connected in series. Greater part of required magnetomotive force in the quadrupoles is obtained with the current flowing in the main coils. Tracking is made by the use of sub coils [1]. The dependence of the integrated gradient along the orbit upon x and the inductance are given in Figures 5 and 6.

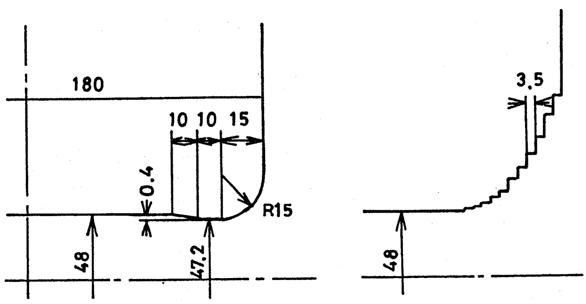

Fig.1 Shape of pole tip of the bending magnet.

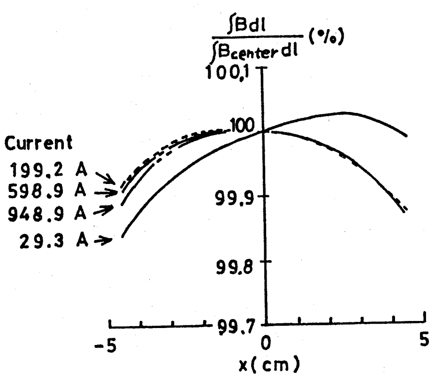

Fig.2 Dependence of the integrated field along the orbit upon radial displacement (x).

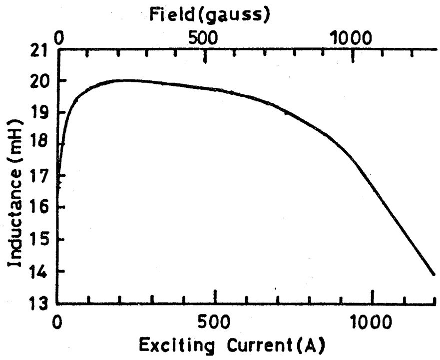

Fig.3 Dependence of the inductance upon the exciting current.

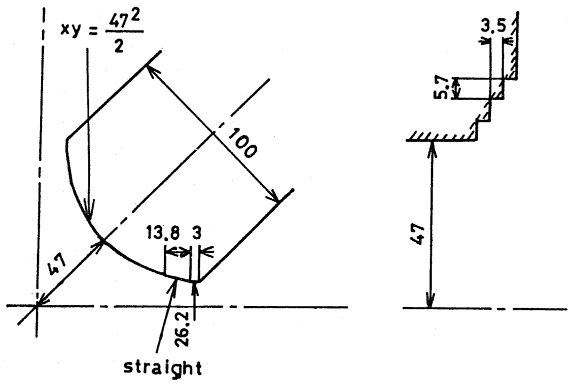

Fig.4 Shape of pole tip of the quadrupole.

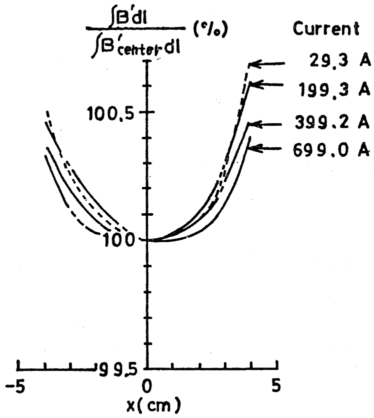

Fig.5 Dependence of the integrated gradient along the orbit upon radial displacement (x).

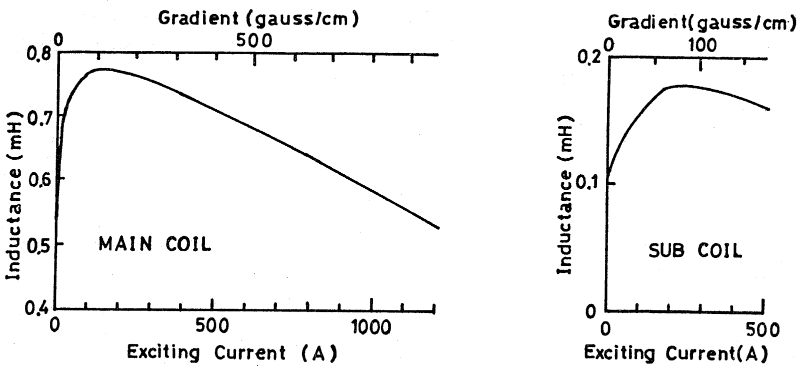

Fig.6 Dependence of the inductance upon the exciting current.

Reference
1) K. Shimizu et al., private communication.