excited with a half sinusoidal signal of 1000 A peak current, 12 μs width at 1 Hz. repetition rate. The measured pulse response of the injection kicker magnet is shown in fig.1.

Pulsed Beam Current Monitor

Measurement of pulsed currents requires ferrites with high pulse permeability. For this purpose high frequency, high permeability (>2500) Mn-Zn-Ni ferrites were developed. In order to measure the injected current (~30 mA, 2 μs pulse width, 1Hz repetition rate) in the microtron - booster synchrotron transfer line, a current monitor with large circular aperture (90 mm) was made using the ferrite toroids (120mm x 100mm x 15 mm) developed indigenously. Fig.2 shows the monitor developed along with the measured current response. The measured sensitivity and rise time were ~0.02 V/mA and ~ 60 ns respectively.

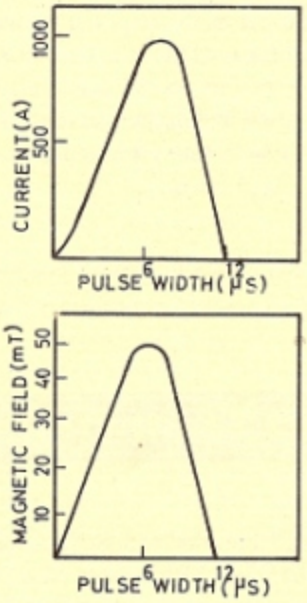

Fig. 1. Excitation current wave form and magnetic field response of the injection kicker magnet.

Ferrite Magnets for Sputter Ion Pumps

A large number of sputter ion pumps are required in the SRSs to achieve ultrahigh vacuum conditions. These need to be baked at 300°C along with the vacuum system. The permanent ferrite magnet used in the pump should therefore be capable of withstanding repeated thermal cycles. The oriented strontium ferrites required for this purpose have been developed. The strontium ferrite is composed of SrO and Fe_2O_3. Their homogeneously mixed powders were processed by ceramic techniques and the slurry was pressed as slabs in a magnetic field (~10kO_e) oriented parallel to the thickness of the slab. Ferrite slabs of size 156mm x 102mm x 12.7mm were fabricated.

The sputter ion pump magnetic circuit made from these magnet slabs have been tested for repeated temperature cycling and found satisfactory.

Ferrites under development

Development of some other important ferrites has also been taken up. Mn-Zn-Ti-Sn mixed ferrites have been developed for use in high frequency (~500 kHz) switched mode power supplies and found to exhibit good switching characteristics under full load conditions. Large (120mm x 100mm x 25mm) U-U cores of this ferrite are under development.

Yittrium Iron Granet (YIG) ferrites are under development in collaboration with Solid State Physics Laboratory, Delhi. These will be used for making three port Y - Junction waveguide circulators (2 MW peak power) and four port differential phase shift ferrite circulators with 5 MW peak power.

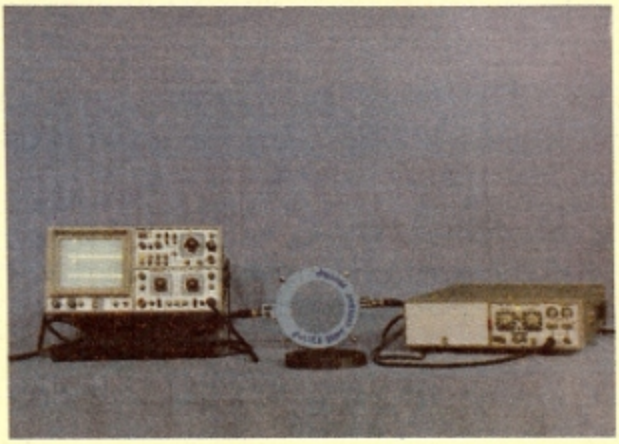

Fig. 2. Pulsed beam current monitor developed at CAT.

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