Fig. A.7.1 1.25m undulator structure

Fig. A.7.2 4-cell PWT linac structure

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A.8 Restoration of RF cavity for synchrotron storage ring Indus-1

RF cavity for synchrotron storage ring, Indus-1, is made of stainless steel and it is internally electroplated with copper. The cavity is having an internal diameter of 840mm and length of 600mm. The cavity structure is re-entrant type and there are big "capacitor disks" at 10mm from the median plane which are attached to the end plates through 250mm long "drift tubes". Vacuum in the RF cavity of storage ring, Indus-1, started deteriorating in the month of June 2001 and within few weeks time the vacuum level deteriorated by 3 orders. The leak check, which became quite complicated due to the location and internal electroplated surfaces, showed a leak in the drift tube. Work was done to analyze the problem that involved, design of alternate structure and the cooling circuit, FEM analysis of temperatures and thermal deformations, tuning, manufacturing, electroplating, assembly, vacuum testing, RF testing and integration into the ring for operation. All the work of design and manufacturing was completed in two months time. The cavity is now working in the ring with a vacuum level of 1×10^{-8} mbar. The total thermal detuning is now less than 50kHz at 22kV, which is well within the on-line tuner range (80kHz), and start-up time is about 10 minutes.

Fig. A.8.1 View of one half of the RF cavity

Figure A.8.1 shows the view of one half of the RF cavity showing stainless steel outer structure, internal copper plated surfaces, large flange for helicoflex seal (with seal in place), capacitor disk, beam port, vacuum and tuner ports.

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A.9 Chemical cleaning of aluminum alloy dipole chambers of Indus-2

Indus-2 storage ring vacuum envelope consists of 16 dipole chambers each of length 3.6m, with a bending angle of 22.5°. Aluminum alloy 5083 H321 plates were machined in two halves and welded on mid plane for making dipole chambers. Aluminum being highly electropositive is converted to aluminum oxide upon exposure to air. The thickness of the oxide layer will depend on the treatment it has undergone during fabrication and storage conditions. At temperatures above 340°C, magnesium is incorporated into the oxide film by diffusion, forming a duplex film of aluminum and magnesium oxides. Lubricants used during