Status of the IH Structure for REX-ISOLDE ◇

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For the REX-ISOLDE-project an IH-structure has been designed serving as booster accelerator for radioactive ions from an energy of about 300 keV/u to an extraction energy that could be varied from 1.1 MeV/u to 1.2 MeV/u by capacitive plungers [1]. The power resonator has been developed according to results of a diploma thesis [2]. The resonator vacuum tank consists of three parts: The upper and lower shell and the center frame, which are all manufactured at NTG. The center frame has been made out of one block of steel and is carrying the ridge of drift-tubes.(fig. 2) In all three parts of the tank a water cooling system has been installed to avoid overheating. In order to tune the tank to the CERN frequency of 101.28 MHz, measurements of the resonance frequency had been made and were compared to MAFIA-calculations [3]. As a result one could calculate the necessary change for the height of the resonator tank. After having done geometrical changes, frequency-measurements always had to be passed once again. The tank will be copper plated at GSI in the beginning of 1999 and will be vacuum tested afterwards.

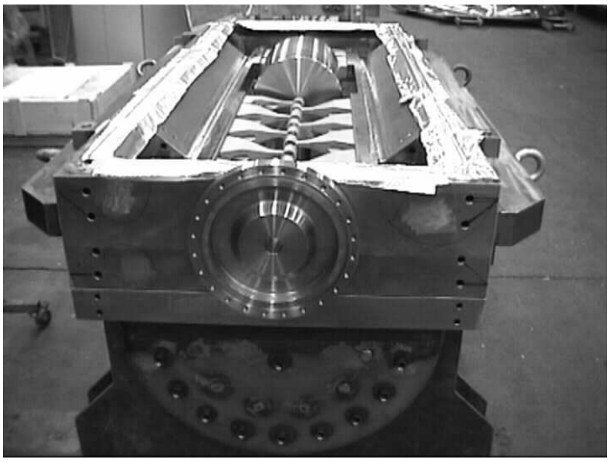

Fig. 1: The IH-tank in a rather raw state. The center frame carrying the drift-tubes is fixed on the lower shell. The blank metal part inside the shell at the end is the dummy for the triplet lens.

For the transverse focusing in the first acceleration section an inner tank quadrupole triplet lens has been installed inside a water cooled vacuum housing (see fig. 3), which will be copper plated together with the tank, the drift tubes and the piston tuners. The piston tuners are finished, the piston tuners' drives are in production. With these capacitive plungers it will be possible to vary the final energy between 1.1 MeV/u and 1.2 MeV/u. The result of changing the final energy in this way has been examined once more by a detailed MAFIA model of the power resonator. The calculations are in good agreement with measurements taken from a 1:2 down scaled model of the resonator and show that the design gap voltage distribution can be achieved in the power resonator for both final energies with the proper resonance frequency.

Fig. 2: Between the low energy part (left in picture) and the high energy part (right in picture) a dummy of the quadrupole triplet has been mounted to simulate the RF-behaviour of the lens in order to measure the proper resonance frequency. Inside the accelerator there are 20 gaps on a distance of 1.5m

Fig. 3: The inner quadrupole triplet lens from DANFYSIK without the water-cooled vacuum-housing.

References

[1] D. Habs *et al.*, Nucl. Instr. Meth. **B139** (1998) 128
[2] B. Keil, diploma thesis, LMU München, 1997
[3] H. Bongers *et al.*, this report p.78

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