Report of visit at DESY

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Cavity Thermal Design

- The cavity is operated at an equilibrium temperature, which depends on the input RF power. The global temperature rise is not an issue. The cavity tuning is kept by changing input cooling water temperature.
- Temperature gradient in the cavity is, however, not desirable because it causes the cavity deformation, de-balancing the field.
- Basically, the analysis is made by the static model.
- Dynamic state has been analysed by Paramonov. A large cooling capability does not cure deformation and detuning. A high stiffness is the only way to cure the problem. SUS shield is placed for that purpose.

Cooling Water

- Temperature of cooling water then depends on input RF. Typically, 20deg C.
- Cooling water speed is less than 2m/s. Higher flow is troublesome because it may causes cavitation.
- Water flow and pressure 30 m^3 /hour, 6000 mbar=6e+5Pa.
- Delta T in and out coolant is not sure.

Cavity Fabrication

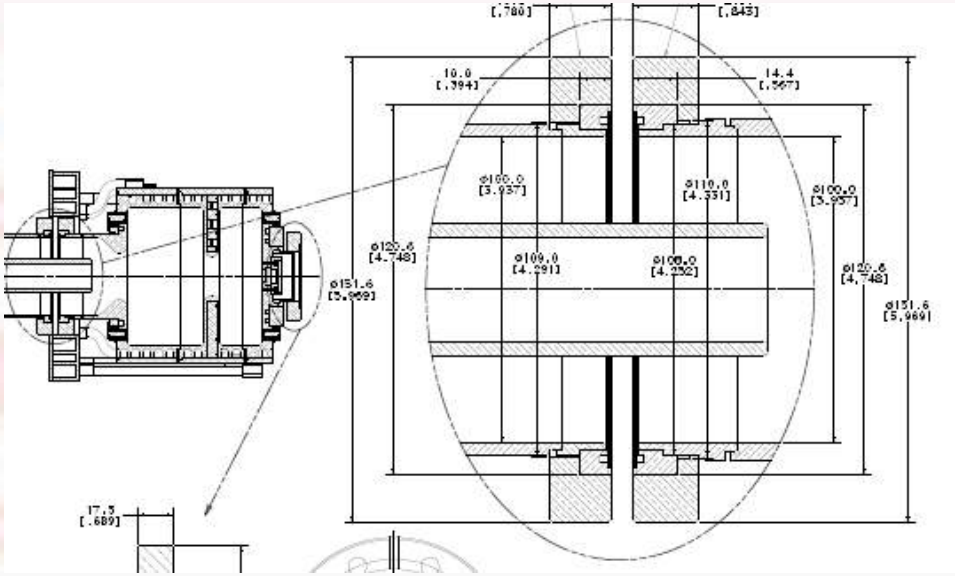
- Because frequency shift is out of control in the brazing process, the frequency is not finalized in the machining phase.
- The cavity frequency is then tuned higher than the target to reserve the tuning space.
- Generally, pushing the cavity is better than pulling the cavity to avoid any disturbances for the cavity surface.
- Machining technology is a conventional one, which is employed for an ordinal Cu accelerator structure.
- The brazing has been performed with vacuum, argon atmosphere, hydrogen atmosphere up to now. Any significant differences have been observed except the temperature control easiness.

Dark Current

- Dark current is typically 300μA with 42 MV/m. This number is taken with the cavity processed with the water shower cleaning. The water shower cleaning may be effective, but it could not be applied to the cathode end plate because of some geometrical limitation.
- Dry ice cleaning is performed for the latest cavity. The dark current becomes 1/10 (30 μA) in comparison with cavities processed with the water cleaning.
- The cathode and RF contact geometry is not changed at all. Be-Cu coil is still employed. If the new contact including the cathode plug and the end plate geometry, shows a signific-antly good performance, DESY will follow us.

Beam loading and Coupling

- The expected beam loading is small in RF gun because the beam current is much less comparing to ordinal NC acceleration and most of the power is dissipated by cavity wall.
- The energy in-flatness could be caused by SC and BC sections.
- Due to the small beam loading, the cavity is designed with 1.0 coupling to the RF source.
- The coupling is tuned by thickness of Cu gasket to connect the gun cavity and coupler. 9 mm thickness (squashed down to 7mm) for 1.0 coupling.



Some Pictures