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Cryomodule of KEK-ML cavity

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Concept of module design

Conceptual design :

- Operation at 20 MV/m; Pcav of >50W x 2 (degradation of Q?) Phom of 1.5 W x 2 (increase to 150W x 2) Performance test in long pulse or single cavity operation is possible.
- CW operation is limited at 15 MV/m. Pcav = 25 W/cavity
- Optimum location of HOM dampers 35 cm from the end cell
- Central cubic tower structure open structure for assembling easy alignment



He-jacket of cavity

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54

298.98

cavity :

> Ti-jacket

small bellows area to suppress the pressure effect

- 2 phase in He jacket for >50W load diameter of 300 mm
- 3 ports for cooling He inlet (14 mm), GHe outlet (54 mm) pre-cooling (14 mm)
- small area of jacket bellows: suppress the pressure fluctuation
- both end plate gives the center axis of the cavity
- supported by the Ti-frame(5K)







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HOM damper

- ➢ HOM of 1.5 W x 2 increases to 150 W x 2
- Not direct cooling with LN2: Thermal conduction cooling is simple in Japanese High Pressure Code.



He and Ne flow of the ML module

Frequency tuner

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Frequency tuner

- Slide-jack type tuner with a piezo fast tuner developed for the ILC cavity slide-jack: stroke of 3mm (1 MHZ) with a resolution of 0.1 μm piezo tuner: stroke of 4-8 μm at 2K
- Mounted on 2K He jacket

The motor is located outside of cryostat.

- Hold the beam pipe center on the beam axis.
- > Movement test is in progress on the prototype tuner.







Component asemmbling

5K frame :

- > Cavities and HOM dampers are fixed on the 5K frame.
- > Alignment targets are set on the 5K-frame.
- > The frame is covered with 5K and magnetic shield plates.
- > Cooled by LHe.



Main frame at RT

Back bone frame :

- > Main frame (back bone) is located at room temperature.
- 5K-frame and cavities are linked by the legs which can compensate the shrink of the legs, and move on the frame.



Schedule of cavities

Facility of cERL (ERL Test Facility)

tuner





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Cryomodule of ML cavity for cERL

- > Design and fabrication is under going.
- > Two phase He is in the 300mm jacket.
- > Helium jacket have three ports, inlet, outlet and pre-cooling.
- Operation gradient is limited at 15 MV/m. Performance test at 20 MV/m is possible in long pulse or single cavity operation.
- > Total assembling is scheduled in the summer of 2012.
- Cooling test will start in autumn.

For all talker of WG3

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