Summary of Meeting for S1-Global module design Cryomodule and Cryogenics
(20081111)
Date: 11 Nov. 2008
Time: 23:00-00:30 (Japan Time)
Attendant: Akira Yamamoto, Jim Kerby, Mark Champion, Don Mitchell, Chuck Grimm, Hitoshi Hayano, Carlo Pagani, Paolo Pierini, Serena Barbanotti, Tetsuo Shidara, Tug Arkan, Tom Peterson, Norihito Ohuchi

Agenda
(1) New design of FNAL cavity vessel and interface in Module C (Don Mitchell, Chuck Grimm)
(2) Progress of Module-C design (Norihito Ohuchi)
(3) Heat loads for cryogenics in RDR (Tom Peterson)
(4) STF cryomodule heat load (Norihito Ohuchi)
(5) GDE-meeting agenda for cryomodule and cryogenics session

Discussion
(1) Proposed new design of FNAL cavity vessel
- Two tuner positions for FNAL cavity are proposed, one is in the center between two support lags (current INFN design) and the other is the outside of two support lags (proposed design by FNAL). The second idea is coming from the sticky operation of the KEK tuner by piezo which was shown in India-TTC meeting.
- In the proposed design of moving the support lag positions, the position relation with respect to GRP is not plug-compatible. In the tests of blade tuner, there was no problem in the slow tuning. The friction coefficients were measured for the tuner system and they were sufficiently small.
- At present, there is no standard tuner and cavity vessel system as the standard for the ILC, the envelop definition is necessary for the plug-compatibility. It is necessary to understand the requirement of the design change to the proposal model.
- On Tuesday session at the Chicago GDE meeting, we continue the discussion based on the presentations by Carlo and Noguchi.

(2) Module-C design change by the KEK tuner position change
- The moving direction of the big vacuum bellows in order to make a space for connection work between Module-A and Module-C must be changed by the interference with this bellows and the tuner drive shaft of the new KEK tuner which was shown in the last meeting.
- For connection work between the module-C and the vacuum bellows, the Module-C length is redesigned to be 6000 mm.
- The position of the vacuum vessel support in the connection side is designed to move 100 mm to the input coupler port.
- KEK will send the drawing of the modified Module-C cryostat in the dxf format to INFN. The check of the tooling compatibility concerning of input coupler assembly will be done by the INFN group with consulting with DESY people.
- The length of 6100 mm can be available without any position change of the support of the vacuum vessel.
- The minimum length of the module can be considered.

(3) Revised heat load definition in RDR
- Dynamic heat loads in RDR are mostly scaled from Tesla TDR data by Chris Adolphsen and combined with the TTF experiment.
- The updated data are coupler heat loads and the static heat load of the support posts. The data in spread sheet is the good template for the new cryomodule.
- In the same spread sheet, the cryogenic plant analysis with using these heat loads is included.
- For the cryo-plant analysis from the LHC experiments and the industrial studies, the efficiencies of 200W/W at 5K ~8K and 700W/W at 2K are applied, and the operational margin of the cryo-plant is assumed to be 1.5.
- The cooling scheme which was proposed by Dana in JLab will improve the design efficiency for the ILC cryo-plant and turn down cryo-plant capability. However, it will not have impact on the estimate of cryo-plant size and cost.

(4) STF heat loads
- The heat loads of the 4 cavity-STF module were measured at 2K, 5K and 80K levels.

- The heat load at 2K by the evaporation of liquid helium was 4.9 W, and the summation of the heat loads of components in the module was 4.90 W by calculation with measured temperature profile. The major heat sources were RF cables for HOM couplers and monitors, and the Piezo cables.
- RF cables might be the important components for discussion of heat loads.
- Heat loads of RF cables in RDR are considered to have thermal anchors at 5K and 40-80 K. The data are coming from the Tesla TDR. The RF cable has a good electrical insulator, and then it is not clear that it is good as the thermal component at the thermal anchor. However, the static heat load of the RF cables in the TTF experiment was not so high.
- The heat loads at 5K by the temperature rise of 5K shield was 8.2 W, and the summation of the components at 5K level was 8.97 W.
- The heat loads at 80K by the temperature rise of 80K shield was 64.9 W, and the summation of the components at 80K level was 46.8 W with the assumption of the heat flux at 1.0 W/m^2.

(5) Agenda of the cryomodule and cryogenic session in the GDE meeting

- The agenda of the cryomodule and cryogenic session was informed and discussed.

Next meeting date and discussion items

Meeting Date: 25 November 2008 23:00 (Japan time), 7:00 (FNAL), 14:00 (INFN and DESY)

Discussion items

(1) Progress of S1-Global module design

(2) Others