Summary of Meeting for S1-Global module design, Cryomodule and Cryogenics (20090107)
Date: 09 Dec. 2009/01/07
Time: 23:00-00:00 (Japan Time)
Attendant: Akira Yamamoto, Jim Kerby, Paolo Pierini, Hitoshi Hayano, Tetsuo Shidara, Tom Peterson, Hirotaka Nakai, Norihito Ohuchi

Agenda
(1) WPM analysis in STF-cryomodule (Hitoshi Hayano)
(2) Pressure analysis in the vacuum vessel in case of cold trouble (Hirotaka Nakai)
(3) Progress of S1-G cryomodule CAD work (Norihito Ohuchi)
(4) WPs of the cryomodule and cryogenics (Norihito Ohuchi and Tom Peterson)

Discussion
(1) WPM analysis in STF-cryomodule

8 WPMs were installed for 4 cavities, and 5 WPMs were installed on the GRP in the STF cryomodule. Data of WPMs from 27 June 2008 to 18 July 2008 including cool down were discussed.

Summary of the presentation;

(1) GRP x direction: WPM data looks good. Net movements are 0~0.8 mm.

(2) GRP y direction: 2 WPM readouts of 5 were unstable. Net movements are -0.2~+1.0 mm.

(3) Cavity x direction: 2 WPM readouts of 8 were unstable. Net movements are -0.4~+0.2 mm.

(4) Cavity y direction: 2 WPM readouts of 8 were unstable. Net movements are -0.7~+0.5 mm.

Suspected reason of detection unstable

(1) Connection between WPM electrode and SMA-connector conductor pin.

(2) Connection between SMA feed-through at vacuum vessel and signal cable connector.

C: In the thermal tests with the STF-Module-B in this year, the positions of WPMs in the vacuum vessel will be calibrated, and the GRP deformations during cool-down will be measured by WPMs and optical instruments.

Q: After warm-up of the cryomodule, did the components go back to the initial positions?

A: The components almost went back to the initial positions.

C: Repeatability of WPM positions through several thermal cycles, which means repeatability of the positions of the cavities and the GRP, is very important.

C: It is good for the members that the next test of WPMs in April is planed during the GDE meeting in Tsukuba.

(2) Pressure analysis in the vacuum vessel in case of cold trouble

The target of this analysis is for assessment of pressure rise in cryogenic systems by numerical calculation when vacuum insulation fails, with according to the agreement to the Cryogenics Work Packages in November 2008.

Work direction;

(1) Reconstruction of the Fortran code by Walker in FNAL with Mathematica®.

(2) Improvement of the Mathematica® code to increase precision in calculation.

(3) Paper retrieval of other past works on the same subjects to compare with numerical simulations.

C: For the dead line of this analysis, the quick answer is not required, and in the phase-1 of the design work over one or two years, the results should be reviewed.

C: In the work of Ron Walker, the thermal insulator in the vacuum vessel was assumed to be Perlite. The results from the cryomodule crush test in DESY are something rather different from the analysis by Ron Walker. In the cryomodule, heat flux seems to be limited and influenced by the air inflow and the material outside of the cavity helium jacket (MLI, thermal and magnetic shields). In the cryomodule, the situation is complicated. The analysis conditions should be discussed in detail more.

(3) Progress of S1-G cryomodule CAD work

(1) It was pointed by the INFN group that the distance between the input couplers of Module-C was 1383.6 mm at 2K while this distance was 1384.15 mm at room temperature.

(2) The connection flange of input coupler on the vacuum vessel for XFEL is designed to locate at the distance of 1383.6 mm for the best condition at 2K.

(3) The distance of support legs on the gas return pipe at room temperature is 1385.6 mm for XFEL.

Designs of the locations of the connection flanges and the support legs in the KEK drawings are different from the above mentioned data. The KEK CAD data are improved in order to have consistencies for these components between two laboratories.

C: The INFN group has already started the construction drawing and discussion of the material size with Zanon. The documentations of the agreements, negotiations and integrated comments of interfaces for the Module-C of Zanon will be presented at the next meeting.

(4) WP of the cryomodule and cryogenics

The WPs of the cryomodule for TDP R&D plan update were confirmed on the modified points from the last discussion. These modified WPs were confirmed.

The modified parts;

(1) 1.3.3 Quadrupole, BPM and correctors assembly

Quadrupole package including BPM and correctors location, support, installation procedure, alignment, vibration, current leads.

BPM and correctors are added in the sentence.

(2) 1.3.6 Transportation

Seek transportable cryomodule (region to region).

Investigate transportation down to the tunnel through vertical shaft, with inclination (to save shaft size).

Transport study with inclination is included.

Next meeting date

Meeting Date: 20 January 2009 23:00 (Japan time), 8:00 (FNAL), 15:00 (INFN and DESY)