14th Summary of Meeting for S1-Global module design, Cryomodule and Cryogenics (20090601)

Date: 2009/06/01

Time: 22:00-23:00 (Japan Time)

Attendant: Jim Kerby, Tom Peterson, Don Mitchell, Paolo Pierini, Serena Barbanotti, Tetsuo Shidara, Hirotaka Nakai, Akira Yamamoto, Hitoshi Hayano, Norihito Ohuchi

All presentations are unloaded in the INDICO site:

http://ilcagenda.linearcollider.org/conferenceDisplay.py?confid=3619

Agenda

1. Updated construction schedule and quality control of Module-C (Paolo Pierini)
2. Updated sensor list (Norihito Ohuchi)
3. Summary of material study (1) (Hirotaka Nakai)
4. Others

Discussion

(1) Updated construction schedule and quality control of Module-C (Paolo)

・All materials for the vacuum vessel, the gas return pipe and the thermal shields are in ETORRE ZANON. And composite posts are available at INFN.

・The conditions of the manufacturing the vacuum vessel:

a. The plate was rolled and welded longitudinally for making the vessel.
b. Preparation of nozzles (opening for nozzle) for the next stage.
c. Preparation of external parts (flange and welding)

・The gas return pipe:

a. The plate was cut by the water jet.
b. The gas return pipe will be welded longitudinally at the next stage, and all support welded in June. And then it will be sent to machining.

・Thermal shields

a. All shield components have been cut by the water-jet cutting machine.
b. At the next stage, they will be welded, rolled and bended.

・The activities in E.Z. are completely on schedule.

C: Setting the sensors on the gas return pipe by KEK is scheduled on the last week of July.

(2) Updated sensor list (Norihito)

・The sensor list for the S1-G cryomodule was undated.

・For measuring the temperature profile of the HOM coupler, the carbon resistors, which will be calibrated with the Cernox sensors in KEK, is changed from the Cernox sensors. The sensors for the input couplers are the Cernox sensors.

・In the module-C, two cavities for each laboratory are installed. The input coupler of the one of two cavities will be measured with 5 Cernox sensors and 6 CC thermocouples, and the other one will be measured with the reduced number of sensors. For the KEK input couplers, the measurement method is the same.

・In the old list, the temperature profile of the gas return pipe would be measured with the 6 Cernox sensors and 6 CC thermocouples. In the new list, the profile will be measured with 6 PtCo sensors which can measure from 2 K to 310 K.

・For working of sensors in Zanon, the following sensors are assembled.

a. GRP: 8 PtCo, 12 Strain Gauges and 5 WPMs.
b. Support post: 4 PtCo sensors, 6 CC thermocouples.
c. Thermal shields: 3 PtCo sensors, 3 CC thermocouples.

C: Pt sensors are lower cost than the PtCo sensors, and the Pt sensor has better accuracy than the CC thermocouples. The Pt sensor is an industrial product, and then it is good to use the Pt sensors besides the CC thermocouples.

(3) Summary of material study (1) (Hirotaka)

・The acquired data: tensile strength, 0.2% proof stress, elasticity modulus and elongation

・Test temperature: 300K, 77K and 4.2K

・Tested materials: Nb (2 specimen types), Ti (2 companies), NbTi alloy, Nb-Nb joint, Nb-Ti joint, Ti-Ti joint (two companies), NbTi-Ti joint and Nb-SS316L joint (HIP, 2 companies)

・All samples containing Nb were annealed at 750℃ for 3 hours.

・Many photos of samples and test results are shown in the presentation.

・Summary of the presentation

1. A series of tensile tests have been carried out at KEK with metal materials and weld materials for application of special approval in accordance with high pressure safety regulations in Japan.
2. Some additional test may be required, because number of acquired data not enough for special approval.

Next meeting date

Meeting Date: 23 June 2009 22:00 (Japan time), 8:00 (FNAL), 15:00 (INFN and DESY)

Discussion items

・Updated construction schedule of Module-C (Paolo Pierini)
・Module-A design progress (Norihito Ohuchi)
・Summary of material study-2 (Hirotaka Nakai)
・Alignment measurement in Module-B (Kiyosumi Tsuchiya)
・Others