Draft: Minutes of ML-SCRF Technology Meeting (080903)

Date & Time:
13:00-14:21 GMT, September 3, 2008, using WebEx.

Participants:
H. Hayano, N. Ohuchi, T. Peterson, S. Fukuda, C. Adolphsen, A. Yamamoto, M. Ross, W. Bialowons, J. Carwardine, J. Kerby, E. Paterson, N. Toge, H. Padamsee, C. Pagani, P. Pierini, S. Barbanotti, Bob Kephart, S. Prat, Bob Rimmer, S. Mishra, S. Michizono, B. Chase, T. Matsumoto, T. Shidara

Presentation files are available at the following Indico site;
http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=2983

1) General announcement (A. Yamamoto)

- EC meeting at KEK (September 4 – 6)

The following items will be discussed; S0 R&D status, a new RF distribution system, CESR-TR, Plug-compatibility, Project Implementation Plan, Minimum Machine Design and preparation for PAC/AAP reviews and LCWS-08 (Chicago).

- JLab visit (September 11, 12)

Director (Barry Barish) and PMs (Marc Ross, Akira Yamamoto, Jim Kerby) will visit JLab to discuss its activities for ILC together with Mark Champion and Mike Harrison.

- LINAC-08, Asian Workshop (September 29 -)
- PAC (October 19 and 20)

2) TAG leaders' status report

- Cavity integration (H. Hayano)

- The 3rd cool-down test for the STF cryomodule (4 TESLA-style cavities) is scheduled from September 8 till November 28. High Power Test of 4 cavities (20, 20, 29, 20 MV/m) will be performed by connecting them to a tree-distribution and linear-distribution WG systems.
- Discussions on STF phase-2 has started. The application procedure to meet High Pressure Vessel Code has been already consulted. Schedule and design details are under discussion; a new project "Compton X-ray experiment" might divide the STF phase-2 schedule and it is necessary to pay attention to the plug-compatibility, design for cavity package (especially tuner) and available resources.
- Deeply EP-ed (100μm removal) TESLA-shape cavities (#5, #6) were inspected using the Kyoto-camera. The EBW seam part of cavity- #6 was also inspected beforehand.

- Cryomodule (N. Ohuchi)

The S1-Global cryomodule design is under way and 90% of the general design (3D - Modeling) has been completed. The details are discussed between INFN, FNAL and KEK. Module C locates closer to 2K - cold box and FNAL cavities are in the upper stream of this Module. The input-coupler directions for KEK and FNAL/DESY cavities are opposite with respect to beam axis. In the vacuum vessel, input couplers are assembled in the same direction to the KEK - BL cavities. The installation of the S1-Global cryomodule into the tunnel is presently scheduled in the Spring of 2010.

3) A new proposal for RF power distribution

- Clustered Surface RF Production Scheme (C. Adolphsen)

A new RF-power distribution scheme was proposed. It comprises clusters of 70 10-MW klystrons (housed with modulators in a single building on the surface), two ~0.5 m diameter evacuated circular waveguides feeding 350 MW into the accelerator tunnel (one upstream, the other downstream and totally to combined 64 RF units, or ~2.5 km of linac), and periodic tap-offs which feed 10 MW to a local PDS for a RF unit (3 cryomodule, 26 cavity). An appreciable amount of cost reduction will be expected since the service tunnel is eliminated and underground heat load will be greatly reduced. To test the feasibility of this scheme, in terms of power handling, we could build a resonant waveguide and build up the stored energy until it represents traveling waves on the order of 300 MW.

- KEK's Discussion about RF Cluster (S. Fukuda)

Pros and Cons for a new RF-power distribution scheme were discussed in KEK. Although the final conclusion has not yet been obtained, possible contributions from KEK were tabulated.

4) Comments from LLRF (S. Michizono, B. Chase and S. Simrock)

- Field regulation

Field regulation will be worse but may be still OK. Higher stability of subsystems will be required. Robust performance against perturbations or parameter changes will be significantly reduced. Field/current limits at operation will be lower and feed forward might be difficult due to the time delay between RF and beam (especially upstream RF distribution). Fast klystron loops should be used to reduce HLRF errors.

- Availability

Exception detection and handling may be limited and hot spare concept cannot be implemented

- Operational

We can not simply turn on-off individual RF station for commissioning, operational or diagnostic purposes. Setting up of linac cannot be done by incremental adding or controlling RF stations. Operation margin (for cavity quench, field emission and klystron saturation) will be reduced.

5) Plug-compatible definition (A. Yamamoto)

The plug-compatibility document intends to provide basic guide-line for SCRF cavity package and cryomodule designs aiming for an effective and efficient R&D in the Technical Design Phase (TDP). The document will be discussed at the EC meeting and will be presented at the PAC and AAP reviews. Quick comments and revisions from SCRF experts are highly requested.

- Basic Guide-line

- Cavity package to be plug-compatible and replaceable with any other cavity packages
- Flexible R&D and improvement can be made within the envelope
- Cavity package envelope will include (Cavity, beam-pipe, LHe vessel, Tuner, Input coupler).
- Cryomodule unit to be plug-compatible and replaceable with any other cryomodule packages
- Cyomodule unit include (Vacuum vessel, cold-mass support, pipes, (5K shield), 80 K shield, etc)

- Boundary conditions

The following boundary conditions are assumed;

- Three regions need to share tasks in production/construction to share in a fare balance
- R&D works are still required to improve the field gradient
- Multiple sources/productions may be necessary and important to prepare for redundant production capability with holding “insurance”

6) SCRF meeting schedule

- Post-TTC SCRF meeting: It became difficult to organize the Post-TTC SCRF meeting on October 23, because of various schedule conflict. We are seeking for a new schedule; either in the week of October 28 or November 3.
- Next SCRF WebEx meeting: October 1.
- LCWS-08, GDE meeting (November 17 - 21): Need to prepare for Plug-compatibility (overall definition) and a new RF distribution system.
- GDE meeting and AAP (interim) review will be held at Tsukuba in April (20 – 24), 2009.