Draft: Minutes of FNAL-SCRF Technology Meeting (080421-25)

Date & Time: 9:00, April 21-14:30, April 25 CDT, 2008; meeting at FNAL and using WebEx

Participants: L. Lilje, H. Hayano, N. Ohuchi, H. Carter, T. Peterson, S. Fukuda, C. Adolphsen, C. Pagani, R. Larsen, M. Champion, S. Prat, P. Pierini, S. Mishra, A. Yamamoto, N. Walker, M. Ross, P. Garbincius, J. Carwardine, W. Bialowons, N. Toge, K. Yokoya, D. Mitchell, R. Stanek, R. Kephart, E. Kako, K. Jensch, T. Saeki, C. Ginsburg, Y. Iwashita, R. Geng, F. Furuta, K. Tsuchiya, K. Ueno, K. Enami, S. Reeves, J. Ozelis, L. Cooley, G. Cancel, E. Daly, S. Nagaitsev, B. Chase, S. Michizono, Y. Yamamoto, S. Noguchi, T. Arkon, V. Ayazyar, J. Blazey, J. Branlard, C. Burkhart, S. Choroba, G. Ciovati, C. Cooper, T. Czarski, M. Foley, T. Hamerla, A. Hocker, C. Jensen, E. Jongewaard, V. Kashikhin, T. Khabiboullire, P. LeBrun, A. Makagov, C. Nantista, O. Nezhevenko, J. Norem, D. Olis, Y. Orlov, H. Pfeffer, P. Pfund, F. Poirier, V. Poloubotko, C. Reece, A. Roue, D. Sun, Y. Torun, A. Vignovi, H. Weerts, M. Wendt, T. Shidara; (Sorry! Not complete.)

Presentation files will be available at the following Indico site;
http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=2650

1) Monday 4/21: Cavity: Gradient R&D, performance, diagnostics (S0)

9:00 Opening Remark / Introduction; A. Yamamoto

- Reach consensus on parameters of SCRF functional design and Plug-compatible interface:
- Update TDP R&D plan and milestone:

  Cavity: Achieve 9-cell cavity performance of 35 MV/m (S0),
  Achieve cavity-string performance of 31.5 MV/m in cryomodule (S1)
  Cryomodule and Cryogenics: Establish plug-compatible design&optimum thermal balance
  HLRF/LLRF: Establish efficient power source and distribution system,
  MLI: Establish beam-handling design and boundary conditions, System Engineering,
  Cryomodule-String Test in one RF unit and with beam (S2)

9:30 Highlights from regions:
S0, process and test for Ichiro-5 Cavity; R. Geng
Optical inspection device; Y. Iwashita

11:00 Study Status, Concise, focus on standard for understanding:
Asia; E. Kako / F. Furuta
Americas; C. Ginsburg/G. Ciovati
Europe (XFEL); L. Lilje

13:30 Plans at each lab, and philosophy for evaluating performance, inspection, diagnosis:
DESY; L. Lilje

KEK/Kyoto U; H. Hayano, Y. Iwashita, K Enami

FNAL/JLab; M. Champion, JLab(?)

16:00 Strategies for Global R&D Plan (S0):

35 MV/m with yield of 50 % for TDP-1 and 35 MV/m with yield of 90 % for TDP-2

Progress:

- Fundamental understanding with chemical analysis and physical observation,

Further R&D:

- Countermeasure (project oriented)

  Test facility and instrumentation to be improved,

  Feedback loops for fabrication and test to be reinforced
- Fundamental Research for high gradient

  Encouraged in some fraction for high gradient

Consensus:

- R&D target in TDP1

  Improve physical inspections before chemical process and cold test

  35 MV/m with yield 50 % of chemical process in TDP-1

2) Tuesday 4/22: Cavity: Integration, Tuner, Coupler and String-Test (S1, S1-global)

9:00 Tuner:

Lorentz detuning and discussions; Y. Yamamoto

Ball-screw-tuner test results (for LL cavity); T. Saeki

Blade-tuner (update); C. Pagani

Reliability of the motor and the Maintenability; S. Noguchi

10:45 Discussions for tuner functional specification and comparison table; H. Hayano

13:00 Coupler:

XFEL coupler: S. Prat

Fixed/variable coupler: E. Kako

Cost difference&technical issues; S. Noguchi

Discussions on coupler specification and interface; H. Hayano

16:00 “Project X R&D at Fermilab”, joint session with Muon Coll. WS); S. Holmes

17:00 Cavity-string test in cryomodule (S1 and S1-global):

S1 plan at FNAL; S. Mishra

S1-global plan; N. Ohuchi

Progress:

- Functional specification and interface better defined:
- Understanding on reliability

  Tuner: Redundancy of “Piezo” helpful for minimum maintenance,

  Coupler: tunability may help to maximize the operational efficiency
- Global effort for cavity-string test (S1, and S1-global),

Further R&D:

- Tuner: Lifetime test for tuner piezo and motors,
- Coupler windows reliability
- Metal transitions,
- Beam pipe flange

S1 and S1-global

Consensus:

- It is very important to achieve the cavity-string test, redundantly planned:
- S1-global to be realize with international effort, within a time period of CY2009-2010

Further work:

- Cryomodule work to be optimized,

3) Wednesday 4/23: Cryomodule: plug-compatible interface, high-pressure, 5K-shield

9:00 Cryomodule: functional parameters and interfaces; N. Ohuchi

9:30 Interfaces (CAD-work boundary condition) of plug-compatible design; D. Mitchell

Interface to FNAL cryomodule; S. Nagaitsev

Interface to XFEL coupler; S. Prat

11:00 Parameters tables for interfaces; N. Ohuchi

Flange compatibility; JLab

13:30 High Pressure Gas Regulation:

Requirements and the regional constraints; T. Peterson

Comments and discussions for further works; E. Daly

16:00 Thermal balance in cryomodule/cryogenics:

5 K shield study at TTF cryomodule design; P. Pierini

5 K shield study at STF cryomodule design; N. Ohuchi

Lowering radiation shield (80K) temperature; T. Peterson

Progress:

- Functional specification and interface

Consensus:

Cryomodule diameter

Cryogenics design pressure

5 K shield: to be simplified for cost saving with keeping reasonable thermal balance (radiation shield cooled w/ go-line)

Further Work:

As an example, beam pipe flange and seal; to be unified,

Cryomodule: further design to be well plug compatible.

4) Thursday 4/24: HLRF/LLRF and MLI: Modulator, distribution, Beam-handling

9:00 HLRF: functional parameters and interfaces; S. Fukuda

9:15 Optimal Ql and Pk; J. Branlard

LLRF status of FLASH and STF; S. Michizono

LLRF requirement; S. Michizono

Maximum gradient power distribution; S. Noguchi

LLRF plan for NML at FNAL; B. Chase

11:15 HLEF status of XFEL; S. Choroba

Power Distribution System; C. Nantista

Design and R&D status at KEK and preparation for STF and S1-global; S Fukuda

13:30 R&D status of SBK; E. Jongewaard

R&D status of Marx Generator; C. Burkhart

15:20 Main Linac Integration (MLI):

Quadrupole R&D and Test Progress/Plan; V. Kashikhin

BPM and diagnosis; M. Wendt

Beam dynamics issues; P. LeBrun

Progress:

Understanding “power distribution system design with gradient distribution”

Operational overhead required more (LLRF)

Quadrupole R&D

Further work and decision:

Optimization of operational margin

Optimization of tunability

Evaluation of circulator elimination

5) Friday 4/25: Summary, TDP R&D plan, and work-assignment

9:00 Requirements for the Summary and Work Assignment; A. Yamamoto

9:30 Cavity-Process, Cavity-Integration; L. Lilje, H. Hayano

10:45 Cryomodule/cryogenics, HLRF/MLI; N. Ohuchi, T. Peterson, S. Fukuda, C. Adolphsen

13:30 General Summary; A. Yamamoto

Following items were discussed at the FNAL SCRF meeting;

- Cavity gradient R&D plan,
- Functional specification and Plug compatible interface,
- S1 and S1-global plan,
- Cost effective power distribution and optimum tune-ability.
- Static and dynamic tolerance in MLI and beam dynamic

We reached to the consensus for concept of plug compatible design and TDP R&D direction.

6) Next meetings

- Monthly SCRF WebEx meetings; 5/14, 6/11, 7/9, 8/6?, 9/3, 10.1,
- Work-package meetings; Determined by WP coordinators (or GLs)
- TTC meeting (at Dehli); October
- GDE meeting (at Chicago); November
- AAP review; January or February, 2009