Progress and Finding from EDR Kick-off Meetings

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Group Leaders Meeting,
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Tasks at KOM

- Review of RDR (BCD)
  - Verify design parameters and interfaces
- Discuss BCD and/or ACD
  - Unified design and/or plug-compatibility
  - Technical direction toward EDR
    - Industrialization and further basic R&D
- Develop Work Packages toward EDR

Progress of KOMs

Technical Group	Day, (Place)	Chaired / Supported by	
Controls	8/20 ~ (ANL)	J. Carwadine (ANL)	
CFS-US	8/22 ~ (FNAL)	V. Kuchler (FNAL)	
RTML	8/27 ~ (FNAL)	P. Tenenbaum (SLAC)	
CFS-EU	9/03 ~ (CERN)	J. Baldy / J. Osborne (CERN)	
CFS-AS	9/10 ~ (KEK)	A. Enomoto (KEK)	
Cryomodulde & Cryogenics	9/12 ~ (KEK)	H. Hayano, N. Ohuchi (KEK) T. Peterson (FNAL)	
Cavities	9/19~ (DESY)	L. Lije (DESY), H. Hayano (KEK)	
E-source	9/24 ~ (SLAC)	A. Bachmann (SLAC)	
Main Linac Int.	9/27 ~ (FNAL)	C. Adolphsen / T. Shidara (SLAC)	
HLRF	10/1~ (SLAC)	R. Larsen (SLAC), S. Fukuda (KEK)	
E+source	10/8 ~ (Cockroft Inst)	J. Clarke (CCRC), J. Urakawa (KEK)	
Beam Del. Sys.	10/11~ (SLAC)	A. Seryi (SLAC)	
Damping Ring	11/5~ (Cockroft Inst)	A. Wolski (LBNL)	planned

We deeply thank RDR/EDR group leaders and chair (support) persons

General Finding from KOMs (1)

- Design parameters to be verified:
  - Parameters lists of each component,
  - Interface between components,
- Plug-compatible concept critically important to allow:
  - Improvement of base-line design during EDR,
  - ACD with keeping plug-compatible interface,

- Complimentary R&D important
  - Learn most effective industrialization experience from XFEL
  - Further advanced/basic R&D to be complementary carried out
    - For upgrade of the BCD design based on the previous industrialization experience (with less additional demonstration)

Technical Findings from KOMs (2)

Technical Group	Day	Finding (technical topics)
Controls & LLRF	8/20 ~	High availability control and redundancy
CFS-US	8/22 ~	ACD development
RTML	8/27 ~	Common housing/integration, beam dynamics (emit. Preservation)
CFS-EU	9/03 ~	Experience at LHC, Safety, IR Hall structure, exp. from Olympic
CFS-AS	9/10 ~	Time scale required to reach construction, exp. from ITER
Cryomodule & Cryogenics	9/12 ~	Important plug-compatible interface definition, Thermal balance optimization b/w cryomodule and cryogenics, exp. at LHC.
Cavities (process, and production)	9/19~	< E> 30 toward 35 MV/m, Process, Shape, compatibility, Industrialization (XFEL exp.+ ,,) & further improvement (BCD/ACD)
E-source	9/24 ~	Cathode demonstration and vacuum R&D crutical
Main Linac Int.	9/27 ~	Beam dynamics (HP/HOM), Quad. alignment, dE/E acceptable?
HLRF	10/1~	Marx Gen. (ACD) encouraging, Effic. RF distributor, Min. remote cntl
E+source	10/8 ~	Target survivability, undulator, flux concentrater,
Beam Del. Sys.	10/11~	Crab and IR geometry, extendable to 1 TeV
Damping Ring	11/5~	Expect – beam dynamics

Parameters and Interface
Example: Cavity

Category	Item	Parameters	Notes
RF properties	Freguency	1.3 GHz	
	Number cels	9	
	Gradient, Q0	31.5 MV/m, 1.0 E10	In operation
		35 MV/m, 0.8 E10	In vertical test
	HOM damping	Q =	
		R/Q =	
	Short range wake	TBD	
	Temperature	2 K	In operation
Phys. Properties	Length	(1.36) m	
(interface)	Aperture	(60/80) mm	
	Alignment acc.	300 um	
	Wall thcikness	2.8 mm	
	Stiffness		
	Flange/seal system	Material ?	
	Max pressure		
	Lorentz F detuning	1.00 kHz	with flat top at 35 MV/m
	…	….	

Summary

- Design parameters and Interfaces to be well defined,
  - Plug compatible interface to be fixed,
- Industrialization and further basic R&Ds
  - Complementary efforts important

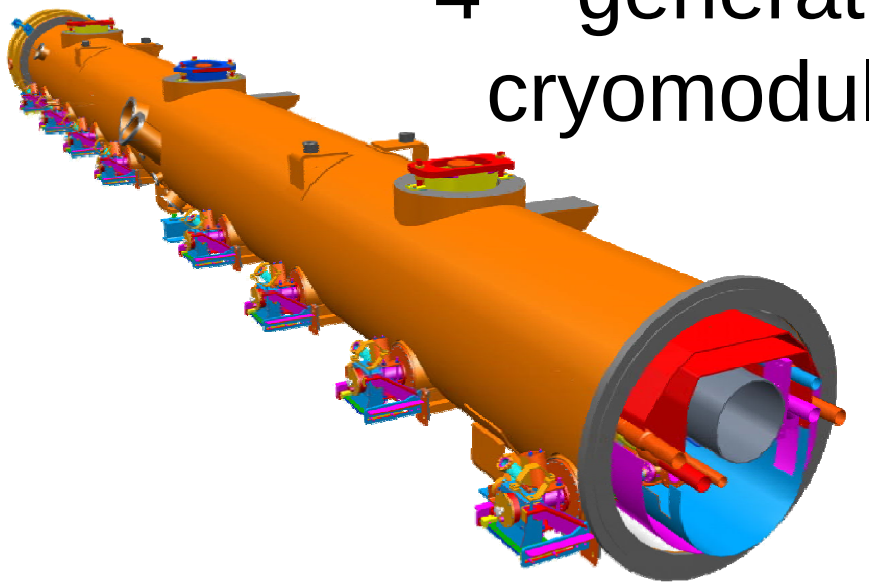
- Work packages to be established,
- Technology to be established with saving/optimizing cost, towards EDR
  - To be well discussed in parallel sessions,

Appendix

Cavities & Cryomodules

Producing Cavities

4th generation cryomodule



Subdivision	Length (m)	Number
Cavities (9 cells + ends)	1.326	14,560
Cryomodule (9 cavities or 8 cavities + quad)	12.652	1,680
RF unit (3 cryomodules)	37.956	560
Cryo-string of 4 RF units (3 RF units)	154.3 (116.4)	71 (6)
Cryogenic unit with 10 to 16 strings	1,546 to 2,472	10
Electron (positron) linac	10,917 (10,770)	1 (1)

Strawman CM schedule (Stanek)

ID	Task Name	Duration	Start	Finish
1	**Ongoing Cryomodule Production**	**95.6 mons**	**Mon 8/3/07**	**Fri 12/26/14**
2	**XFEL Schedule**	**84.7 mons**	**Tue 7/1/08**	**Fri 12/26/14**
4	XFEL Pre-Series Results Available	0 mons	Mon 6/28/10	Mon 6/28/10
9	**ILCTA Schedule**	**61.86 mons**	**Tue 9/18/07**	**Thu 8/1/11**
10	Refrigerator #1 Operational	0 mons	Tue 9/18/07	Tue 9/18/07
11	CM1 (DESY kit) Complete	0 days	Wed 11/21/07	Wed 11/21/07
12	Cryo System Components Installed	0 mons	Mon 6/16/08	Mon 6/16/08
14	CM1 Tests Complete	0 mons	Fri 10/3/08	Fri 10/3/08
15	Refrigerator #2 Operational	0 mons	Thu 7/31/08	Thu 7/31/08
16	INFN Places Order for CM2 Cold Mass	0 mons	Tue 10/16/07	Tue 10/16/07
18	CM2 Cold Mass Parts Available	0 mons	Mon 6/23/08	Mon 6/23/08
20	CM2 Complete	0 mons	Mon 10/13/08	Mon 10/13/08
25	CM3 (Type IV) Complete	0 days	Wed 1/21/09	Wed 1/21/09
28	ILCTA Results Available	0 mons	Mon 7/20/09	Mon 7/20/09
30	ILCTA Running at Low Rep Rate	0 mons	Mon 12/6/10	Mon 12/6/10
32	ILC-like RF Unit Operations Begin	0 mons	Thu 9/1/11	Thu 9/1/11
33	**STF-1 Schedule**	**20 mons**	**Mon 8/3/07**	**Fri 3/13/09**
39	STF-1 Results Available	0 mons	Fri 3/13/09	Fri 3/13/09
40	**STF-2 Schedule**	**35.6 mons**	**Mon 3/16/09**	**Fri 12/2/11**
44	STF-2 CM Assembled (not tested)	0 mons	Fri 11/19/10	Fri 11/19/10
47	STF-2 Results Available	0 mons	Fri 12/2/11	Fri 12/2/11
48	**BCD Cryomodule Design**	**68.86 mons**	**Wed 8/1/07**	**Fri 2/24/12**
49	**Type IV Design**	**6 mons**	**Thu 11/1/07**	**Wed 3/19/08**
50	Initial Drafting Pkges Complete	0 mons	Thu 11/1/07	Thu 11/1/07
55	Type IV Design Complete	0 days	Wed 3/19/08	Wed 3/19/08
56	**Type V (ILC_1) Design Decisions**	**68.86 mons**	**Wed 8/1/07**	**Fri 2/24/12**
57	Begin Type V (ILC_1) Design	0 days	Wed 3/19/08	Wed 3/19/08
77	Type V (ILC_1) Design Complete (w/o Cav Shape)	0 days	Mon 9/20/10	Mon 9/20/10
78	**ACD Cryomodule Design**	**13 mons**	**Mon 3/17/08**	**Fri 3/13/09**
79	**Type ACD Design**	**13 mons**	**Mon 3/17/08**	**Fri 3/13/09**
81	Type ACD Design Complete	0 mons	Fri 3/13/09	Fri 3/13/09
82	**ILC Final Design**	**41 mons**	**Mon 2/27/12**	**Fri 4/17/15**
87	**ILC_1 CM Accepted as new Baseline**	0 mons	Fri 4/19/13	Fri 4/19/13
89	**Ready for Large Scale Production of ILC CM**	0 mons	Fri 4/17/15	Fri 4/17/15