Push-pull studies
How to proceed

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LCWS07
June 1, 2007 at DESY

Global Design Effort

Goal of this talk

- This is not a talk on status of push-pull studies
  - **See next two talks on push-pull related updates since Valencia and other talks in MDI sessions**

- The goal is to discuss, and get your feedback on the way to focus the Engineering Design efforts
  - **Process; Goals; Work Packages?**

Focus of EDR work in BDS

from S4 & RDB report

- **Integrated design of IR, development of IR superconducting magnets, *build engineering prototype of FD magnets*, design study to ensure IR mechanical stability, design of push-pull arrangements**
- development of crab cavity systems, *test phase control system with two single cell cavities, build single multi-cell cavity*
- design, *construction, commissioning and operation of ATF2 test facility*
- develop laser wires for beam diagnostics, *prototype laser wires at ATF2*
- development of intra-train feedback, *prototype at ATF2*
- develop beam dump design & *study of beam dump window survivability*
- develop collimator design, *verify collimation wake-fields & beam damage*
- development and *tests of MDI type hardware such as energy spectrometers, IP feedback BPMs, beamcals, etc.*
- **and the design work, which does not involve hardware development but use results of the above listed work**

related to push-pull studies

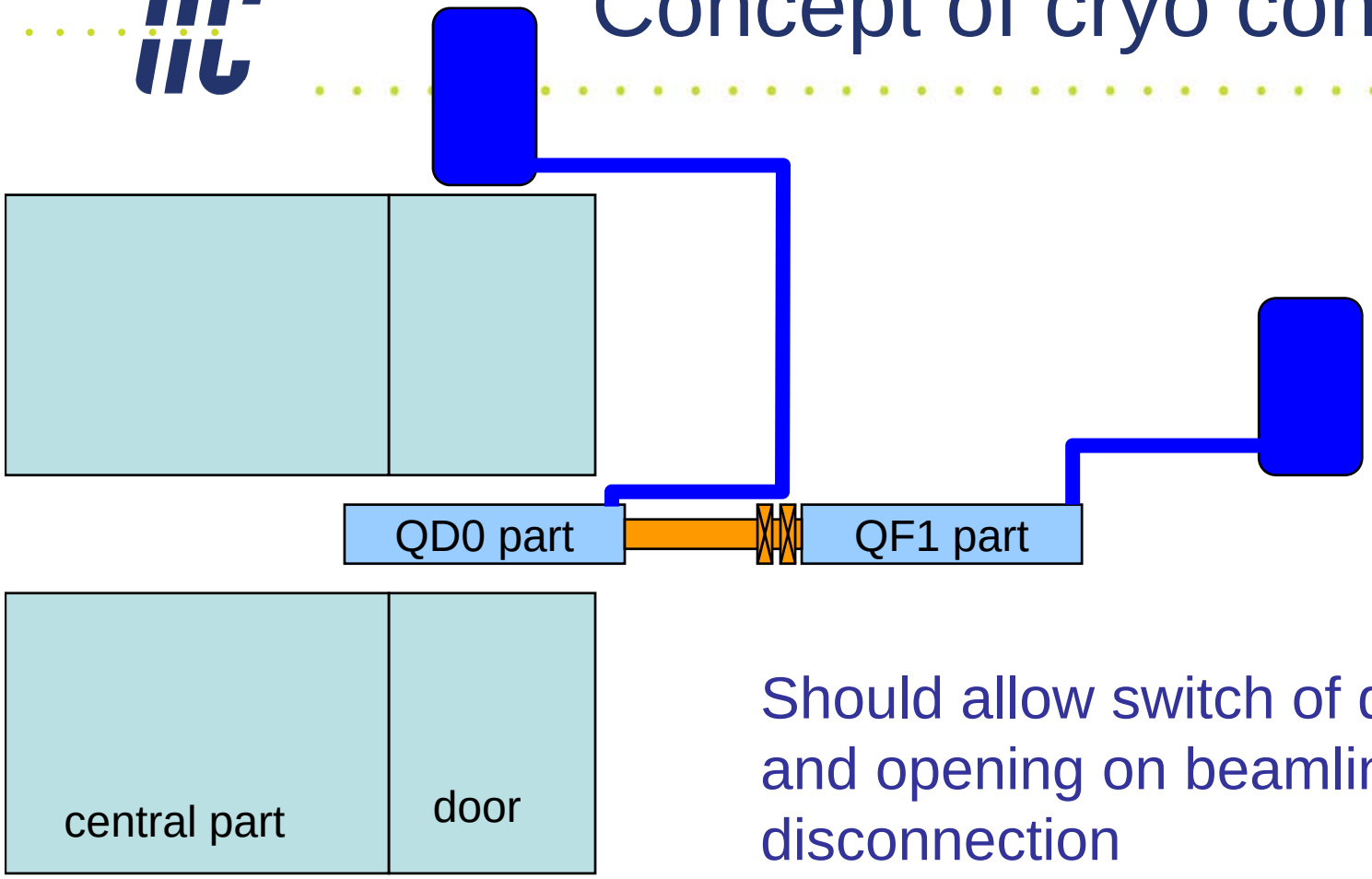
(*hardware in italic*)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	EDR			Approval		Construction							Commiss.
Constraints				LHC physics	total length frozen		tunnel & optics layout frozen		optics details frozen		tunnels ready for install-n		
Beam dumps	beam dump conceptual design and critical tests			pre approval		beam dump final engineering			b.dump design frozen	beam dump construction		beam dump installed	
crab cavity	design, build & test of conceptual phase control system; cavity fabrication; conceptual cryostat design; LLRF develop and test with single cells			design of cryostat; cavity integration; beam test of one cavity		beam tests of two cavities		final engineering		production		installed	
ATF2	ATF2 construction and installation. Start of commissioning		Commissioning	Beam size and optics results	Beam stability results	2nd phase, e.g. SC FD; smaller emittance & beam size		Instrumentation developments and tests at beamline					
Final Doublet	Engineering design; full length prototype; stability design study and initial stability tests			Stability tests & design optimization		final design		production		lab tests	installation and pre-commissioning		
Detectors	Conceptual design; selection of two concepts; continue design			Design optimization		final design and start of production		Construct, assemble and pre-commission on surface				Lower down & commiss.	
IR integrated	Conceptual eng. design of IR vaccum chambers; supports; pacman and moving shielding; cryogenic; service platform; detector moving system; cranes; etc.			Detailed eng. design of integrated IR with finalized choice of two detectors for final design		final design and start of production		production			installation and pre-commissioning		
Magnets	Optimization of number of styles; conceptual design of most magnets; definition of interfaces; Detailed design of low field and other special magnets; Vibration -wise design			Design and cost optimization; layouts with real space allocation, and detailed interfaces.		final design & needed prototypes		production			installation and pre-commissioning		
Collimation	Tests of collimation wakefields and beam damage tests; conceptual eng. design			Detailed eng. design; optimization & integration into beamline		final design & pre-production prototypes		production			installation and pre-commissioning		
Instrumentation	Develop laser wires; test feedback BPMs with secondary beam; conceptual eng. design			Detailed eng. design; optimization & integration into beamline		final design & pre-production prototypes		production			installation and pre-commissioning		
Vacuum systen	Physics and conceptual eng. design. Detailed design of IR vacuum chamber.			Detailed eng. design; optimization & integration of beamlines		final design		production			installation		

related to push-pull studies

Overall tentative schedule of EDR work in BDS

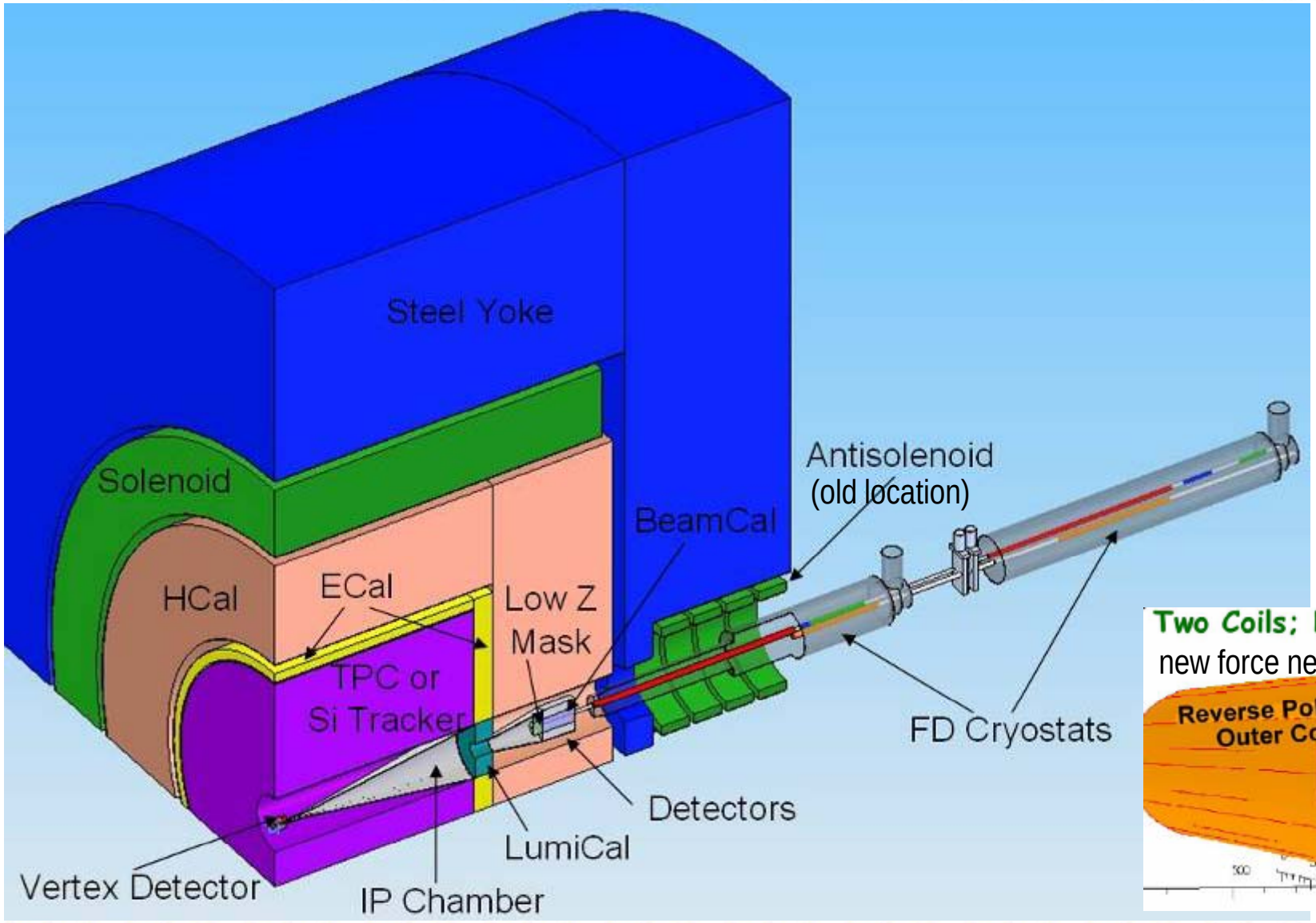
Concept of cryo configuration

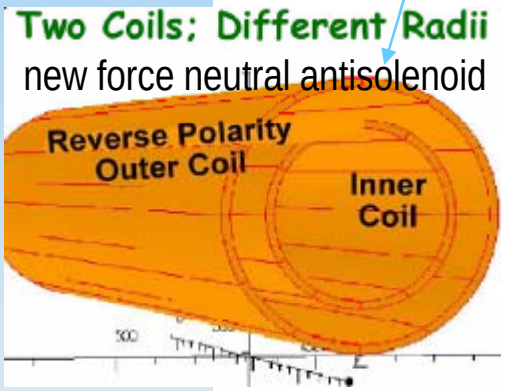


Should allow switch of detectors and opening on beamline without disconnection

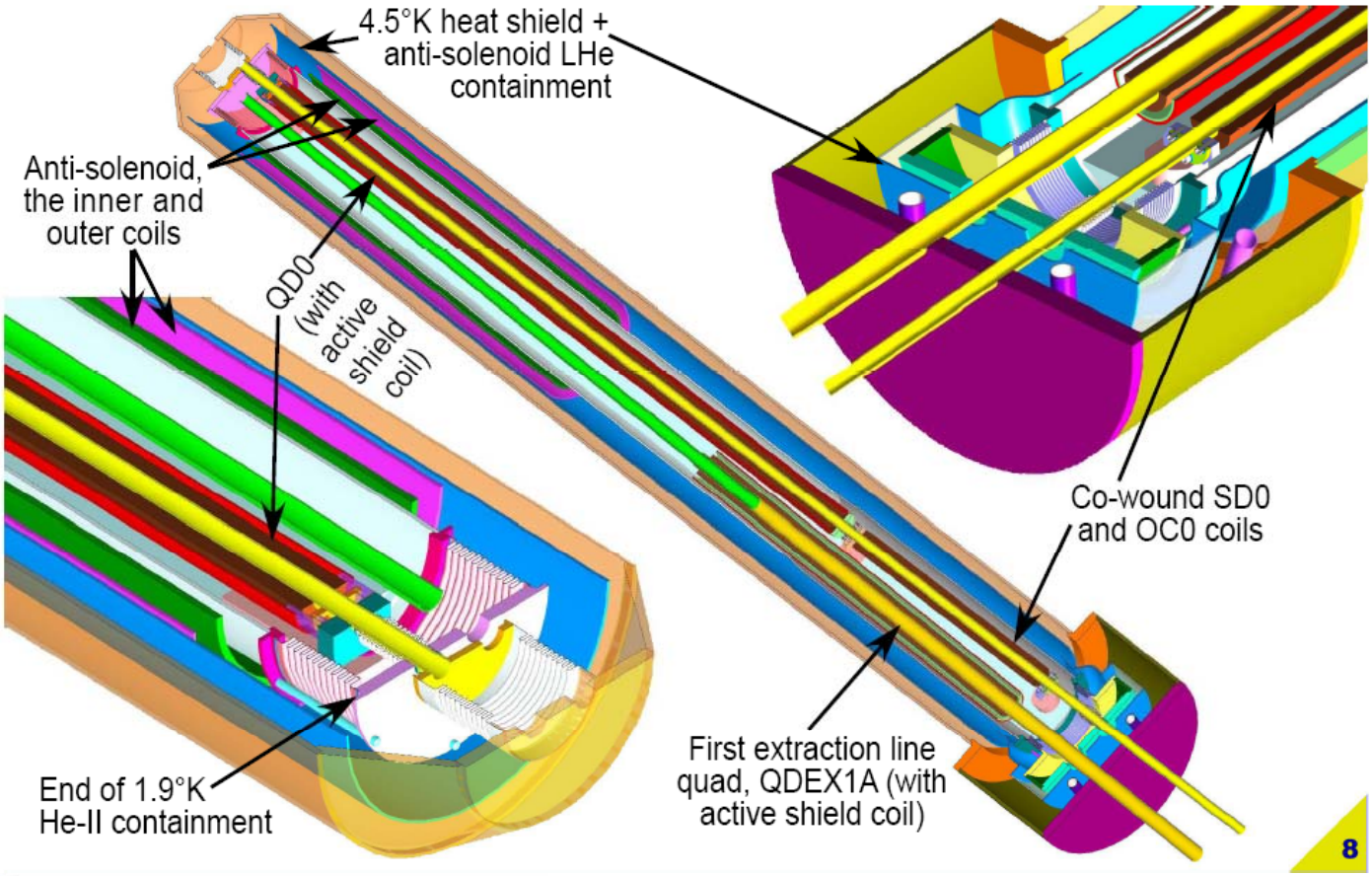
For IR integrated design, the goal, in a nutshell, is to evolve from cartoon-concept level schemes like the one above, to detailed 3d drawings of the system

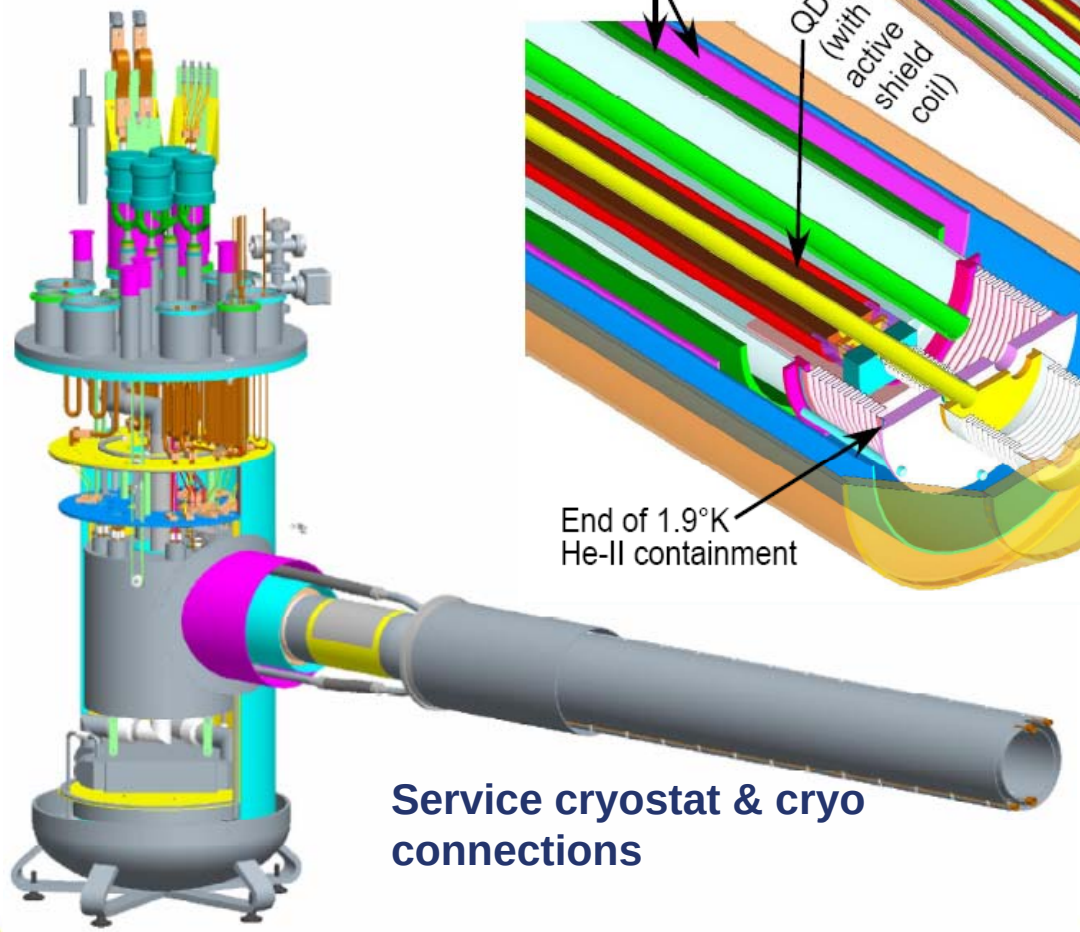
IR integration, a start





FD & IR cryo design, start





BNL

Service cryostat & cryo connections

Workshop on ILC Interaction Region Engineering Design

SLAC, September 17-21, 2007

http://www-conf.slac.stanford.edu/ireng07/

- **Goal: To review and advance the design of the subsystem of the Interaction Region of ILC, focusing in particular on their integration, engineering design and arrangements for push-pull operation.**

- **… goal is to make progress on the design of the ILC IR through focused preparation before and during the workshop…**

- **The International Program and Advisory Committee is being formed. Its charge includes organization of preparatory work before the workshop and production of conceptual solutions and drawings that could be further discussed and reviewed at the workshop…**
  - **this is an attempt to align the organization of the workshop with EDR WP organization ➔ how to do it optimally?**

IR Eng. workshop: tentative working groups

Group A	**Overall detector design, assembly, detector moving, shielding.** Detector design for on-surface assembly and underground assembly procedures. Beamline pacman shielding, detector shielding design.
Group B	**IR magnets design and cryogenics system design.** Cryogenic system design, connections, flexible cryo lines, safety issues. IR magnet engineering design, support, integration with IR, masks, Luminosity & Beam calorimeters, deign of IR vacuum chamber, connection to elements, assembly-disassembly procedures, integration of near IR masks and overall integration of crab cavity.
Group C	**Conventional construction of IR hall and external systems.** Lifting equipment, IR electronics hut, cabling plant, services, shafts, service caverns, utilities, movable shielding;design solutions to meet alignment and vibration tolerances
Group D	**Accelerator and particle phicics requirements.** Including masking, collimation, shielding requirements, image charges, wakes, external radiation, accelerator physics & optics design and constraints on IR engineering design, on alignment tolerances and stability for the IR components and IR hall floor.

Does this map optimally to EDR WP structure

IR Eng. Workshop
Very tentative schedule

	9/17/2007	9/18/2007	9/19/2007	9/20/2007	9/21/2007
9:00-10:30	Introduction plenary, Kavli auditorium. Talks: 1) ILC IR and BDS design and workshop goals. 2) Physics requirements to IR design; 3) IR design experience from existing machines (LHC); 4) Experience from D0, CDF, PEP-II, KEK-B;	Plenary, Kavli. Talks: 1-3) Design and assembly of SiD, GLD-LDC, 4th concept; 4) Accelerator physics design of IR; 5) Alternative designs of IR	Parallel working groups, WG-A, WG-B. ROB rooms	Parallel working groups, WG-B, WG-D. ROB rooms	Post-summary work of working groups. ROB rooms or local offices
10:30-11:00	break	break	break	break	
11:00-12:30	Plenary, Kavli. Talks: Continue on IR deisgn from existing machines (IHEP, Frascati, etc).	Parallel working groups, WG-A: Overall detector design; WG-D: Acc and phys requirements. ROB rooms	Parallel working groups, WG-A, WG-C. ROB rooms	WG-A-B-C-D; Working tour to SLD hall	Post-summary work of working groups. ROB rooms or local offices
12:30-13:30	lunch	lunch	lunch	lunch	lunch
13:30-15:00	Plenary, Kavli. Talks: 1) IR conventional facility design 2) IR magnet and cryogenics design	Parallel working groups, WG-A, WG-D. ROB rooms	Parallel working groups, WG-B, WG-C. ROB rooms	Parallel working groups, WG-A-B-C-D, Summary preparation. ROB rooms	Post-summary work of working groups. ROB rooms or local offices
15:00-15:30	break	break	break	break	
15:30-17:00	Parallel working groups, WG-B: IR magnets design and Cryogenics systems. WG-C: IR hall conventional facility design. ROB rooms	Parallel working groups, WG-B, WG-C. ROB rooms	End of the day plenary discussions, Kavli auditorium	Plenary, Kavli. Summary talks, WG-B; WG-A	Reserve
17:00-18:00	Parallel working groups, WG-B: IR magnets design and Cryogenics systems. WG-A: Overall detector design. ROB rooms	End of the day plenary discussions, Kavli auditorium	End of the day plenary discussions, Kavli auditorium	Plenary, Kavli. Summary talks, WG-C; WG-D	Reserve