

Asian Status and Plan

K. Yokoya

KEK

GDE Mtg at FNAL, Oct.22.2007



Status of China, Korea, India

- Thanks to
 - Prof. V.C. Sahni (India)
 - Dr. J. Gao (China)
 - Dr. E.S. Kim (Korea)

for useful information.
- Visitors to KEK in JFY2007 (man-day)
(those by KEK budget only)
 - Korea 591
 - China 329
 - India 180
 - Taiwan 90
 - Others 31

- DR Design
 - Y.P. Sun, J. Gao, Z.Y. Guo (IHEP/Beijing Univ.) W.S. Wan (LBNL)
 - Proposing a Modified FODO Type ILC DR
 - Lower cost due to lower number of quadrupoles and sextupoles
- Bunch Compressor Design
 - ZHU Xiong-Wei and J. Gao (IHEP)
- Positron Source (Compton)
 - Joining the group lead by T.Omori (KEK)
 - X.P. Li, G.X. Pei (IHEP)
- Going to start GDE works on control system, Marx modulator, LET simulation, etc.

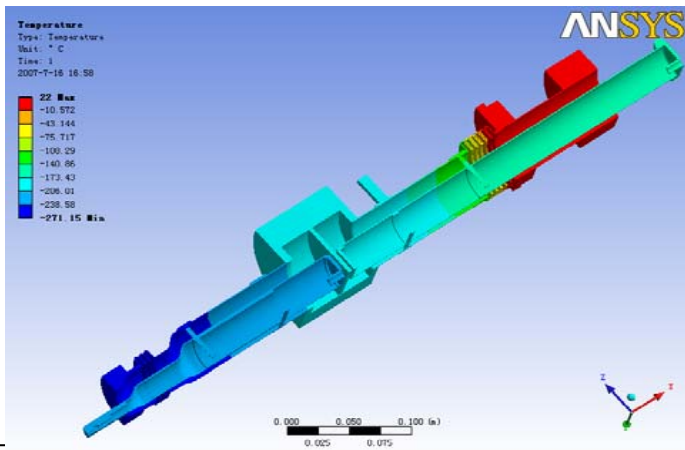
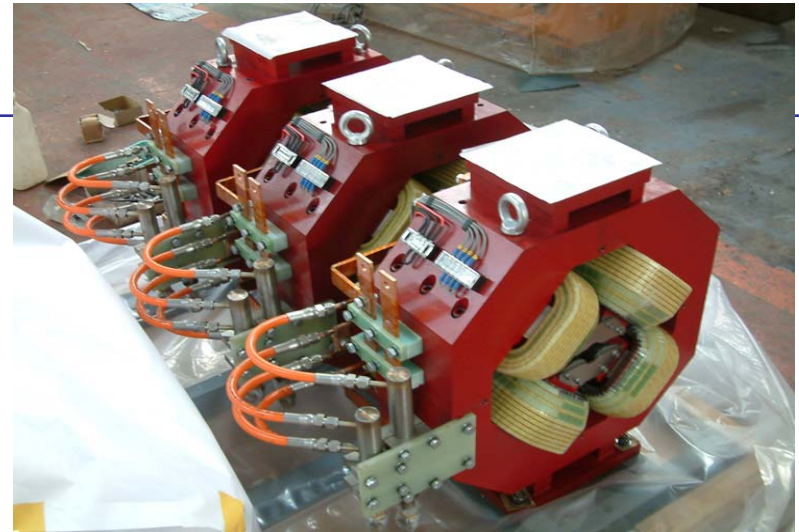


- KEK-ATF Collaboration

- 34 Q-magnets done
- Dipoles underway
- ATF2 optics

- KEK-STF

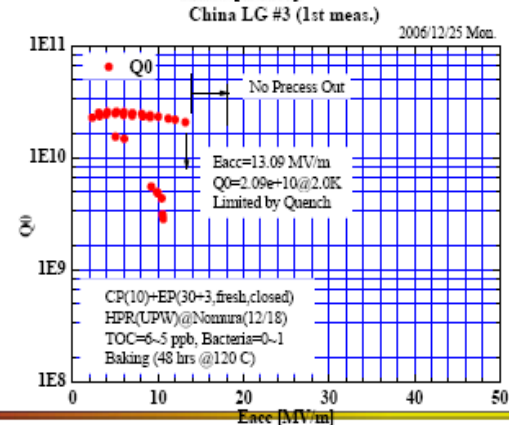
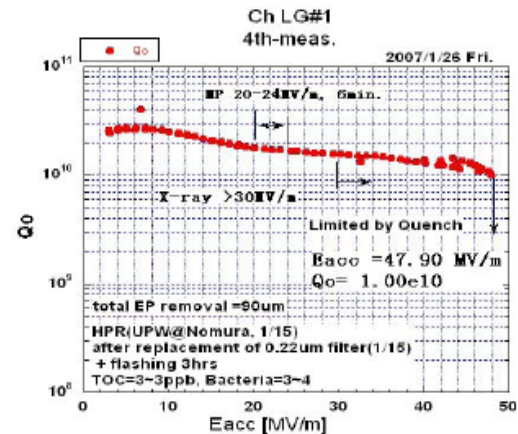
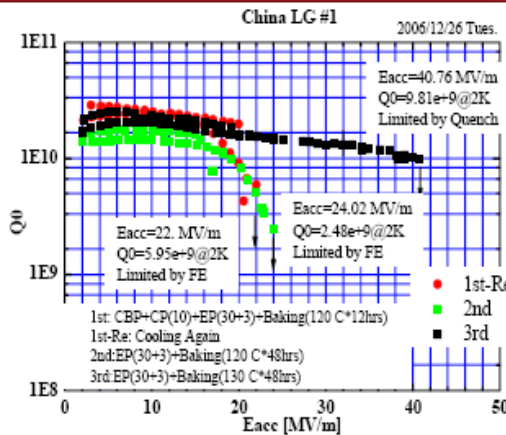
- Cryomodule design
vacuum barrier designed by IHEP group
- LLRF (cavity simulator-controller design, fast interlock system design)
- Coupler design (LL)



• LL Cavity

- Z.G. Zhong, J. Gao, J. Gu, H. Sun, Q. J. Xu, J.Y. Zhai
- 6 Single cell cavities fabricated
- One with NingXia Large grain recorded 48MV/m

Results of Cryogenic Vertical Tests- China LG #1



1. China LG #1 would be removed 30 micron per step by EP and the relationship of Eacc,max and thickness removed by EP was expected to achieve by serials of tests.
2. In the first two test, FE was very strong with large X-ray and limited maximum Eacc.
3. In the third test, the gradient once reached to 40.76 MV/m and the quality factor is almost 1.0 E+10.
4. For the 2nd and 3rd test, the cavity has been baked for 48 hours and no evidence of a strong degradation of the quality factor is seen in these tests.
5. China LG #3 was tested vertically only once. In the test, FE is very strong and the cavity is limited by quench. The roughness of the inner surface is very large without CBP. More EP and vertical tests would be continued.





CCAST ILC Workshop

- CCAST: China Center of Advanced Science and Technology, Director: T.D. Lee.
- International Workshop (Physics) held in June.
- ILC Workshop (Accelerator, CIAW07) is going to be held in Nov.5-6 at IHEP.

<http://ilc-china.ihep.ac.cn/CIAW07/index.html>

(Also, ILC Asia R&D
Workshop in Nov.6-7)

- Important step for active participation of China to ILC.



Korea (1)

- Budget for ILC (accelerator) ~ 0.3M\$ (M&S)
- DR
 - Optics (KNU)
 - Instabilities (KNU)
 - Ring-extraction jitter correlation study for ATF
- RTML
 - Short bunch compressor (KNU)
- BDS
 - IP-BPM and S-Band BPM for ATF2
 - Q-BPM for STF2 (done) (PAL)



Korea (2)

- SRF

- LL Cavity (PAL)

9-cell fabricated, to be tested at KEK



- Cavity design and processing (KNU, PNU)

- HLRF IOT (proposed) (CHEP)

- Cold-BPM development for STF (PNU)

- Construction of SRF Test Lab. in PAL (50% done)

- Frequency: 1.25-1.55 GHz, RF Power: ~100 W

- Test cryostat for cavity with 1-3 cells @1.3GHz



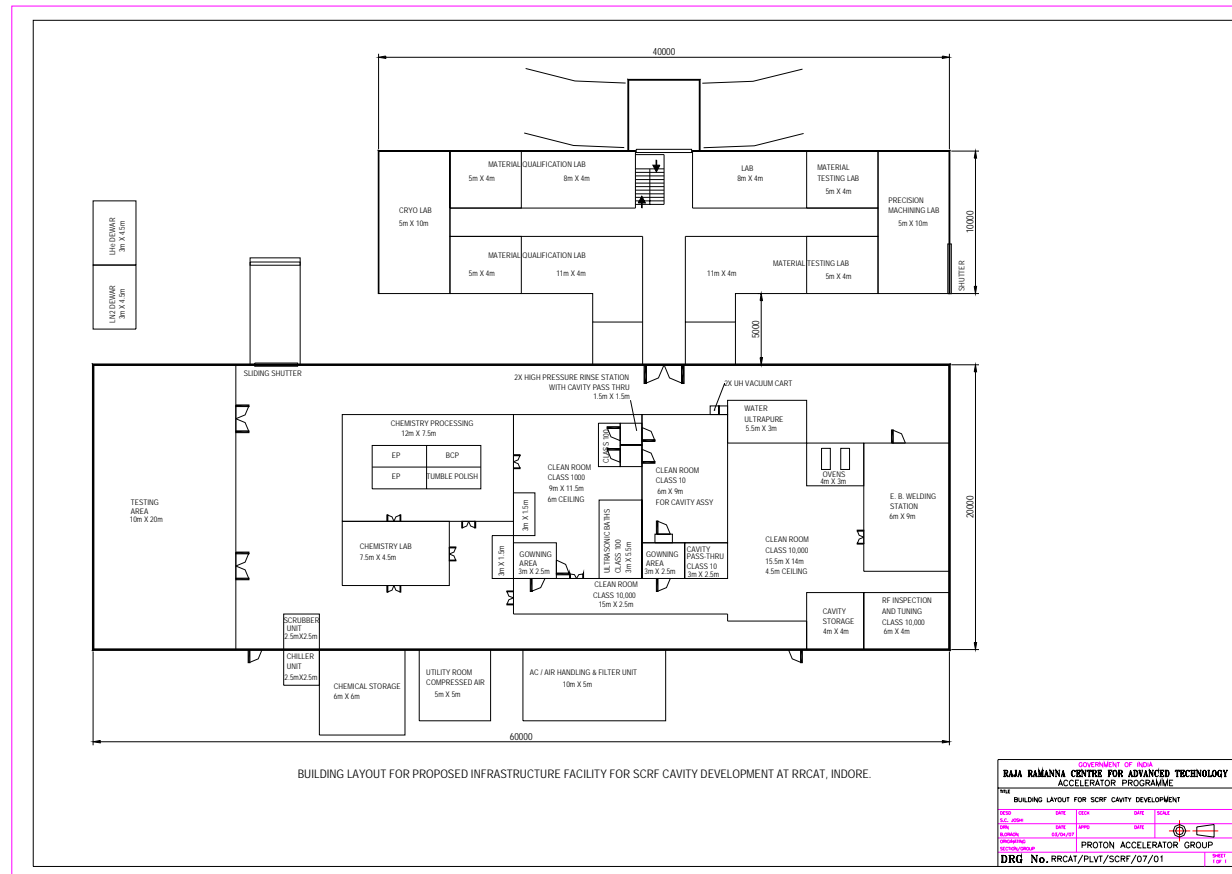
India

- Activity centered at RRCAT (Raja Ramanna Centre for Advanced Technology) at Indore
- Accelerator design for ILC
- SC material R&D
- Setting up SRF facility (For Proton driver, FEL, etc.)
- Partner institutes
 - (Indian DAE): RRCAT, BARC, VECC, TIFR; (Others) IUAC & DU.
 - (Overseas) FNAL, SLAC, KEK.



Proposed SRF Facility at RRCAT

- ~35M\$ in total
- Approval “in principle”, but "actual sanction“ under process (wait till early next year)
- Detailed design started
- Include
 - Cavity fab.
 - EBW
 - CP, BP
 - Clean rooms
 - HPR
 - etc





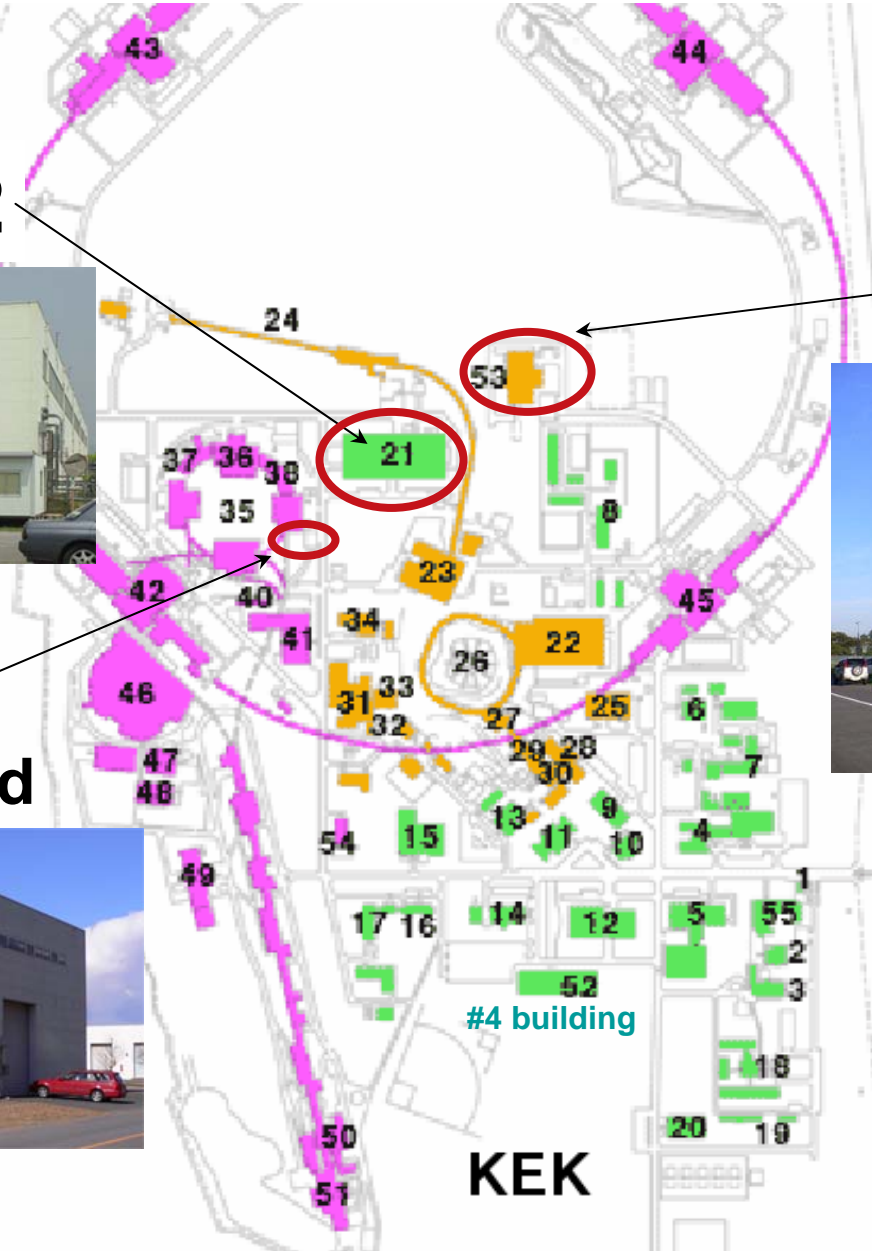
ILC-Related Facilities at KEK

ATF/ATF2

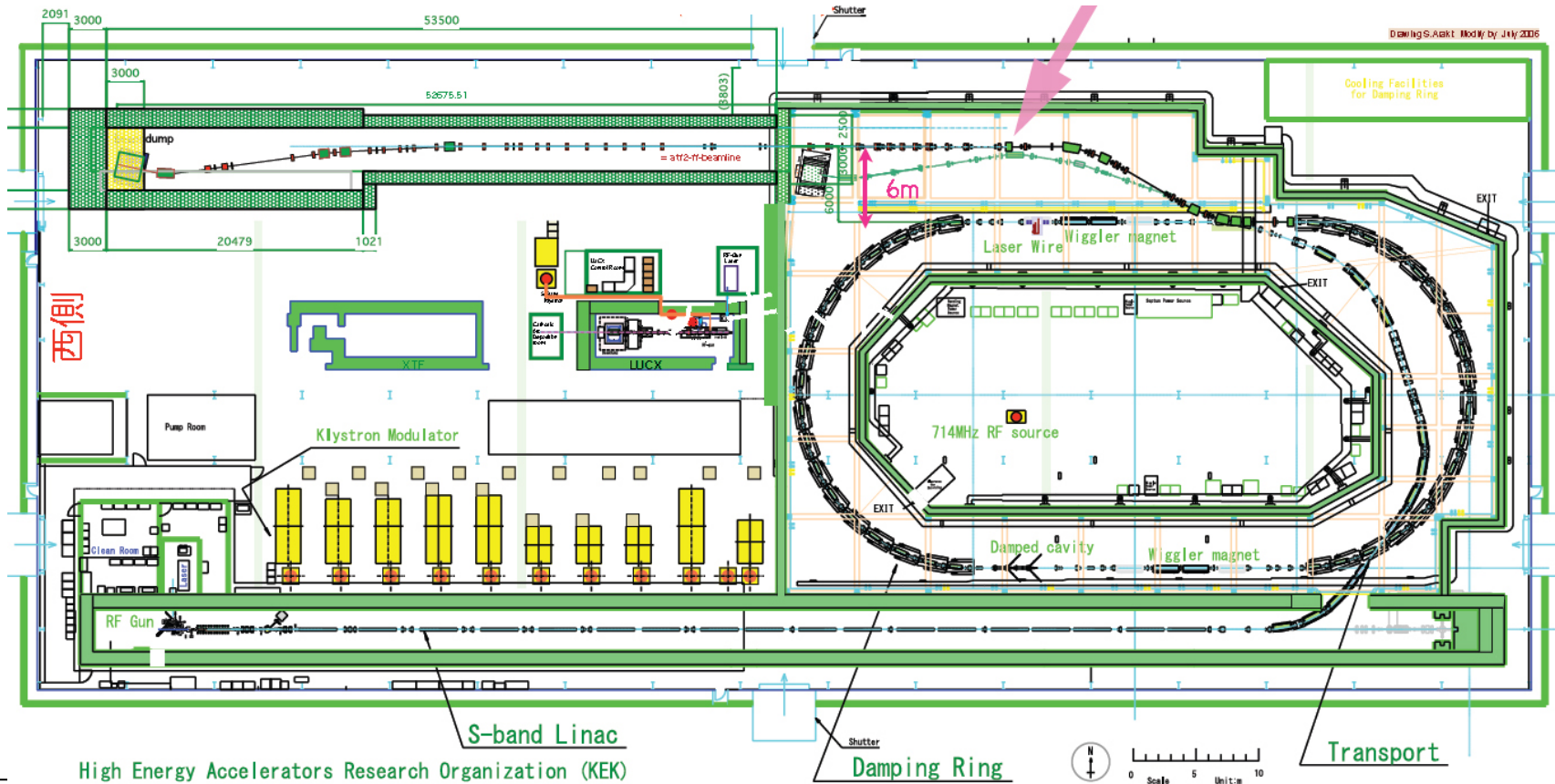
STF



Cavity R&D Stand

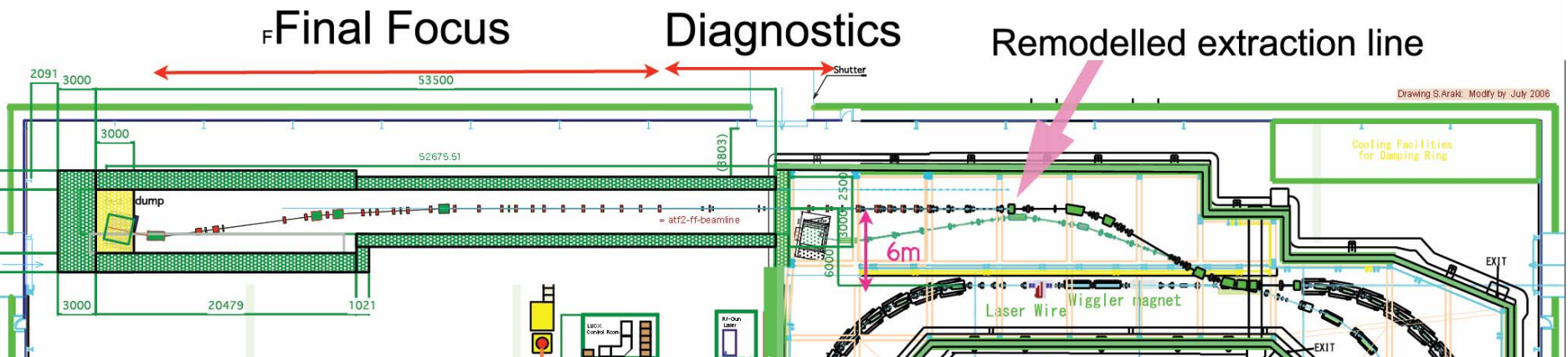


- Built in 1993, international MoU in 2005
- Continue to be a good test bench for ILC-DR
- Collaboration meeting twice a year Z(May, December)
- Beam source for ATF2



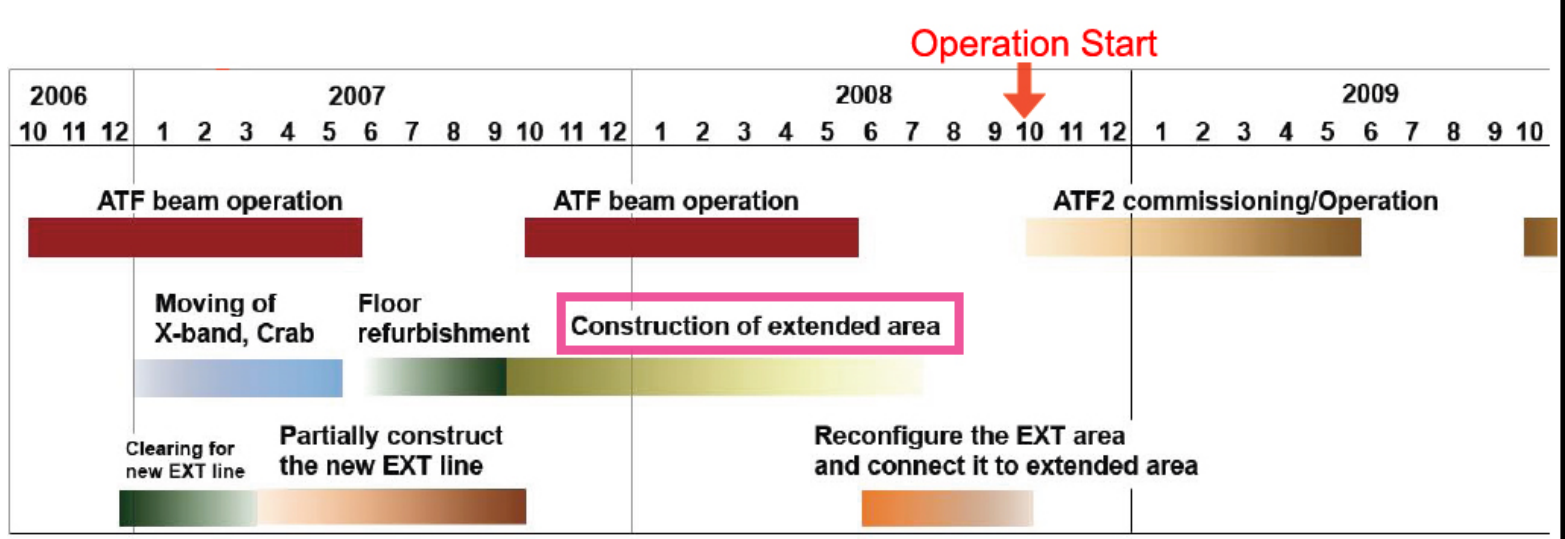
- **What's being done now**
 - **Fast kicker development (KEK, LLNL, SLAC, DESY)**
 - **Laser wire (RHUL)**
 - **Improvement of DR BPM resolution (SLAC, FNAL)**
 - **Digital IP feedback system (Oxford, etc)**
 - **nm resolution BPM (SLAC, KEK)**
 - **Laser-Compton scattering for positron production (ILC ACD)**
 - **Fast-ion instability study**
 - **CSR measurements**
- **Future**
 - **Bunch by bunch extraction for ATF2**
 - **1nm vertical emittance**

- >100 participants from ~25 institutions
- Will be one of the BDS Work Packages



ATF2

- Construction budget peaked in this year
- Floor refurbishment Jun-Sep this year
- First beam in fall-winter 2008





ATF2 Floor Refurbishment

- Started in June
- Finished end of Sept.
- As in the schedule



Aug.27



Sep.5



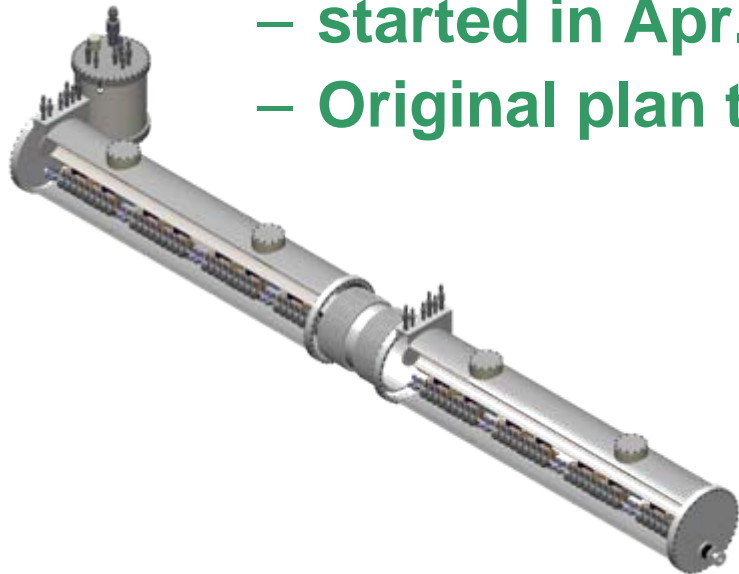
Sep.26

- In 3 steps:
 - STF0.5 : 2 cryostats (4-cavity length) with 1 TESLA-like and 1 LL cavity)
 - STF1 : Original plan was 4 cavities each.
 - STF2 : ILC 1-unit

- STF0.5

- started in Apr.
- Original plan to finish in July.

- Vacuum leak detected in both TESLA-like side and LL side
- A Good lesson



STF0.5, Now

- 2 cryostats separated
- TESLA-like side repaired and being cooled. High power test is starting.
- Leak has not yet identified in LL side
- Decision needed in early November on STF0.5 for LL.

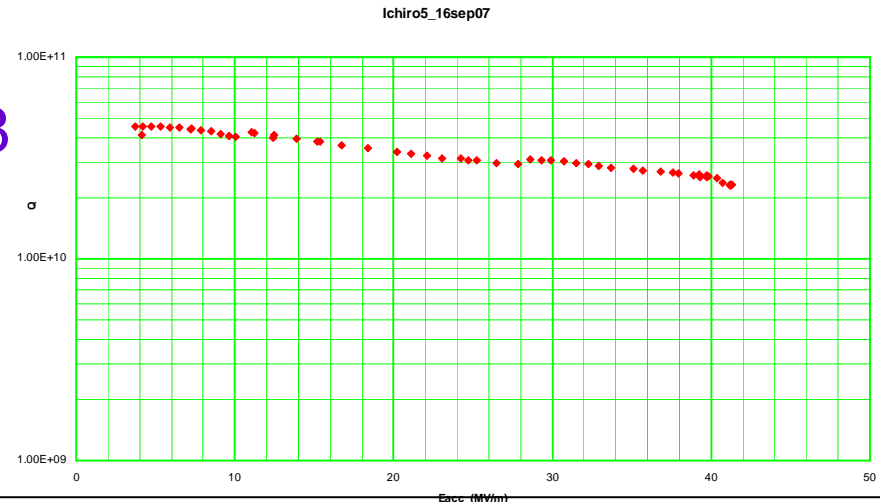


Valve box after repair(8/15)



LL module separated and moved to surface(8/29)

- S0 cavity exchange program
 - Plan : 2-3 cavities KEK(LL) \leftrightarrow US and DESY \rightarrow KEK
- Delay due to
 - Contamination problem of HPR pump (old system)
 - STF0.5 too busy
 - Delay of new EP/VT system
- 1 LL cavity sent KEK \rightarrow JLab (September)
 - 1st VT done with good results (41MV/m, 2×10^{10})
- Other S0 exchange presumably from Apr.2008
- S0 with KEK and foreign cavities is the 1st priority in JPY2008





New SC Infrastructure

Clean room : already in use

UPW (Ultra-Pure Water system): already in use

HPR (High Pressure Rinsing system) : completed

EP (Electro-Polishing system) : under test. operation from Jan.2008

CP (Chemical Polishing system) : JFY2008.

VT (Vertcal Test Stand) : in operation from Jan.2008

1F フロア

UPW(Ultra-pure Water)

2F フロア

Clean room

EP bed for ILC

CP

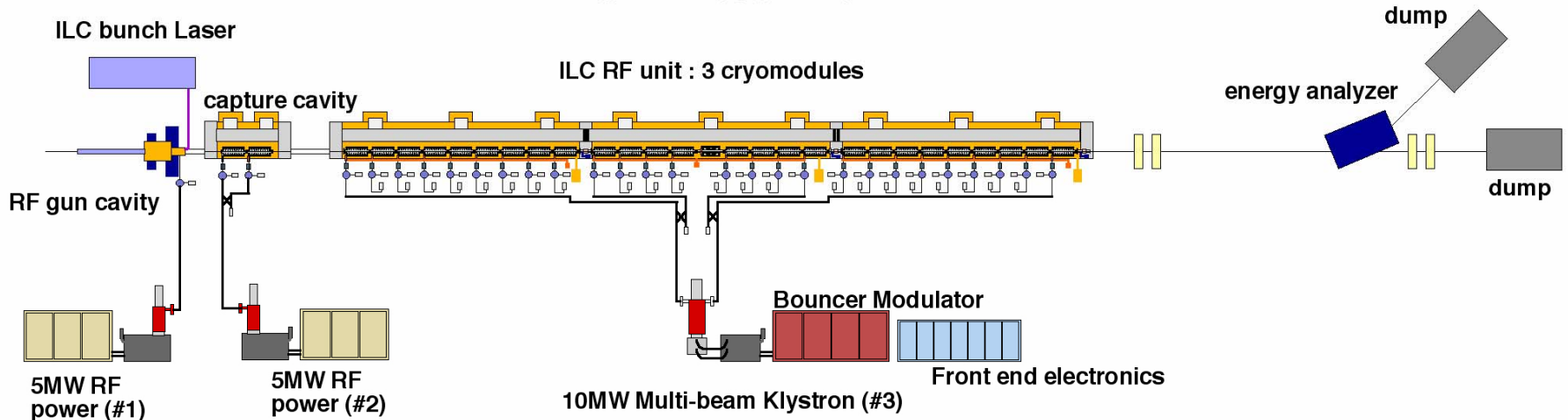
HPR

1F : 電解研磨用熱交換機
1F : 温水槽
1F : 整流器
防壁堤 WT20xH200
1F : 純水装置
基準面
純水装置用 パックアータンク
純水装置用 エアコンプレッサ
クッション槽
新床コンテナ
シャッター
温水中超音波洗浄槽
1F : 電解研磨リザーブ槽
クリーンルーム
D.N
化学研磨リザーブ槽 : 2期工事
化学研磨槽 : 2期工事
浸漬水洗槽 : 2期工事
シャワー水洗槽 : 2期工事
浸漬脱脂槽 : 2期工事
模型連続電解研磨装置
外部排気処理装置へ
パックアータンク
エアコンプレッサ
シャッター
EP床チャンセル
超音波洗浄槽
手元盤 超音波発信器ラック
クリーンルーム

Next Step : STF1, STF2

- STF1
 - 4 cavities in a module (same cryostat as STF0.5)
 - Spring- early summer 2008
- STF2 : 1 RF unit (as close as ILC design)
 - 1 modulator (can be Marx if in time)
 - 1 klystron (horizontal)
 - 3 cryostats (close to type-4)
 - Beam (full intensity)

STF Phase 2 Plan

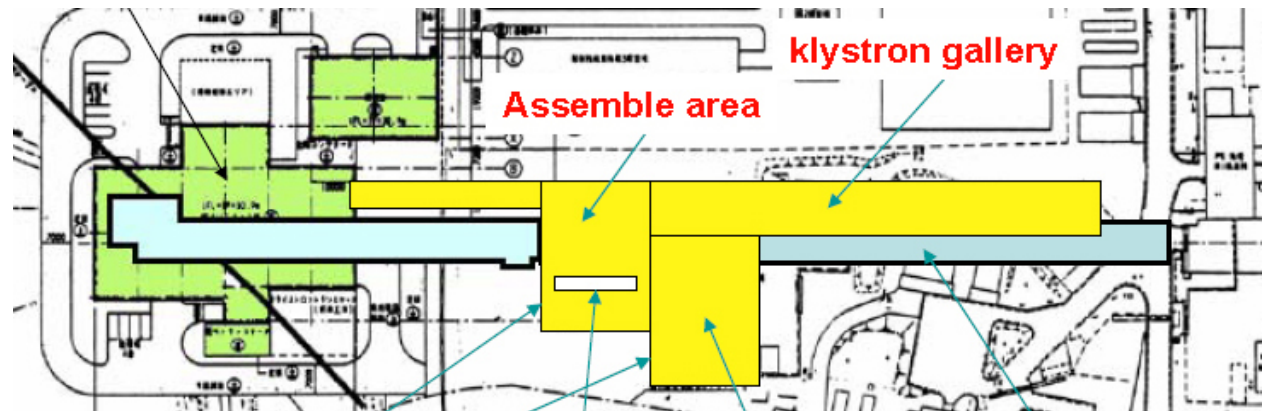


- **Timeline**
 - **Design in JFY2008**
 - essential part of the cryomodule design by summer
 - Schedule may slight depend on STF1
 - **Construction in JFY2009-2010**
- **Need to select the cavity shape for STF2**
 - **Well before construction (high pressure vessel regulation)**
 - **around Mar.2008**

- Change foreseen in JFY2009 (Apr.2009-Mar.2010)
 - KEKB will (nearly) reach its target of integrated luminosity 1 ab^{-1} in the end of JFY2008
 - J-PARC will shift construction period → operation period in ~JFY2009
- A New 5-year Plan (Roadmap, 2009-2013) being formed among KEK directorate, including ILC R&D, KEKB upgrade, ERL(1st step), Detector development, etc.
 - STF2 will be the first half of this plan
 - Hopefully, STF3 in the second half

STF3

- Needed for
 - Technology transfer to industries
 - Establish mass production technology
- Should be based on ILC final design
- Finish before the ILC mass production start
- The scale is still to be discussed
- 3 ILC RF units in the present consideration
- Requires an extension of the tunnel (downstream of STF2)



Summary

- ATF2 going well. Floor done. 1st beam will be in fall-winter next year.
- STF0.5 still going on with some delay.
- STF1 to follow. Construction end Jun.2008?.
- New EP facility & VT will be ready early 2008
- STF2 being planned (construction 2009-2010)
- KEK is drafting 5yr plan 2009-2013.
- Other Asian countries are building up.
Own projects & participation in KEK work.
More active participation in the near future.