Asian LC Activity Status and Prospects (other than Japan)

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IHEP

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LC activities in China

ILC R&D Activities (fields) in China

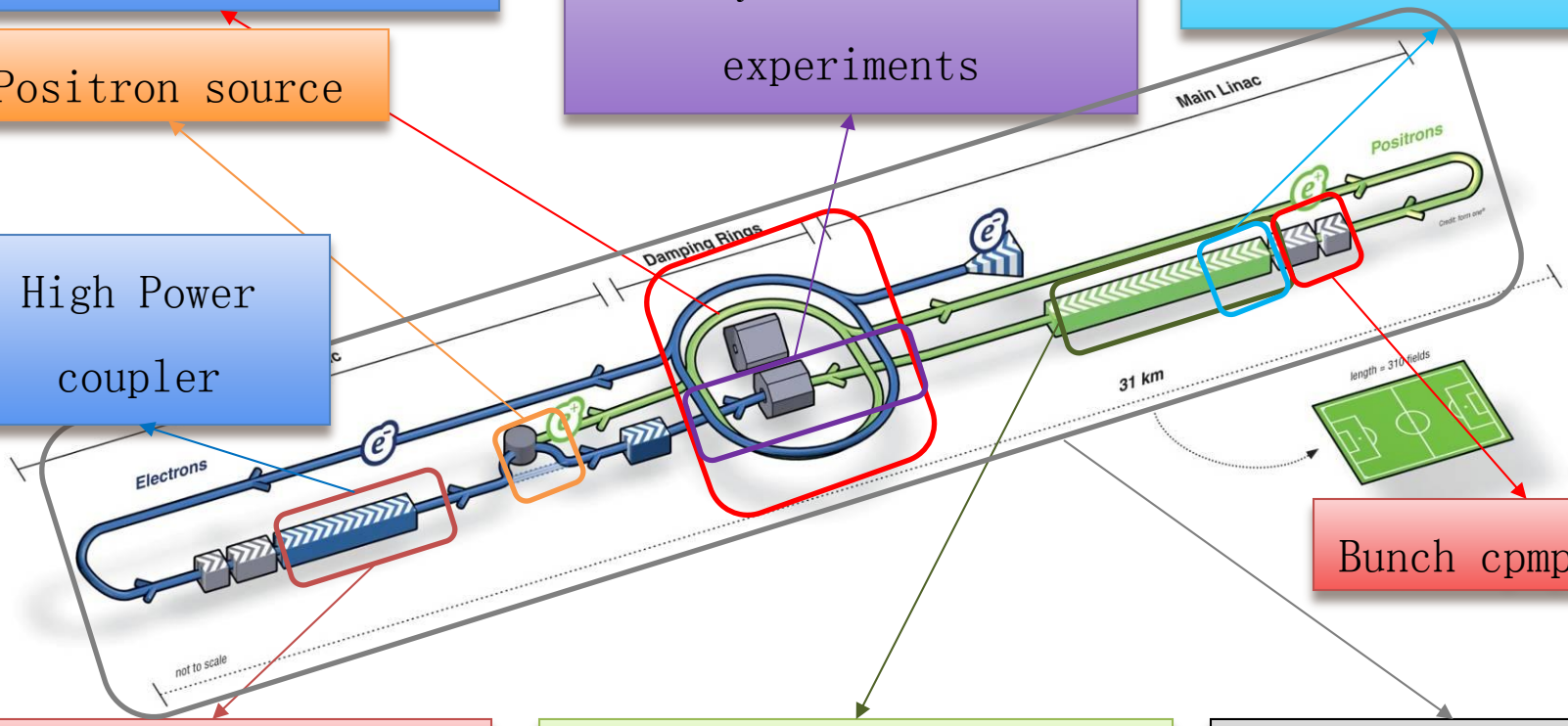
ILC Damping ring design;Fast kiker

ATF2 Hardware, beam dynamics and experiments

LLRF、Instrumentation

Positron source

High Power coupler



Bunch cpmpressor

1.3GHZ 9 cell cavity

Cryostat and cryomodule

Parameter design
Beam daynamics

IHEP in ILC Design

（SB2009,Single bunch compressor TDR, two bunch compressors)

Model Parameter Sets

- Dy 38→16
- n_γ 1.7→1.1
- δ_B ~4%→2.8%
- L(top 1%) 60%→69%

BTR@DESY, Oct.26.2011
K.Yokoya

		500GeV Reference		Gao	mod. Gao
		noTF	TF	BAW2	
Ecm	GeV	500	500	500	500
gamma		4.89E+05	4.89E+05	4.89E+05	4.89E+05
N	e10	2.0	2.0	1	1
frep	Hz	5.0	5.0	5	5
Nb		1312	1312	2625	2625
PB	MW	10.5	10.5	10.5	10.5
sigz	mm	0.3	0.3	0.166	0.15
enx	m	1.0E−05	1.0E−05	1.00E−05	1.00E−05
eny	m	3.5E−08	3.5E−08	1.00E−08	2.50E−08
betax	mm	11.0	11.0	8.0	7.0
betay	mm	0.48	0.20	0.166	0.15
sigx	nm	474.2	474.2	404.4	378.3
sigy	nm	5.86	3.78	1.84	2.77
theta_x	ur	43.1	43.1	50.5	54.0
theta_y	ur	12.2	18.9	11.1	18.5
Dx		0.30	0.30	0.12	0.12
Dy		24.6	38.2	25.6	16.4
Upsilon		0.062	0.062	0.066	0.078
Ngamma		1.7	1.7	1.0	1.1
deltaB		3.7%	3.7%	2.3%	2.7%
HDx		1.1	1.1	1.0	1.0
HDy		6.1	2.8	4.0	3.4
HDy		2.0	1.5	1.6	1.5
Lgeo		7.51E+33	1.16E+34	1.40E+34	9.97E+33
L (formula)		**1.47E+34**	**1.75E+34**	**2.24E+34**	**1.50E+34**
Simulation (noTF)		noTF	TF		mod.Gao
Ngamma		1.82			1.093
deltaB(%)		4.107			2.887
L		1.58E+34			1.48E+34
L(1%)		60.2			69.4
simulation (TF)					
Ngamma			1.87		1.09
deltaB(%)			4.26		2.853
L			2.09E+34		1.72E+34
L(1%)			60.2		69.3
L(TR)/L(no)					

IHEP in ATF2 collaboration since 2005: hardwars, beam dynamics and experiments

IHEP in ATF2 collaboration on beam dynamics and experiments (one of the key focusing point of R&D)

•2007.10-2008.10 IHEP visitor (Sha Bai) to LAL,France (FCPPL), worked on ATF2 beam waist manipulation and find the minimum beamsize of 20nm for ATF2.

•2009.1-2009.6 IHEP visitor (Sha Bai) to KEK,Japan, worked on ATF2 beam waist manipulation and experimental study.

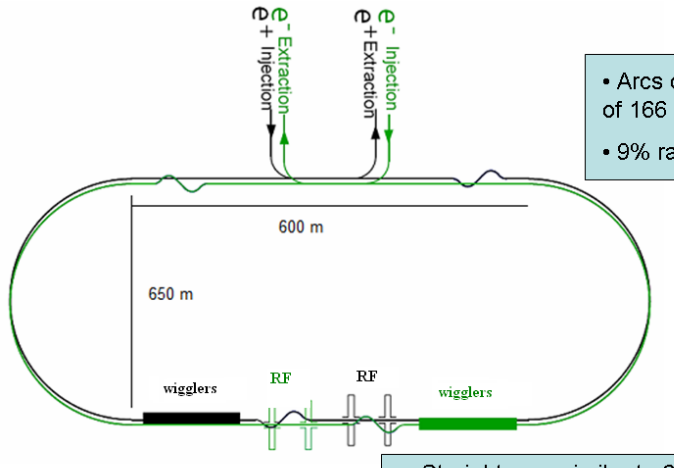
•2009.10-2009.12 visitor (Sha Bai) to KEK,Japan,
worked on ATF2 multiknobs
correction simulation and
experimental study.

•2011.11-2012.1 IHEP visitor (Sha Bai) of KEK,Japan,
worked on waist Corrections at
the Interaction Point of ATF2 in the Presence
of IPBSM Fringe Rotations and input beam
6_{13}, 6_{24} and Twiss reconstruction.

•2012.11-2013.2 IHEP visitor (Yiwei Wang)
to LAL, France (FCPPL), worked ILC ATF2

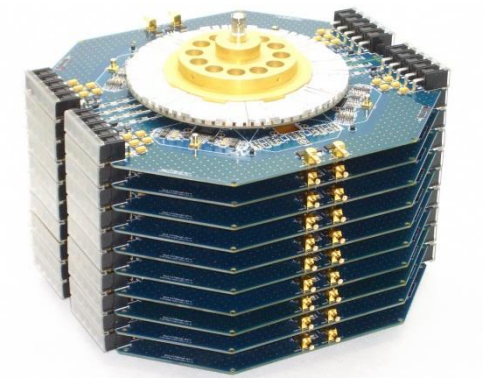
Through ATF2 collaboration and FCPPL on ATF2, two Ph.D students and one Post Doc have been trained.

IHEP Damping Ring R&D （alternative design)

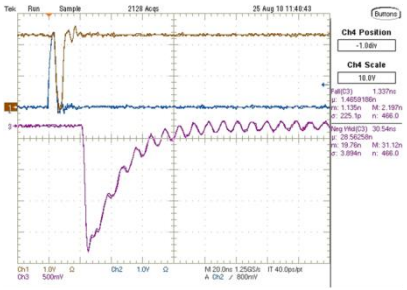


DMC4 (e-linac 10 Hz)

Beam energy	5.0 GeV		
Circumference	3243.08 m		
RF frequency	650 MHz		
Transverse damping time	**13.9 ms**		
Natural bunch length	6 mm		
Natural energy spread	0.13%		
Phase advance per FODO cell	65°	75°	90°
Momentum compaction factor	4.17×10^{-4}	3.31×10^{-4}	2.11×10^{-4}
Normalized natural emittance	6.34 um	5.27 um	3.76 um
RF voltage	24.48 MV	20.04 MV	14.07 MV
RF acceptance	2.42%	2.26%	1.87%
Synchrotron tune	0.047	0.037	0.024
Working point x/y	44.52/41.88	48.02/45.55	56.06/54.15
Natural chromaticity x/y	-49.2/-48.1	-54.7/-53.5	-69.6/-67.7

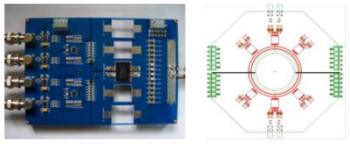


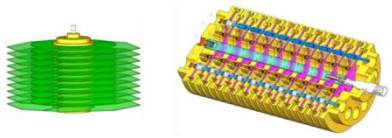
IHEP Pulse Source for ILC Damping Ring Kicker R&D Progress



Single Switch Test Result


Multi-channel Clock


MOSFET Driver

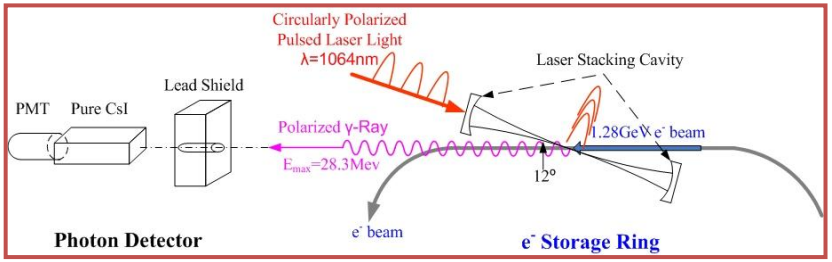

Inductive Adder

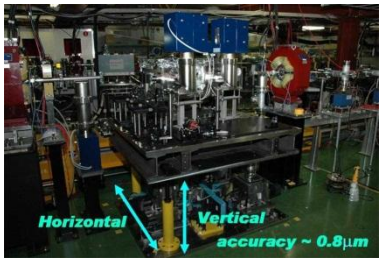
The whole system will be integrated and tested in the end of 2011 with the goal of the pulse length <10 ns,1 MHz, ±5 kV

IHEP in collaborations on ILC positron source

IHEP in Collaboration With KEK

Polarized Gamma-rays generation experiment at KEK-ATF

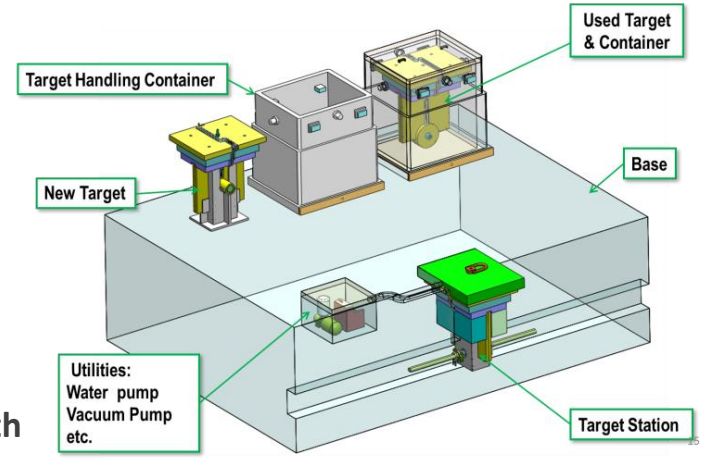




- From September of 2005, IHEP started collaboration on ILC positron source with Omori's group from KEK.
- From September of 2006 to July of 2008, IHEP Ph. D student, Xiaoping Li, visited at KEK working on the experiment studies on the polarized Gamma-rays generation at KEK-ATF.

Setup of the experiment at KEK-ATF

New General Layout for Remote Target Replacement of positron source , Dr.Jia of IHEP



IHEP in Collaboration With LAL (FCPPL)

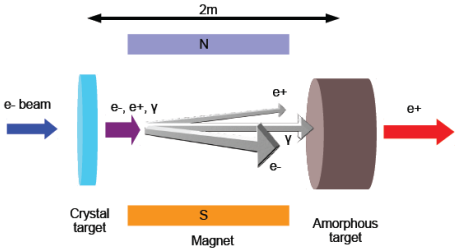
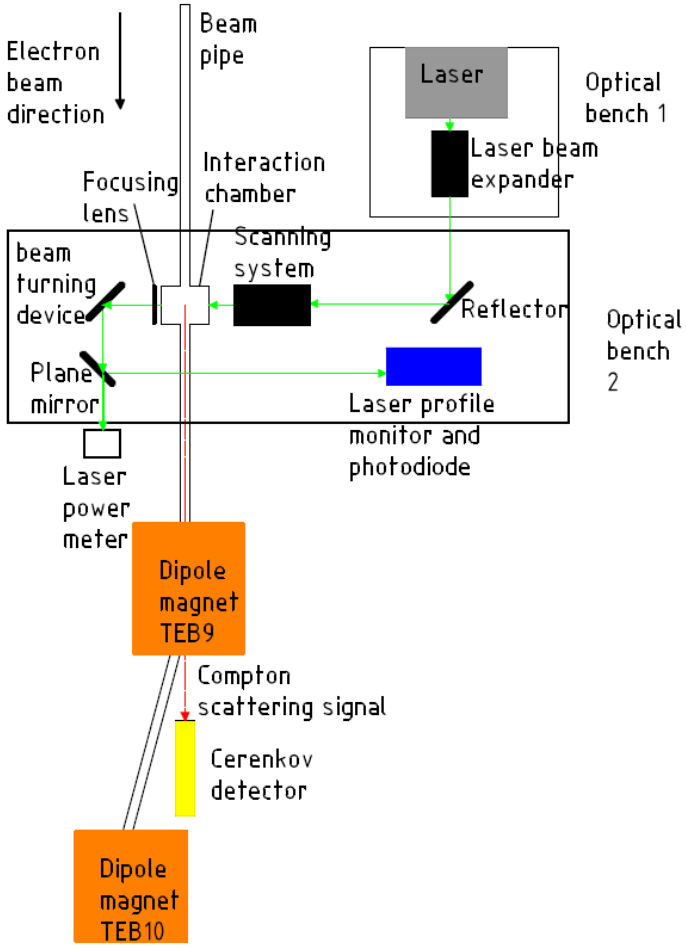


Figure 5.1: Hybrid scheme using crystal and granular target for ILC.(TODO not correct, take the figure of the bending magnet)

A Ph.D student of IHEP, Mr. Chenghai Xu, has been co-directed by supervisors LAL (R. Chehab) and IHEP under FCPPL (2008-2012). Now Dr. Jin Song works with LAL (2013-) .

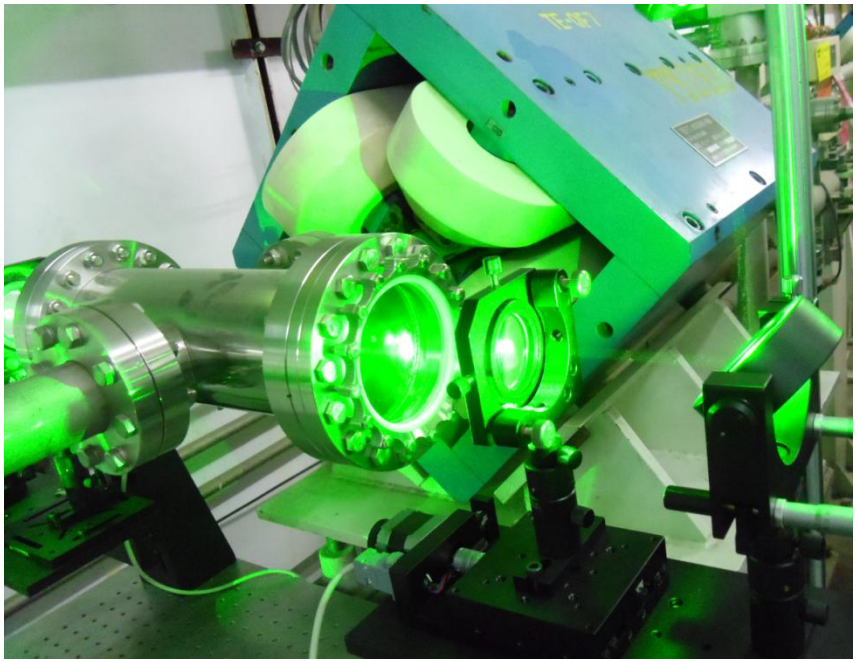
IHEP in Collaboration With ANL

Advanced Laser Wire system had been constructed and installed in the tunnel of electron beam transport line of BEPC Ⅱ in 2012

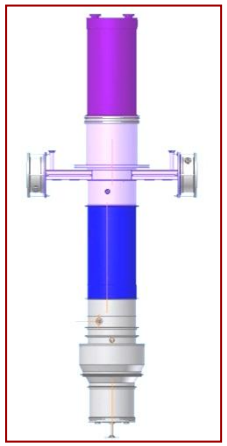


Left : Layout of Laser Wire system.

Below : Real structure near the interaction chamber in the tunnel.



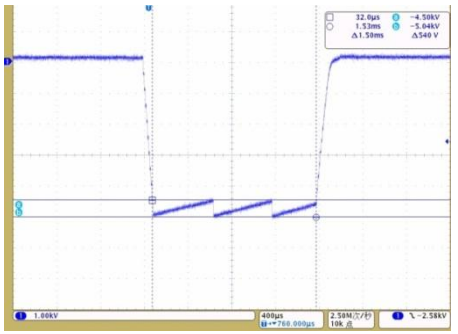
First ILC 1.3GHz Klystron and 10MW 5Hz Solid State Max Generator in China (2013)

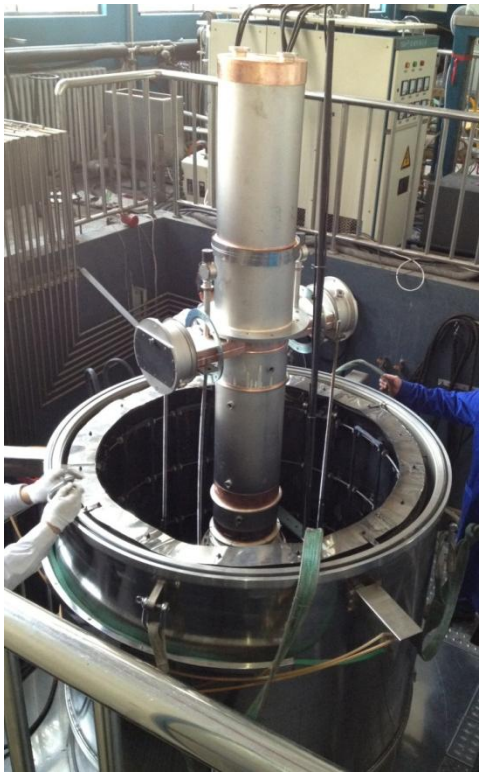


Institute of Electronics, CAS

Pulse Voltage	120 kV
Pulse Current	140 A
Pulse Length [flat-top]	1500 uS
Total Pulse Charge	192 mC
Total Pulse Energy	23,520 J
Repetition Rate	5 Hz
Average AC Input Power	125 kW
Total # of Stations	~ 600

Marx固态调制器主要技术指标





IHEP

IHEP ILC 1.3GHz SC Cavity R&D History (low loss and large grain type)

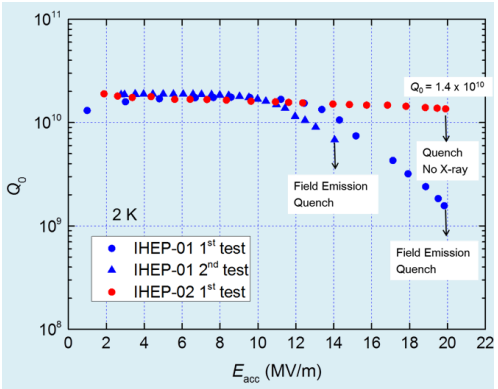
Two Ph. D students and one Post Doc has been trained

2013 9-cell TESLA-like, fine grain cavity with HOM

to treat & test in KEK
install to STF for beam test

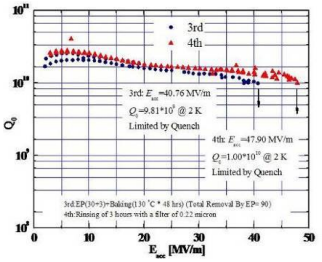
2012 7-cell & 9-cell low-loss, large grain cavity with HOM, test in 2013

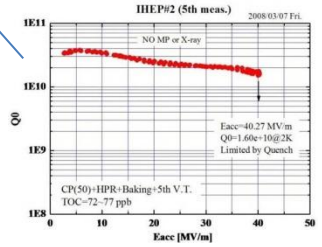
2010 9-cell low-loss, large grain cavity without HOM, 20 MV/m by CP



2008 single cell low-loss large and fine cavity, max. 40 MV/m by CP

2006 single cell ICHIRO large grain cavity, max. 48 MV/m by EP



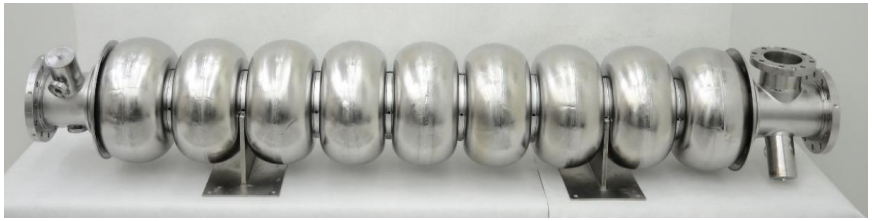


IHEP 1.3 GHz Low Loss Large Grain 9-cell Cavities

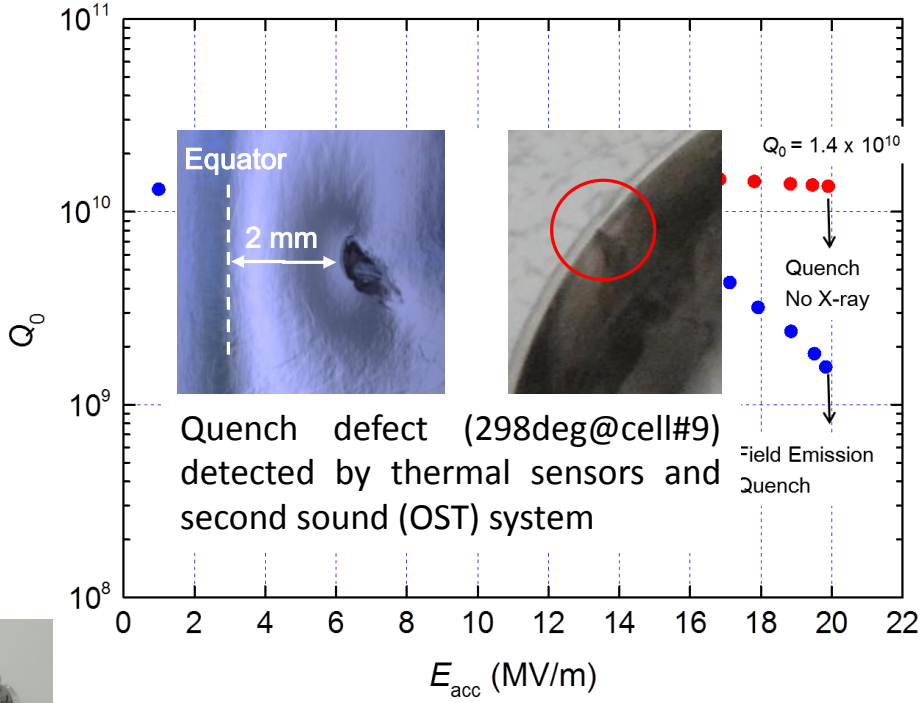
Low Loss shape cavity is one of the ILC post-TDR SRF R&D options.
Large grain niobium cavity has higher Q0 and lower material cost, but difficult in fabrication, welding and processing.

CP 40 MV/m, Q_0 = 1.6 x 10^{10} @ 2K
EP 48 MV/m, Q_0 = 1.0 x 10^{10} @ 2K

9-cell Cavity IHEP-01 (no HOM, 2010)



9-cell cavity IHEP-02 (with HOMs, 2012)



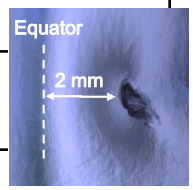
IHEP-01 20 MV/m, 5 cells ≳ 30 MV/m

IHEP-02 20 MV/m, 7 cells ≳ 40 MV/m

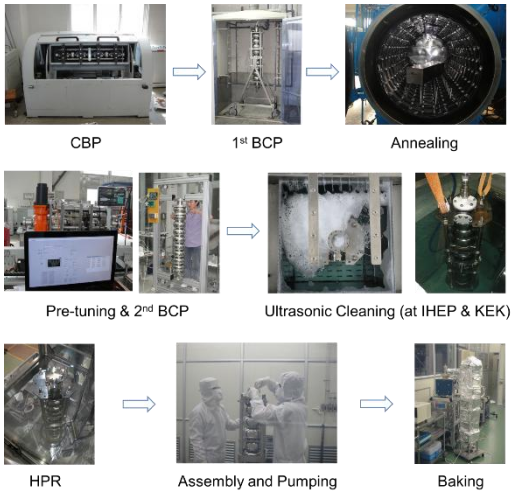
Local grinding can remove the defects.

IHEP02 vertical test results at Fermi in 2013

Cell#	Gradient	Limitation (test mode)
1	> 20.5	limited by quench at cell#9 (Pi)
2	> 37.9	passband excitation (2Pi/9)
3	> 43.5	passband excitation (2Pi/9)
4	> 40.0	power limit (Pi/9)
5	> 42.0	power limit (Pi/9)
6	> 40.0	power limit (Pi/9)
7	> 43.5	passband excitation (2Pi/9)
8	> 37.9	passband excitation (2Pi/9)
9	= 20.5	quench (self pulsed) at cell#9 (Pi)



IHEP 1.3GHz 9-cell LL-LG Cavity Process, Test and Dressing (Collaboration with KEK, Jlab and Fermi)



IHEP-01 1st pass at IHEP and KEK (2010)

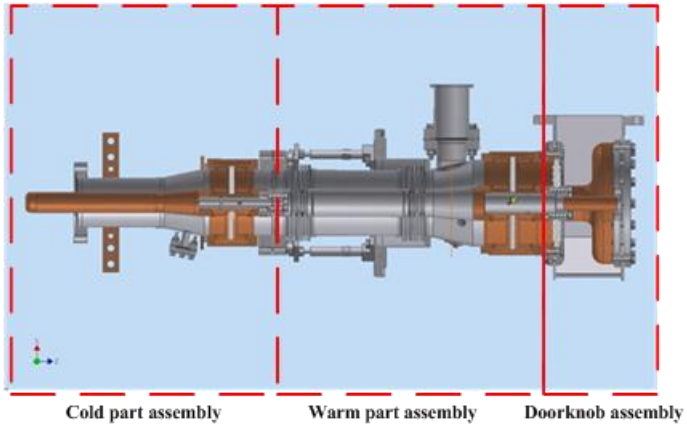
IHEP-01 2nd pass at IHEP and JLAB (2011)

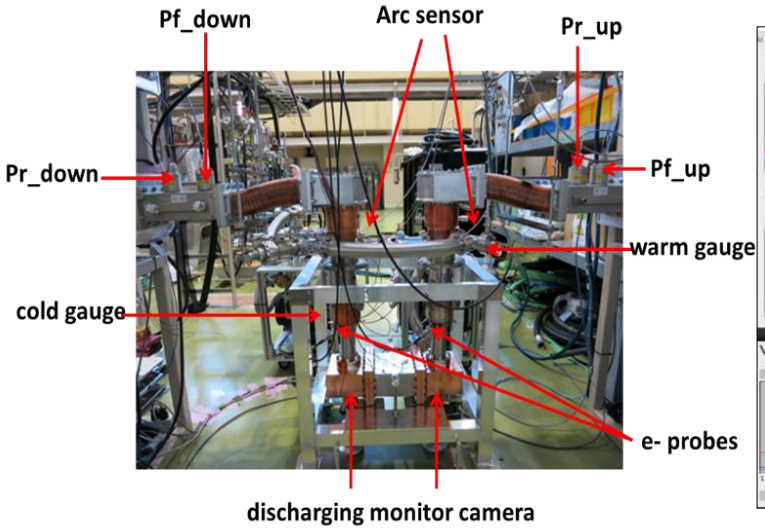
IHEP-02 at IHEP and FNAL （2013）

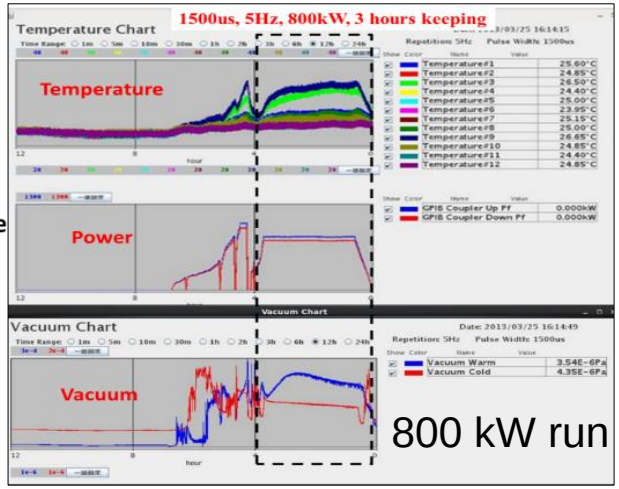
Helium vessel and magnetic shield （2013）

ILC 1.3 GHz High Power Input Coupler

By 72 hour conditioning in KEK STF, the two couplers reached ILC specification:
1 MW, 1.5 ms, 5 Hz （2013）



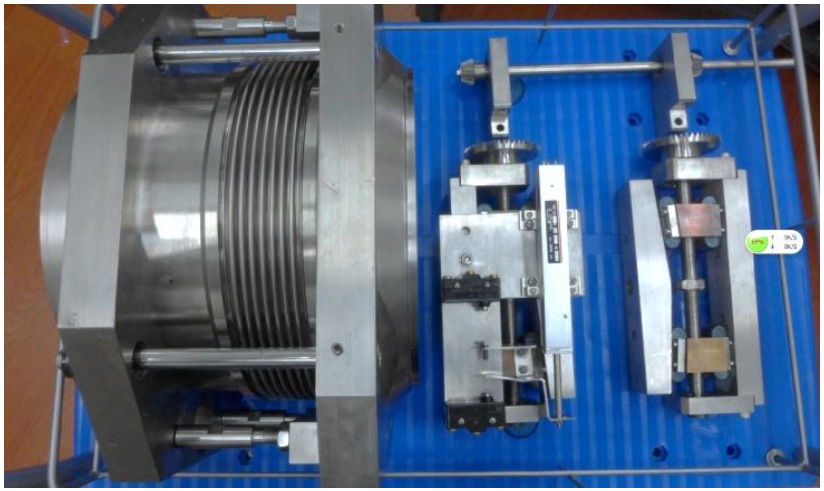


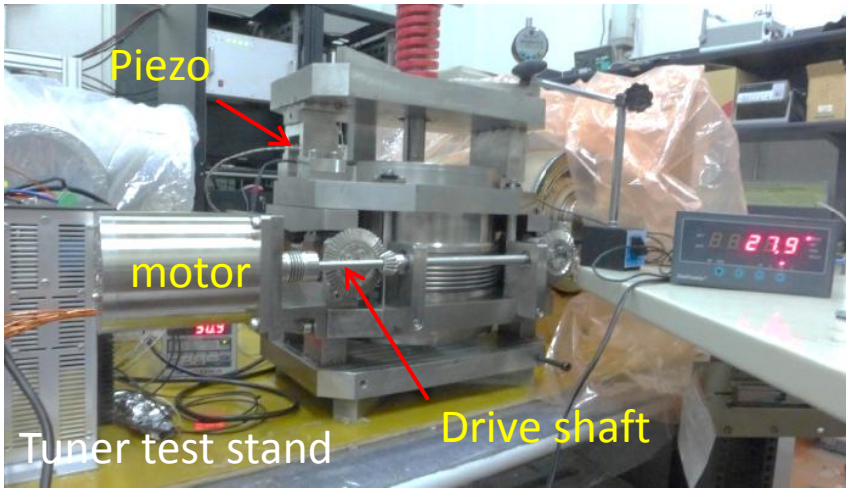


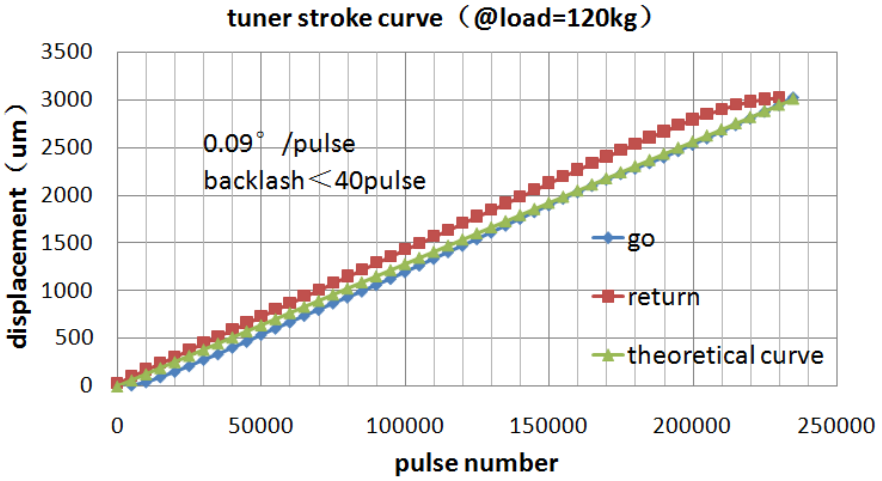
1.3 GHz Tuner and LLRF System

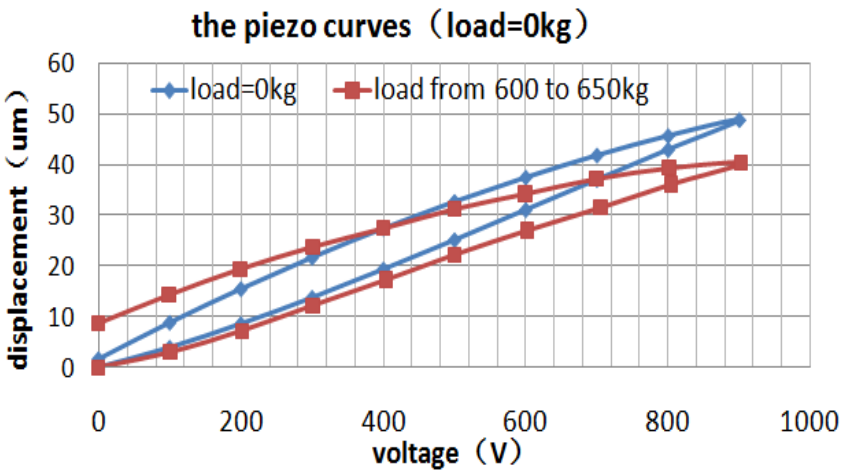
- 1.3 GHz digital LLRF system room temperature test with 9-cell cavity. Phase stability ± 0.03° (pp), amplitude stability ± 0.05 % (pp) , better than ILC spec (± 0.24 ° and ± 0.07 %)
- Tuner and Piezo room temperature test reached the design stroke and resolution

Tuner and Piezo test



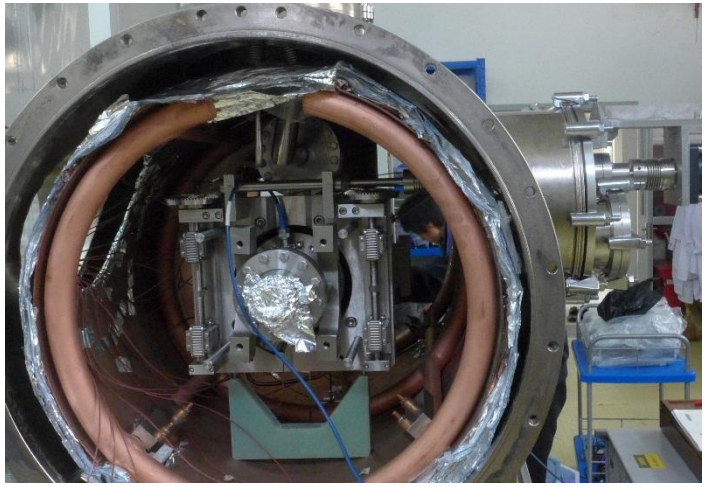






Slide Jack Tuner Test on 4-cell Cavity

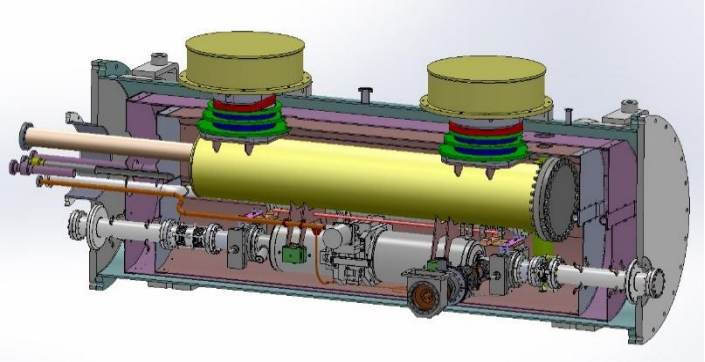
Test the slide jack tuner performance at LN_2 temperature on a PKU 4-cell cavity.

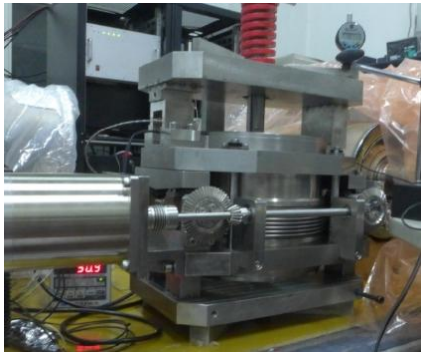


IHEP ILC-TC1 Cryomodule

ILC Test Cryomodule (ILC-TC1) Assembly

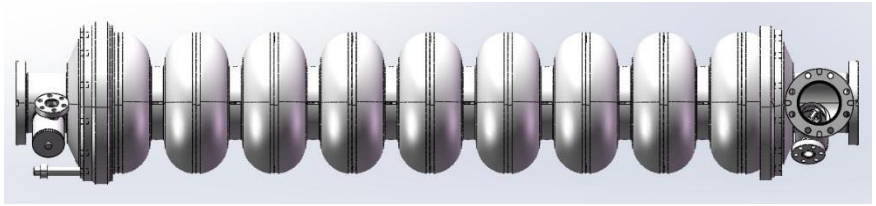
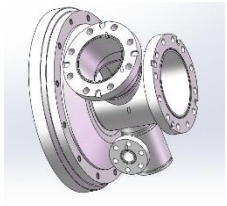
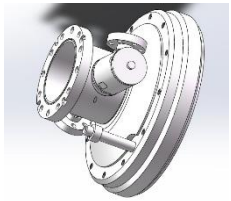
- Cryomodule assembly in end 2013
- Horizontal test in 2014
- With beam pipes for beam test



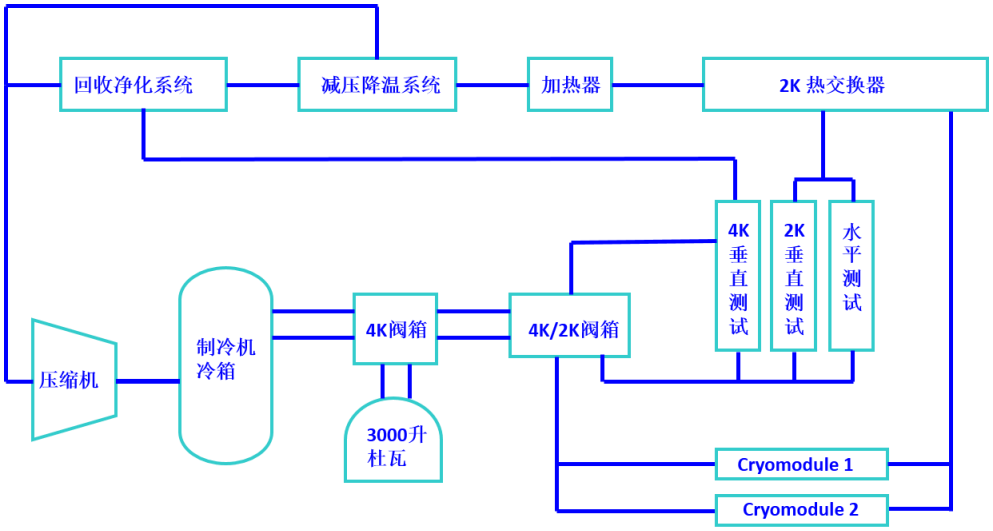


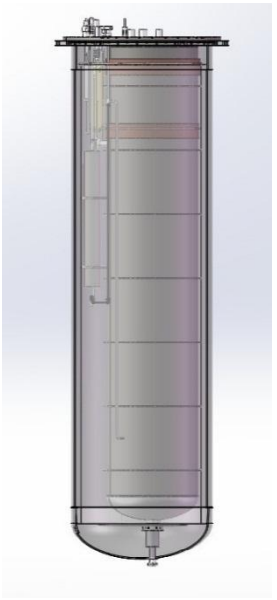
IHEP made TESLA-like 9-cell Cavity

- Fine grain cavity collaborating with KEK
- Dumbbells are done, end groups in fabrication
- Cavity EBW scheduled in early 2014, then process and test in KEK.
- Plan to install to KEK STF-2 cryomodule


IHEP New Cryogenic Plant for SRF R&D





Helium Plant (*Air Liquide*)

- Refrigeration: 1000 W @ 4.5K
- Liquefaction: 284 L / h
- 2K Pumps (total): 8000 m^3/h @ 3100 Pa
- Deliver in end 2013, vertical test and horizontal test commission in 2014

Vertical Test Dewar

- With heat exchanger
- Inside diameter: 0.85 m
- Inner depth: 4.2 m
- Deliver in early 2014

IHEP Cavity Industrialization Study

高能锐新 HE-RACING TECHNOLOGY

HE-Racing Technology (HERT)

- previous IHEP workshop (on campus)
- experience in accelerator components
  - S-band accelerator tubes
  - magnets
  - high power input couplers for SRF cavity (ILC 1.3 GHz, 500 MHz …)

Press Machine

CMM Machine

Newcomer in SRF cavity

- TESLA single cell and 9-cell cavity as the startup
- facilities for cavity fabrication, welding and annealing

CNC Turning Center

Vertical Machining Center

HERT New EBW Machine and Furnace

EBW Machine

Vacuum chamber: L 3.3m x W 1m x H 1.3m

Voltage: 60 kV, inside equator weld possible

In commissioning

Furnace

High temperature: 1350 C

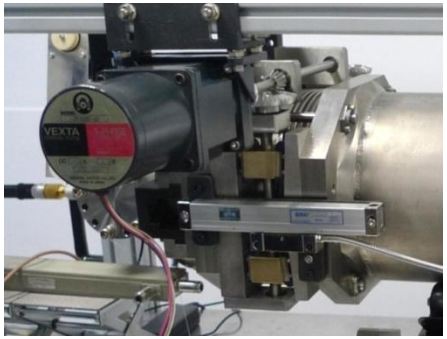
Working vacuum: 3.0×10-3 Pa

In commissioning

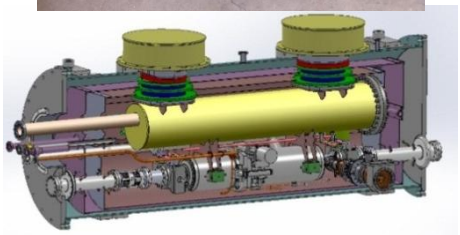
Key SC Accelerator Technologies for ILC at IHEP （Summary)

1.3GHz 9-cell cavity (IHEP-01,IHEP-02)

IHEP first Large-grain low-loss shape, 20MV/m



Tuner



Input coupler (tested)

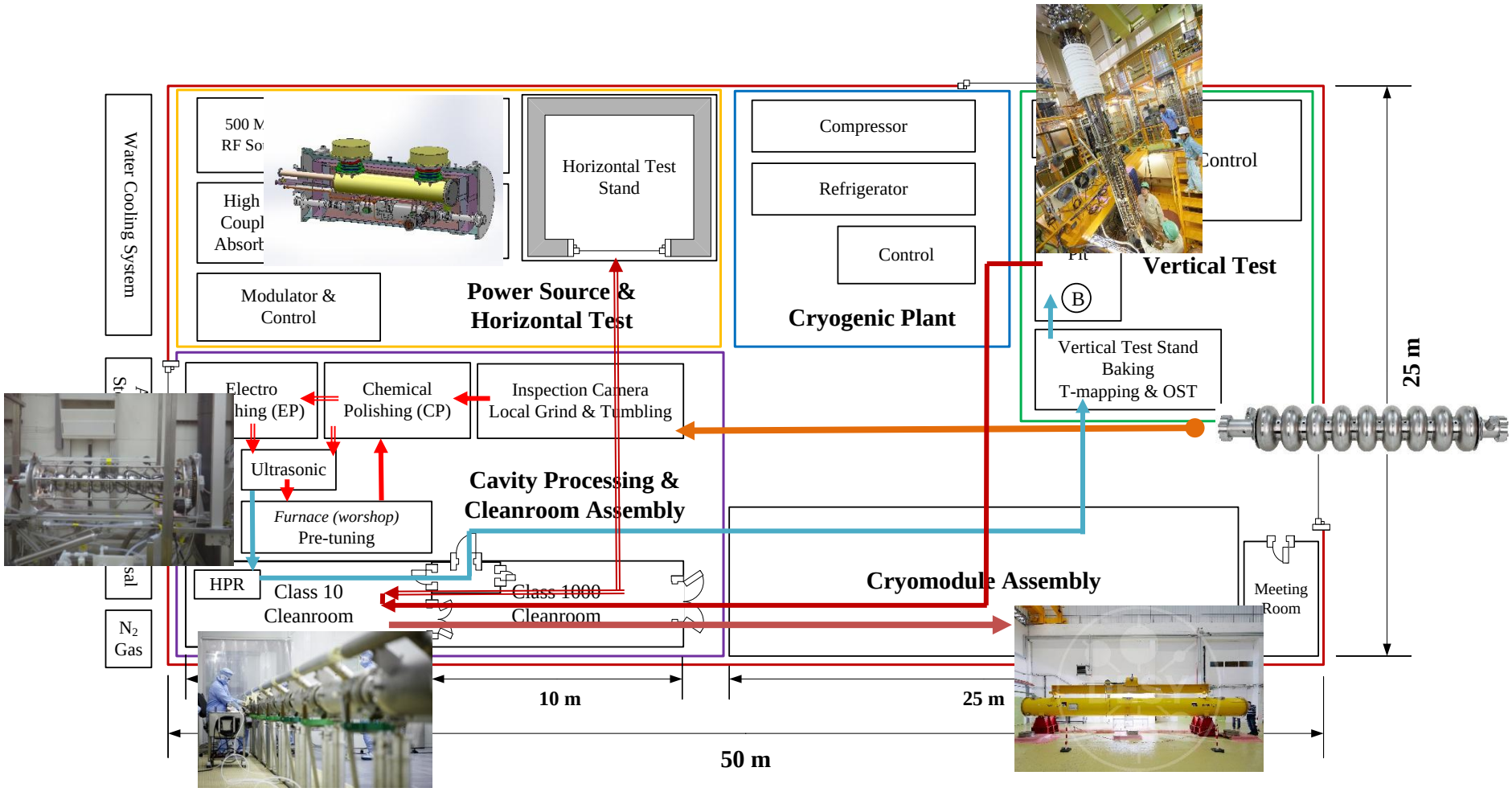
LLRF (tested)

IHEP ILC Test Unit

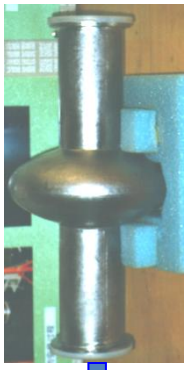
12 m Cryomodule for Euro-XFEL

PXFEL1 in FLASH; 58 ordered for XFEL

IHEP Planed New SC Lab



Beijing University SC Cavities R&D History



SCRF started

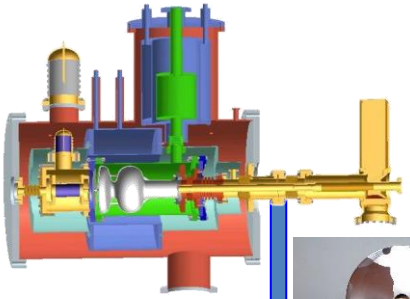
1988

1994

2000

2002

2003



2005

大晶粒铌材超导腔

2006

2007

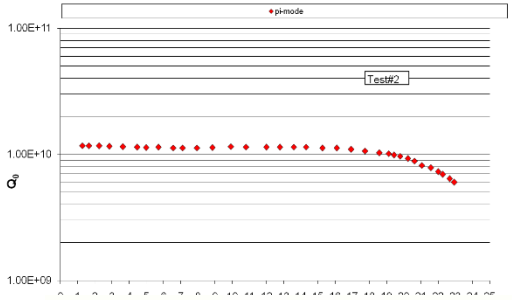
2×3.5cell

2008

2009

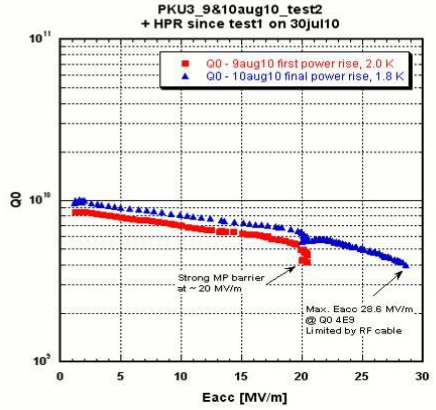
2×9cell

TESLA type fine and large grain 9 cell cavities （Beijing University)

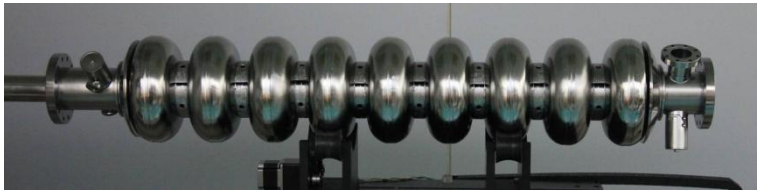


In 2008, the first TESLA type 9-cell cavity reached 23MV/m

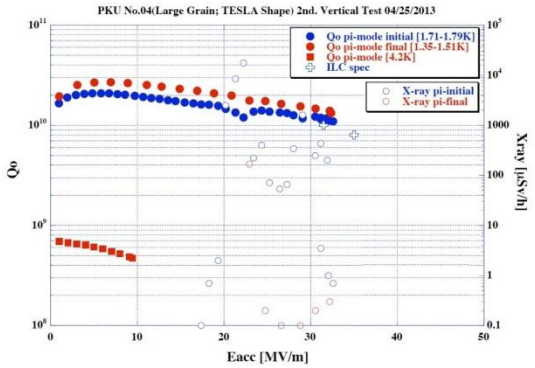
TESLA fine grain tested at Jlab



2nd test Max Eacc 28.6 MV/m at Q0 4E9, limited by RF cable.



TESLA large grain tested at KEK



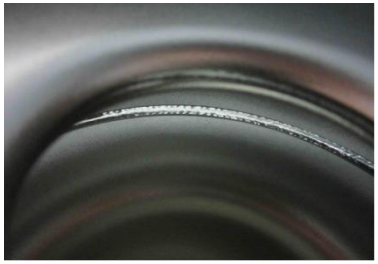
腔编号	Eacc(MV/m)	Q_0
PKU1	23.0	$>1\times10^{10}$ at 19MV/m
PKU2	22.4	2.0×10^{10}
PKU3	28.6	4×10^{10}
PKU4	32.4	$>1\times10^{10}$
ILC 标准	31.5±20%	$>1\times10^{10}$

Ningxia Orient Superconductor Technology Co., Ltd.
1.3GHz SC Cavity industrialization

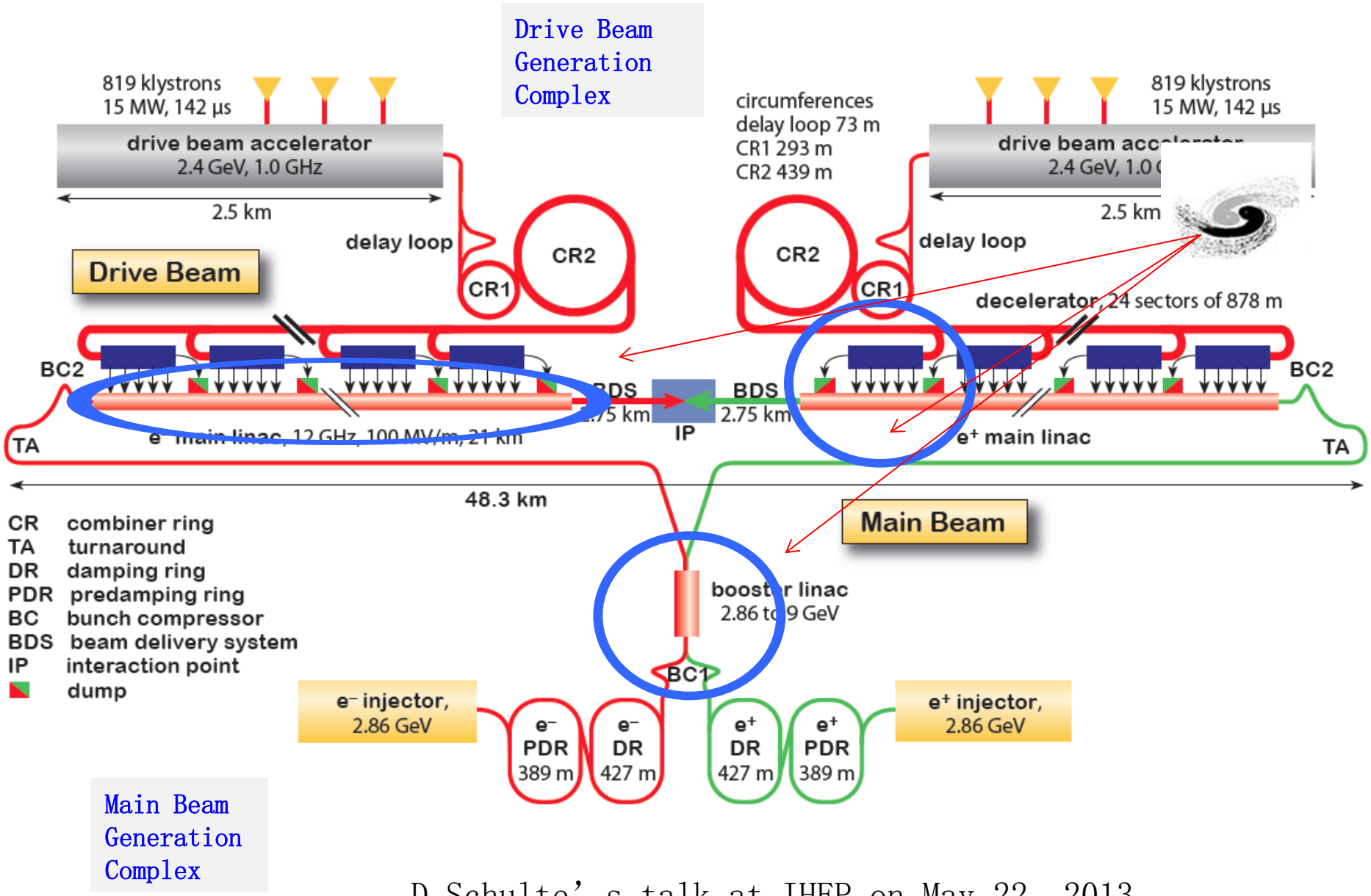
(Founded by OTIC and PKU, Feb. 2011)

Factory facilities

EBW Machine（High Voltage）



IHEP collaborates with CLIC



D. Schulte's talk at IHEP on May 22, 2013

The external dipole modes from the PETS

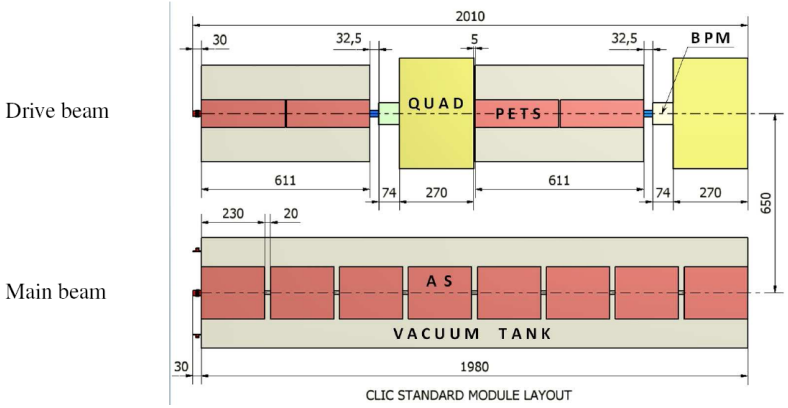


figure : standard module layout

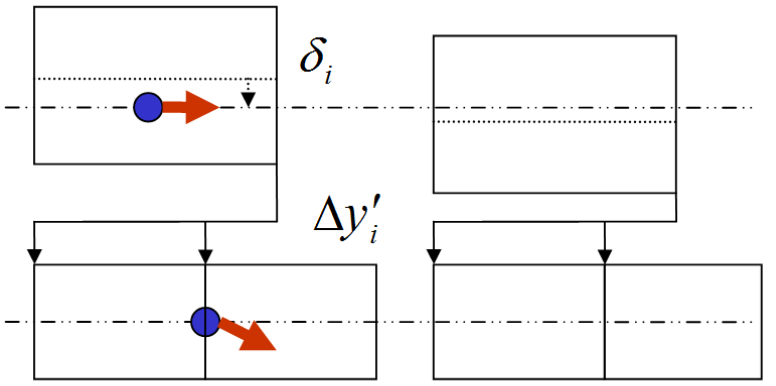
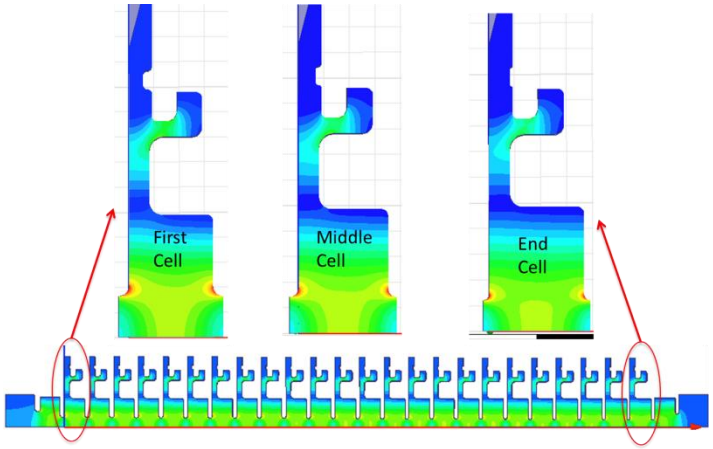


figure : schematic of misaligned PETS and the kick on main beam

- The accelerating structure of main linac (called “cavity” in the following) gets power from the PETS (Power Extraction and Transfer Structure) of the decelerator.
- If the PETS are misaligned, it will feed high frequency field into cavities.
- dipole modes excited in cavities by the external field
- Kick the main beam and lead to the beam quantity degrade — beam offset & emittance growth

One Ph. D student from IHEP has been trained at CERN

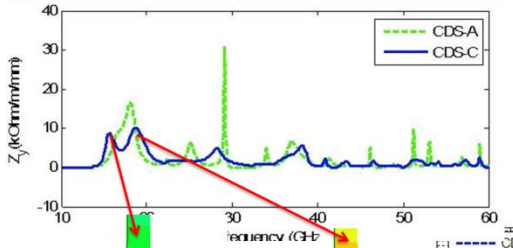
Tsinghua University-CERN CLIC Collaboration on Accelerating Structures



Parameters of CDS-C and CLIC-G

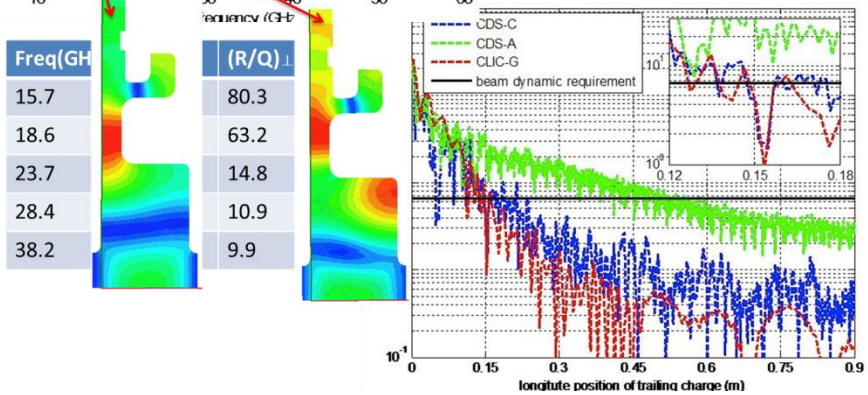
	CDS-C	CLIC-G
Iris aperture (mm)	3.15, 2.35	3.15, 2.35
Q-factor (Copper)	4895, 5385	5538, 5738
Shunt impedance (MΩ/*m*)	59, 83	81, 103
Group velocity (%c)	1.38, 0.73	1.65, 0.83
Max surface E-field (MV/m)	245	235
Max Sc (MW/mm^2)	5.66	5.39
Max temperature rise (K)	23.0	47.5
Peak input power (MW)	67.5	60.5
Filling time	75.4	64.8
RF-to-beam efficiency	24.7%	27.5%

Wakefield simulation (using Gdfidl)



	s=0.15m
Beam dynamic	< 6.6
CLIC-G	~5
CDS-A	~25
CDS-C	~4.5

Freq(GH	(R/Q)⊥
15.7	80.3
18.6	63.2
23.7	14.8
28.4	10.9
38.2	9.9

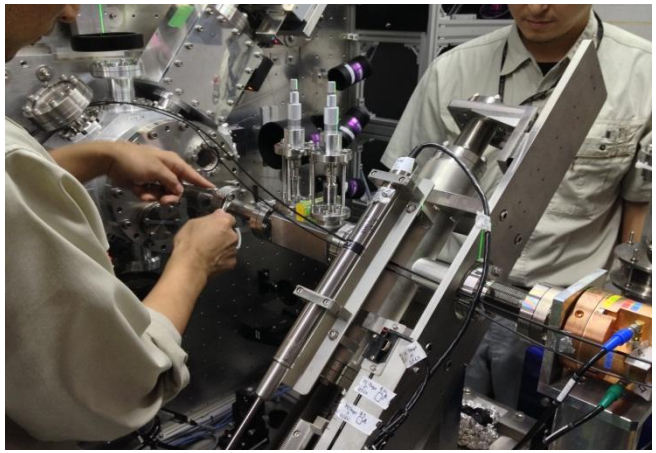


One Ph. D student from Tsinghua University has been trained at CERN

LC activities in Korea

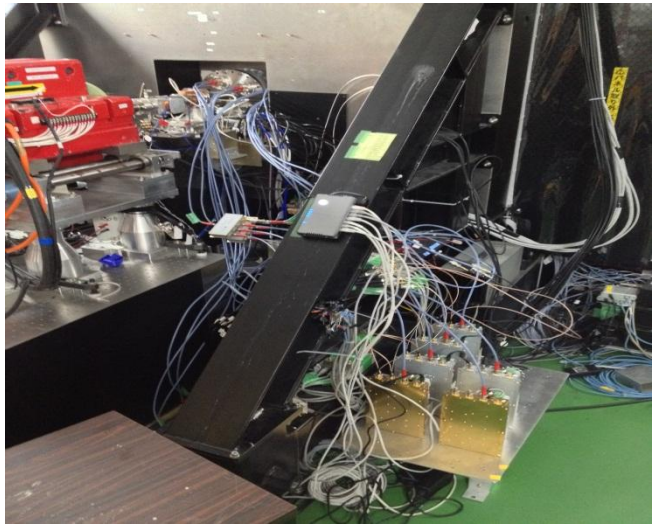
Main LC collaboration R&D has been focused on ILC/CLIC
ATF2 experiments: **IP-BPM monitor**

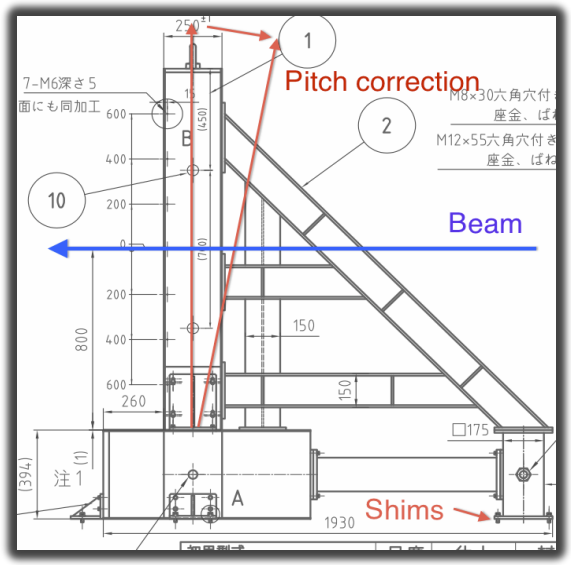
Low-Q IP-BPM Test (Nov. 2013)



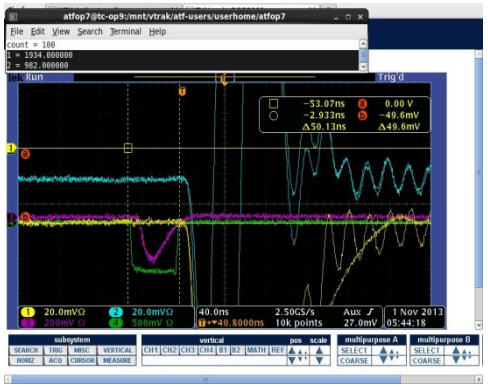
Ref. BPM install

Electronics w/ cable connection

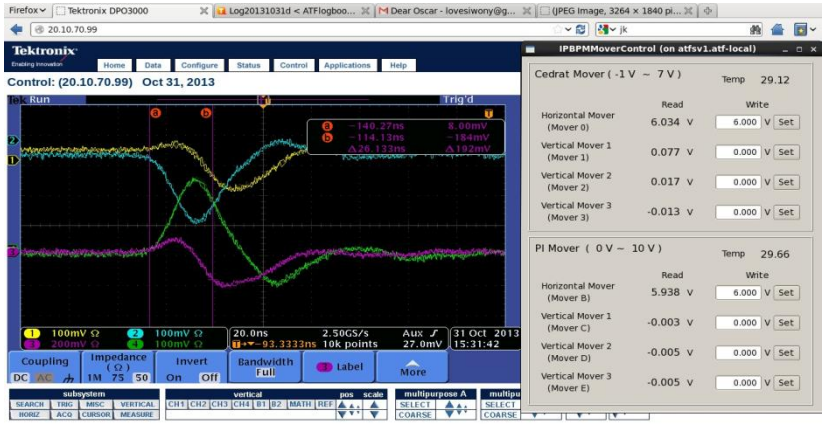




IP-chamber re-align
by using IP-BPMs

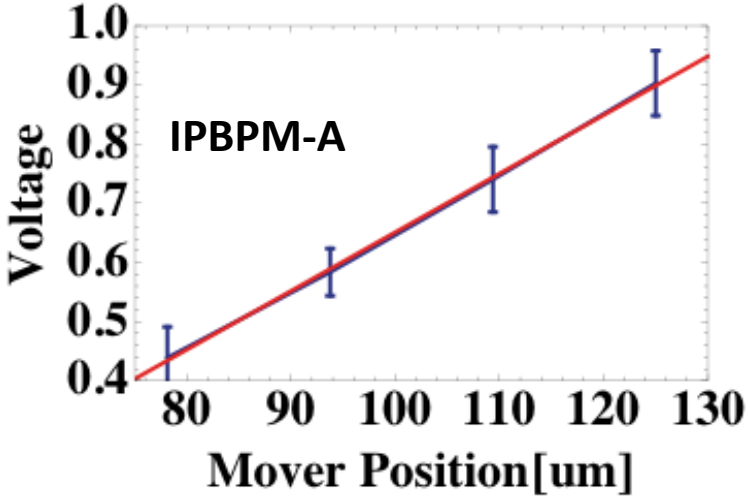


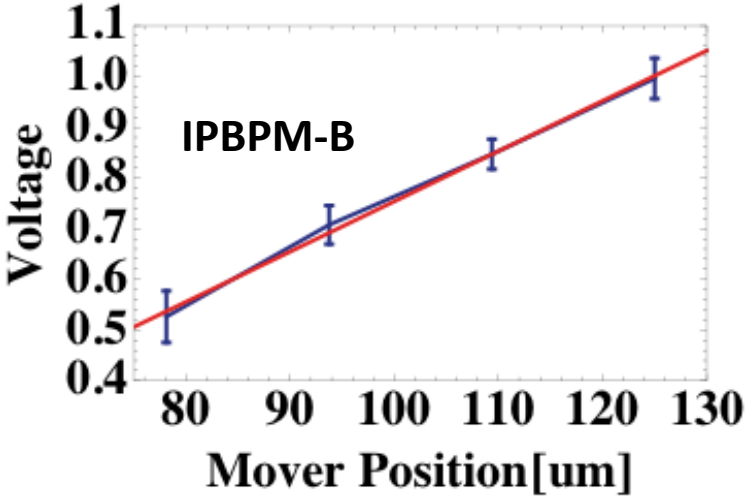
ADC system
check
(C009-H)

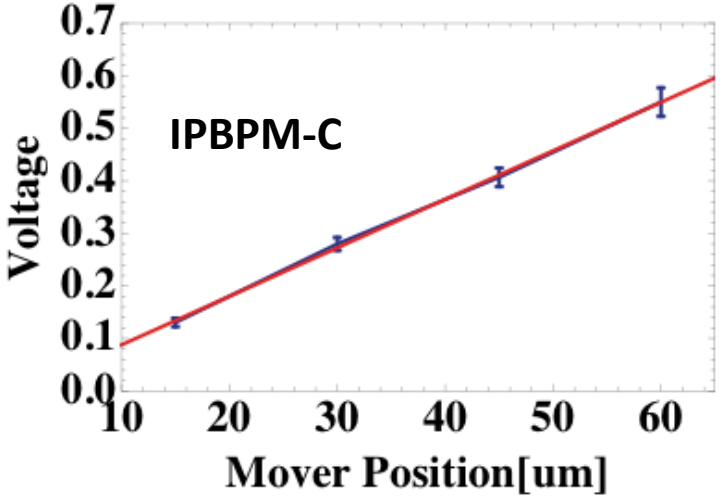


IP-mover
control
program
with
I-Q tuning

1st resolution test for Low-Q IP-BPM (Nov. 2013)

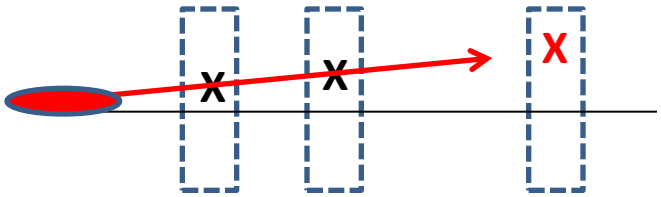




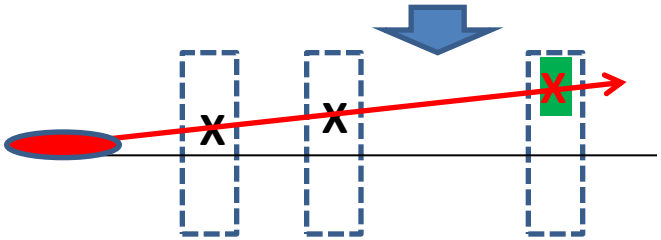


	IP-BPM A [uV/nm]	IP-BPM B [uV/nm]	IP-BPM C [uV/nm]
30dB att.	9.9113	9.9105	9.2349
0dB att.	313.42	313.39	292.03

1st resolution test for Low-Q IP-BPM (Nov. 2013)

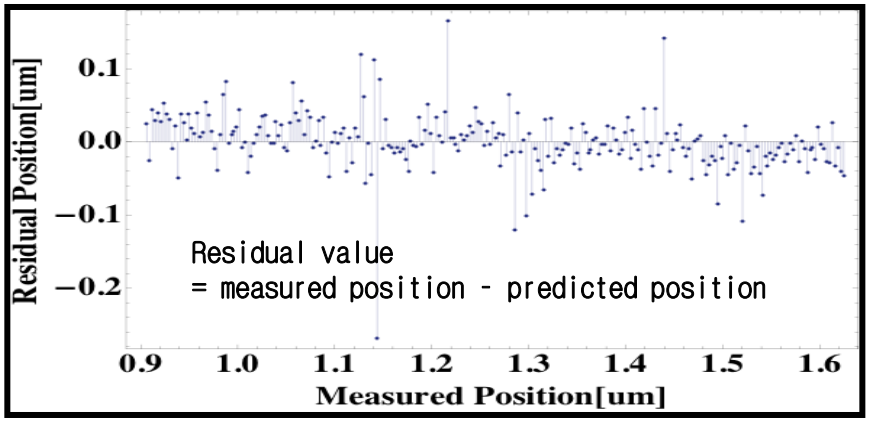


Beam position prediction

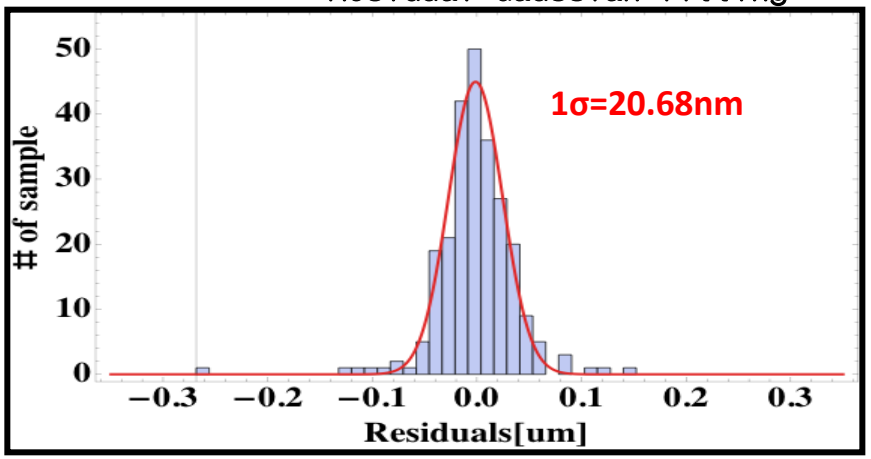


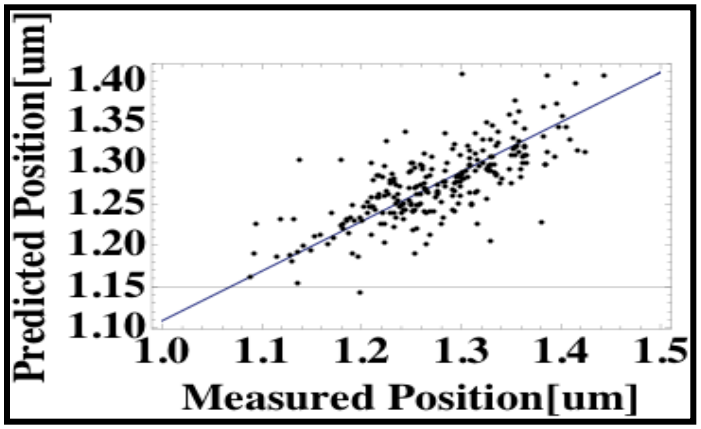
Beam position measurement

Convert to residual



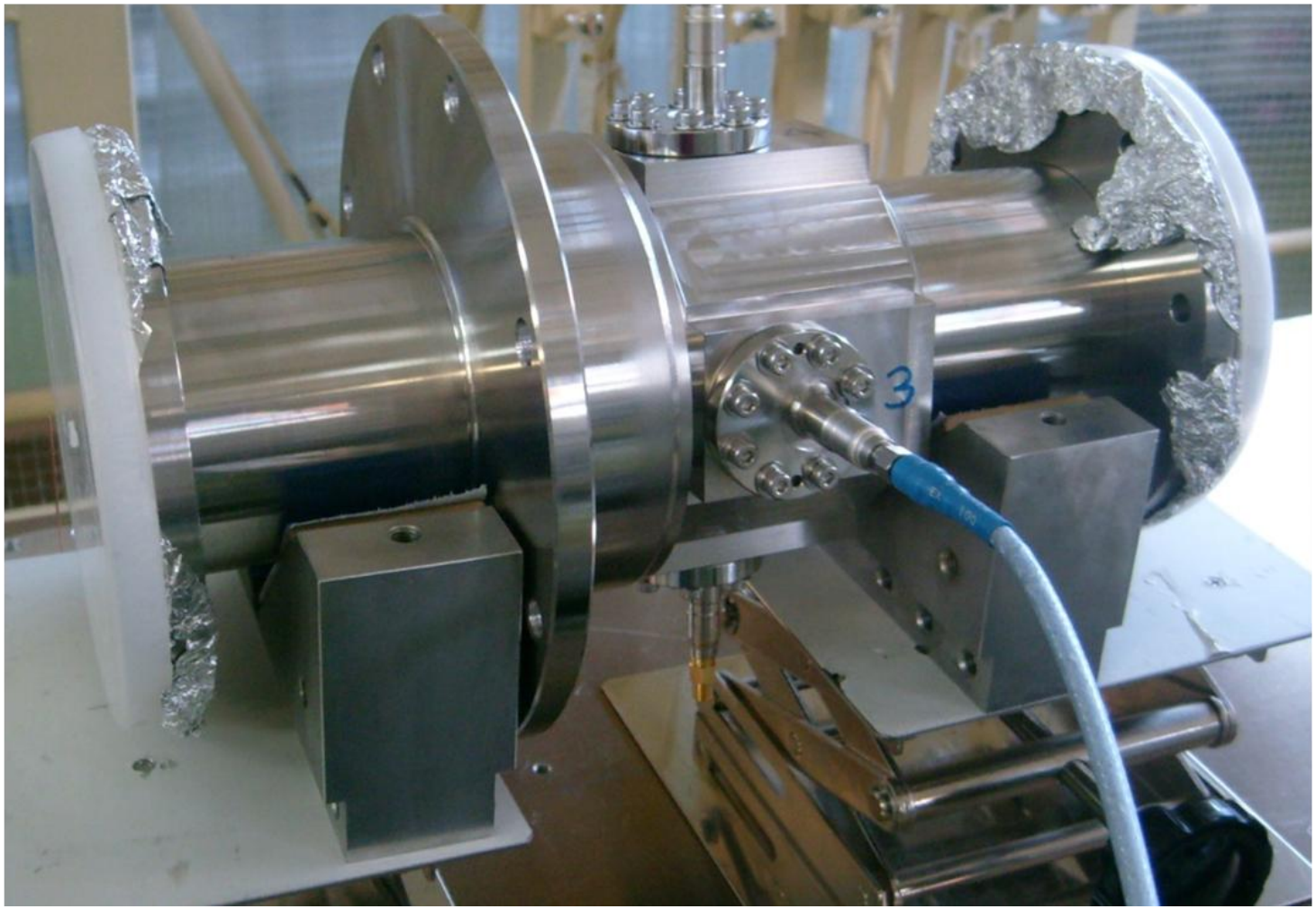
Residual Gaussian fitting





$$\text{Resolution} = \frac{\text{Residual}}{\text{Calibration factor}} = 20.68 \text{ nm}$$

Fabrication L-band cavity BPM (Nov. 2013)



LC activities in India

RRCAT, Development of 1.3 GHz tuner and testing

Development of two types of 1.3 GHz SCRF cavity tuners have been taken up.

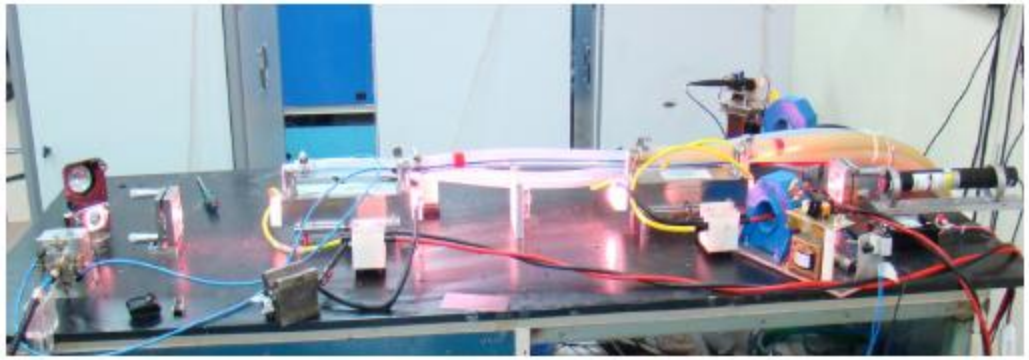
- Blade tuner fabrication and testing.
- Scissor tuner design, analysis and fabrication.

1.3 GHz Prototype Dressed Cavity with Blade Tuner

1.3 GHz Prototype Dressed Cavity with Scissors Tuner

RRCAT, Laser Welding Technology for SRF Cavity Fabrication

20 kW Nd:YAG fiber-coupled laser



Prototype 3.9 GHz SCRF Nb cavity

Prototype 1.3GHz cavity Nb half cells welded

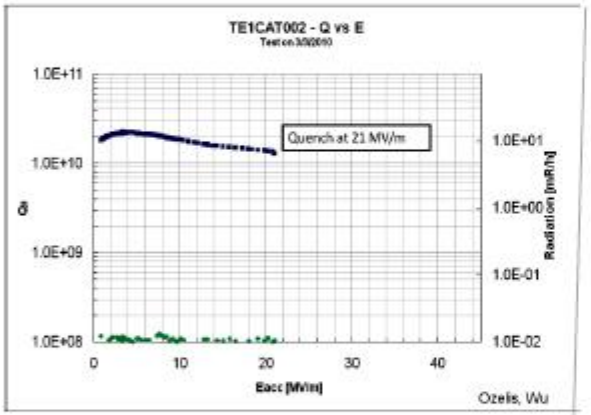
9-cell copper cavity

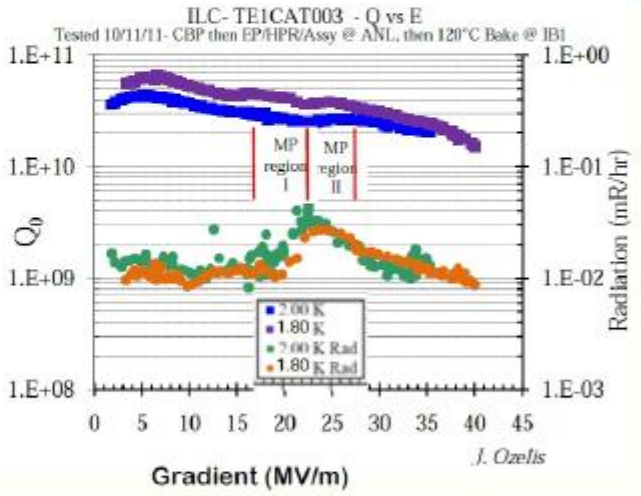
Development of Single Cell 1.3 GHz SCRF Cavities at RRCAT - IUAC Under Indian Institutions & Fermilab Collaboration

First Indian 1.3 GHz superconducting cavity performance measured at Fermilab. Maximum accelerating field of 21 MV/m at Q > 1 E+10 achieved at 2 K.

Subsequently, two more cavities have been fabricated and processed under IIFC to improve the performance.

These cavities have exhibited accelerating gradients up to 37.5MV/m with a Q > 1 E+10 at 2 K.





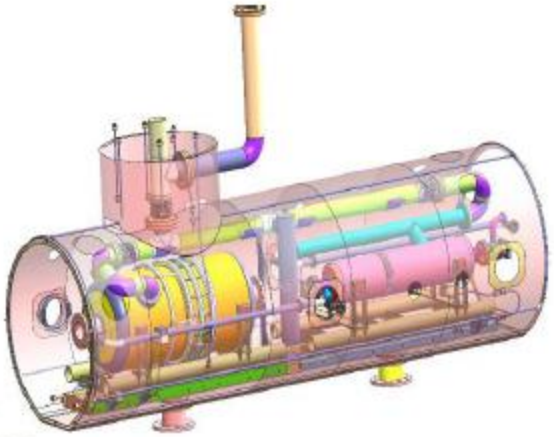
5-Cell 1.3 GHz cavity

Amit Roy

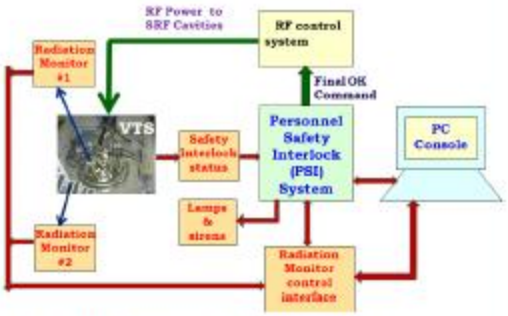
RRCAT, SCRF Cavity Test Setups

VTS Cryostat & Cavity Insert Assy

RF Supply for VTS



Internal Configuration of HTS
(with cryogen piping)



Block Diagram of VTS PSI System

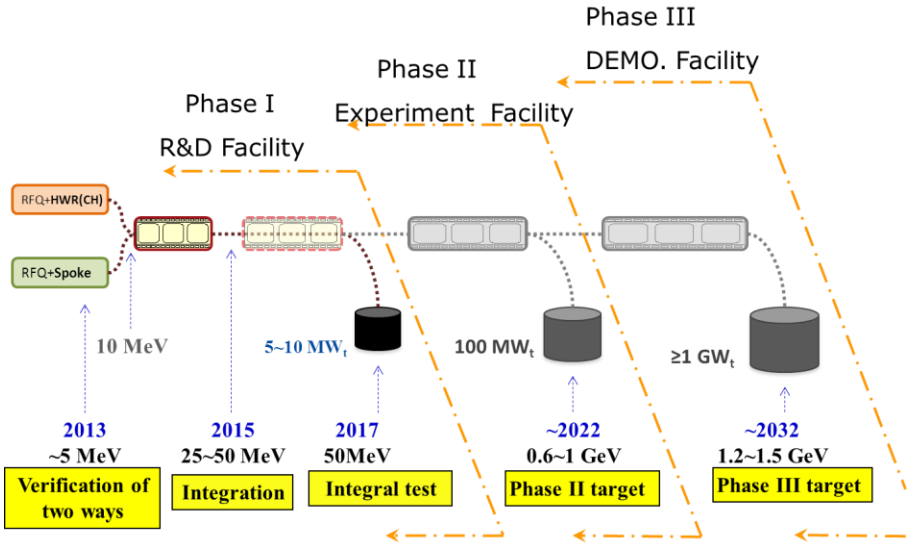
VTS PSI Rack

ILC perspectives in Asia

Asian countries and regions are very active in different kinds of large accelerator facilities in addition to LC R&D

Accelerators projects in mainland China and Taiwan

CSNS under construction



China ADS R&D Program started

Beijing Advanced Photon Source (BAPS)
In proposal (5GeV)

Taiwan Photon source (TPS) under construction

Current Accelerator Projects in Korea (2013)

PLS-II (3.0-GeV Light Source)

10-GeV PAL-XFEL

RAON, Rare Isotope Acc.

SC Cyclotron for Carbon Therapy

KOMAC,100-MeV Proton Linac

Accelerator activities in India

1. 1 GeV proton linac for spallation neutron source is proposed by RRCAT, Indore to be built over the period 2012-2022.

2. 200 MeV high current proton linac proposed by BARC, Mumbai for ADS related development in the period 2012-2017.

3. A RIB project at VECC, Kolkata using 50 MeV electron linac followed by heavy ion superconducting linac in hte period 2012-2017.

4. Development of Nb resonators of TESLA type(1.3 GHz, multi-cell) and 650 MHz elliptical resonators for protons being developed at RRCAT, Indore; VECC, Kolkata and IUAC, New Delhi.

Vietnam is coming…

“Windows on the Universe” held at ICISE, Quy Nhon, August 11-17, 2013, Vietnam

“Physics at LHC and beyond“ to be held at ICISE, Quy Nhon, August 11-17, 2014, Vietnam

China's scientific effort and potential

- In 2011, China's R&D 868.7 Billion RMB，increasing 23% compared with 2010， R&D vs GDP 1.84%.
- In 2011,China's R&D 2.88 Million man-year， increasing 9.8% compared with 2010， keeping the first place in the world (In 2020, 3.8 Million man-year）.
- In 2010, China's fundamental research investment 32.4 Billion RMB，increasing 20% compared with 2009.
- In 2011,China's science and technology manpower 62 Million，increasing Million compared with 2010.
- In 2011, undergraduate students in universities 23 Million，increasing 0.77 Million，graduate student 1.65 Million，increasing 0.11 Million.
- In 2011, students going abroad 0.34 Million，increasing 19% compared with 2020，returning students 0.186 Million，increasing 38% compared with 2010.
- In 2011, NSFC 18.3Billion RMB.

……

- **In 2023, China' GDP 17k Billion UDS，USA 's GDP 19k Billion USD. Two economic peak countries world then…**

IHEP Director, Prof. Yi Fang Wang's speech for ILC Event on June 12, 2013

(During Fragrant Hill Scientific Meeting on future e+e- colliders, June 12-14, 2013, Beijing)

(China's stand point on ILC)

Today is a very important day for our high energy physics community and for the global Science community. After almost 10 years efforts, we completed the technical design report of the International Linear Collider(ILC). This is truly an international event, to be celebrated by all the scientists and engineers involved in the last twenty years, by everybody in the community and by the whole world.

Since August of 2004, when ICFA having chosen the cold technology for ILC at IHEP in Beijing, thousands of scientists and engineers around world from different institutions and universities have been working as an integrated team on this unique project, a truly global efforts, a great worldwide endeavor of human being, and a big dream for all of us. The way we are organized is very successful, of course, with a very strong leadership and inspiration of Prof. Barry Barish and Prof. Sakue Yamada. The completion of TDR shows that we can organize ourselves successfully and efficiently. This is also a demonstration that we can organize ourselves to construct the ILC, and our dream can become a truth.

The discovery of Higgs comes really on time, thanks to our colleagues at the Large Hadron Collider. ILC cannot be better justified at this moment. We can now study in detail the properties of Higgs, and search for signs of new physics beyond the Standard Model. Both are extremely important towards the understanding of the world we are living in, which is a dream by billions of people over thousands of years.

On behalf of the Chinese High Energy Physics Community, I am honored to share with you our strong emotion and full support for ILC. We will certainly be part of it. This is a new way of life for us to explore, a new wonderful culture for us to enrich, a common endeavor for us to find our own roles to participate, to contribute, to support each other, and to share its coming fruits, both for the progress of science and to the progress of our society, all in general.

With the success of this worldwide observed ILC Event, we reset the needles of our clock and make the new counting for the next milestone, the final approval of all the participating governments for the construction.

2013-6-12 Beijing

Statement from the Asian High Energy Physics Community on the International Linear Collider

（http://www.interactions.org/cms/?pid=1033193）

Date Issued: 3 September 2013

……

(Asia's stand point on ILC)

AsiaHEP/ACFA believes that the ILC is the most promising electron positron collider to achieve next generation physics objectives.

……

AsiaHEP/ACFA welcomes the proposal by the Japanese HEP community for the ILC to be hosted in Japan. AsiaHEP/ACFA looks forward to a proposal from the Japanese Government to initiate the ILC project.
Considering the situation in which accelerator science is rapidly growing and related technologies are building in Asia-Oceania region, the participation in a cutting-edge accelerator project, such as the ILC, will accelerate the benefits to the whole accelerator science as well as to high energy physics in this region.

AsiaHEP/ACFA will make every effort to promote the ILC, especially in Asia-Oceania region.

Potential technical contribution to ILC construction from China (example and hope)

Parameters	Value
C.M. Energy	500 GeV
Peak luminosity	1.5 x10^{34} $cm^{-2}s^{-1}$
Beam Rep. rate	5 Hz
Pulse duration	0.73 ms
Average current	5.8 mA (in pulse)
Av. field gradient	31.5 MV/m +/-20% Q_0 = 1E10
# 9-cell cavity	16024 (x 1.1)
# cryomodule	1,855
# Klystron	~400

Higgs factory (250GeV)

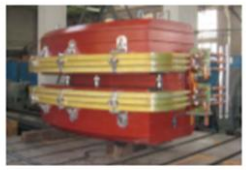
300 cryomodules (cold mass)

Three cavity production centers: 800-1000 cavities in total

Magnets for international collaborations


For NSLS-II (BNL, USA)


For ILC-ATF2(KEK, Japan)


For PEFP (KAERI, Korea)


For PEP-II (SLAC, USA)


For SPEAR3 (SLAC, USA)


Undulator for Europe XFEL

Damping ring magnets:

1/3?

First Visit from Japanese Government on ILC

-Visit of Japanese Embassy Officer to IHEP

(日本驻华使馆经济部一等秘书来访)

On June 24, 2013, afternoon at 15:30,
Japanese Embassy officer in Beijing, Science and Technology Attache. **Mr. Yamanouchi Hiroya(山之内裕哉),** Visited IHEP.
Duration: 1 hour
Place: IHEP Main building A302

Concluding remarks

- Asian countries have been active in participating LC R&D collaboration and training of the students and specialists.
- Asian countries are trying to master the key technologies of ILC before its construction.
- Asian countries are very active in large accelerator facilities' constructions, which could be a good reservoir of advanced accelerator technologies and skilled accelerator specialists.
- Supporting and participating ILC R&D and preparing themselves for participating ILC construction are vital to Asian countries in this most important opportunity provided by ILC to have a significant development in Science, Technology and Society.
- Asian countries have big potentials to contribute to ILC, in science, technologies, human resources and economy.
- A more coordinated efforts on ILC in Asia are needed under ACFA.
- The momentum should be kept and strengthened in Asian countries on ILC under the guidance of ICFA-LCB within LCC.

Thank you for your attention

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