

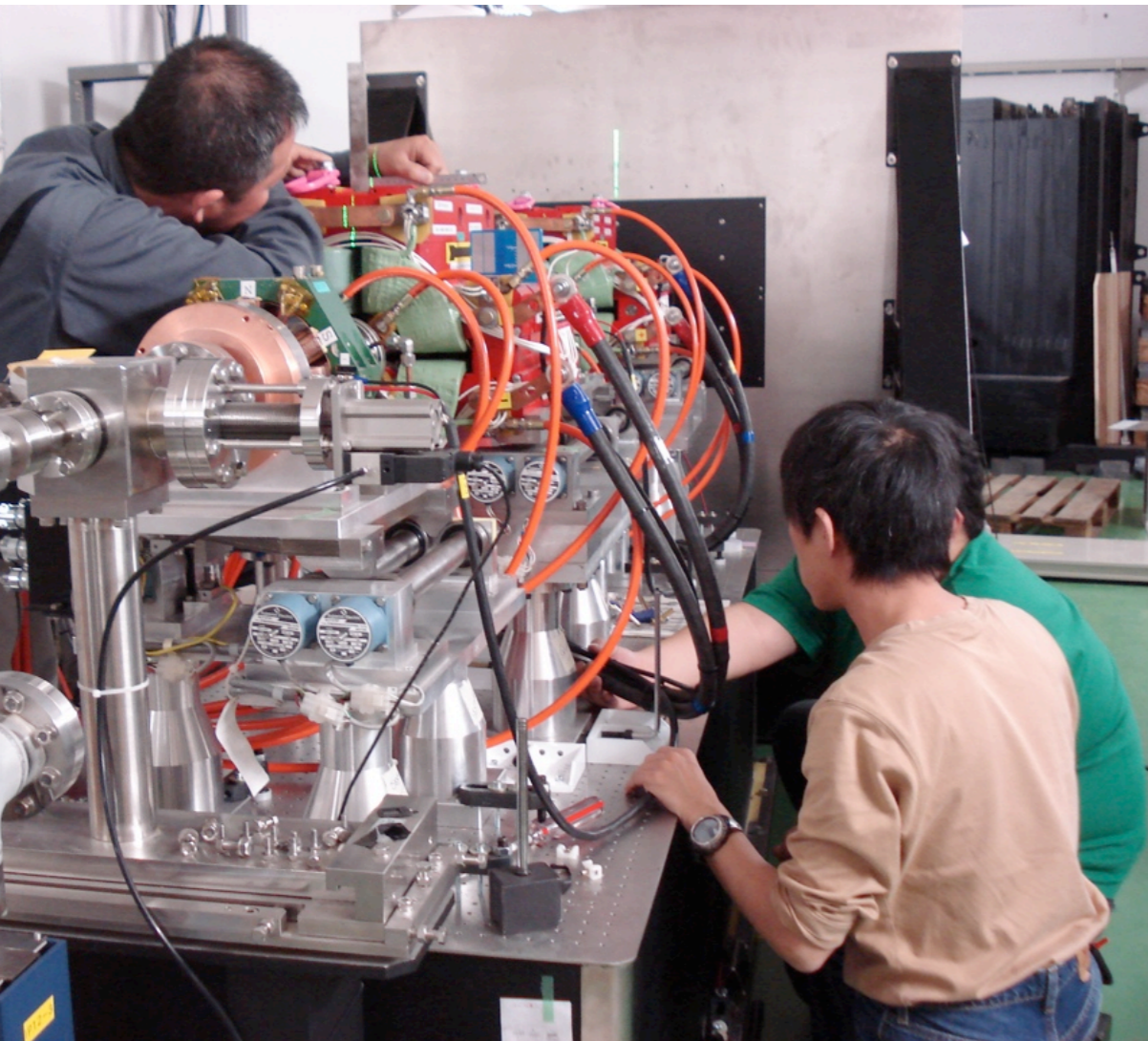
# Goals at this meeting

Major issues to be presented and discussed;

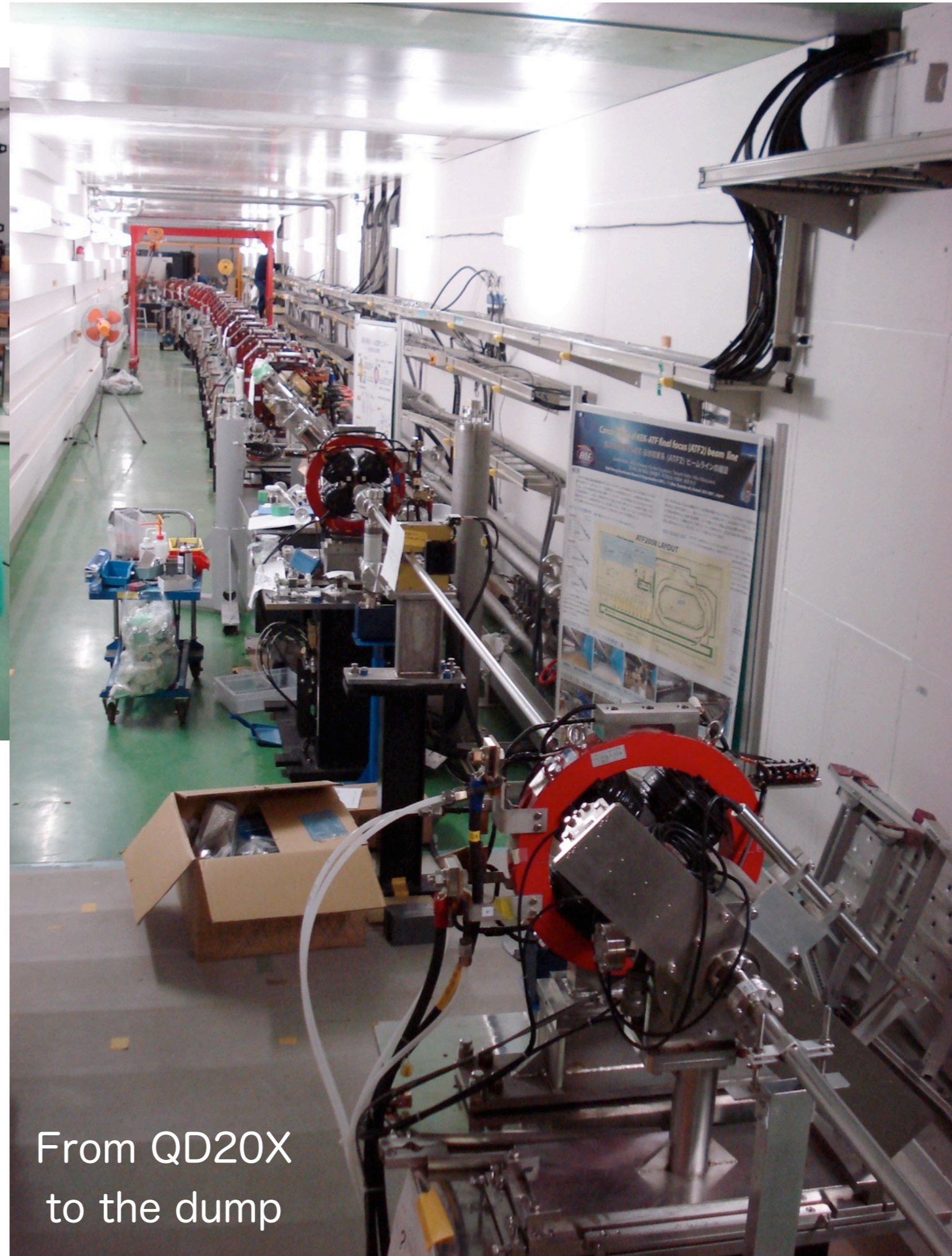
1. Commissioning status
2. Plan and Milestones in 2009-2010
3. Long Term Plan in 2010 -

T. Tauchi,

7th ATF2 Project Meeting, 15 December 2008



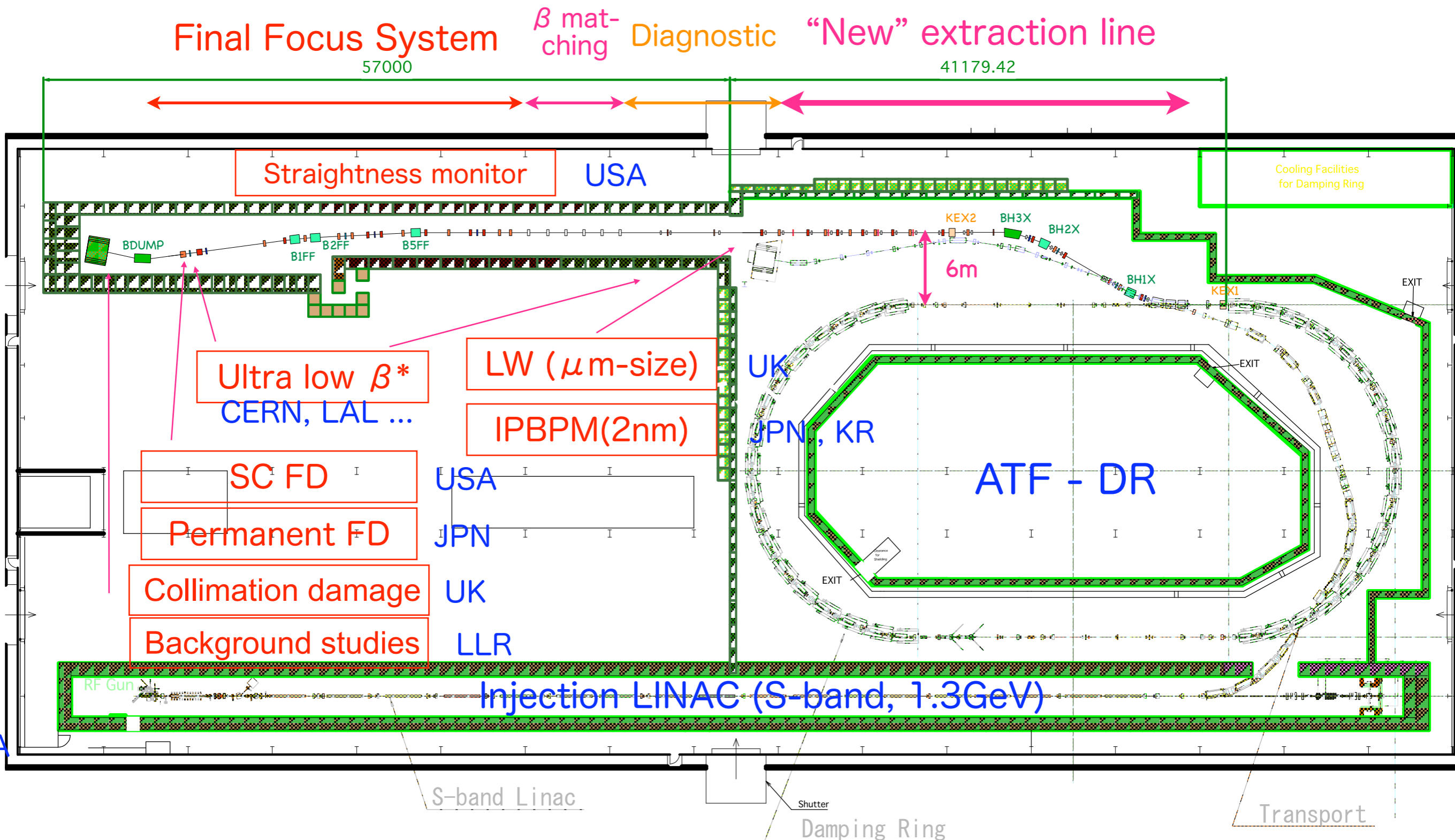
FD alignment after the  
Radiation Inspection ,  
11 December, 2008



From QD20X  
to the dump

# ATF2 beam line and planned/proposed R&Ds

2008 - 2010 - 2012 - 2014



## Optional Photon facility ; 2015 - 2019

- laser and optical cavities for photon linear collider
- generation of photon beam

## Future Laser Facility

### ”Strong QED” experiments with Laser

- Non-linear QED with Laser intensity of  $> 10^{22}$  W/cm<sup>2</sup>

The “proposal” was presented by T.Tajima at the 6th TB/SGC meeting, 11-12 June 2008

Recommendation : need clear justification of uniqueness of the experiments at ATF2

# Organization of Commissioning Team

Goal of the team is to achieve the target beam size, i.e.  $\sigma_y=37\text{nm}$ , by 2010. Also, the team will develop beam tuning tools and find the mostly needed ones for minimizing beam size.

Team leader : Toshiyuki Okugi (KEK)

Mailing list : [atf2-commissioning@ilcphys.kek.jp](mailto:atf2-commissioning@ilcphys.kek.jp) since April 2008

home page : <http://ilcphys.kek.jp/mail/atf2-commissioning/>

## Monthly meetings with Webex

Coordination with other R&D tasks will be taken care by the System/Group Coordinators (SGCs) in the ATF international collaboration.

In the meantime, T.Okugi and K.Kubo will collaborate to plan a tentative schedule for three years with gathering information from the R&D tasks, since K.Kubo is Machine Study Schedule Coordinator in the SGCs.



# Organization of Software Projects

Expression of interests (Eols) for the projects has been called,  
24 June, 2008.

We adopt the two software environments, i.e.

- (1) in framework of V-system ( ATF control system) and
- (2) the flight simulation

Many softwares based on the V-system have been developed and used at ATF and the flight simulator is very useful to develop the softwares for colleagues especially outside of KEK.

Overall coordinator : Shigeru Kuroda (KEK)

Organizing task groups with priorities and task leaders

# ATF2 Software Tasks , Sep. 2008

Beam Tuning Direct				Hardware Direct			
Project Title	Contributing Institutes	Priority	Leader	Project Title	Contributing Institutes	Priority	Leader
Coupling Mea.&Corr. in EXT	KEK,SLAC,LAL,CI	VH	C.Rimbault				
Dispersion Mea.&Corr. In EXT	KEK,SLAC,CI	VH	J.Jones				
EXT Beta-Matching	SLAC, KEK,CI,LAL	VH	K.Kubo				
EXT Orbit Corr./FB	SLAC,KEK,LAL,CI, JAI	VH	Y.Renier	EXT Orbit Corr./FB	SLAC,KEK,LAL,CI, JAI	VH	
FFS Orbit Corr./FB	SLAC,KEK,LAL,CI, JAI	VH	A.Scarfe	FFS Orbit Corr./FB	SLAC,KEK,LAL,CI, JAI	VH	
Beam Line Modeling Tools	SLAC,CI	M	S.Molloy				
IP FB( Pulse-Pulse)	LAL, JAI	H+L	Y.Renier	IP FB( Pulse-Pulse)	LAL, JAI	H+L	
FB Integration	SLAC, JAI	H	J.R.Lopez				
IP Waist&Beta adjustment	LAL(IHEP),CI	H	S.Bai				
Non-Mover-Based BBA(EXT)	KEK,LAPP	H	T.Okugi				
Mover-Based BBA(FFS)	SLAC,KEK,LAPP	H	J.Nelson				
				C&S-Band Cav.BPM IOC Dev.	JAI,UCL	VH	S.Booget
				IP Cav.BPM	KEK	M	Y.Honda
Final IP Spot-Size Tuning	SLAC,KEK,LAL,Tokyo,CERN,CI	M/H	G.White				
				Magnet Mover IOC Dev.	SLAC	M/H	J.Nelson
				EPICS Interface for WS/etc	JAI(LW?)	M/H	
				Software Interface for IP BSM	Tokyo	M/H	Y.Kamiya
Bunch-Bunch IP FB(Intra-Pulse)	JAI	M	J.R.Lopez	Bunch-Bunch IP FB(Intra-Pulse)	JAI	M	P.Burrows
FS Core Software Dev.	SLAC	M(Ongoir	G.White				
				Controls Infrastructure Dev.	JAI,SLAC,KEK	M(Ongoir	N.Terunuma
EXT Bunch-Bunch FB	JAI,Oxford	L/M	J.R.Lopez	EXT Bunch-Bunch FB	JAI,Oxford	L/M	P.Burrows
				EPICS Readout of Fiber-PLIC		L	
				PS IOC Dev.	SLAC	L	
Integrated Automated Tuning	SLAC	L	G.White				



# Beam Commissioning Team Tasks

Task Group Leaders  
( Priority )

VH = very high

H = high

M = medium

L = low

X = not specified

## Beam deliver to the dump with small beam loss

- Beam delivery to the dump KEK, ... S.Kuroda(X)
- New RF gun commissioning KEK, ... S.Kuroda(X)
- Good injection efficiency  
( LINAC stabilization etc. ) KEK, ... S.Kuroda(X)
- PLIC cable for beam loss monitor SLAC, ... D.McCormick(X)

## Hardware Commissioning for ATF2 ( including the software work )

- Magnet HA-PS SLAC, KEK, ... B.Lam(X)
- Magnet movers  
( beam steering test with mover ) SLAC, LAPP, KEK, J.Nelson(M/H)
- Cavity BPMs (S and C-band)  
( calibration of position sensitivity with beam ) JAI, UCL, SLAC, KNU, KEK, ...  
S.Boogert(VH)

## Alignment and Stability

- alignment of magnets
- FD system and vibration/GM

KEK

LAPP, Tokyo univ.

R.Sugahara(X)

B.Bolzon(X)

## Optics Modeling

- Measurement of the quadrupole strength error and optics modeling of the extraction and ATF2 beamline
- BBA ( with/without Mover )

KEK, SLAC, (Daresbery ), ...

S.Molloy(M)

KEK, SLAC, ... T.Okugi(H)

J.Nelson(H)

## Beam diagnostics at extraction line

- Dispersion correction
- Coupling correction
- Beta Matching
- Emittance growth study from DR to EXT

KEK (Vsystem based), J.Jones(VH)  
SLAC (FS based ), ...

KEK, SLAC, LAL, ...  
C.Rimbault(VH)

KEK, SLAC, ... K.Kubo(VH)

LAL, (Daresbery), SLAC, KEK,

... P.Bambade (X)

## IP BSM studies

- |   |                   |                |
|---|-------------------|----------------|
| - Laser Interferometer ( Shintake Monitor ) | U. of Tokyo, KEK, | Y.Kamiya(M/H)  |
| - IP BPM                                    | KEK, KNU, ...     | Y.Honda(M)     |
| - Carbon Wire Scanner                       | SLAC, KEK, ...    | D.McCormick(M) |

## Feedback Study

- |   |                     |               |
|---|---------------------|---------------|
| - EXT Orbit correction and feedback       | SLAC,KEK,LAL,CI,JAI | Y.Renier(VH)  |
| - Orbit Feedback ( pulse-to-pulse ) at IP | KEK, SLAC, LAL,     | Y.Renier(H/L) |
| - Intra-train feedback at EXT and IP      | Oxford, JAI, ...    | J.R.Lopez(M)  |
| - FFS Orbit correction and feedback       | SLAC,KEK,LAL,CI,JAI | A.Scarfe(VH)  |

## Beam size tuning at ATF2 final focus line

- |                           |                          |              |
|---------------------------|--------------------------|--------------|
| FF Optics studies         | LAL, IHEP, ...           |              |
| - with large beta optics  |                          | S.Bai(H)     |
| - by IP waist scan        |                          |              |
| - pushed beta optics      | CERN,SLAC,KEK,LAL,CI,JAI | R.Tomas(X)   |
| Final IP spot size tuning | ALL                      | G.White(M/H) |

# Strategy by the commissioning team

Nov.-Dec. 2008

Radiation Inspection, 12/11

Fast Kicker Study

The “fast kicker study” will use the special setting.

ATF2 Start

Jan. 2009~

Beam line  
commissioning

DR study  
( fast ion, DR emittance ... )

Reduction of  
radiation loss

Hardware study at the extraction line  
( FONT, Laser Wire ... )

Injection  
stabilization

Extraction line tuning and study  
( dispersion, coupling correction , emittance growth at extraction... )

Device Commissioning for ATF2  
( cavity BPM, Mover, Guarder, Magnet PS )

ATF2 final focus line study  
( beam size tuning, stabilization ... )

# Commissioning Schedule in JFY2008

DR studies RF gun and linac, injection ...

Commissioning for RI

High beta operation

ATF2 hardware

## 10 2008

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

## 11 2008

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

## 12 2008

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Fast Kicker

## 1 2009

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

## 2 2009

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

## 3 2009

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Hardware commissioning at site

Cold cavity BPM

- preparation of radiation inspection
- radiation inspection (RI)
- fast kicker study ( cannot extract the beam )
- nominal beam study time

# Session Organization

	15th Dec. Monday	16th Dec. Tuesday	17th Dec. Wednesday	18th Dec. Thursday
9:00		Beam dia. at EXT	Beam size tuning	<b>Joint w. TB/SGC</b> Summary of project meeting
12:00		Optics modeling Feedback system	<b>Comm, Plan (milestones) and Organization</b>	R&D status
13:30	Introduction -start at 14:00 Comm. status	Beam dia. at EXT -start at 13:00 Align. & stability	<b>Publication policy</b>  <b>Joint w. ILC-BDS</b>	<b>TB/SGC</b> Proposals (4)  closed session
16:00	Specil seminar at 17:00 -	IPBSM		Conclusion

16:30, ATF Daily operation meeting

18:00- Banquet

# Commissioning Plan and Organization

Commissioning should be integrated with the whole collaboration.

It is essential to have a long term plan, i.e. milestones, to achieve the ATF2 goal by 2010.

Also, it is essential for non-KEK colleagues to prepare/plan their participation in machine times, e.g. trip and study plans.

In addition, we should have a concrete week-long plan in advance. Also, we must take account of non-ATF2 studies in the same week.

# ATF2 milestones

2009

2010

dec jan feb mar apr may oct nov dec jan feb mar apr may oct nov dec

BSM Laser Wire mode commissioned	■		■		■					■	■						■	
First test of fast kicker		■																
Observe several micron beam size			■															
BSM 8° (0.25-1.5um) commissioned			■															
Observe sub micron beam size			■															
BSM 2° mode (1-6um) commissioned			■															
Achieve $\epsilon_y=24\text{pm}$ beam in DR			■															
BSM 30° (70-400nm) commissioned				■														
Extract and preserve of $\epsilon_y=24\text{pm}$				■														
First observation of ILC-scaled $\sigma_y=75\text{nm}$				■														
Achievement of $\epsilon_y < 12\text{pm}$ in DR					■													
Repeat observation of 75nm beam								■										
Extract & preserve $\epsilon_y=12\text{pm}$ beam									■									
BSM 174° (20-100nm) commissioned									■									
First observation of design 37nm beam										■								
Fast kicker system fully commissioned											■							
Monalisa installed on beamline											■							
Reliable observation of 37nm beam												■	■	■				
Achieve 2nm resolution of IP BPM														■				
Evaluate IR position stability to nm level														■				
Commissioning of Monalisa														■				
Commissioning of FONT feedback																	■	
Observe of nm stability of IP position																	■	
Initial tests of squeezed $\epsilon$ -function																		■

VERY TENTATIVE



# Goals at this meeting

## 1. Agreement of “monthly” milestones by 2010

- suggestion base on beam size

## 2. Detailed plan for sub-systems

- DR emittance, IPBSM, IPBPM (2nm) , Monalisa and FONT etc.
- ILC like bunches by the fast kicker
- control and tuning software, i.e. serialization of the tasks

## 3. Detailed schedule by end of March, 2009

- Installation/removable of fast kicker study
- Installation of new QM7R('s)
- re-alignment of beam lines ( BT and FF )
- IPBSM commissioning with 8 and 2 degree modes
- DR emittance to be  $\varepsilon_y=24\text{pm}$  by end of February, 2009

## 4. Agreement of publication policy