

# Status and Construction Schedule of ATF2

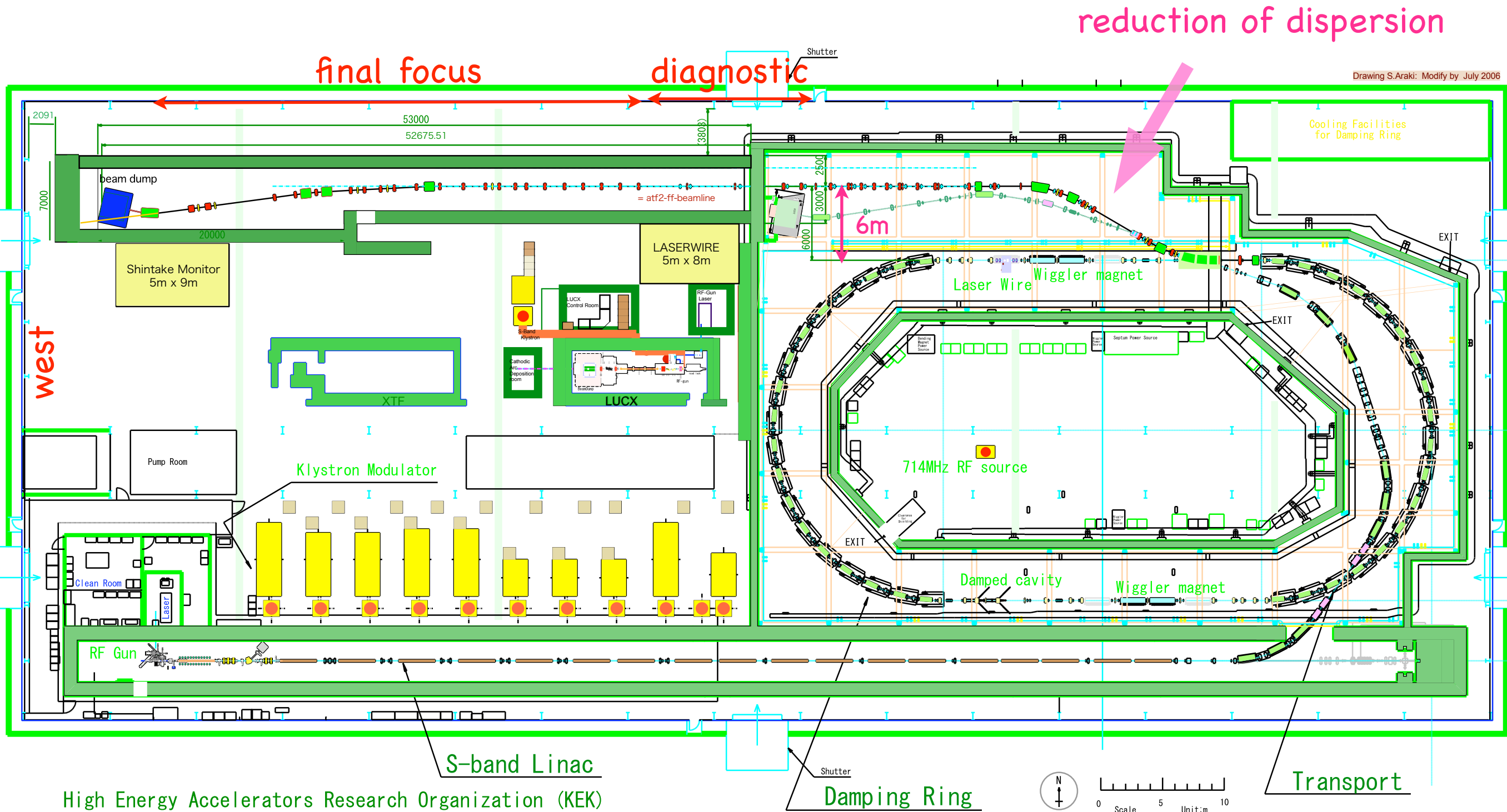
by T.Tauchi

ATF2 Meeting, Annecy, 9-11 October 2006





Component	Sub-component	Number (no spares)	Comments	Status	Present	New
Magnet	Quadrupole	29	with QD0,QF1	production	27	2
	Sextupole	5		design	0	5
	Octupole	2		design	0	2
	Bend	3	FF-bends =3	design	0	3
	H. Steering	3	horizontal		0	3
	V. Steering	2	vertical		0	2
	Cable of ext.kicker	2	re-location of two kickers		0	2
Magnet Support	Movers	27	20Q-magnets, QD0,QF1 and 5 sextupoles	SLAC	27	0
	Base	27	for each magnet except for the FD support	design	0	27
	Bends	3	support with base		0	3
	FD support	1	active movers for QD0,QF1,SD0,SF1 and BSM	CERN/LAPP and KEK	1	0
Power Supply	HA system	40	8(ExtQ), 6(MatQ), 5(Sext), 2(Oct), 16(FFQ), 3(B)	production		40
Vacuum	Beam pipe (m)	93.154	ATF extraction line at present and ATF2 beam line (50.613m)	design	0	93.154
BPM	Q-BPM for Q & Sext.	33	QD18-21X, IHEP-Qs except for QD0,QF1,SD0,SF1	production	39	-6
	Q-BPM (s-band)	4	with larger diameter (40mm) ,final doublet system	design	0	4
	stripline	4	especially for commissioning	production	0	4
	IP-BPM	3	2nm resolution for position jitter at IP	prototype	0	3
Wire scanner	Metal wire	5	exsit at the extraction line - relocation	existing	5	0
	Laserwire	5	upgrade of the metal wire scanners	R&D	0	5
IP - BSM	Shintake monitor	1	upgrade of the FFTB monitor, i.e. 532nm	upgrade	1	0
	Urakawa monitor	1	laser cavity type	R&D	0	1
Fast orbit correction	Feedforward	1	from DR to extraction line	R&D	0	1
	Feedback	1	intra-train fast feedback based on digital circuit	R&D	0	1
Commissioning tools	Screen monitor	4		exisiting	4	0
	Carbon wire scanner	1	beam size monitor at IP	design	0	1
ICT	beam loss	1	beam current monitor		0	1
Beam dump	ATF2Beam dump	1	design is the same as the ATF one		0	1



west

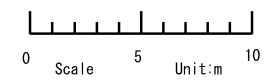
final focus

diagnostic

reduction of dispersion

Damping Ring

Transport



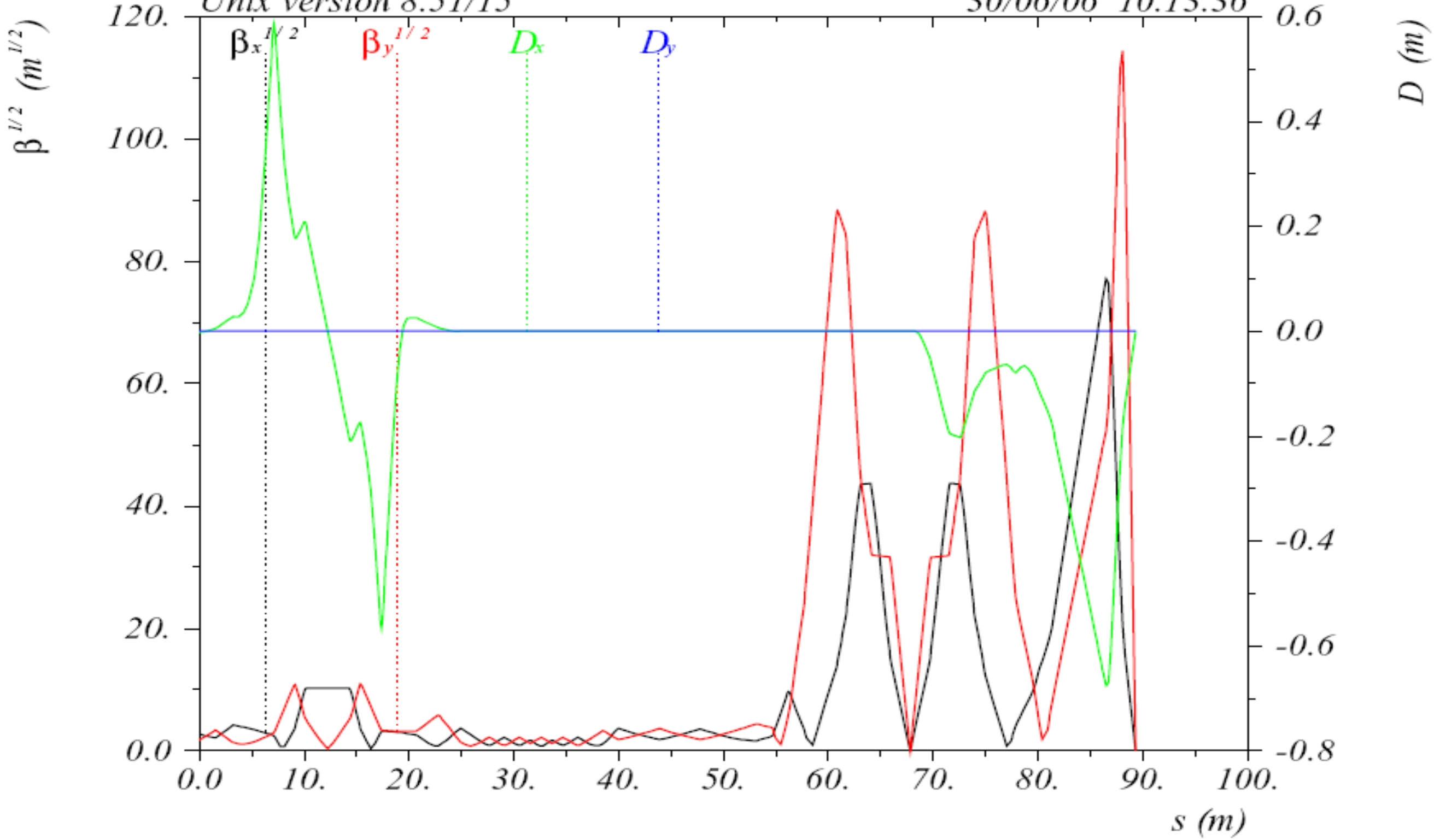




ATF2 Optics (v3.5)

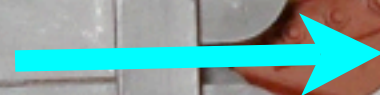
Unix version 8.51/15

30/06/06 10.13.36





6 m from DR-line,  
1.2m high beam line







**ATF2 Area  
view from west**

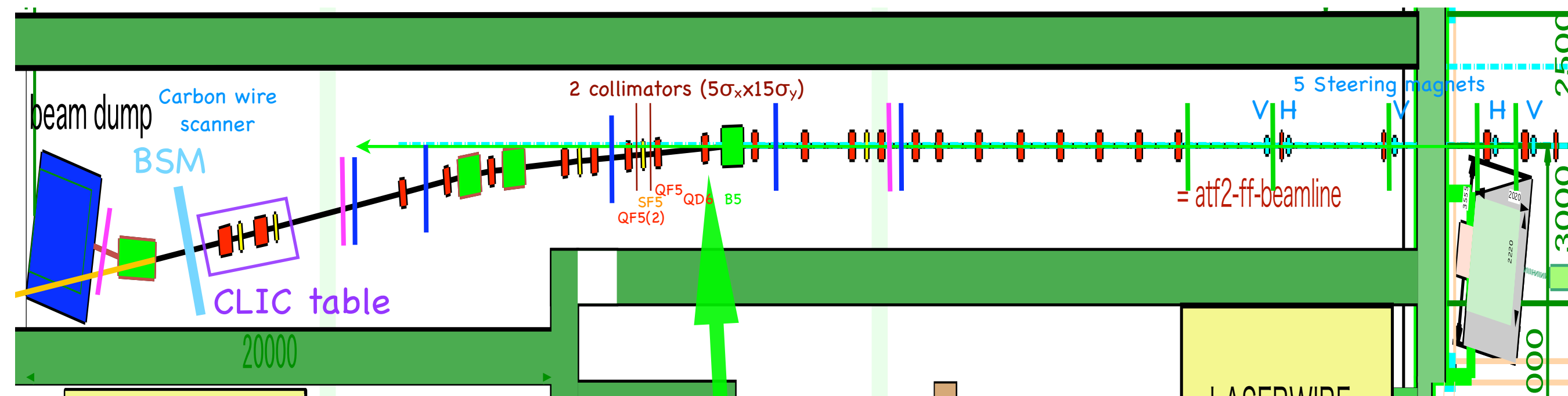


# Beam Instrumentation and Magnets at FF

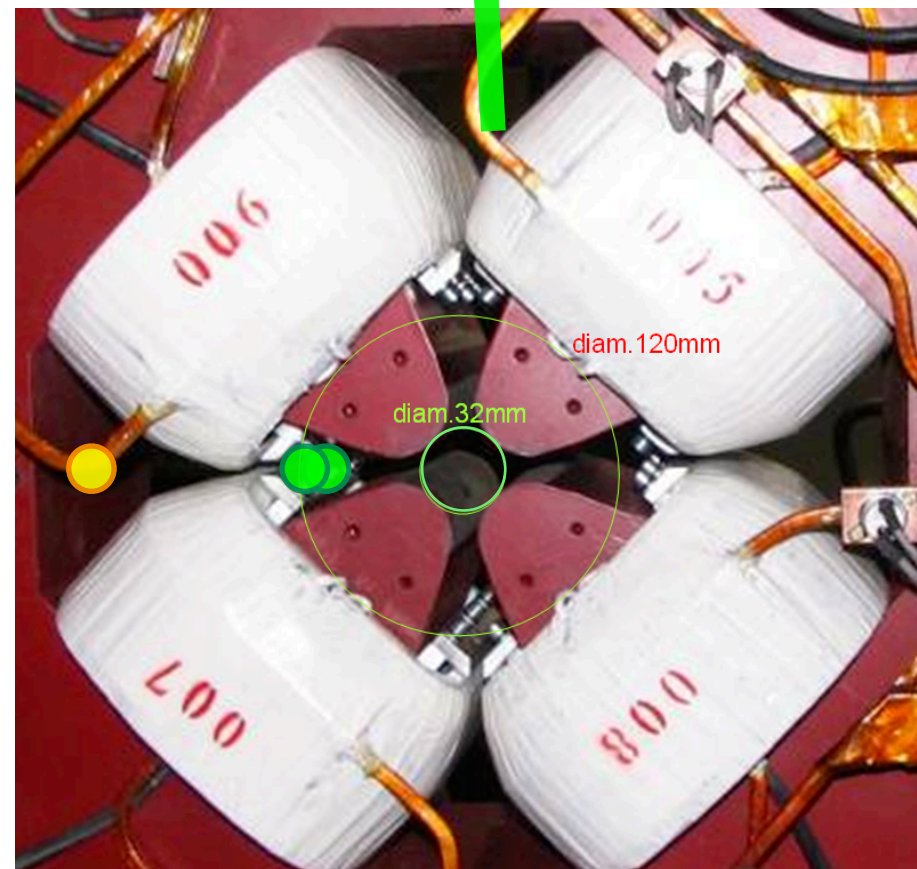
4 Screen monitors for commissioning, (1 at the ATF-EXT)

5 Stripline BPMS for commissioning

5 Wire scanners/Laserwires



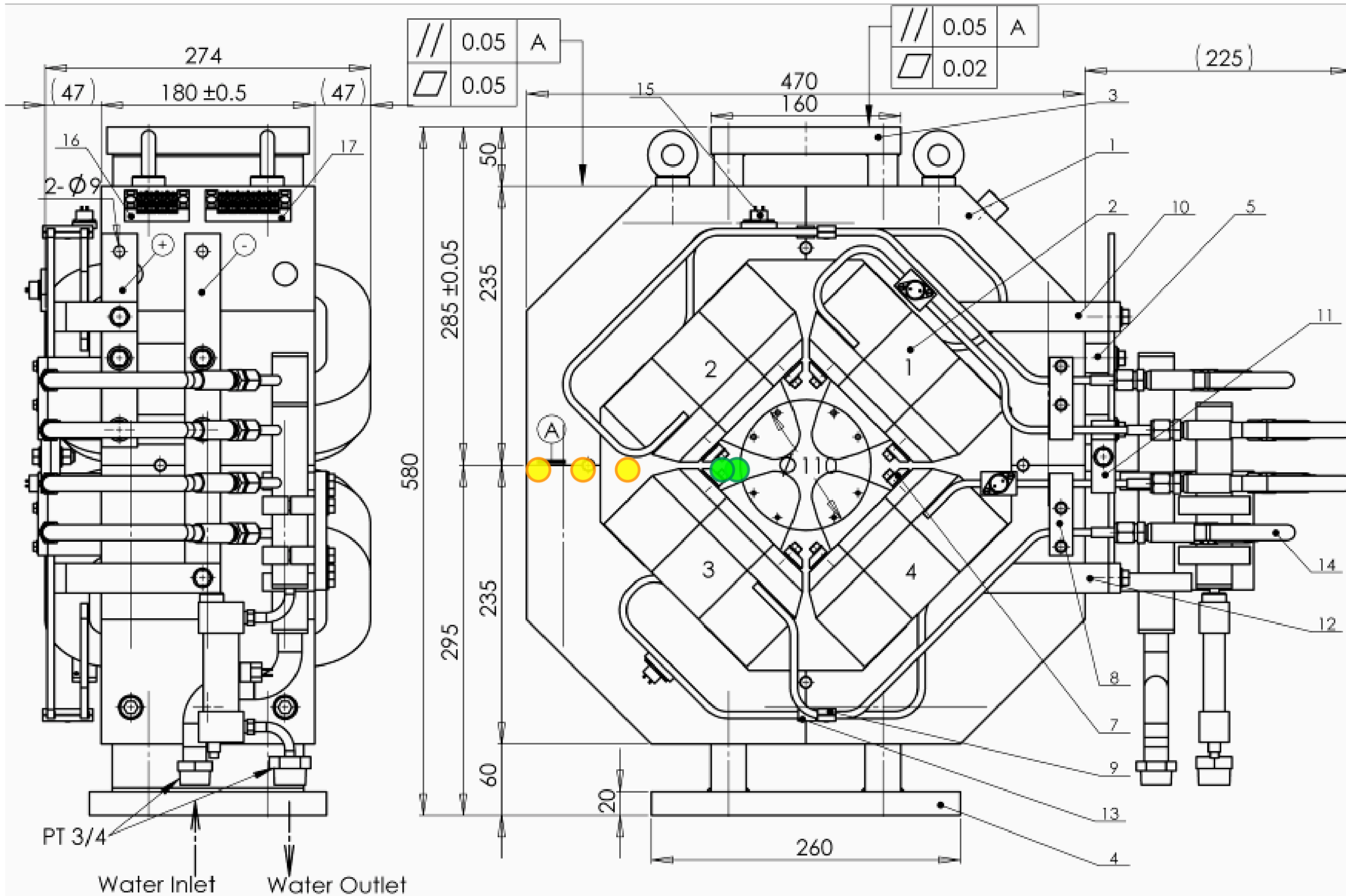
Laserwire signals at QD6 and QF5



All Q- and Sext-FFs have QBPMs and FFTB movers, 4 s-band BPMs in the FD system.



Caution : not final dimension !



Laserwire signals at QD6 and QF5, SF5, QF5(2)

# Sextupole Location

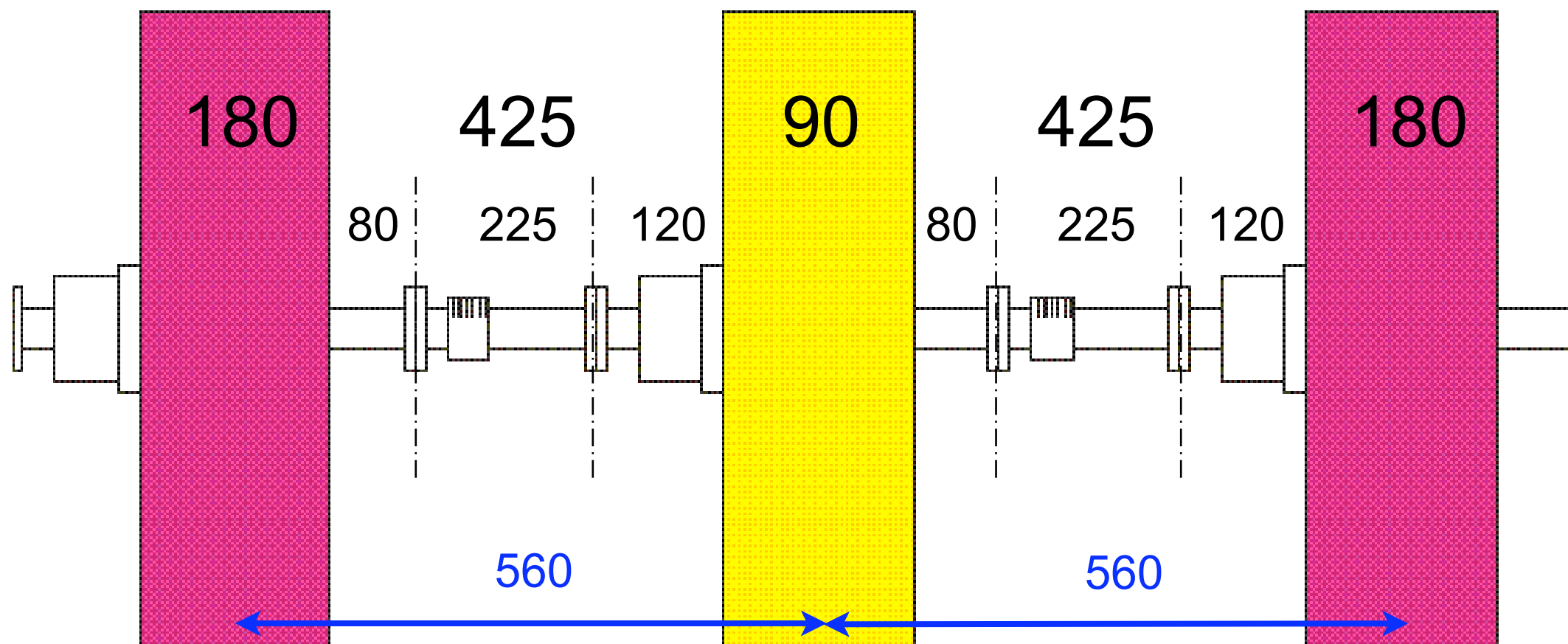
T.Okugi

all the c-band BPMs

QF9  
QF5  
QD4

SF6  
SF5  
SD4

QF9  
QF5  
QD4



180

425

90

425

180

80

225

120

80

225

120

560

560

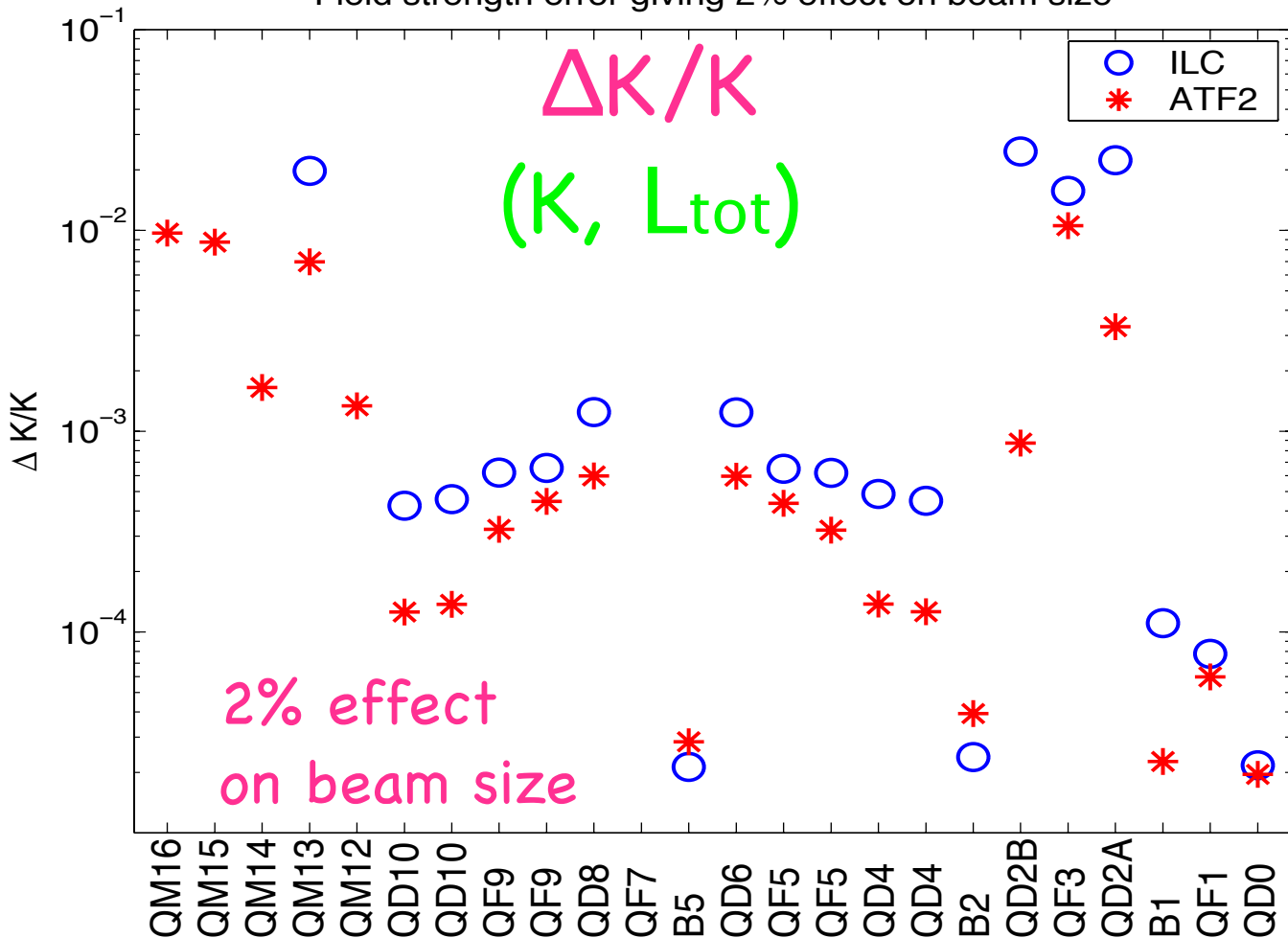
540

540

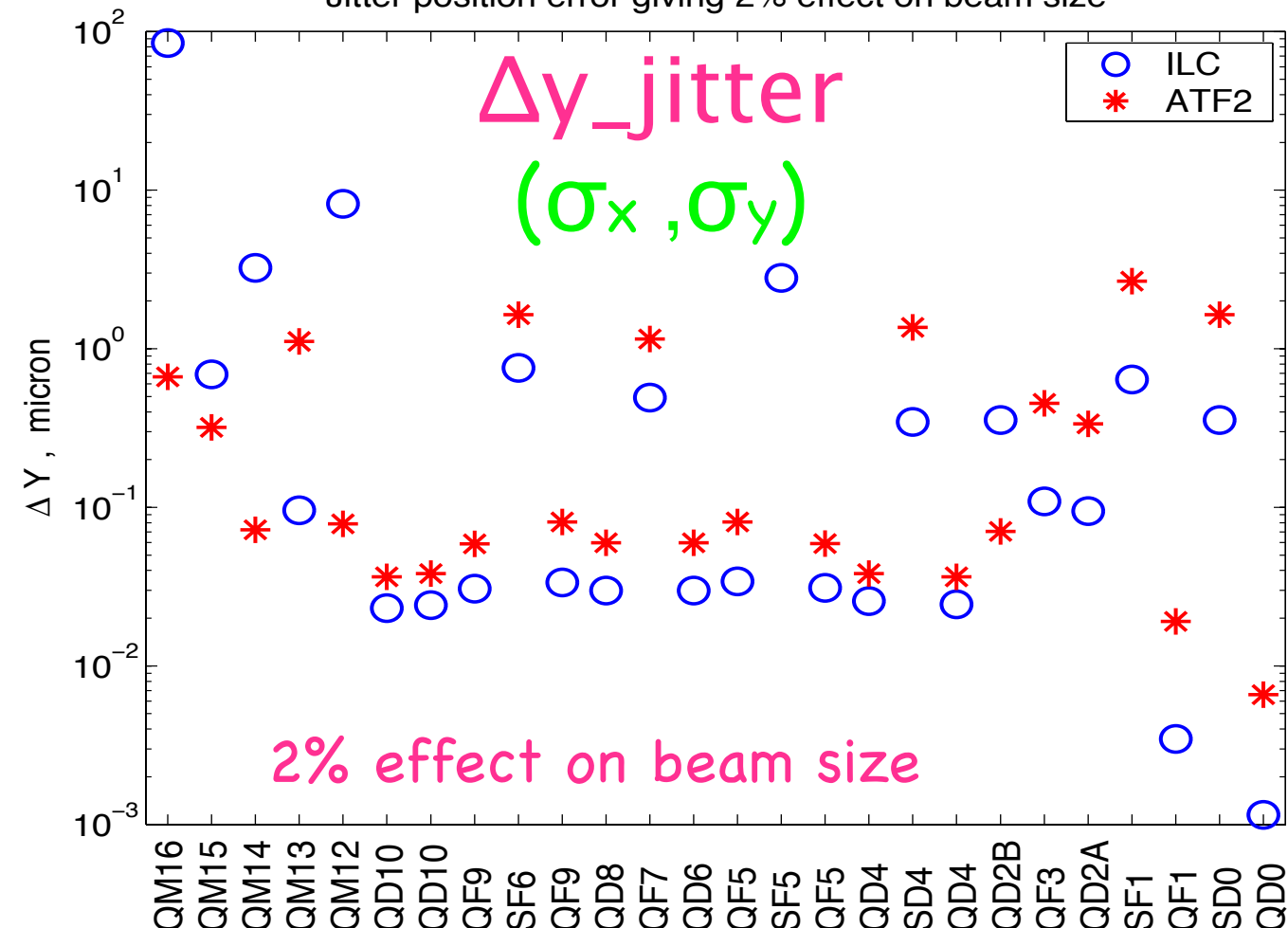
540



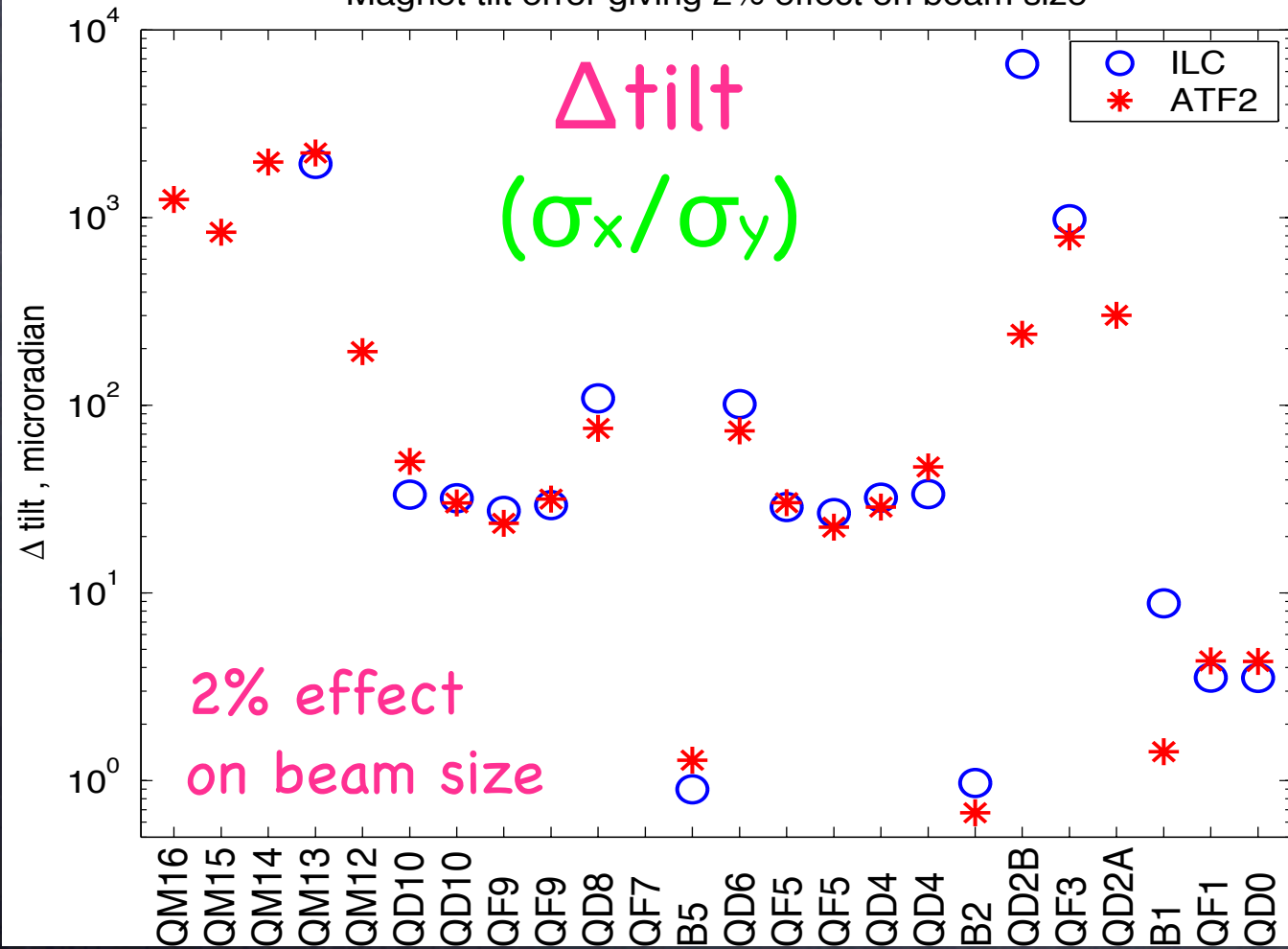
Field strength error giving 2% effect on beam size



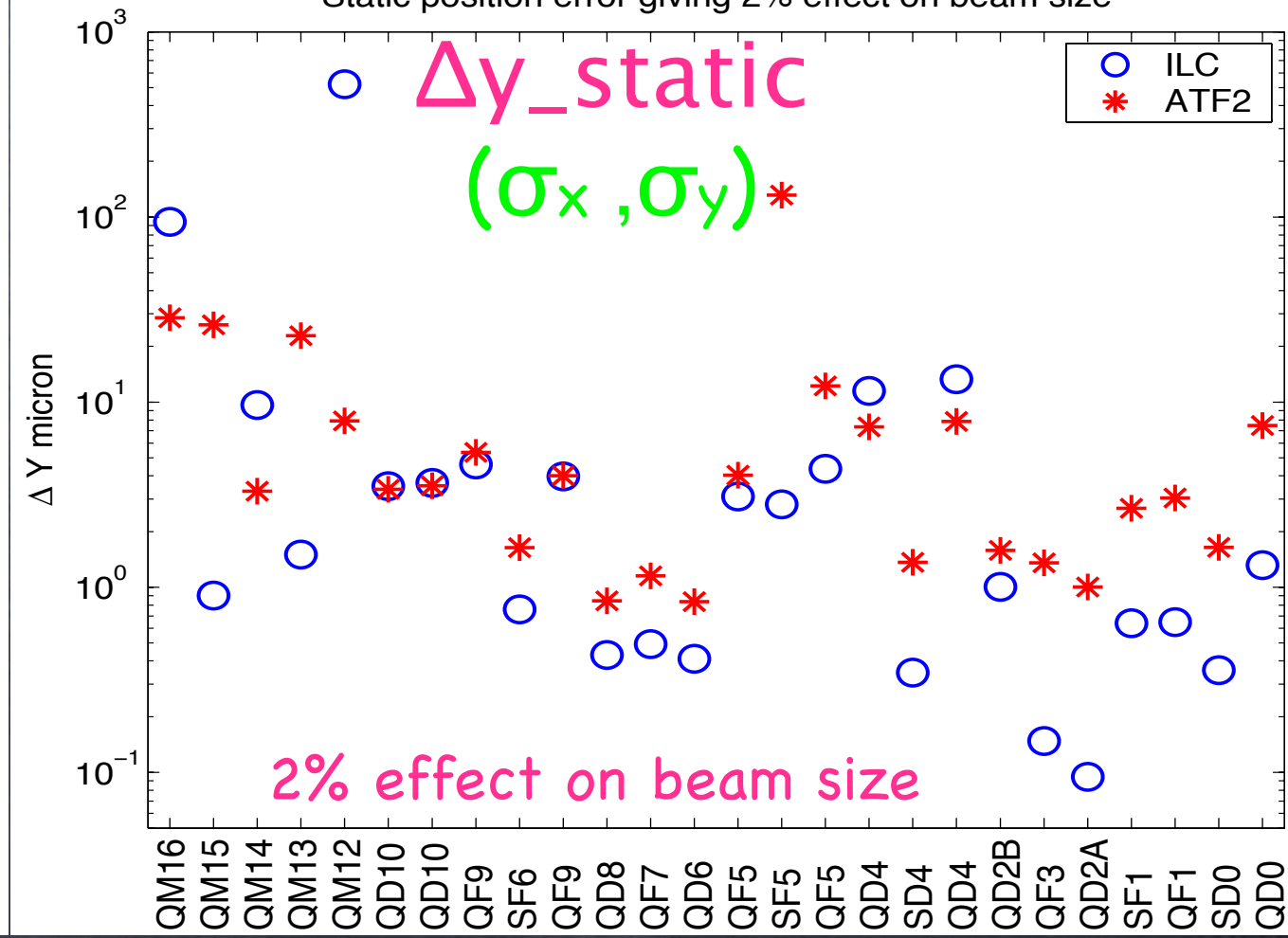
Jitter position error giving 2% effect on beam size



Magnet tilt error giving 2% effect on beam size

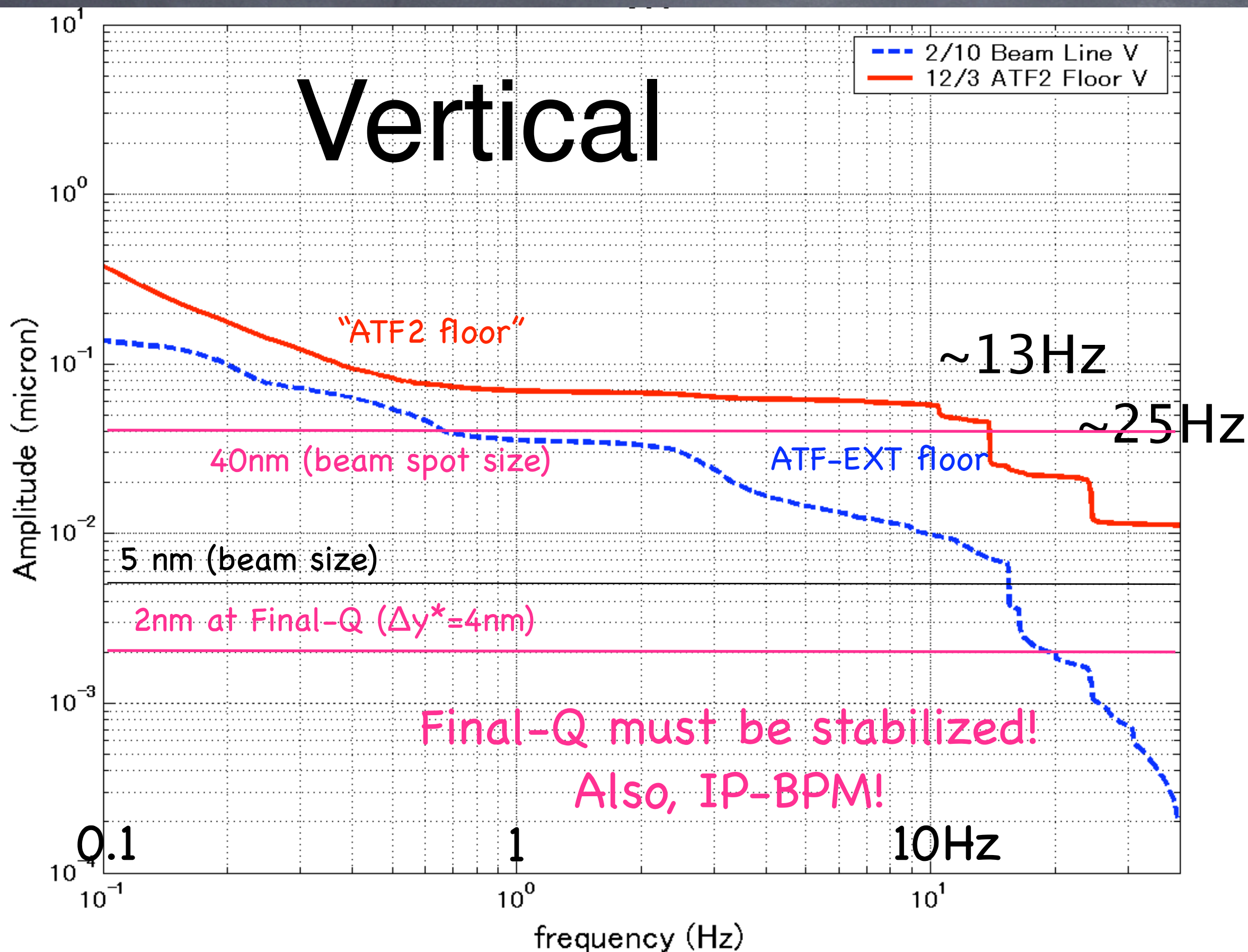


Static position error giving 2% effect on beam size



# Amplitude of GM

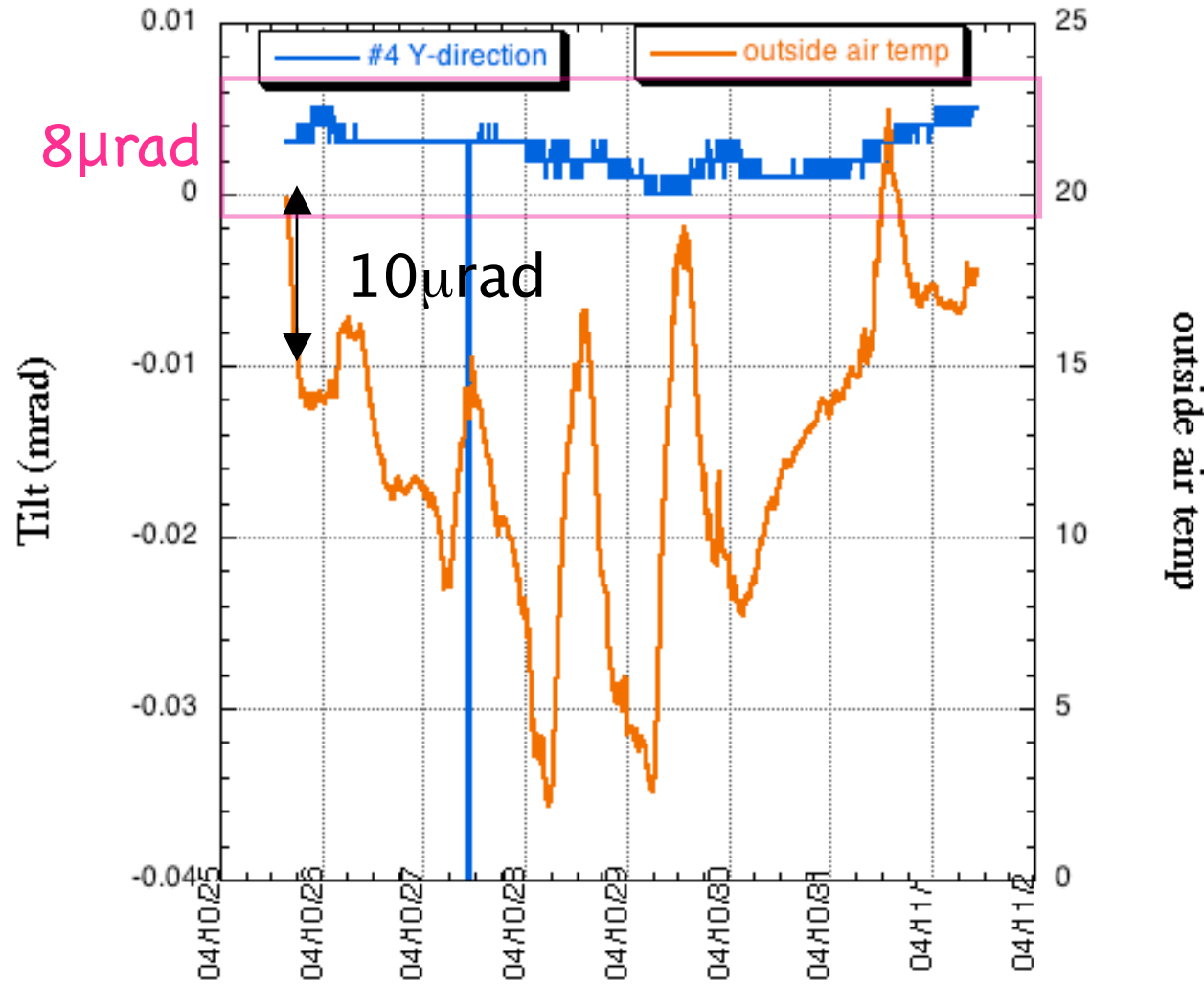
## Vertical



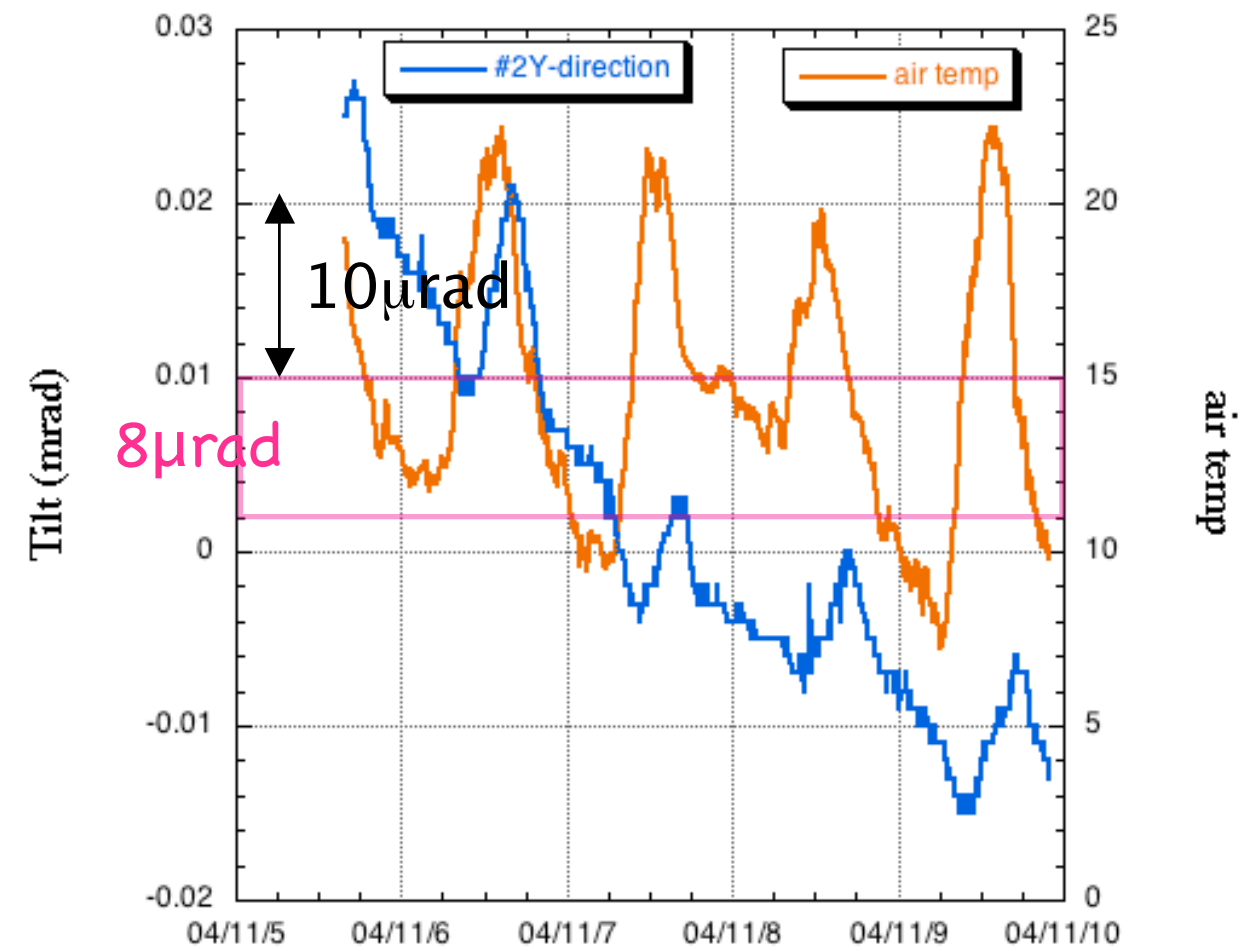


# Floor tilt comparison

## ATF beam line

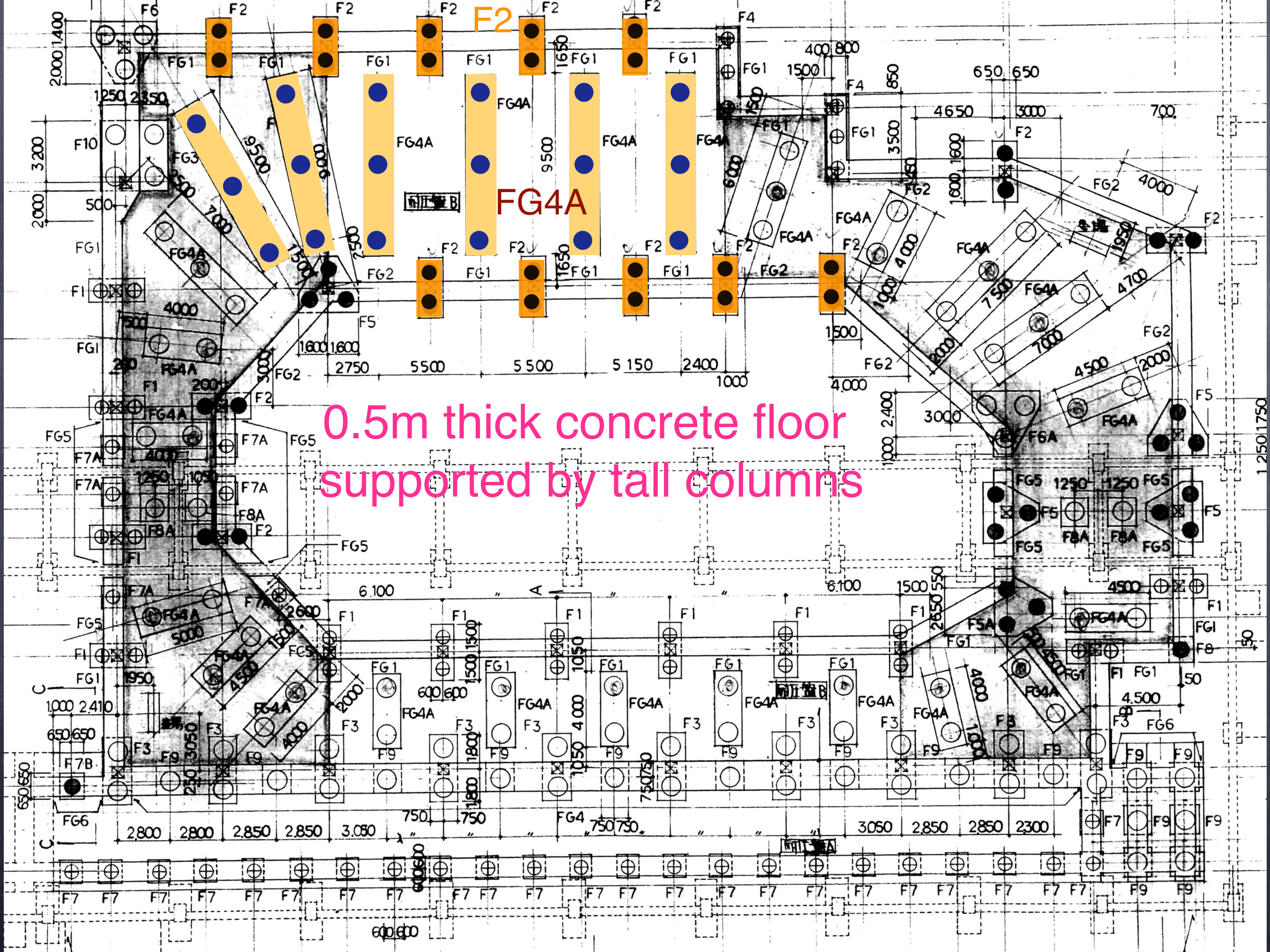


## ATF2



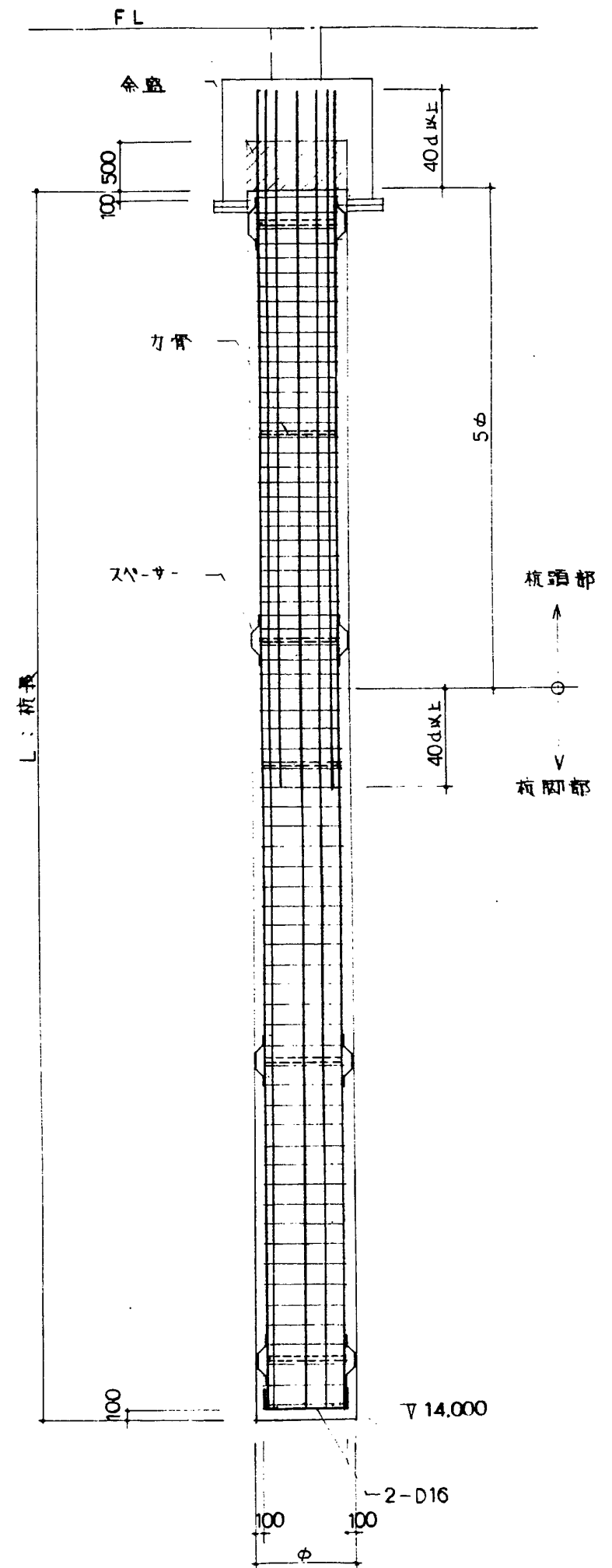
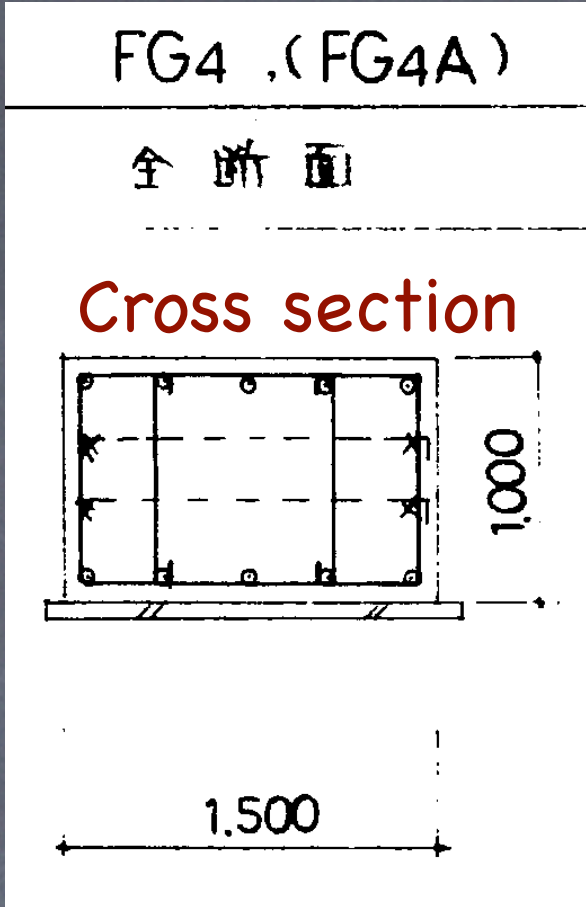
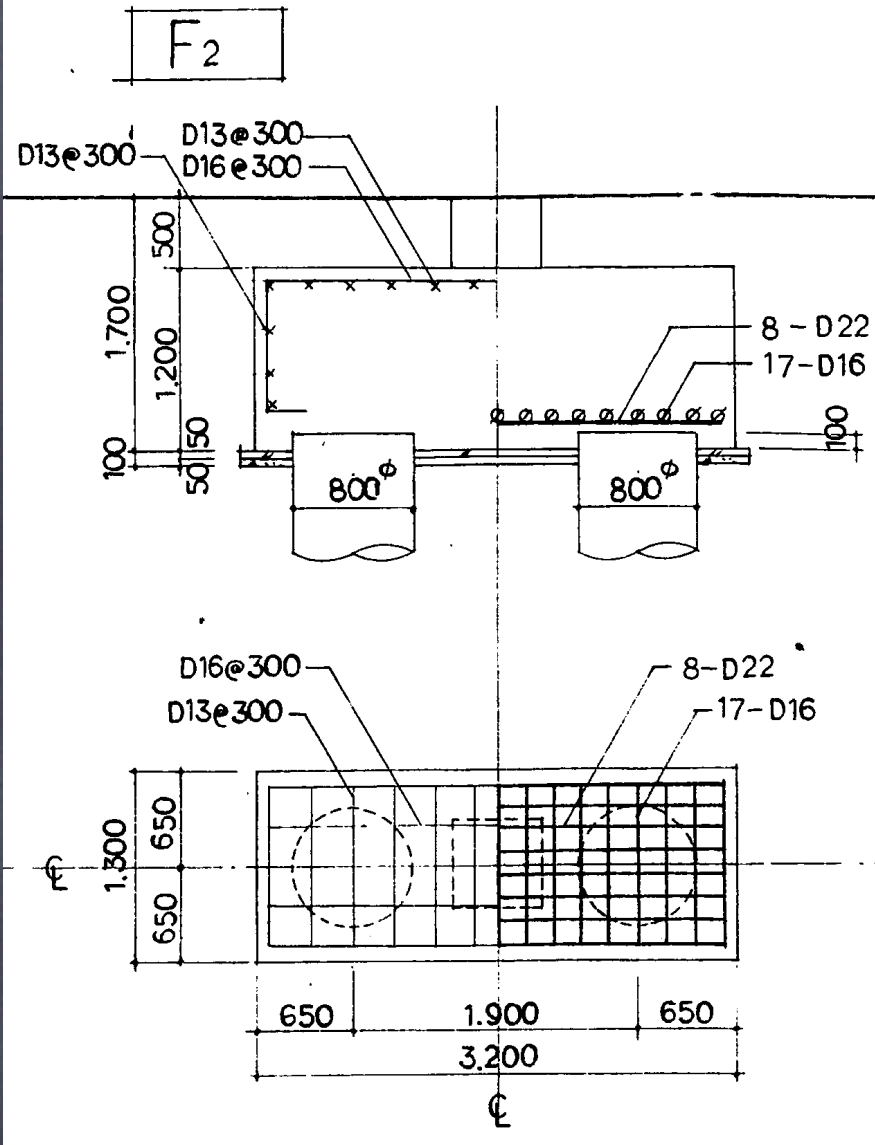
Tolerance of  $8\mu\text{rad}$  for Bend at ATF2. (Kuroda)  
[ 10% beam size growth ]





0.5m thick concrete floor supported by tall columns

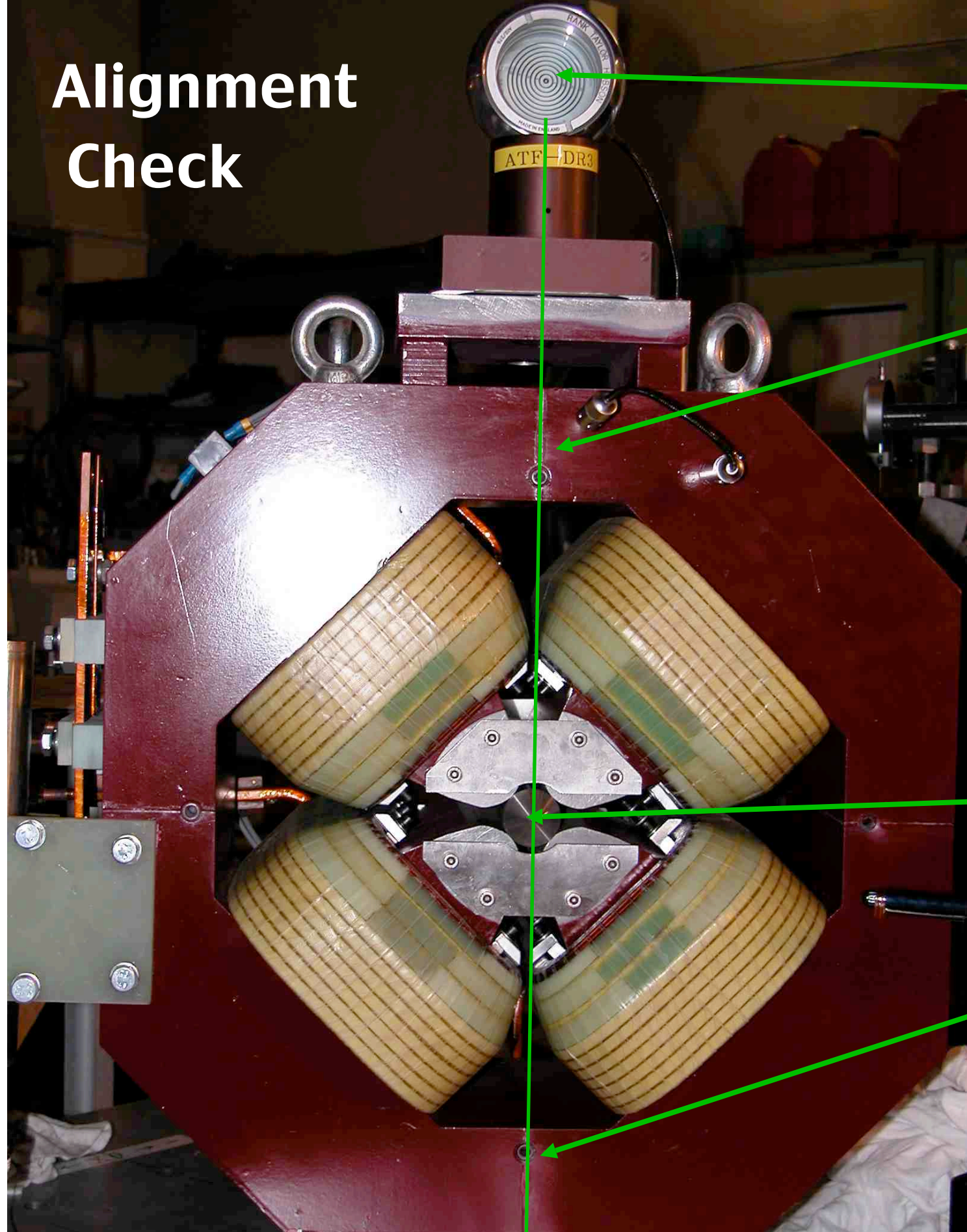




unit=m	F2	FG4A
Concrete Block		
height	1.2	1.0
width	1.5	1.5
length	3.2	9.6
Supporting Column		
number	2	3
diameter	0.8	1.0
tallness	12.4	12.8



# Alignment Check



(1) Alignment target

(2) top halved line

(3) Magnet mechanical Center

(4) bottom halved line

All 4 points should be aligned.



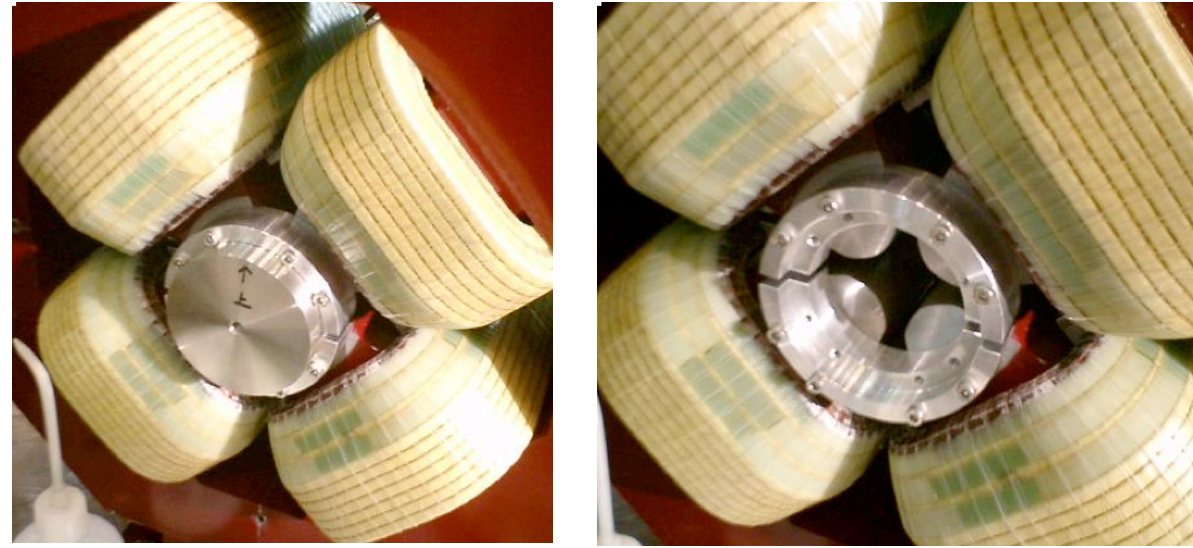
# BPM mount test

- go through the mount procedure
  - no geometrical difficulty for both sides of the magnet
- alignment accuracy
  - repeatability: 100um (overall the procedure), 20um (if the adapter was not removed)
- relation with the reference plane of the magnet is still under testing...

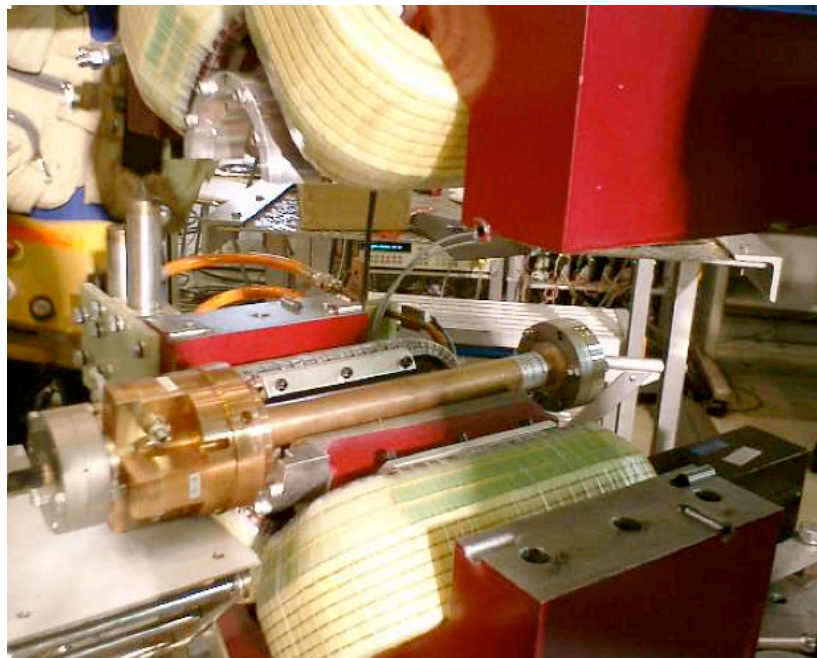
the reference jig



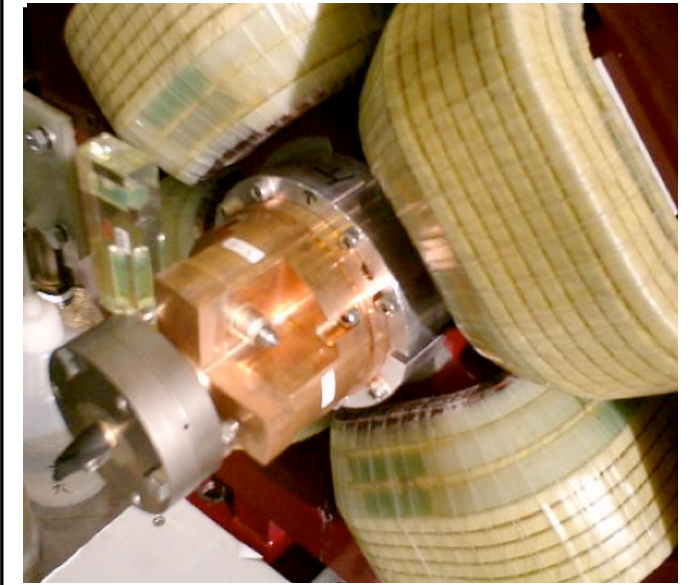
attach the adapter using the reference jig



split the magnet and sandwich the BPM



fix the BPM



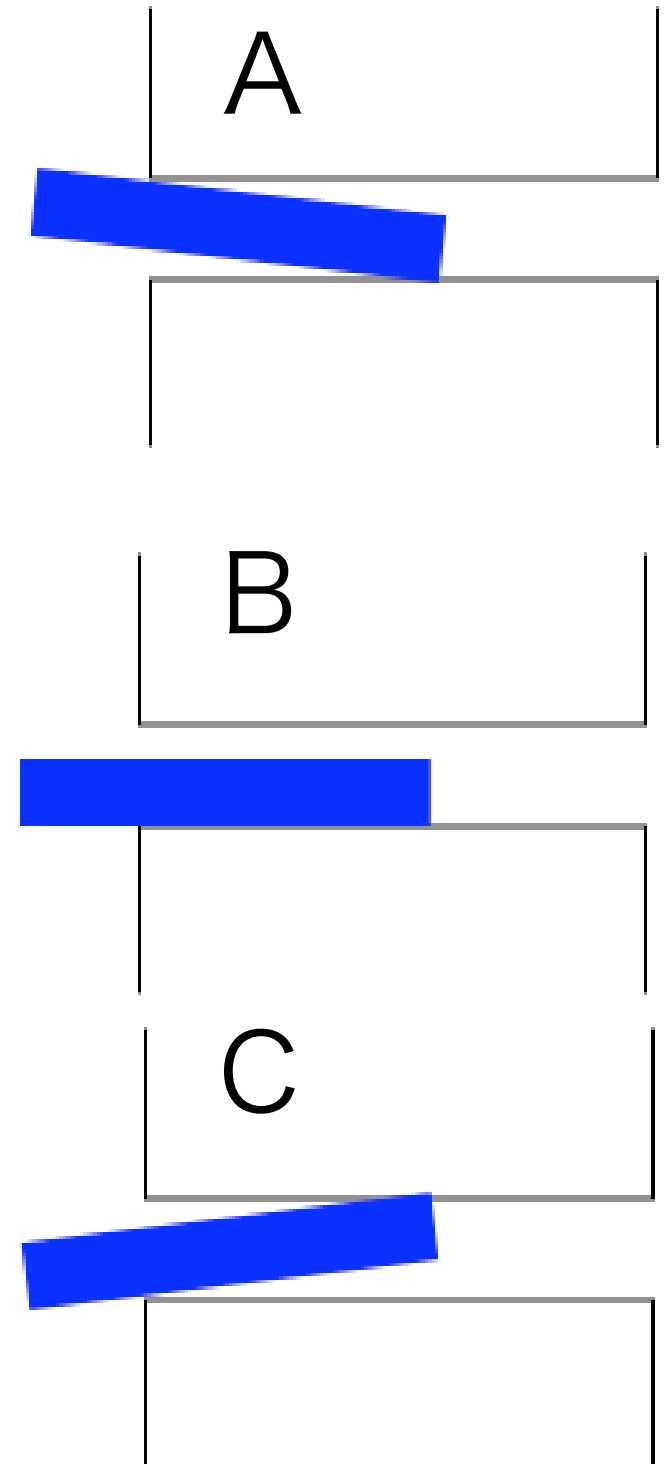
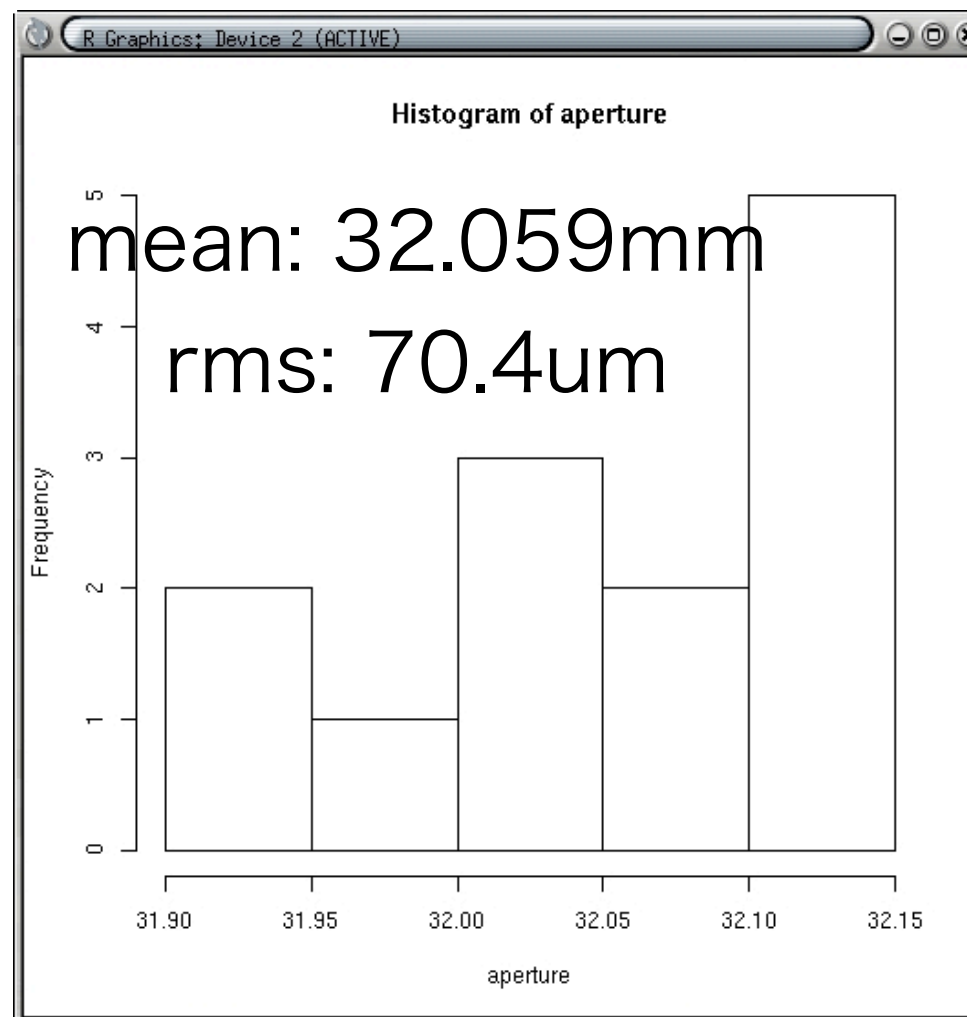
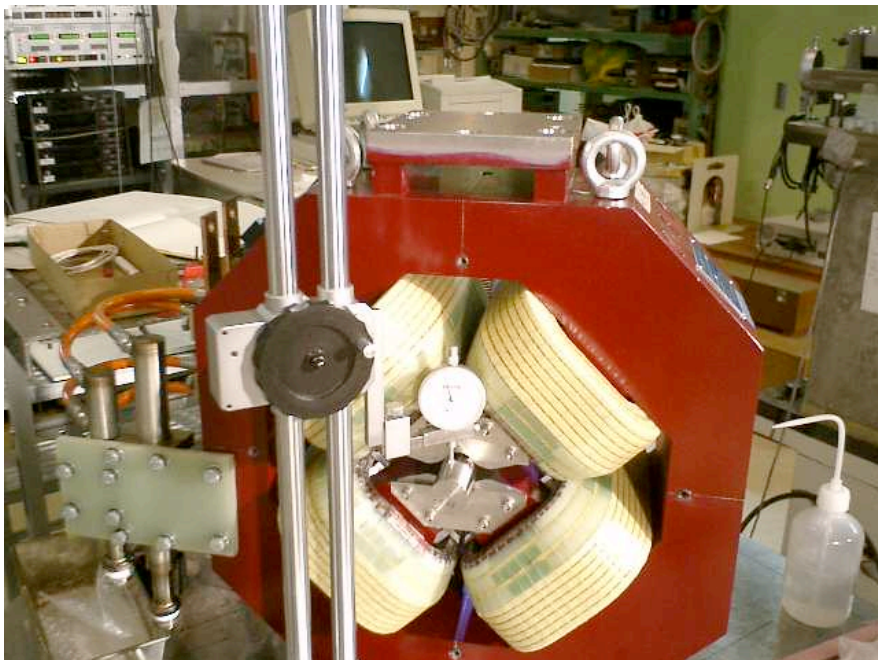
try other side of the magnet





# BPM mount test (accuracy)

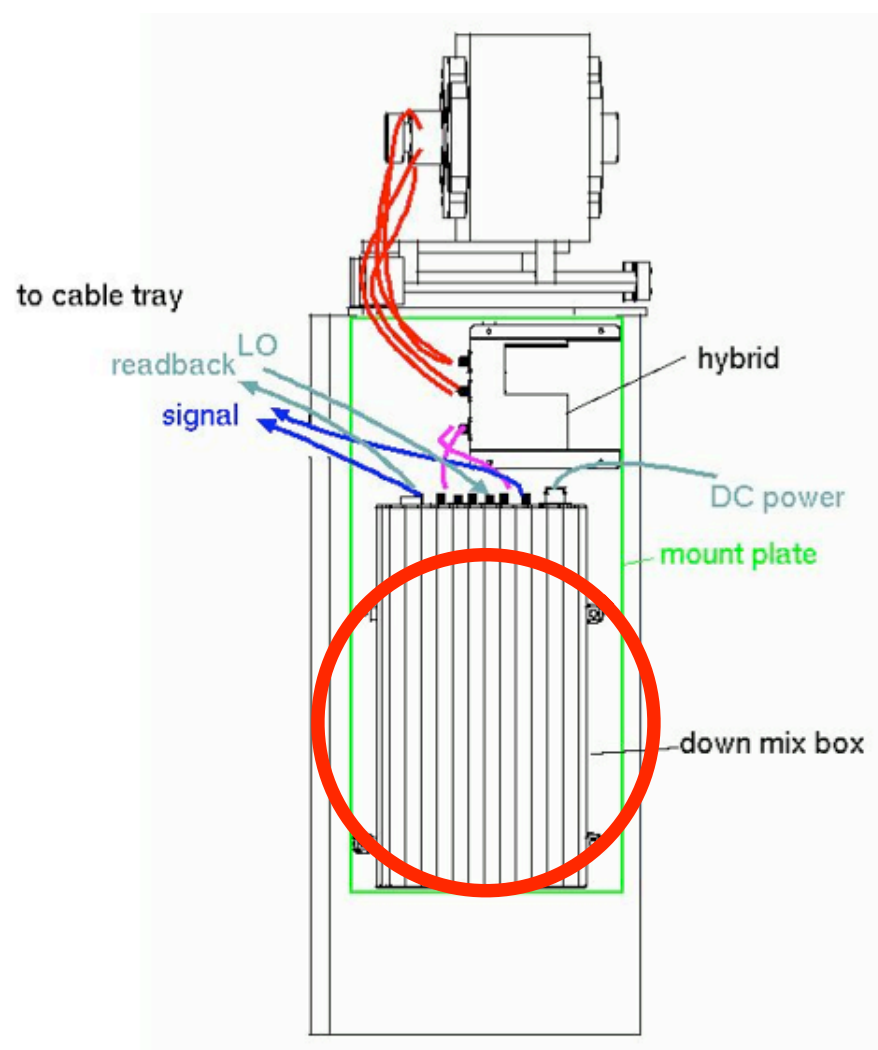
- systematic offset in the BPM mount procedure
  - jig to align the adapter < pole aperture
  - BPM diameter < inner diameter of the adapter (30um)
- pole aperture measurement
  - $2 \times (A+C) + \text{rod dia. (31.95mm)}$
  - checked several magnets in Nikko -> big variation
- relation between pole and the reference plate
  - direct measurement with a height gauge -> 215um difference from design for No08 magnet





# BPM electronics test status

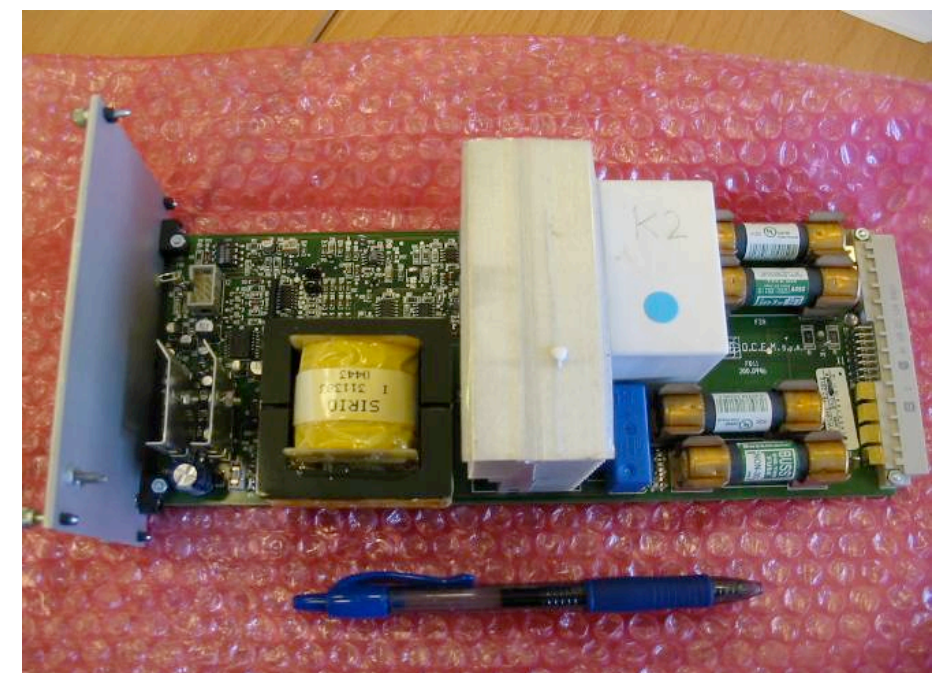
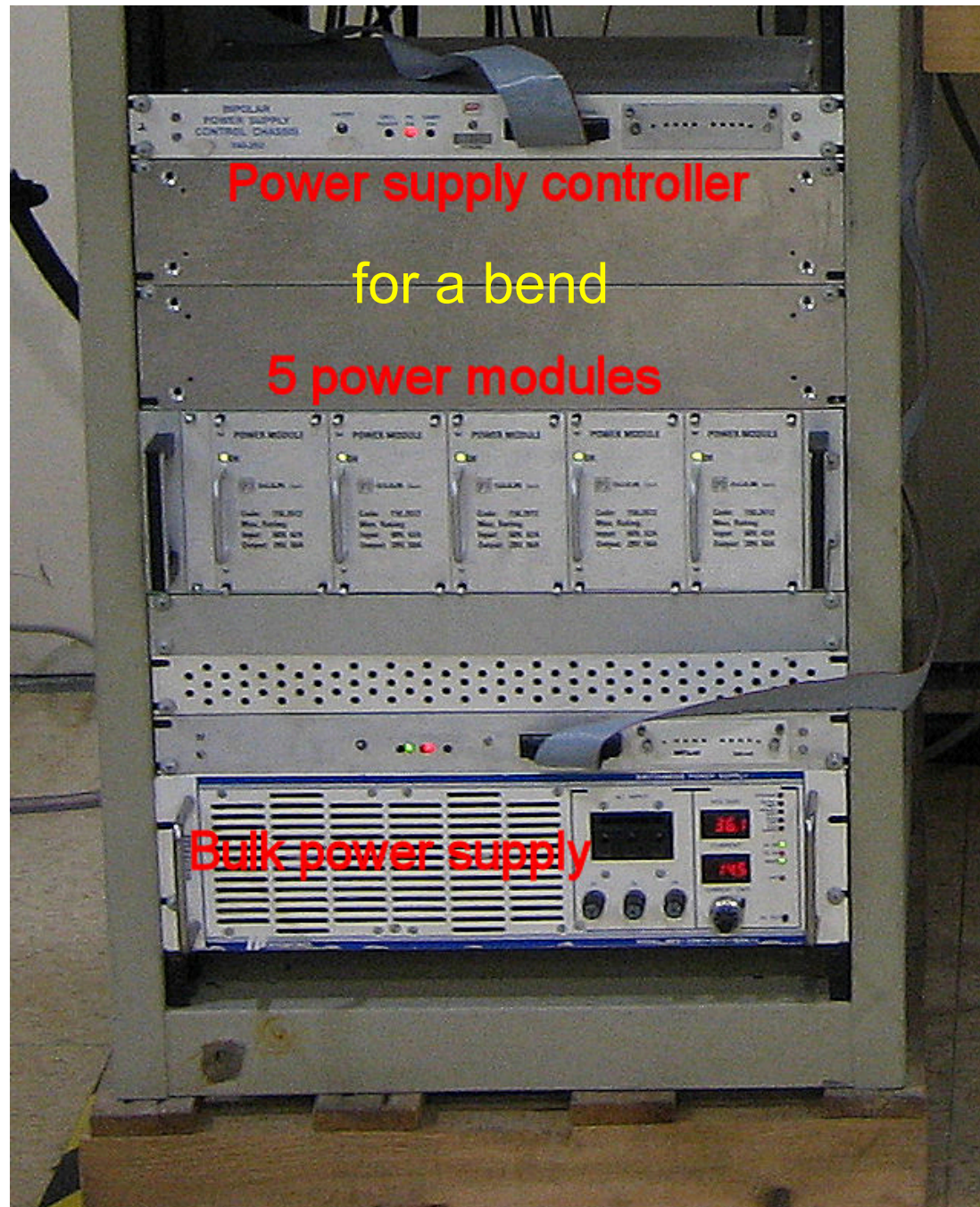
- SLAC people bring down-mix boxes (6?)
- The boards (without the box) have been tested at SLAC
  - done: gain and noise
  - not yet tested: cross-talk, non-linearity, stability
- Test plan in KEK during their stay
  - stability test: measure same signal with more than two electronics and compare, record readbacks (temp. , LO power, ... ) from the box and check its correlation
- power consumption: 8V , 0.75A, temperature of the box: 37~38 degC





# HA system by SLAC

- Example : a power system with Ethernet control that will provide 200A in a 4 out 5 redundant module configuration.

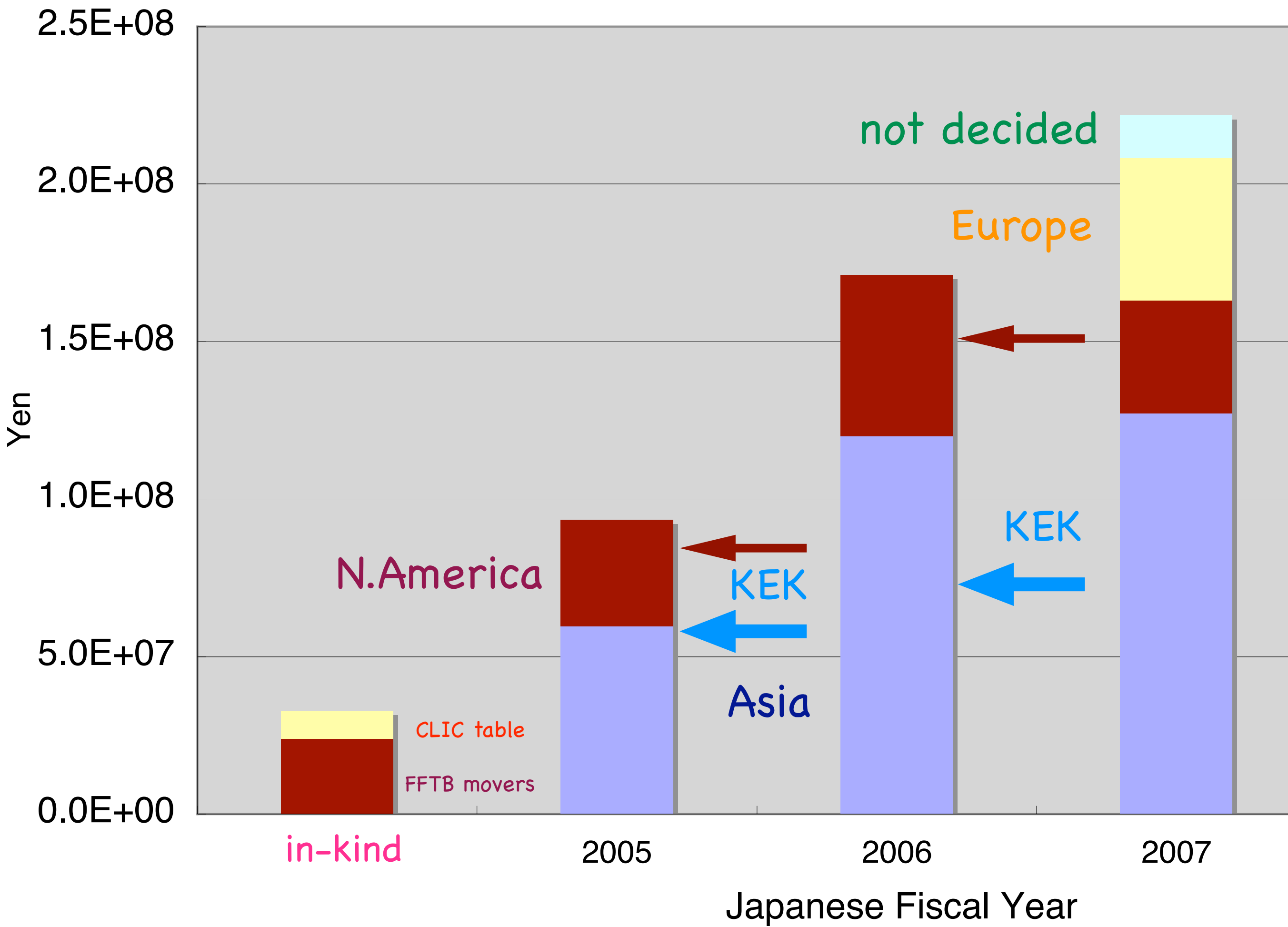


# HA Power supply system for 40 magnets of 8(ExtQ), 6(MatQ), 5(Sext), 2(Oct), 16(FFQ), 3(B)



Figure 10: Diagram of Power Supply Placement in a Rack







# Summary

- (1) Almost on schedule;  
i.e. the commissioning in February 2008
- (2) Budget "reduction" at KEK
  - increase international contributions which have been recommended by KEK review committee and LCPAC06.
  - or delay the schedule
- (3) In summer 2007, the floor will be constructed.
- (4) ATF will be operated for Oct.-Dec. 2007 as much as possible.