

# *Hardwares for commissioning*

*2<sup>nd</sup> ATF2 Project Meeting*

*KEK, Tsukuba, Japan*

*5/ 31/ 2006*

*T.Okugi (KEK)*

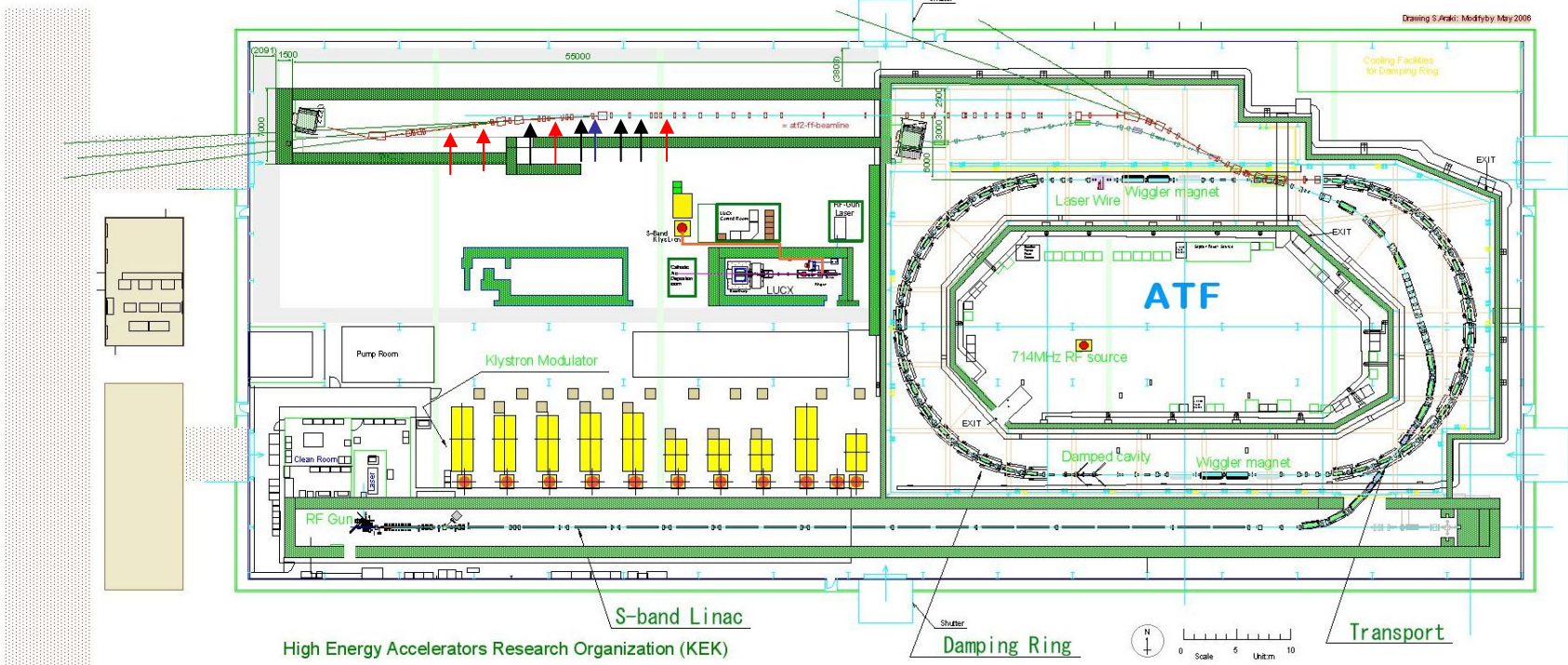
## *Location to put stripline BPMs*

***Strip-line BPMs is not useful only for commissioning,  
but also for the calibrations of the cavity BPMs***

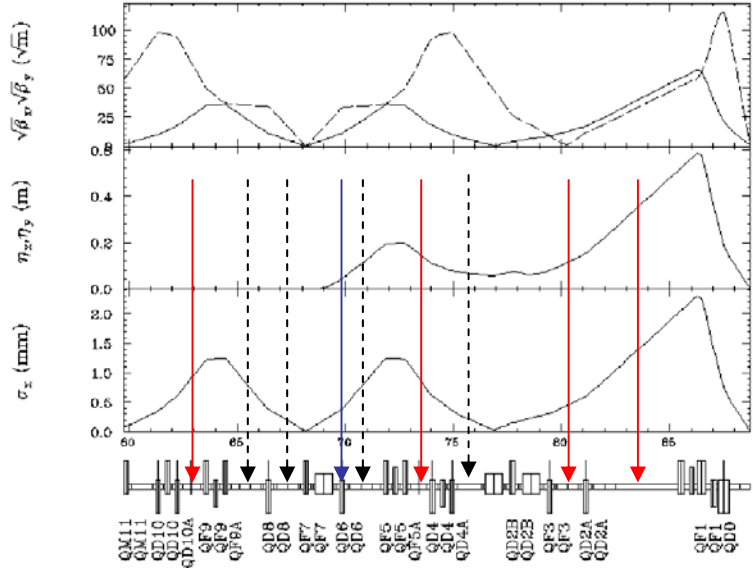
QD10	QD6	QD2B
0.900 (0.420)	2.000 (1.520)	0.850 (0.100)
QD10A	QF5	B1
1.300 (0.820)	0.560 (0.080*)	0.850 (0.100)
QF9	SF5	QF3
0.560 (0.080*)	0.560 (0.080*)	1.700 (1.220)
SF6	QF5A	QD2A
0.560 (0.080*)	1.300 (0.820)	4.875 (4.395)
QF9A	QD4	SF1
2.000 (1.520)	0.560 (0.080*)	0.575 (0.000*)
QD8	SD4	QF1
1.700 (1.220)	0.560 (0.080*)	0.790 (0.135*)
QF7	QD4A	SD0
0.850 (0.100)	1.950 (1.200)	0.575 (0.000*)
B5	B2	QD0
0.850 (0.100)	0.850 (0.010)	

( ) ; Free space to put the monitors  
\* ; Assumed 18cm sextupoles

# ATF2 LAYOUT



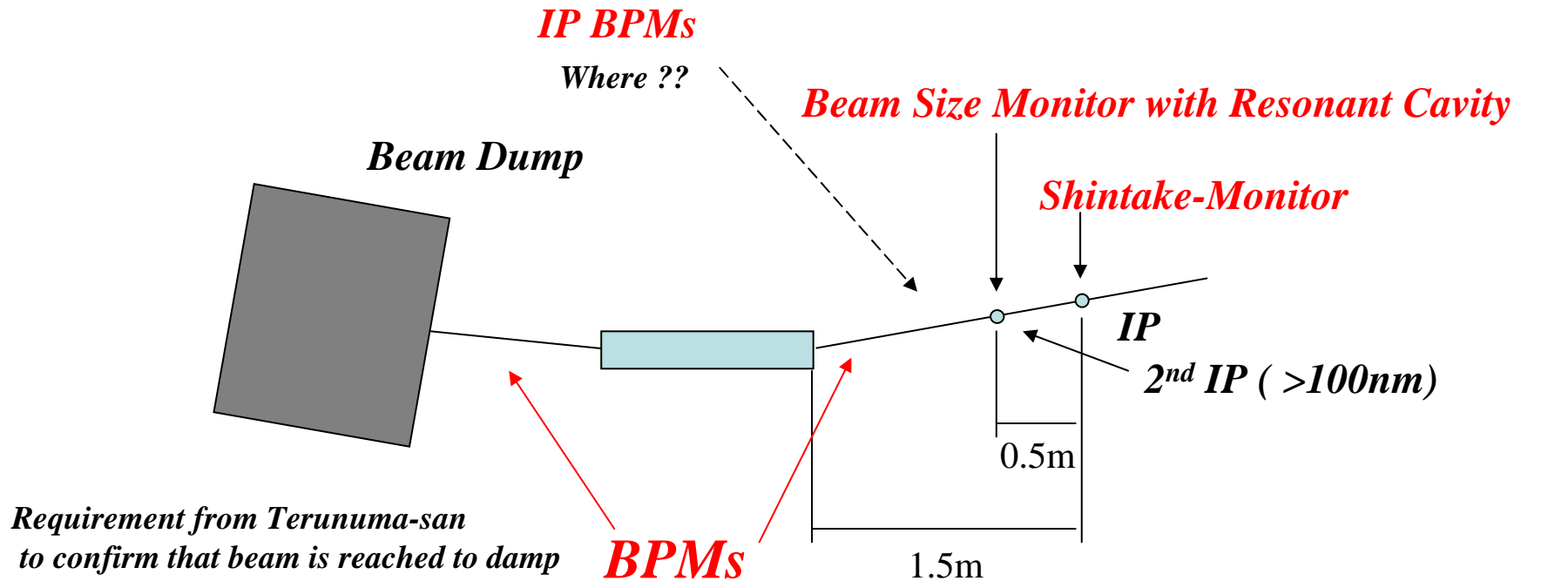
High Energy Accelerators Research Organization (KEK)



*Location with red and blue arrow is separated by almost 90 degrees each other.*

*I want to put the stripline BPMs at red arrows location, if possible.*

# *Around IP – Monitor Configuration*



*Cavity or Strip-line BPM ??*  
*( Beam size is around 2-3mm. )*

*Requirement from Kuroda-san*  
*Post IP BPM is necessary for tuning.*

*Where ??*

*Cavity or Strip-line BPM ??*

*If we use the C-band cavity BPM,*  
*the location is better to be closed to IP for Shintake monitor BG.*

# *Around Final Doublet – Monitor Configuration*

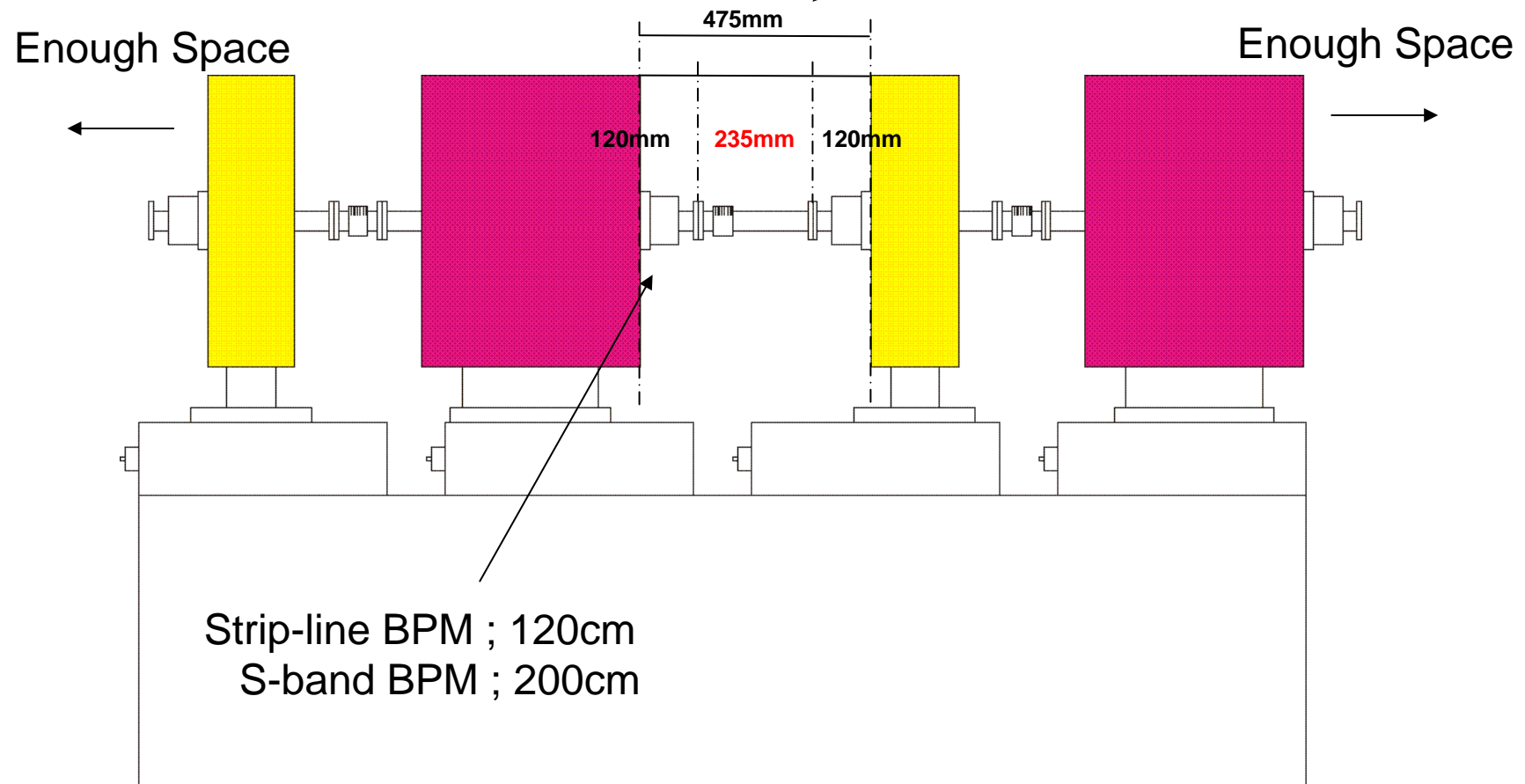
*S-band BPM ?*  
*Strip-line BPM ?*  
*No BPM ?*

18cm Sextupole ; 475mm

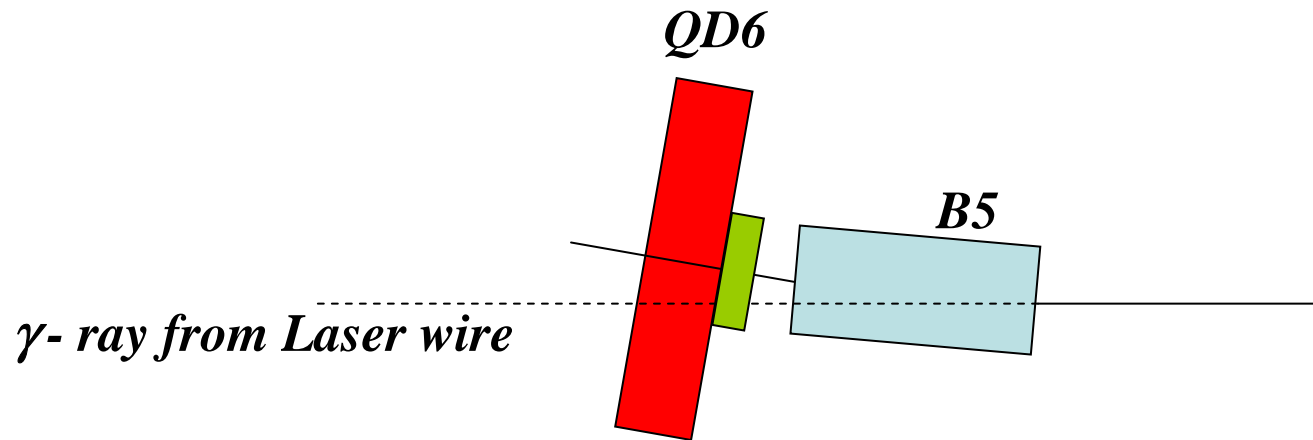
6cm Sextupole ; 535mm

10cm Sextupole ; 515mm

30cm Sextupole ; 415mm



## *Around QD6 – Monitor Configuration*

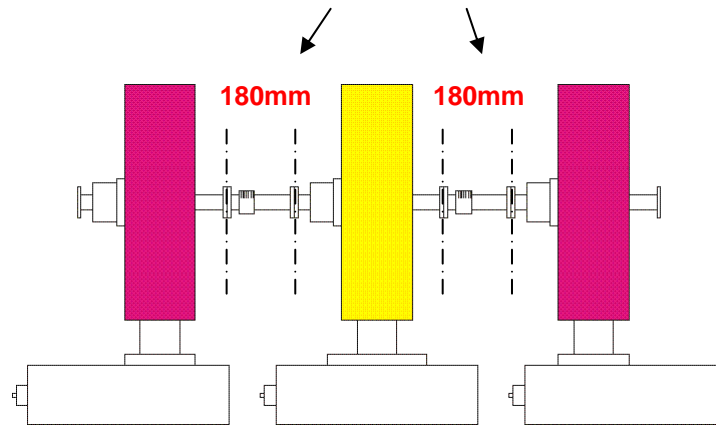


*As discussed in 1<sup>st</sup> ATF2 project meeting in SLAC,  
we cannot put the C-band cavity BPMs on QD6  
to avoid the  $\gamma$ - ray from laser wires.*

*We need to prepare **a button BPM or a strip-line BPM**  
instead of the cavity BPM for QD6.*

## *Around SF6 and SF5 – Collimator Configuration*

*Is this a enough space to put collimators ??*



The collimator should be put around SF6 and SF5 for the requirement from the Shintake monitor detector background.

The apertures should be smaller than the half of the QF1 aperture.

However, the collimator is also the background source for laser wire detector. The aperture of the collimator should be adjustable !

# Screen Monitors

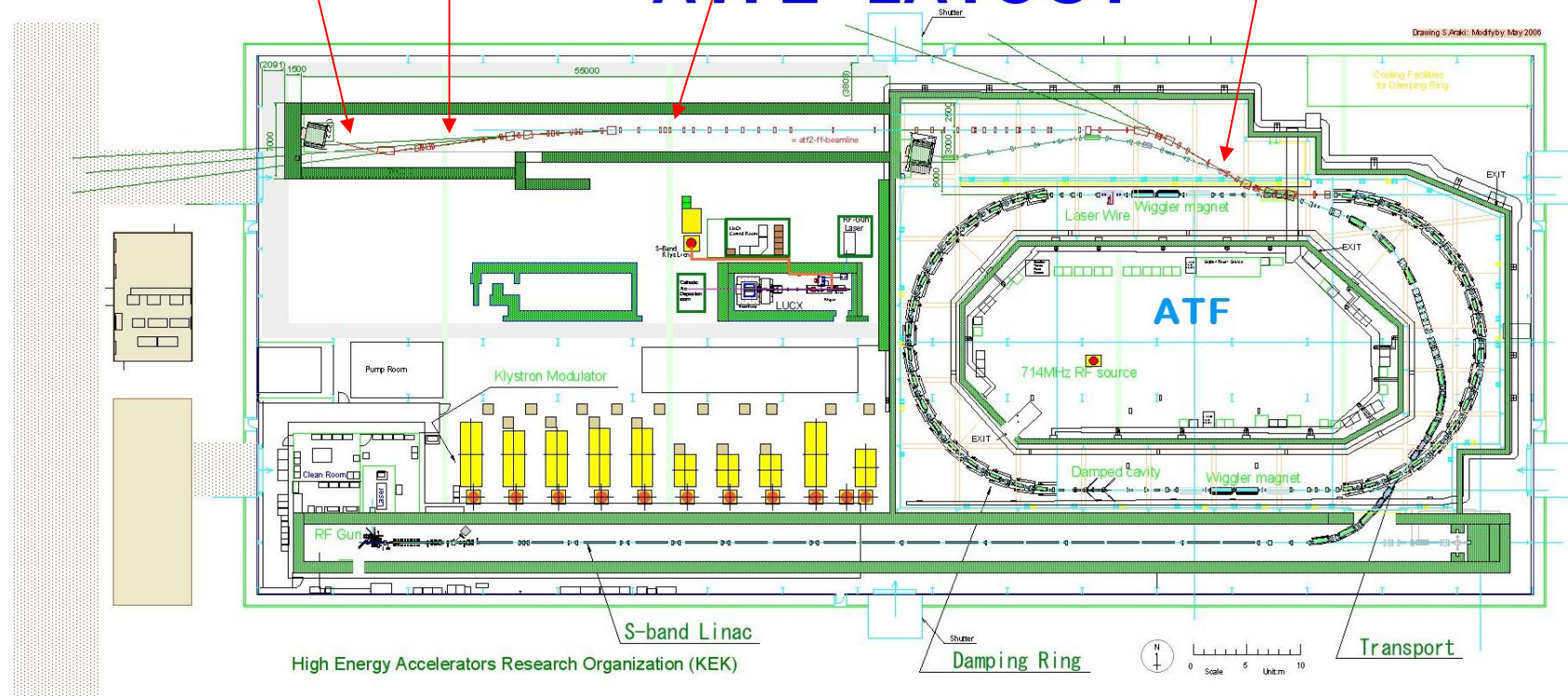
*To confirm the beam profile at front of the beam damp*

*To confirm the beam profile at the entrance of the final doublet*

*To confirm the beam profile at the entrance of the collimator*

*To measure the momentum spread*

## ATF2 LAYOUT



*I propose to put 4 screen monitors in the beamline.  
Since **we already have 4 screen monitors**,  
we don't have additional screen monitors.*

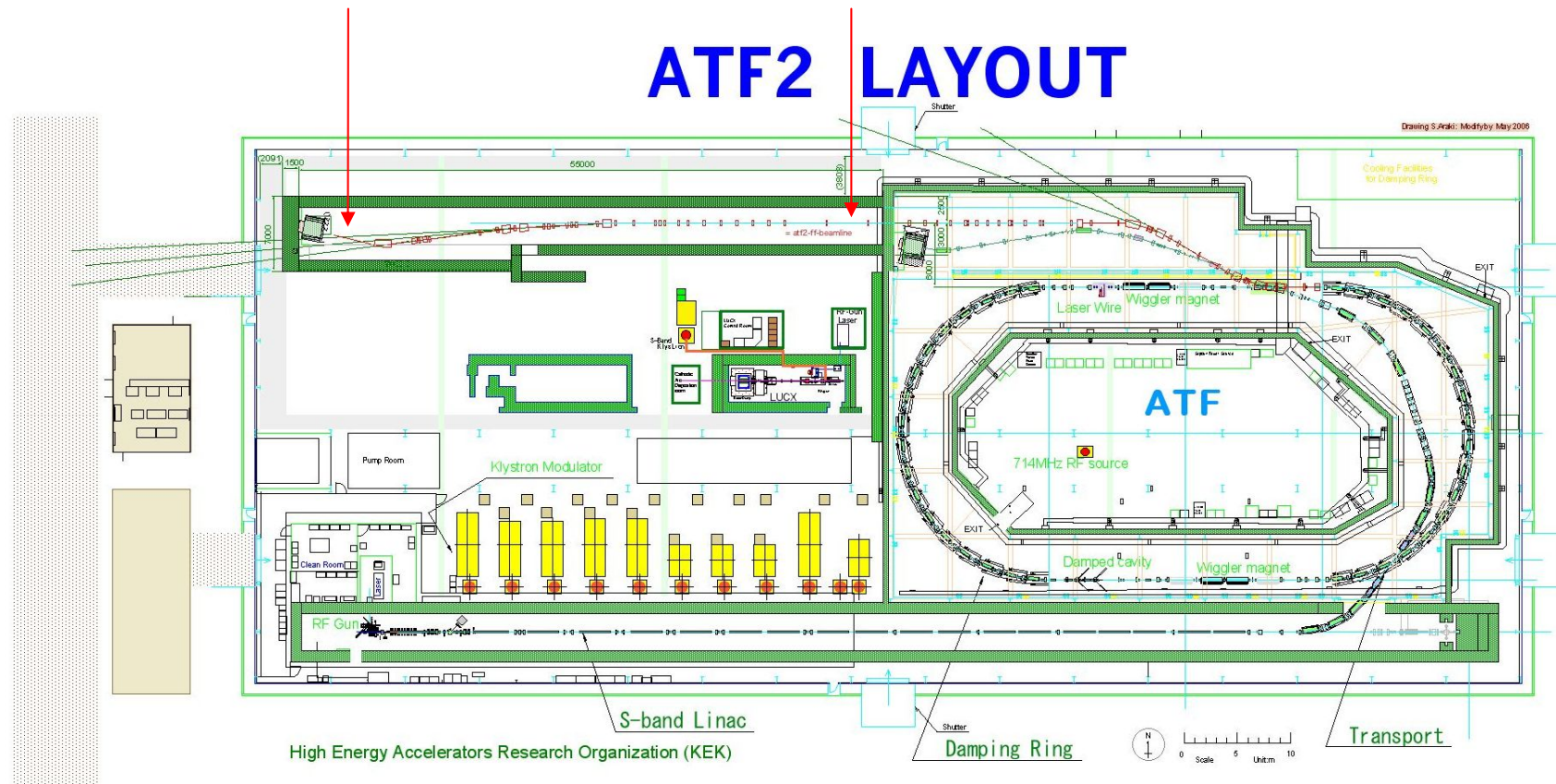


# ICTs

*Put ICT at the end of the beam line.*

*Put ICT at middle of the beam line.*

## ATF2 LAYOUT



*I propose to put at least 2 ICTs in the beamline.*

*Since **we already have 1 ICT** in present extraction line, we need 1 additional ICT.*

## *Around Wire Scanner – Monitor Configuration*

*We consider **the tungsten wire scanners are important items** from commissioning stage.  
Since we cannot remove the tungsten WSs from beam line, we must put laser wire with 5 WSs.*

*Laser wire group require to put the BPMs to both side of each laser wire chamber.*

*We have BPMs on every quadrupole magnets.  
Do we need additional 10 BPMs ?*

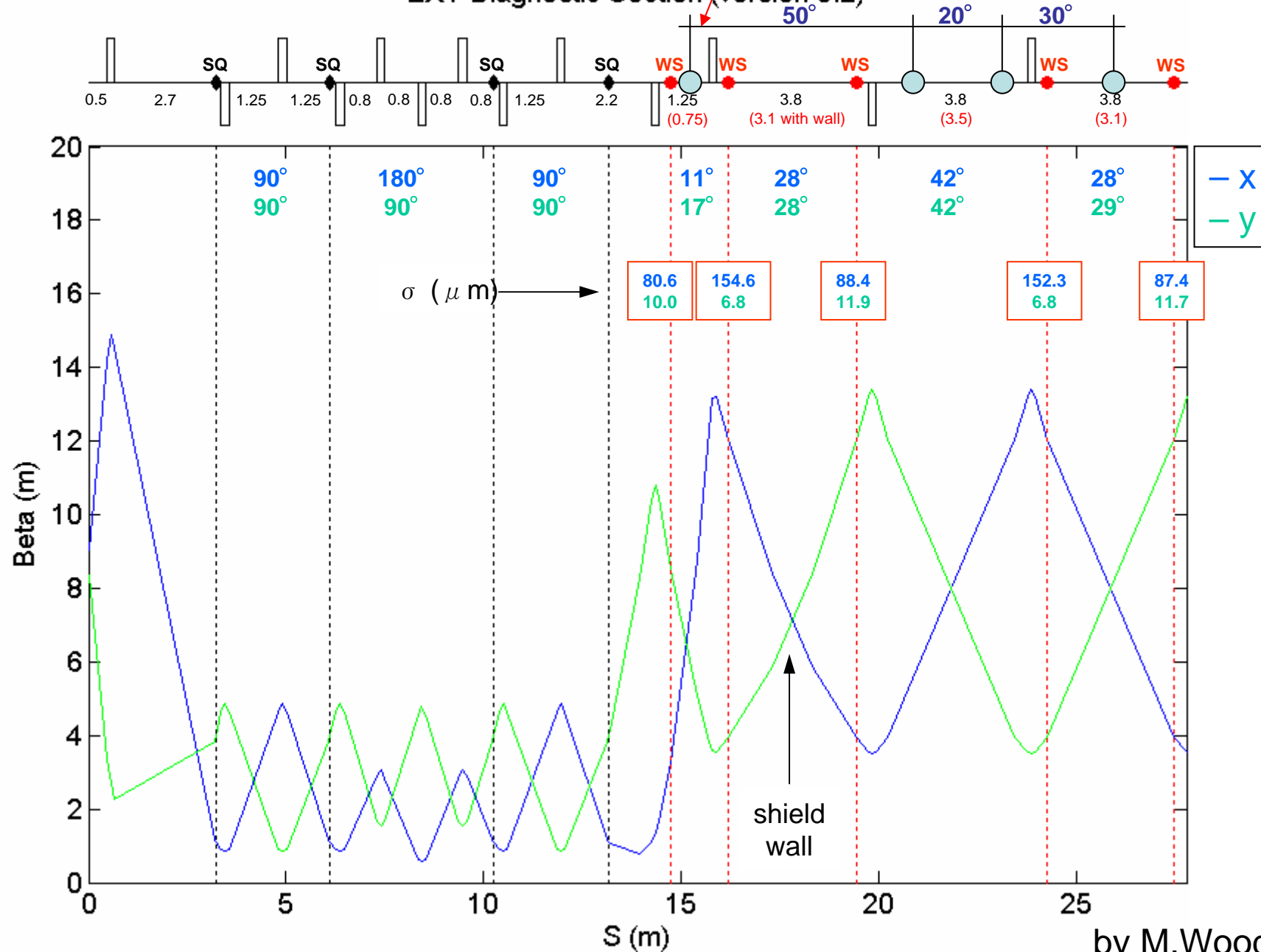
*If yes, the total space of the laser wire chamber is almost 1m.  
If no, the total space of the laser wire chamber is almost 0.5m (??).*

*Where is the LW location in beam line ?*

*In the next slide, I wrote the candidate locations to put laser wires.  
I can find only 4 locations.*

**We don't have space to put additional BPMs**

### EXT Diagnostic Section (version 3.2)



by M.Woodley

## *Summary of the Beam monitors for commissioning of ATF2*

### **BPMs**

- We use the C-band cavity BPMs for all of the quadrupoles and sextupoles, except for QD6 and final doublet.
- We need **5 additional strip-line BPMs**
- We need **the additional BPMs at the post-IP and at the entrance of beam damps.**  
( We must decide where and which type. )
- We need the strip-line or button BPMs on QD6.
- We must decide which type of BPMs are used for the final doublet.

### **Screen monitors**

- We put 4 screen monitors in the beamline.  
However, since we already have 4 screen monitors in present extraction line, **we don't have additional screen monitors.**

### **ICTs**

- We put at least 2 ICTs in the beamline.  
Since we already have 1 ICT in present extraction line, **we need 1 additional ICT.**

### **Collimators ??**

### **Laser Wires**

- We have space to put only 4 laser wire chambers in beam line.

# *Commissioning Plan*

*2<sup>nd</sup> ATF2 Project Meeting*

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*T.Okugi (KEK)*

# Commissioning -

*These beam and monitor commissioning items will be done in parallel at the commissioning stage of the ATF2.*

## *Commissioning of the beam*

- 1) Commissioning of the **incoming beam to FF**  
dispersion, 2<sup>nd</sup> order dispersion, chromaticity, coupling corrections,  
**by using the conventional monitors** (wire scanners, stripline BPMs etc.)  
at beam diagnosis section.
  
- 2) Commissioning of **the FF beamline**
  - 2-1) Beam will be passed through the beam line **without cavity BPMs**.  
( We need some **stripline BPMs** or **screen monitors**. )
  - 2-2) Commissioning of the cavity BPMs.  
( We need some **stripline BPMs** for **calibrations of cavity BPMs** )
  - 2-3) **BBA with the cavity BPMs**
  
- 3) Beam orbit stabilization, by **using the feed-forward**  
from ring BPM information to the extraction line orbit.  
(both of position and angle, if possible)

## *Commissioning of the beam monitors*

### *1) Shintake monitor*

*- In order to be commissioning of the Shintake monitor, we must make small beam size at IP.*

*We need a **carbon wire scanner** for Shintake monitor commisioning.*

*- We strongly request to establish the **Shintake monitor ASAP**, since **we cannot start the beam size tuning of FF system w/o IP beam size monitor.***

### *2) Laser wire scanners*

*- We will use the **tungsten wire scanners at the initial commissioning for coupling correction etc. .***

### *3) IP BPMs*

### *4) IP beam size monitors with resonant cavity*

*- This is **the backup technology of Shintake monitor.***

*At the first stage, the minimum measurable size is around 100nm.*

*( Refer to Honda-kun's talk. )*