IR status

2009/9/22 M. Iwasaki (Tokyo)

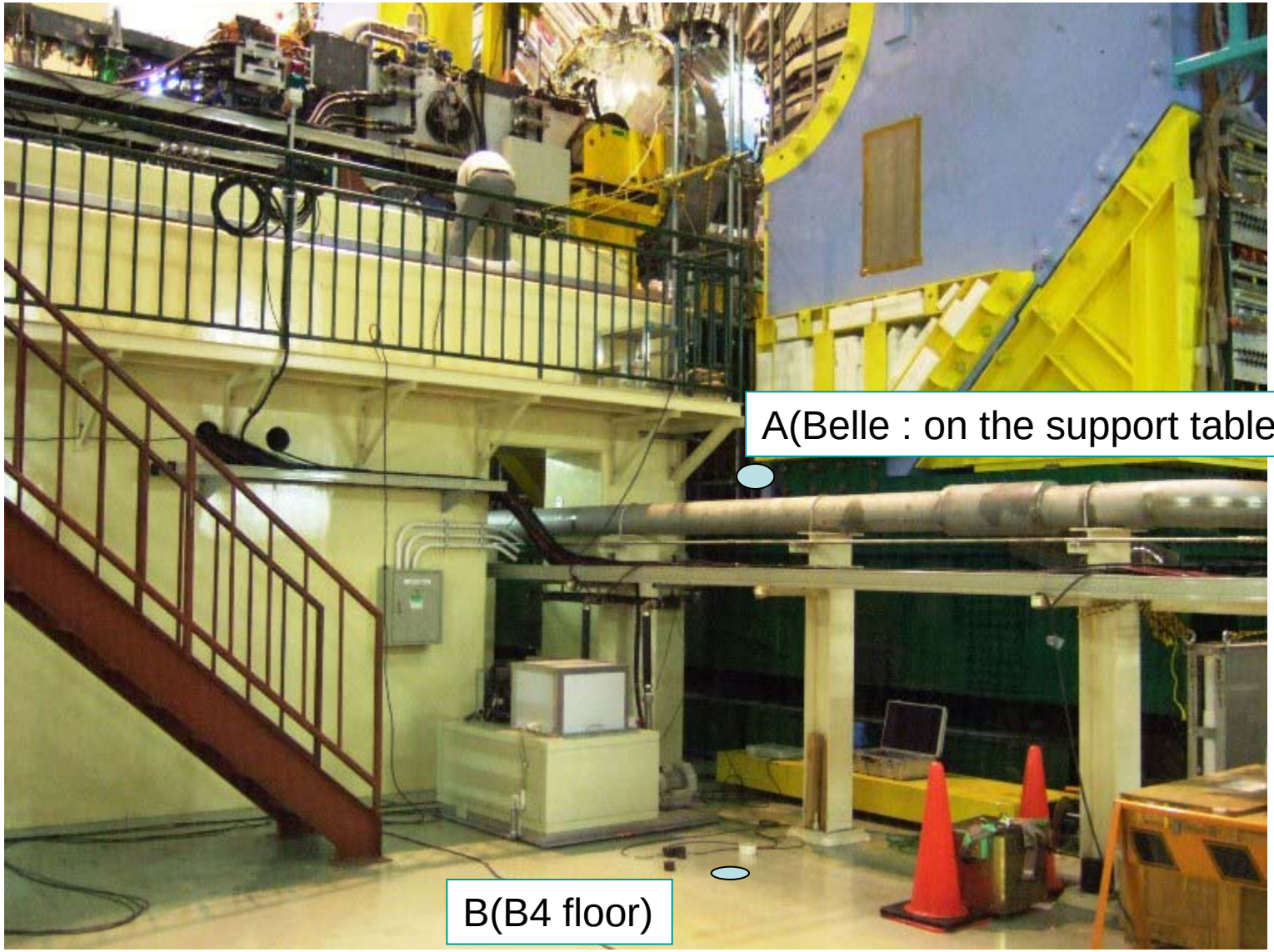
- No Accelerator report today
  (There was JPS, and I didn't attend the accelerator meeting this time.)

- There was an IR meeting on 9/17
  - Experimental hall vibration
  - IR assembly ← in progress, but no report today
  - Discussion on the Belle-II detector rotation
  - Discussion on the Detector BG

Experimental Hall
Vibration measurement

H. Yamaoka

Sep. 18, '09
KEK H. Yamaoka

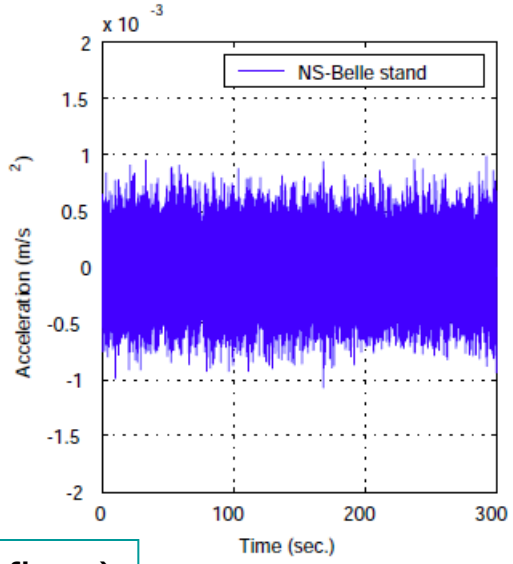


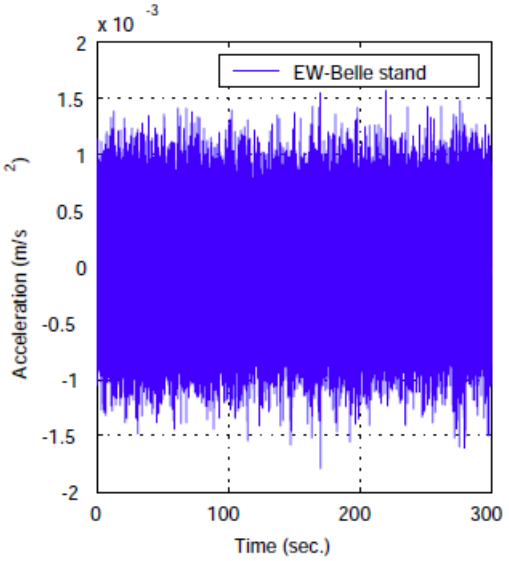
Raw data (Wave form)

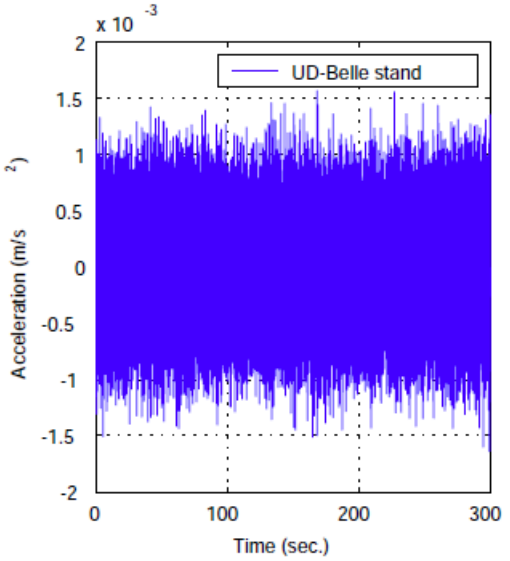
Sep. 18, '09
KEK H. Yamaoka

A(Belle : on the support table)

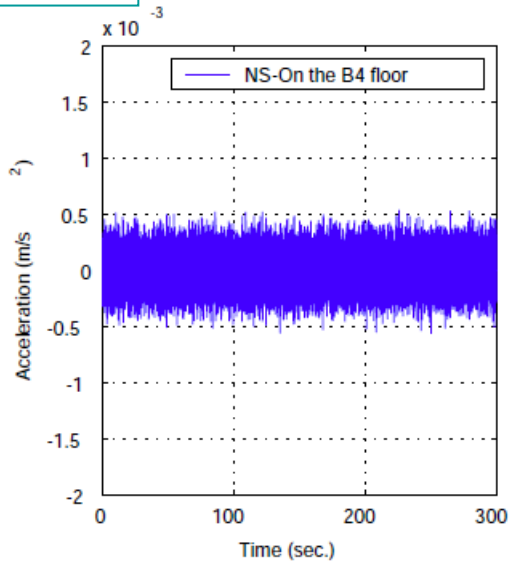
X: Perpendicular to the beam Y: Beam direction V: Vertical

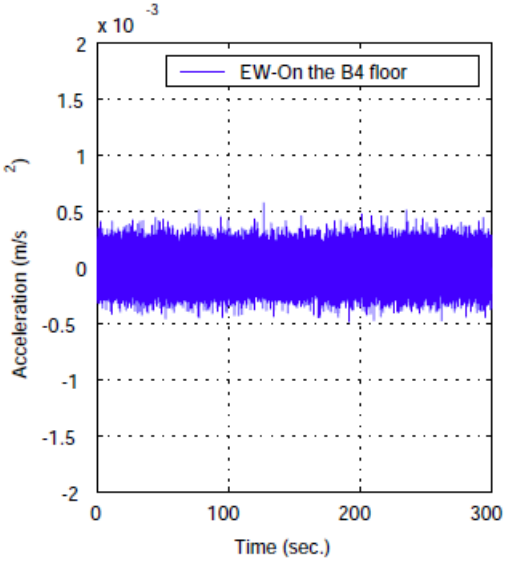


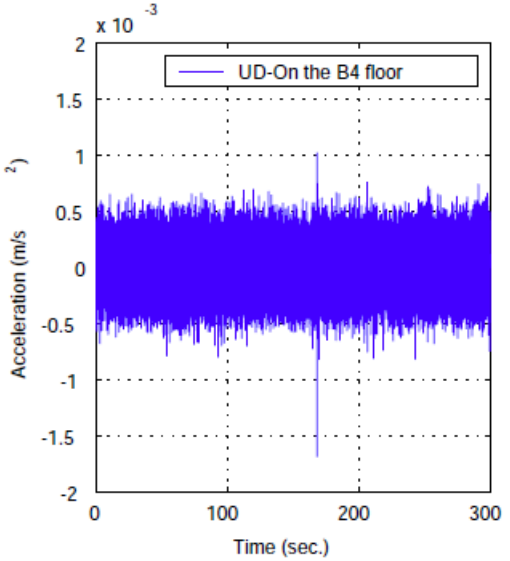




B(B4 floor)





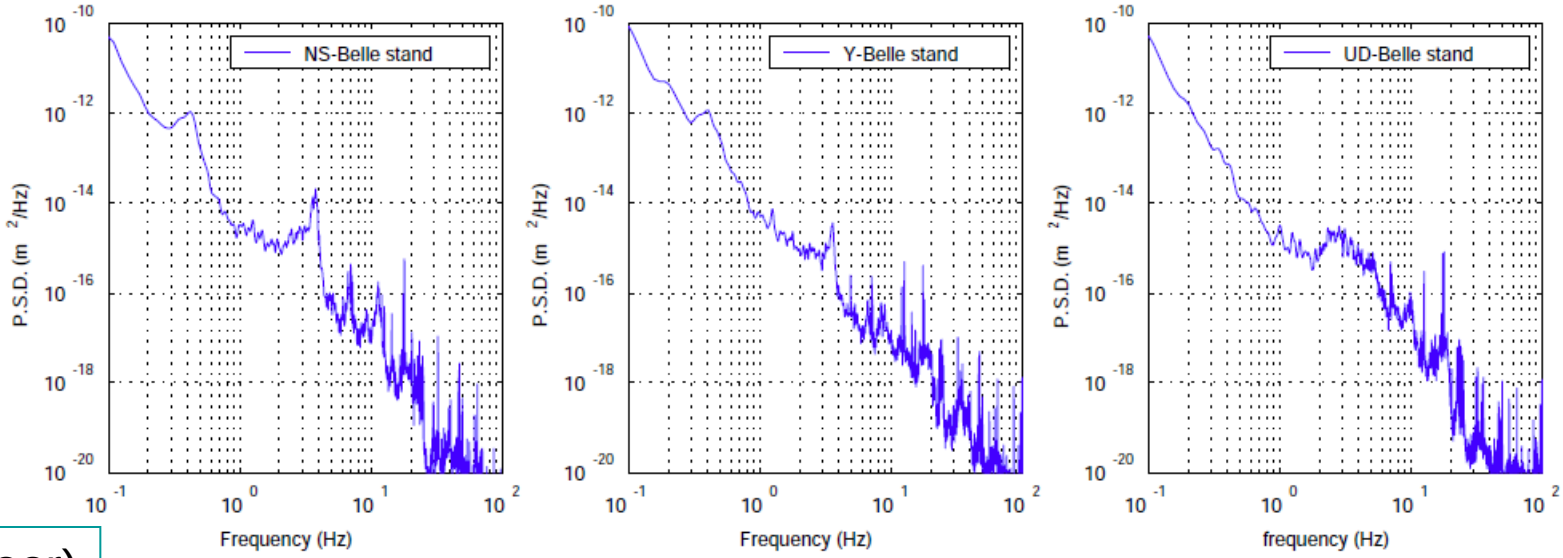


Power Spectrum Density

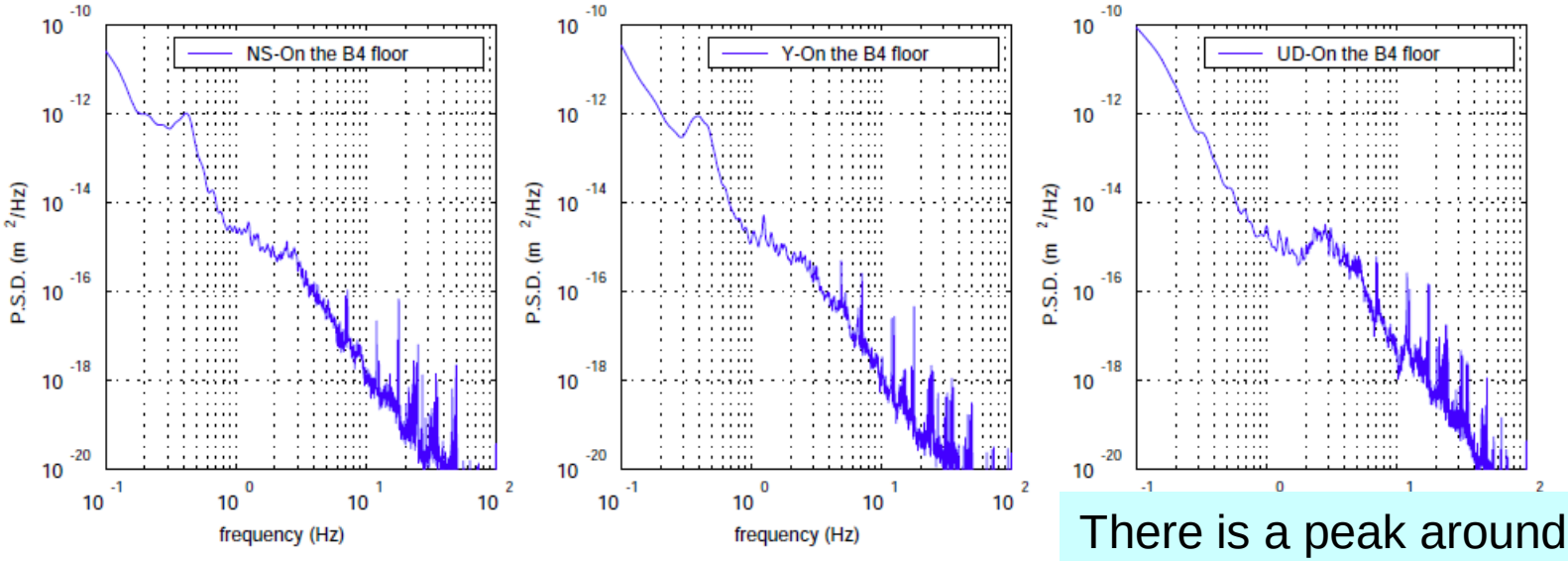
Sep. 18, '09
KEK H. Yamaoka

A(Belle : on the support table)

X: Perpendicular to the beam Y: Beam direction V: Vertical



B(B4 floor)



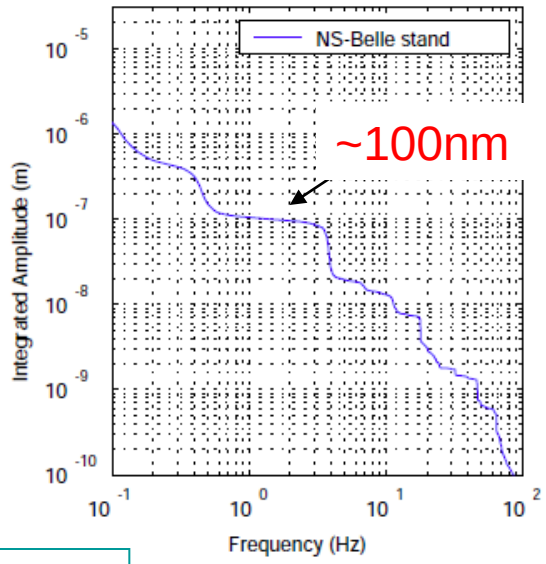
There is a peak around ~3 Hz

Integrated Amplitude

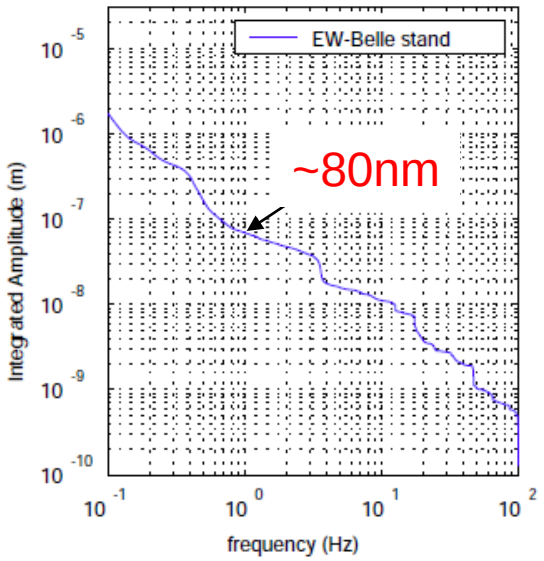
Sep. 18, '09
KEK H. Yamaoka

A(Belle : on the support table)

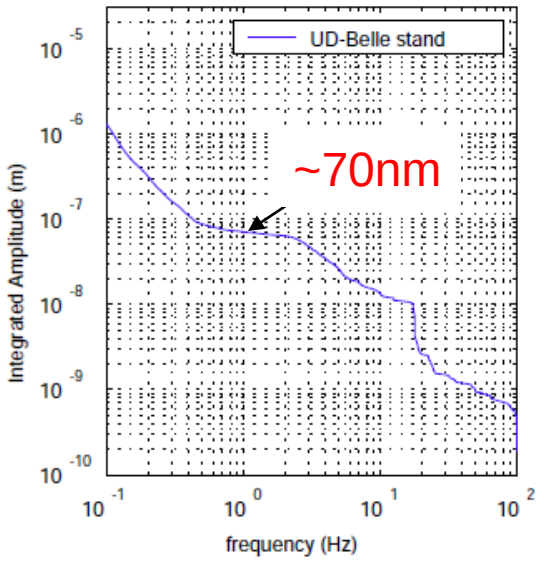
X: Perpendicular to the beam



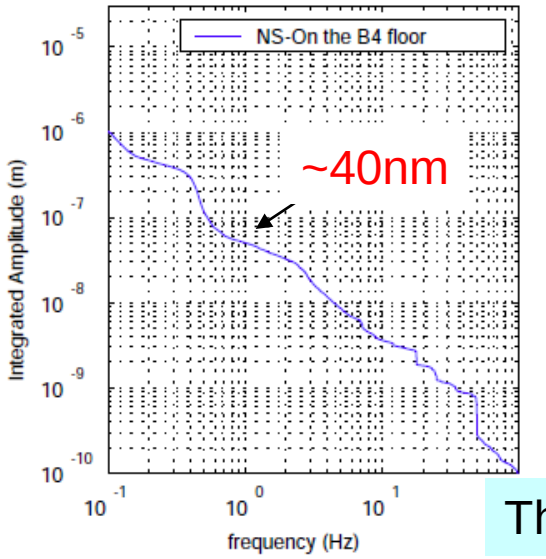
Y: Beam direction

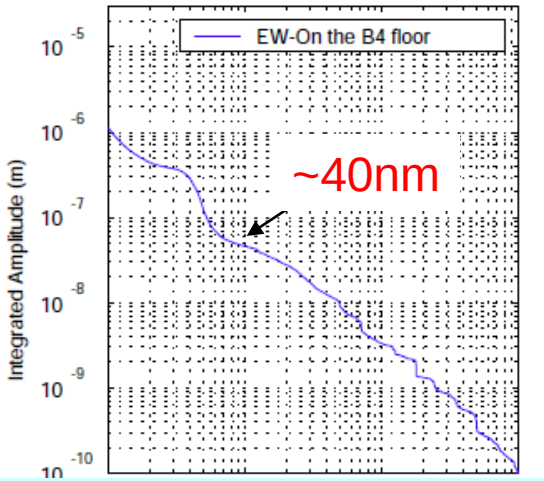


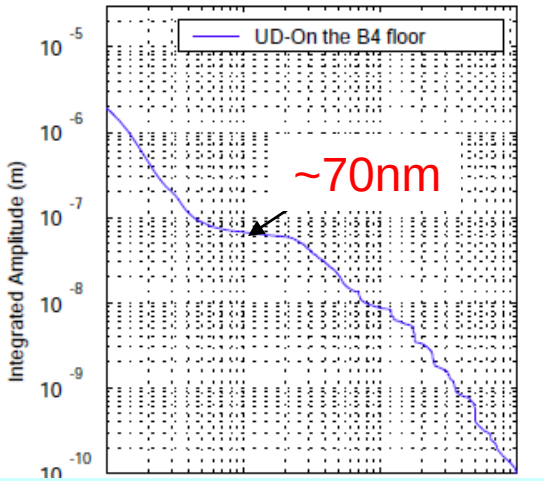
V: Vertical



B(B4 floor)



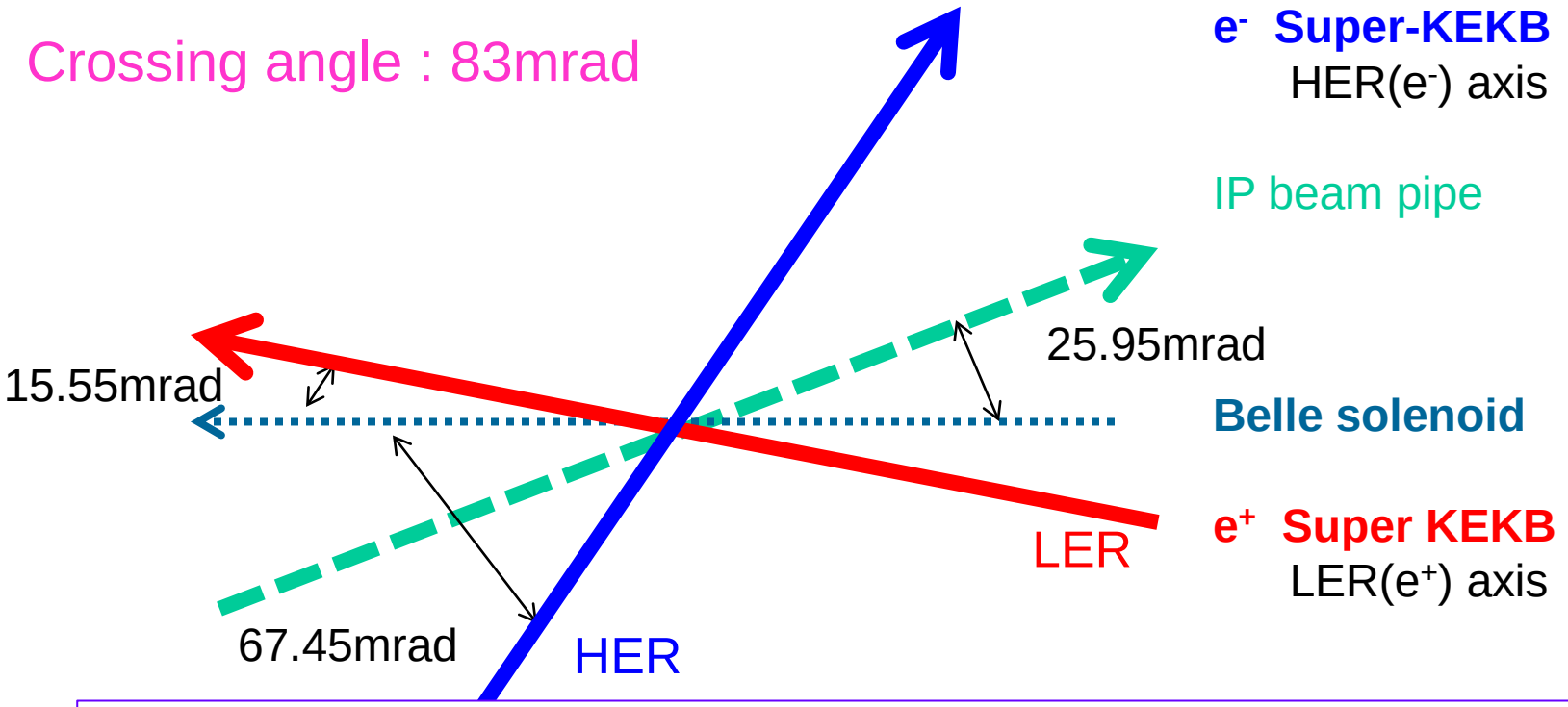




The amplitude around ~3 Hz peak is ~100 nm in the Belle

Detector rotation

Relationship between Belle-II and Super-KEKB: Nano-beam



If we rotate our detector by ~26mrad,
the beam-pipe direction becomes the Belle solenoid axis

There are several (=2) options to rotate the Belle

Method 1 → Using Caterpillar (cost ~200M yen+ α)

Method 2 → Using air pad (cost … under estimation)

Detector BG

- We need to estimate Touscheck and the beam-gas BG
  using the beam-line simulation
    Touschsk→ by Tohoku Beam-gas → by Tokyo

- Touschek → Rough estimation was done (without simulation)
    HER: x20 higher than current
    (based on the beam-size, beam-current and # bunches)

- Beam-gas
    Vacuum around IP (+- 2m) will be worse (x100)
    But we hope it won't be the x100 effect
    (The main beam-gas BG is from the upstream region)

- We'll propose the BG estimation run during this fall Belle run
  to estimate the Touschek and beam-gas with single beam.

To Do

1. Detector BG
   Simulations of Touscheck and the beam-gas BG

2. Beam-pipe design
   HOM calculation (in progress)
   We need heavy metal shield design and its support structure
   (1cm radius Be beam-pipe will be broken with the current
   weight and support method of the beam-pipe shield parts)

3. IP assembly
   In progress

4. Detector rotation
   Ask for the cost estimation

Backup

Accelerator design (as of 2009,Aug-)

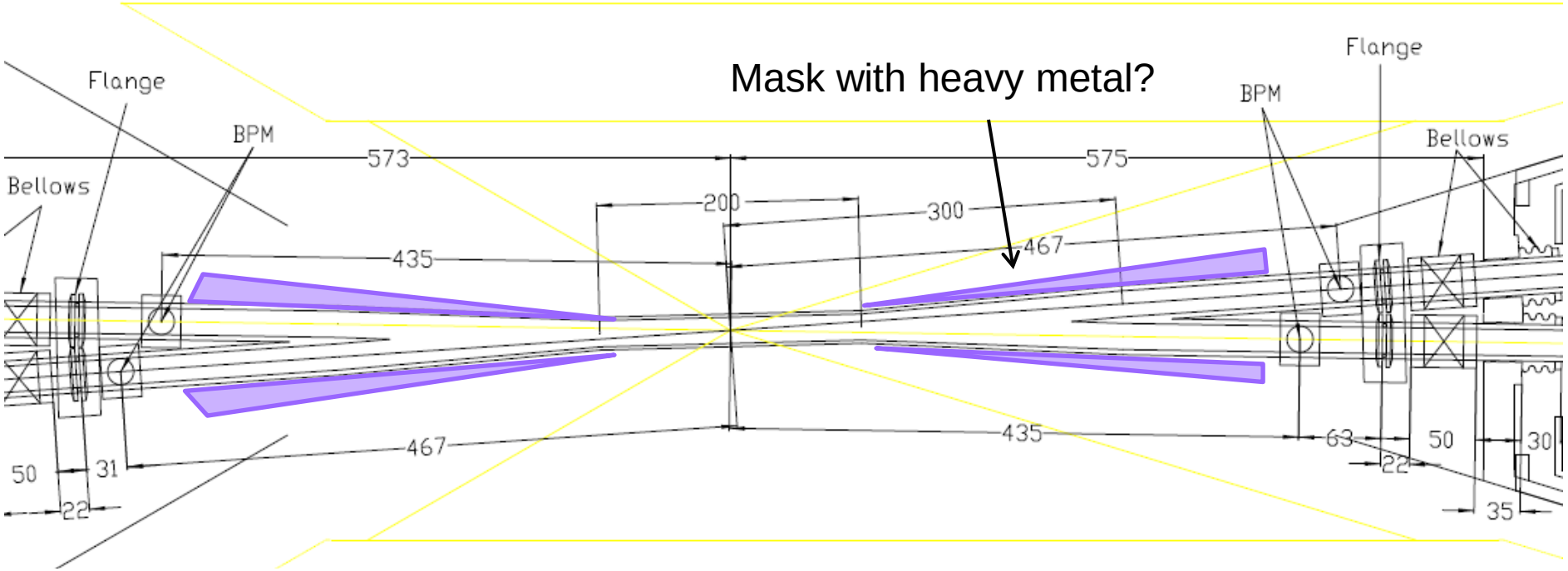
- The base design is Nano-beam option
  → There are two final-Q magnets in both L / R sides

- Crossing angle becomes 83 mrad
  to put the final-Q magnets closer to the IP

- The QCS chamber radius is 1cm
  → to avoid the resonant cavity structure,
  our beam-pipe radius should be 1cm

- 7x4GeV beam energy is considered
  (To solve the problem on dynamic aperture.)

Belle-II IP chamber deign (2009,Aug)

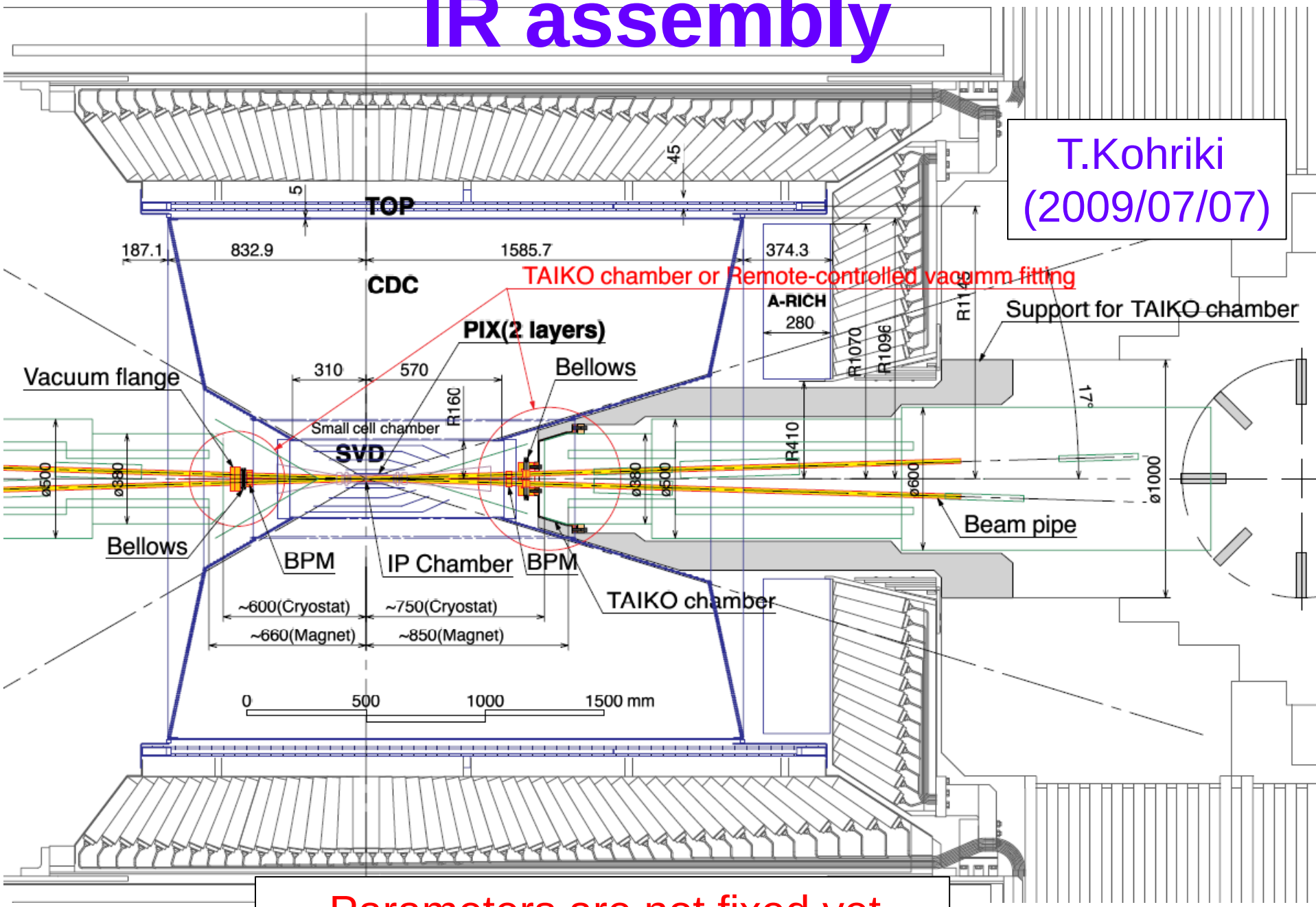


- Size / shape : preliminary
- Assume 1cm radius to Be straight part beam pipe

→ We need to think about the support of the heavy metal masks (~20kg in one side)

They should be supported by SVD and CDC (otherwise, 1cm radius Be pipe will be broken)

IR assembly



Parameters are not fixed yet

IR assembly : current status

Members:

KEK T.Kohriki + Machine shop

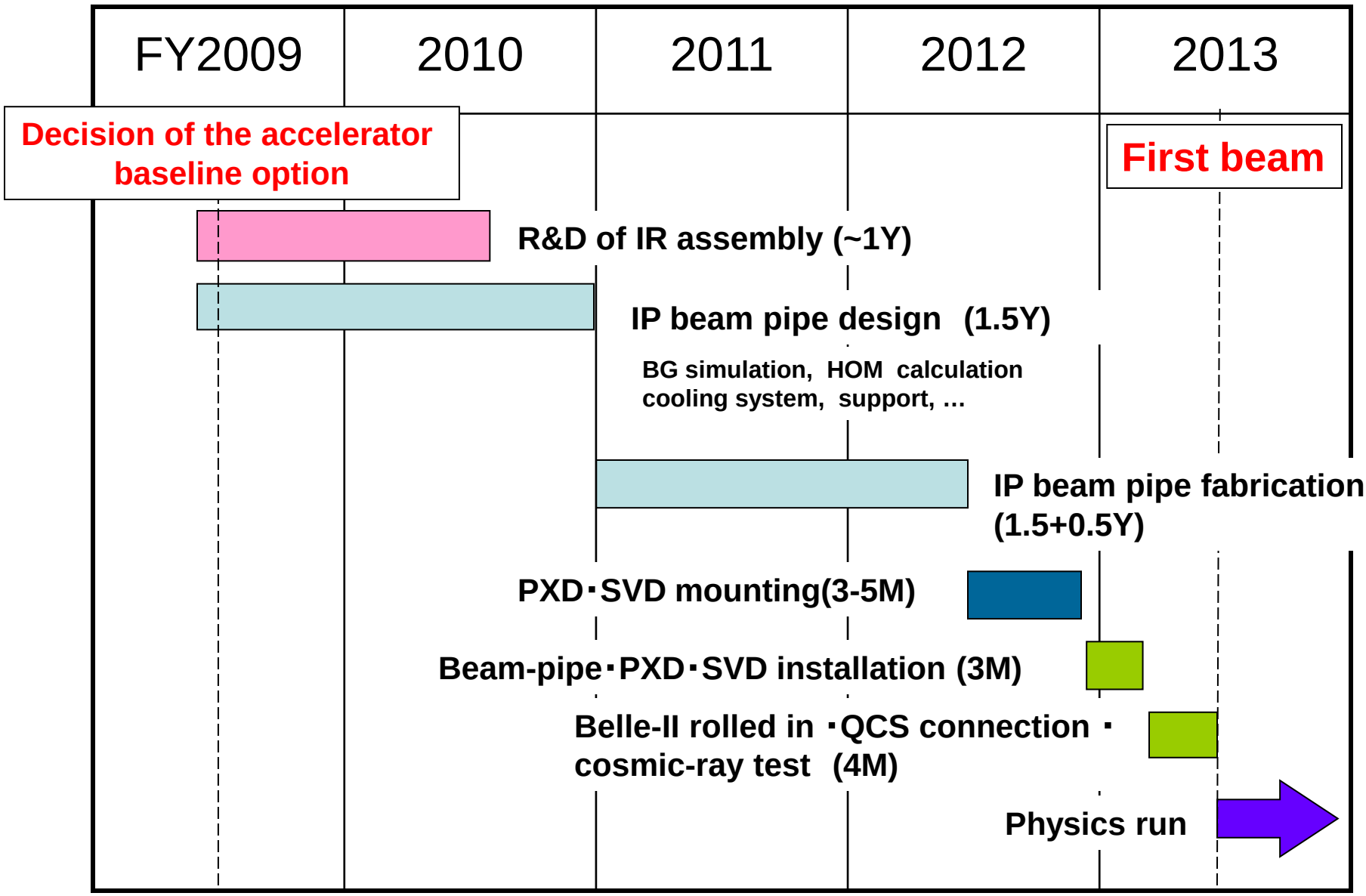
R&D of remote-controlled vacuum fitting

- We start weekly meeting with Kohriki-san and Machine shop

- Currently several ideas for the remote-controlled connection (But we didn't consider the details yet)

- We must do remote-controlled vacuum connection test soon

Schedule


FY2009
2010
2011
2012
2013
Decision of the accelerator baseline option
First beam
R&D of IR assembly (~1Y)
IP beam pipe design (1.5Y)
BG simulation, HOM calculation
cooling system, support, …
IP beam pipe fabrication (1.5+0.5Y)
PXD・SVD mounting(3-5M)
Beam-pipe・PXD・SVD installation (3M)
Belle-II rolled in ・QCS connection ・ cosmic-ray test (4M)
Physics run