Updates on Shintake monitor Status

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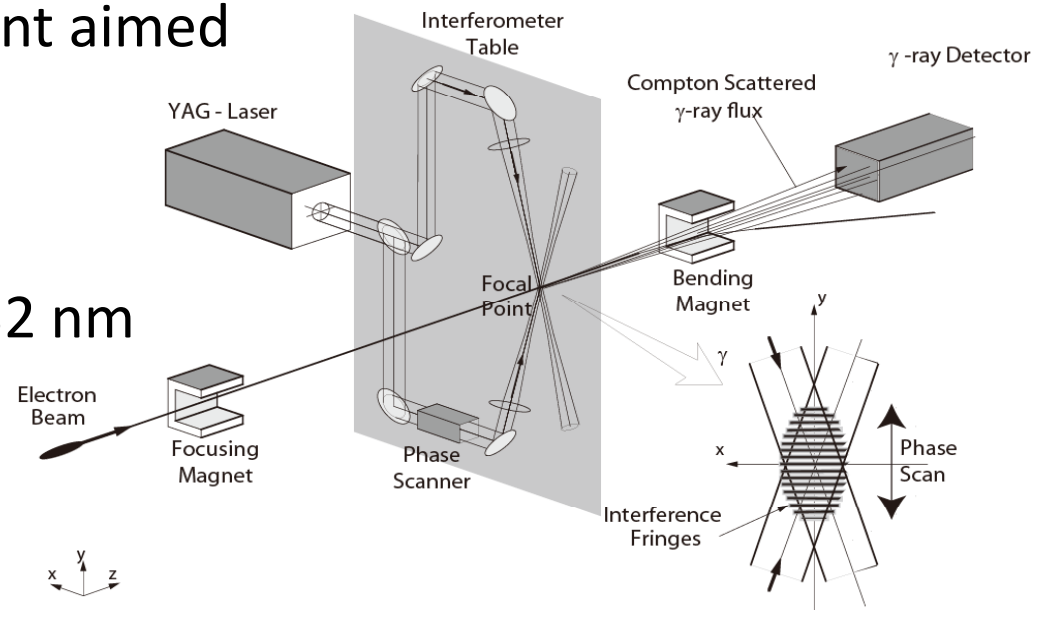
Overview of Shintake monitor

- Shintake monitor
  - a beam size monitor to be installed at the ATF2 IP.
  - uses Compton scattering from laser interference fringe and electron beam in measurement
  - σ_y=37 nm measurement aimed
- Main components
  - Pulsed Nd:YAG Laser

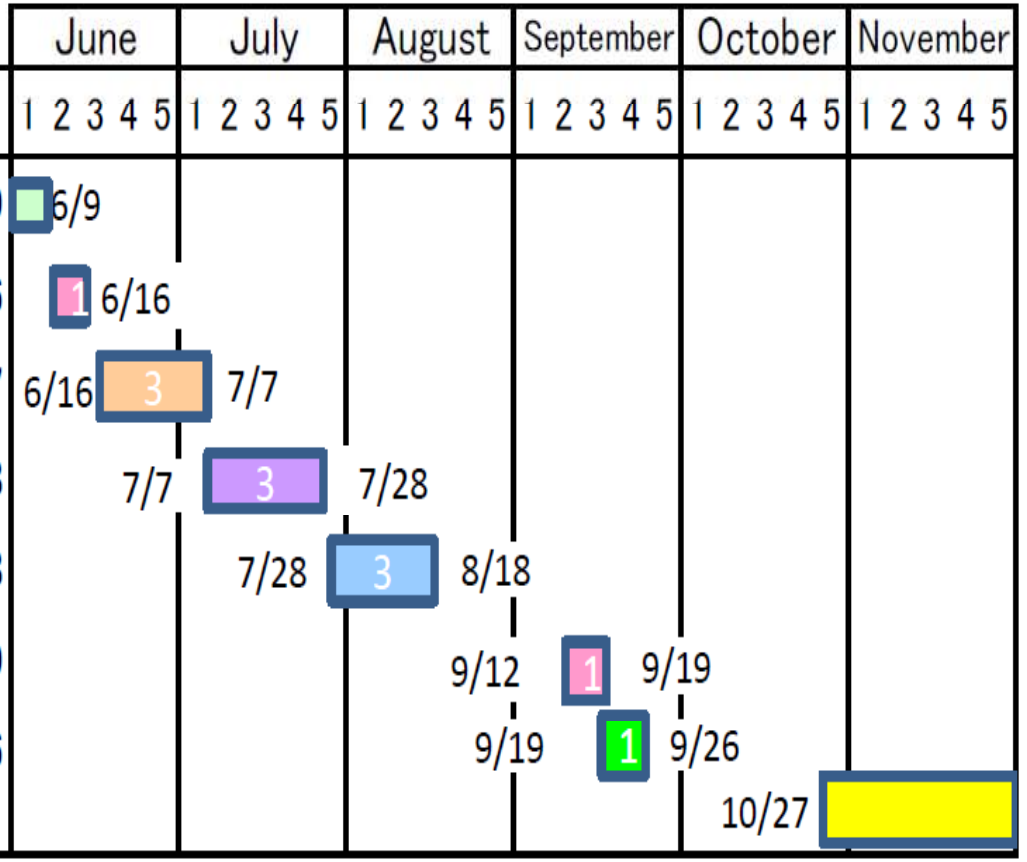
    use 2nd harmonic 532 nm
  - Vertical Optical Table
  - Gamma-ray Detector



Schematic of Shintake monitor

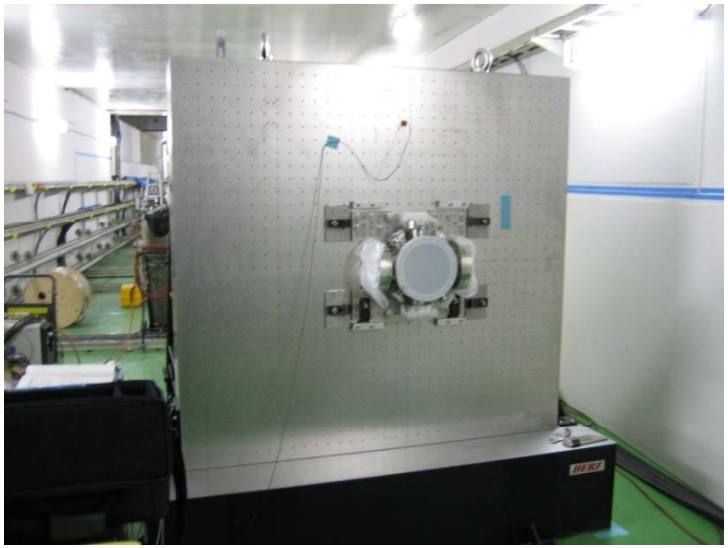
Schedule

Task	Start	Duration	End
Installation	4/1		6/9
Laser Operation & Alignment	6/9	1 week	6/16
Contrast Check	6/16	3 week	7/7
Position Stability Measurement	7/7	3 week	7/28
Phase Stability Measurement	7/28	3 week	8/18
Transfer of Laser Table	9/12	1 week	9/19
Long Distance Alignment	9/19	1 week	9/26
ATF2 Beam Operation	10/27		

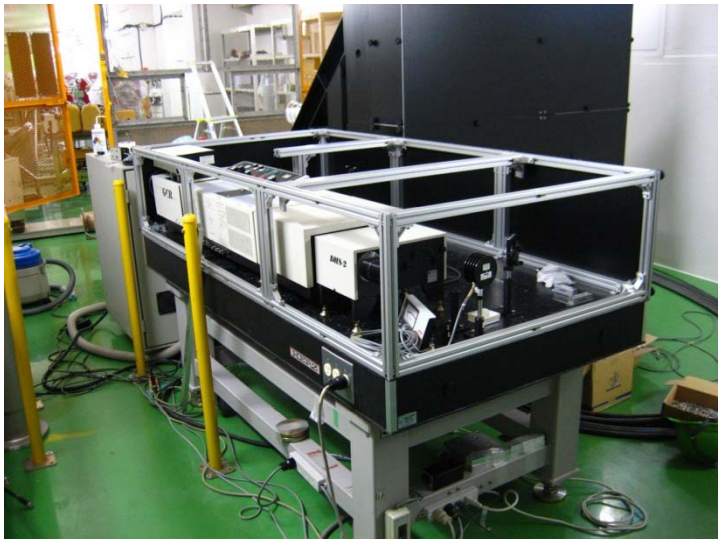


Installation status

- Now we have installed the laser and the optical table into the ATF2 beam line.
- We need to construct the actual optics before ATF2 beam operation and test the performance of the optics.

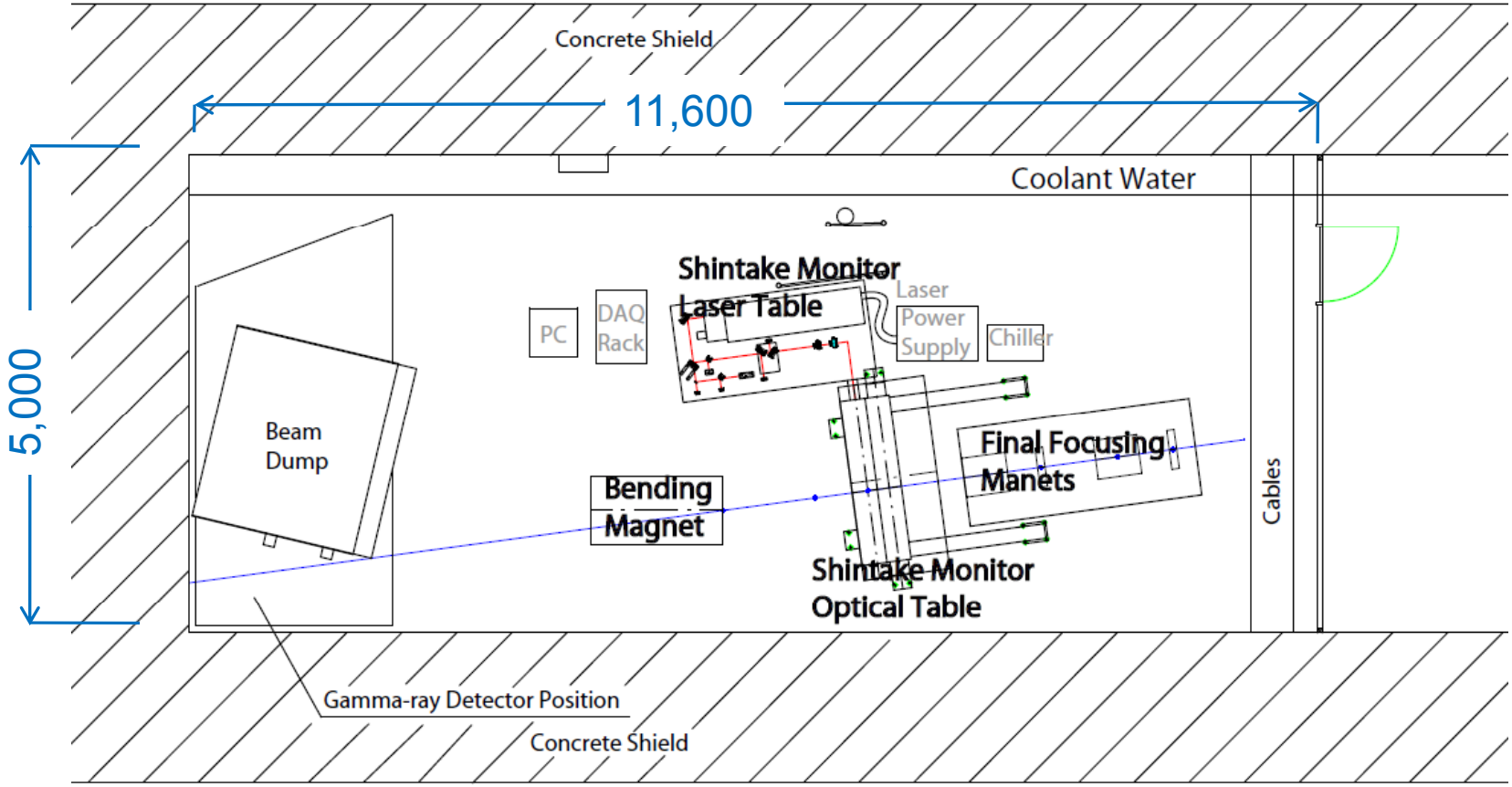


Vertical Optical Table



Pulsed Laser

Layout of Shintake monitor (in optics test)



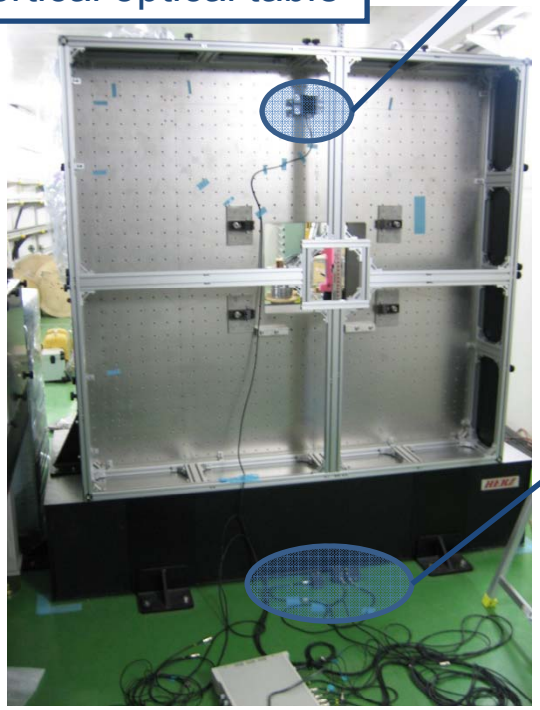
Vibration Measurement

- measured the vibration of the optical table and the floor
- estimate the effect to the laser position jitter
- used acceleration sensors

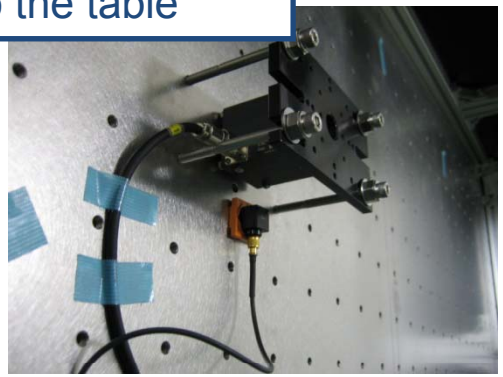
acceleration sensor
TOKKYOKIKI Corp. MGS-102S
range : 0.1 ─ 400 Hz

Measurement Condition

vertical optical table



sensor attached to the table

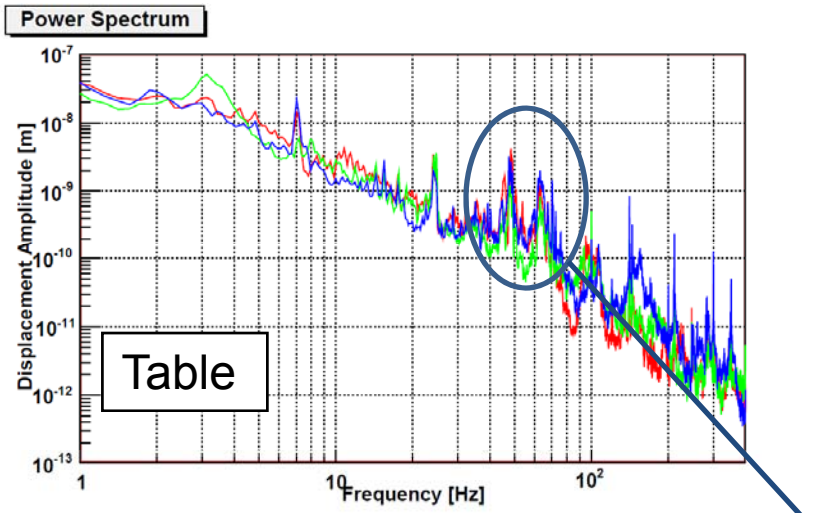


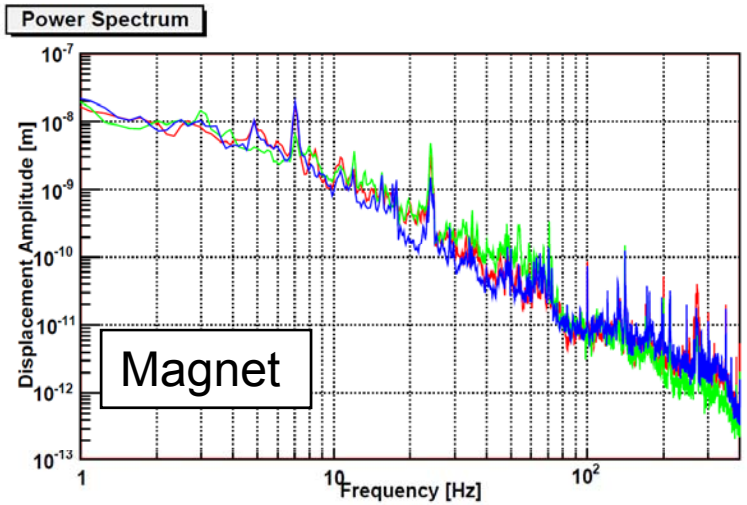
sensors put on the floor

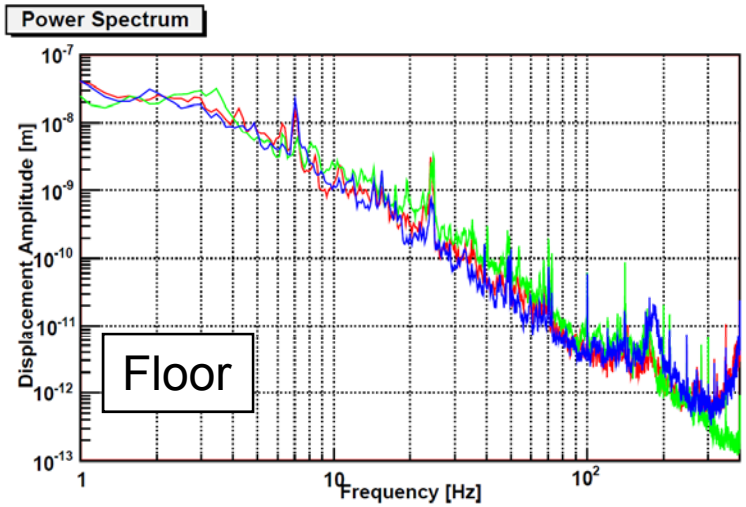
arrangement of the measurement

magnet support

Displacement Amplitude



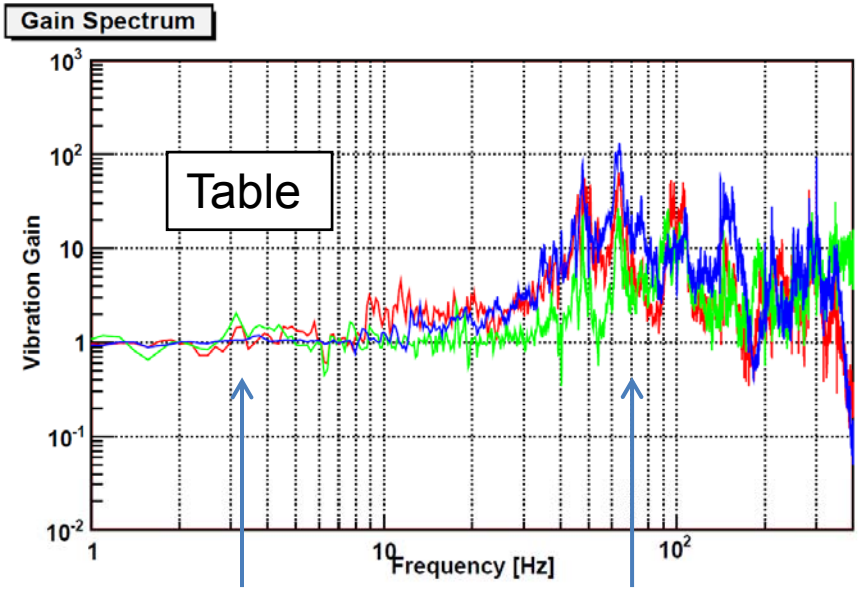


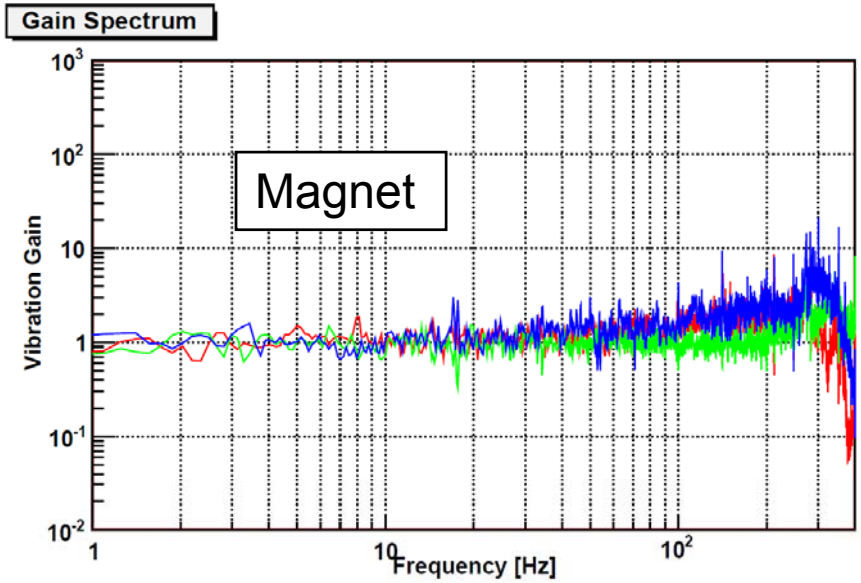


resonance occurred
in 40 – 80 Hz

X direction (horizontal)
Y direction (vertical)
Z direction (beam axis)

Vibration Gain





low frequency :
- vibrates togather
- gain equals to 1

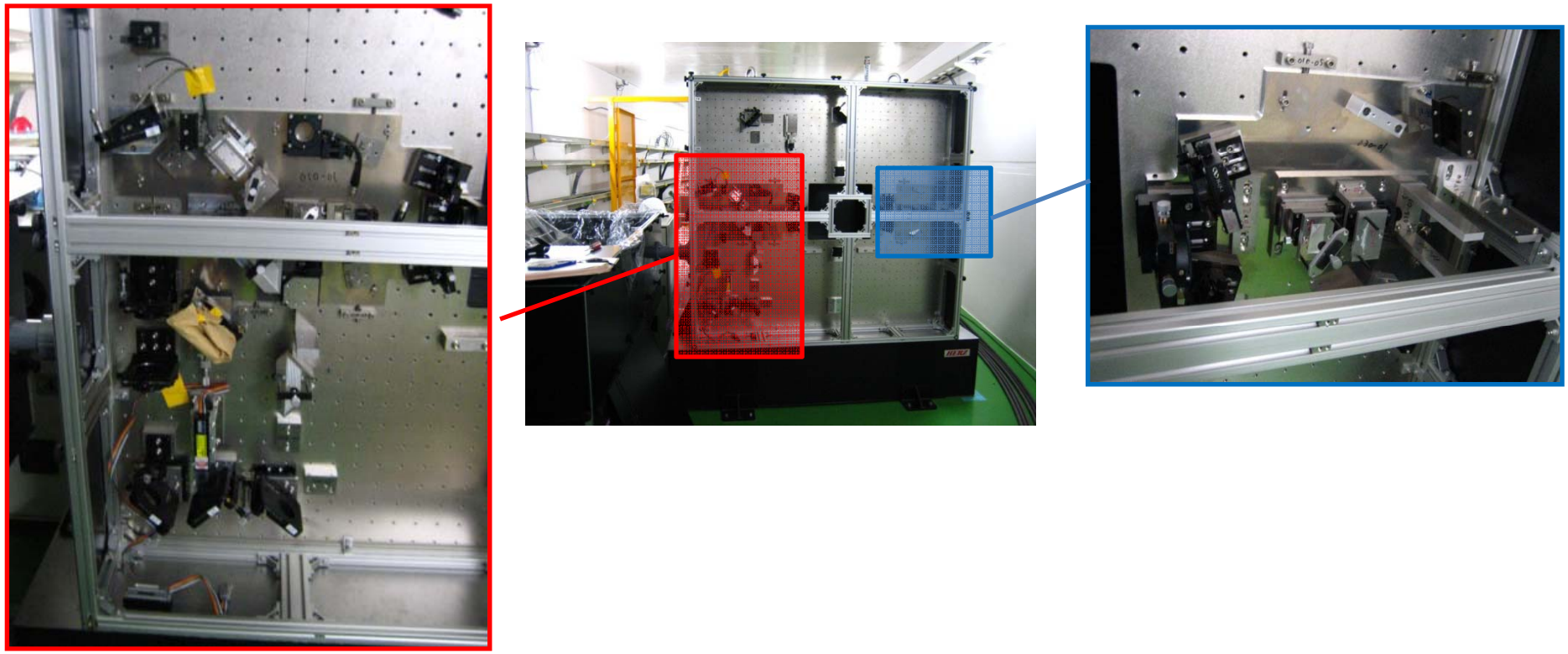
high frequency :
- resonance occurred
- gain become large

$$\text{Gain} = \frac{\text{Table Vibration}}{\text{Floor Vibration}}$$

X direction (horizontal)
Y direction (vertical)
Z direction (beam axis)

Attachment of the Optics

- Now we have started the mount of the optics like these pictures.



Summary

- We are developing IP-BSM (Shintake monitor)
- We have started the installation of Shintake monitor
- Vibration condition is not so bad for the moment.
- We will test the optics performance by the ATF2 beam operation.