

Commissioning work

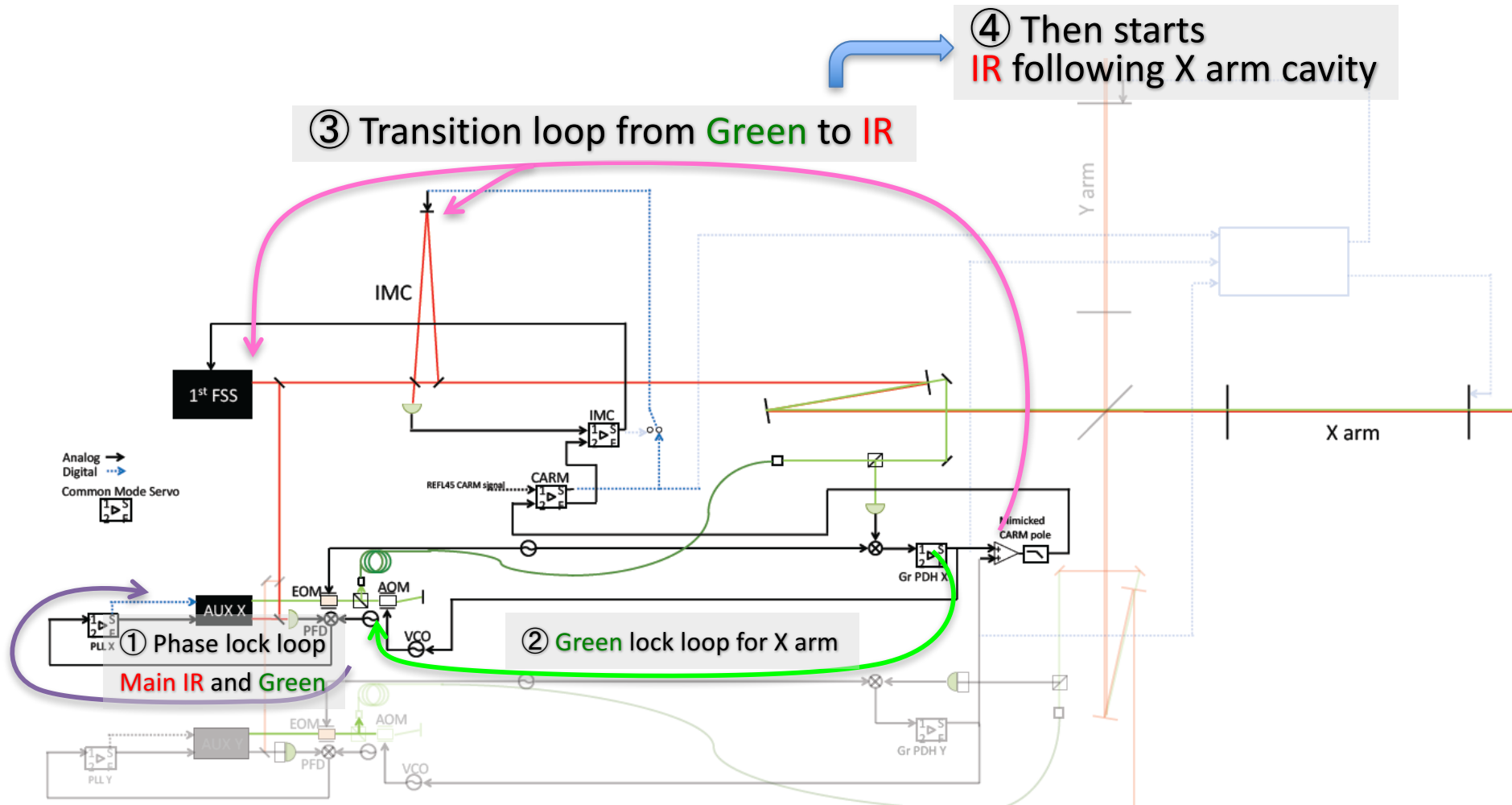
KAGRA face to face meeting
@NAOJ
2018/12/5(Wed.)

O. Miyakawa
and KAGRA Collaboration

- HPL: High Power Laser
- XA stage: X arm commissioning.
 - X arm alignment.
 - ALS (Arm Length Stabilization, Green) lock.
 - Transition from Green to IR
 - Lock IR main laser to 3km arm: done on this Sunday!.
- YA stage: Y arm commissioning.
 - Alignment will start in ~~December~~ January.
- FPM stage: Fabry-Perot Michelson lock.
- RSE stage: RSE lock.
 - Needs to pass check points.

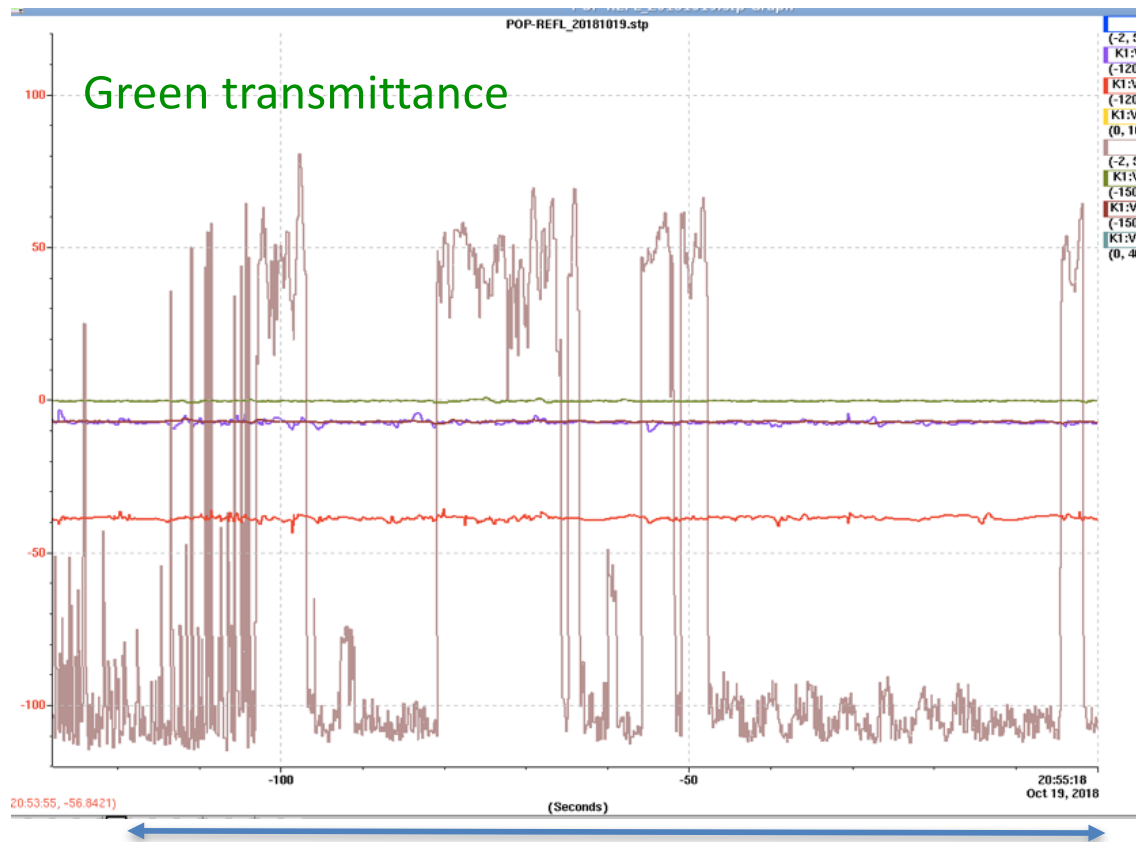
- X arm alignment (2018 September ~ mid October)
 - Green and IR
 - Optimization for VIS
 - Vacuum
- Lock green laser to X arm lock (October 19~)
 - ~2hours lock achieved!
- IR frequency followed to X arm fluctuation. (November.10)
- Locked IR laser to X arm (December 2nd!)
 - Fluctuation of fiber was a serious problem.

1.5month

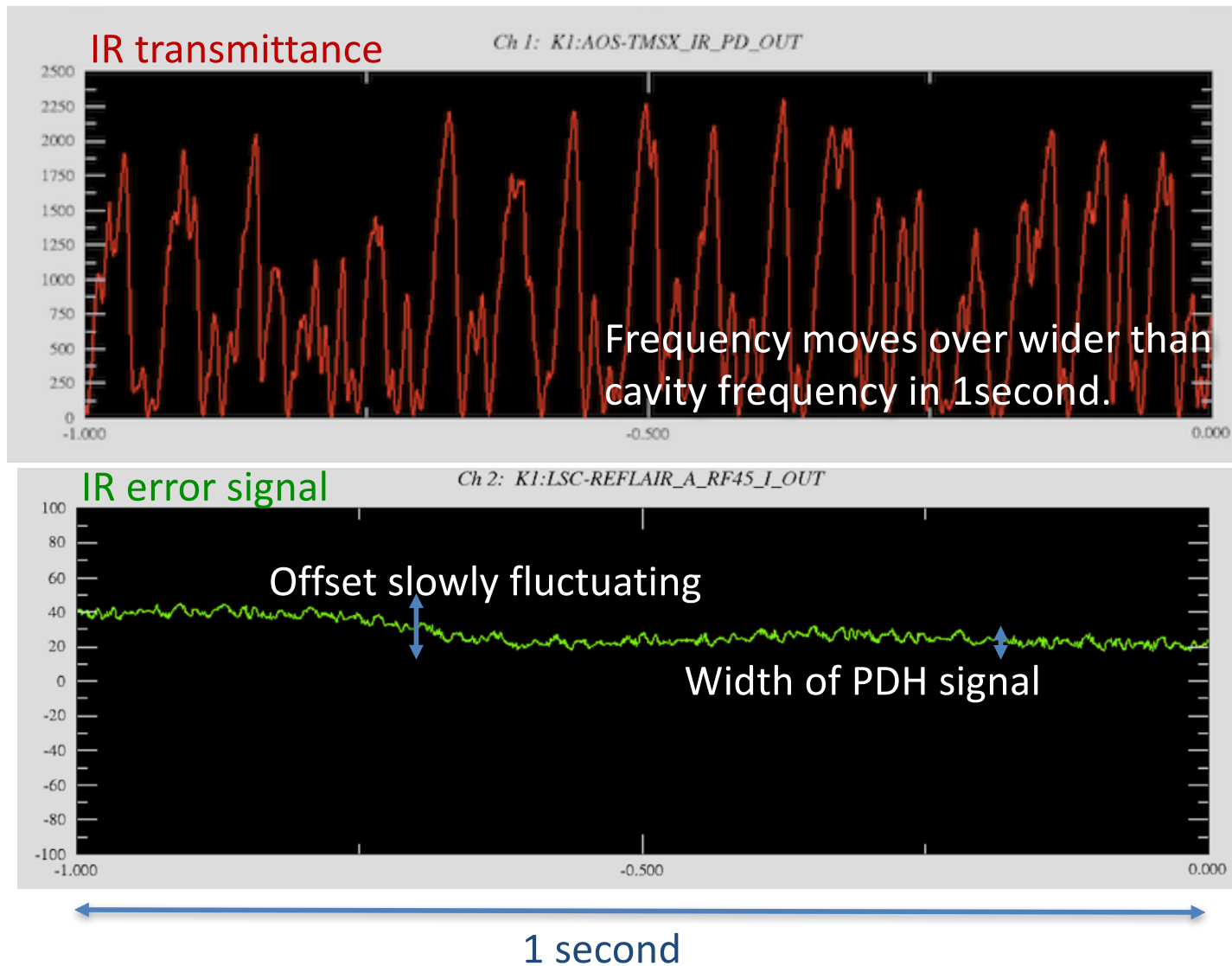


② First 3km arm cavity lock with green

- The first green lock was established on October 19, just 6 hours after the gate valve opened!
- It was quite promising result at that time.

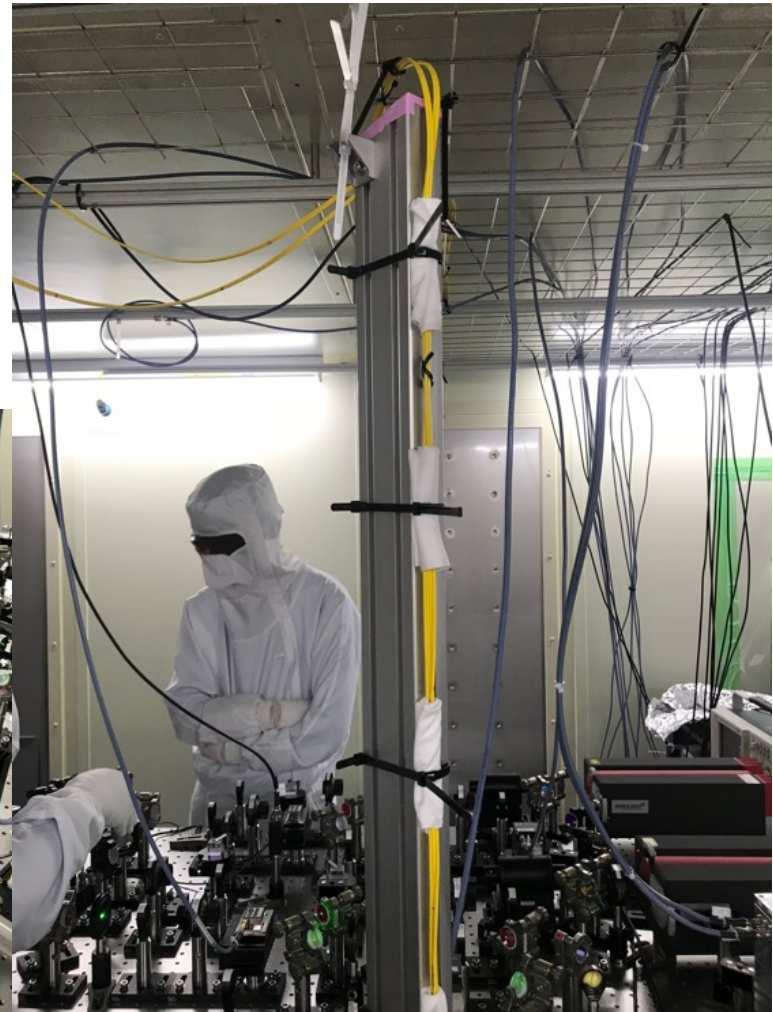
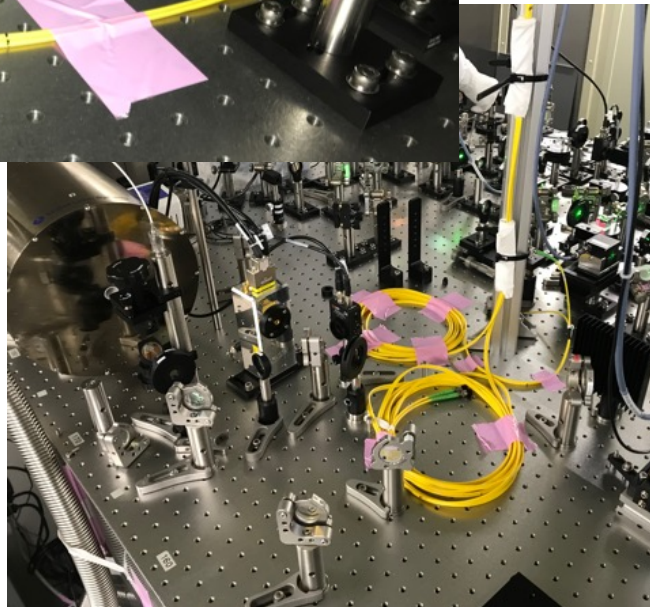
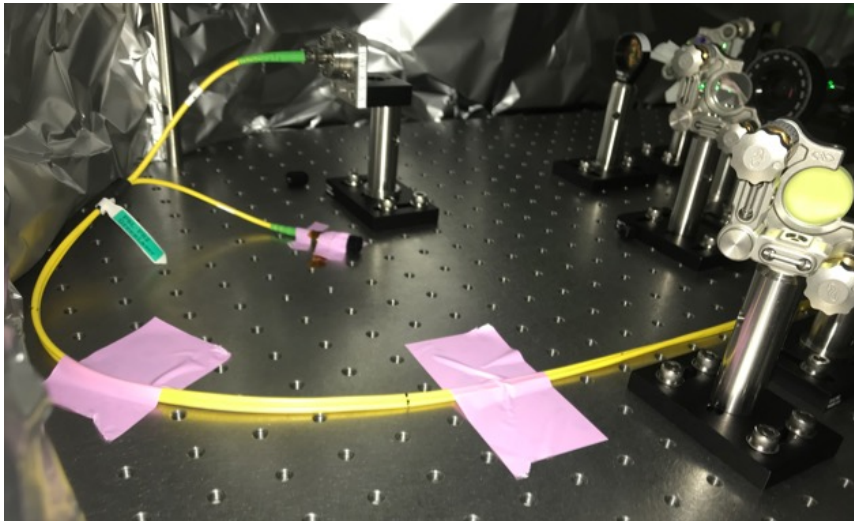


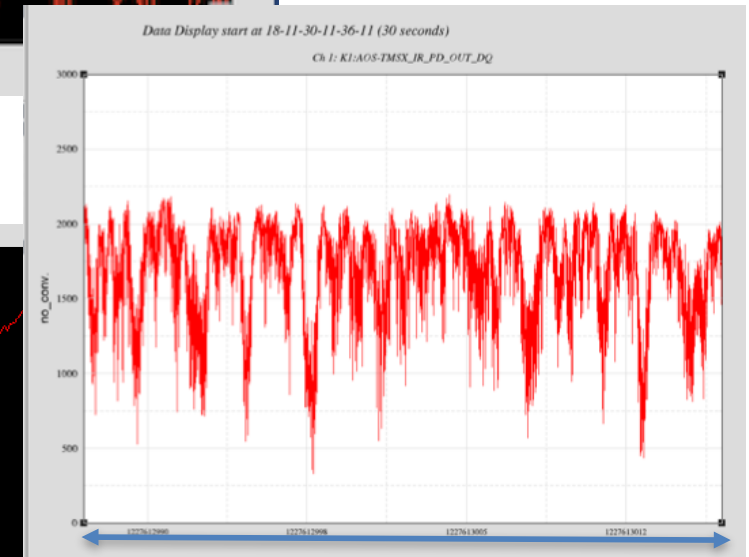
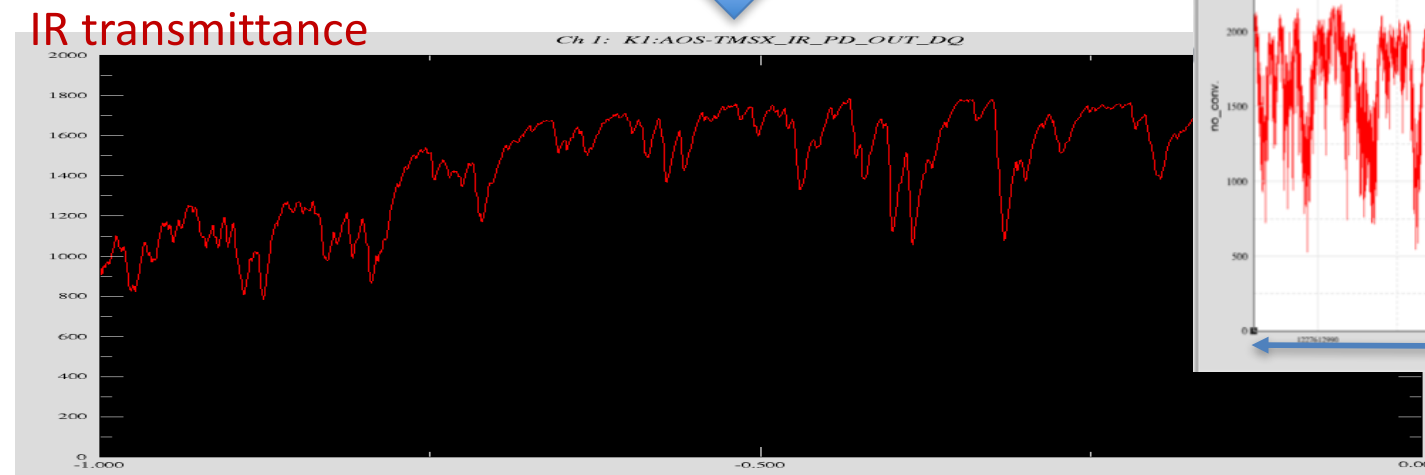
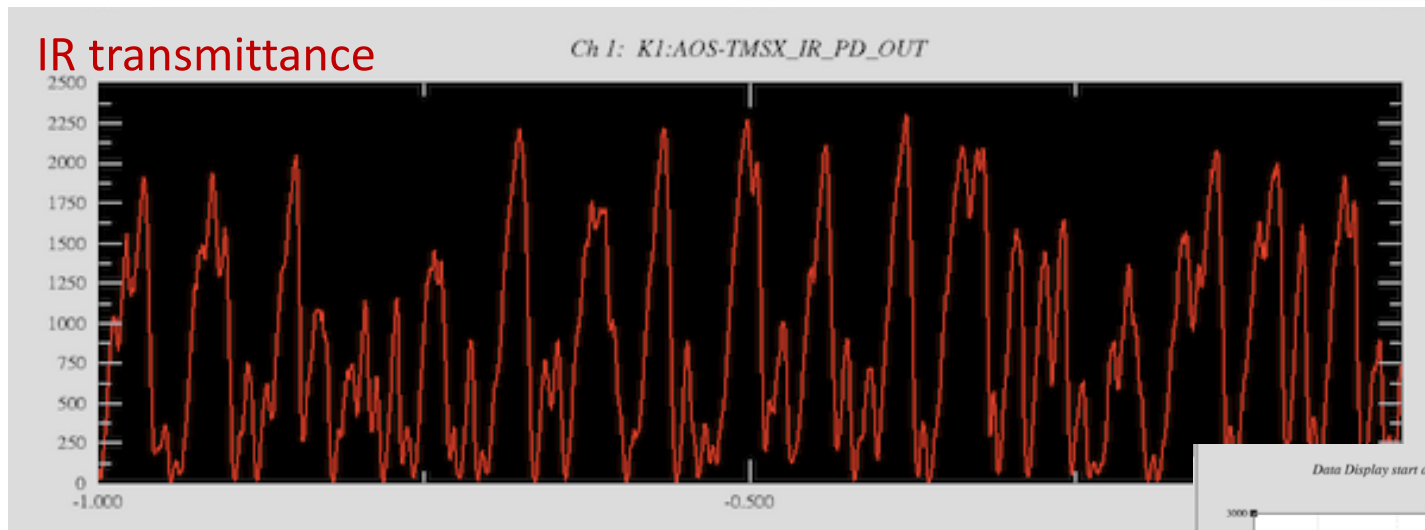
③ Large fluctuation than cavity frequency



All air filters were turned off.

Fiber of green was tightened.



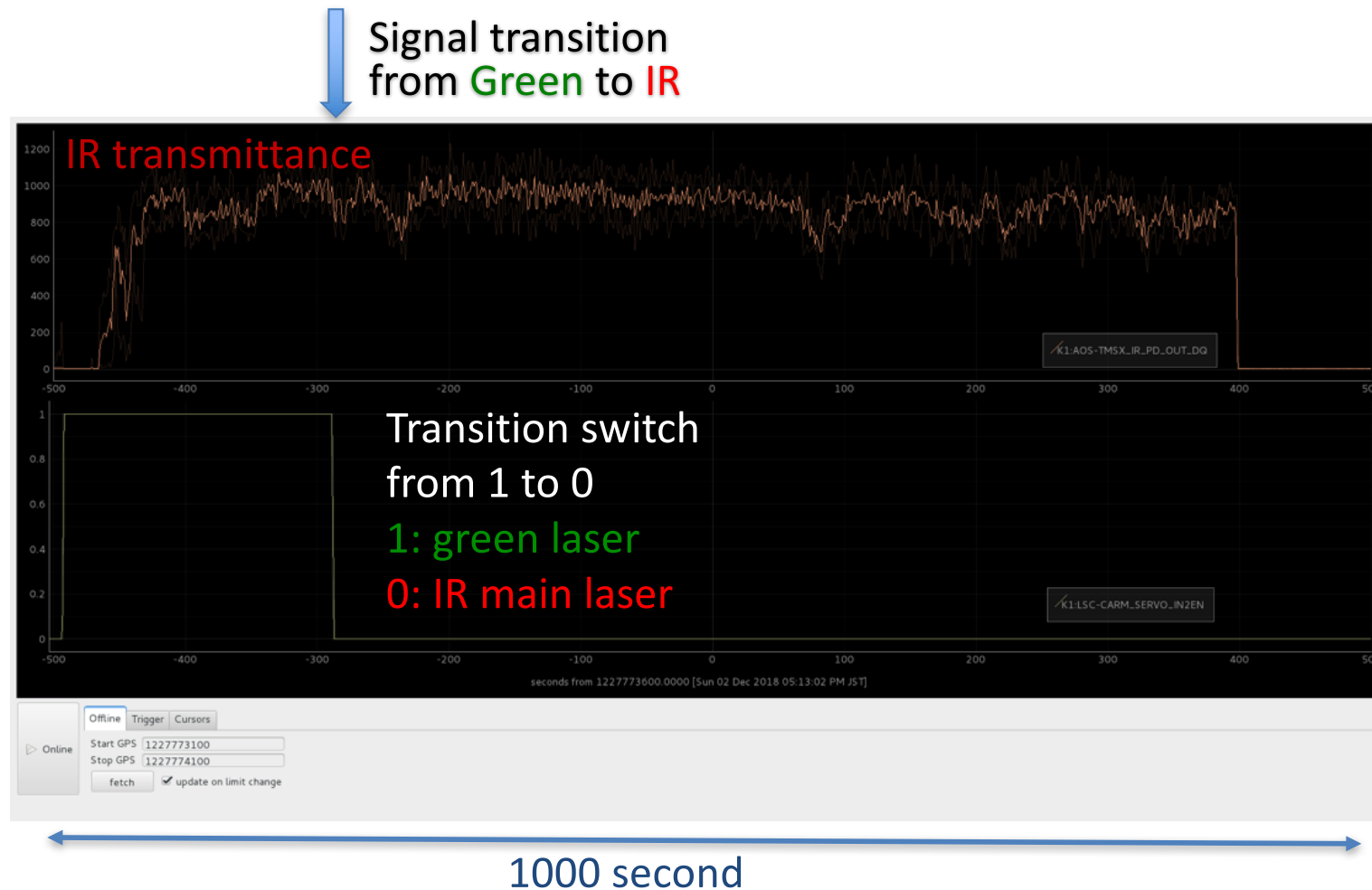


30 second

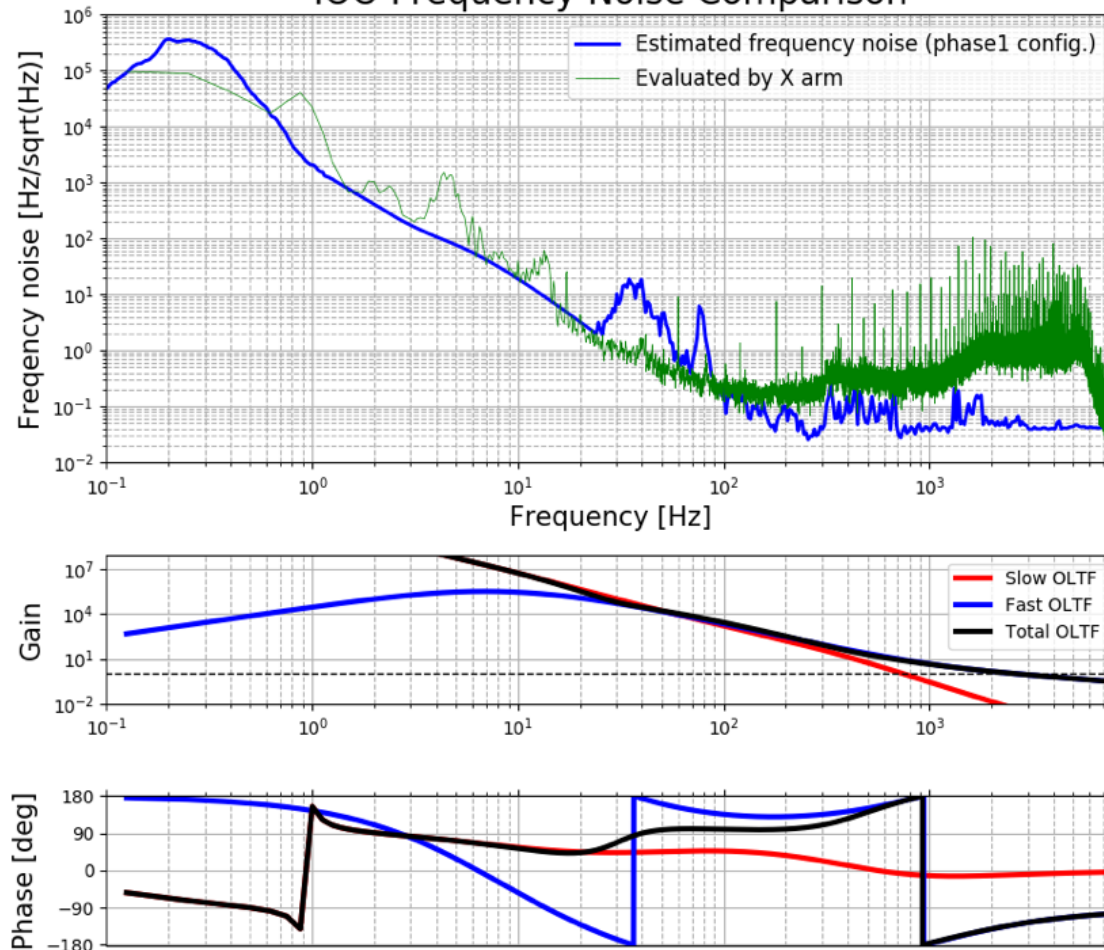
1 second

④ First X arm lock to main laser!

On Sunday, we locked IR for 15 minutes!



IOO Frequency Noise Comparison

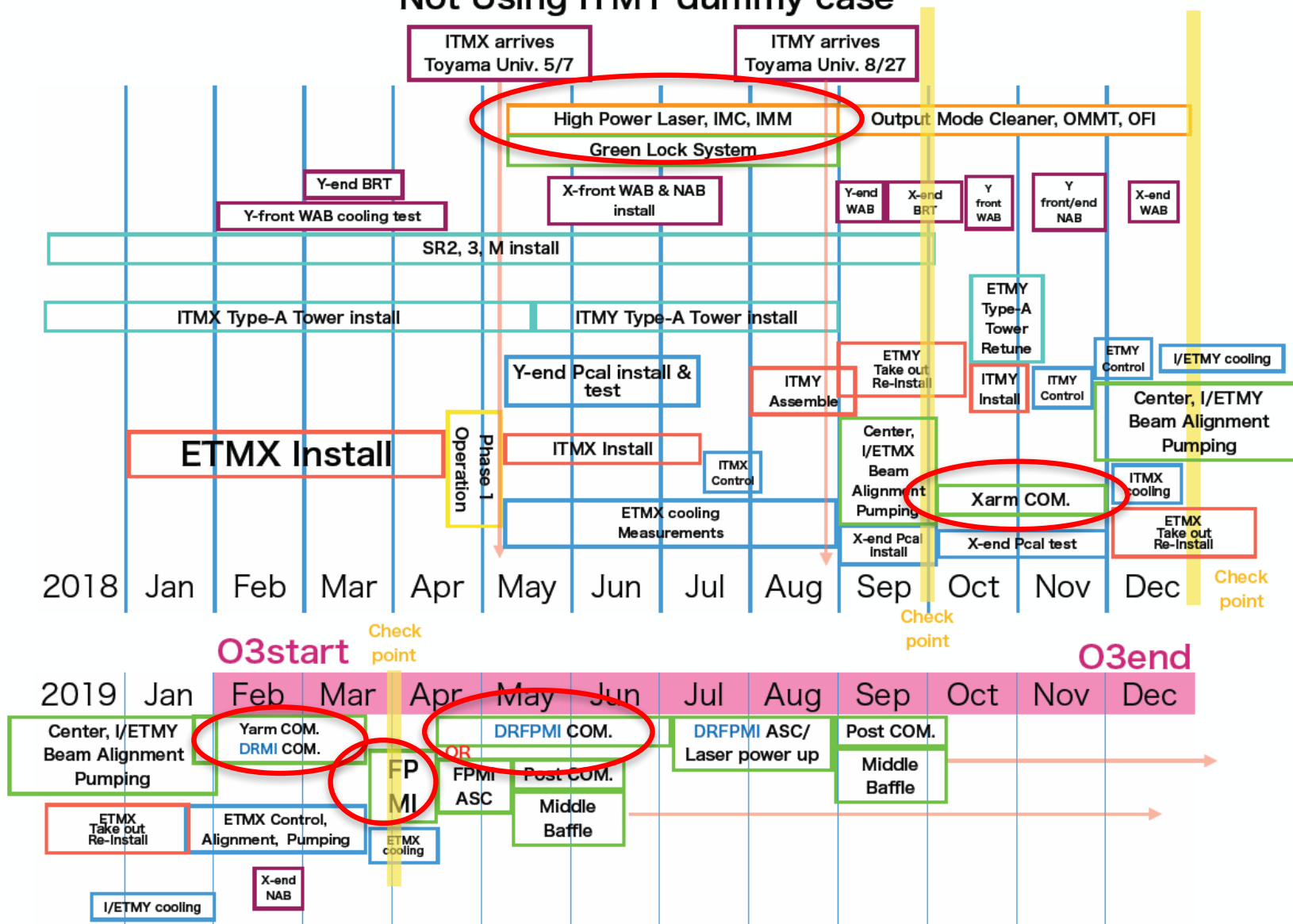


- X arm noise floor seems to be limited by iMC frequency noise.
- Crossover frequency between iMC length and Fast loop is 120Hz.

- 2018/11/26 Plan B schedule was proposed.
 - Needs more time for Xarm commissioning.
 - Original finish date; 12/9(sun).
 - Proposing finish date; 1/6(sun).
 - 1 month longer
- Impact on other commissioning date
 - Y arm alignment 11/26 -> 1/18
 - Lock try of Yarm cavity: 2/11 -> 2/18 (1 week delay).
 - Lock try of DRMI: 1/28 -> 2/4 (1 week delay).
 - Lock try of FPMI: 3/25 -> 3/18 (1 week earlier).
- Risks
 - Optimizing closing the Xend chambers may introduce some risk of leakage.
 - Commissioning time for Yarm & DRMI are roughly 2 weeks shorter than before.
 - Schedule of AOS is tight. Commissioning of BRT-Y will be possible after the week of March 11 by AOS.

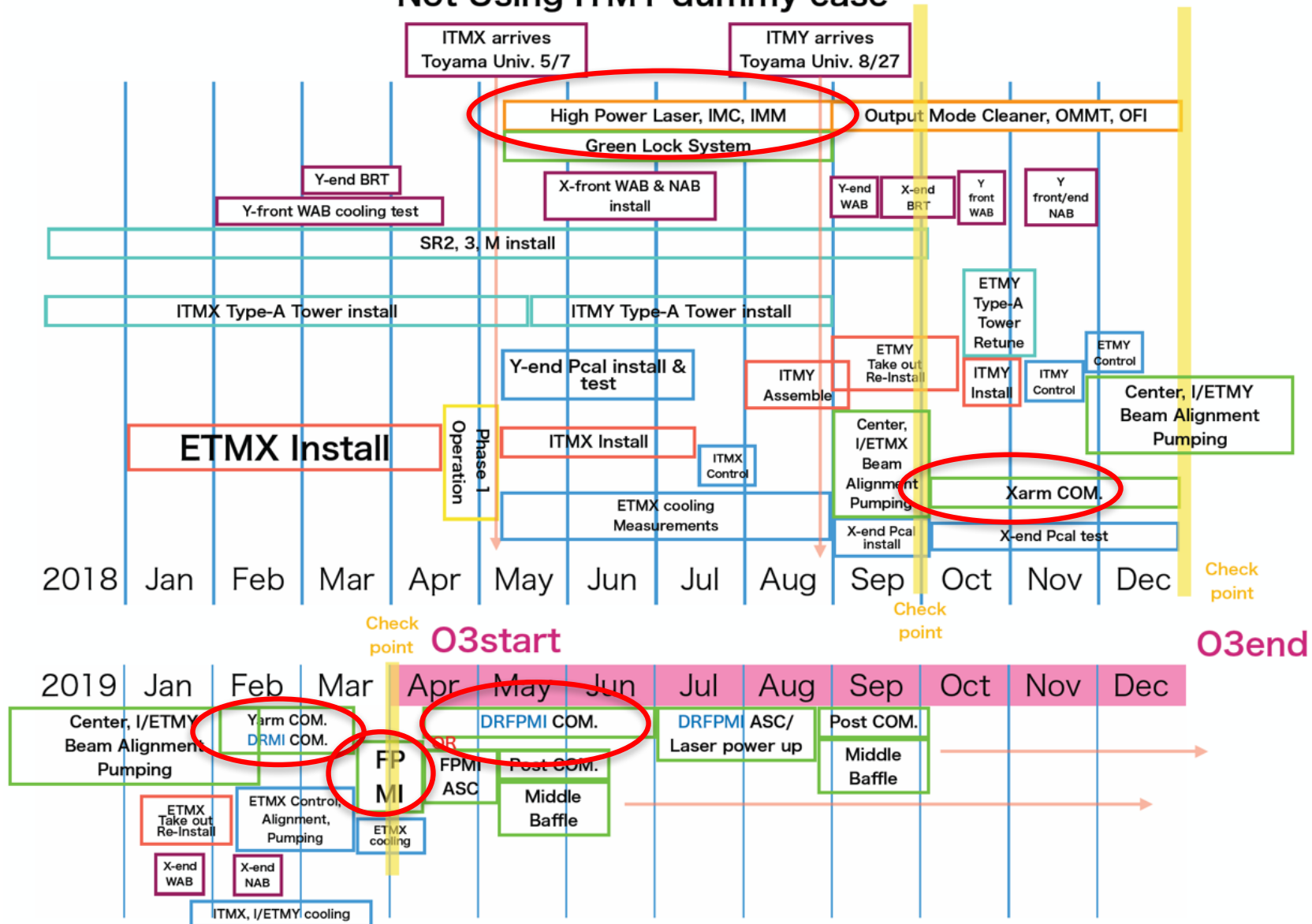
See [JGW-G1809310](#) for detail.

Not Using ITMY dummy case



2018/11/26

Not Using ITMY dummy case



- Schedule of Yfront (WAB & NAB have been installed.)
 - Yaw FR install. Close chambers & pumping: 12/10-17
 - Leak test, venting, open 800 flanges: 12/17-21
 - IYC finalize: 12/24-1/11
 - BS alignment to ETMY: 1/21-23
 - Close 800 flanges & pumping: 1/28-2/1
 - Leak test: 2/4-8
 - Cooling start: 2/11
- Schedule of Yend (WAB & NAB have been installed.)
 - Yaw FR install: 12/10-17
 - Close chambers & pumping: 1/7-11
 - Leak test, venting, open 800 flanges: 1/14-18
 - ETMY alignment to center: 1/24-25
 - Pcal & EYC finalize: 1/28-2/8
 - Close 800 flanges & pumping: 2/11-15
 - Yarm commissioning start: 2/18
 - Leak test: 2/18-22
 - Cooling start: 2/25

- End of Xarm commissioning: 1/6
- Open chambers. IMC, BS & PR2 recovery works: 1/7-11
- Install beam dampers@PRM: 1/17-18
- Beam alignment of BS & SRs: 1/18-23
- Green beam alignment: 1/23-24
- Beam alignment of OMMT, OMC: 1/23-25
- Close chambers & pumping: 1/28-2/1
- DRMI start: 2/4
- IMC high power, Leak test: 2/4-8

- Y arm commissioning and DRMI commissioning will be proceeded in parallel.
 - Needs careful time sharing.
 - No night work in the mine during this term.
- Shall we go ahead to DRFPMI?
 - depends on how we proceed by each check point.
 - 3~4 more months are expected to establish DRFPMI compared with FPMI.
- Joining O3 run
 - Needs noise hunting time to establish the suitable sensitivity to contribute scientifically in O3 run.
 - We need careful consideration how many months remaining before finishing O3 run of LIGO/VIRGO.