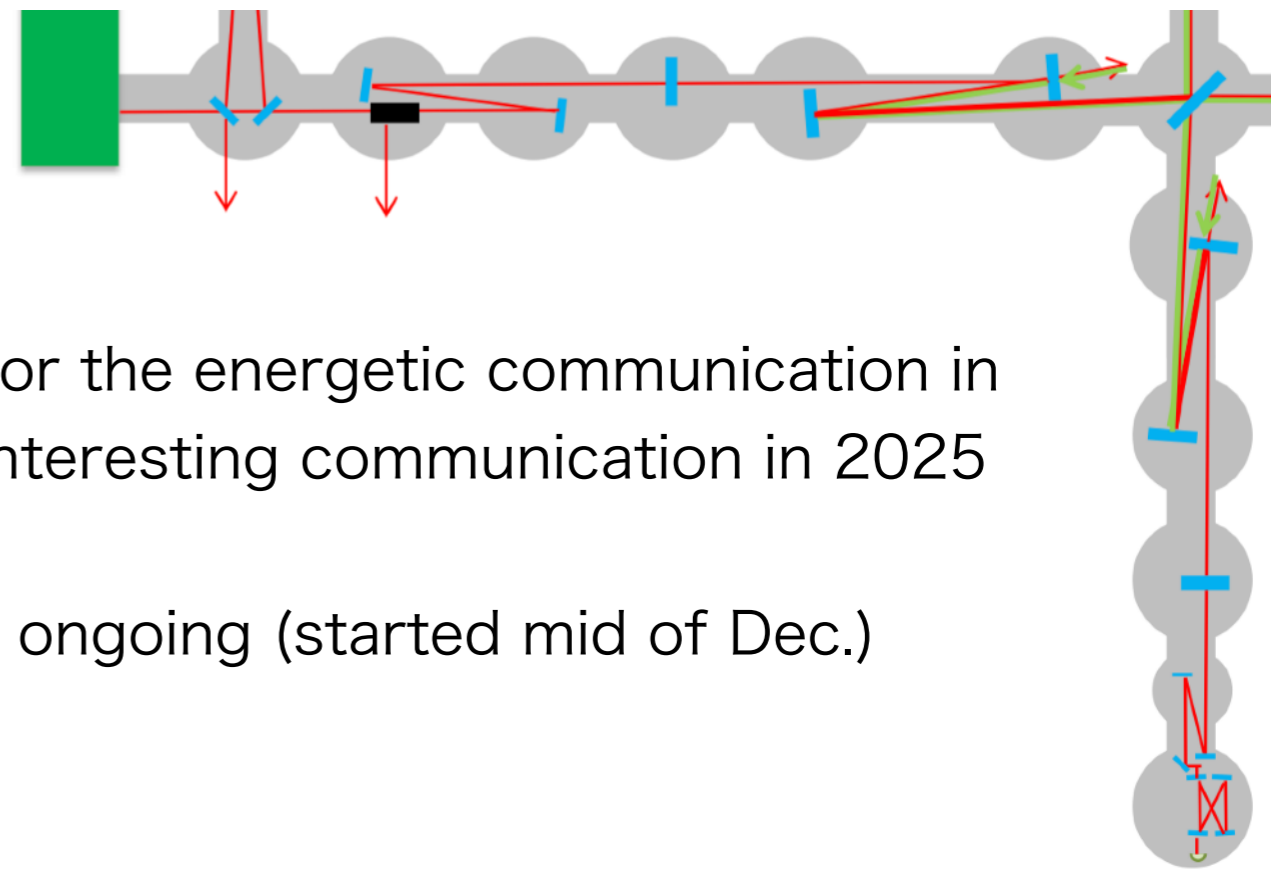


Status of KAGRA

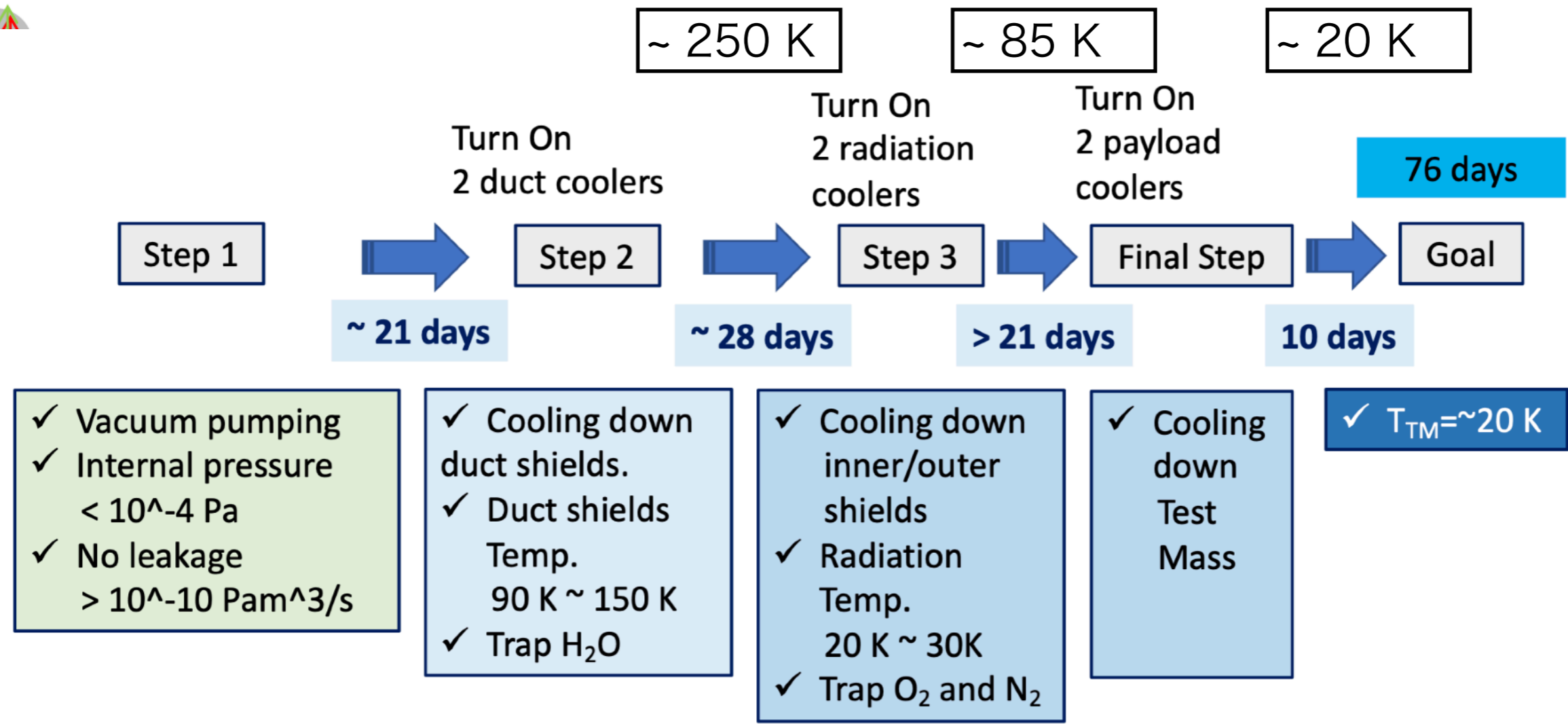
VK PEM meeting 250116
Takaaki Yokozawa



Current status of KAGRA

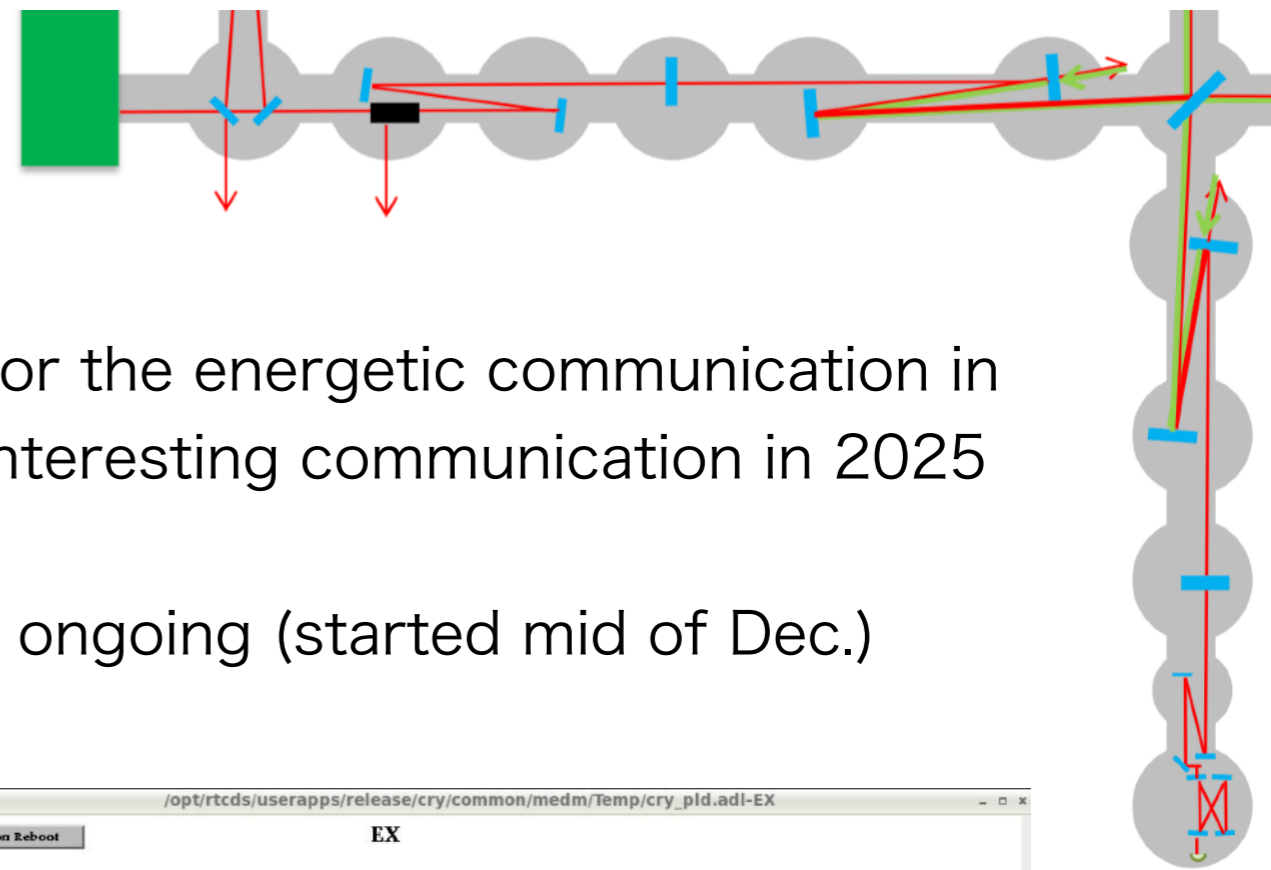


- Happy new year. Thank you very much for the energetic communication in 2024, we hope to have the continuous interesting communication in 2025
- Status of KAGRA
 - Cooling down the Type-A suspension ongoing (started mid of Dec.)
 - For O4b, Step 3 would be the target

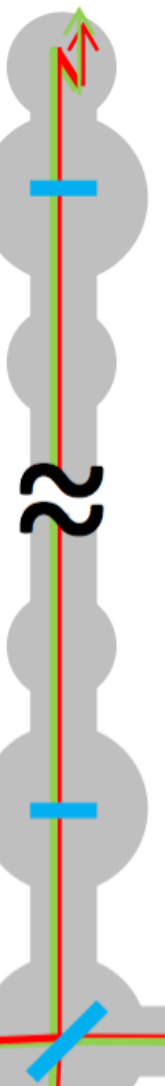
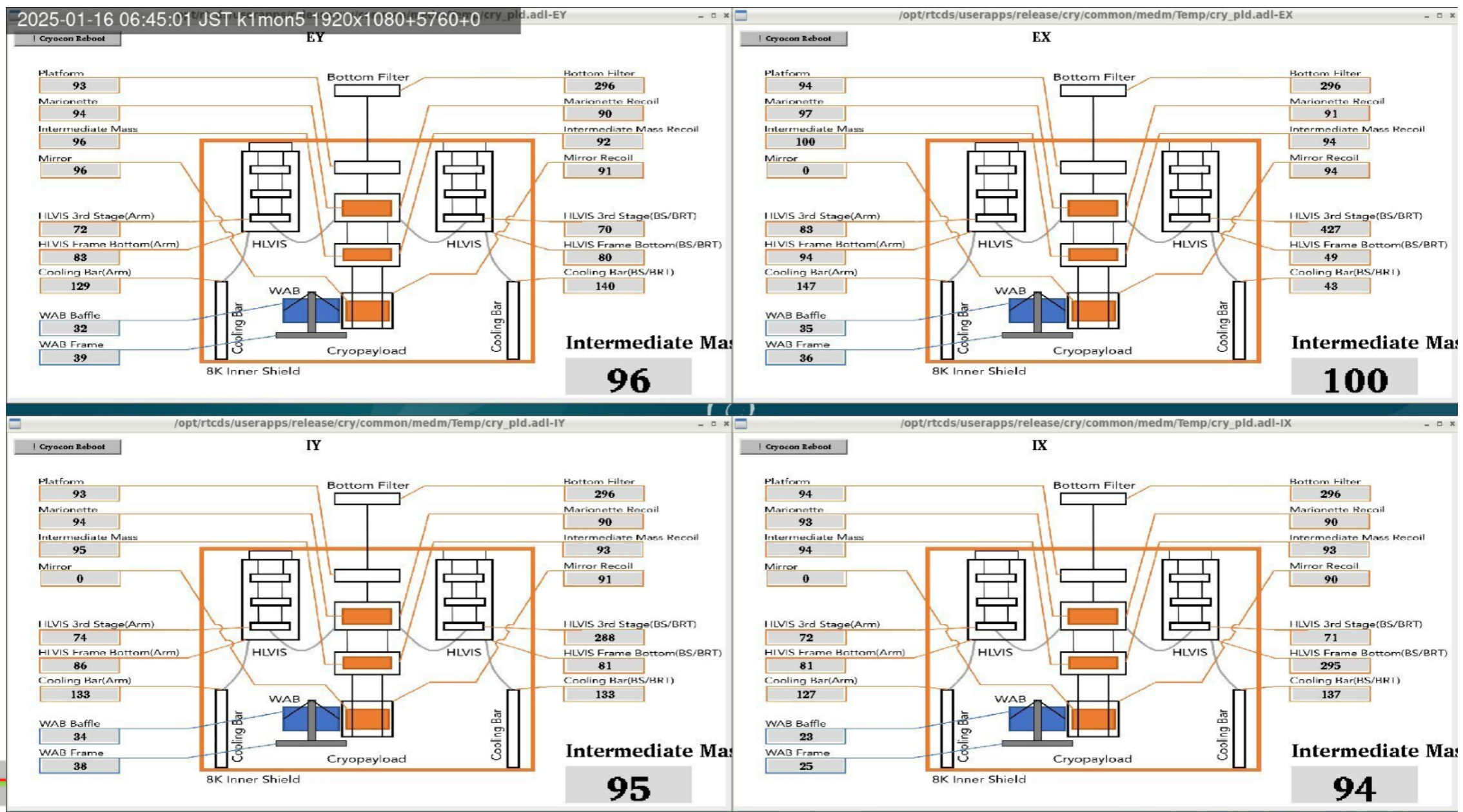




Current status of KAGRA

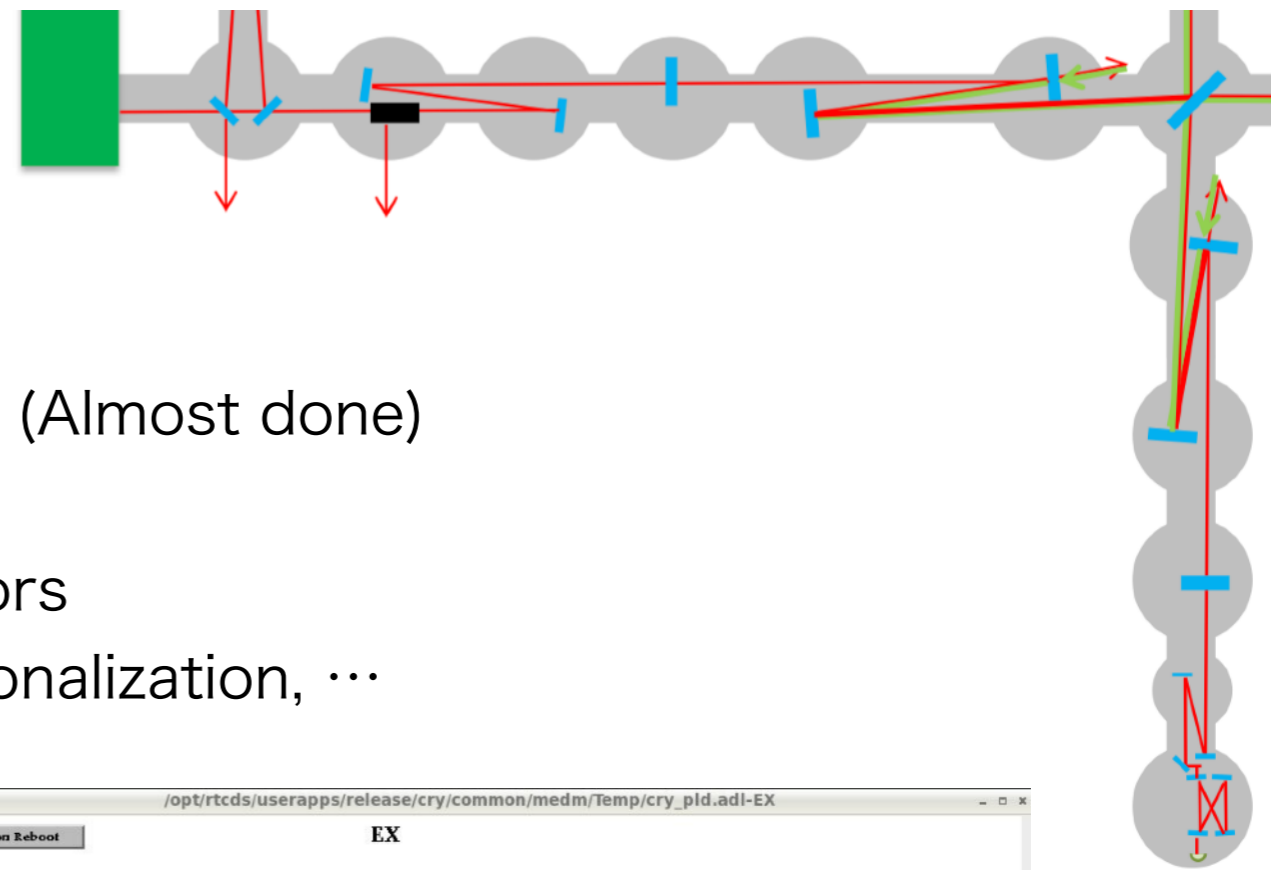


- Happy new year. Thank you very much for the energetic communication in 2024, we hope to have the continuous interesting communication in 2025
- Status of KAGRA :1
 - Cooling down the Type-A suspension ongoing (started mid of Dec.)
 - For O4b, Step 3 would be the target

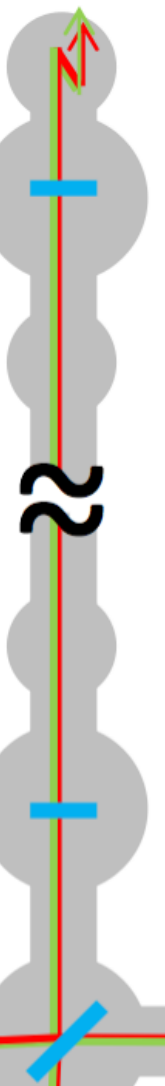
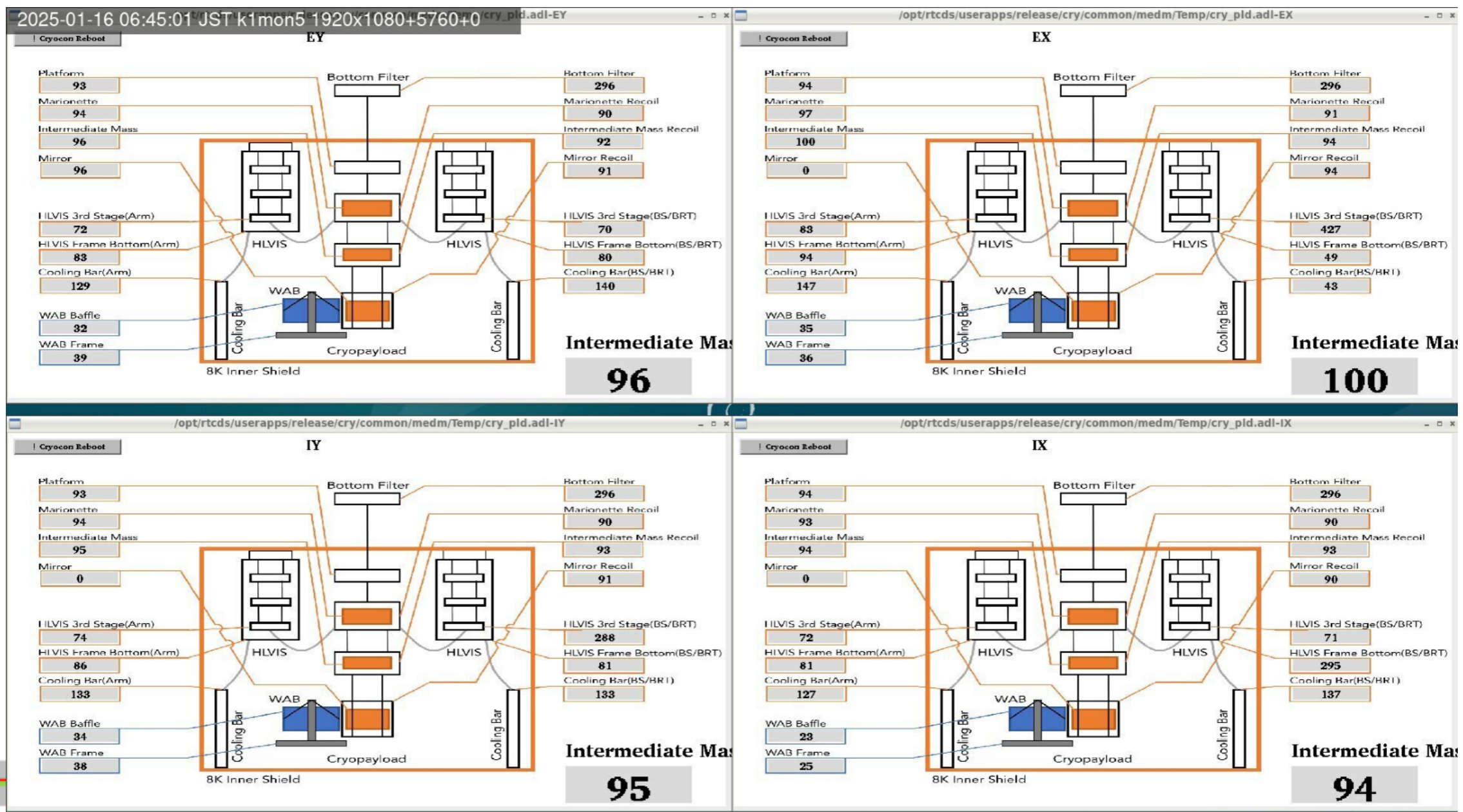




Current status of KAGRA

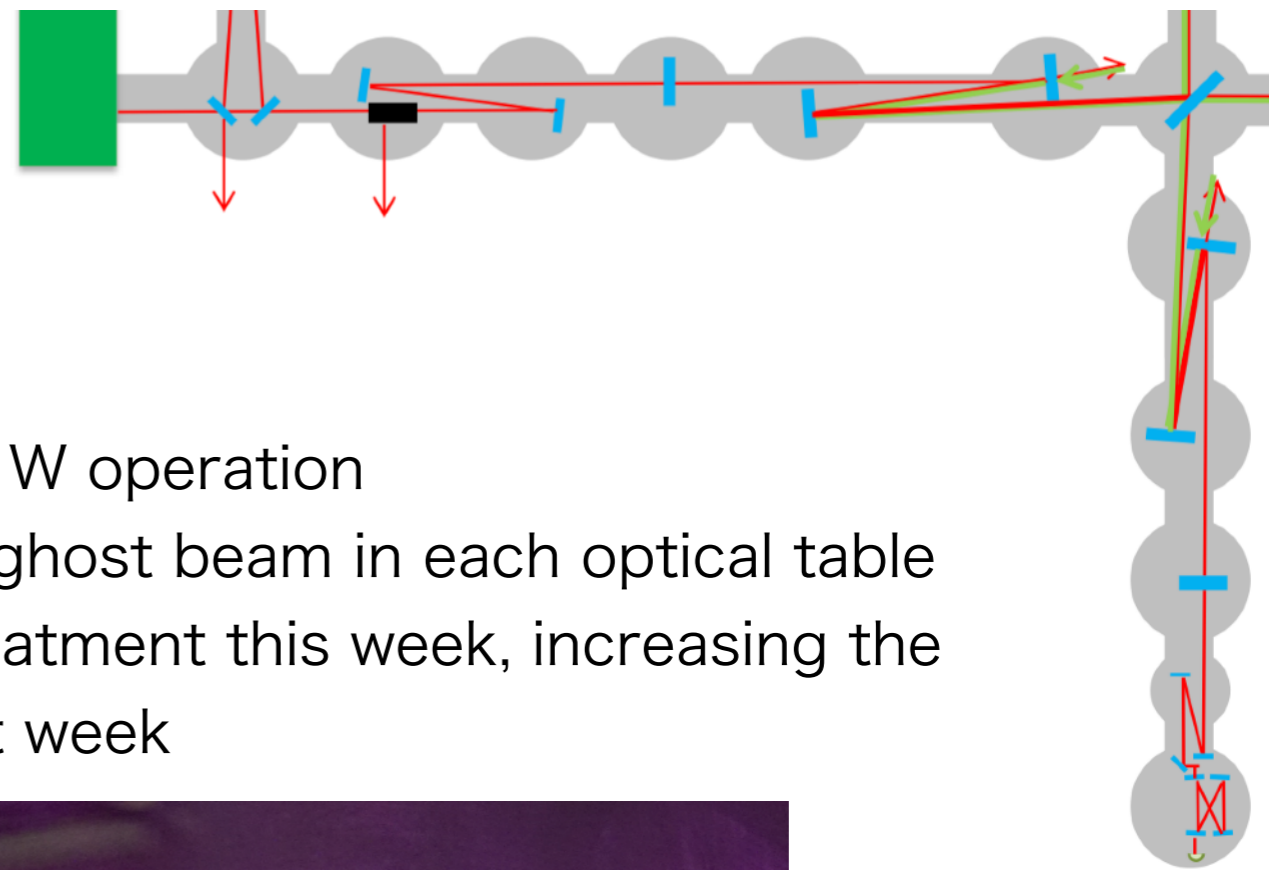


- We need the suspension commissioning (Almost done)
 - Changed the resonant frequency
 - Changed the gain of the photo sensors
 - TM, IM and MN balance, sensor diagonalization, ...

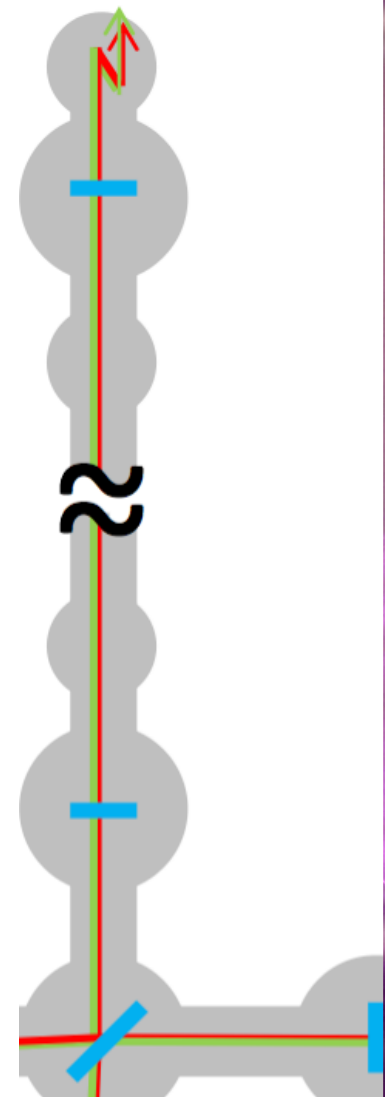
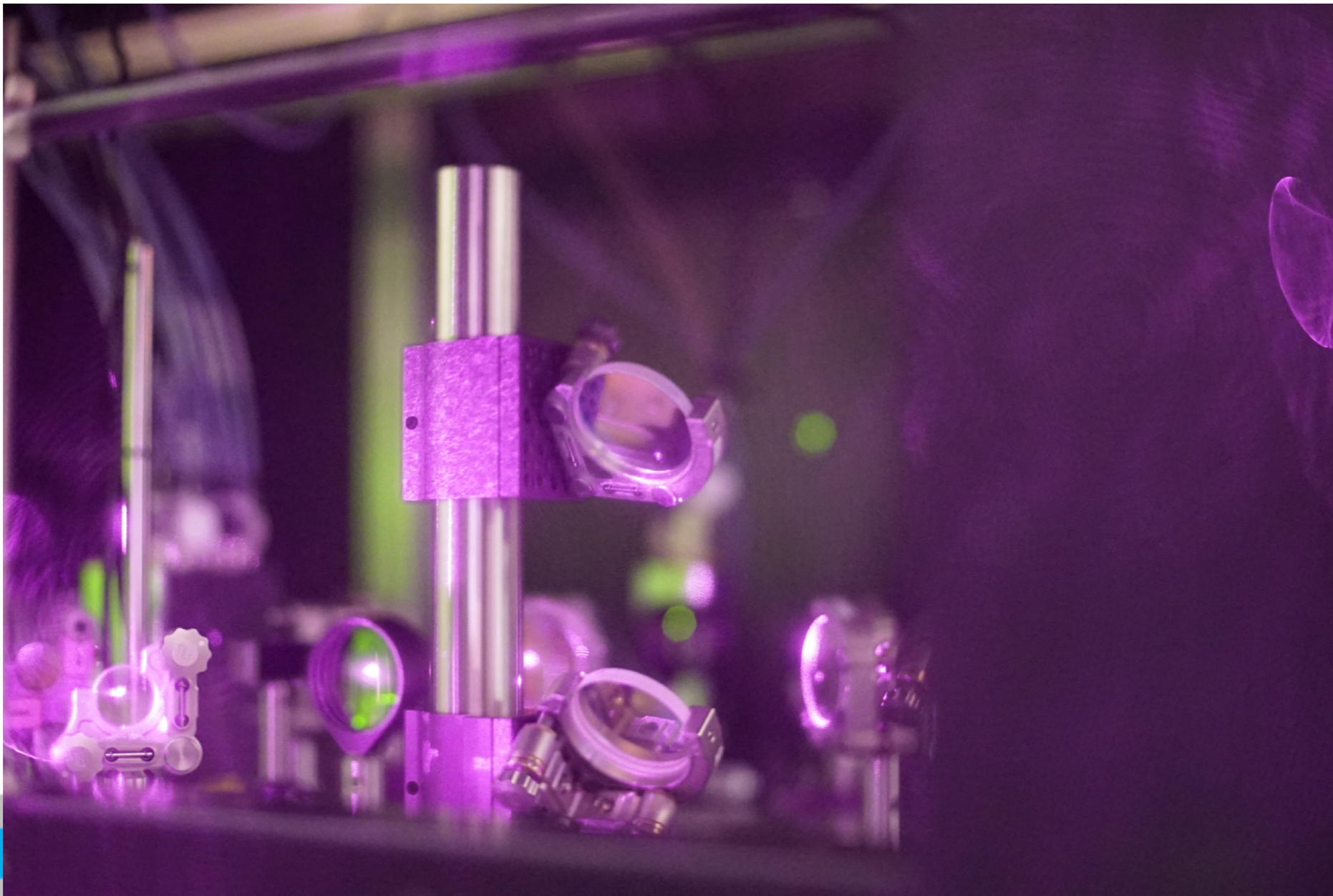




Current status of KAGRA

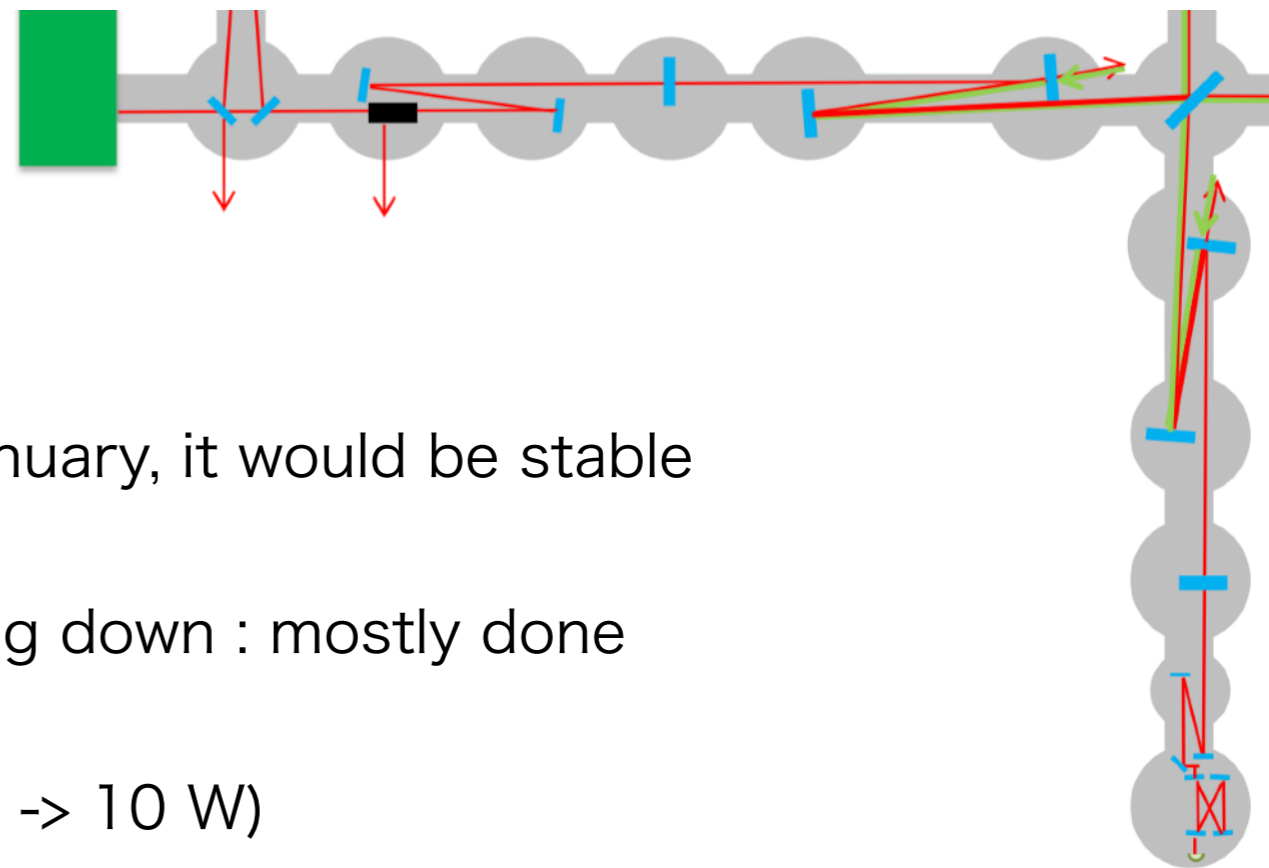


- Status of KAGRA 2:
- Prepared towards the 10 W operation
 - Output from IMC, now (and O4a) 1.3 W operation
 - Treat the beam path, saturation and ghost beam in each optical table
 - Plan to complete the optical table treatment this week, increasing the IMC output laser power to 10 W next week

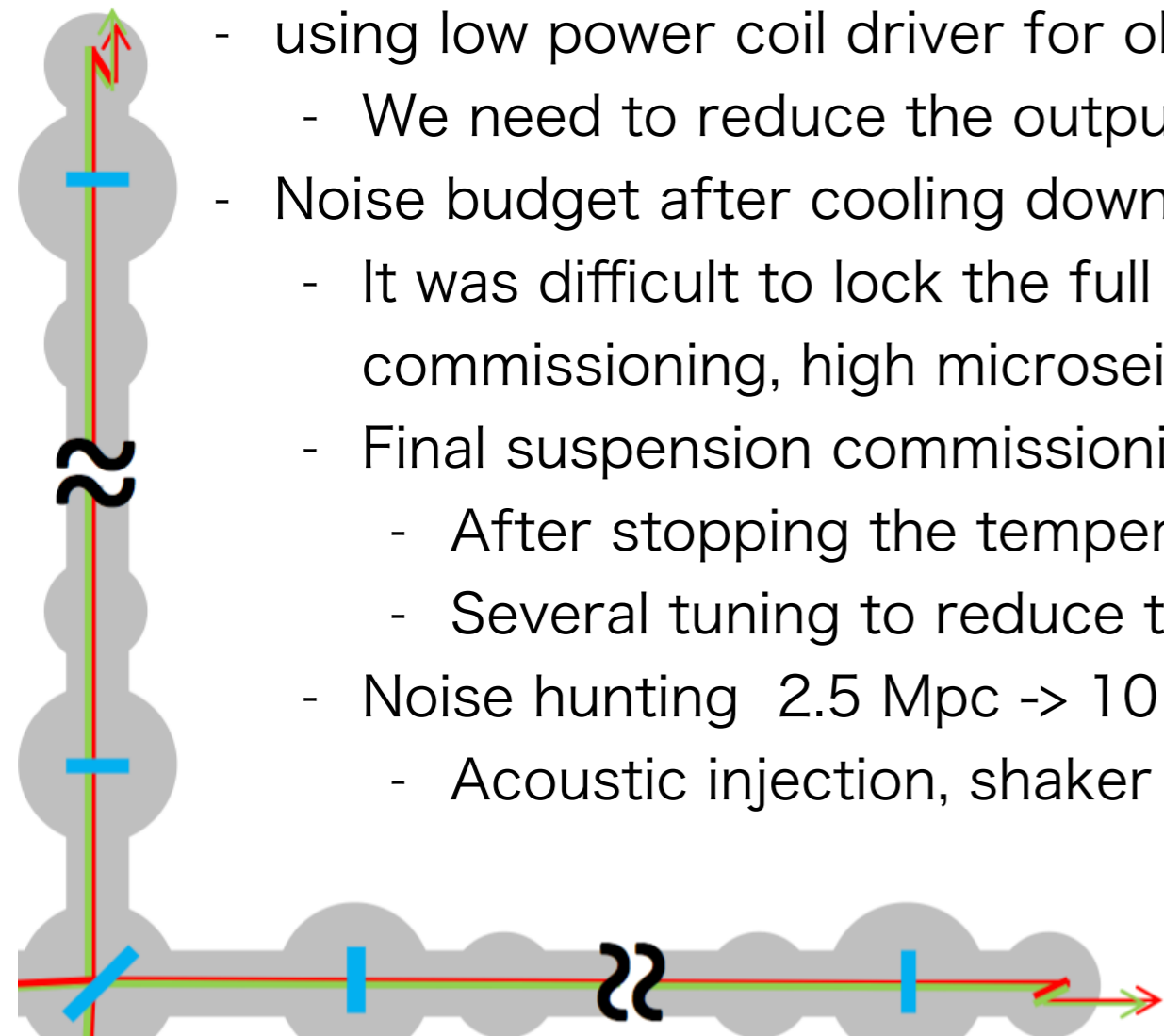




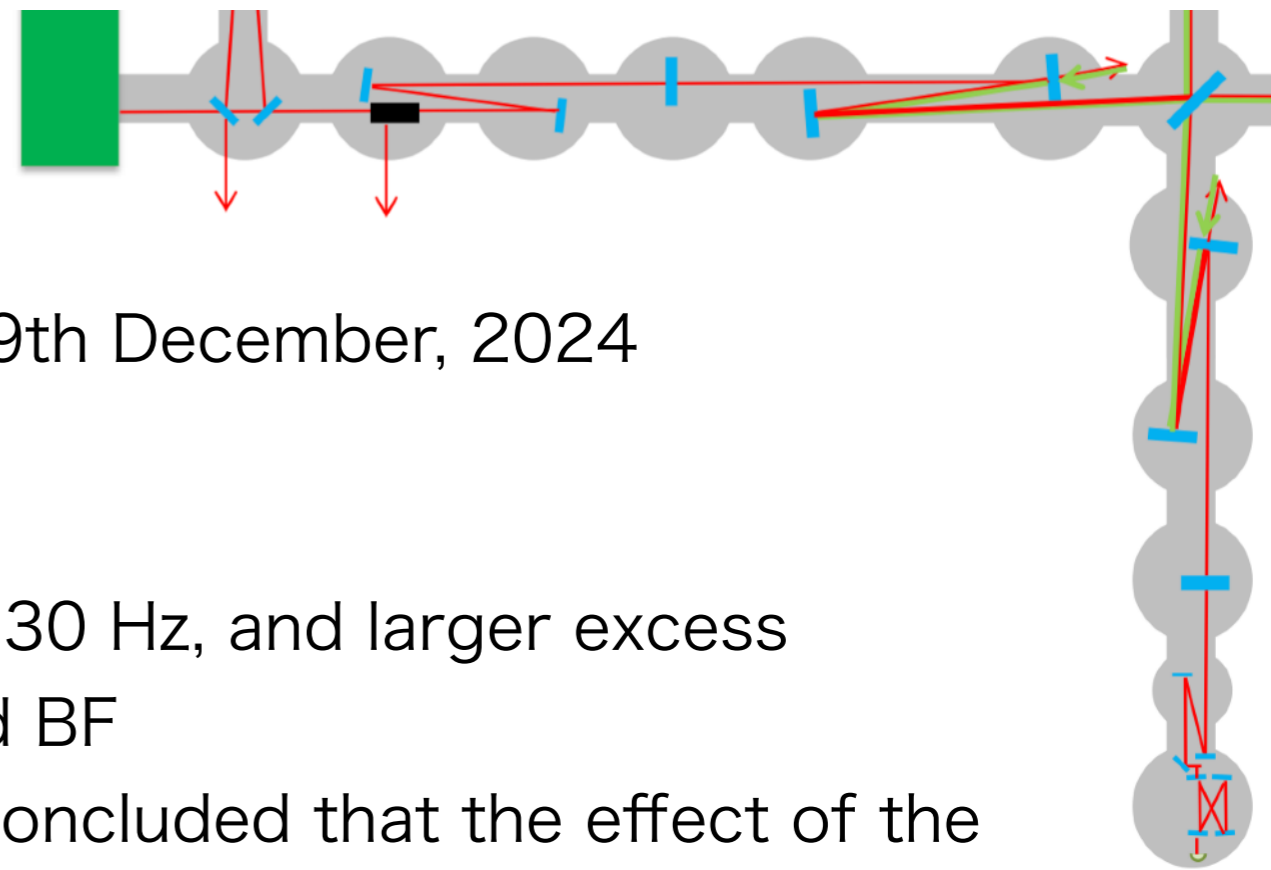
Schedule of the KAGRA



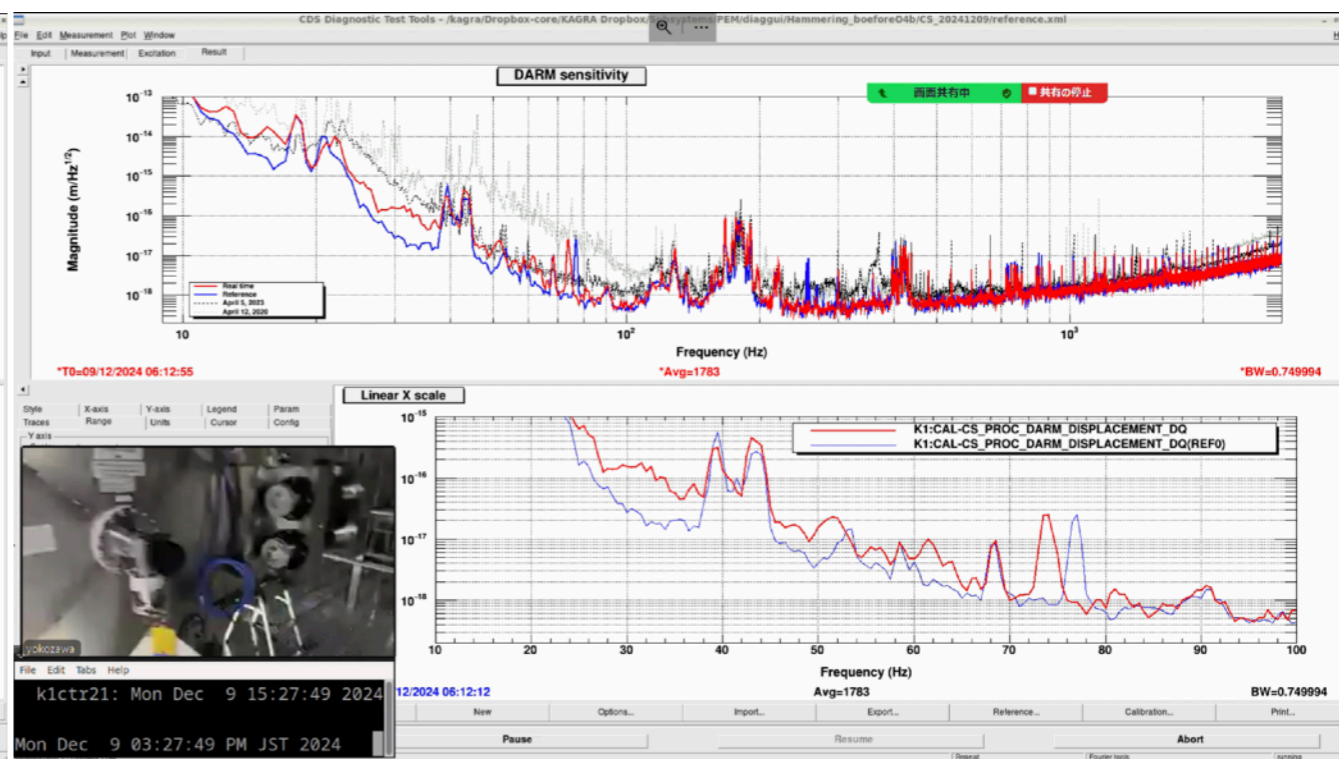
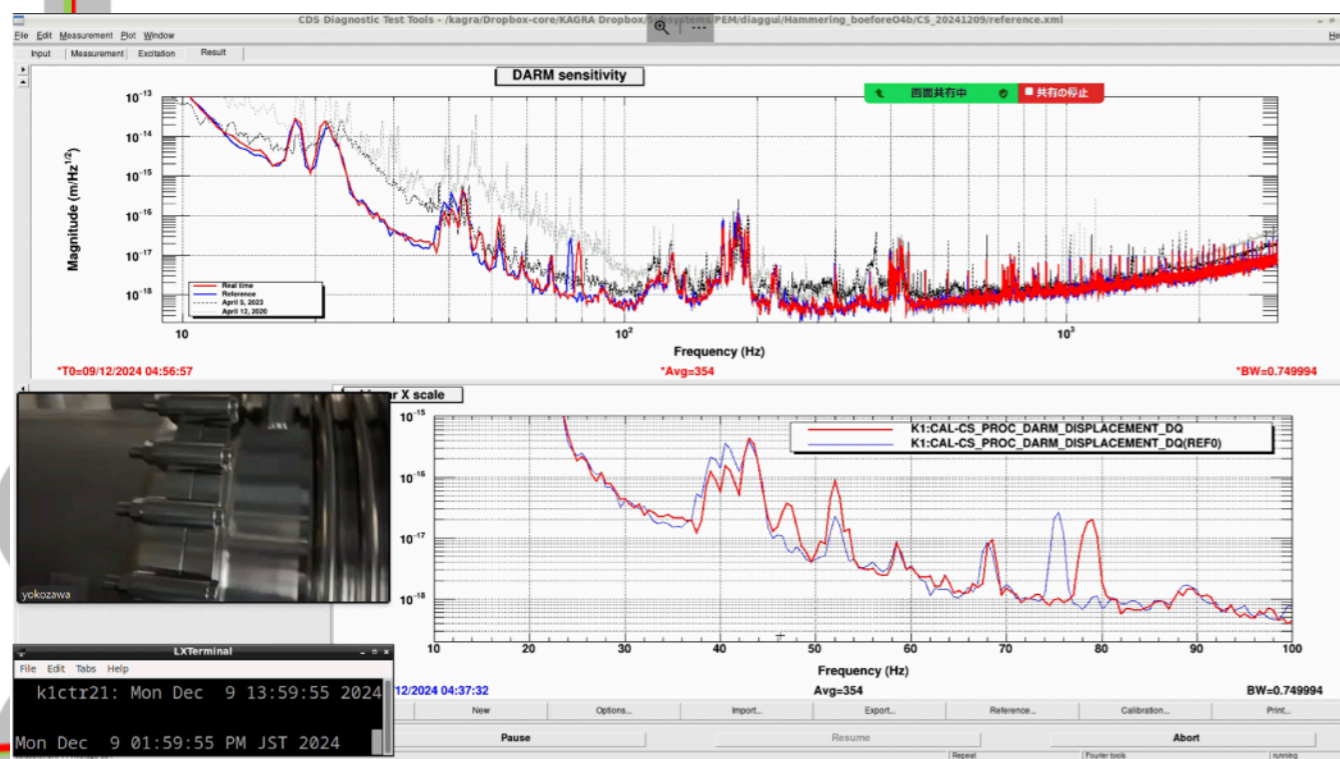
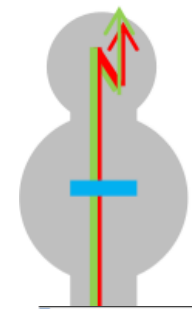
- Cooling down
 - Start mid. of Dec last year, end of January, it would be stable temperature, ~85 K.
 - Suspension commissioning for cooling down : mostly done
- Increasing the laser power
 - Target 10 W output from IMC (1.3 W -> 10 W)
 - This week and next week (up to 24th January)
- using low power coil driver for observation (Soon)
 - We need to reduce the output circuit noise to TM.
- Noise budget after cooling down, increasing laser power and so on
 - It was difficult to lock the full IFO after new year (due to suspension commissioning, high microseismic, limiting time)
 - Final suspension commissioning toward the stable observation
 - After stopping the temperature
 - Several tuning to reduce the sensor noise
 - Noise hunting 2.5 Mpc -> 10 Mpc February and March
 - Acoustic injection, shaker injection, magnetic injection, ...



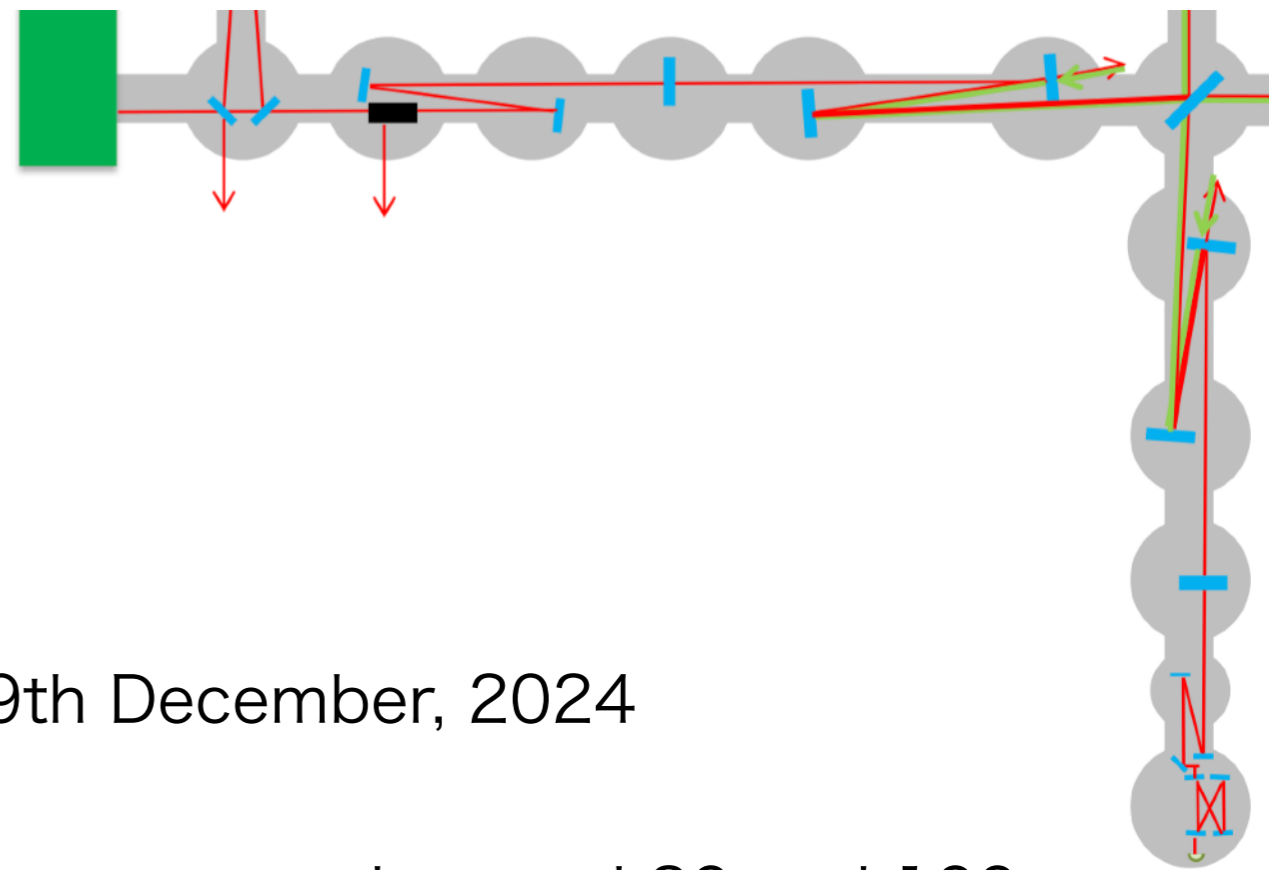
Tapping test



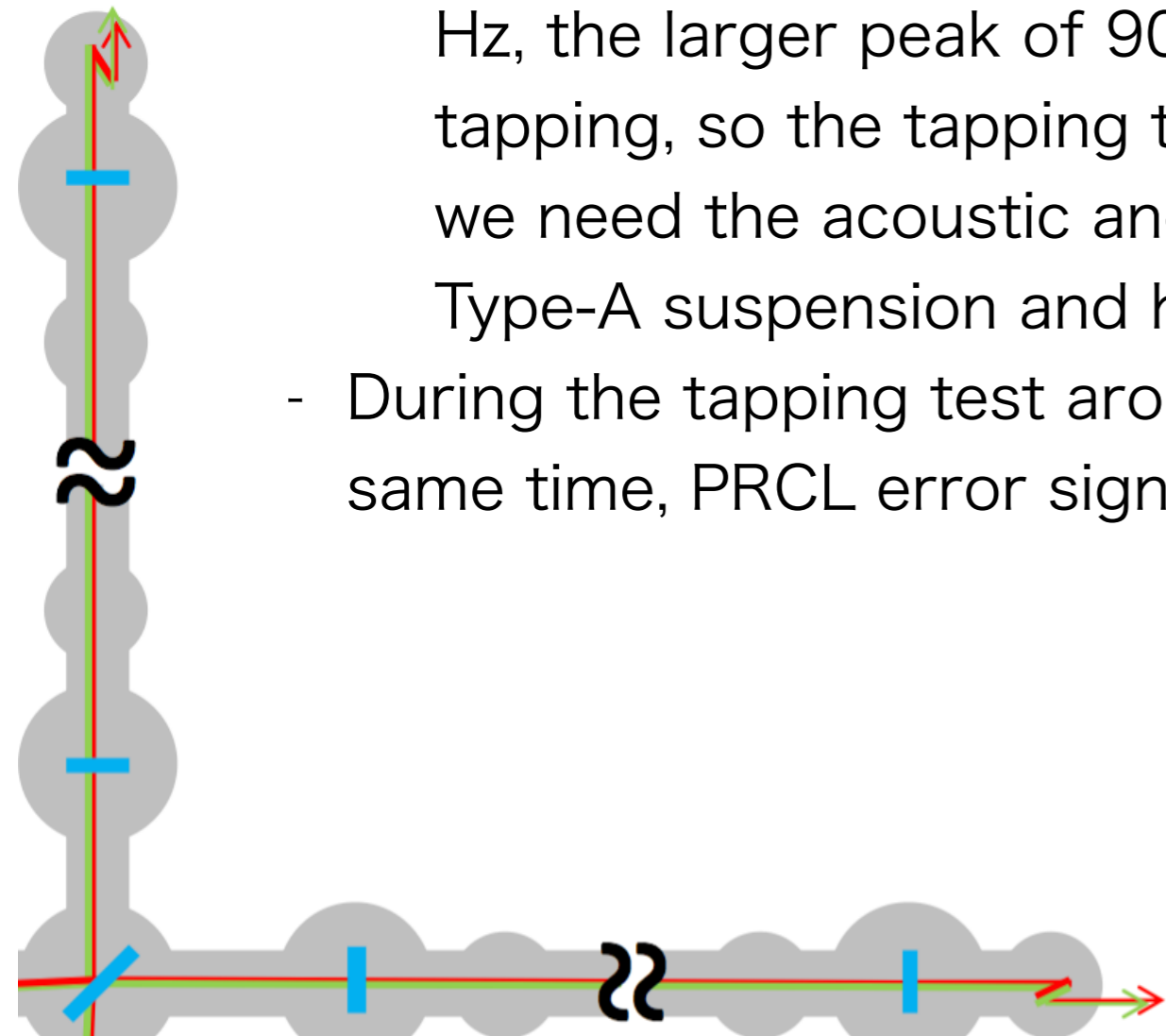
- Tapping test performed the week of 9th December, 2024
 - Xend, Yend (klog31887)
 - Xfront, Yfront, BS (klog31952)
 - There are some excess around 30 Hz, and larger excess detected the beam duct around BF
 - By the shaker injection, we concluded that the effect of the linear coupling from vibration to DARM was small, but the low frequency by tapping test may affect the DARM sensitivity
 - The beam duct near the BS also detected the large excess, similar with Type-A results



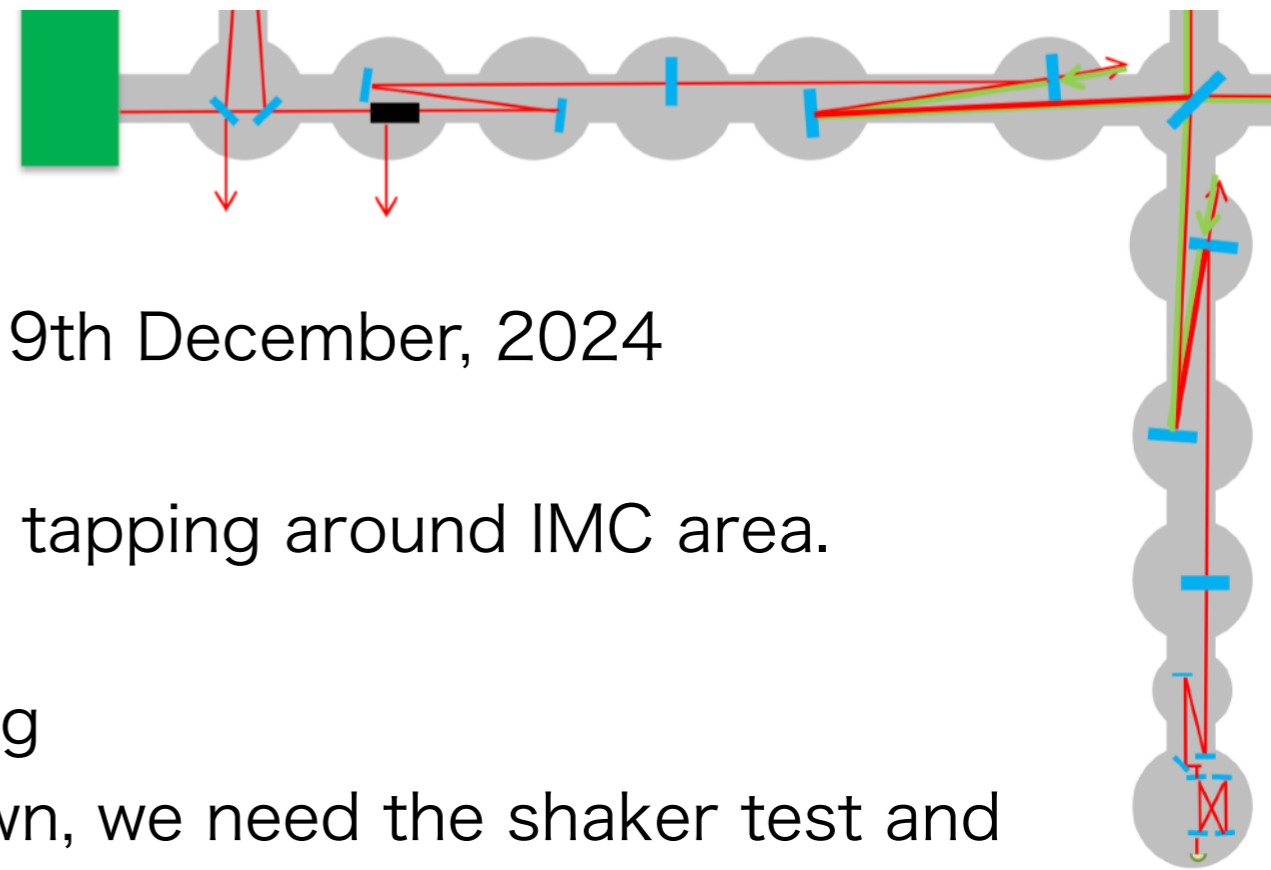
Tapping test



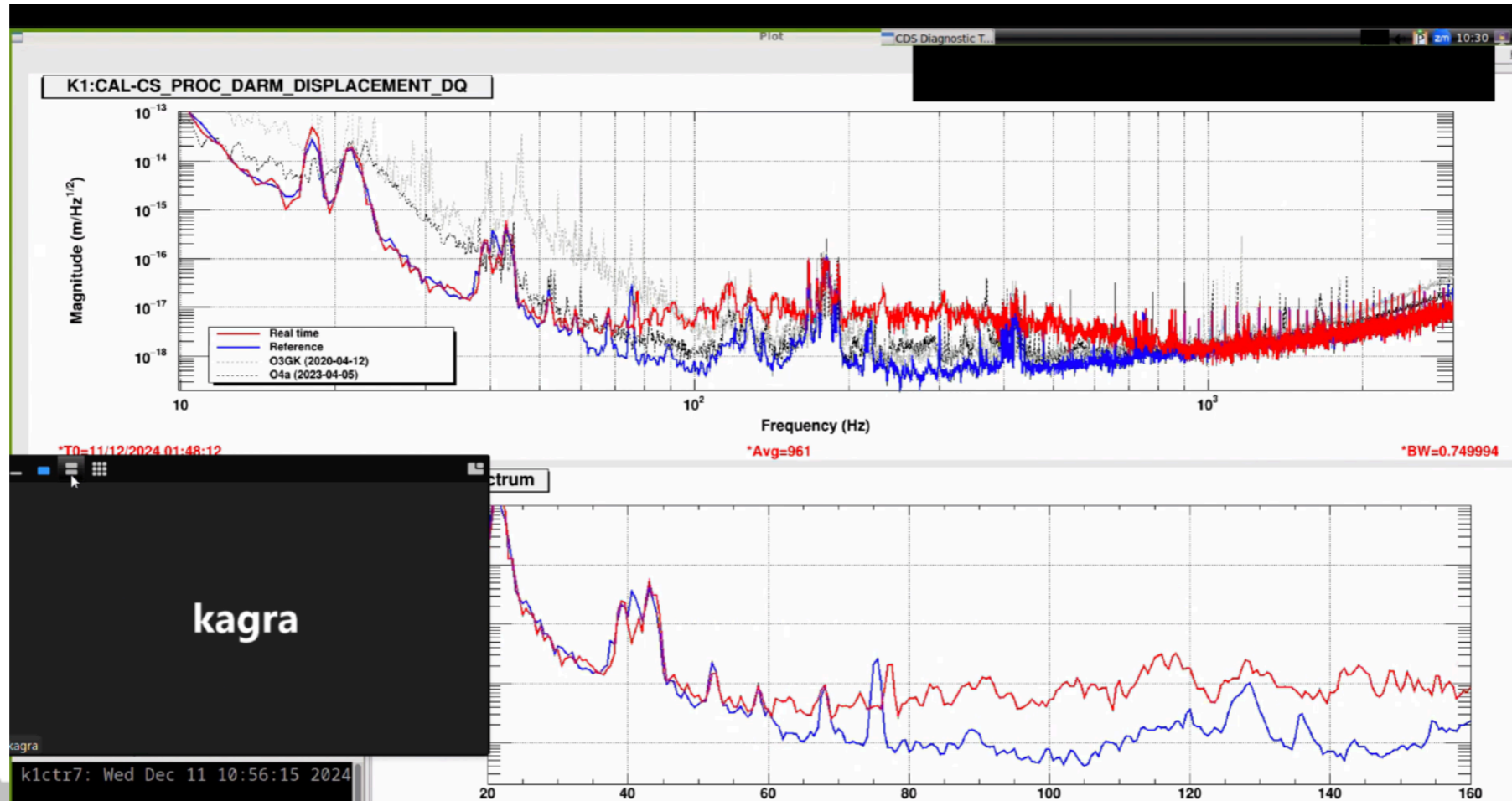
- Tapping test performed the week of 9th December, 2024
 - BS, SR, OMC ([klog31964](#))
 - When tapped near the OMC, large excess detected 80 and 100 Hz, the larger peak of 90 Hz appeared in OMC LSC error when tapping, so the tapping test would be too strong for OMC area, we need the acoustic and shaker injection test after cooling the Type-A suspension and high power operation
 - During the tapping test around BS, larger excess detected, at the same time, PRCL error signal and IP at BS also excess



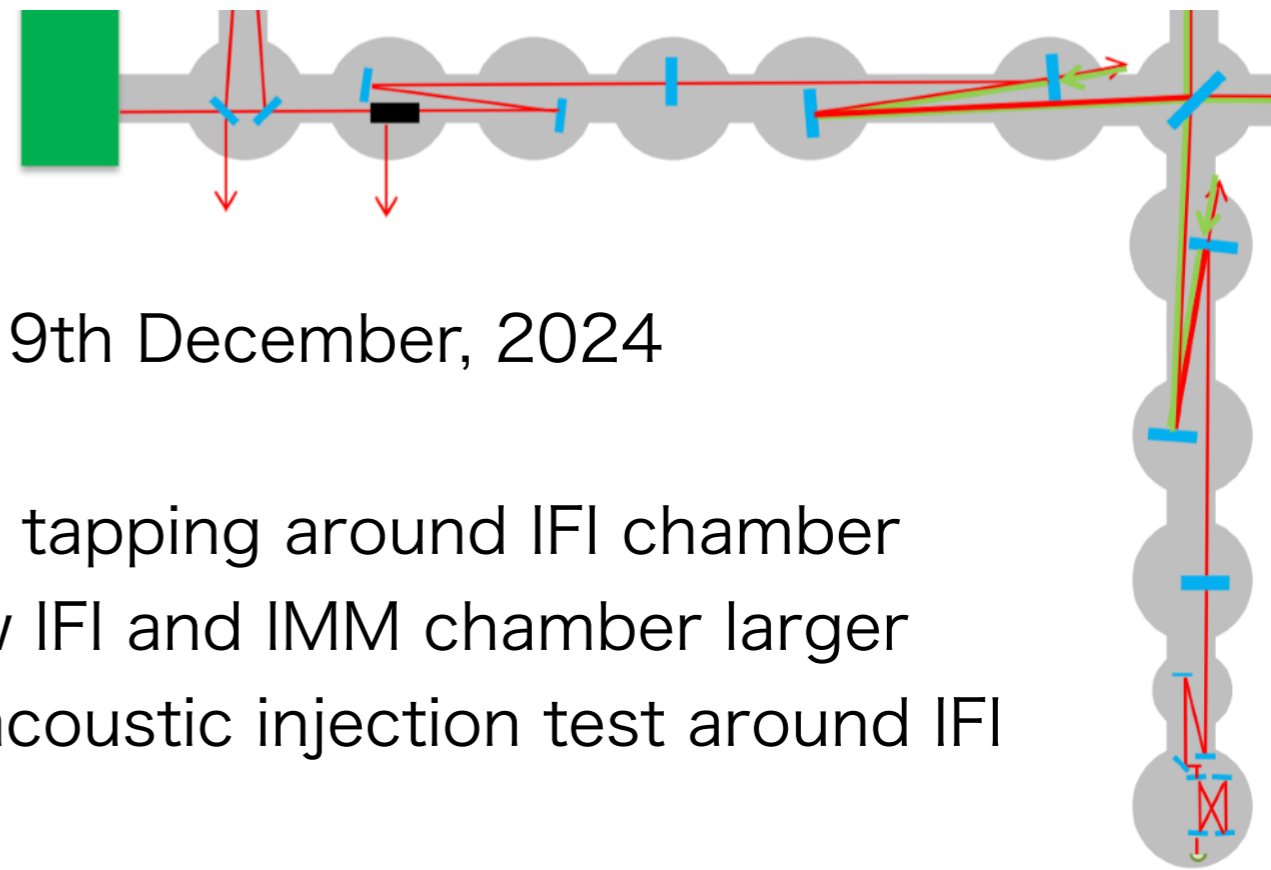
Tapping test



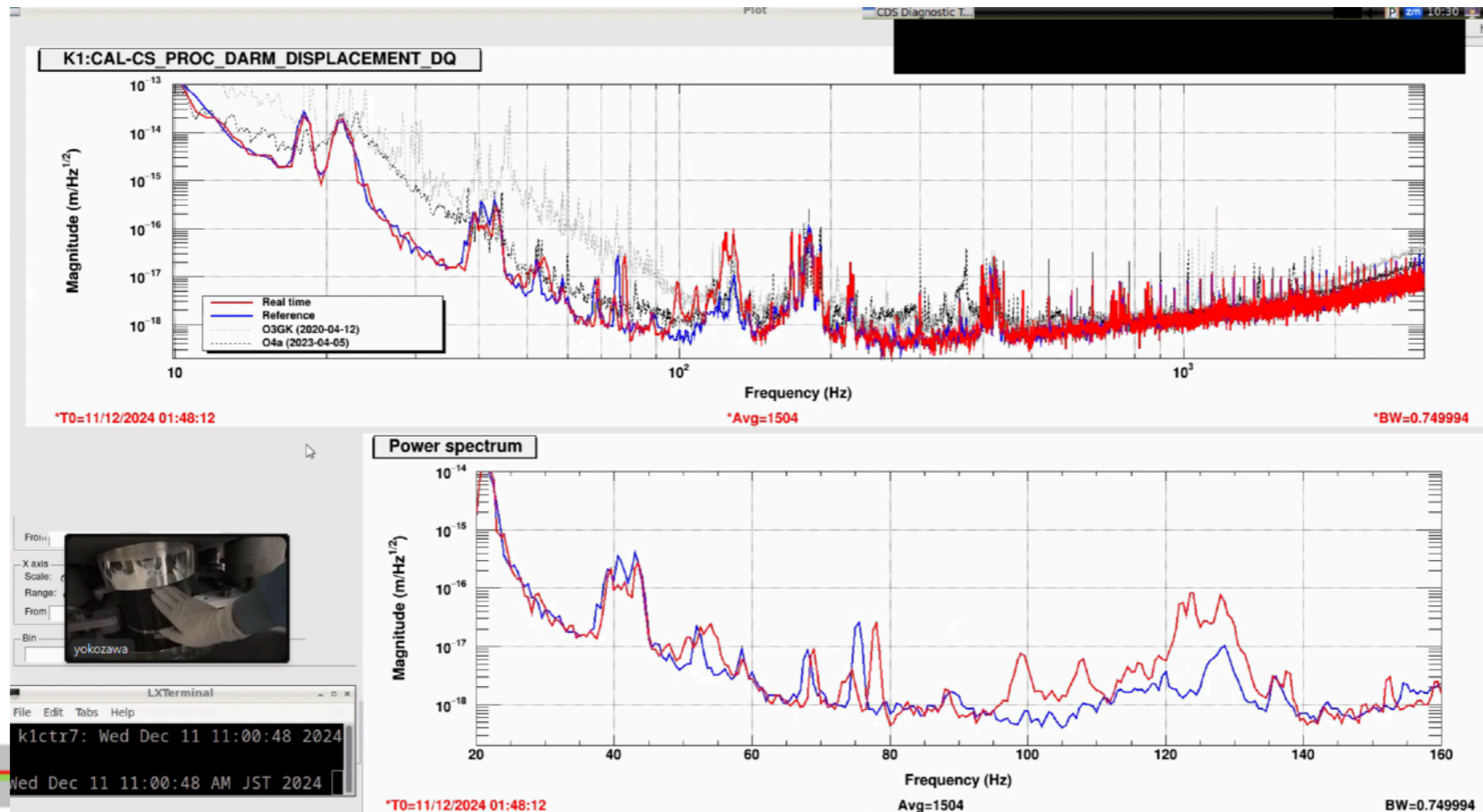
- Tapping test performed the week of 9th December, 2024
 - IMC, IFI, IMM, PR ([klog31978](#))
 - There are several excess when tapping around IMC area.
 - Chamber tapping affects
 - Stack bellows leg < chamber leg
 - Still the noise path was unknown, we need the shaker test and check with various IMC control signals.



Tapping test

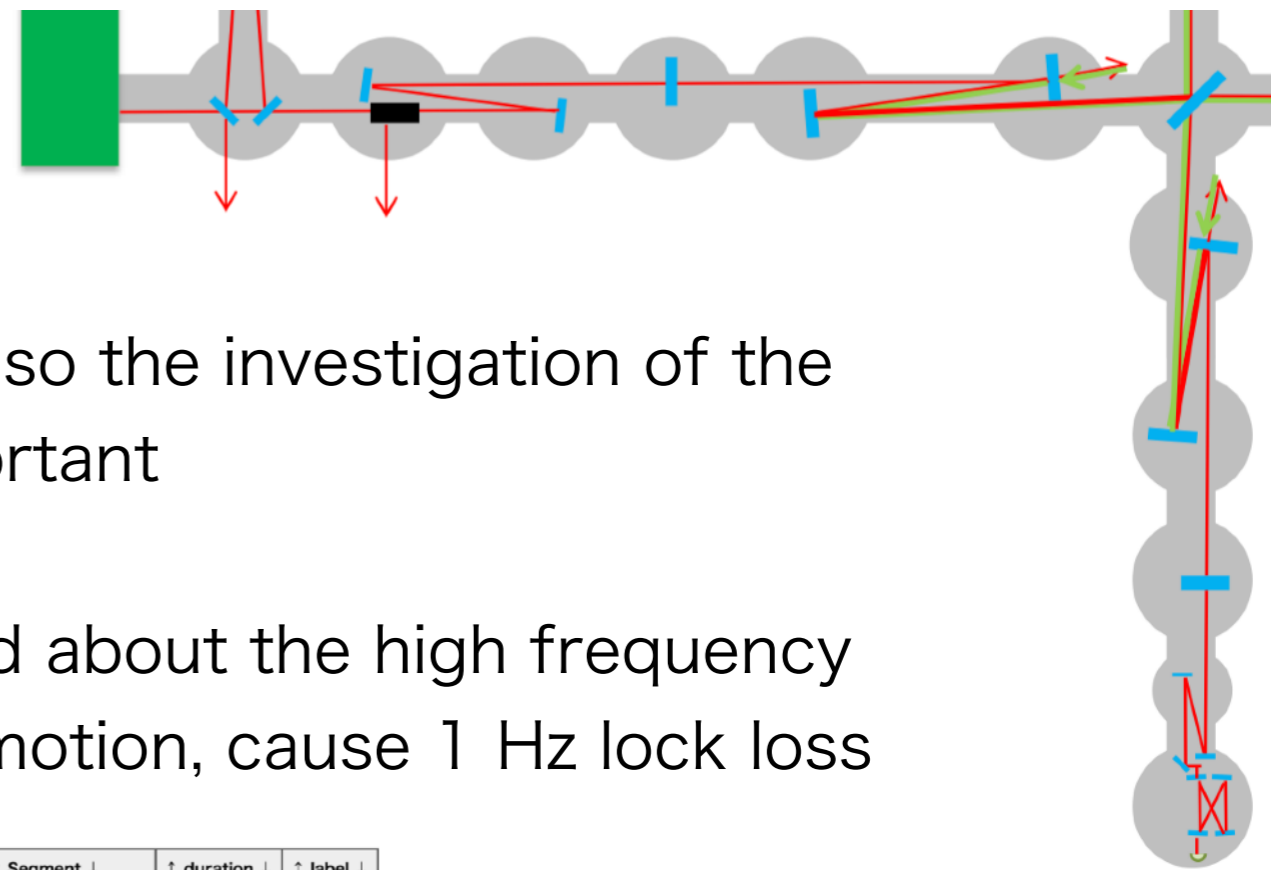


- Tapping test performed the week of 9th December, 2024
 - IMC, IFI, IMM, PR (klog31978)
 - There are several excess when tapping around IFI chamber
 - Bellows leg and beam duct btw IFI and IMM chamber larger
 - We also need the shaker and acoustic injection test around IFI chamber
 - 127 Hz peak can also detected in IMMT1 TRANS QPD2, especially pitch direction





Ground motion



- KAGRA constructed in underground, so the investigation of the ground motion at KAGRA site is important
 - Ground motion from fault (?)
 - Now, Ozaki-san(Aogaku) studied about the high frequency ground motion, so called fault motion, cause 1 Hz lock loss

ID:1

↑ ID ↓	↑ lockloss GPS ↓	↑ JST ↓	↑ Segment ↓	↑ duration ↓	↑ label ↓
1	1368959220	2023-05-24 19:26:42 JST	1368957619,1368959220	1601	1Hz

