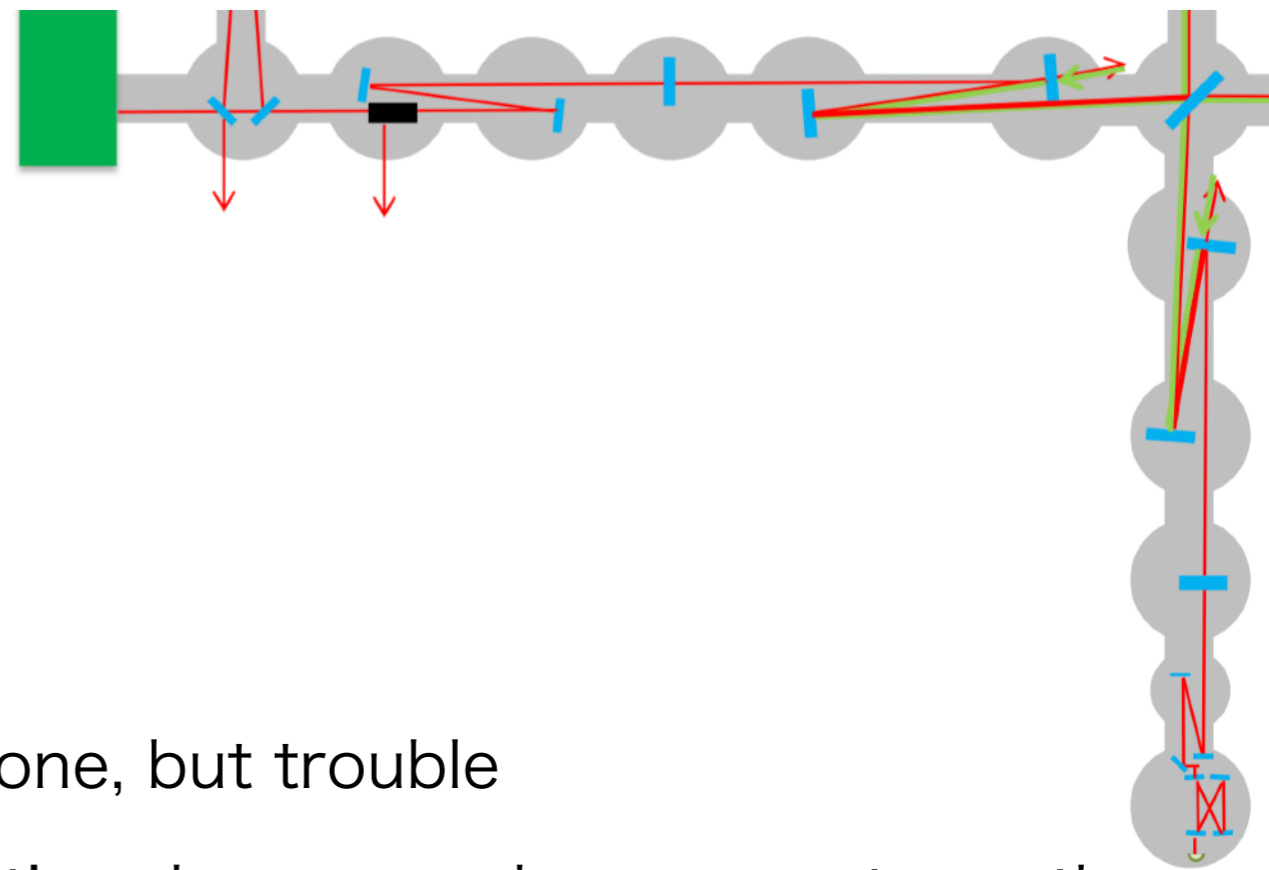
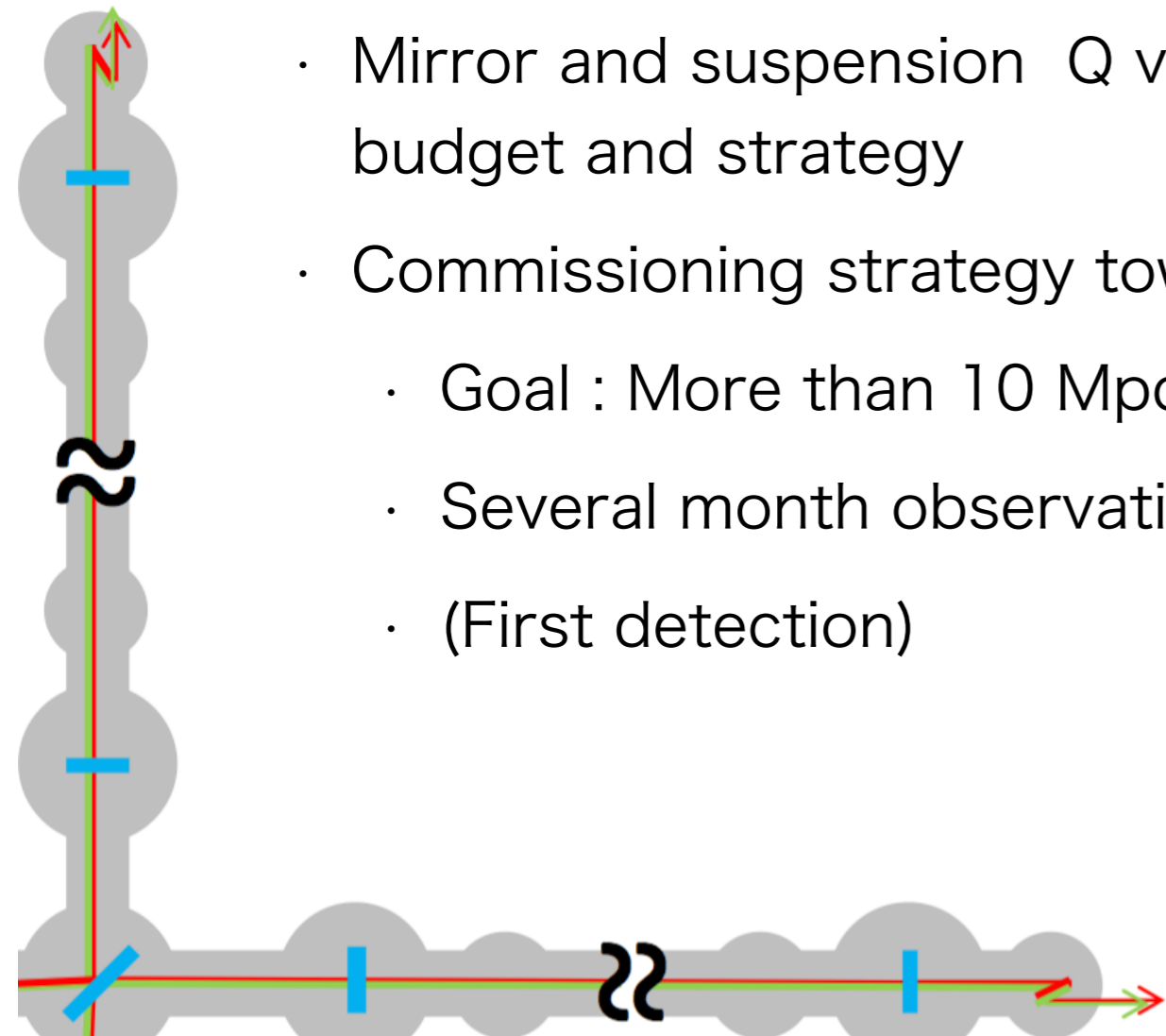


KAGRA status

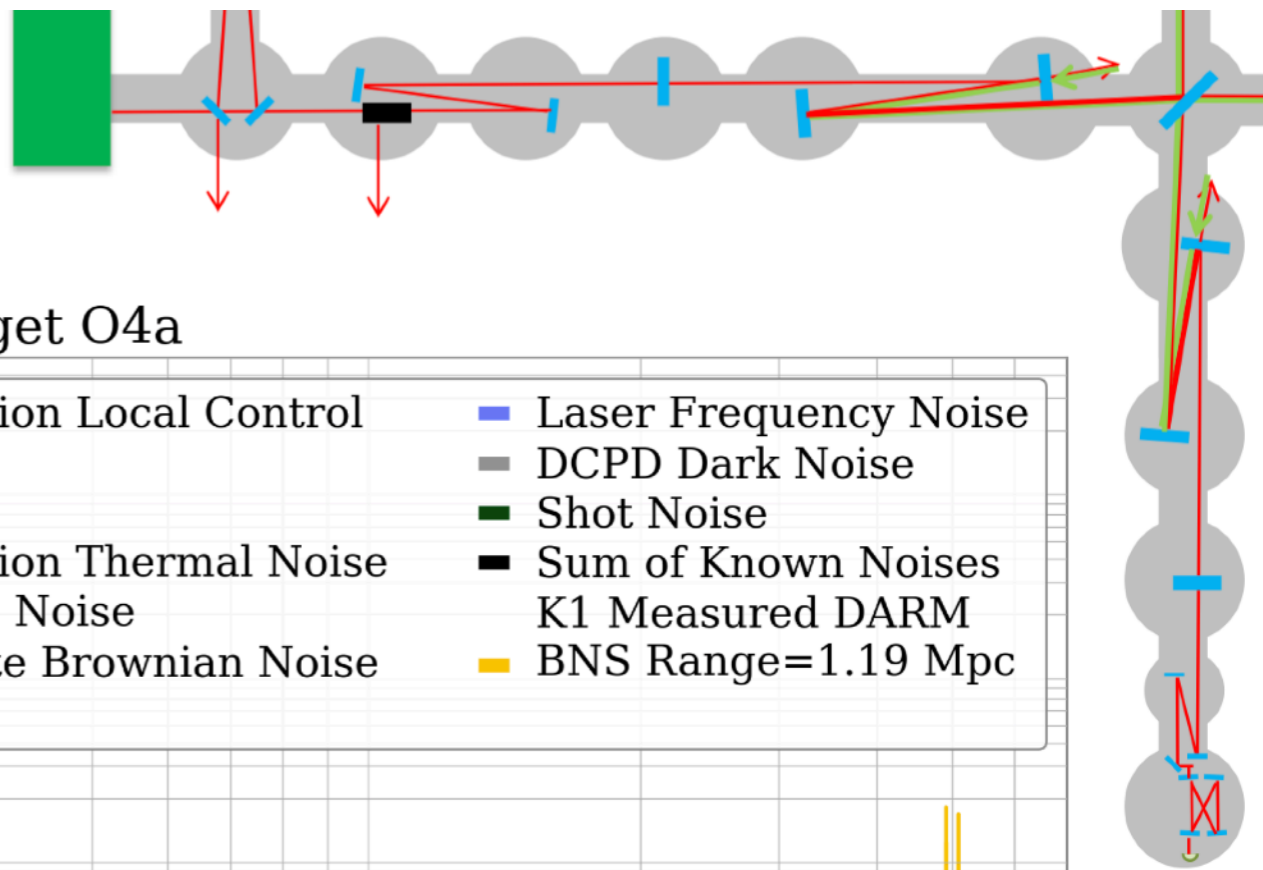


- After O4a
 - Cooling down : Ongoing
 - Replace new high power laser : Done, but trouble
 - OMC treatment : Stray light mitigation done, new damper next month
 - Mirror and suspension Q value measurement : ongoing for noise budget and strategy
 - Commissioning strategy toward O4b
 - Goal : More than 10 Mpc next spring (April?)
 - Several month observation
 - (First detection)

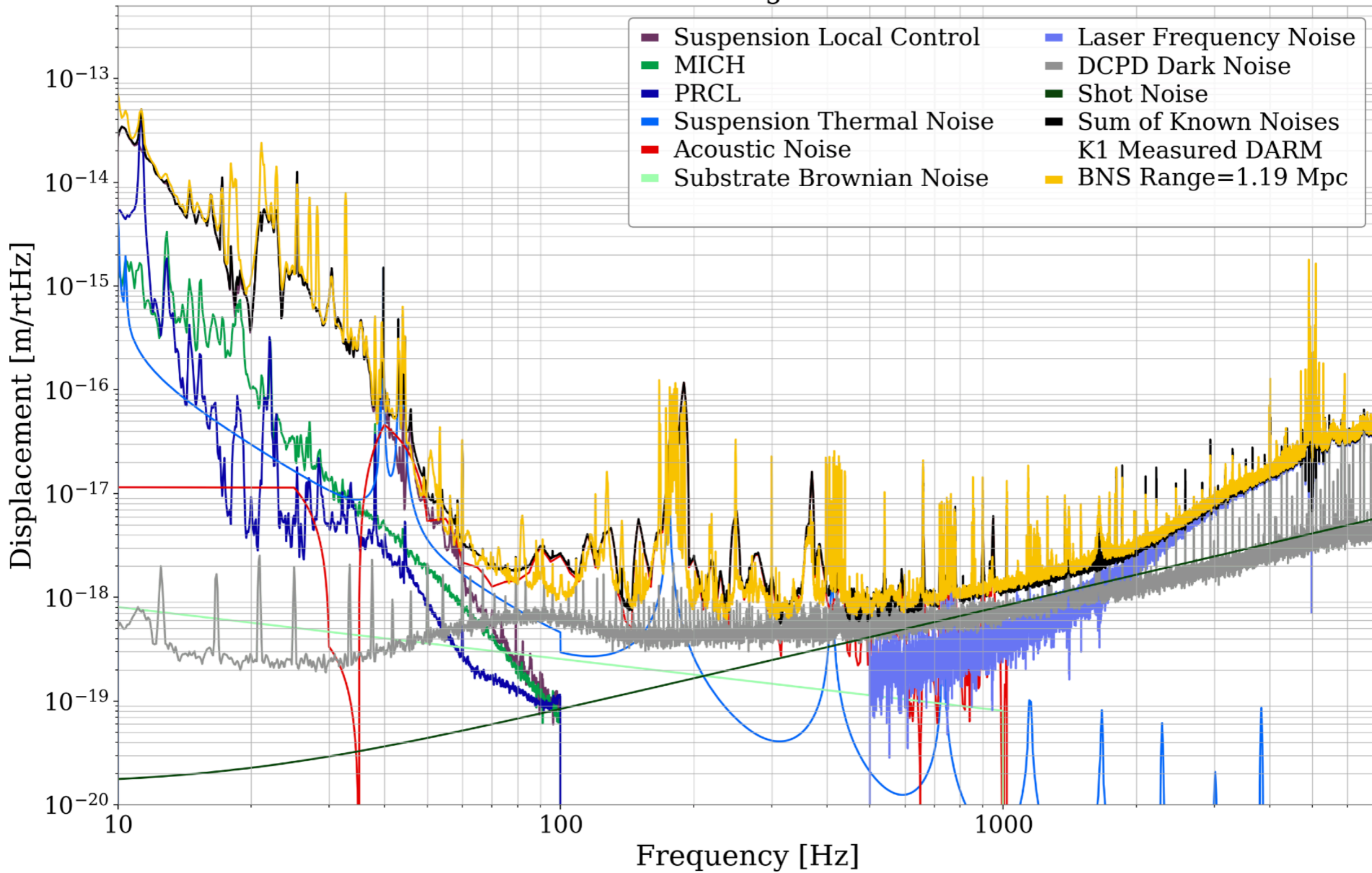




Noise budget O4a

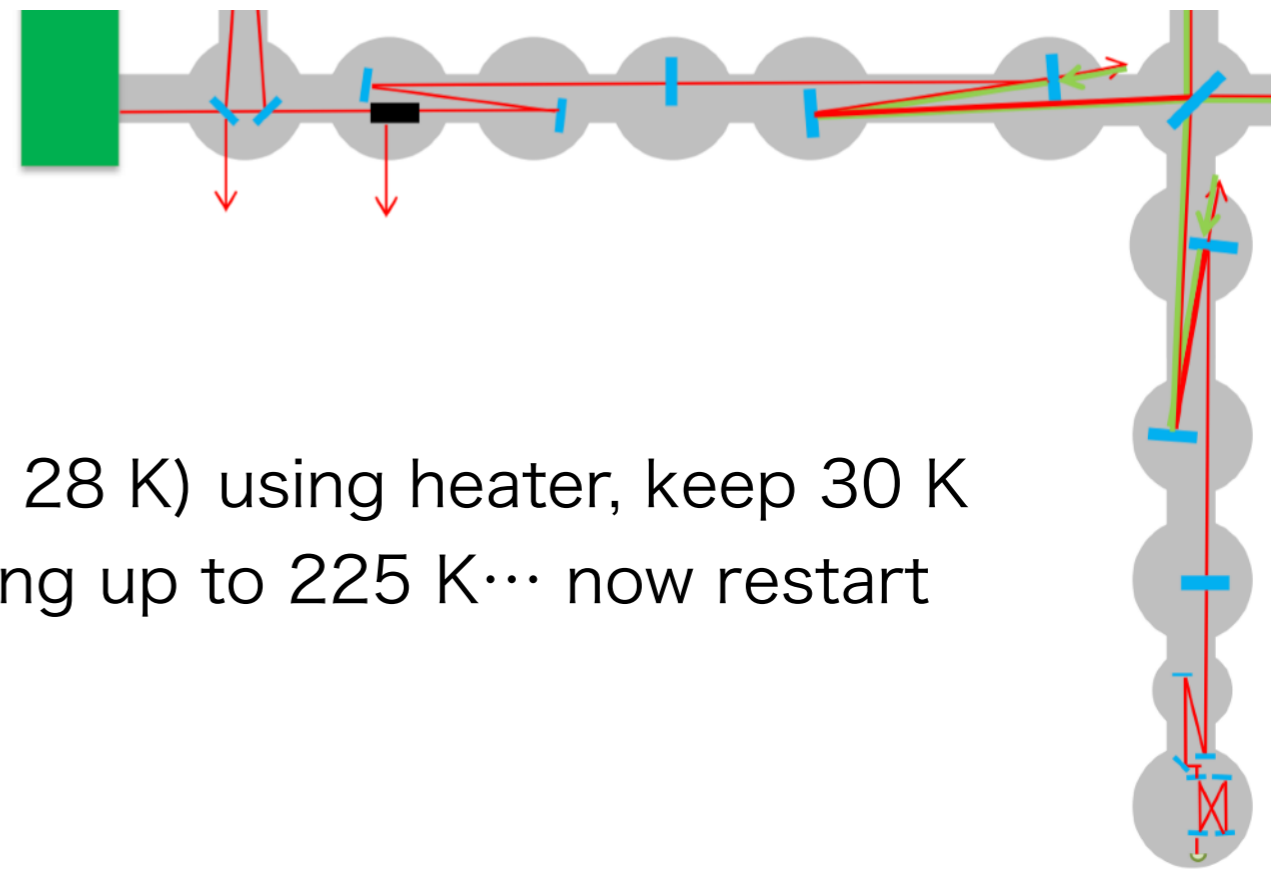


Noise Budget O4a

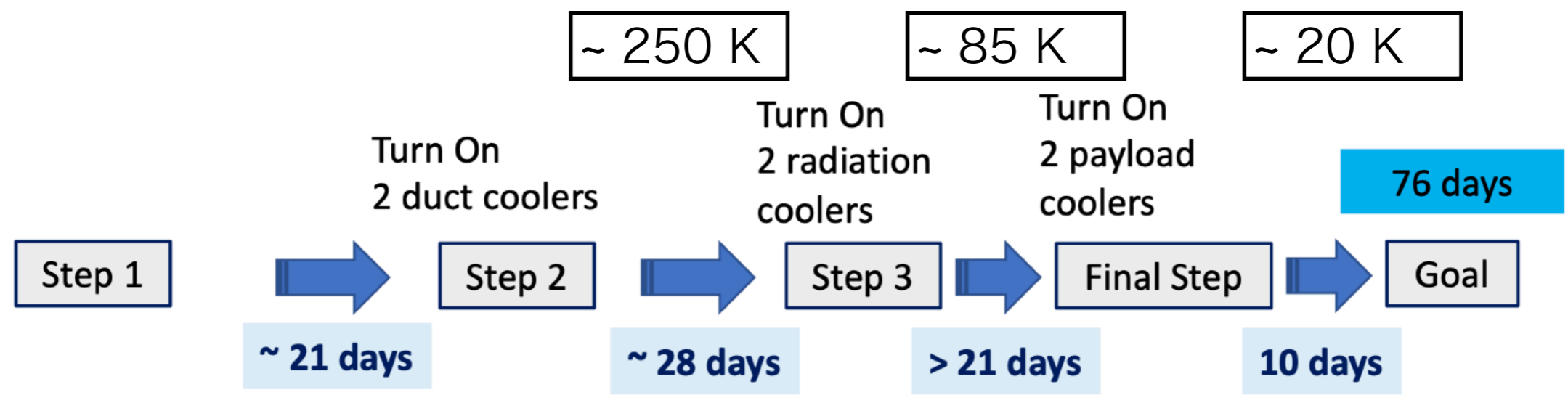




Cooling down



- Start Cooling down from end of July
 - EX : 85 K -> 20 K -> 30 K -> 225 K
 - Frosting occurred in 20 K (Nitrogen 28 K) using heater, keep 30 K
 - Maintenance of cooler : once warming up to 225 K... now restart cooling
- IX, IY, EY : 250 K -> 85 K
 - Discussing when cool down to 20 K



- ✓ Vacuum pumping
- ✓ Internal pressure < 10^{-4} Pa
- ✓ No leakage > 10^{-10} Pam³/s

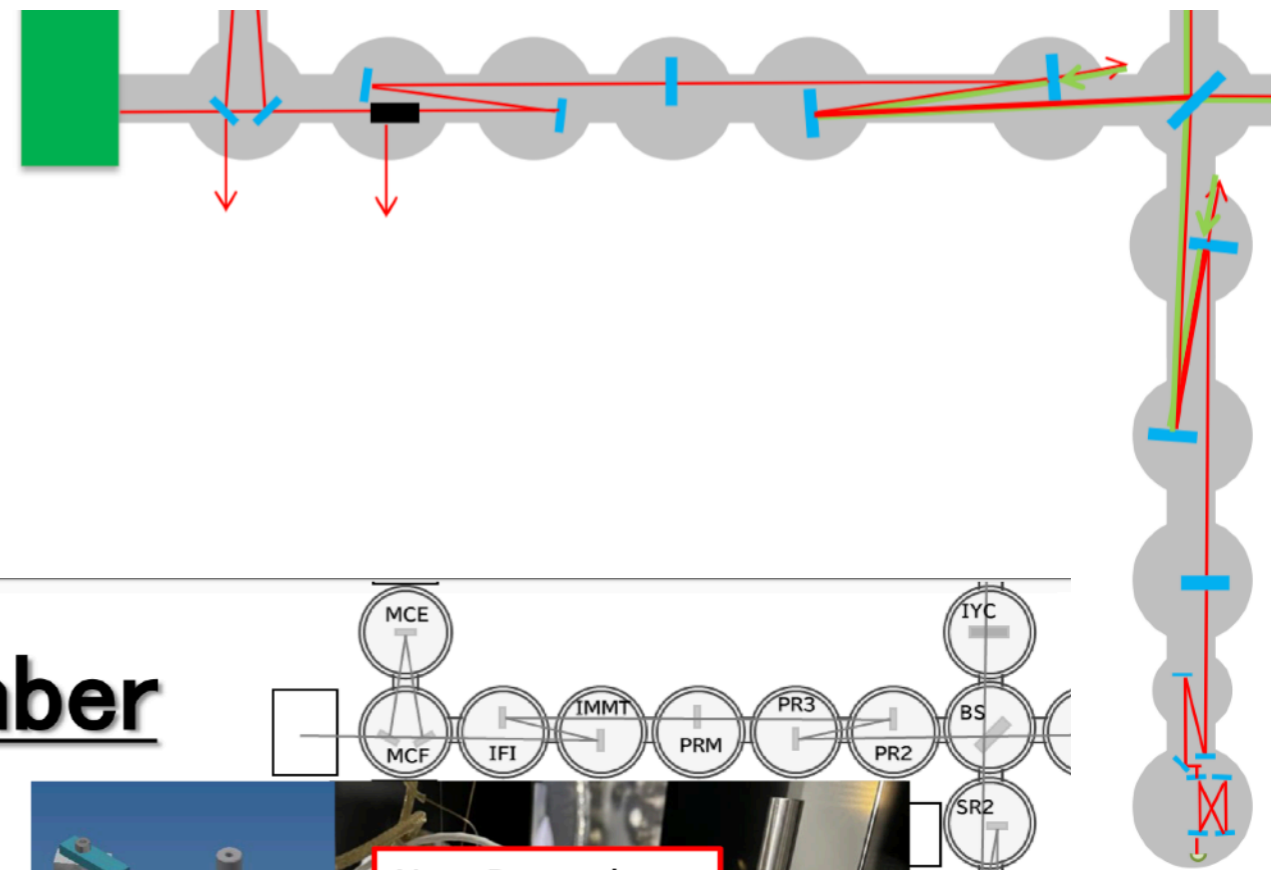
- ✓ Cooling down duct shields.
- ✓ Duct shields Temp. 90 K ~ 150 K
- ✓ Trap H₂O

- ✓ Cooling down inner/outer shields
- ✓ Radiation Temp. 20 K ~ 30K
- ✓ Trap O₂ and N₂

- ✓ Cooling down Test Mass

✓ T_{TM} = ~20 K

OMC treatment

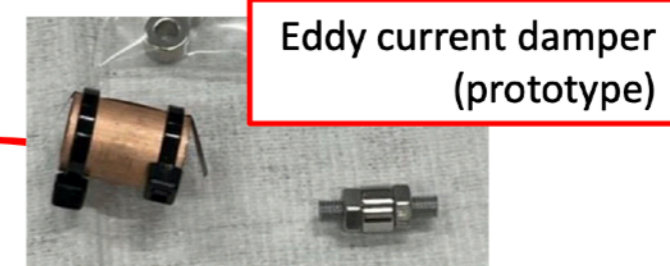
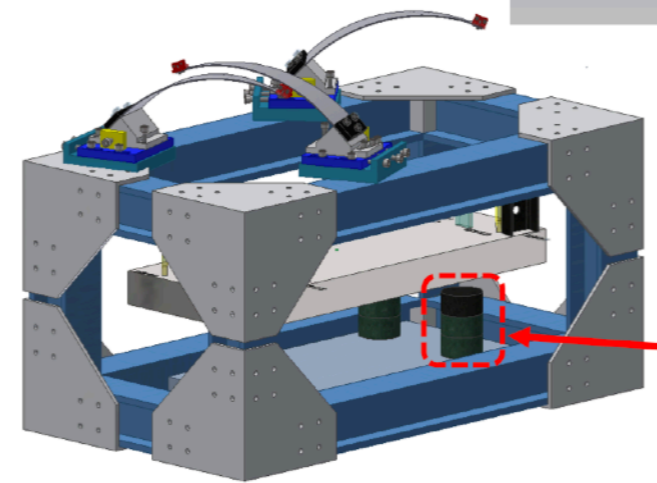
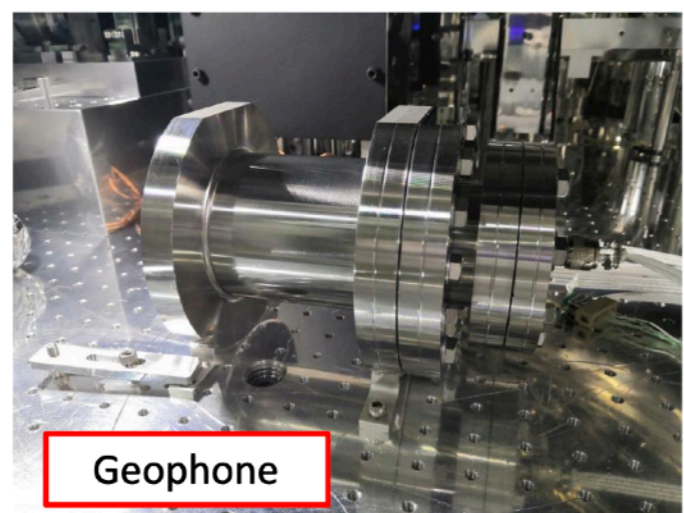
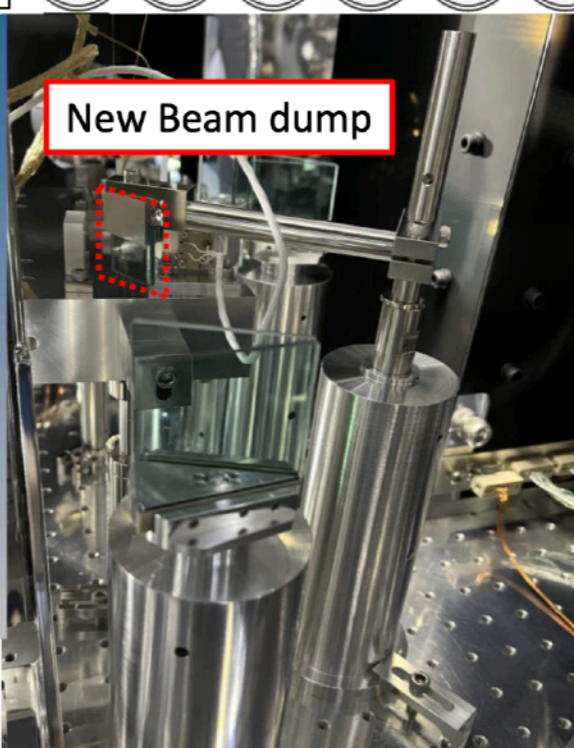
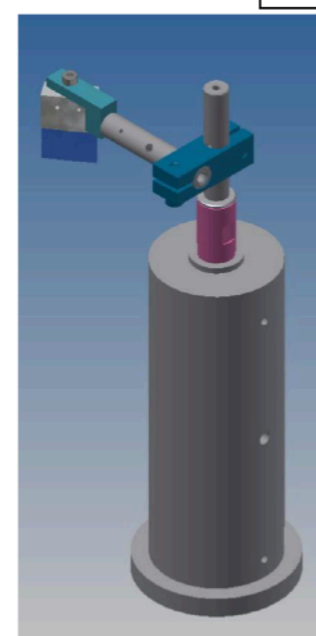


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OMC (output mode cleaner) Chamber

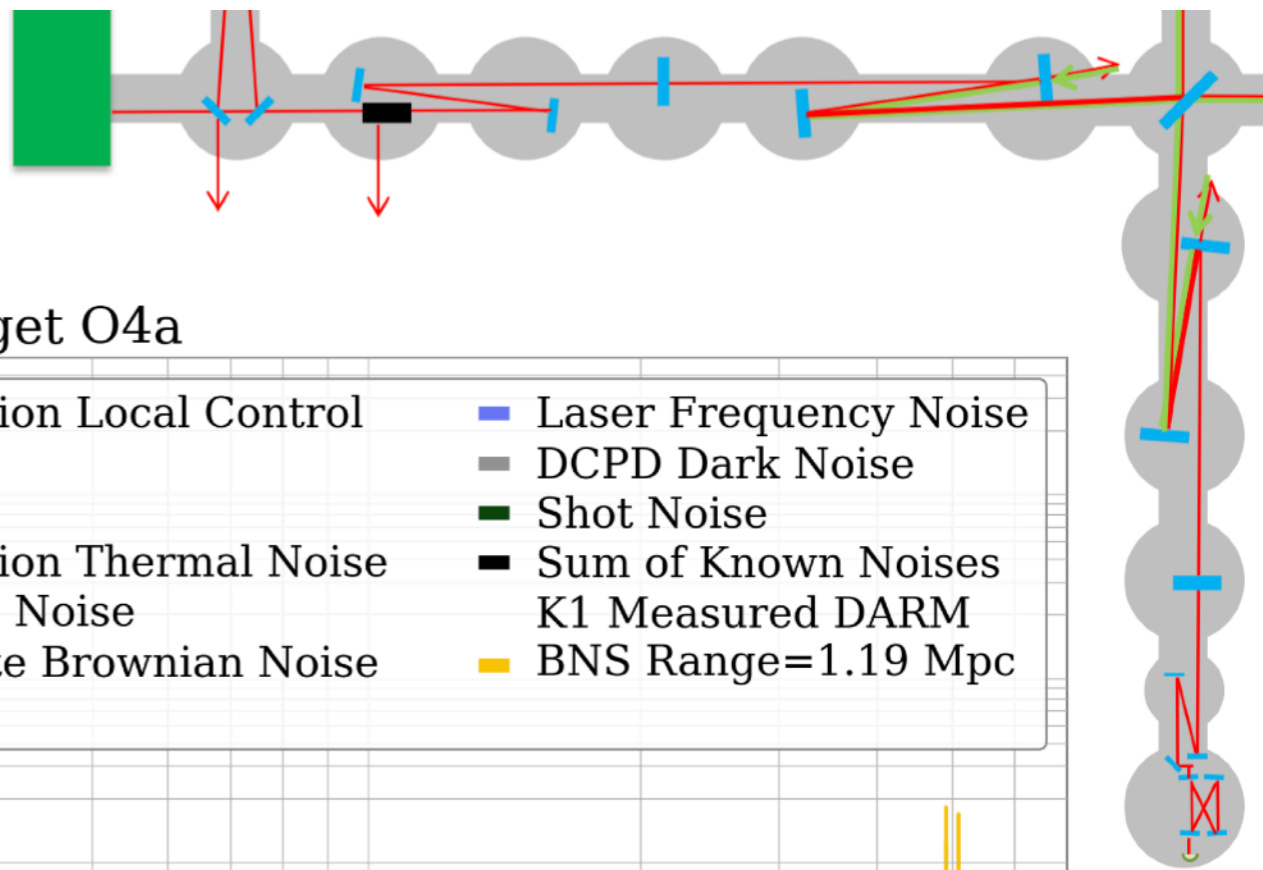
Toward O4b

- ✓ Mitigation of the environmental noise influence
- ✓ Installation and optimization of beam dumps
- ❑ Installation of vibration dampers
- ❑ Installation of an in-vac geophone
- ❑ Optimization of fixing the in-vac optics/cables

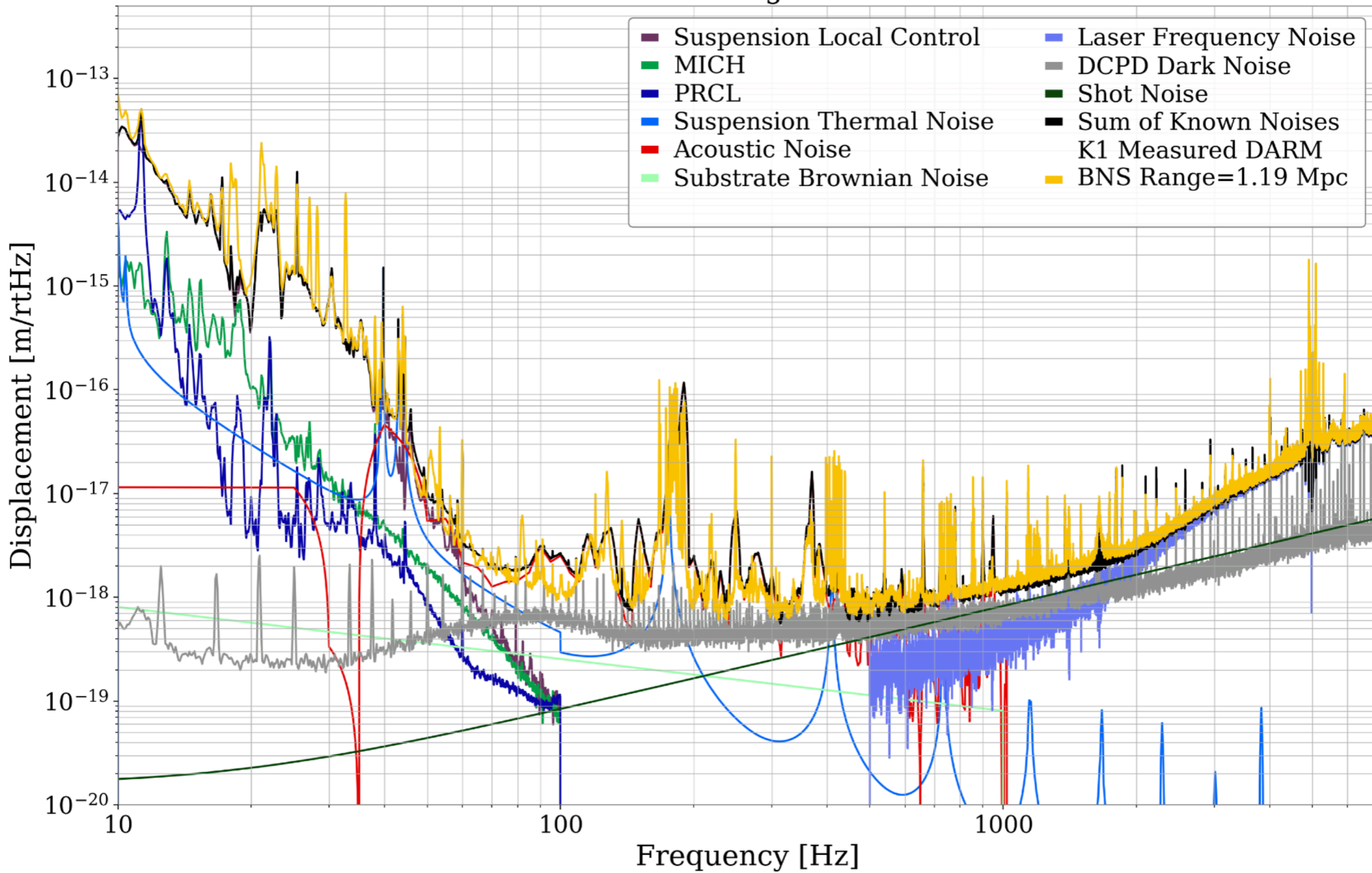




Noise budget O4a

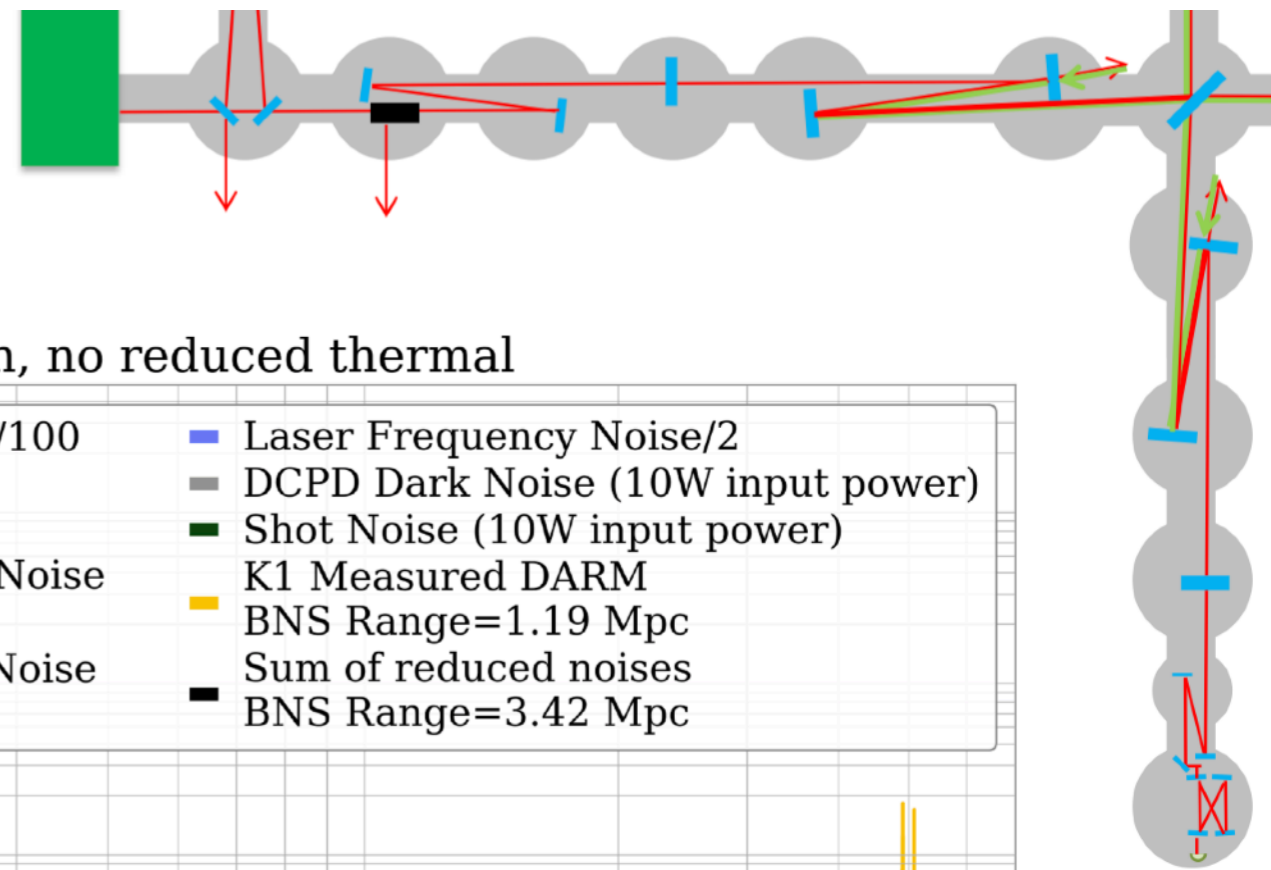


Noise Budget O4a

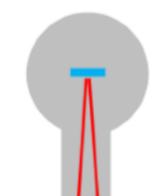
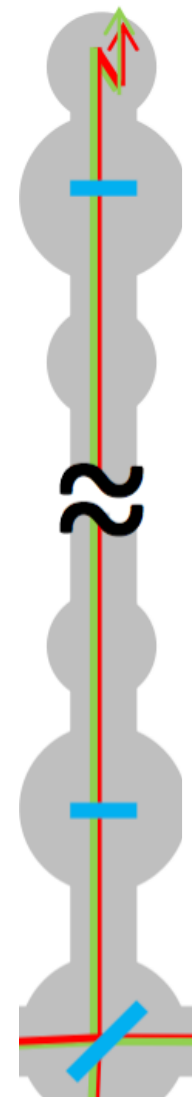
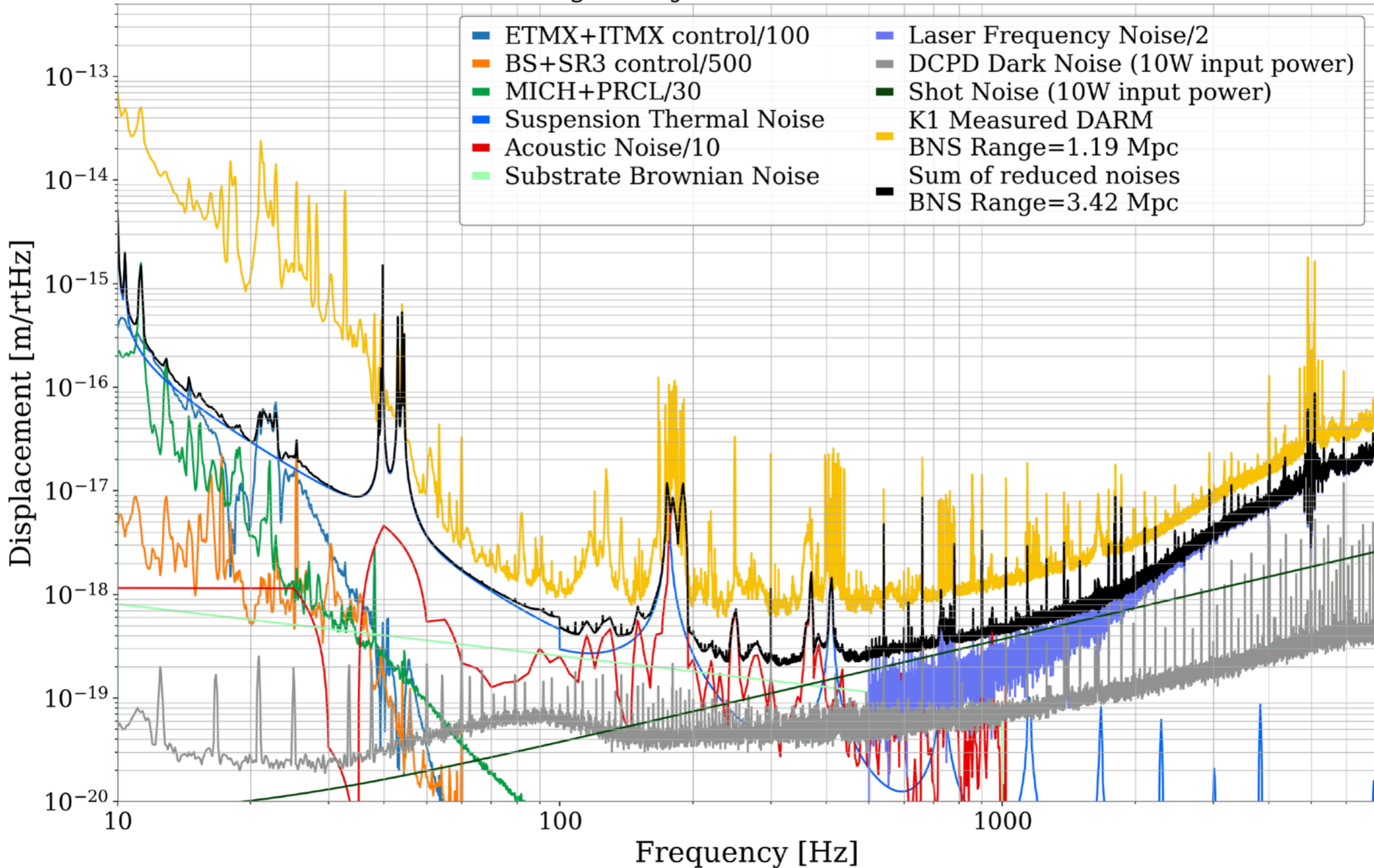




Strategy noise hunting

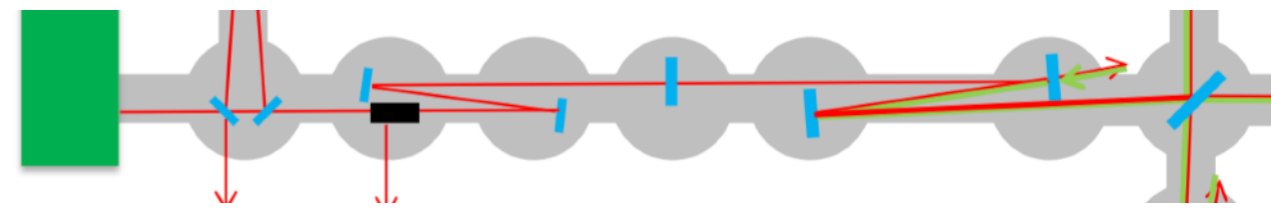


Noise Budget Projection, no reduced thermal

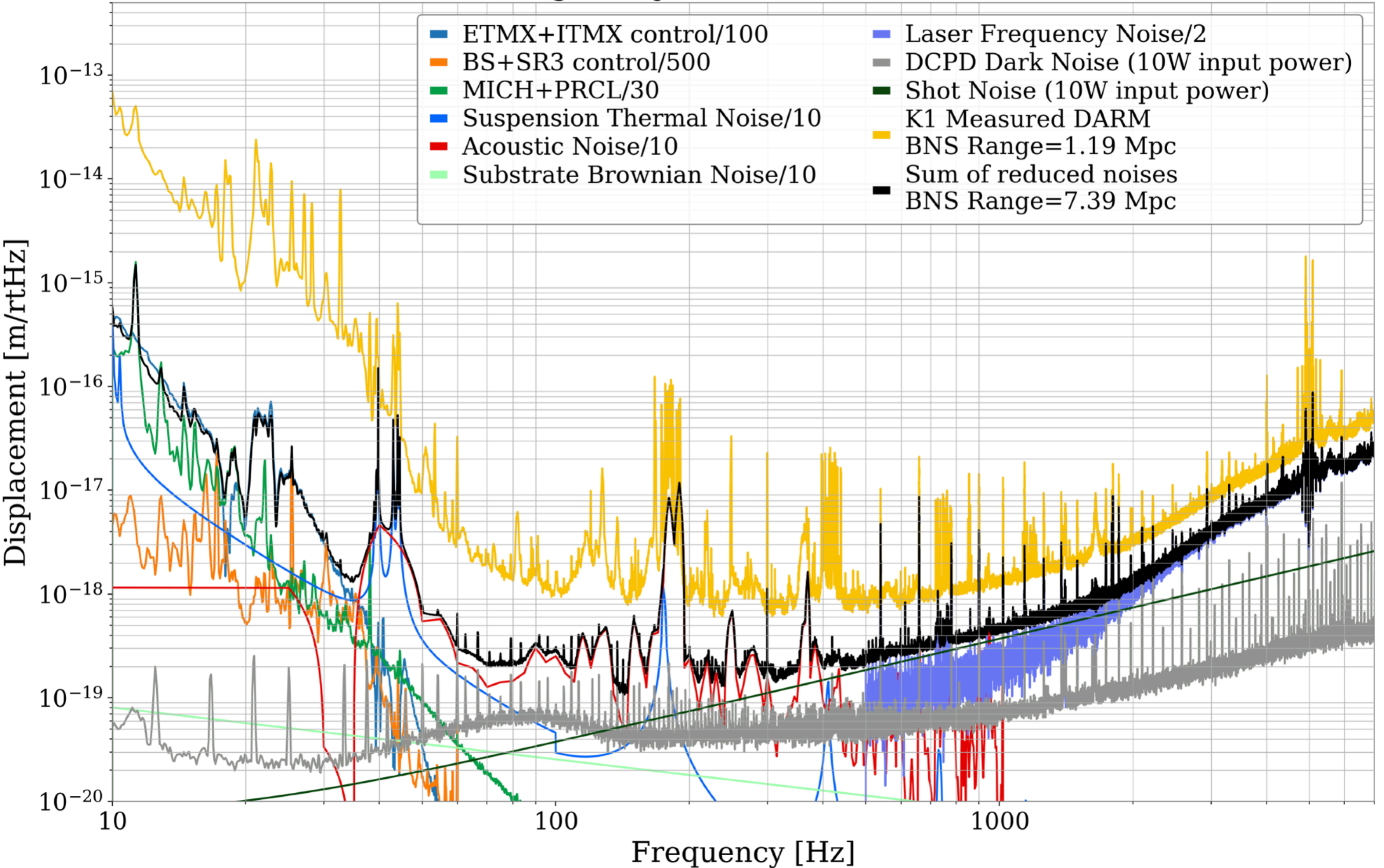




Strategy noise hunting

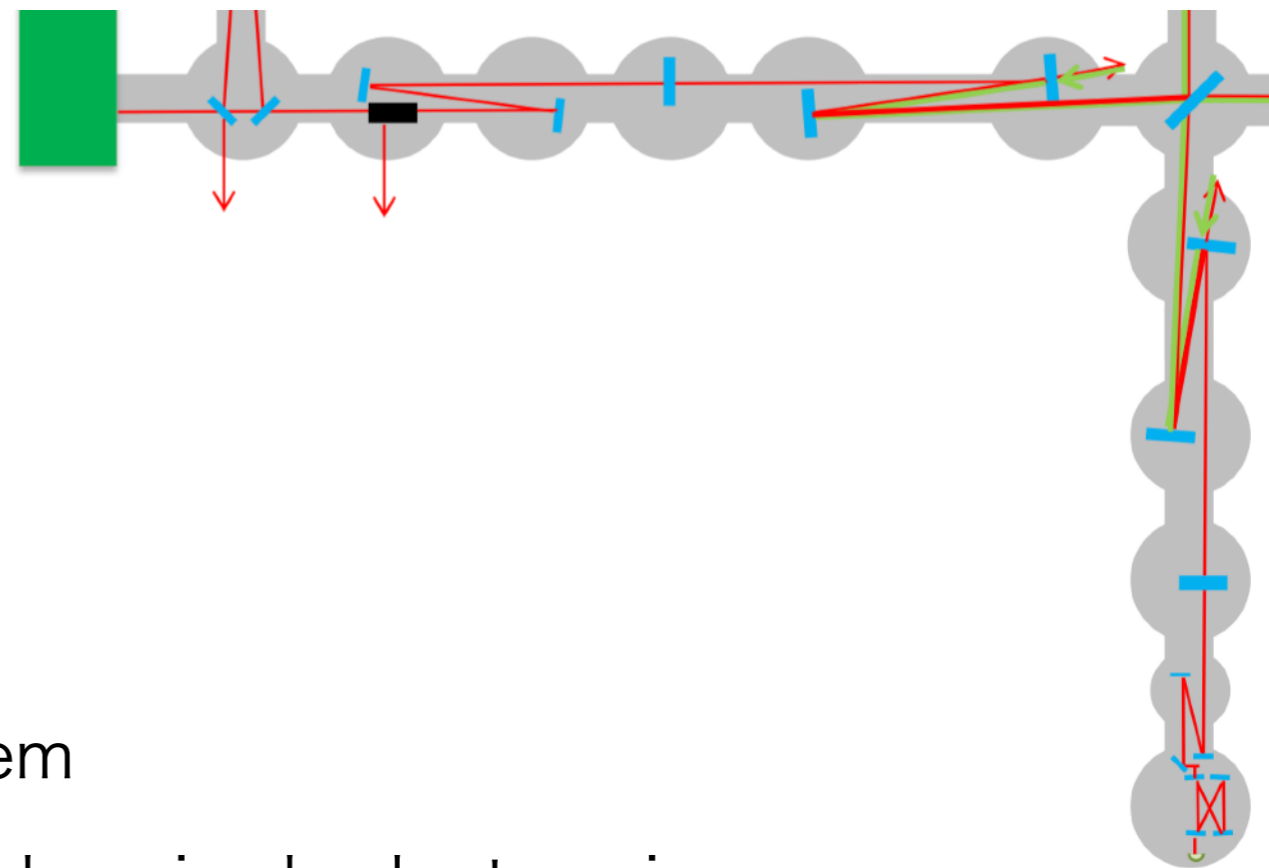


Noise Budget Projection, with reduced thermal





Strategy noise hunting



- So
 - Cooling down :
 - Error handing for cooling system
 - Measuring the Q value and made noise budget again
 - Increasing laser power :
 - At least 10 W IMC output
 - Good suspension control
 - Challenging, but try
 - Acoustic noise hunting
 - OMC treatment

