

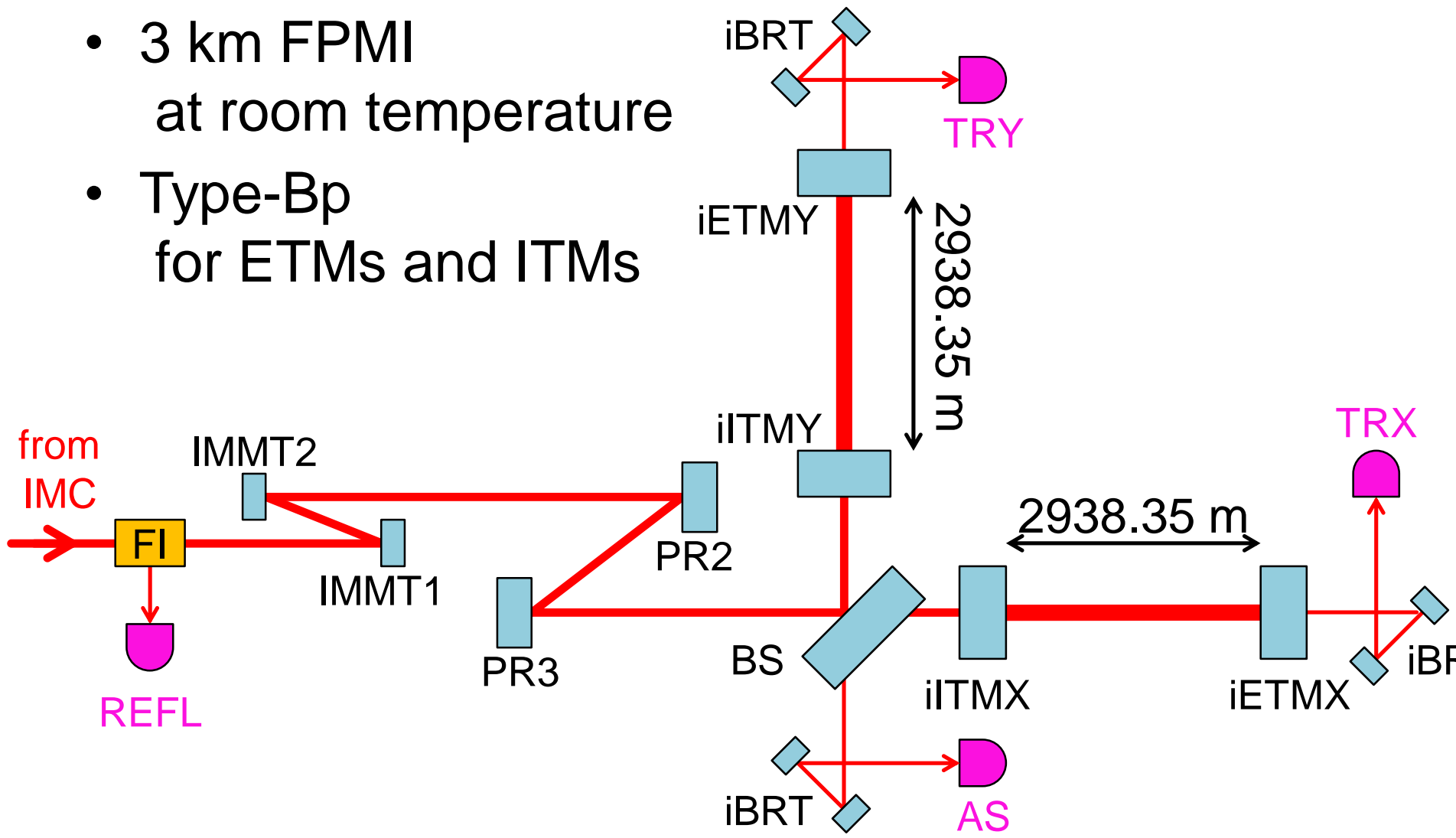
New iKAGRA Configuration

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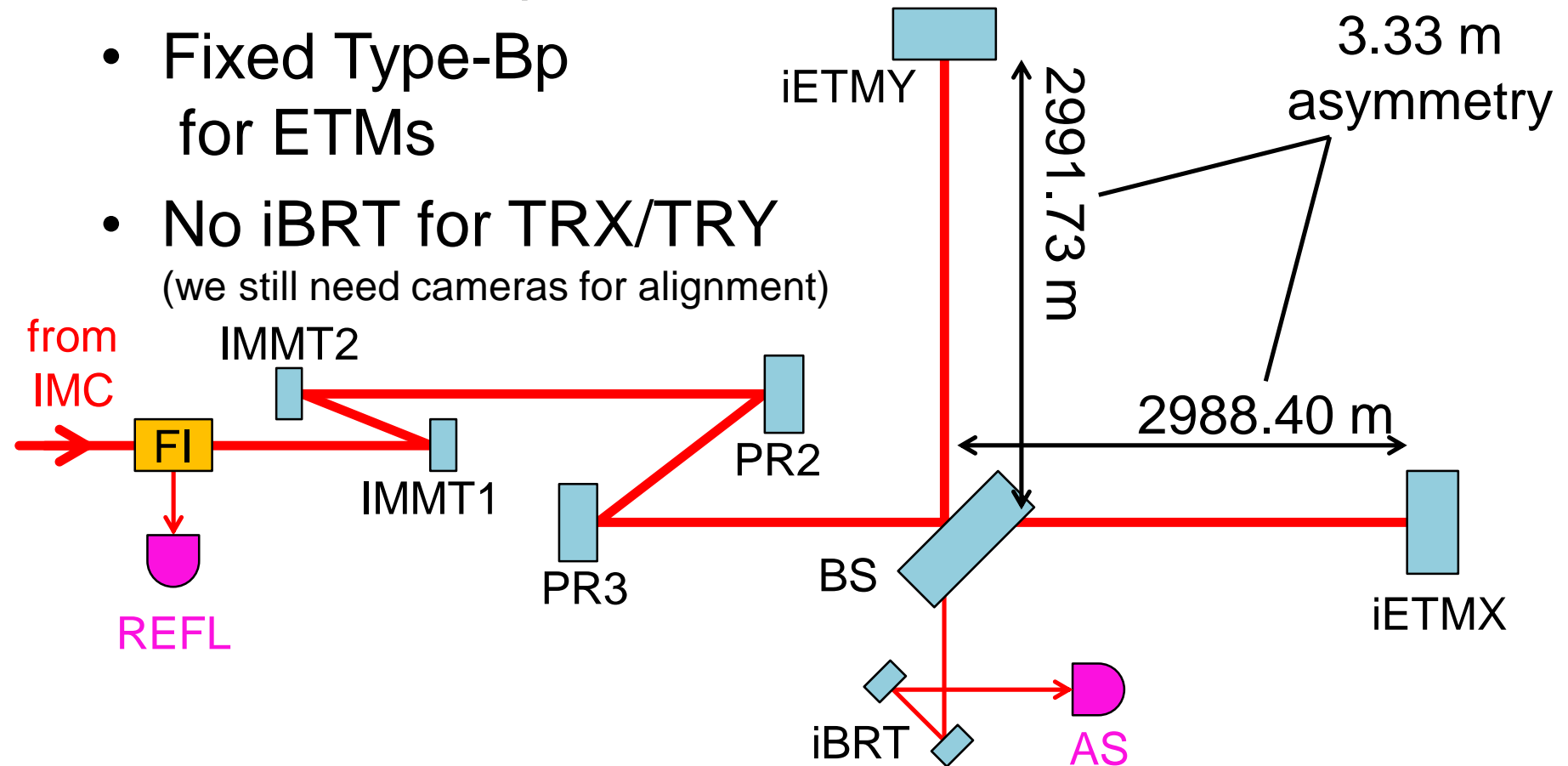
Original iKAGRA Configuration

- 3 km FPMI at room temperature
- Type-Bp for ETMs and ITMs



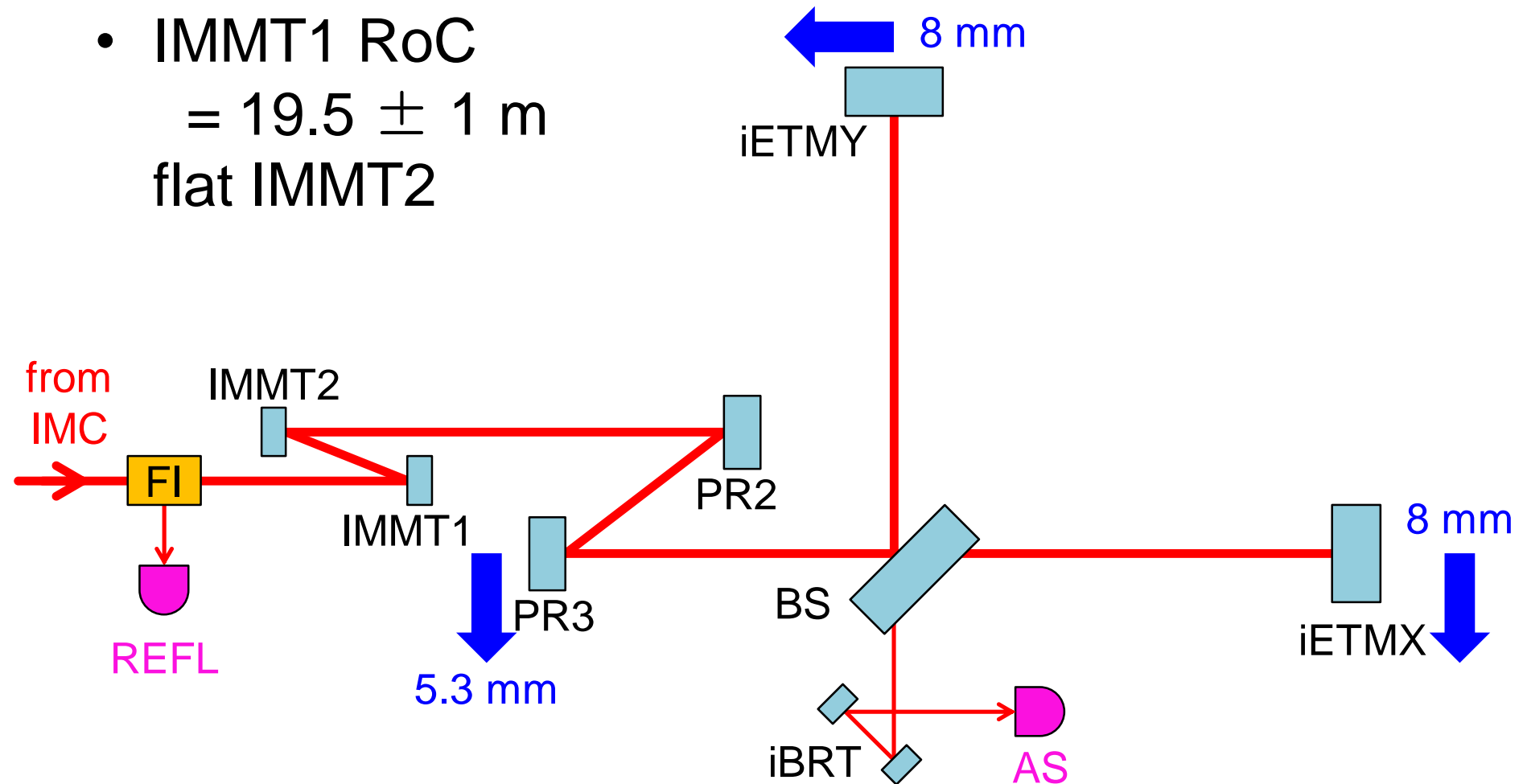
New iKAGRA Configuration

- 3 km Michelson at room temperature
- Fixed Type-Bp for ETMs
- No iBRT for TRX/TRY
(we still need cameras for alignment)



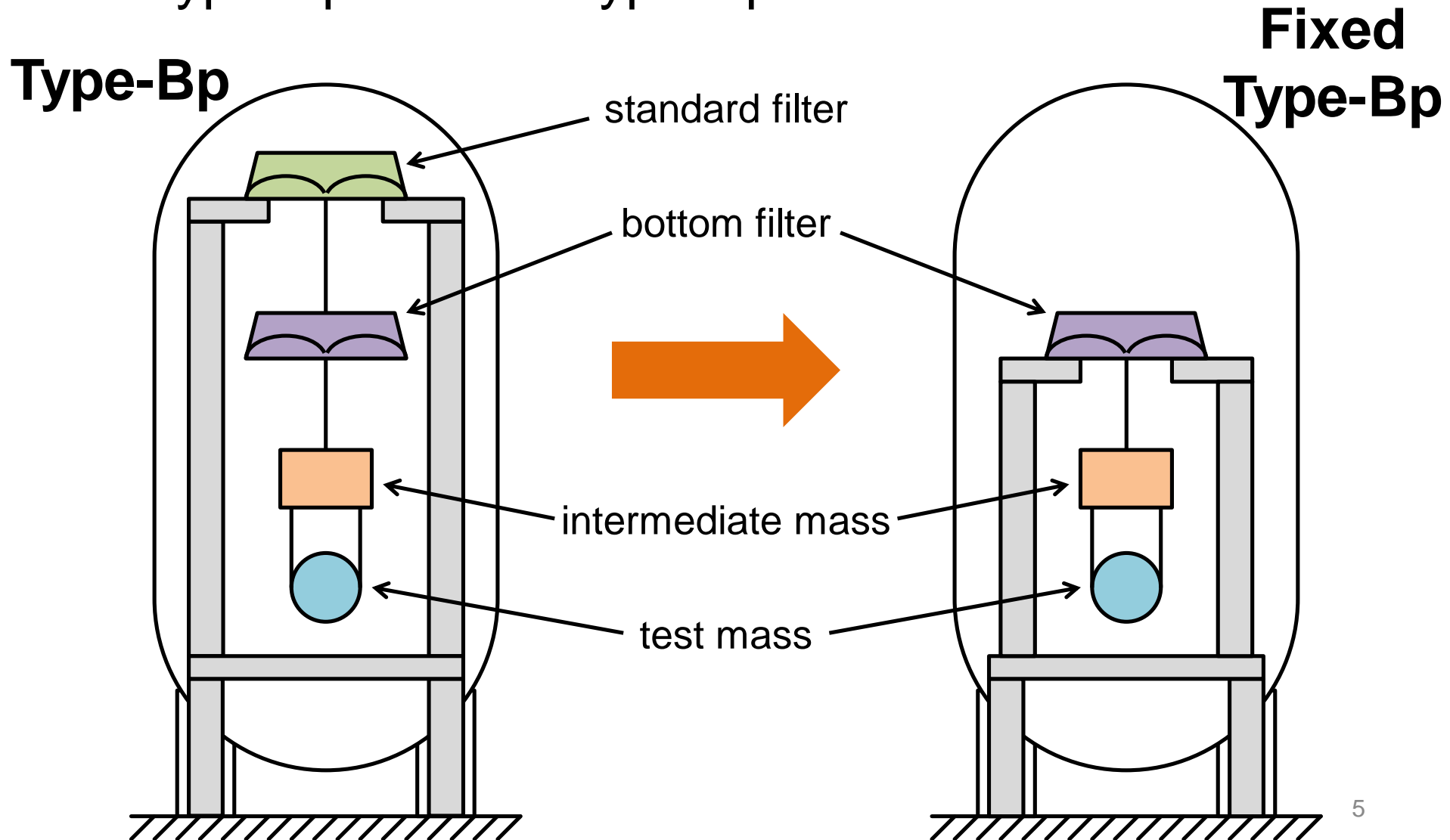
Optical Layout Tweaks

- move PR3 and ETMs (since ITM wedge is gone)
- IMMT1 RoC
= 19.5 ± 1 m
flat IMMT2

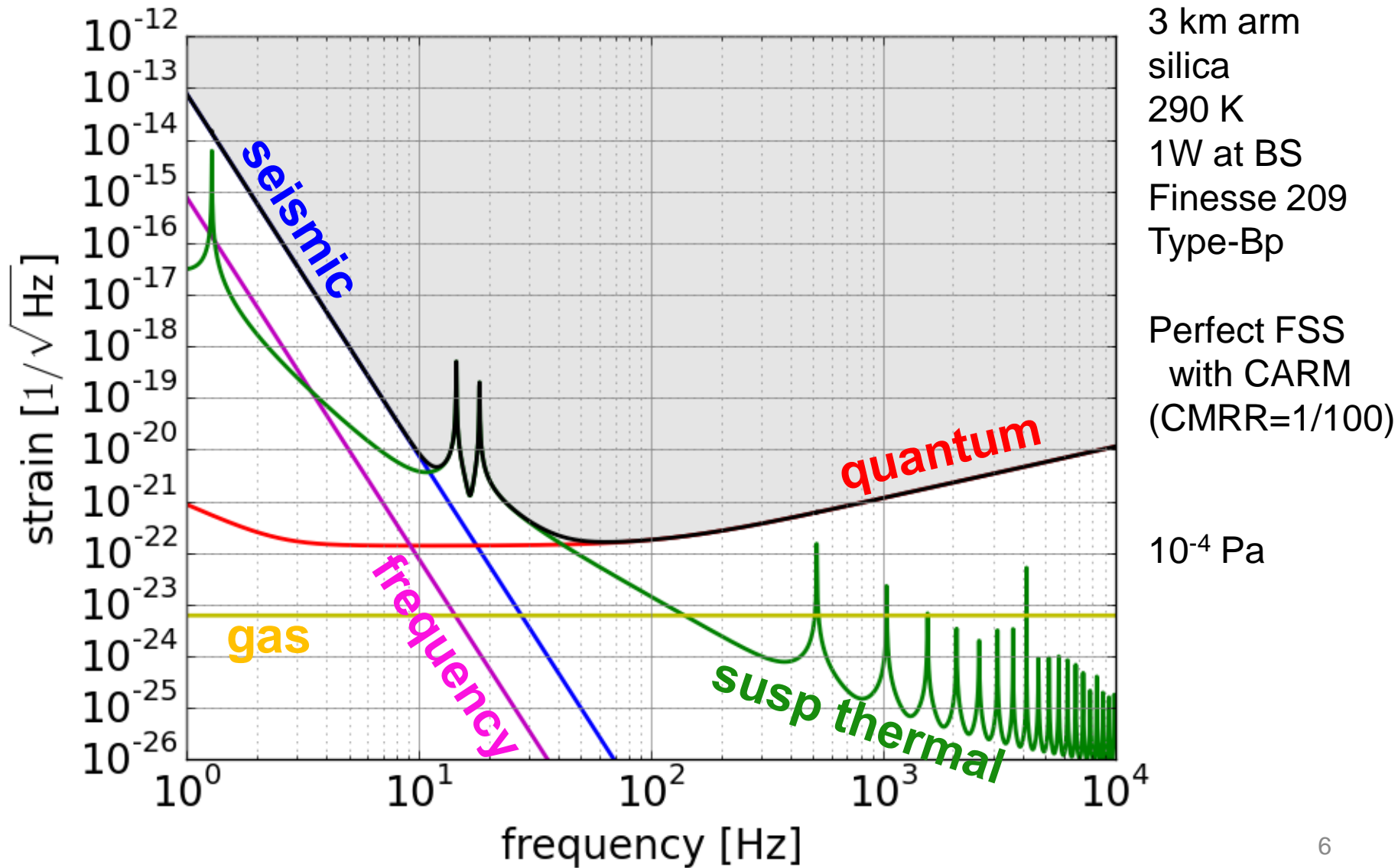


Suspension Change

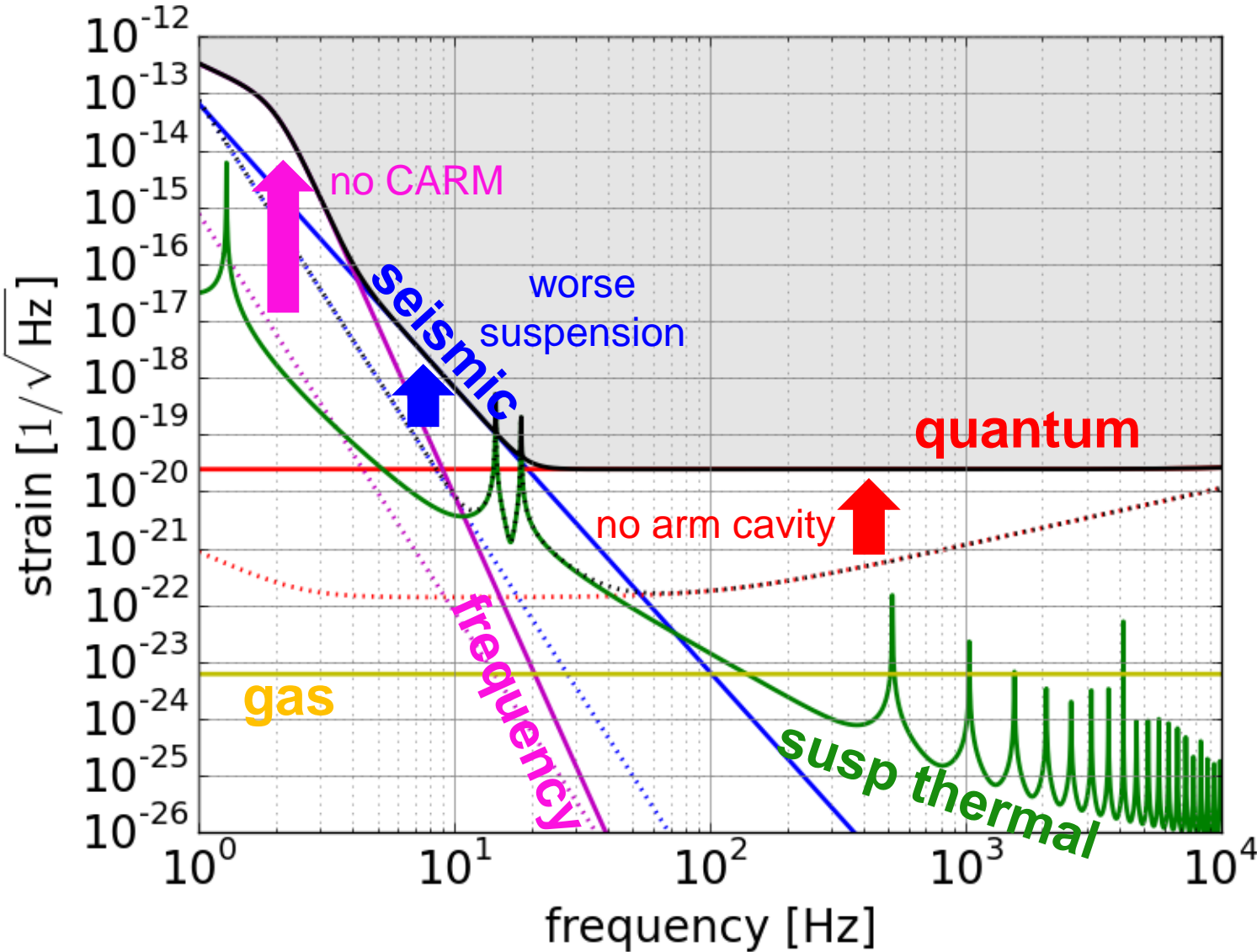
- Type-Bp to fixed Type-Bp



Original iKAGRA Sensitivity



New iKAGRA Sensitivity



3 km arm
 silica
 290 K
 1W at BS
 Michelson
 Fixed Type-Bp

Perfect FSS
 with IMC
 (3.33 m MICH
 asymmetry)

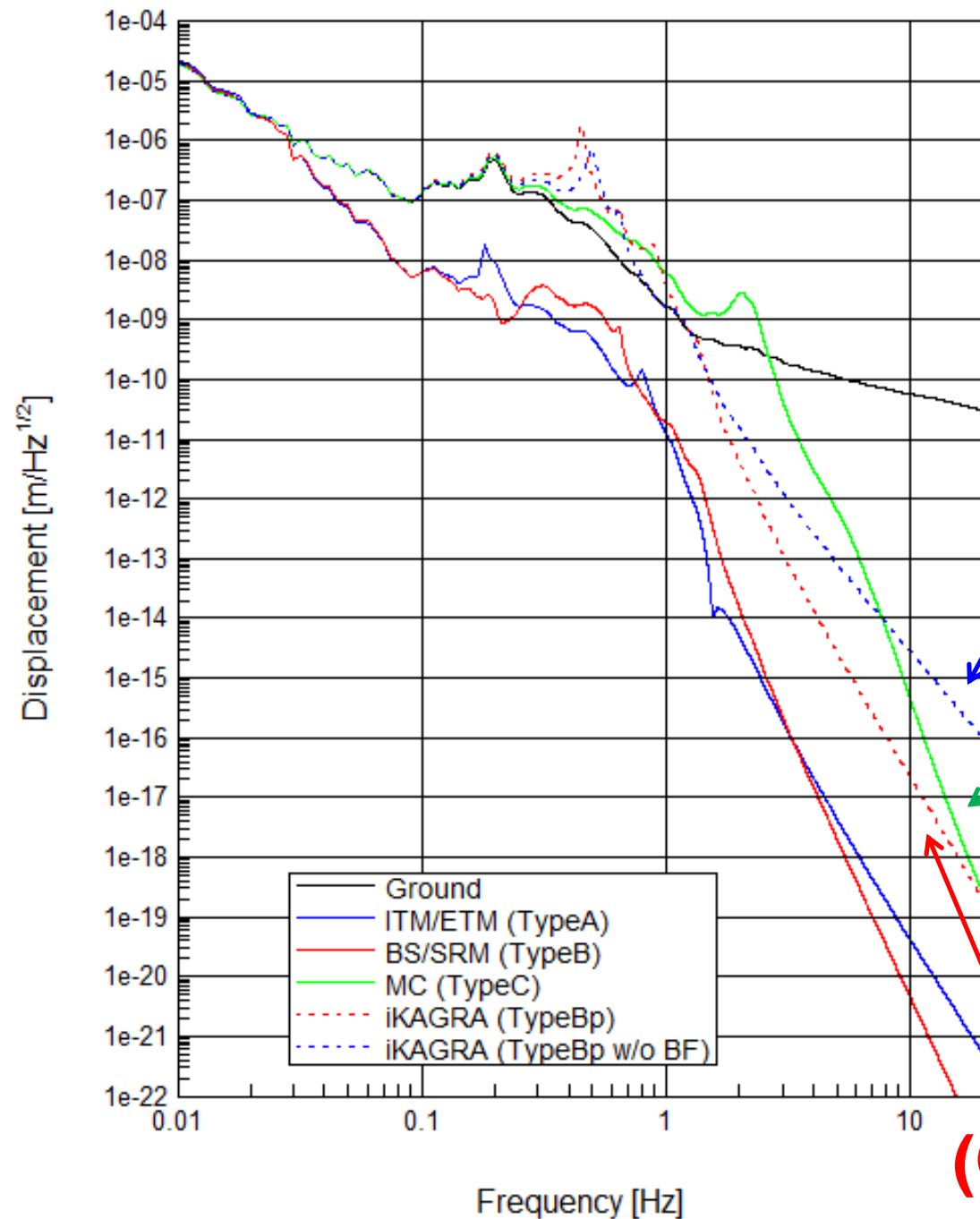
10^{-4} Pa

Summary of Differences

| | Original iKAGRA | New iKAGRA |
|-------------------------|----------------------------|---------------------------------|
| Configuration | 3 km FPMI | 3 km Michelson |
| Temperature | room temperature | room temperature |
| Test mass suspension | Type-Bp (triple pendulum) | Fixed Type-Bp (double pendulum) |
| Sensitivity at 100Hz | $2e-22 / \sqrt{\text{Hz}}$ | $2e-20 / \sqrt{\text{Hz}}$ |
| 3 km layout test | with arm cavities | no arm cavities |
| Frequency stabilization | as far as CARM | as far as IMC |
| iBRT for ETM trans | necessary | unnecessary |

Appendix

Suspension Performance

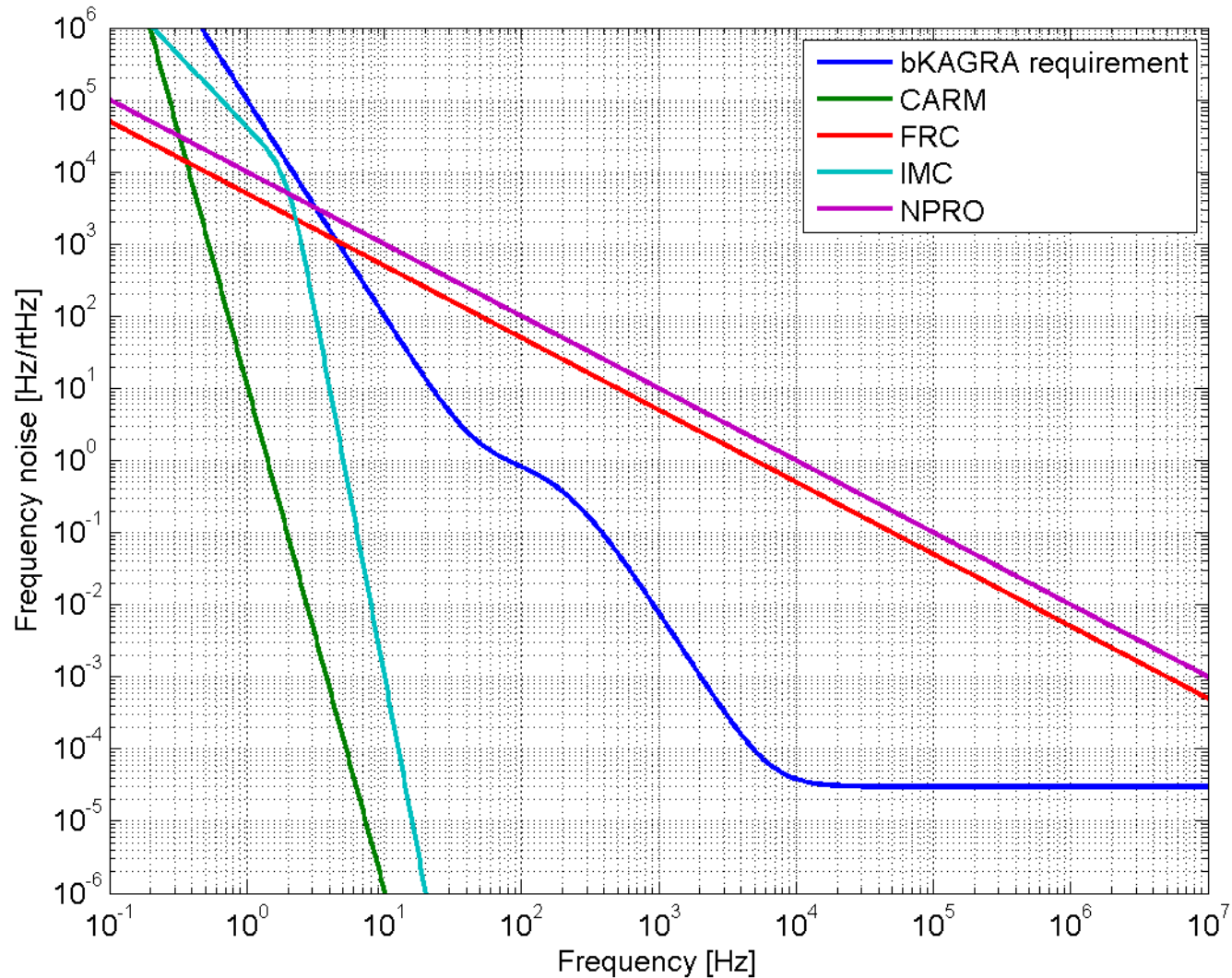


**Fixed Type-Bp
(New iETM)**

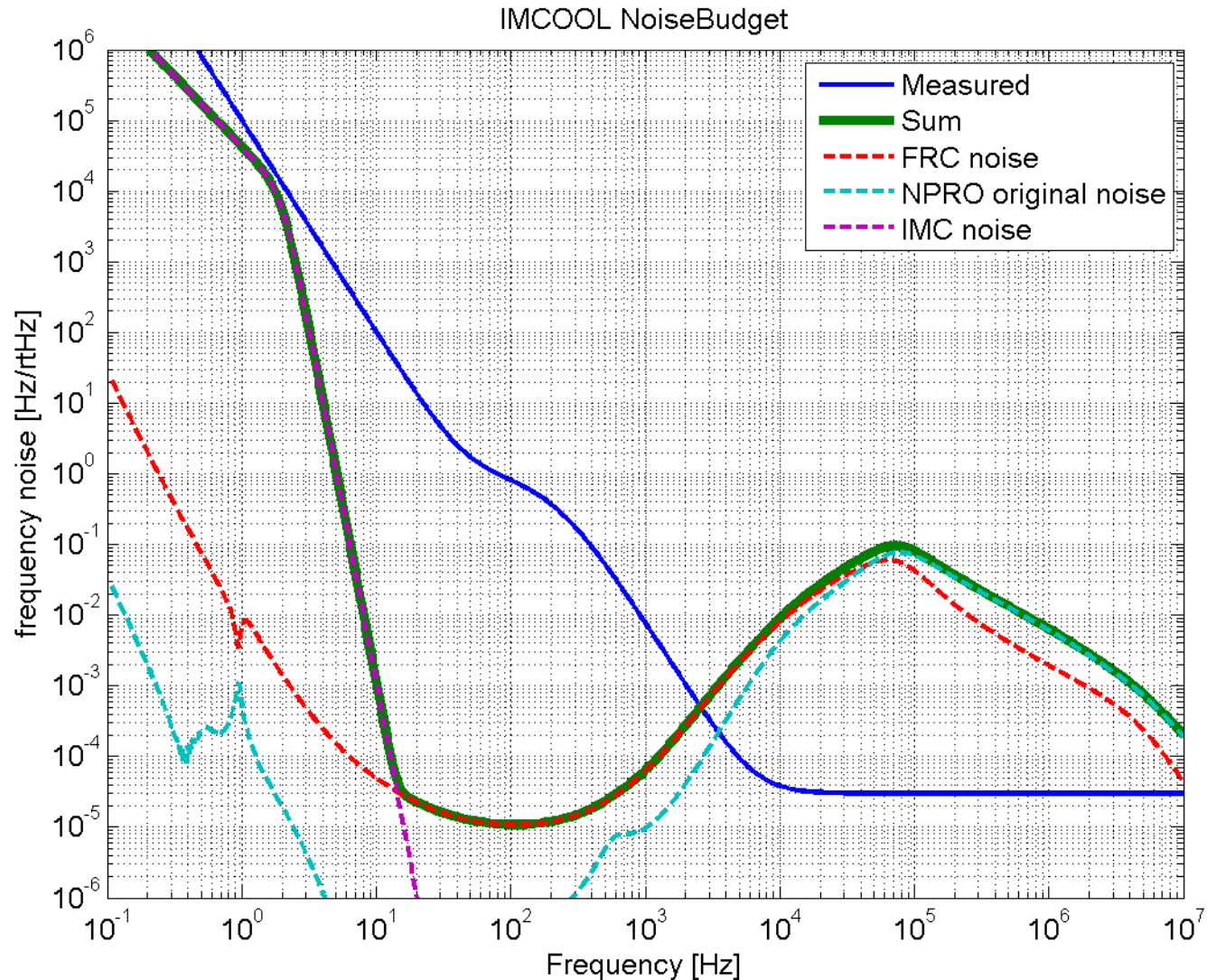
**Type-C
(IMC)**

**Type-Bp
(Original iETM)**

Frequency Noise



Frequency Noise with IMC Servo



Frequency Noise with CARM

