Introductions and welcome

1st FWG Open Meeting

Nov 9, 2021

Kentaro Somiya (FSC)

http://gwwiki.icrr.u-tokyo.ac.jp/JGWwiki/KAGRA/KSC/FSC/FWG/1stMeeting

What is the Future Working Group?

- Advanced R&Ds are seeds for future upgrades.
- New ideas are necessary before selecting good ideas.
- The KAGRA Future Working Group (FWG) is a place to share your ideas and discuss advanced techniques for gravitational wave detectors.

“The more successful you are, the more mistakes you will make. People who don’t do anything, don’t make mistakes.”
— Robert Anthony

Three important features of FWG

- FWG is free from the KAGRA authorship
  - Contributions are not counted for the authorship
  - Non-KAGRA members can join the working group
- FWG is free from the KAGRA's boundary conditions
  - One can propose anything even if it sounds unrealistic
  - A practicality shall be discussed at F2F/KSC meetings
- FWG is free from harassments

This meeting is organized by FSC

Future Strategy Committee (FSC)

Members: M.Ando (chair),Y.Gao, S.Haino, H.Jin, R.Lee,M.Leonardi, E.Majorana, Q.Nguyen, S.Saha, L.Shao, K.Somiya, K.Yamamoto, and Z.Zhu

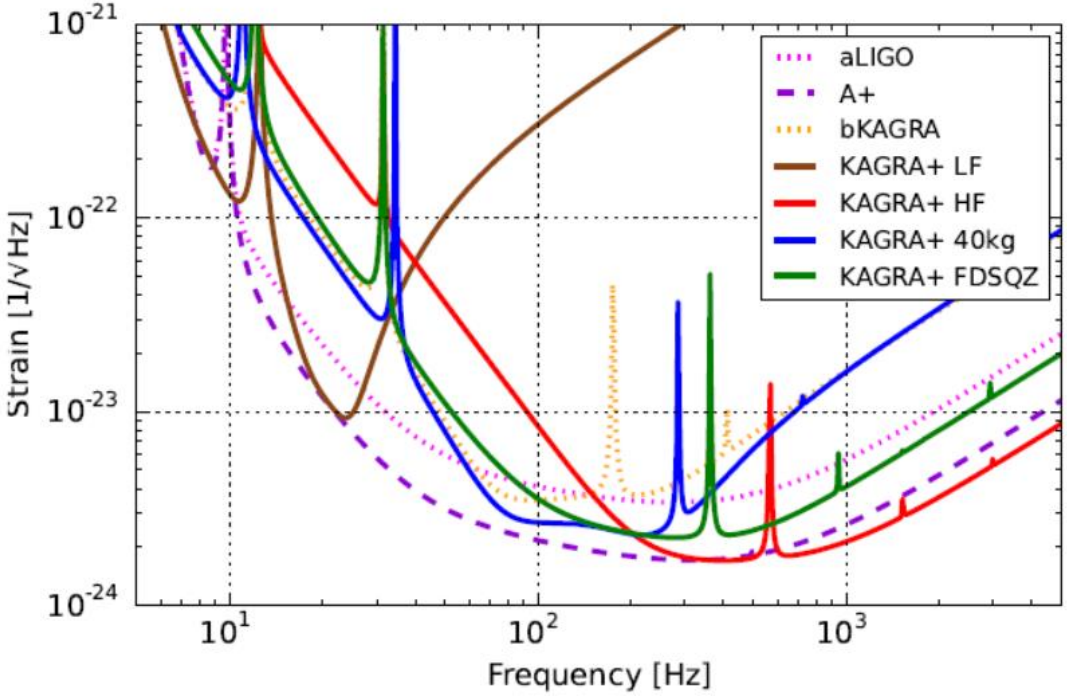
http://gwwiki.icrr.u-tokyo.ac.jp/JGWwiki/KAGRA/KSC/FSC

* Yong, Ray-Kuang, and Hong-Bo will chair sessions of the meeting.
* H.Abe at TT helps organizing the zoom meeting.

KAGRA+ updates and related R&Ds

[Copied from Somiya KIW8]

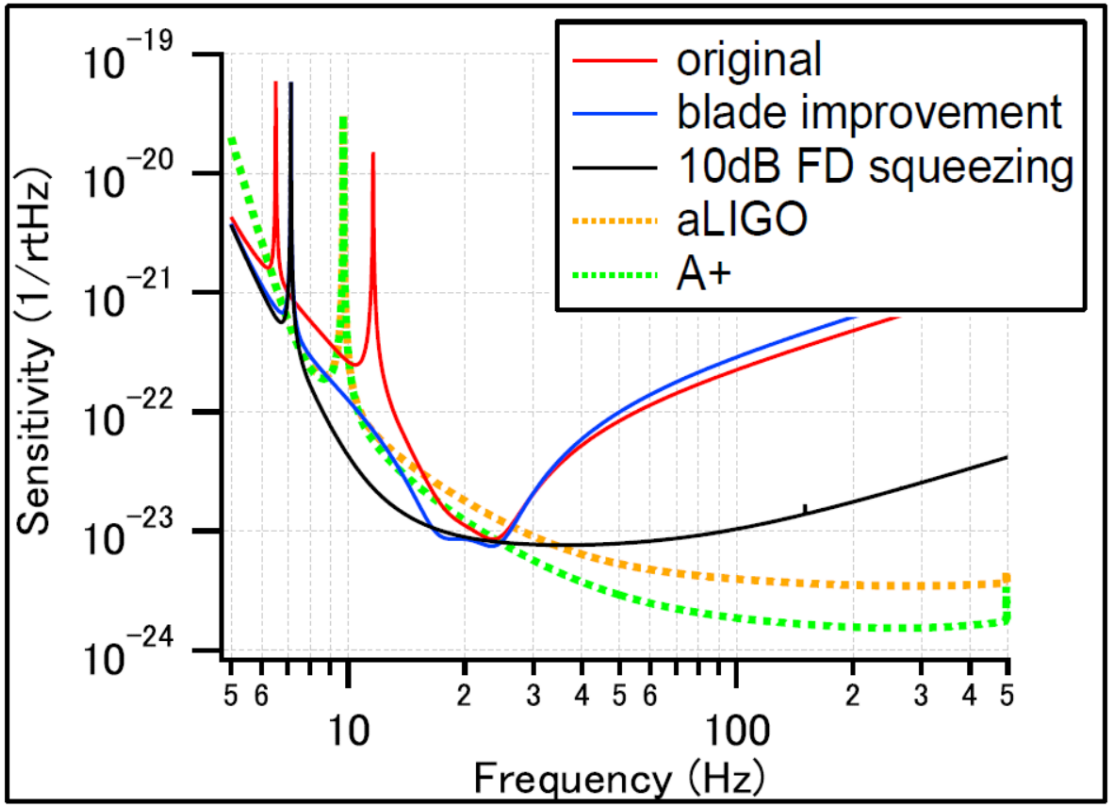
(KAGRA+ White Paper)



	bKAGRA	LF	HF	40kg	FDsq
SRM	85%	95%	91%	92%	83%
detune	3.5°	28.5°	none	3.5°	none
fiber(l)	35cn	1m	20cm	29cm	23cm
fiber(d)	1.6mm	0.5mm	2.5mm	2.2mm	1.9mm
mass	23kg	23kg	23kg	40kg	23kg
I_{BS}[W]	670	4.5	3440	1500	1500
temperature	22K	24K	21K	21K	21K
SQ	0	0	6dB	0	5dB

I found some rooms to improve the LF and HF sensitivities, and proposed them at the KIW8 meeting.

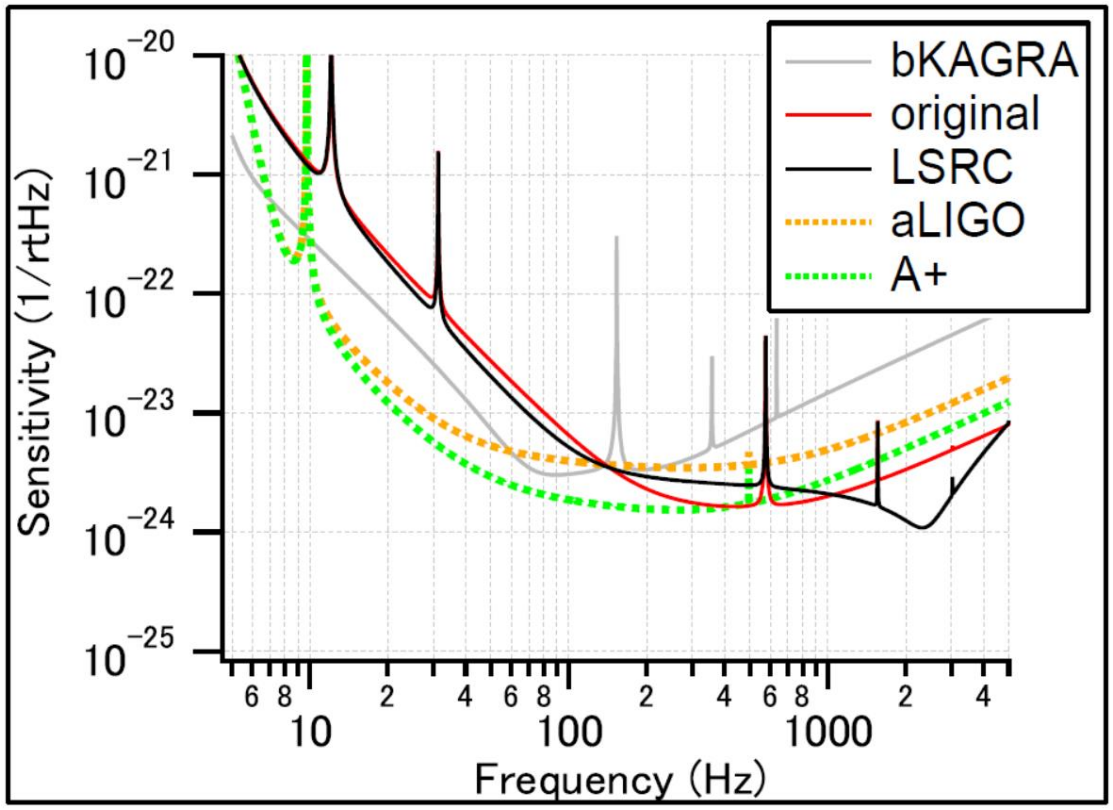
Updates of the KAGRA+ LF



	bKAGRA	LF	LF2	LF3
SRM	85%	95%	95%	40%
detune	3.5°	28.5°	35.6°	0
fiber(l)	35cn	1m	1m	1m
fiber(d)	1.6mm	0.5mm	0.5mm	0.5mm
mass	23kg	23kg	23kg	23kg
IM	21kg	300kg	300kg	300kg
blade	14Hz	14Hz	5Hz	5Hz
I_{BS}[W]	670	4.5	4.5	4.5
temperature	22K	24K	24K	24K
SQ	0	0	0	10dB

- Suspension TN was limited by dissipations of the blades.
- FDSQ seems better than the detuned RSE configuration, though FC loss is not included here.

Updates of the KAGRA+ HF



	bKAGRA	HF	HF2
SRM	85%	91%	99.5 %
finesse	1550	1550	3100
detune	3.5°	none	none
fiber(l)	35cn	20cm	20cm
fiber(d)	1.6mm	2.5mm	2.5mm
mass	23kg	23kg	23kg
I_{BS}[W]	670	3440	3440 (860)
temperature	22K	21K	22K
SQ	0	6dB	6dB (10dB)

- Long SRC effect with an extremely high finesse arms/src (SRC length is the same as the current one).
- Higher laser noise coupling is another issue.

Related R&Ds

For KAGRA+ LF3

- Newtonian noise and other LF noises
- Further improvement of the filter cavity loss

For KAGRA+ HF2

- Quantum noise calculation with high finesse arms
- Laser noise couplings
- Control schemes