KAGRA, KAGRA+, and beyond

Panel discussion at GWADW2023

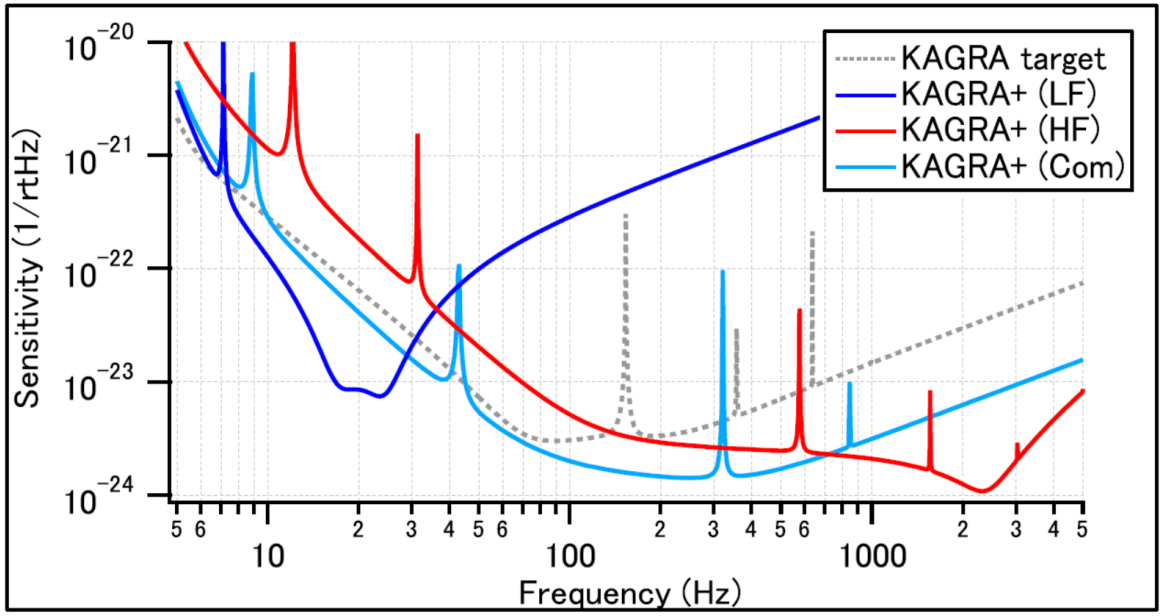
K.Somiya, on behalf of KAGRA

Timeline and todo

	On site	Off site
~now		• Develop frequency dependent squeezing (TAMA) **Project R&D** • Study on birefringenece of sapphire substrate Leonardi + Eisenmann Fri PM
Before O4b	• Cooling TMs to 20K (currently 80K&250K) • Increasing laser power (currently ~1W) Akutsu Mon PM	
Before O5	• Replace ITMs • Install frequency dependent squeezing	• Develop Long SRC technique (JAXA) • Newtonian noise measurement and cancellation study
Post O5	• KAGRA+ ~LF, HF, Combined	• Collaboration with 3G Nishino Tue PM • Advanced techniques Suzuki Fri PM

KAGRA+

[KAGRA+ White Paper]
[Michimura 2020]
[KS, KIW8]



	bKAGRA	LF	HF	Com
SRM	85%	40%	99.5%	81%
finesse	1550	1550	3100	1550
detune	3.5°	35.6°	0°	0.3°
fiber(l)	35cn	1m	20cm	23cn
fiber(d)	1.6mm	0.5mm	2.5mm	3.6mm
mass	23kg	23kg	23kg	100kg
I_{BS}[W]	670	4.5	3440	3470
temperature	22K	24K	22K	20K
SQ	0	0	6dB	5dB (FD)

* IM of LF is 300kg, Blade spring is 5Hz.
* SRC length is not changed for HF; 66m.

- Discussion has been suspended as we first need to find a better sapphire substrate.
- HF is attractive for a BNS merger observation.
- Development of LF would be useful toward 3G.