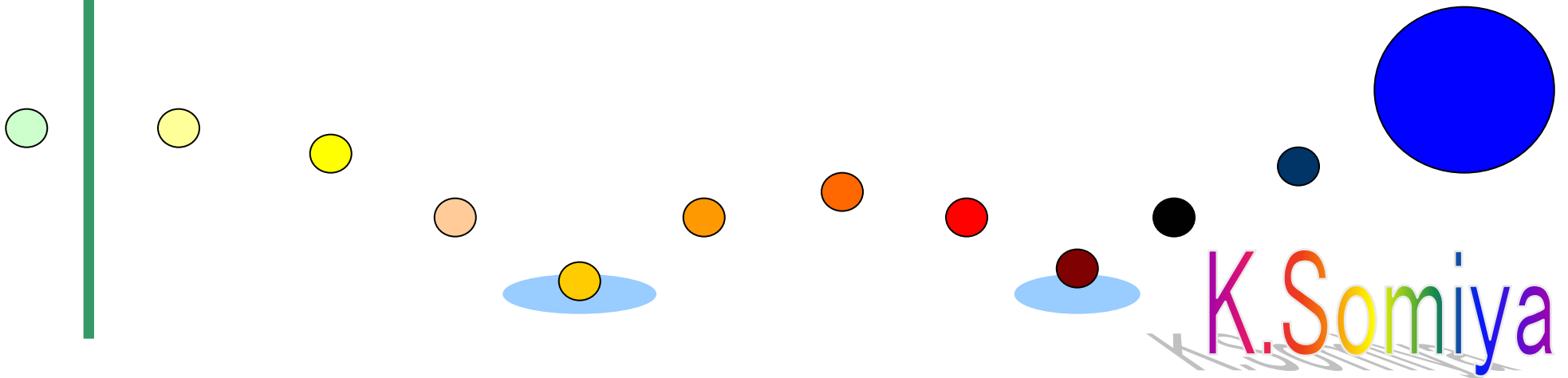


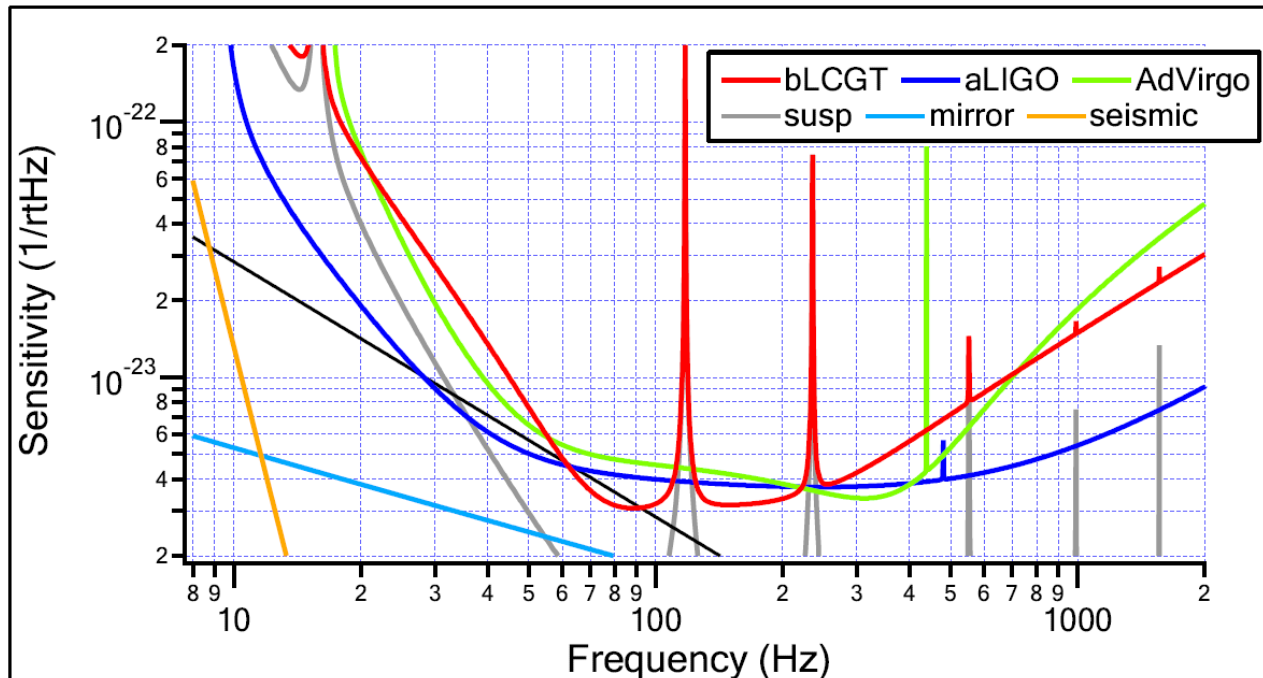
Current status of LCGT-LF Special Working Group

May. 2011

Kentaro Somiya
TITech



Background of the argument



- Suggestion by the External Review; "LCGT-LF"
- Gap between the bLIGO sensitivity and seismic wall
- Ugly suspension thermal-noise peaks
- High inspiral range for the narrow-band configuration

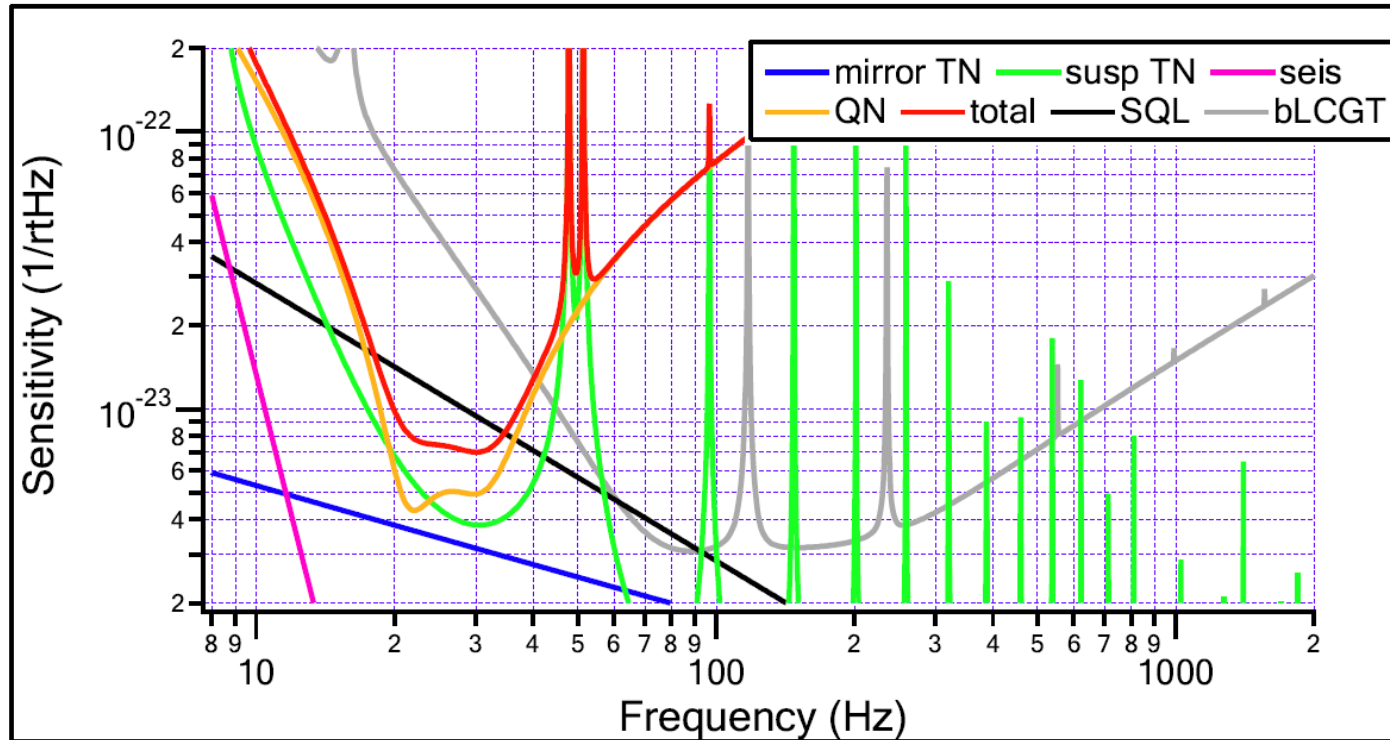
Discussion procedure

- Collecting people's opinion (4/5-4/13)
- LCGT-LF meeting (8 persons, 4/22)
- Email-base discussions (4/22~)
- Writing a report...

4.22 meeting member

Agatsuma, Aso, Hayama, Kanda
Kuroda, Somiya, Takahashi, Yamamoto
(+ observers)

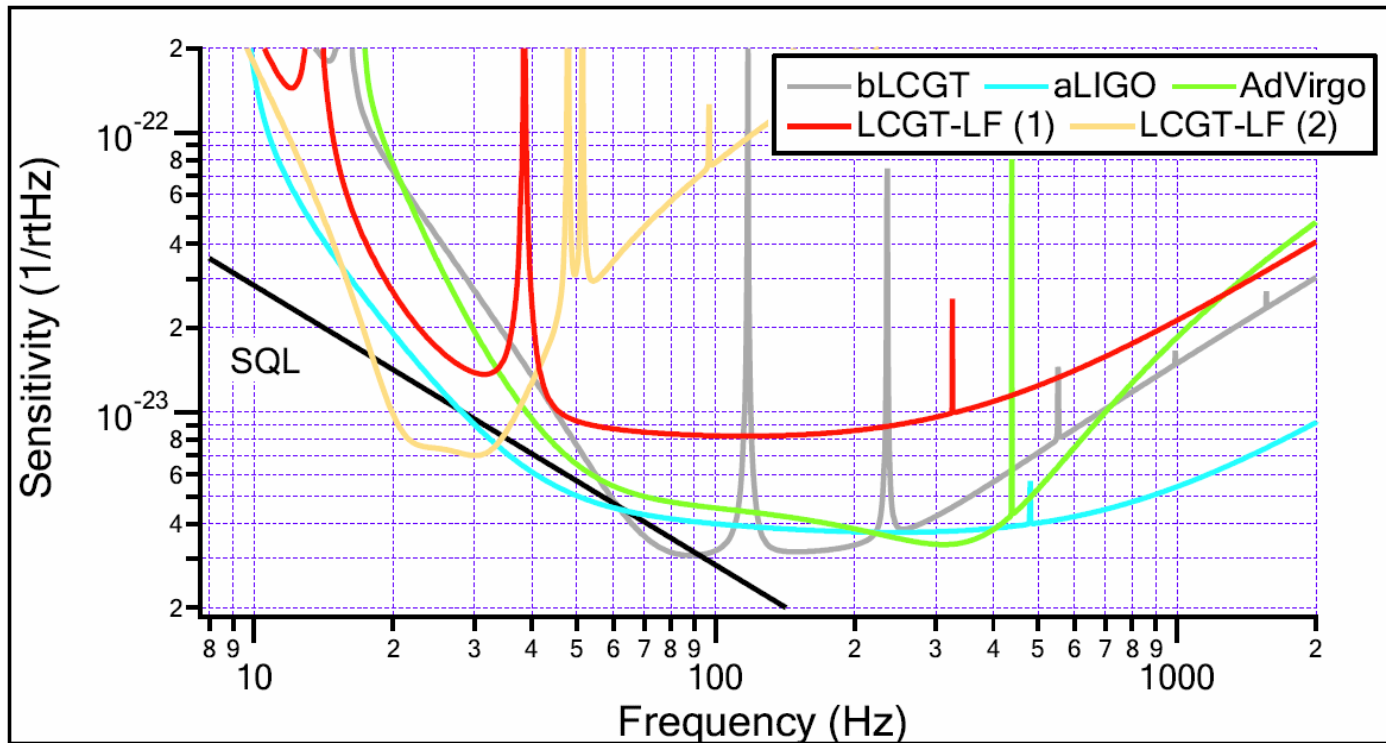
LCGT-LF



- BNS IR=196Mpc
- 100Ms BBH IR=4.2Gpc
- Easier requirement for cooling
- Narrow band

- Input power 1.5~12W
- PRG=11, Rsr=88%
- Finesse 1050
- Fiber length 120cm
- Fiber thickness 1.4mm
- Max 170mW cooling

LCGT-LF(2)



- BNS IR=159Mpc
- No peaks around 100Hz
- bLCGT-compatible by altering fibers
- Worse than aLIGO at any frequency

- Input power 15W
- PRG=11, Rsr=85%
- Finesse 1550
- Fiber length 40cm
- Fiber thickness 0.6mm
- T=32K

Preliminary conclusion

LCGT-LF would be no better than bLCGT for the following reasons:

- There are some attractive GW sources at low freq but we will lose too many at high freq and also lose some information by narrow-banding.
- Xylophone concept does not perfectly work with LCGT and other 2G detectors for different locations.
- Low seismic motion is a strong point of LCGT and cooling Sapphire is a risky point of LCGT, so going LF can be technically more reasonable but we still need to cool mirrors and the schedule would be tight anyhow.