Discussion on Space Gravitational Wave Detection

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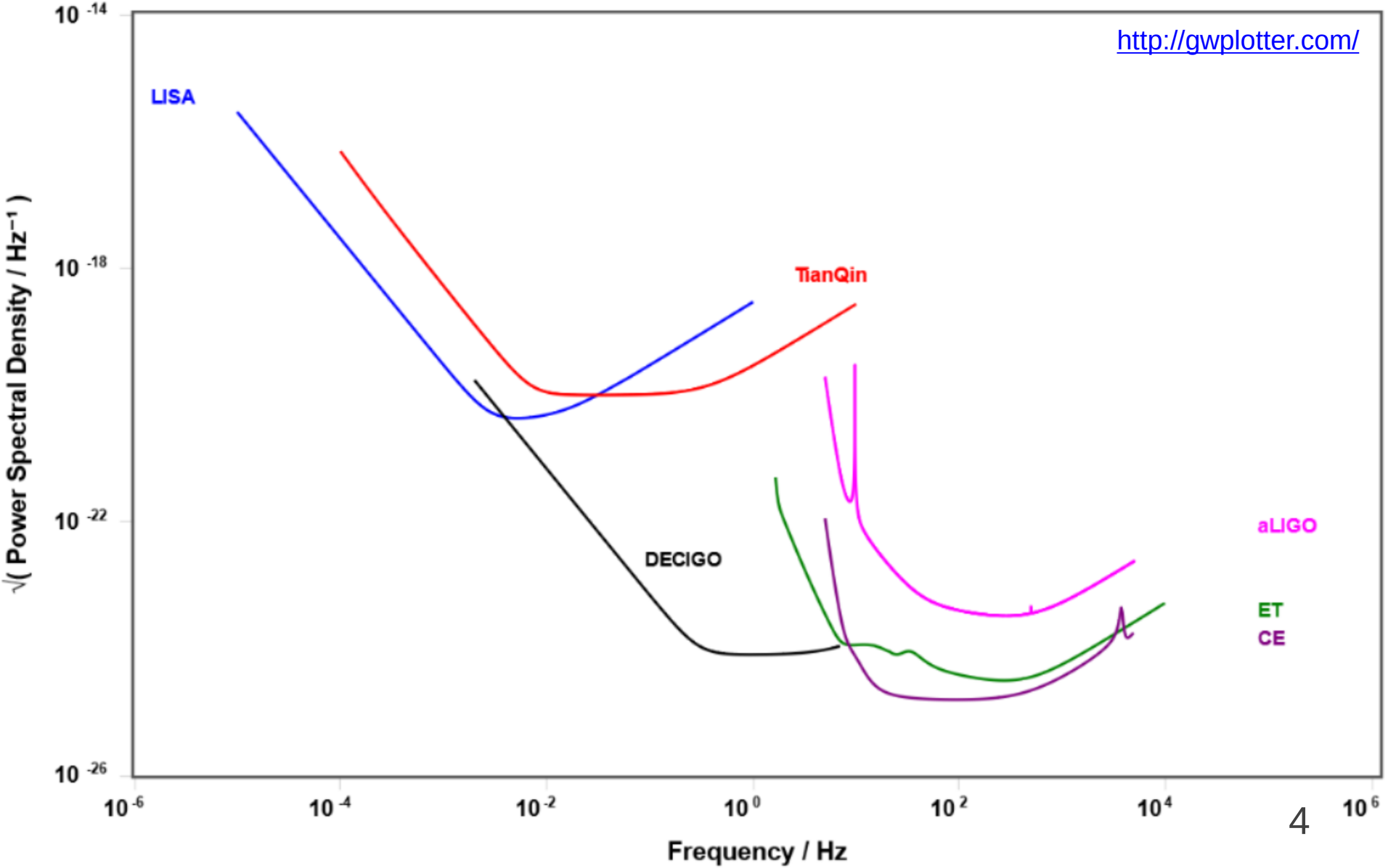
Questions

- How to realize DECIGO-like sensitivity?
  - Possibility in Japan? (vs KAGRA?)
  - FP-type TianQin?
  - Any new ideas?
  - Do we really need DECIGO? Descope?
  - LiteBIRD is enough?
- Any pathfinders? Space demonstrations?
  - Science case for intermediate steps?
- International collaboration?
  - Fabrication, test, launch
- How to attract students?
  - How to increase the number of people?

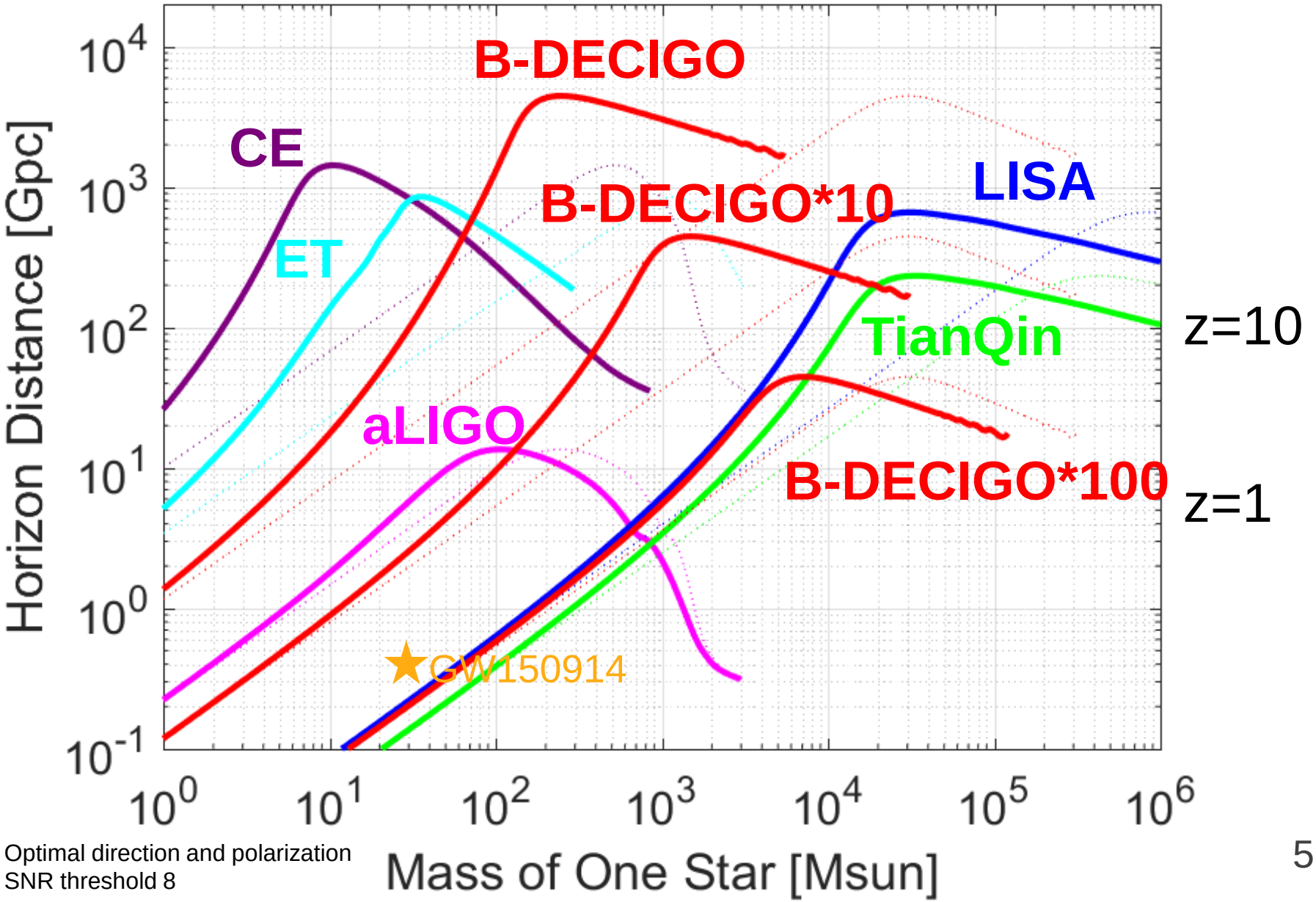
Space GW Detectors

	LISA	TianQin	B-DECIGO
Arm length	2.5e6 km	1.7e5 km	100 km
Interferometry	Optical transponder	Optical transponder	Fabry-Pérot cavity
Laser frequency stabilization	Reference cavity, 1064 nm	Reference cavity, 1064 nm	Iodine, 515 nm
Orbit	Heliocentric	Geocentric, facing J0806.3+1527	Geocentric (TBD)
Flight configuration	Constellation flight	Constellation flight	Formation flight
Test mass	1.96 kg	2.45 kg	30 kg
Acceleration noise	1e-15 N/rtHz	7e-15 N/rtHz	1e-16 N/rtHz

Sensitivity Curves



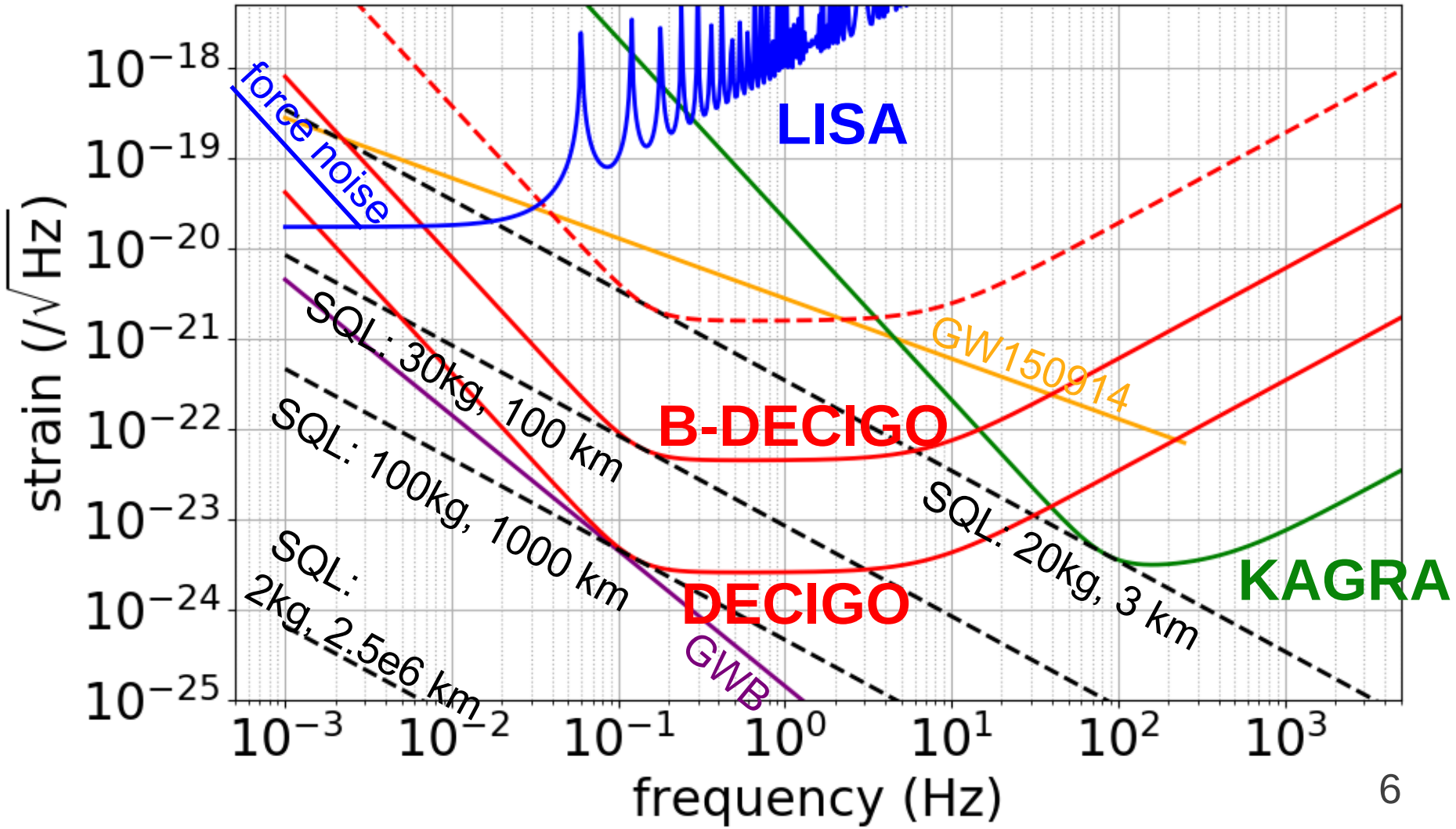
Horizon Distance



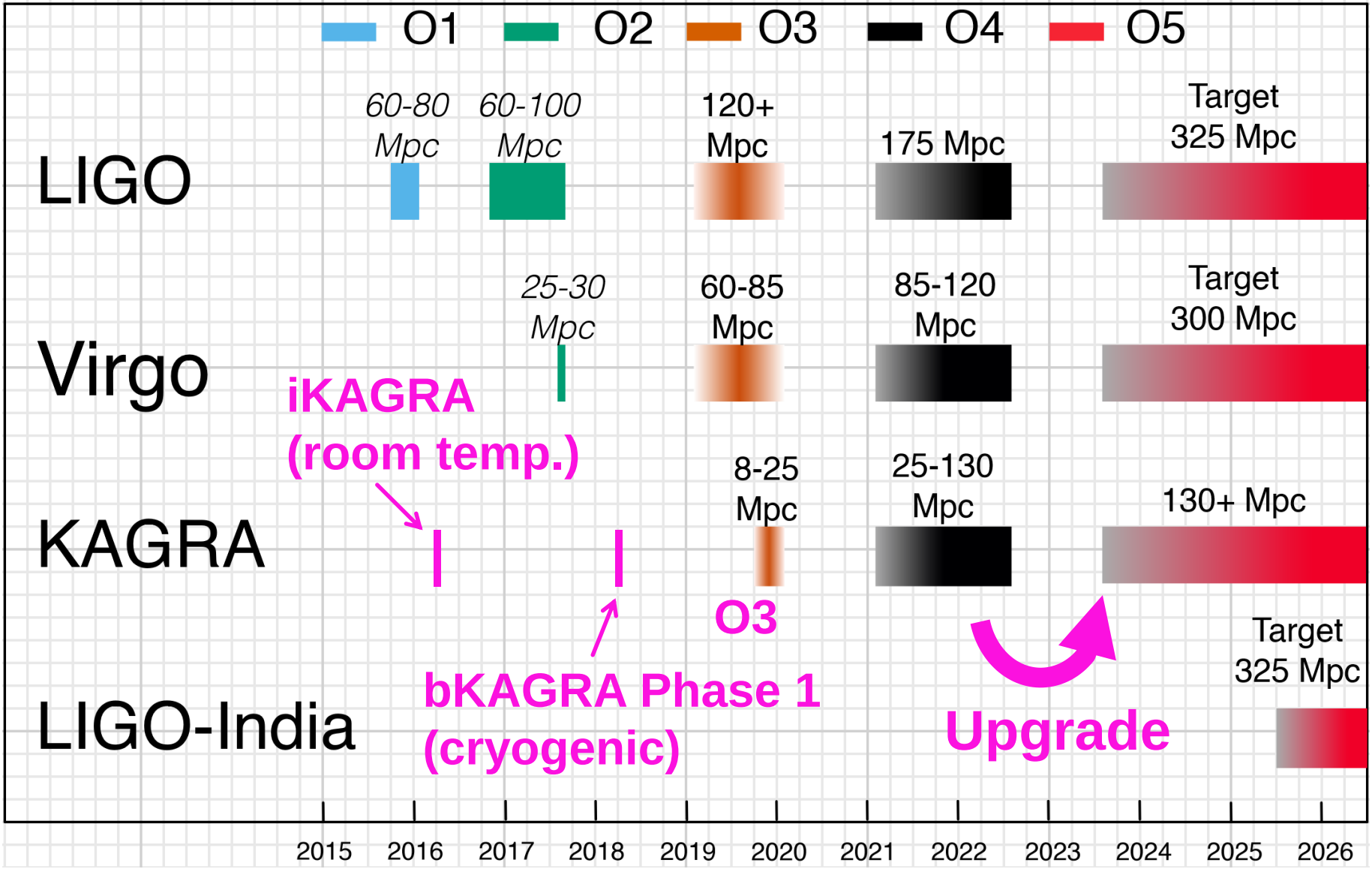
Optimal direction and polarization
SNR threshold 8

Sensitivity Design

NOTE that they are not official sensitivity curves!



Observation Scenario (Ground)



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Roadmap (Ground and Space)

https://www.dropbox.com/s/wxe1taqa1nsw1oi/spaceGW181113_ando.pdf