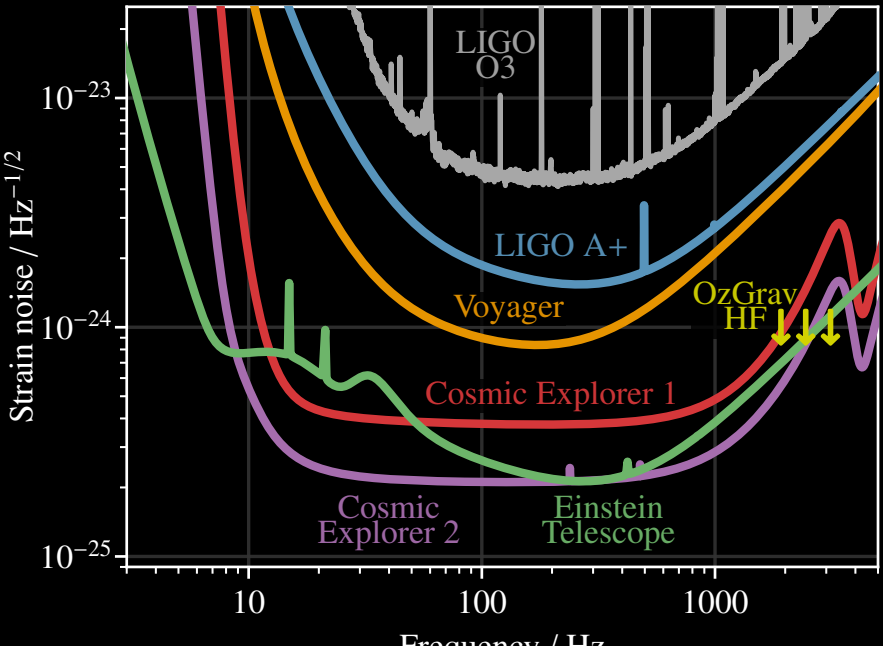
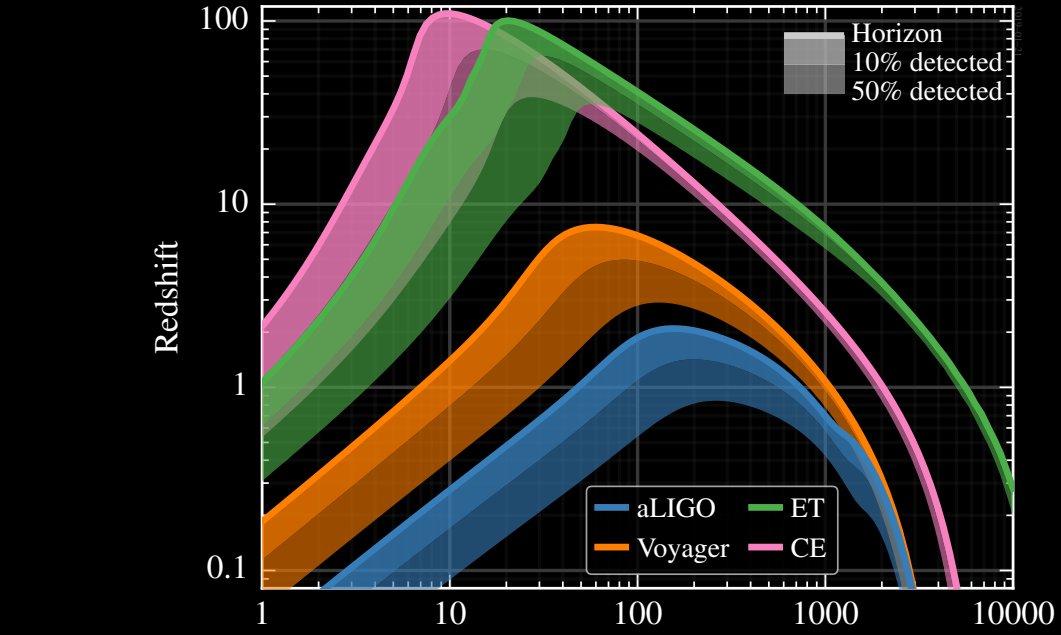
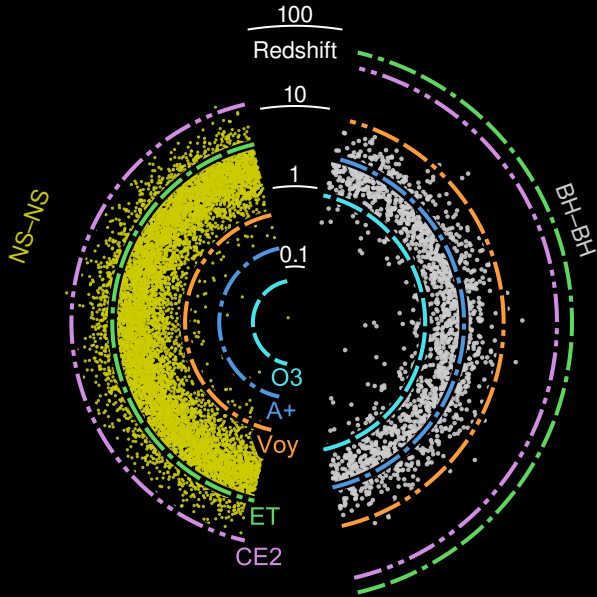

LIGO
O3
LIGO A+
Voyager
OzGrav
HF
Cosmic Explorer 1
Cosmic
Explorer 2
Einstein
Telescope
10^{-23}
10^{-24}
10^{-25}
Strain noise / $Hz^{-1/2}$
10
100
1000
Frequency / Hz



Hall/Miller, T1800084



Hall/Vitale, GW900803; after arXiv:1903.04615

What is Voyager?

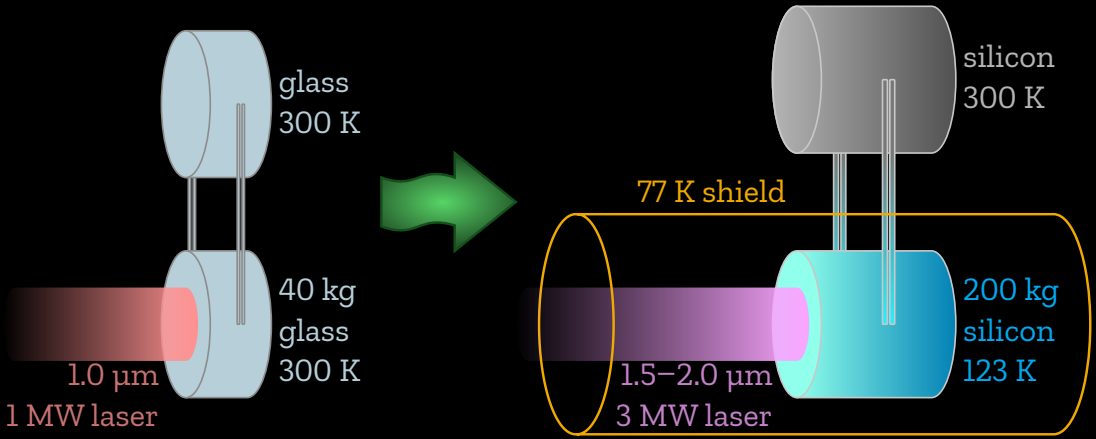
A concept for a cryogenic silicon interferometer in the existing 4 km facilities.

Open questions: what is the timeline, how many facilities would be upgraded?

Cryogenic silicon requires significant R&D (already underway)

RX Adhikari et al., (2019), arXiv:1905.02842

From aLIGO to Voyager



What is Cosmic Explorer?

A new 40 km detector facility, conceived in two stages:

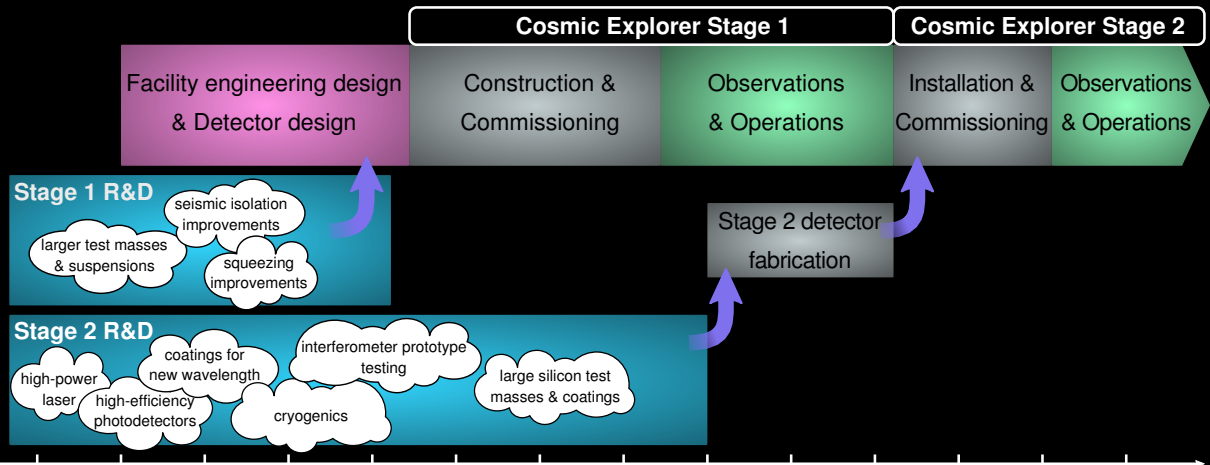
- Stage 1 (2030s): room-temperature silica (aLIGO technology)
- Stage 2 (2040s): cryogenic silicon (Voyager technology)

Open questions: how many CEs to build, and where to place them

Astro2020 Decadal whitepaper: arXiv:1903.04615

BP Abbott et al., Classical and Quantum Gravity **34**, 044001 (2017)

Possible CE timeline (under development)

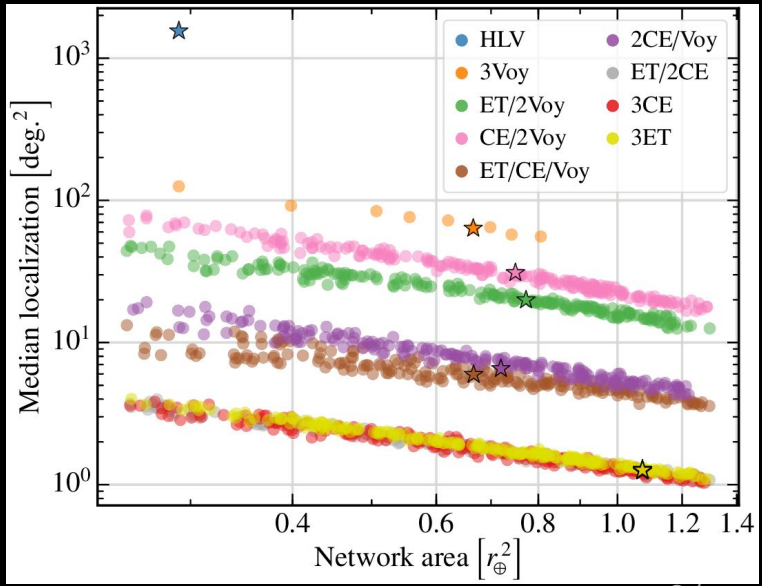


The global 3G network

The composition of the 3G network is not known: how many ET, CE, Voyager...?

Think about how your analyses depend on the number, type, and location of detectors.

(Example: many, many randomly placed networks and their localization capabilities for BNSs at $z = 0.3$.)



Hall, Evans, arXiv:1902.09485

A few words about low frequency

Low frequency performance is hard to achieve.

Don't expect good sensitivity at 1 Hz.

- aLIGO goal is 10 Hz (currently 20–30 Hz)
- CE goal is 5 Hz
- ET goal is 3 Hz

Think about how your analyses depend on low-frequency performance

Example: early-warning SNR threshold for a close-by BNS