

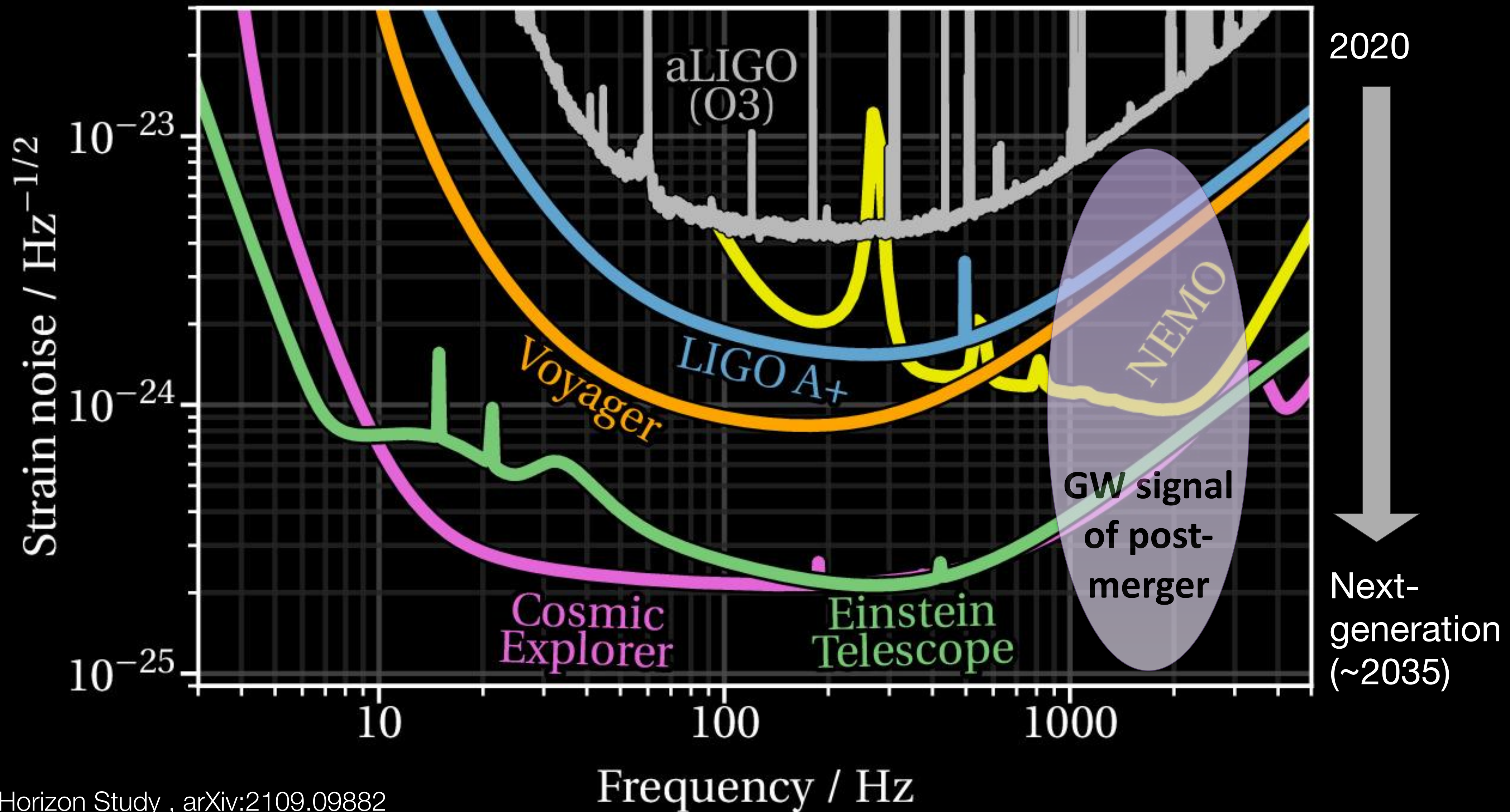
Future Prospects for Gravitational-Wave Observations

INT Workshop 22r-2a "Neutron Rich Matter on Heaven and Earth"

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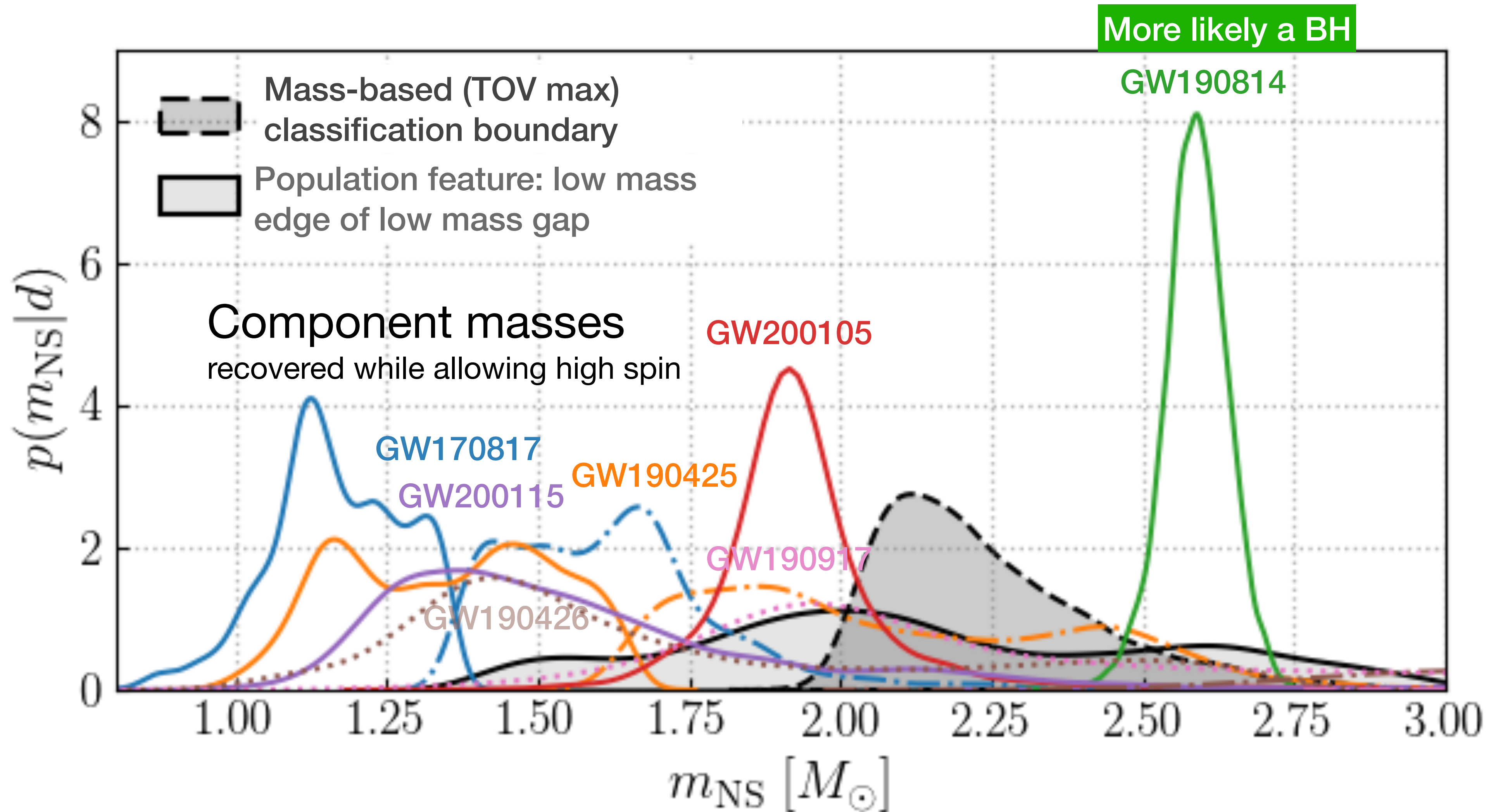
GW Landscape



2020

Next-generation (~2035)

So far: Low-mass objects observed in GW



The work of the LSC is supported by NSF's LIGO Laboratory which is a major facility fully funded by the National Science Foundation.

LVK Observing Plan



Updated
2023-05-16

O1 O2 O3 O4 O5

80 Mpc 100 Mpc 100-140 Mpc 160-190 Mpc 240-325 Mpc

LIGO

30 Mpc 40-50 Mpc 70-100 Mpc 150-260 Mpc

Virgo

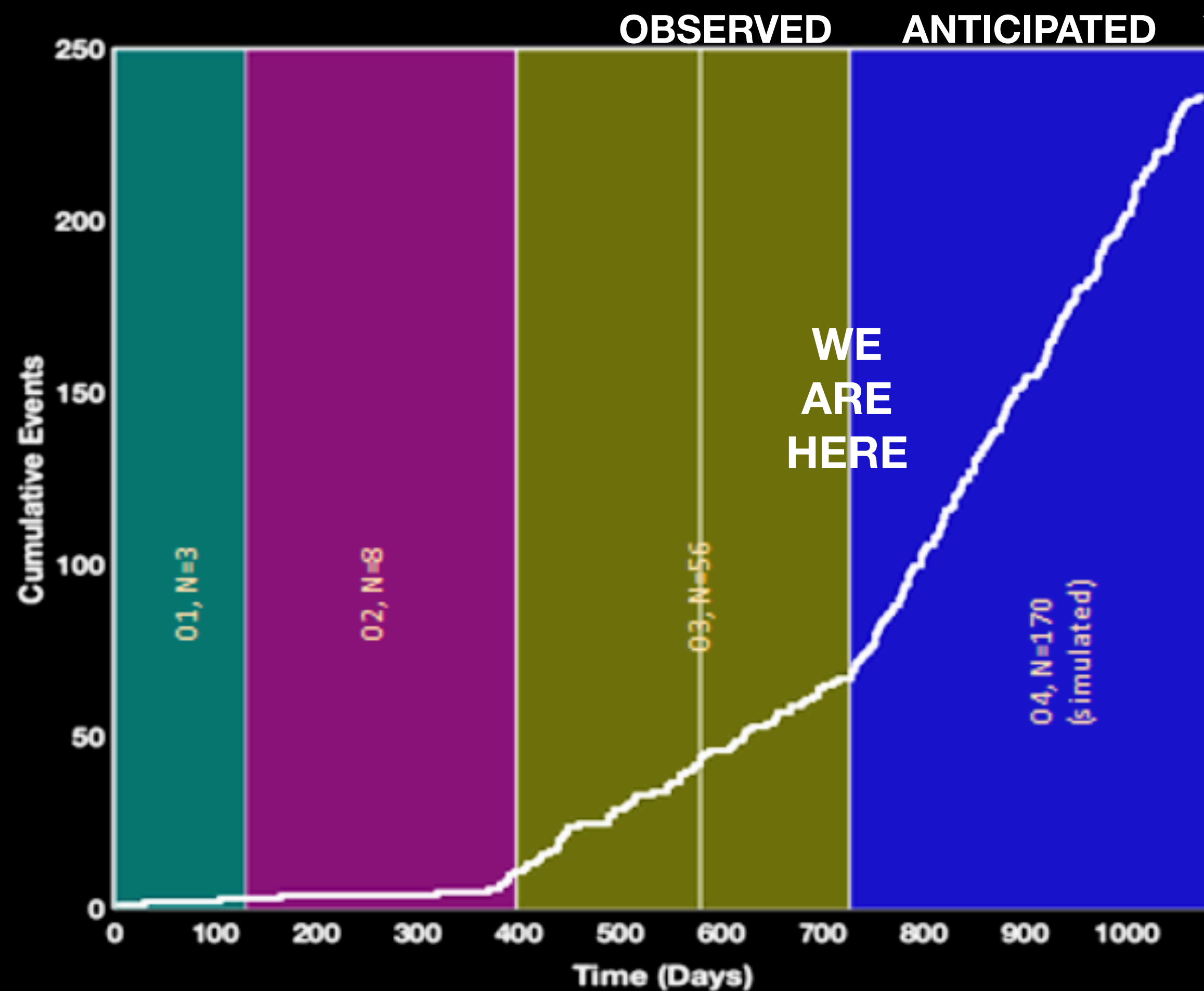
0.7 Mpc 1-3 Mpc ≈ 10 Mpc ≥ 10 Mpc 25-128 Mpc

KAGRA

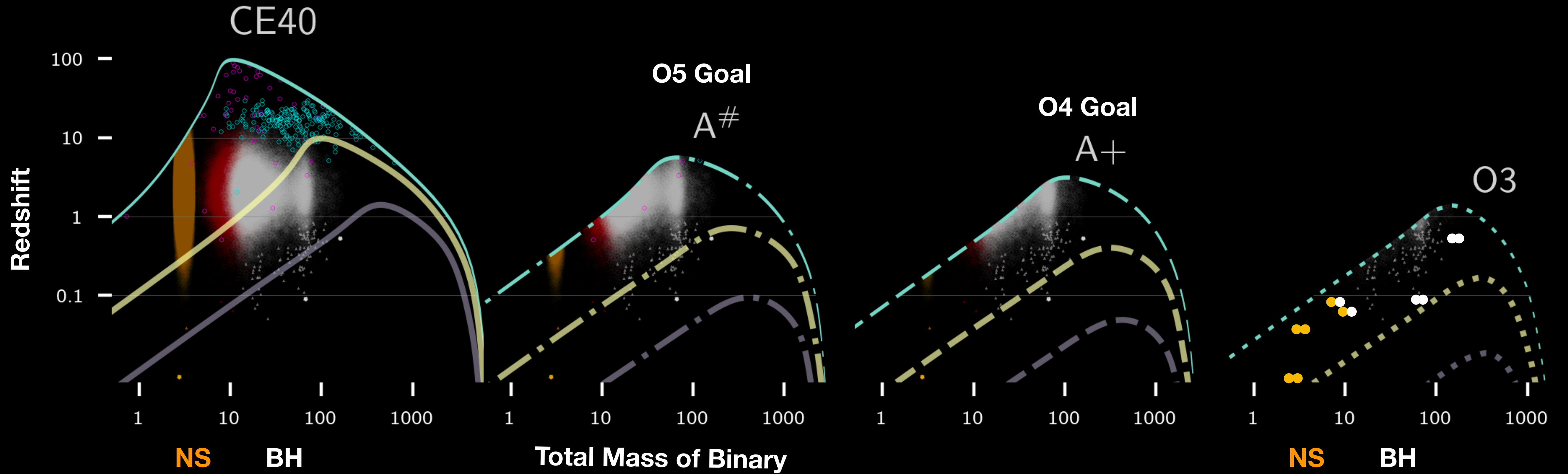
G2002127-v19

2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029

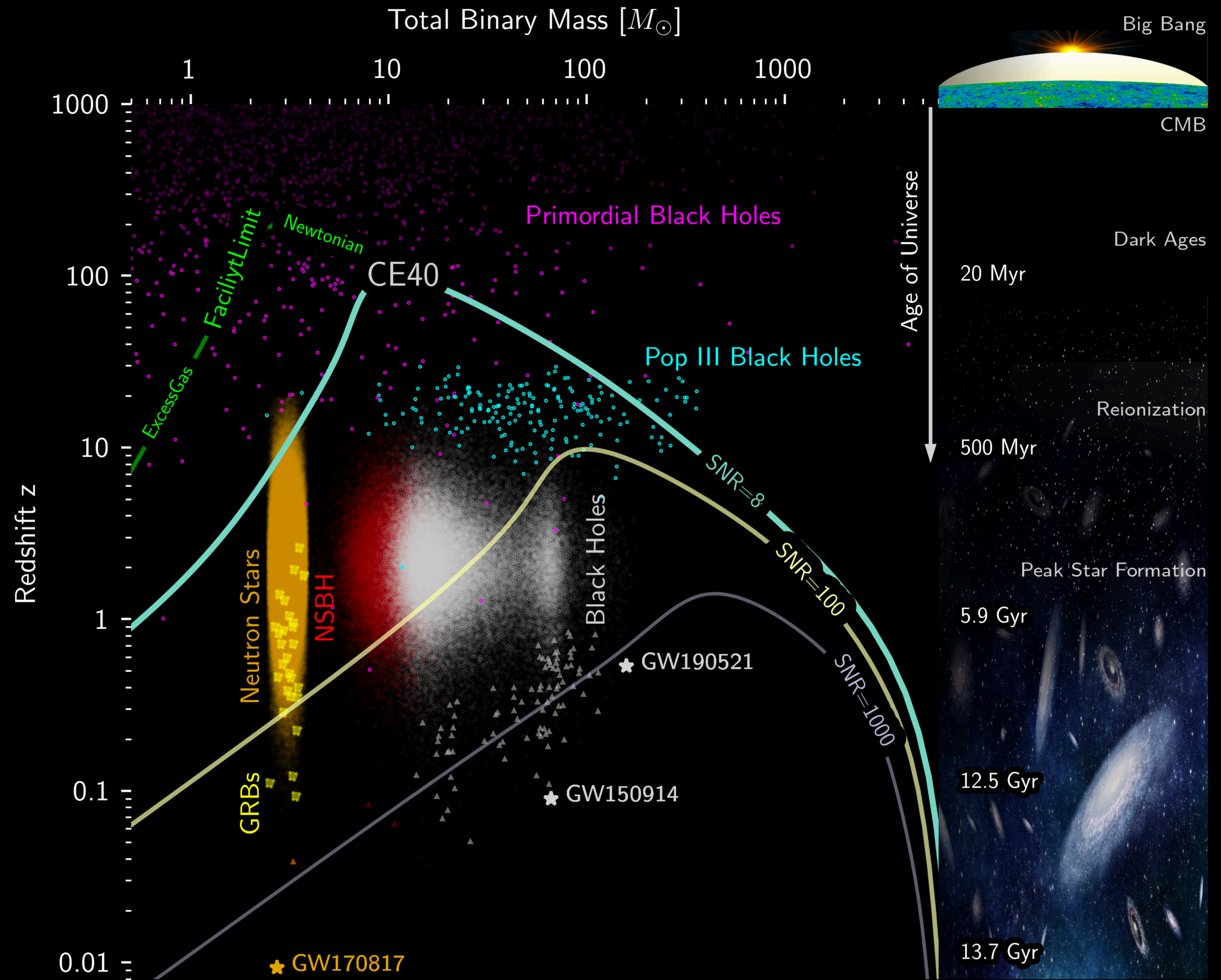
- 15 significant alerts in O4 so far (https://gracedb.ligo.org/latest/?query=GCN_PRELIM_SENT)
 - Which likely have a NS? S230518h, S230529ay
 - O4 target BNS search volume of $0.016 \text{ Gpc}^3 \text{ yr}$ ($\sim 4\times$ previous total)
 - goal BNS range $\sim 190 \text{ Mpc}$
- LVK Observing Scenarios Document, [LIGO-P1200087](https://arxiv.org/abs/2308.14234)



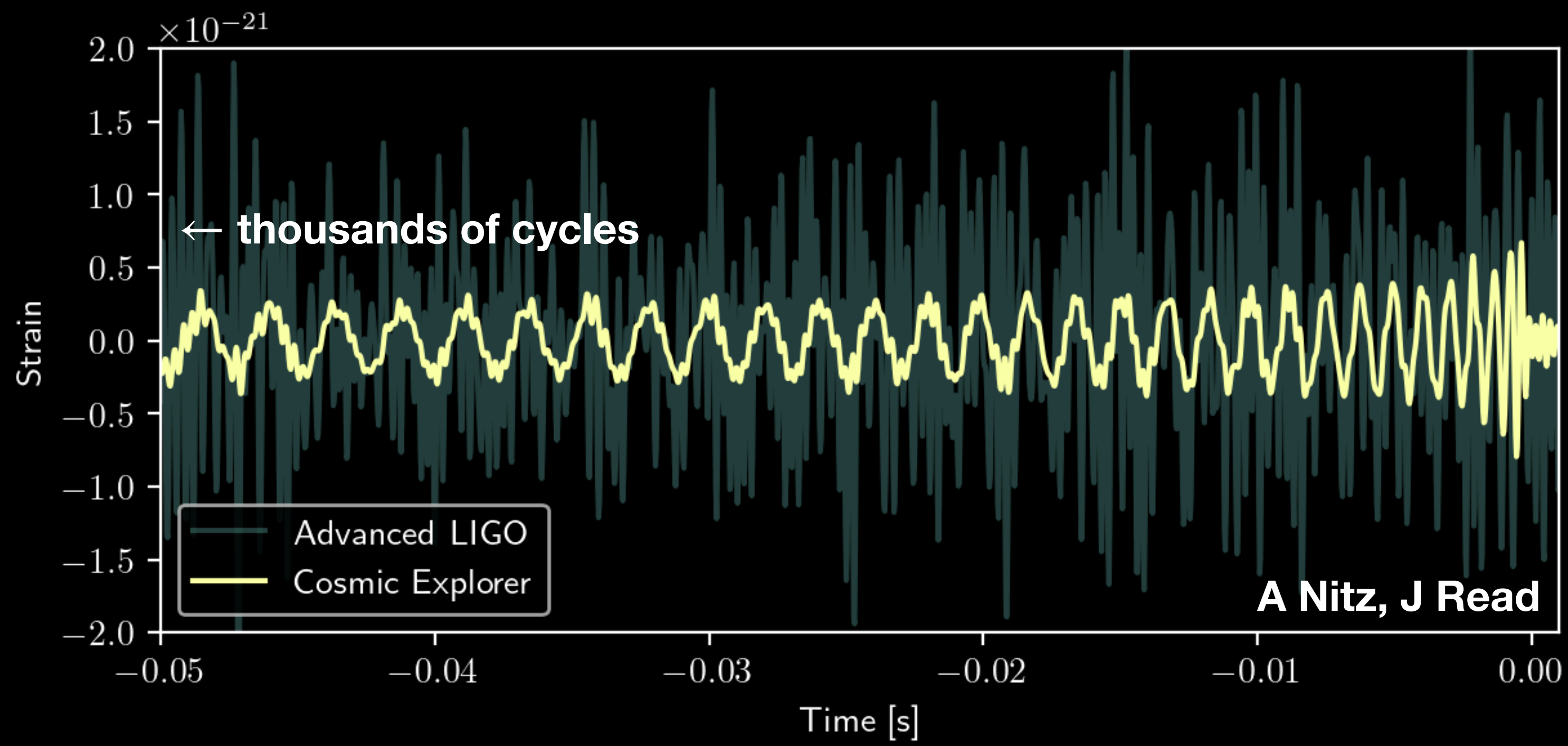
Unveiling the GW Universe



ngGW Universe



170817-like inspiral



Timeline

White Paper for NSF MSCAC
ngGW , arXiv:2109.09882

