AAS GWSIG Update

Kelly Holley-Bockelmann
Chair, GWSIG
k.holley@vanderbilt.edu

GWSIG's 2018 push: connect with and welcome astronomers to LISA

'Advoreach' (advocacy+ outreach)

LISA is happening! To get the most science out of LISA, we need to build capacity in the new field of gravitational wave astronomy. This requires a huge, formal, and persistent effort to train and learn from scientists at all levels, from senior faculty to undergraduates.

Preparing the Astronomical Community for LISA Science

Host Decadal Town Hall meetings all across the US

Think-tanks/workshops with astronomers

Short primer on GW Astro —> post on arXiv. Add links to observer tools (reincarnate observer tools)

‘Science vignettes’ featuring how GWs can help address a problem

Deploy GWSIG members to give LISA talks/colloquia in US

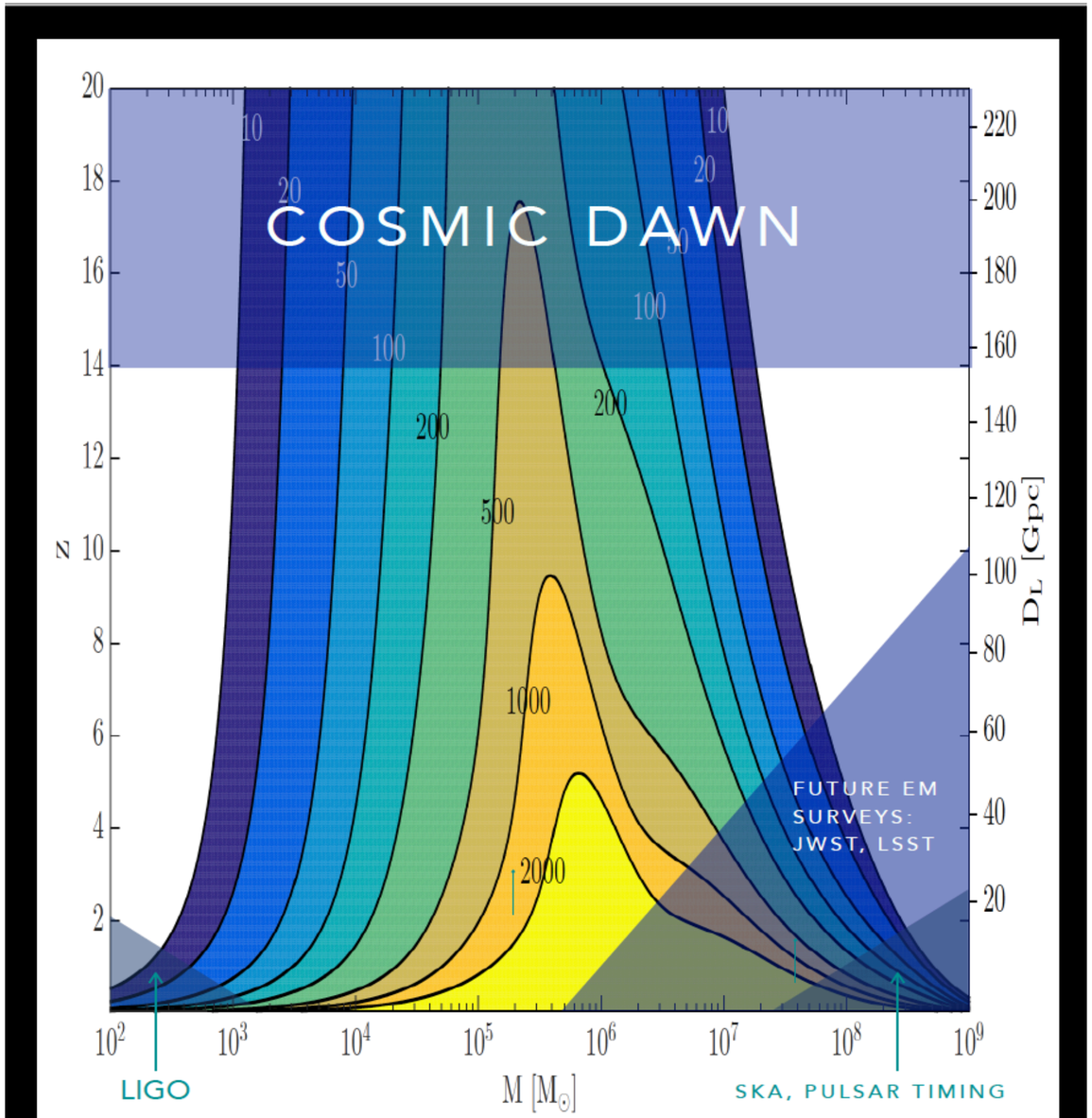
Coordinate with NASA Physics of the Cosmos Multi-Messenger Science Analysis Group

DO YOU LIKE SUPERMASSIVE BLACK HOLES?

LISA WILL DETECT SUPERMASSIVE BLACK HOLES MERGING OUT TO Z~20.

THE UNIVERSE TALKS. LISA WILL LISTEN

lisa



LISA IS DESIGNED TO DETECT THE INSPIRAL AND MERGER OF INTERMEDIATE AND MASSIVE MILKY WAY-CLASS BLACK HOLES WITH SIGNAL-TO-NOISE RATIOS IN THE HUNDREDS THROUGHOUT THE CURRENTLY OBSERVABLE UNIVERSE AND INTO THE COSMIC DAWN, AN EPOCH INACCESSIBLE WITH TRADITIONAL SURVEYS.

Time to think about how LISA complements future missions

@GWSIG this morning

LUVOIR and LISA
John O'Meara

Lynx and LISA
Rob Petre

in exchange for:

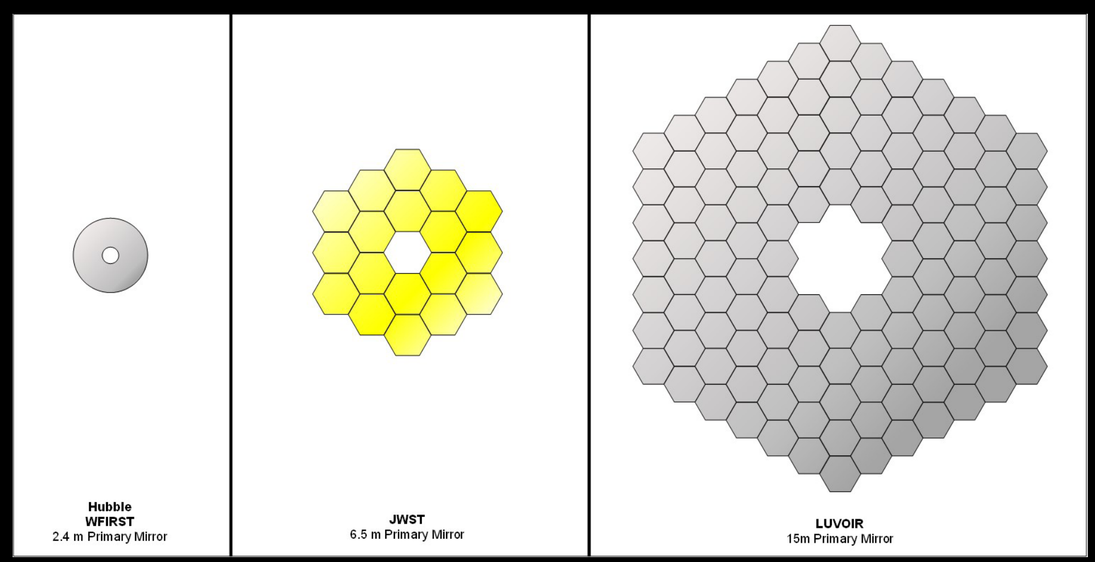
LUVOIR Splinter meeting: Tuesday@2pm

LISA and LUVOIR
Kelly Holley-Bockelmann

Upcoming APS presence, discussion at this meeting about further LUVOIR/LISA meet up

LUVOIR + LISA = AWESOME

- Accurate SMBH masses out to z~8
- Trace the history of SMBH formation and the dependence on environment
- Binary SMBH?
- Observations of compact binaries
- Recoiling AGN



LUVOIR-A

LUVOIR can help maximize LISA science, even without electromagnetic counterparts!

— accurate black hole mass **measurements** up to z~8 for 10^5<10^7 M⊙

— connecting SMBH birth/growth during the dark ages

— the type of galaxy for SMBH hosts

— BH occupation fraction up to z~8 and for Mgal=small

— find evidence of binary black holes (enlist time-domain?)

— look for recoiling AGN (can get 3-d space velocity) — maps to SMBH spin and mass ratio before SMBH merger

— measure galaxy merger rate to constrain SMBH merger dynamics

— hypervelocity stars from 3-body scattering out to Coma?

— pulsar planets, nearby highly eccentric and/or hot Jupiter planets (regardless of inclination)

— nuclear structure to connect EMRIs to tidal disruption events, and to constrain core scouring

— observations of compact binaries to better understand common envelope phase

Dear LISA Community: **We're in this together.** We need writers, speakers, artists, excited people, nitpickers, and hard workers to share the load!

Thanks!