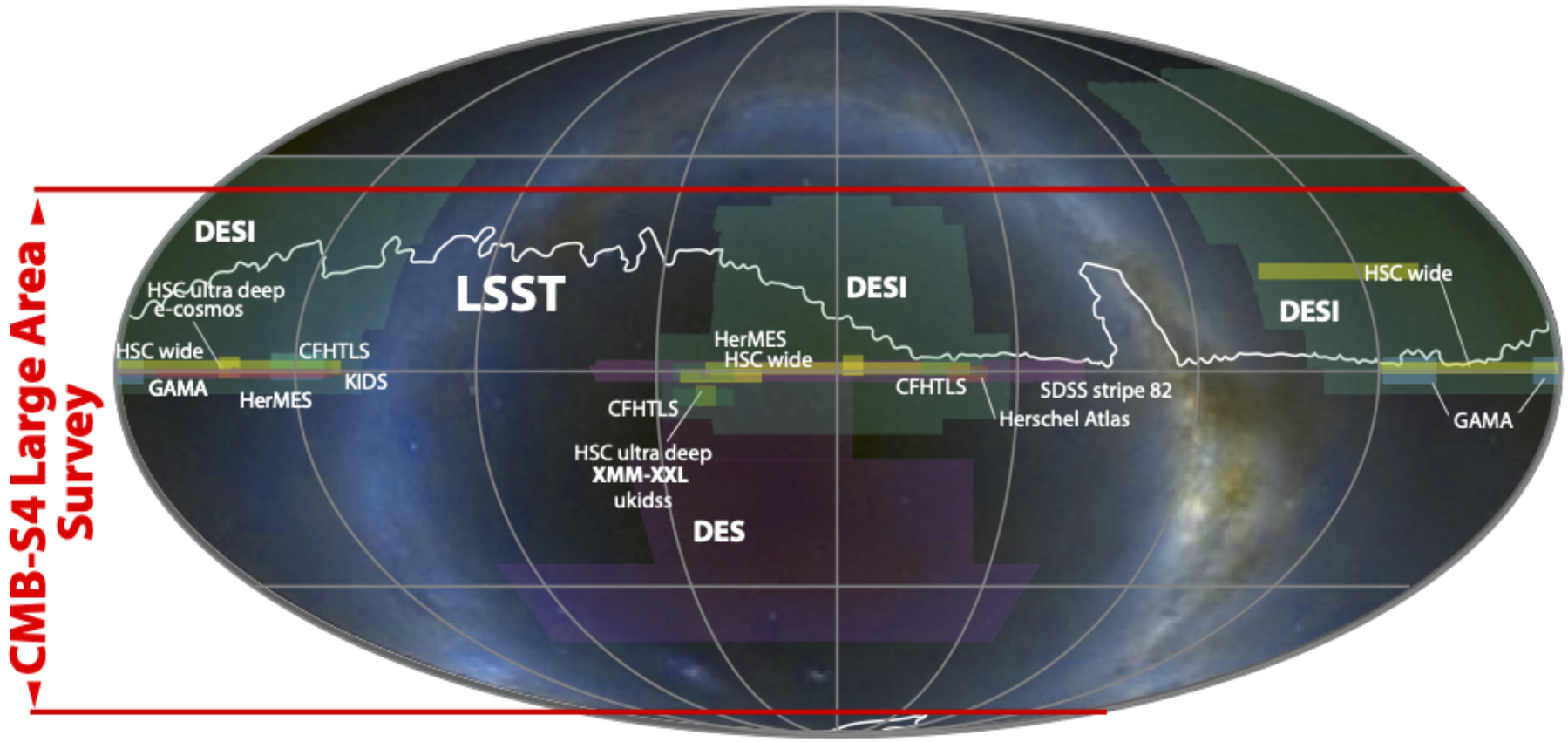
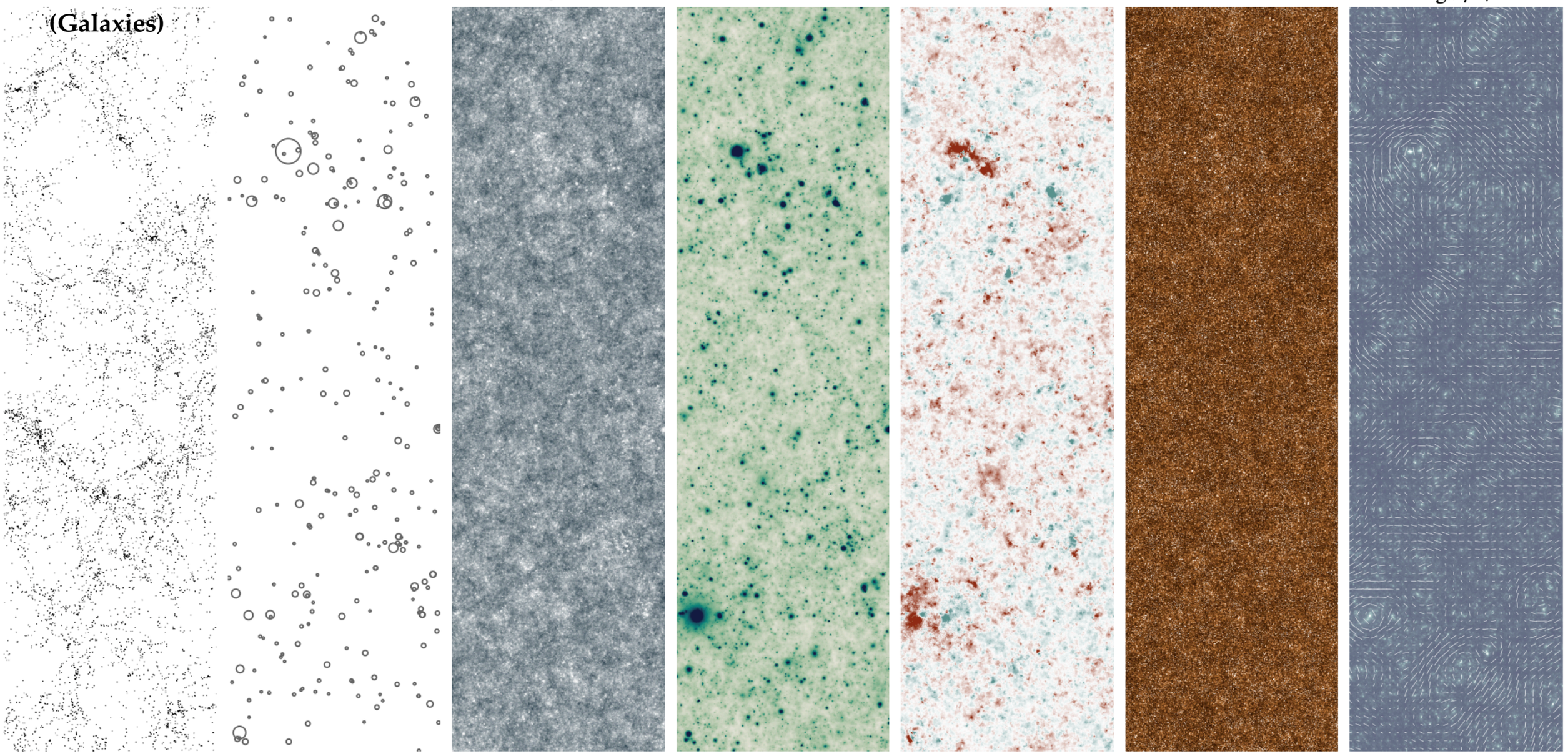
CMB Lensing x Galaxy Surveys

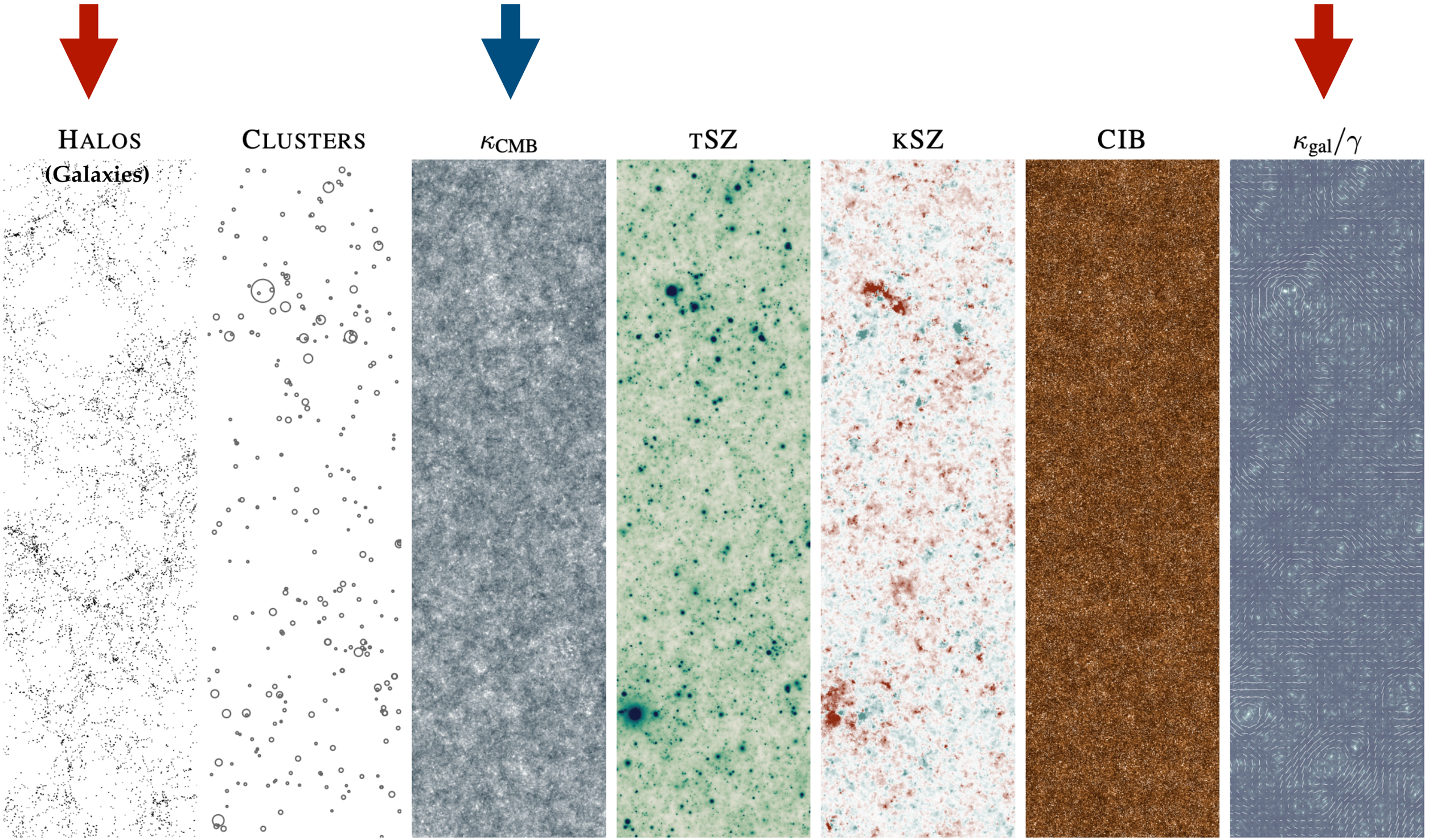
CMB-S4 2022 Spring Collaboration Meeting

Chihway Chang (UChicago/KICP)





https://arxiv.org/abs/2203.06795 (Baxter, CC, Hearin et al.; Image credit: Yuuki Omori)



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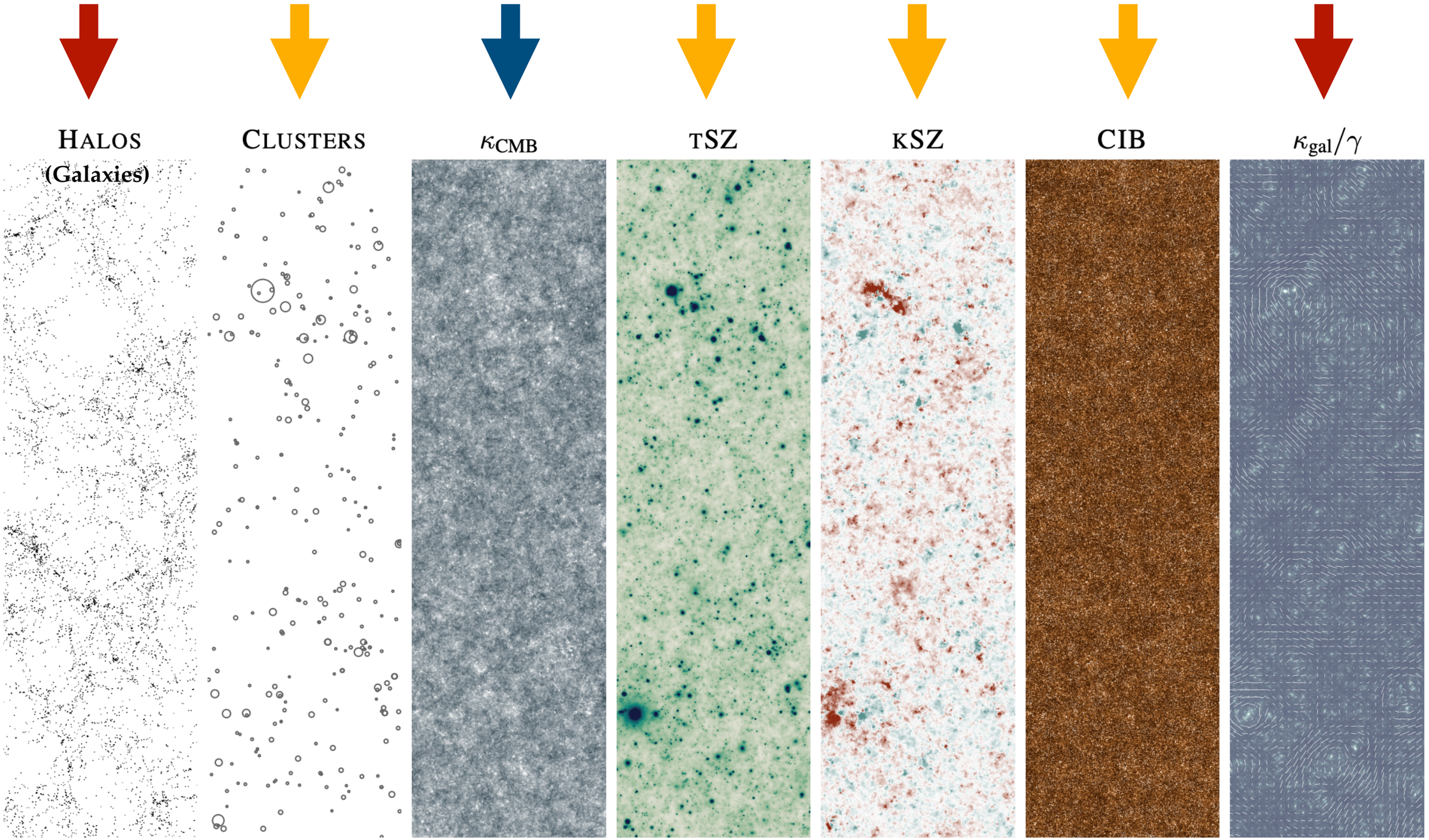

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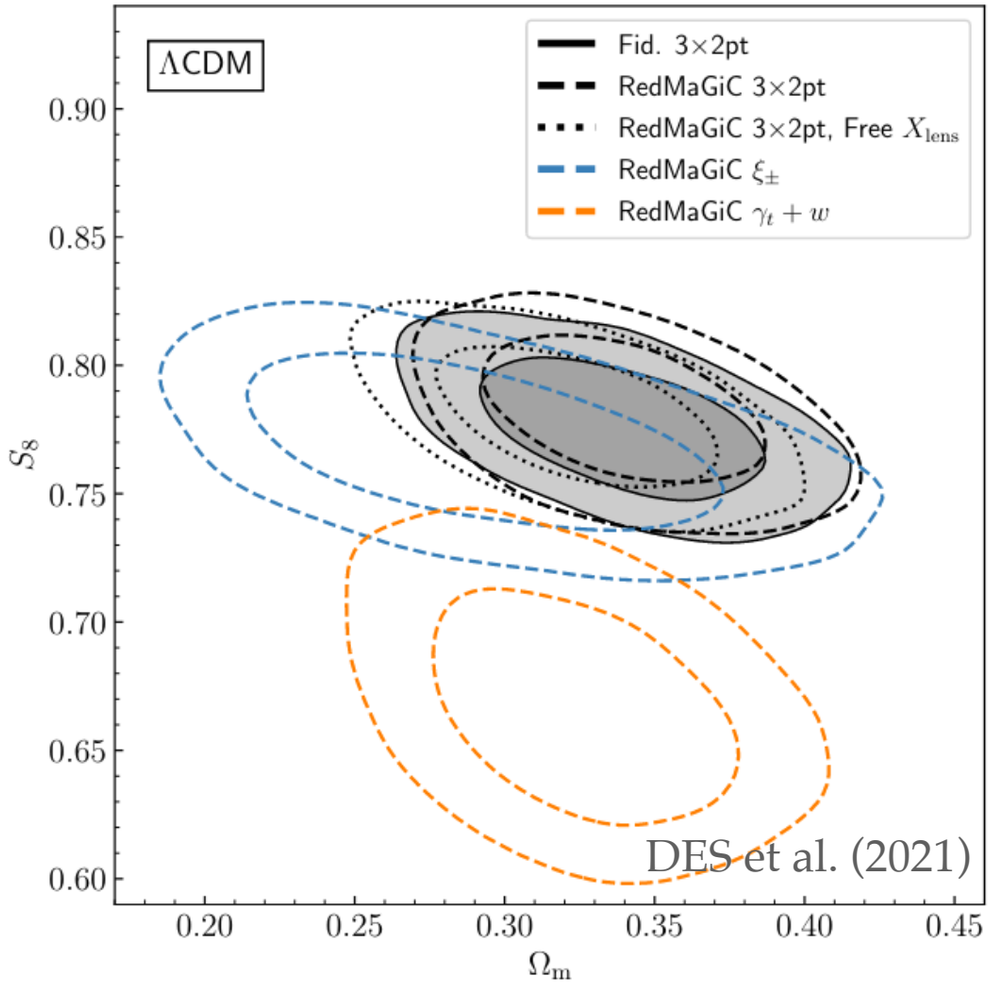
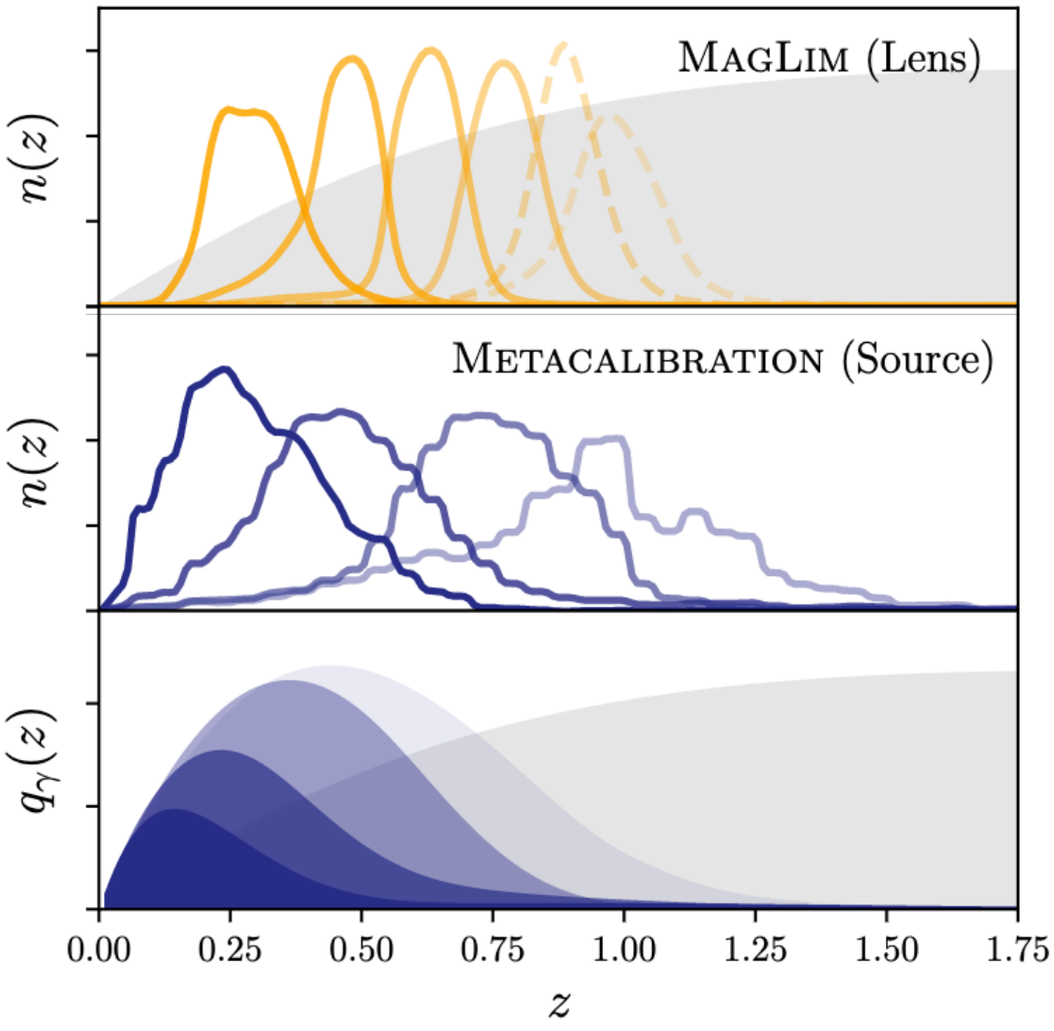
Why cross-correlate?

- Access to **high-redshift** large-scale structure (LSS) information: dark energy, gravity, neutrinos, primordial non-Gaussianity
- Increased **robustness** in LSS cosmology: astrophysical and observational systematics





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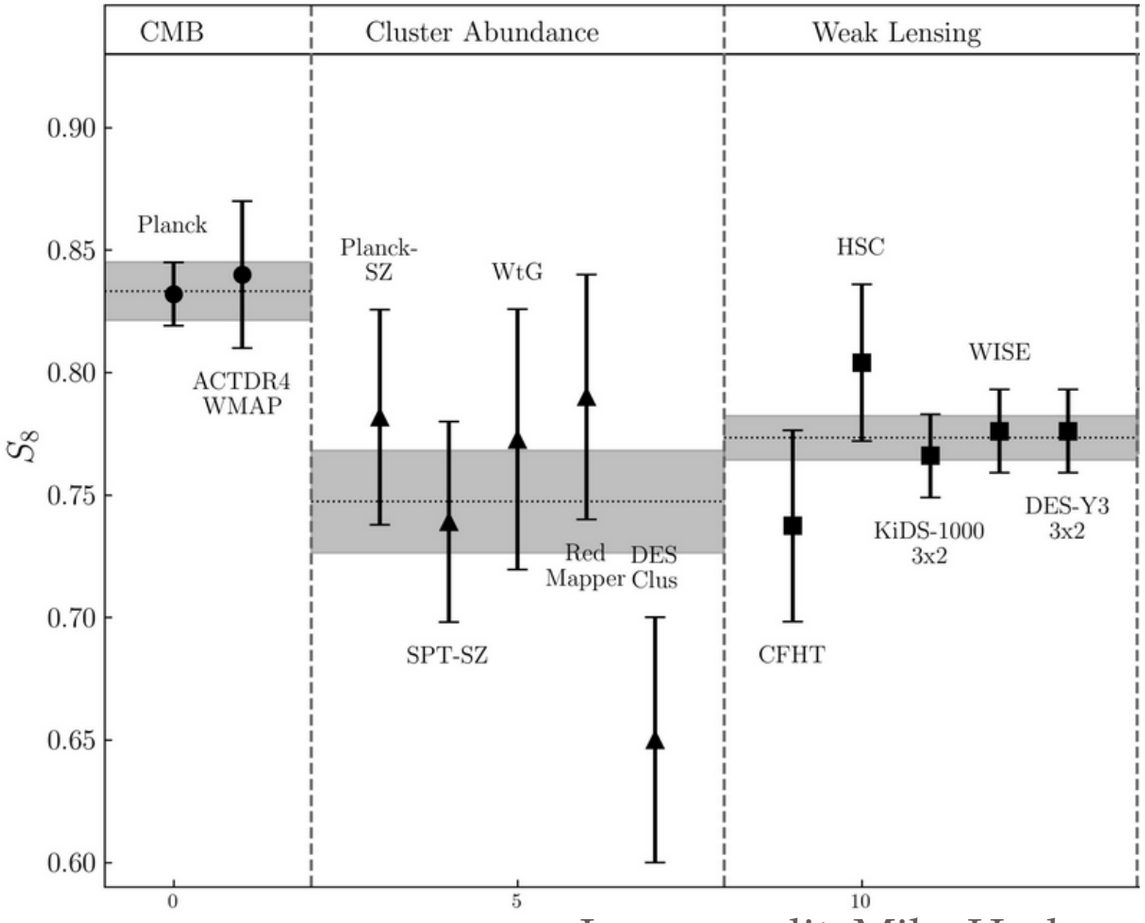
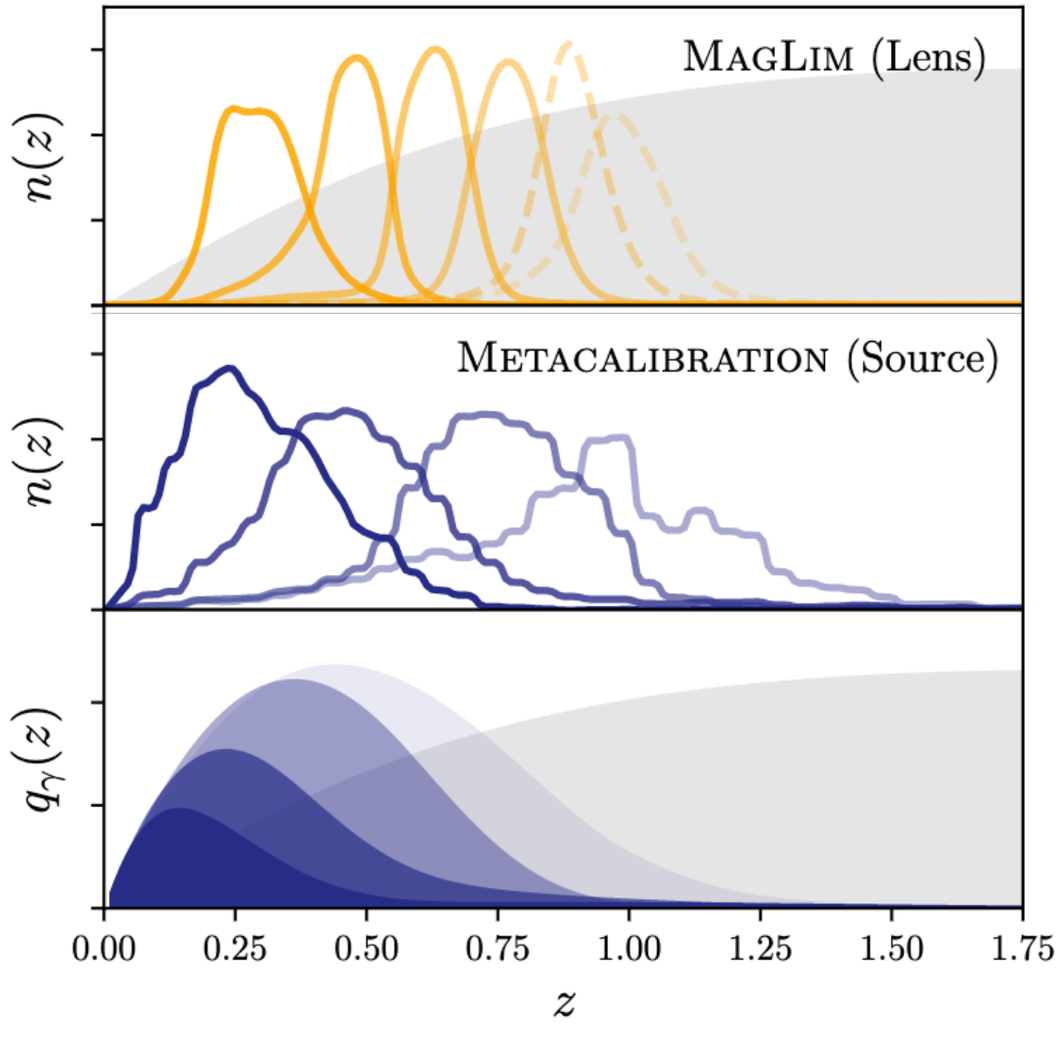
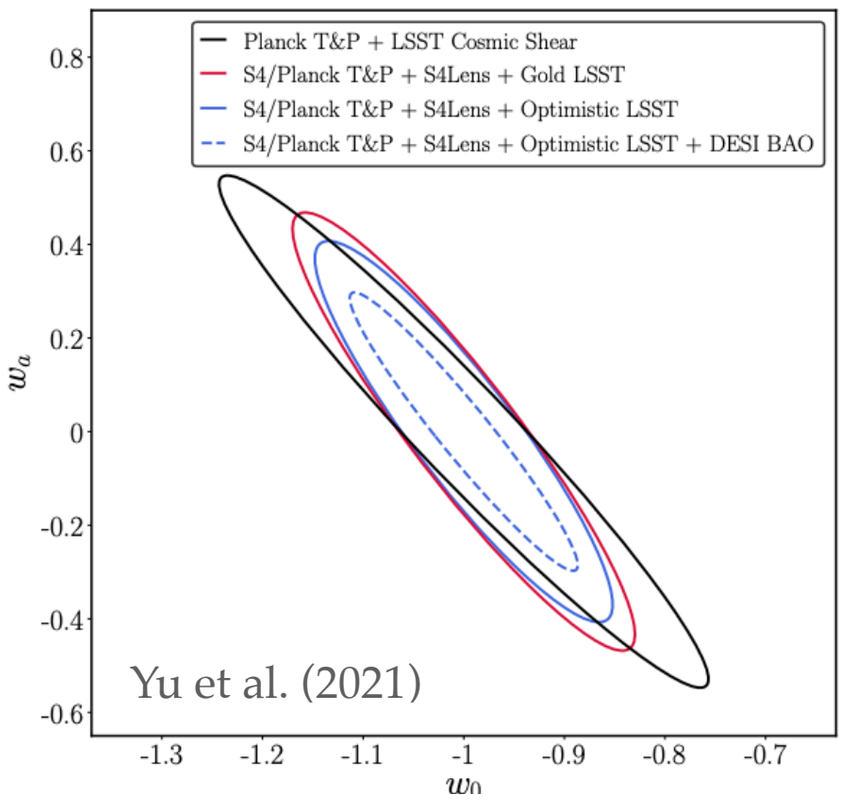
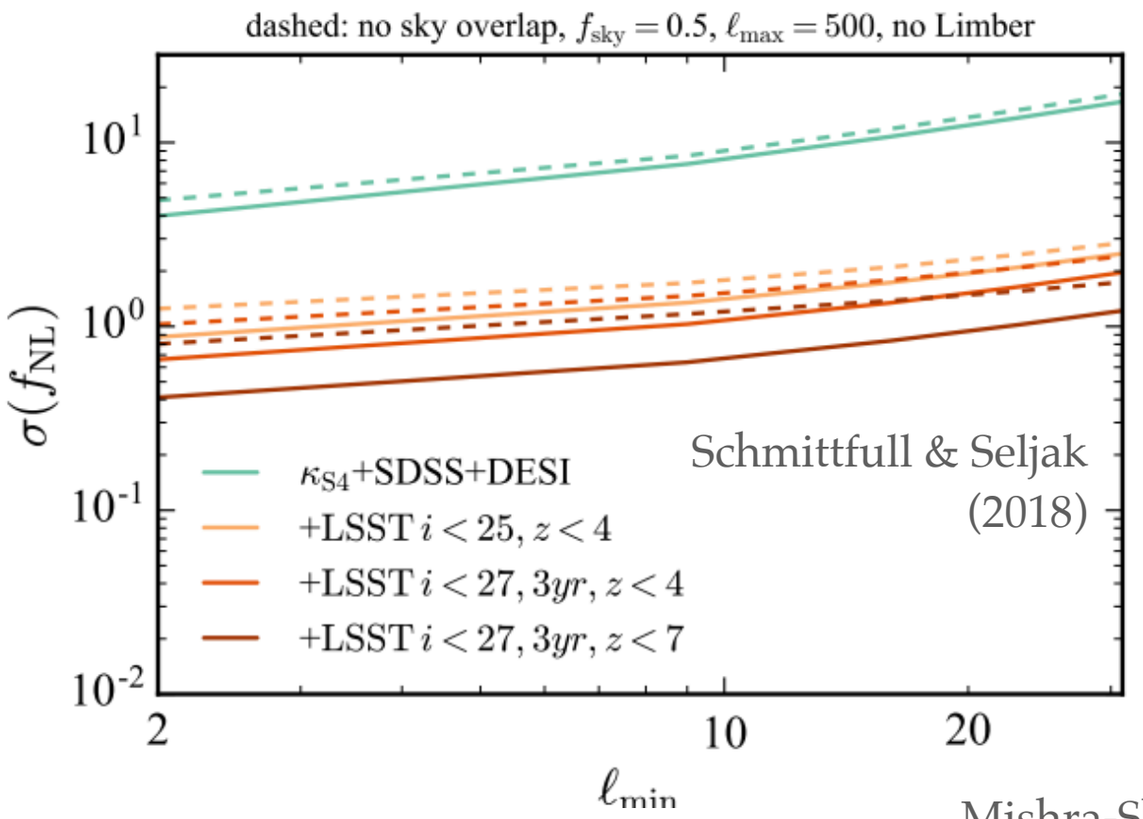


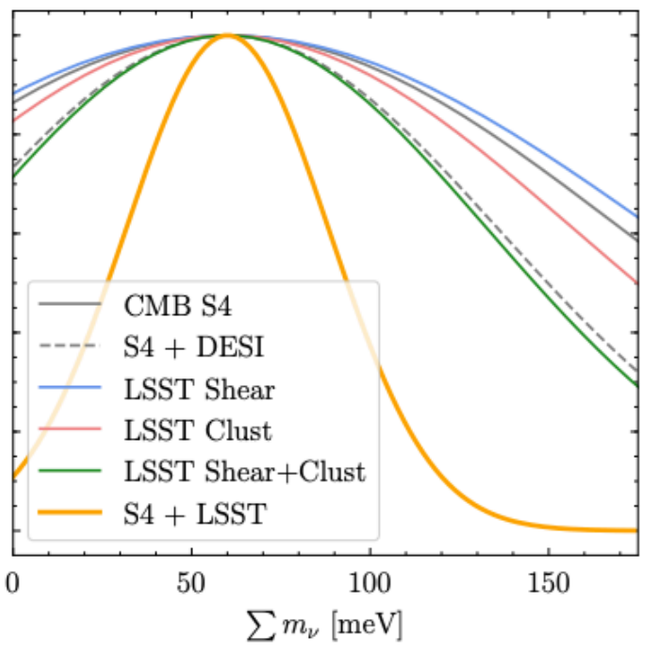
Image credit: Mike Hudson

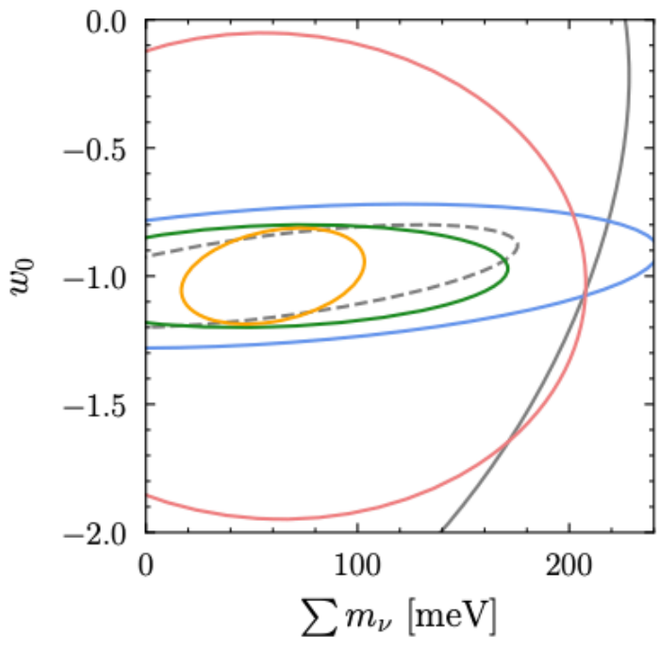


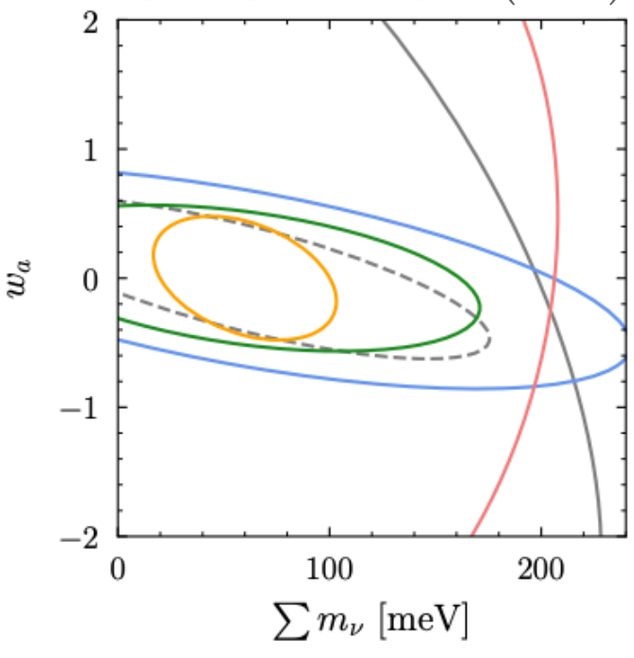
It's promising!









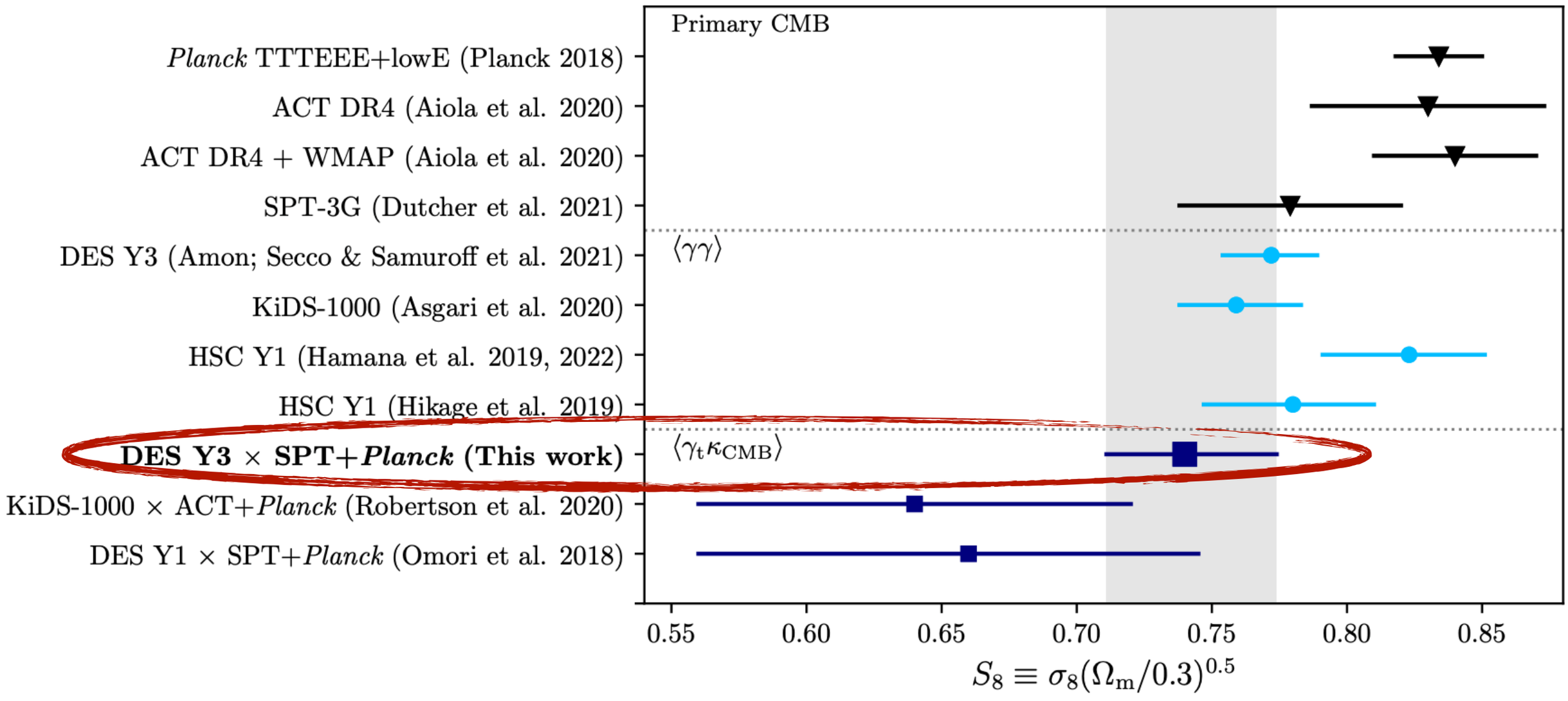


Mishra-Sharma et al.(2018)

Where we are *now*

Current constraints are already competitive! But, devils are in the details… there are many things we learn from doing this with Stage-III data.

CC, Omori, Baxter et al. (2022)



Where we are *now*

Current constraints are already competitive! But, devils are in the details… there are many things we learn from doing this with Stage-III data.

- CMB lensing x galaxy surveys can now provide meaningful cosmological constraints
- Technological advances in analysis
- Need to improve on small-scale modeling
- We do not forecast surprises
- Cross-survey, cross-collaboration analyses takes real effort and real dedicated sources: joint simulations, joint analysis tools, cross-collaboration infrastructure

Thanks!

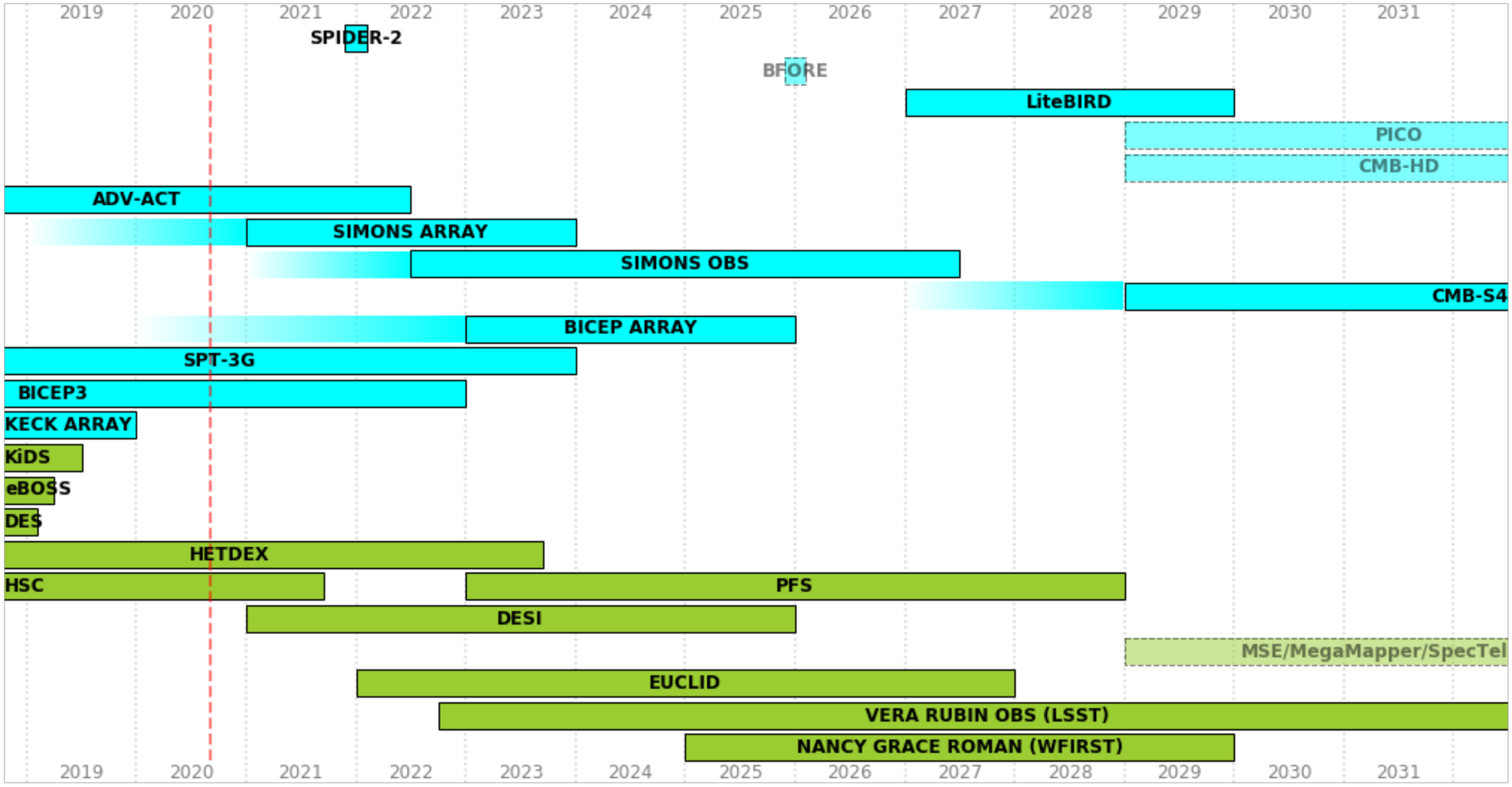


Image credit: David Kirkby