

Discussion session: “Tensions”

Discussion session: tensions

Pick your tension

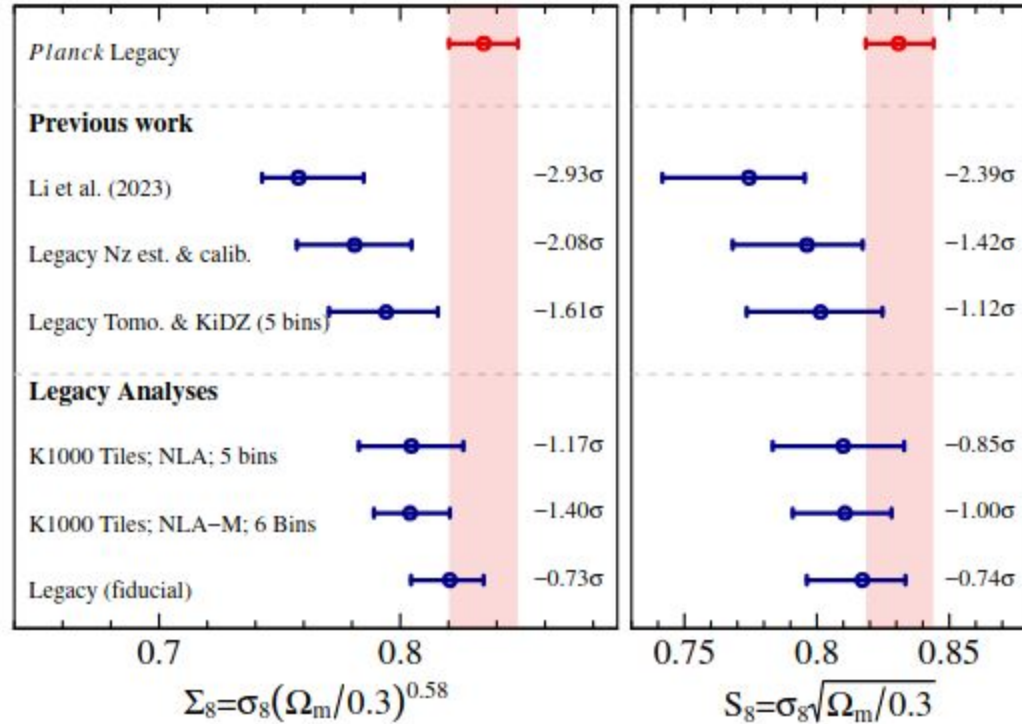
- S_8 / σ_8 / lensing is low
- H_0
- w_0/w_a
- Negative m_ν
- EB correlation and birefringence
- Radio dipole
- <shout your own>

S_8 / σ_8 / lensing is low

Questions

- Is it solved by KiDS-Legacy?
- What evidence is there from non-shear?
 - Lensing tomography?
 - Full-shape?
 - Cluster counts?
- Wasn't strong feedback supposed to solve it?
Is feedback not strong anymore?

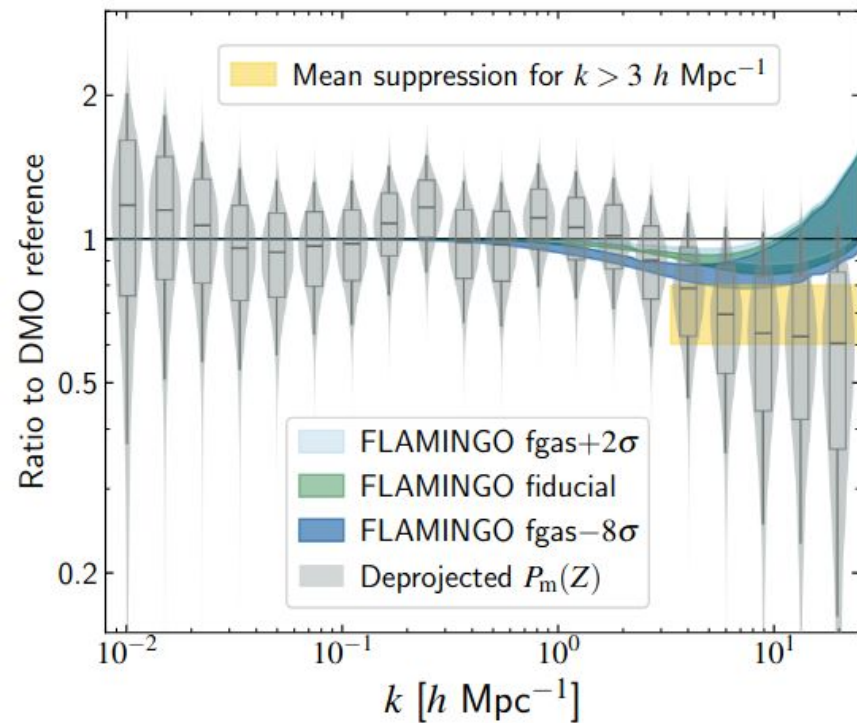
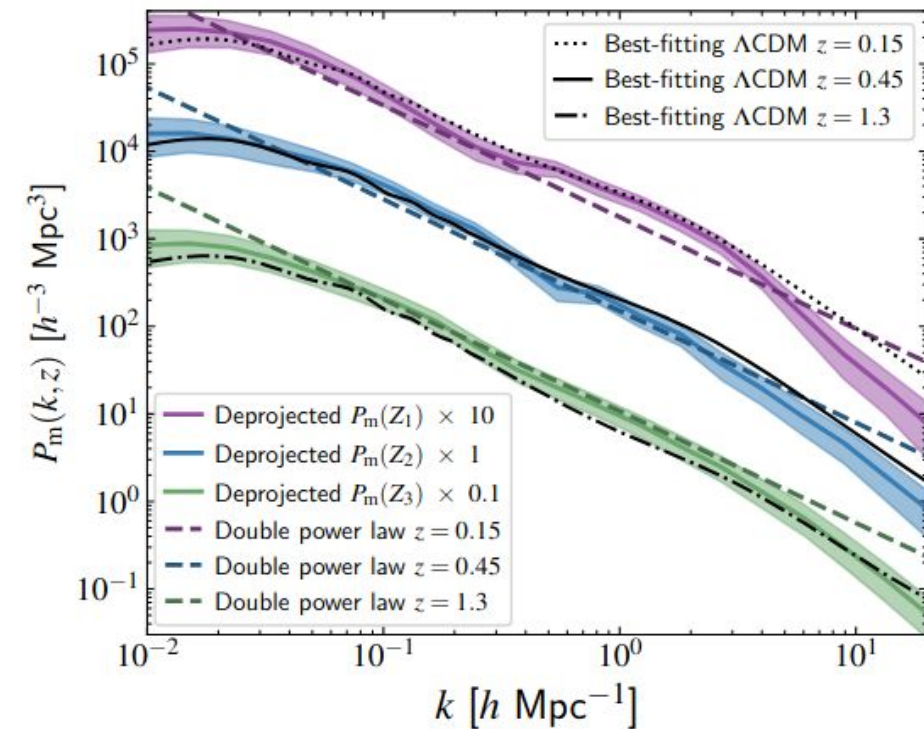
S_8 / σ_8 / lensing is low



Wright et al

<https://arxiv.org/pdf/2503.19441>

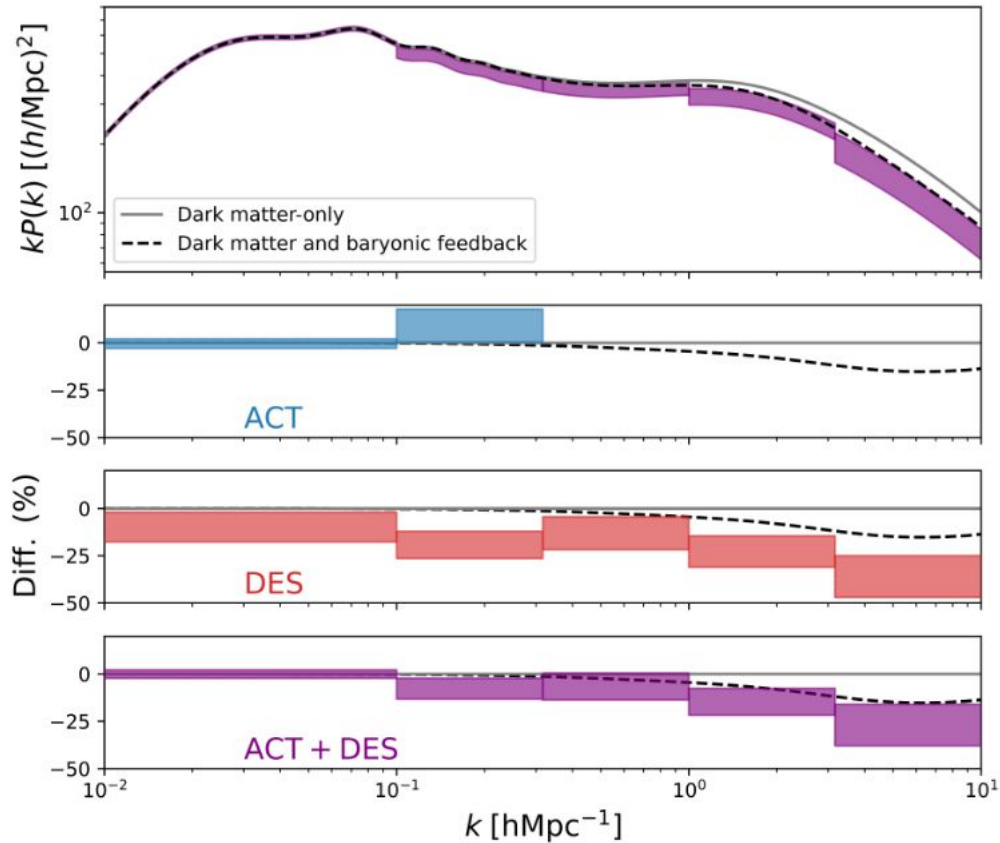
S_8 / σ_8 / lensing is low



Broxterman et al

<https://arxiv.org/pdf/2509.08365>

S_8 / σ_8 / lensing is low

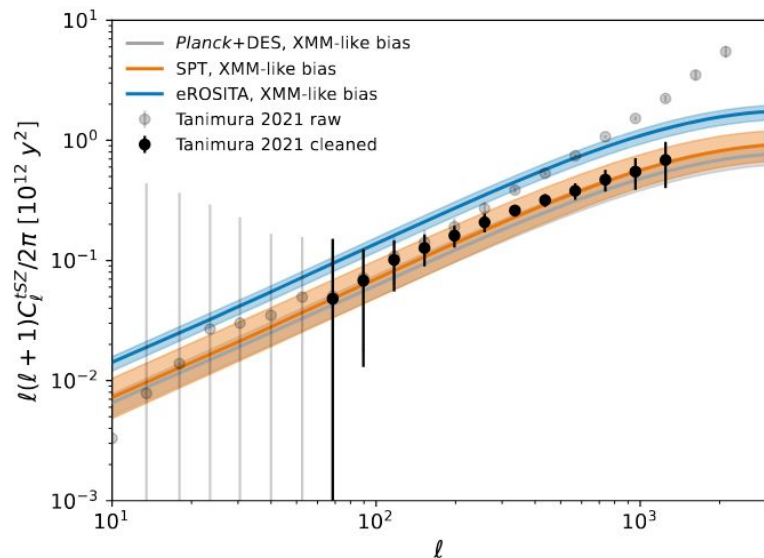


Perez Sarmiento et al

<https://arxiv.org/pdf/2502.06687>

S_8 / σ_8 / lensing is low

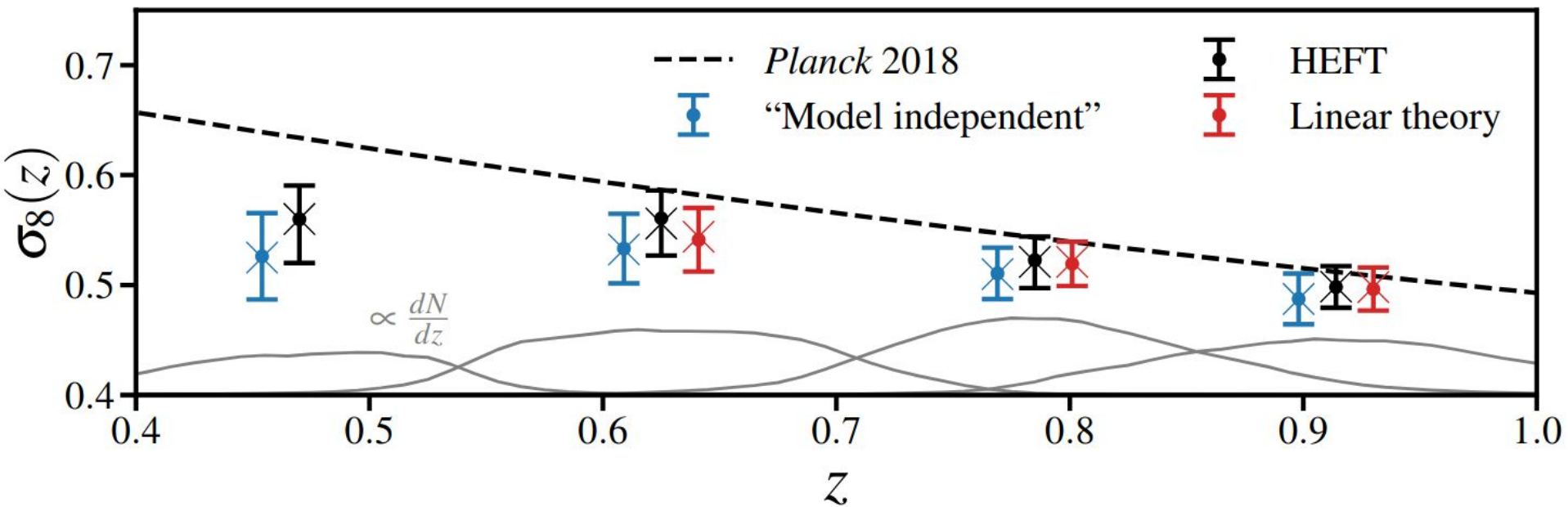
	<i>Planck</i> +DES	SPT	eROSITA
Ω_m	$0.312^{+0.018}_{-0.024}$	0.286 ± 0.032	$0.29^{+0.01}_{-0.02}$
σ_8	0.777 ± 0.024	0.817 ± 0.026	0.88 ± 0.02
S_8	$0.791^{+0.023}_{-0.021}$	0.795 ± 0.029	0.86 ± 0.01
$(1 - b)$	$0.844^{+0.055}_{-0.062}$	0.790 ± 0.070	0.630 ± 0.034
$(1 - b)_{\text{XMM-like}}$	$0.721^{+0.047}_{-0.053}$	0.674 ± 0.059	0.538 ± 0.029



Aymerich et al.

<https://arxiv.org/pdf/2509.08673>

S_8 / σ_8 / lensing is low

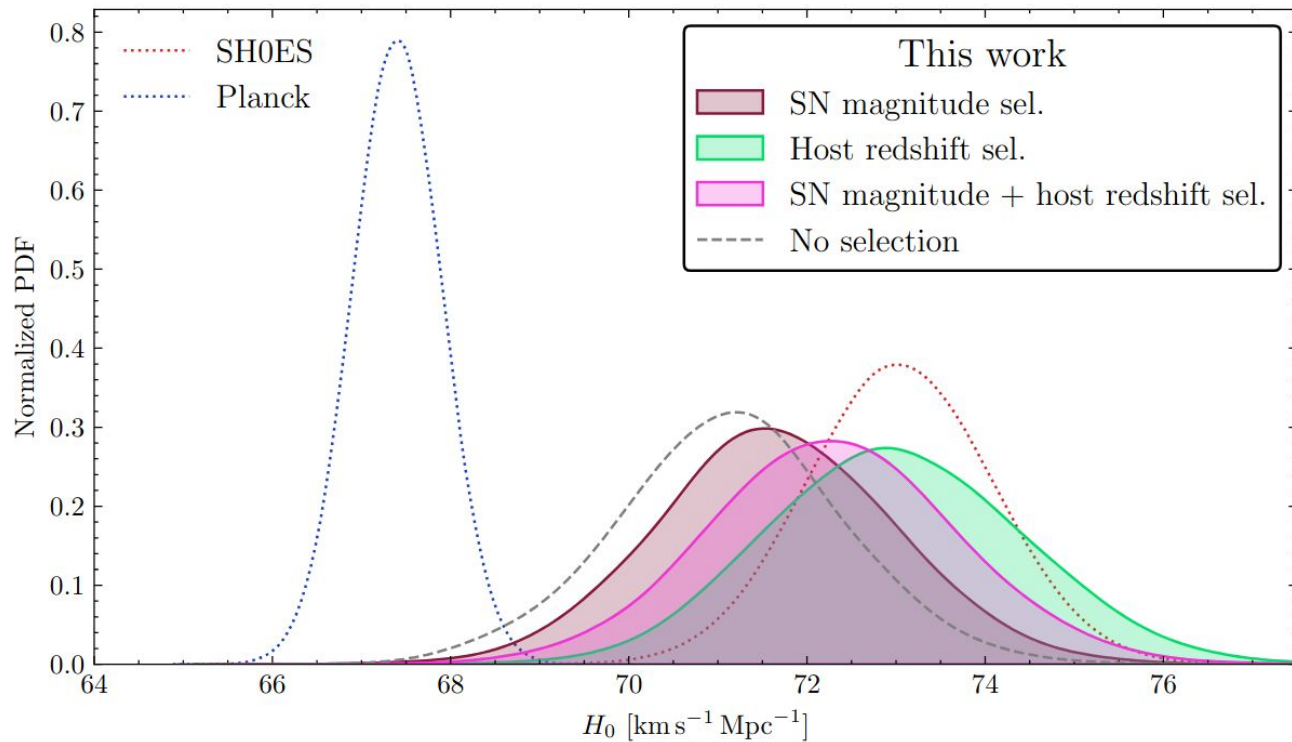


Sailer et al.

<https://arxiv.org/pdf/2407.04607>

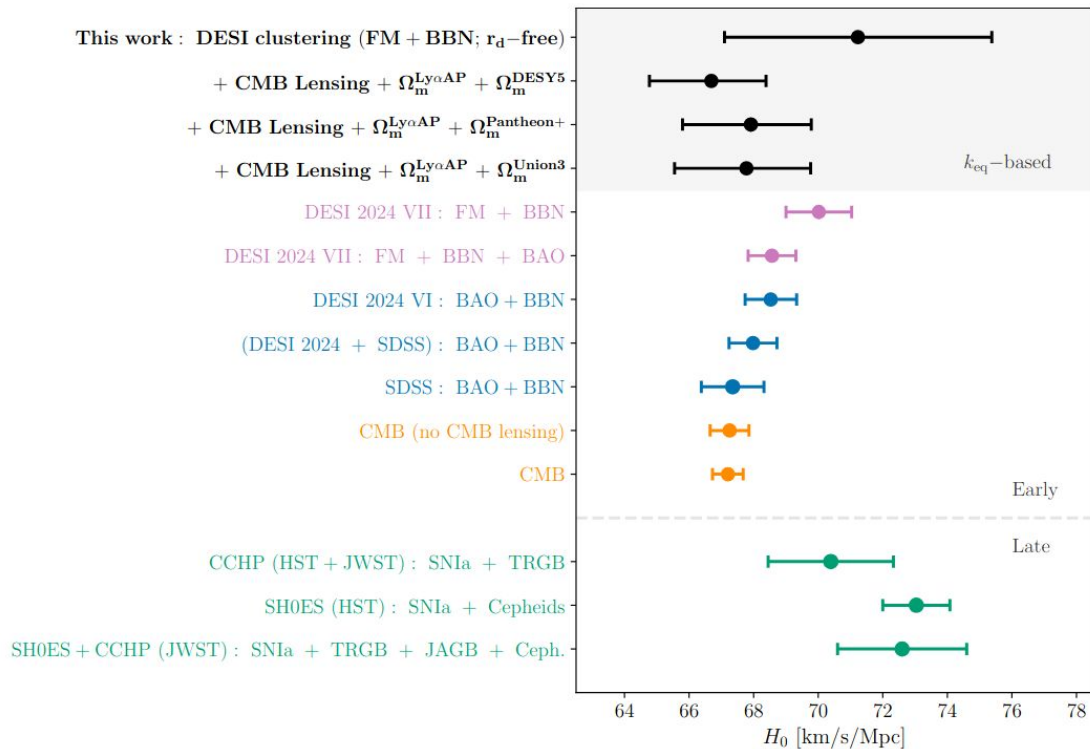
Questions

- What supernova systematics could cause it?
 - Supernova environmental effects?
 - Cepheid calibration?
- What CMB systematics could cause it?
 - Wrong r_s ?
 - A_{lens} ?
 - Wrong T_{CMB} ?
- How else can we measure H_0 ?
 - P_k turnover/curvature
 - CC
- What LCDM+ physics could explain it?
 - EDE? Clumpy recombination?



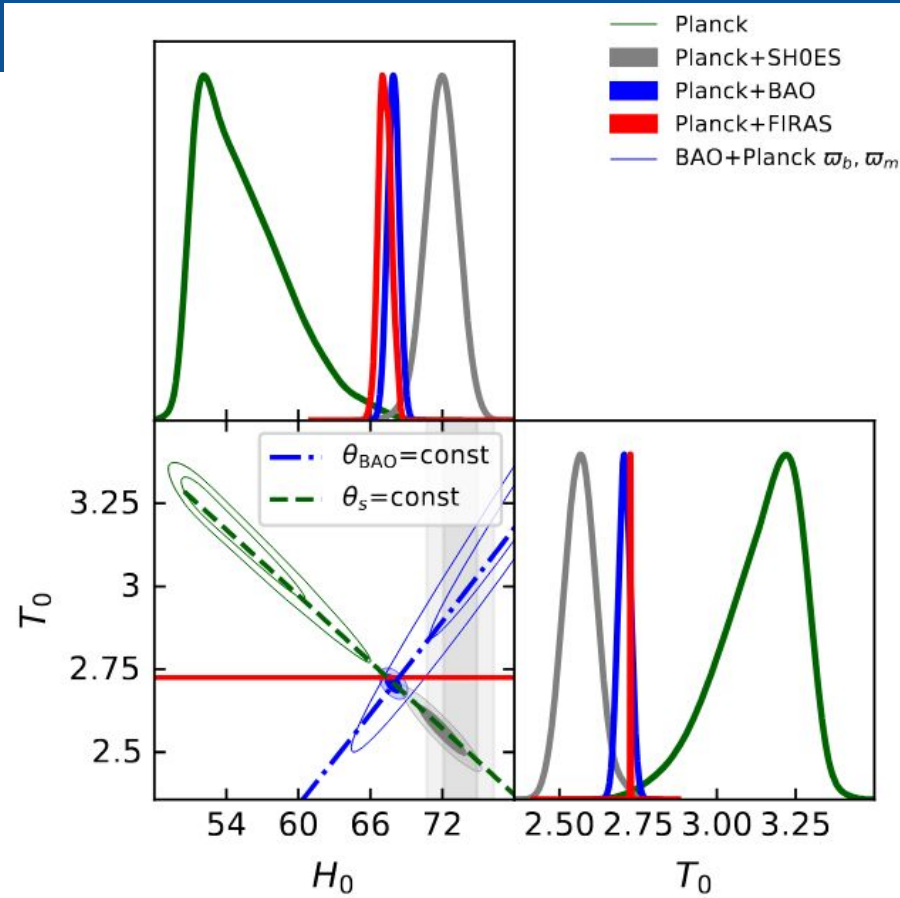
Stiskalek et al.

<https://arxiv.org/pdf/2509.09665>



Zaborowski et al.

<https://arxiv.org/pdf/2411.16677>



Ivanov et al.

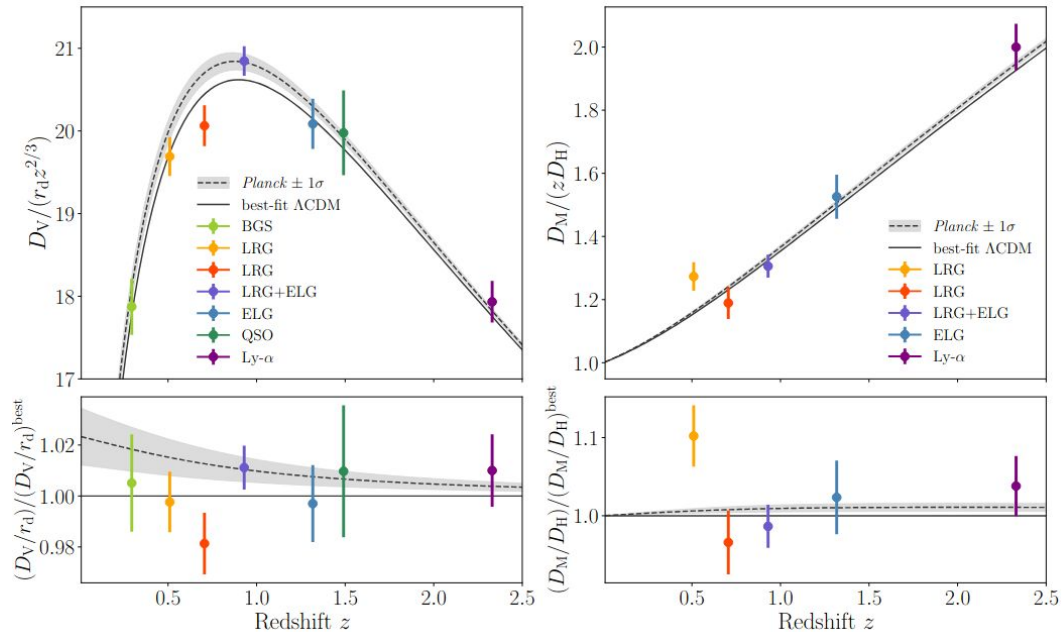
<https://arxiv.org/pdf/2005.10656>

Questions

- Are there suspicious outliers/internal tension in SNe and BAO data?
- What systematics could cause it?
 - Wrong $\tau/r_s/A_{\text{lens}}/T_{\text{CMB}}/\Omega_k$?
- What do we need to believe it?
 - 5-sigma? 7-sigma?
 - Complementary confirmation? From what?
 - Can it really be connected to growth?
- If it is real, what next?

$$\left. \begin{aligned} D_M/r_d(z = 0.70) &= 17.86 \pm 0.33, \\ D_H/r_d(z = 0.70) &= 19.33 \pm 0.53, \end{aligned} \right\} \begin{array}{l} \text{SDSS LRG} \\ 0.6 < z < 0.85, \end{array} \quad (3.2)$$

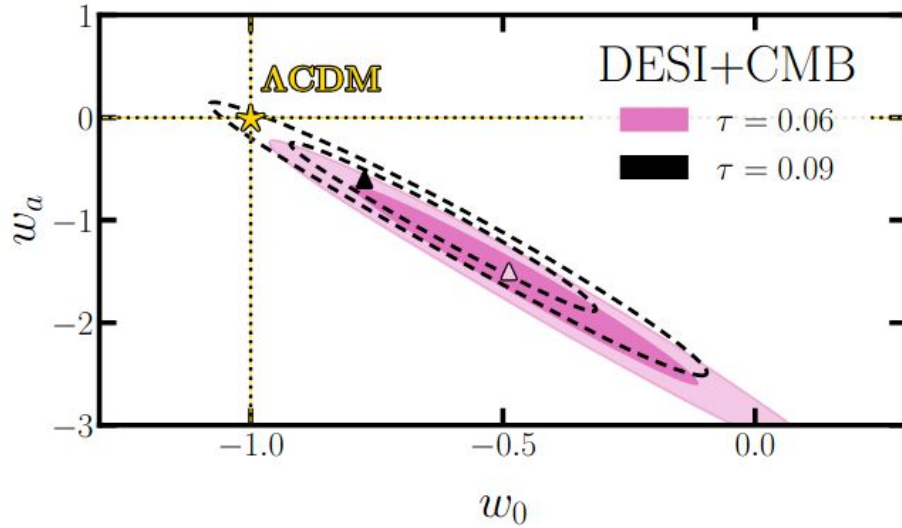
respectively, which can be compared to the DESI results in Table 1. While the results at effective redshift $z = 0.51$ are in good agreement, a larger difference can be seen in the $0.6 < z < 0.8$ redshift bin, particularly in comparison to the DESI result $D_M/r_d(z = 0.71) = 16.85 \pm 0.32$.



Sailer 2025,

<https://arxiv.org/pdf/2504.16932>

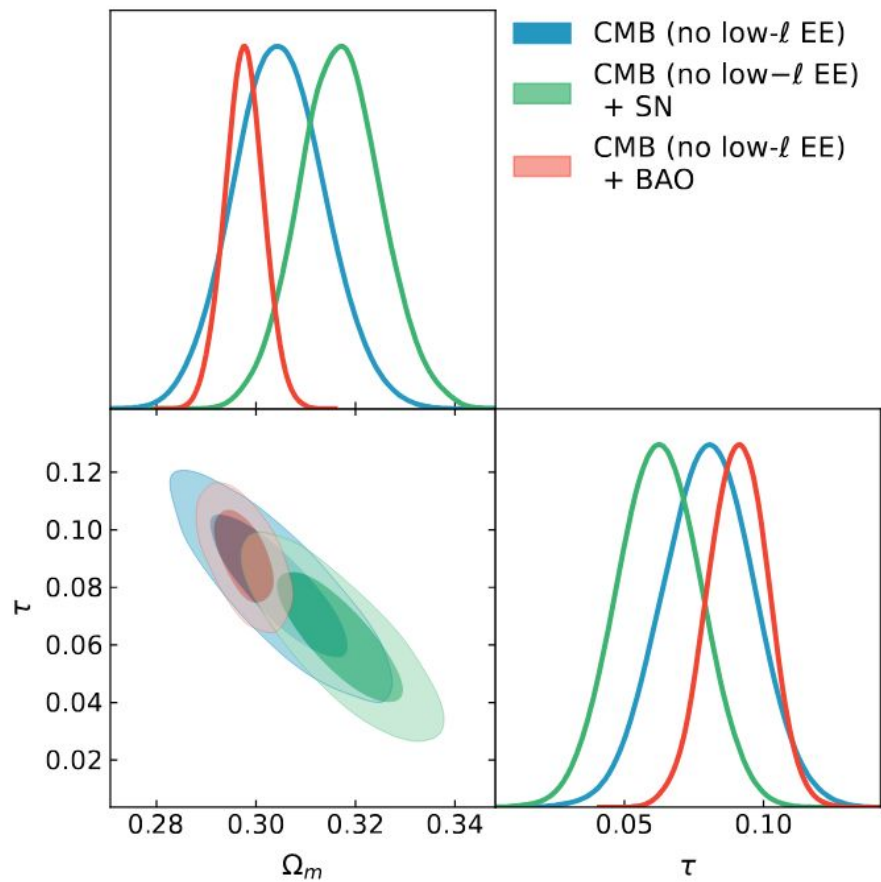
$$W_0 - W_a$$



Sailer 2025,

<https://arxiv.org/pdf/2504.16932>

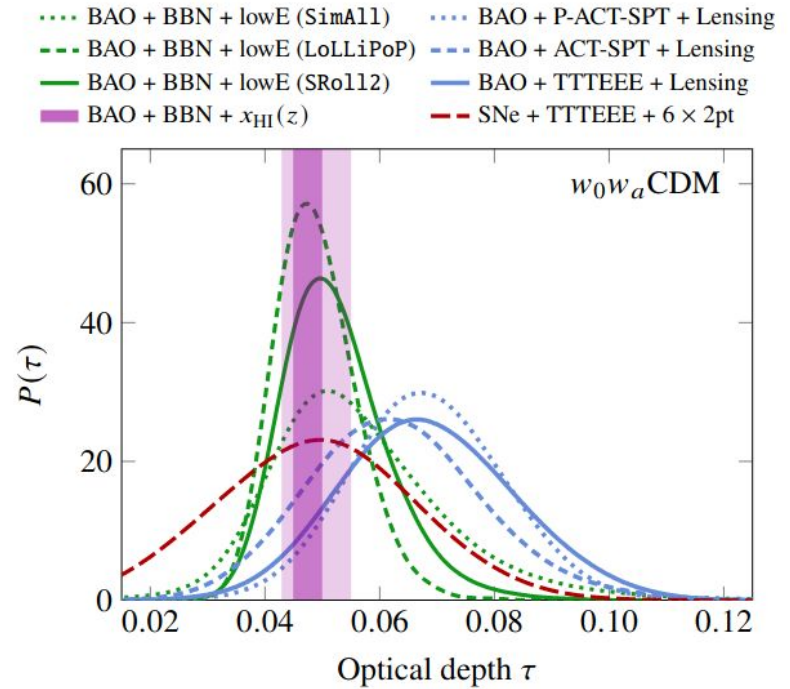
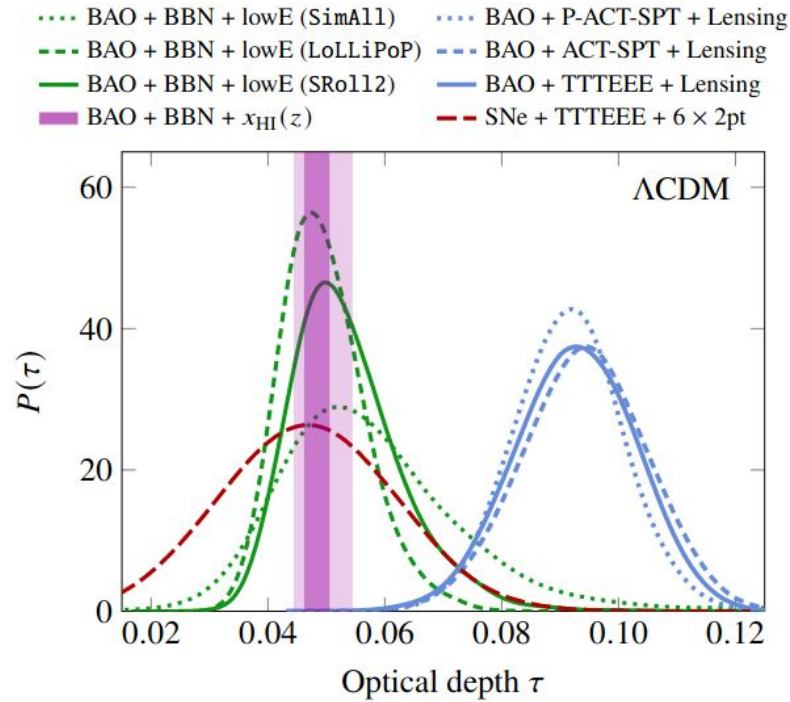
$$W_0 - W_a$$



Jhaveri et al.

<https://arxiv.org/pdf/2504.21813>

$$W_0 - W_a$$



Elbers 2025,

<https://arxiv.org/pdf/2508.21069>

Questions

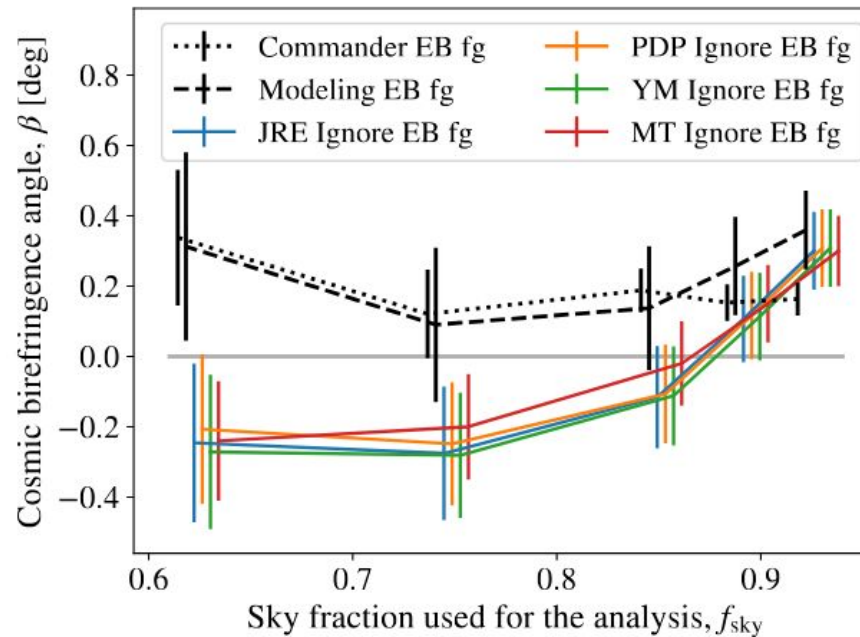
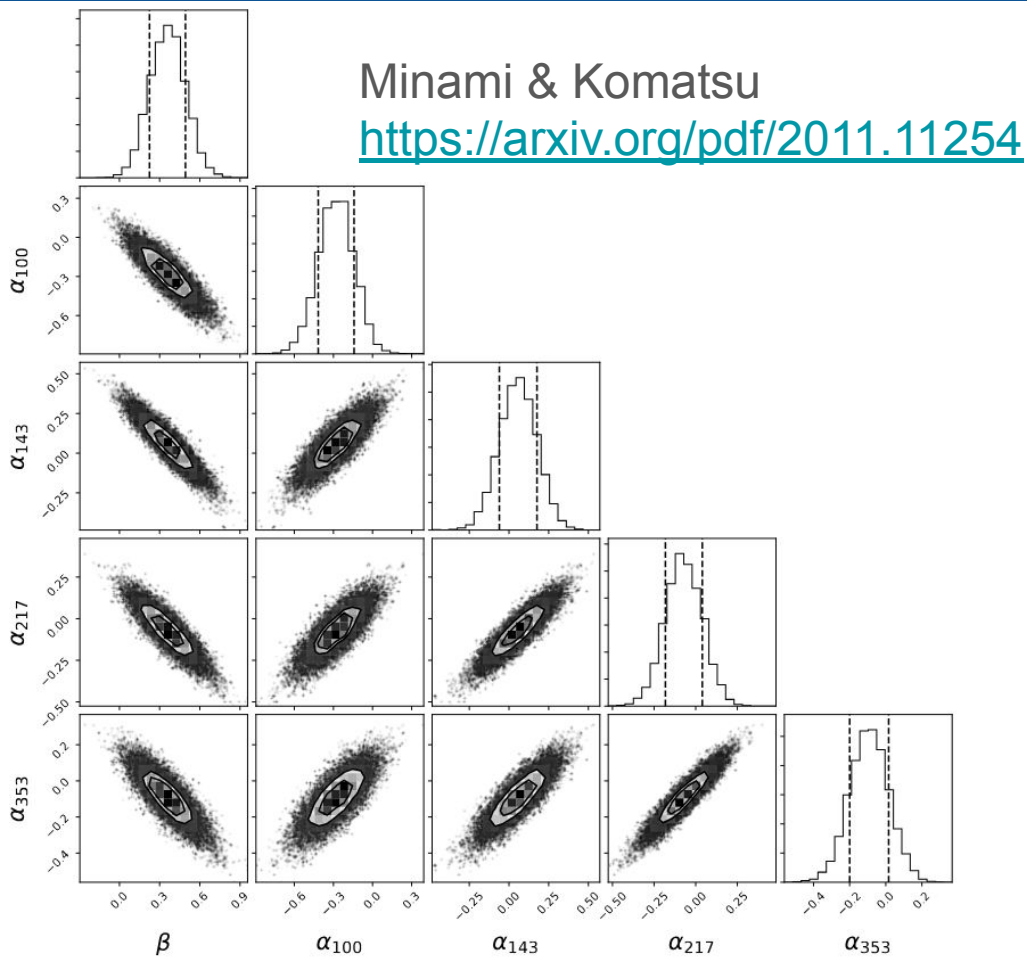
- Is this further evidence of w_0 - w_a ? Should we use PP priors?
- How will we ever convince particle physicists of an m_ν measurement?
 - Can it be done independently of growth?
 - Will growth probes ever be sufficiently robust?
 - Will independent measurements ever be sufficiently sensitive?

EB and birefringence

Questions

- Is there evidence beyond Planck with foreground assumptions?
- Will polangle calibration ever be good enough? (need $\Delta\beta \sim 0.1^\circ$)
- Could a signal be connected to other parity-violating physics?
 - Tri/bi-spectrum
 - Anisotropic birefringence

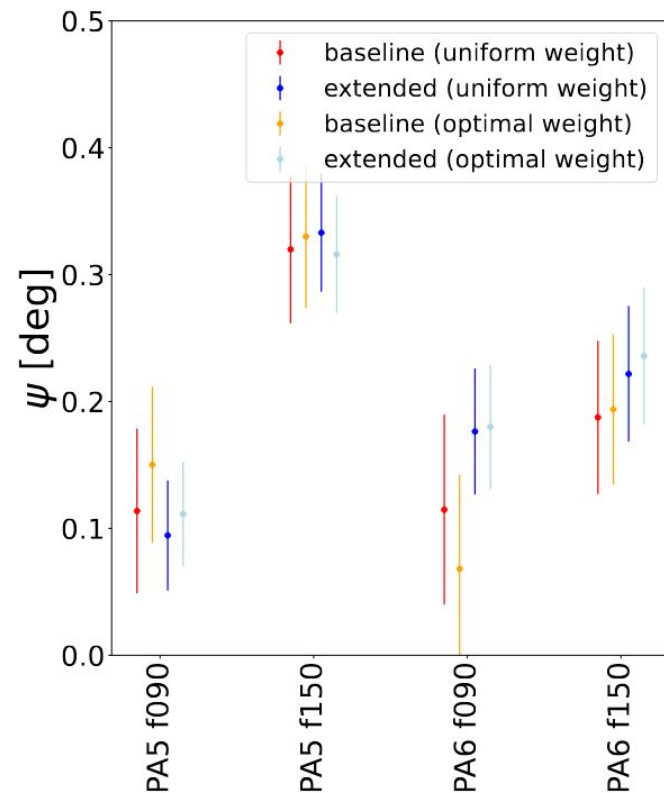
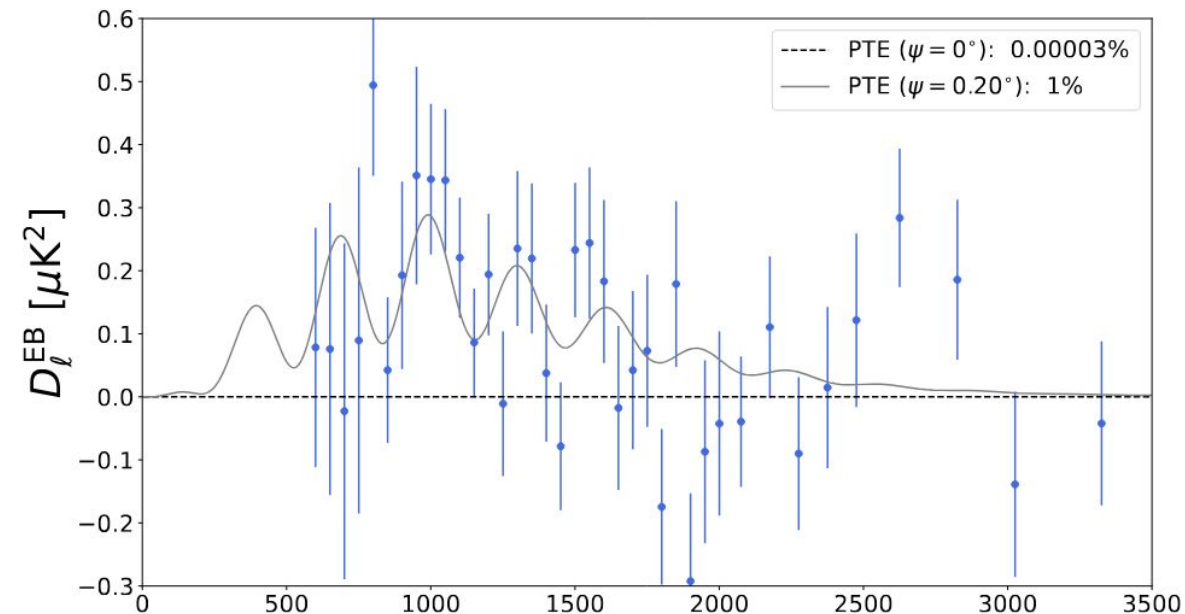
EB and birefringence



Diego-Palazuelos et al.

<https://arxiv.org/pdf/2201.07682>

EB and birefringence



Louis et al. 2025 (ACT DR6)

<https://arxiv.org/pdf/2503.14452>

Radio dipole

Questions

- What robustness tests can we use?
 - $\ell=2, 3, 4$?
 - Clustering dipole? x-corr?
- Is it worth checking for violations of CP in future data?
- If it's real, what does it imply for LCDM/FRW (if anything)?
- If it's real, does it tell us something interesting about initial conditions?

Radio dipole

Seacrest et al.

<https://arxiv.org/pdf/2505.23526>

