Kilo Degree Survey

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on behalf of the collaboration

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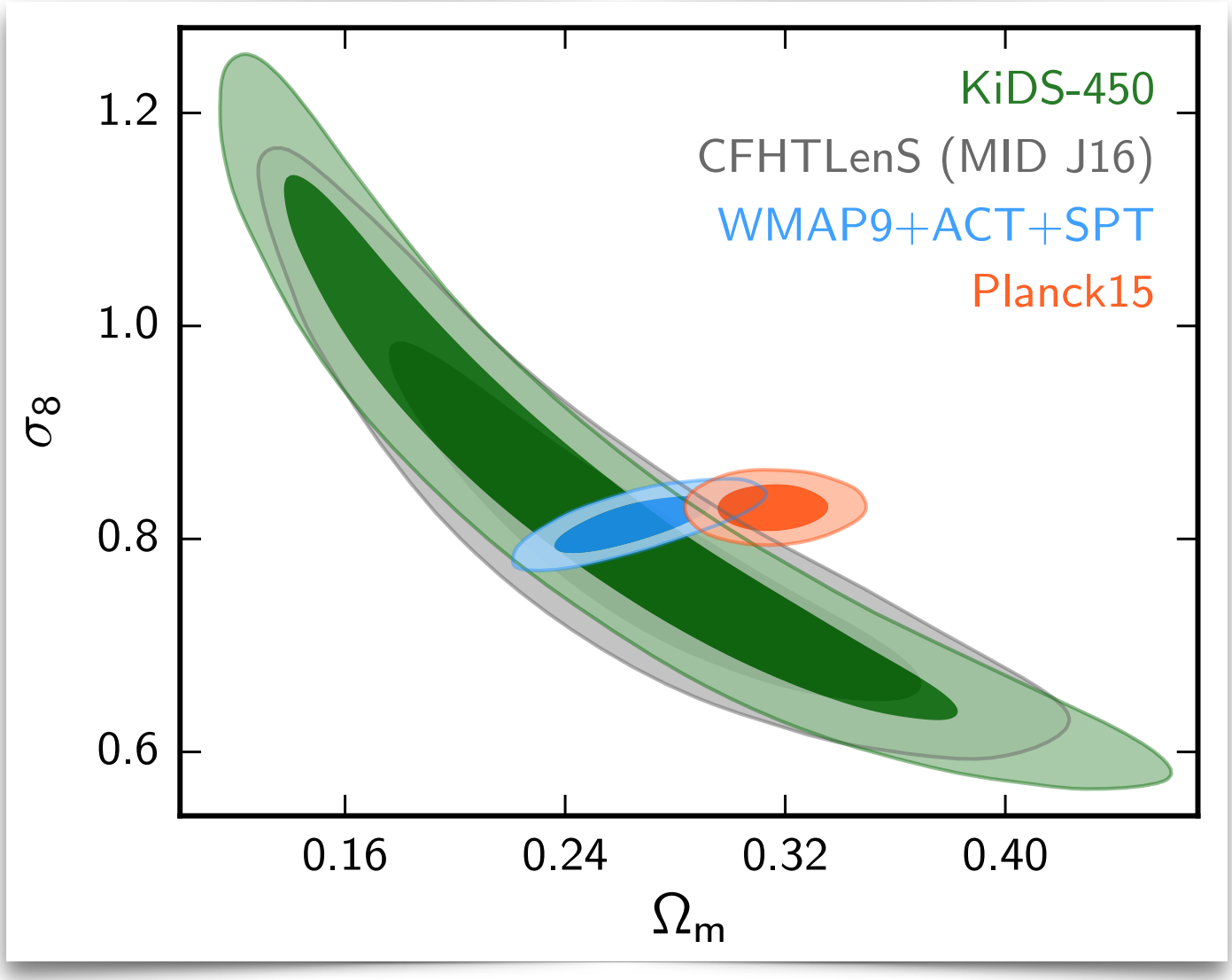
KiDS & DES survey properties

- Mirror/Focus (2.6 m Cassegrain vs 4.0 m Prime)
- Area (450 sq vs 1800 sq deg) —> 1350 vs 5000 sq deg
- Depth (r~24 vs r~23)
- Seeing (0.68 vs 0.96 arcsec)
- FOV (1.0 vs 3.0 deg^2)
- Source density (~8.5 vs ~5.5 $gal/arcmin^2$)
- Filters (ugri{ZYJHK$_s$} vs griz{Y})
- Team size (~30 vs ~130)

Differences in the analyses

- Matter power spectrum w/ baryonic feedback (HMCODE vs Halofit+cuts)
- Shear measurement (lensfit vs Metacalibration/im3shape)
- Photometric redshift calibration (spec-z vs 30-band photo-z)
- Photo-z uncertainty (bootstrap realizations vs mean-z shifts)
- Intrinsic galaxy alignments (A vs {A, η})
- Covariance (analytic & numerical simulations)
- Propagation of shear calibration uncertainty (covariance vs free parameters)
- Lens sample (overlapping spec-z surveys vs RedMagic) —> RSDs

KiDS-450 cosmic shear

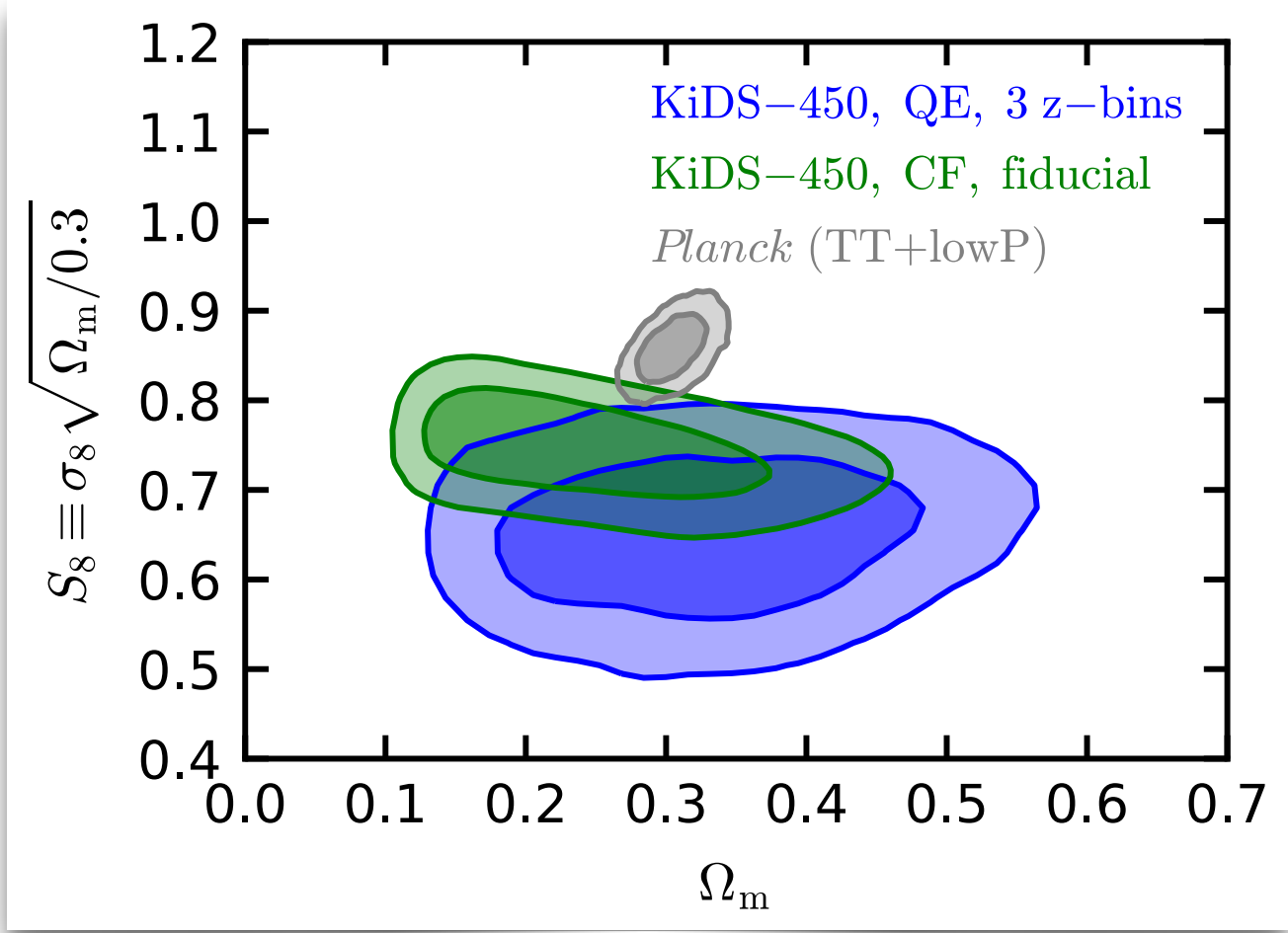


2.3σ tension with Planck - unaccounted systematics or new physics?

Explored extended systematics and cosmologies: evolving DE

Hildebrandt et al 2017

KiDS-450 Optimal QE

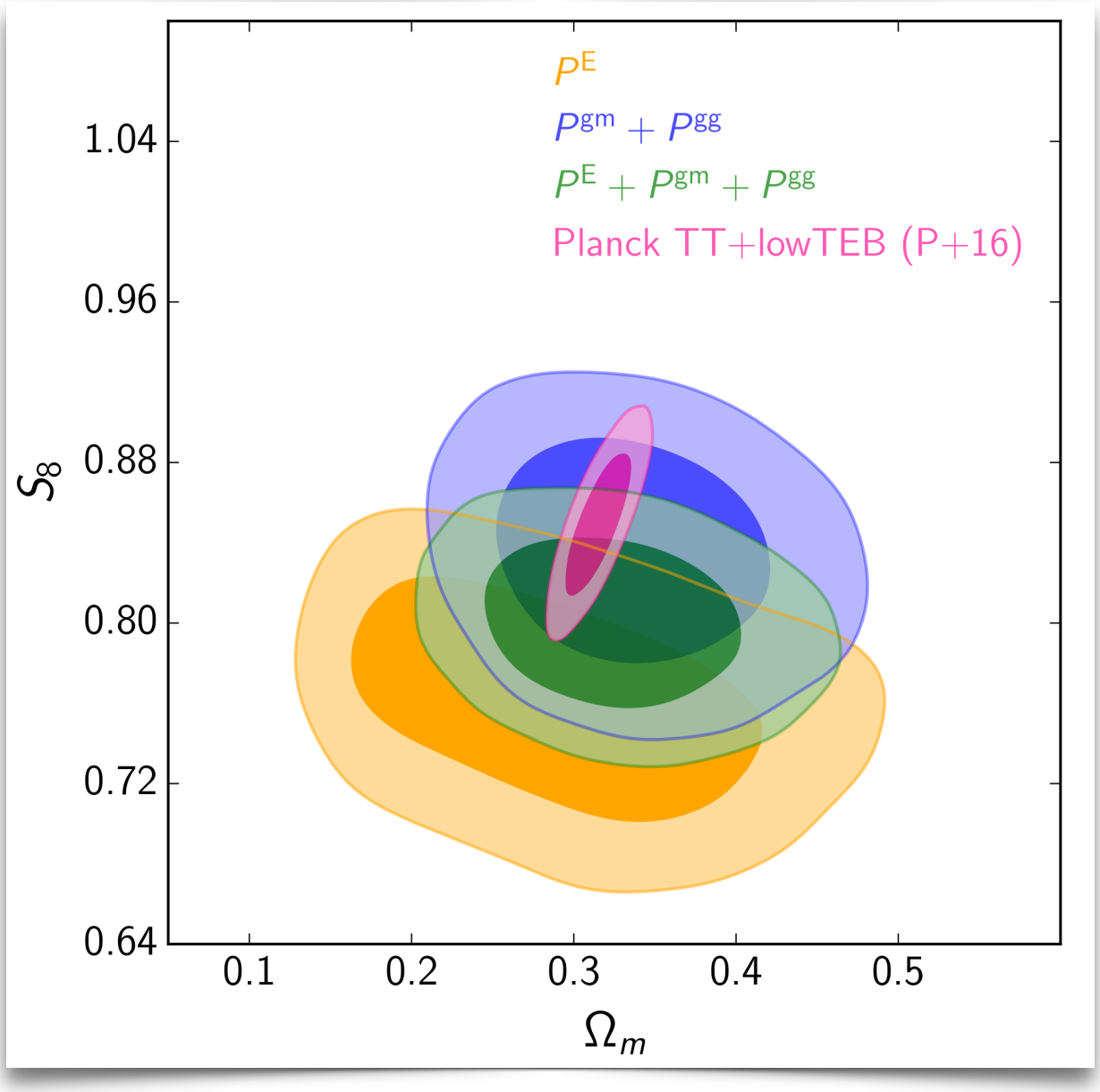


Fourier space analysis, less sensitive to small scales, favoring even lower S8.

In agreement with H17, particularly when CF analysis restricted to large scales.

Köhlinger et al 2017

KiDS + GAMA (3x2pt)

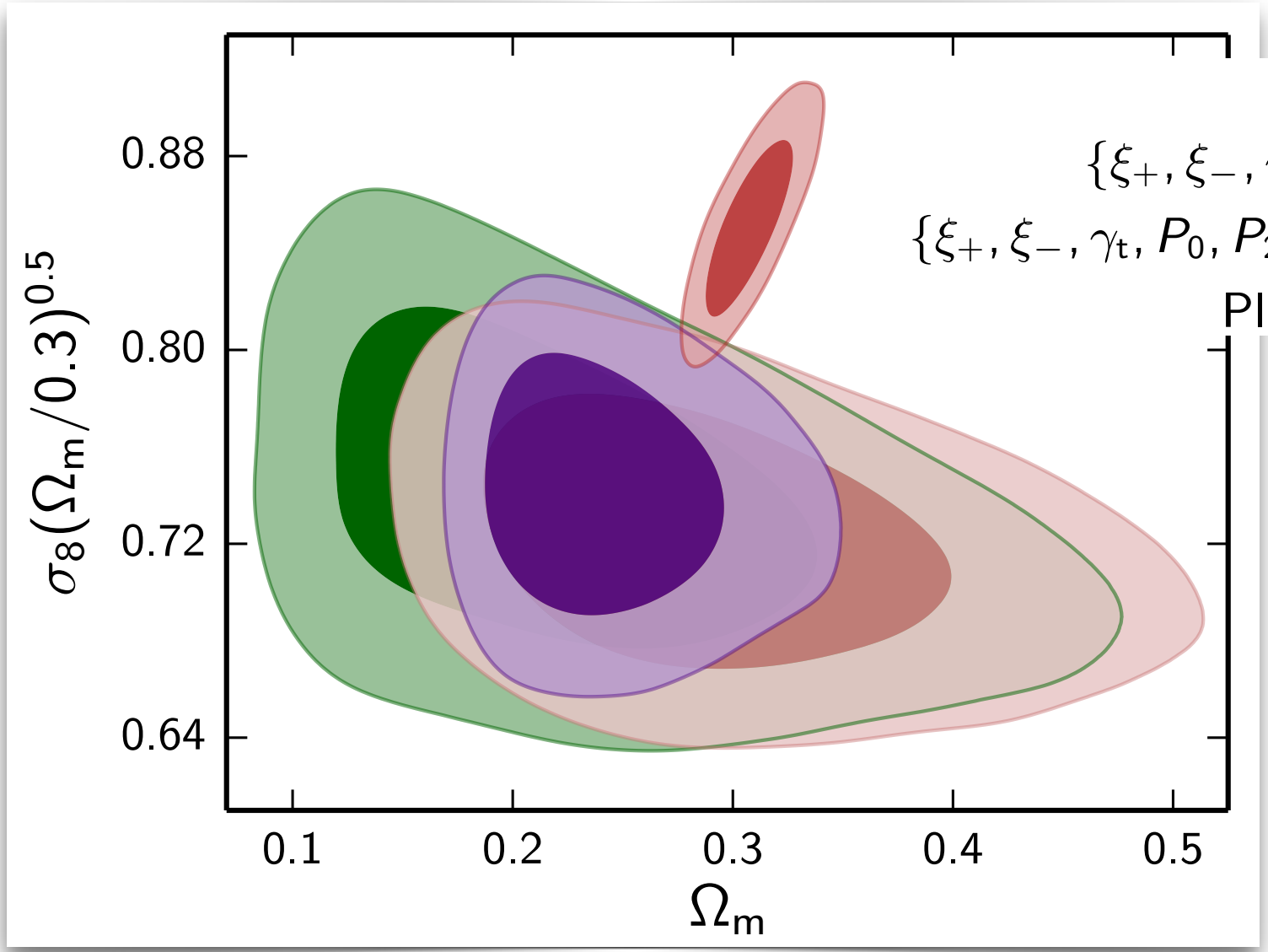


Power spectrum analysis — cosmic shear P^{E} in agreement with H17. Larger S_8 preferred by GAMA clustering.

Combined probes improvements in $\{S_8, \Omega_m, A_{IA}\}$, in agreement with Planck and H17.

van Uitert et al 2018

KiDS + 2dFLenS (3x2pt with RSDs)



Improvements in $\{S_8, \Omega_m, A_{IA}\}$. Planck tension remains.
No alternative to standard model favored.

Joudaki et al 2018

K900/1350 opportunities & challenges

- Double/triple the area: improved statistics
- Photometric redshifts (will improve with VIKING overlap, 5th bin)
- Increase in spectroscopic overlap —> systematics calibration & new physics
- Cross-survey measurement comparison: Lensing without borders

- Intrinsic alignments (nonlinear scales - A, L, z dependence, red/blue split)
- Matter power spectrum (current DM-only calibration ~5% level)
- Baryonic feedback (large spread in hydrodynamical simulations)
- Shear calibration (additive and multiplicative biases)
- Modeling of galaxy bias (linear/nonlinear, validate against simulations)
- Psychological systematics: blinding

Thanks for listening.