

No tension on S_8 ?

A. Blanchard, J.-Y. Héloret, B. Lamine, S. Ilić, I. Tutusaus
(ArXiv: 2205.05017)



Anney, November 6th, 2023



The amplitude of matter fluctuations tension, i.e. S_8 tension.

Definition :

$$S_8 = \sigma_8 \left(\frac{\Omega_m}{0.3} \right)^{1/2} \quad (1)$$

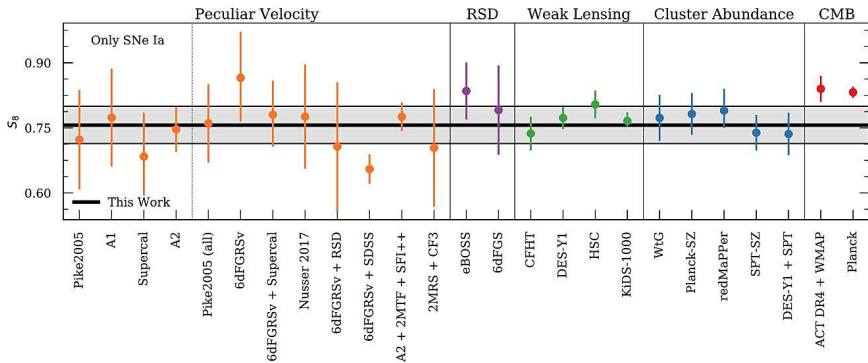
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Well adapted for clusters and weak lensing.

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Stahl et al. (2021)

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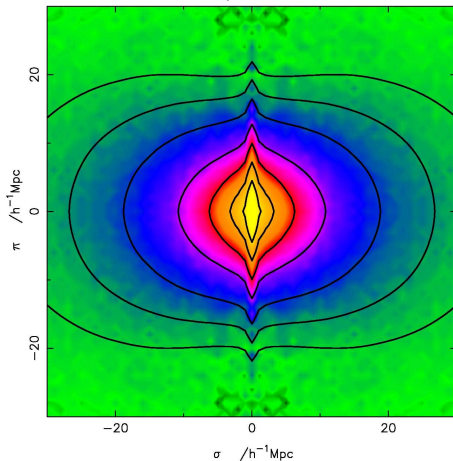
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Hawkins et al. (2002), astro-ph/0212375
2dFGRS: $\beta = 0.49 \pm 0.09$



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Next step: SZ Clusters & eBOSS RSD

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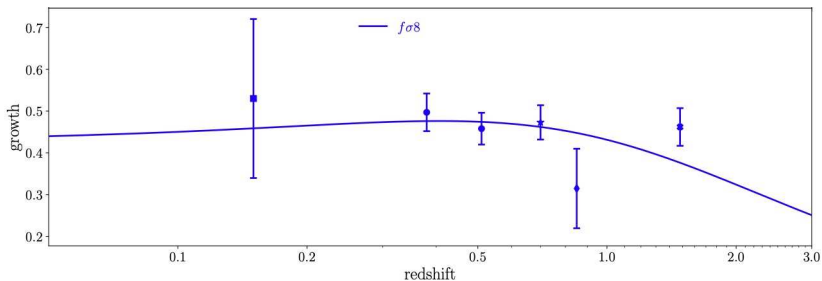
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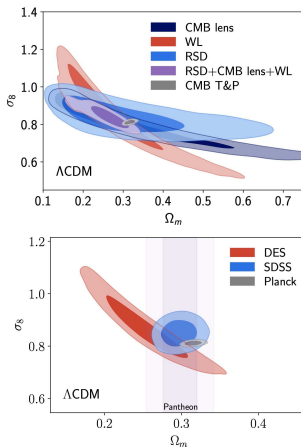
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- Cosmological parameters from Planck CMB **but** σ_8

Redshift space distortion (RSD).



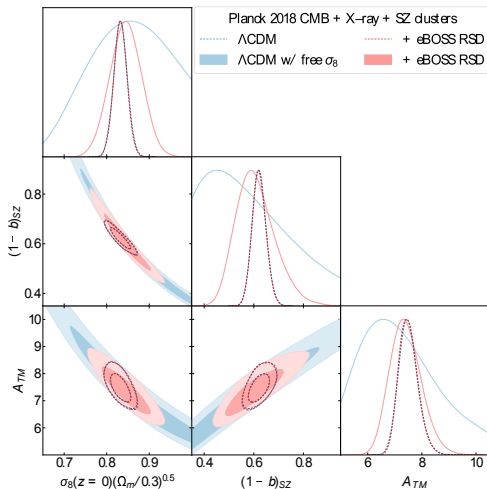
eBOSS: Alam et al. (2020)

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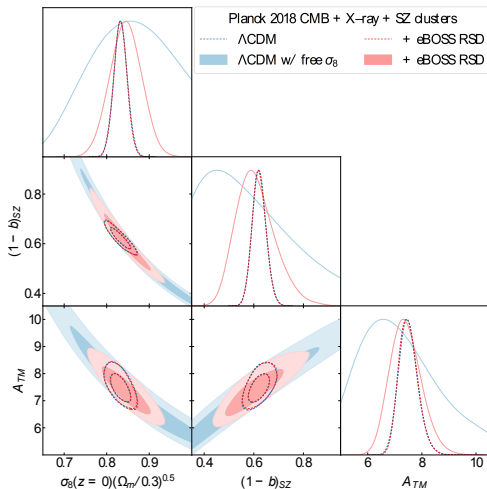


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Constraining $1 - b$, σ_8 , S_8

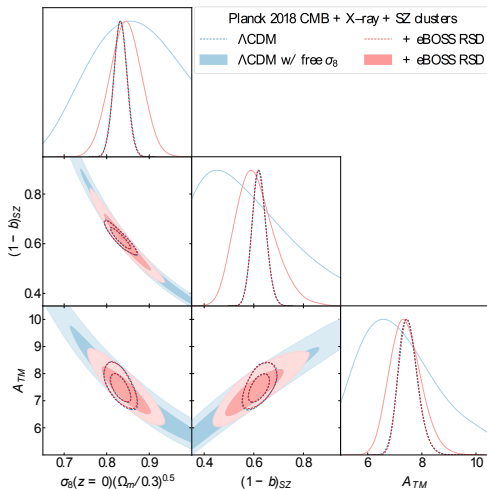


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$$1 - b = 0.608 \pm 0.07$$

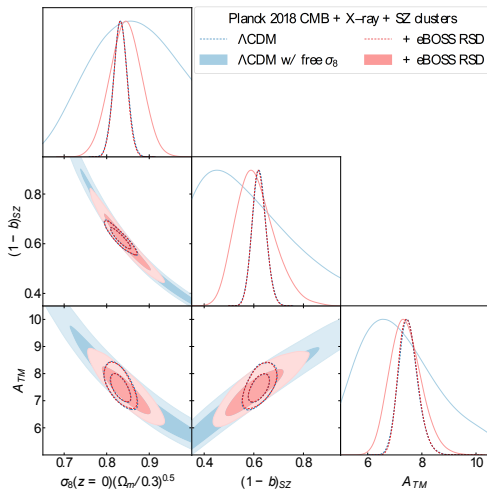
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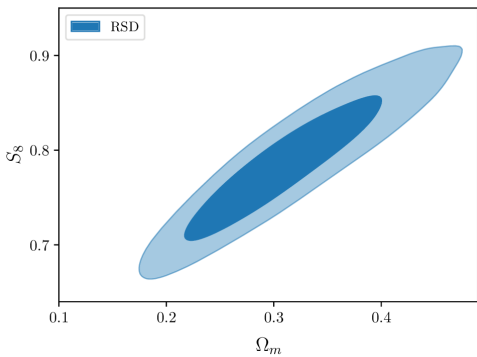
$$S_8 = 0.841 \pm 0.038 \quad \text{Planck : } S_8 = 0.828 \pm 0.016$$

(Blanchard & Ilić 2021)

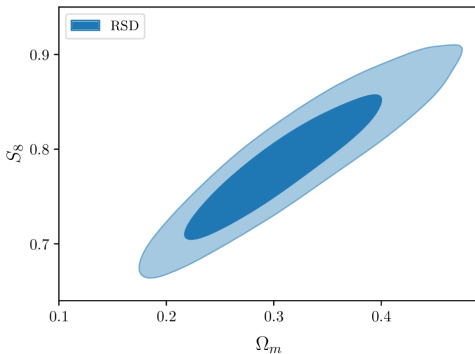
One step further: RSD from surveys

Survey	z	$f\sigma_8$	Refs
2MFT	0.001	0.51+/-0.085	[19]
6dFGS	0.067	0.423+/-0.055	[20]
SDSS DR13	0.1	0.48+/-0.16	[21]
2dFGRS	0.17	0.51+/-0.06	[22]
GAMA	0.18	0.36 +/- 0.09	[23]
WiggleZ	0.22	0.42+/-0.07	[24]
SDSS LRG60	0.25	0.35+/- 0.06	[25]
BOSS LOW Z	0.32	0.48+/-0.1	[26]
GAMA	0.36	0.44+/- 0.06	[23]
SDSS LRG 200	0.37	0.46+/- 0.04	[25]
WiggleZ	0.41	0.45+/-0.04	[24]
CMASS BOSS	0.57	0.453+/-0.02	[27]
WiggleZ	0.6	0.43+/-0.04	[24]
VIPERS	0.6	0.48+/-0.12	[28]
SDSS IV	0.69	0.447+/-0.039	[29]
VIPERS	0.76	0.44+/-0.04	[30]
SDSS IV	0.77	0.432+/-0.038	[31]
WiggleZ	0.78	0.38+/-0.04	[24]
SDSS IV	0.85	0.52+/-0.10	[32]
VIPERS	0.86	0.48+/-0.10	[28]
SDSS IV	0.978	0.379+/-0.176	[31]
SDSS IV	1.23	0.385+/-0.1	[31]
Fastsound	1.4	0.494+/-0.123	[33]
SDSS IV	1.52	0.426 +/-0.077	[34]
SDSS IV	1.944	0.364+/-0.106	[31]

RSD from surveys: constraints

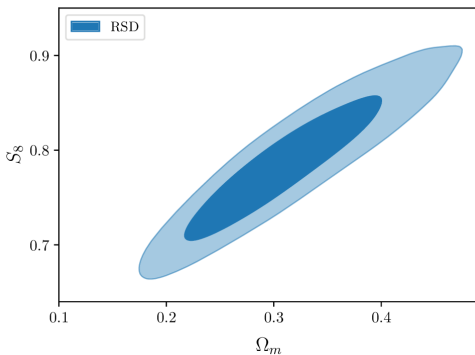


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Need to combine with other *low* - *z* data

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$$\Omega_M = 0.334 \pm 0.018$$

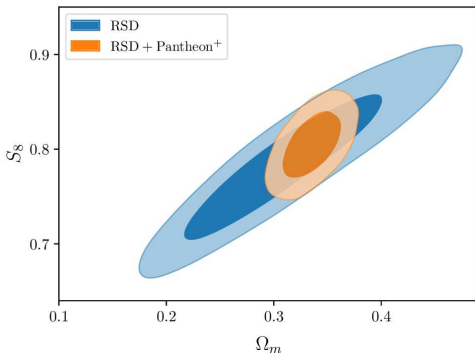
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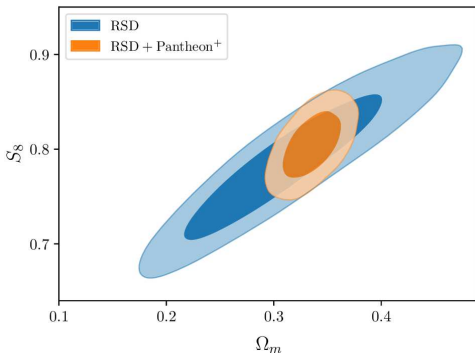


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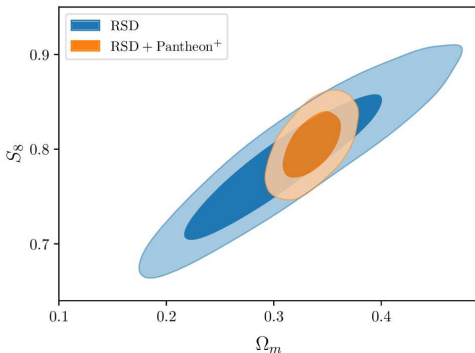
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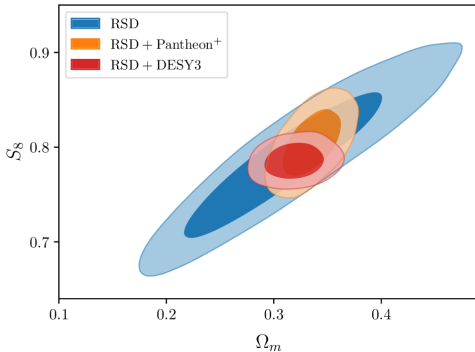
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(official Planck $\Omega_M = 0.3166 \pm 0.0084 \quad S_8 = 0.834 \pm 0.016$)

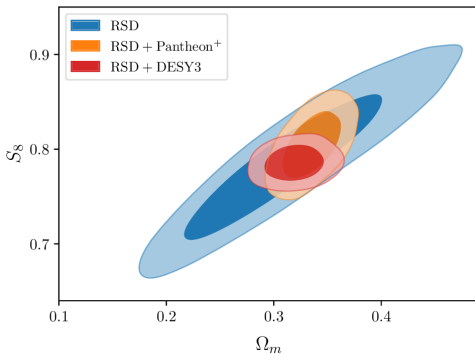
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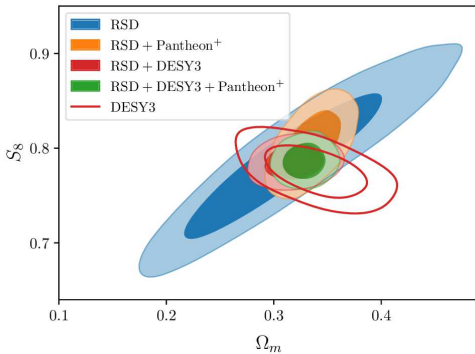


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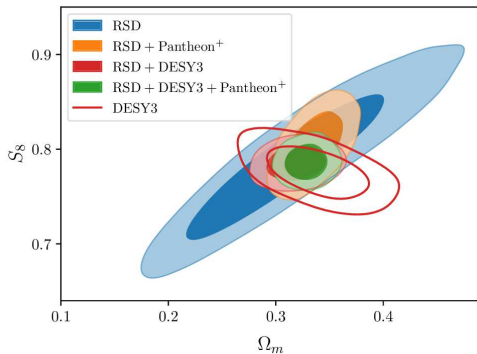


$$\Omega_M = 0.322 \pm 0.016 \quad S_8 = 0.788 \pm 0.012$$

RSD from surveys + DES3yr + Pantheon+



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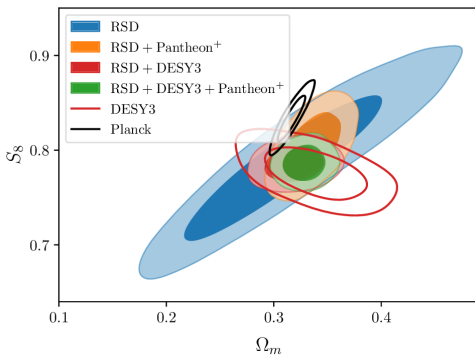
$$\Omega_M = 0.33 \pm 0.012 \quad S_8 = 0.79 \pm 0.012$$

Comparison with Planck

(no lensing)

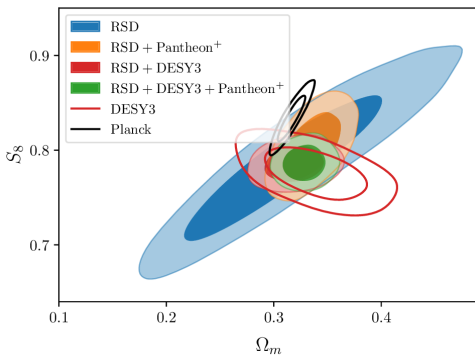
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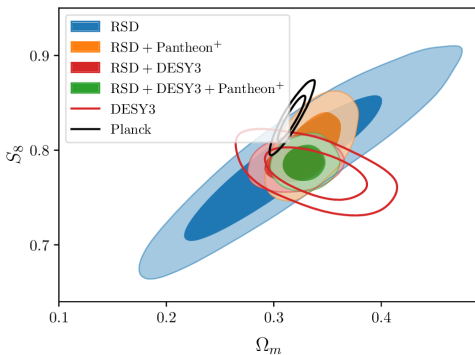


Gaussian Tension :

$$\frac{|D_1 - D_2|}{\sqrt{\sigma_1^2 + \sigma_2^2}}$$

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2.2 σ tension

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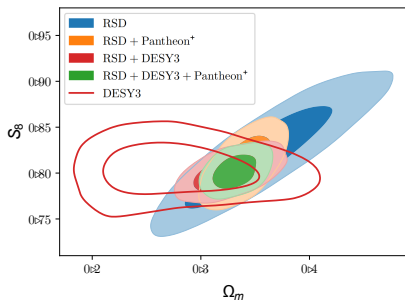
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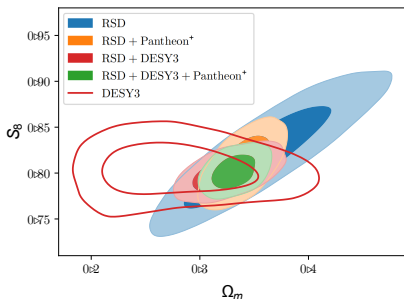
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More on $1 - b$ for clusters

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