Tensions on A_L and impact on the neutrino mass

F. Couchot, O. Perdereau, S. Plaszczynski,
B. Rouillé d'Orfeuil, M. Spinelli, M. Tristram

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A_L ? ?! ....

$C_\ell^\Psi \rightarrow A_L C_\ell^\Psi$

Lensing potential power spectrum

Results from Planck

$A_L = 1.22 \pm 0.10$ (Plik+lowTEB, camb/MCMC)

A_L !=1 indicates either

? a problem in the cosmological model ?

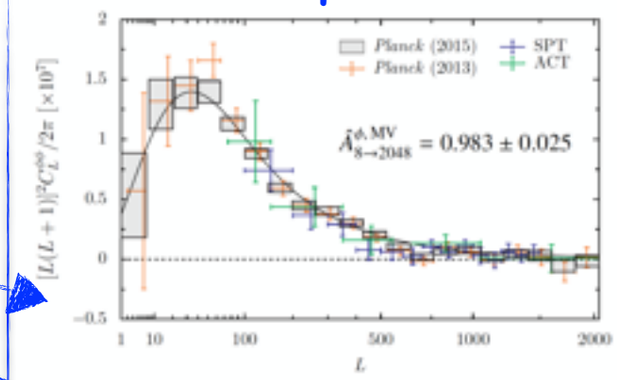
? a problem in the statistical analysis ?

? an impact of the foreground modeling ?

? or remaining systematics in the data ?

...Let's check this one !...

...does not seem to be the problem...



[Planck 2015 results. XV. A&A, 594, A15 (2016)]

...or can make it worse...

Boltzmann solver (CLASS+MCMC)

$A_L = 1.24 \pm 0.10$

Statistical analysis (CLASS+Frequentist)

$A_L = 1.26^{+0.11}_{-0.10}$

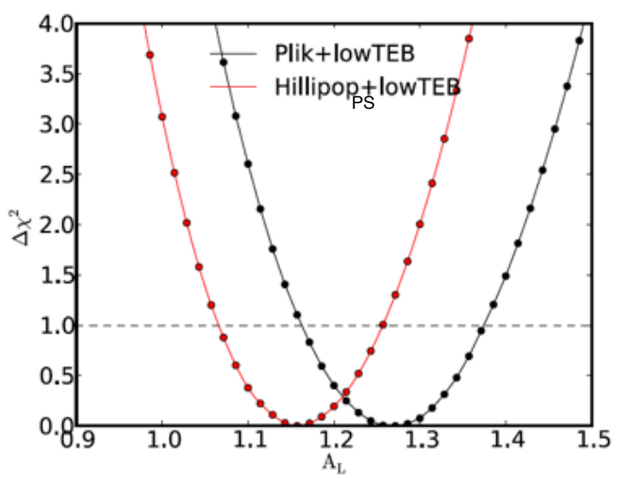
High-ℓ likelihoods and foreground description ?

Plik: the official high-ℓ Planck likelihood

HiLLiPOP: Planck high-ℓ likelihood,
2 versions: w/wo refined PS model

$A_L = 1.22^{+0.11}_{-0.10}$ (Hillipop+lowTEB).

$A_L = 1.16^{+0.10}_{-0.09}$ ($\mathrm{Hillipop}_{\mathrm{PS}}$+ lowTEB)



beware !!

linked to τ ...no time to discuss that you can look into our papers ;-)

F. Couchot et al. A&A 597, A126 (2017) | F. Couchot et al. A&A 602, A41 (2017) | F. Couchot et al. A&A 606, A104 (2017)

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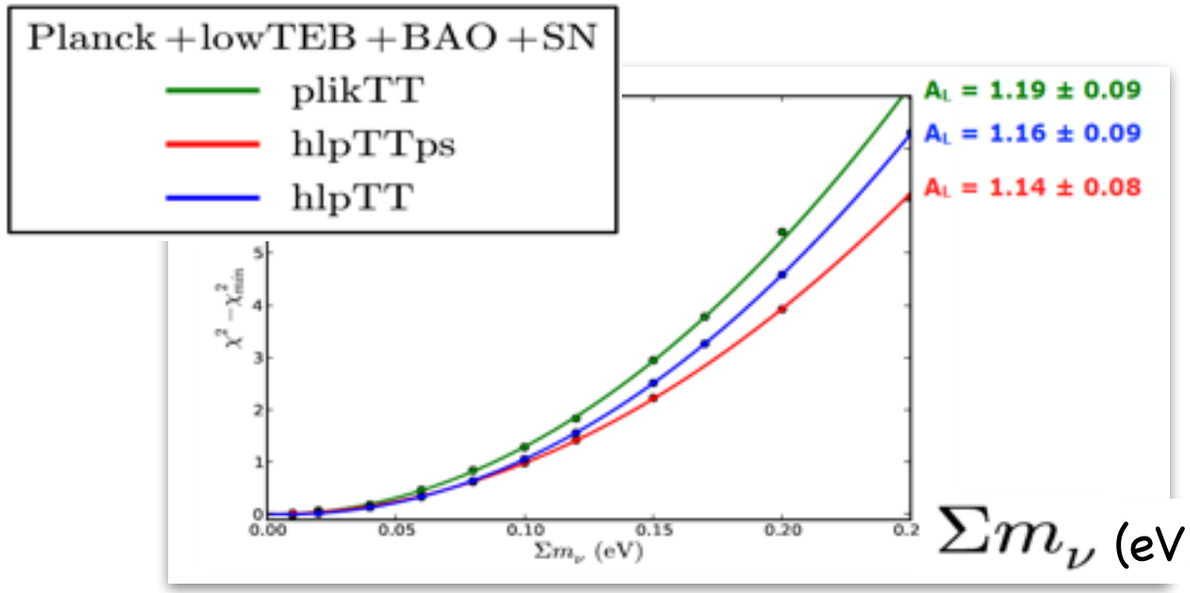
How is A_L related to Σm_ν ?

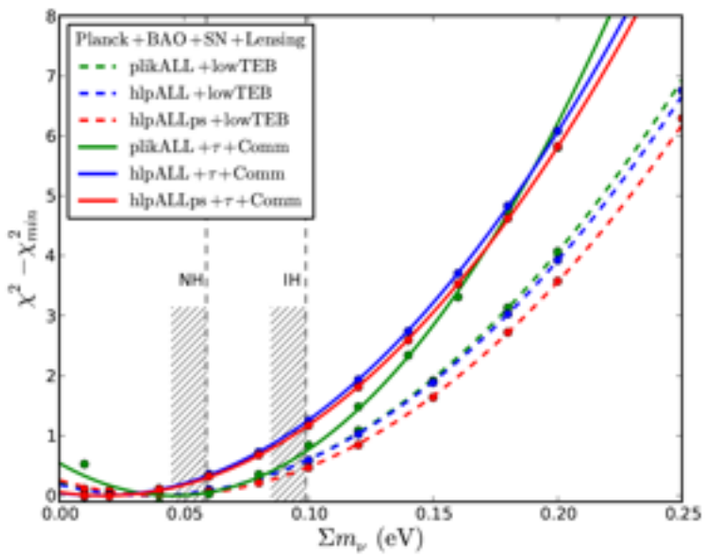
The tension on AL shows up in the neutrino sector !



a high value of A_L **artificially tighter the constraint** on the sum of the neutrino mass

=> FINAL RESULTS

* Planck TT + Polarisation
* Planck lensing (to stretch back A_L->1)
* BAO DR12 (update wrt Planck-2015)
* update of τ from [A&A 596, A108 (2016)]



PLANCKALL +SNIa+BAO+lensing	+lowTEB	$+\tau_{reio}$ +Commander
hlpALL	0.20	0.16
hlpALLps	0.21	0.17
PlikALL	0.19	0.17

+ Estimating a systematic error from the comparison of the results obtained with the different high-ℓ likelihoods

$$\Sigma m_\nu < 0.17 \text{ [incl. 0.01 (foreground syst.)] eV at 95\% CL .}$$

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