The Planck results in light of the BICEP B-mode detection

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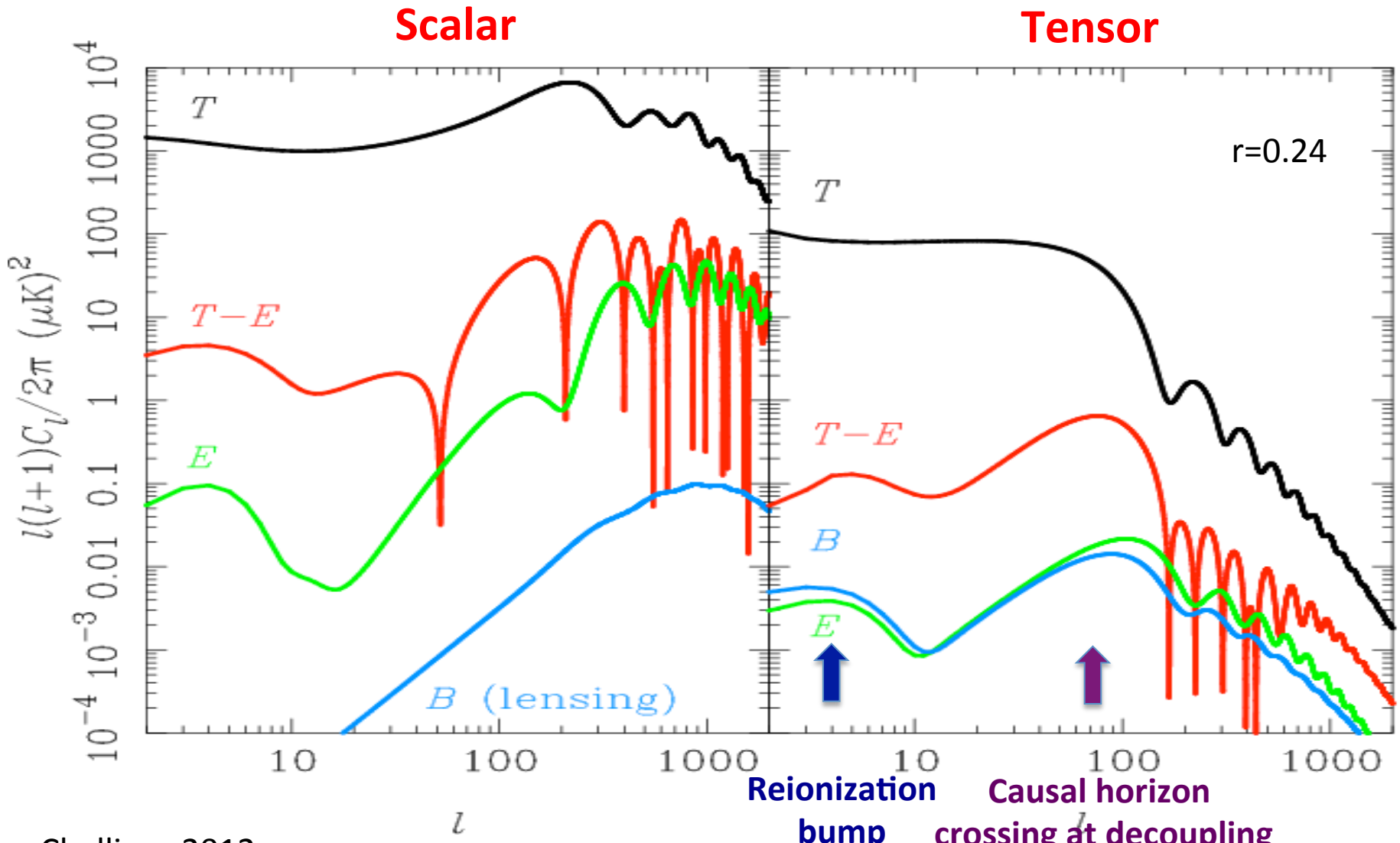
IAP 21/03/2014

Scalar versus Tensor perturbations

Tensors produce BB-polarization, but contribute also to TT and EE!



Challinor 2012

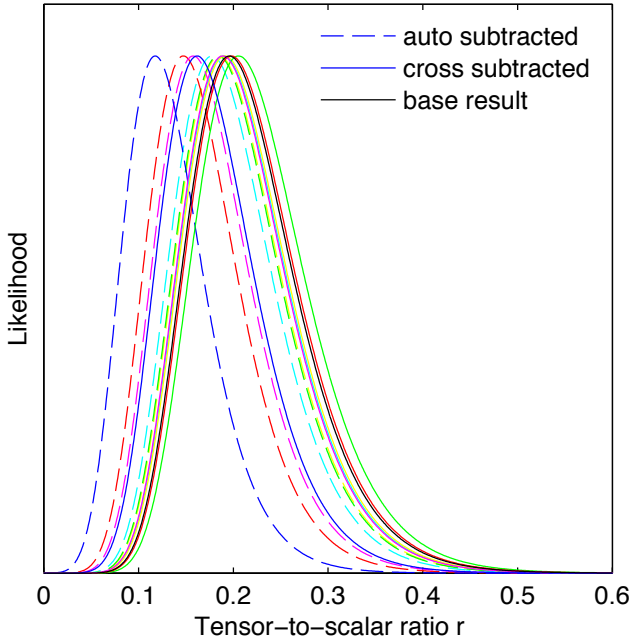
Planck constraints from TT

Model	Parameter	*Planck*+WP
ΛCDM + tensor	n_s	0.9624 ± 0.0075
	$r_{0.002}$	< 0.12
ΛCDM + r + $dn_s/d\ln k$	n_s	0.9583 ± 0.0081
	r	< 0.25
	$dn_s/d\ln k$	0.021 ± 0.012

Constraints from Planck come from the large scale TT (l<100). (assumed consistency relation nt=-r/8)

See Planck 2013 XXII

BICEP2 constraints from BB



Constraints from BICEP come from intermediate scale BB (20<l<200) (assumed nt=0) .

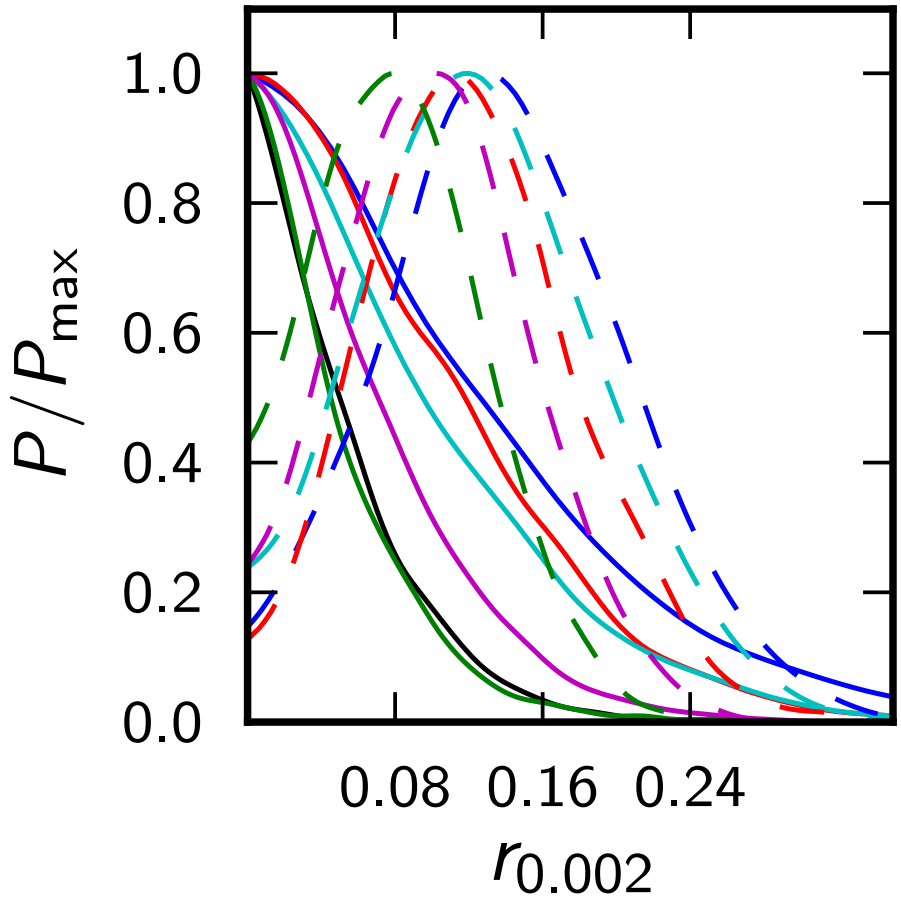
$$r = 0.20^{+0.07}_{-0.05}$$

No foreground subtraction

$$r = 0.16^{+0.06}_{-0.05}$$

With foreground subtraction

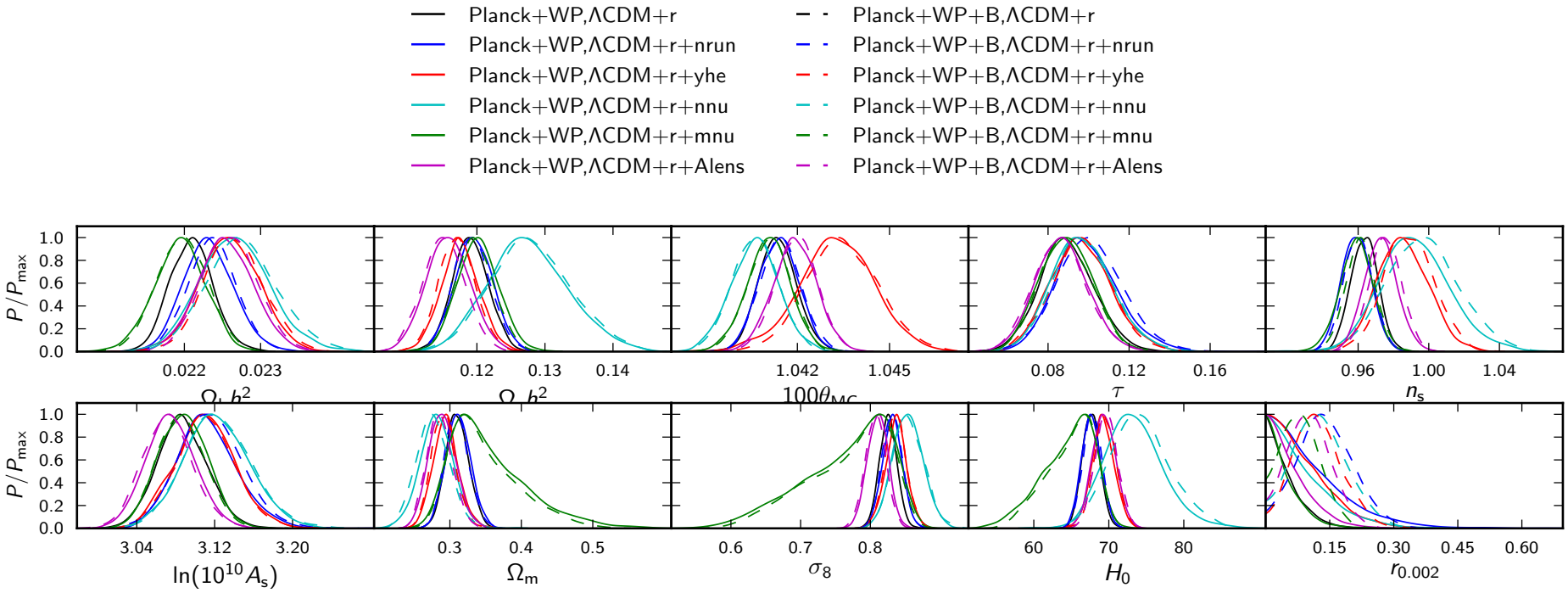
Planck+WP + BICEP2, ΛCDM+r+extensions



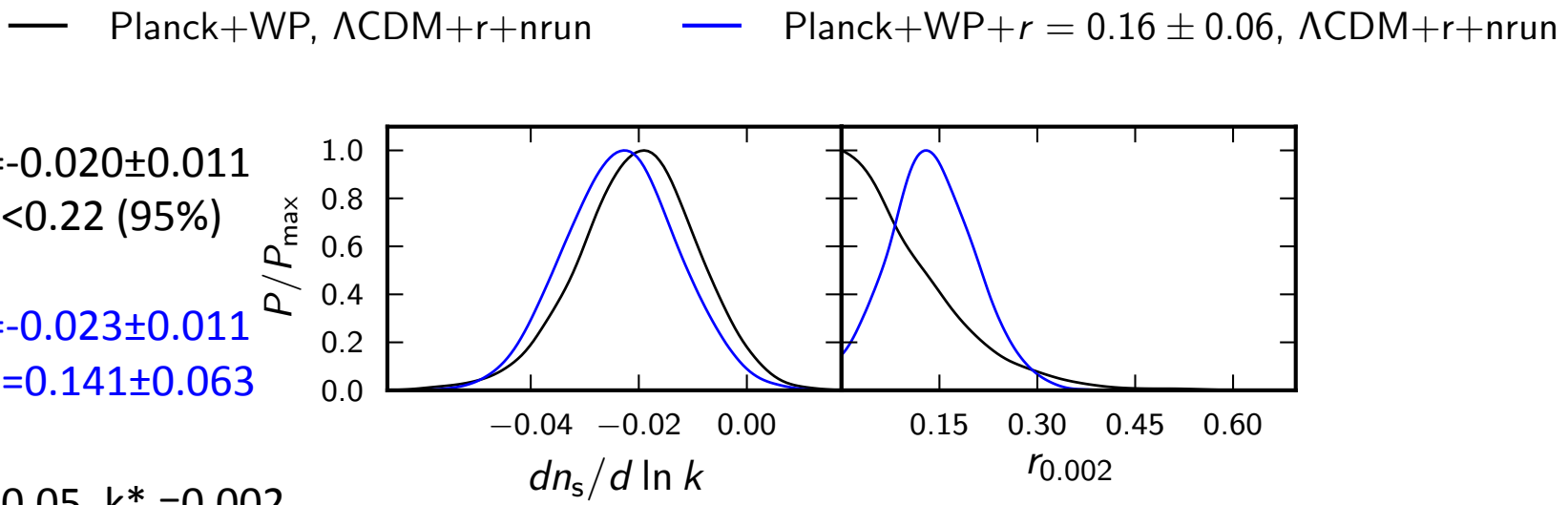
Planck+WP,ΛCDM+r
Planck+WP,ΛCDM+r+nrun
Planck+WP,ΛCDM+r+yhe
Planck+WP,ΛCDM+r+nnu
Planck+WP,ΛCDM+r+mnu
Planck+WP,ΛCDM+r+Alens

Dashed=Add prior on r
r=0.16±0.06

Planck constraints from TT



LCDM+r+running



n_{run}=-0.020±0.011
$r_{0.002}$<0.22 (95%)

n_{run}=-0.023±0.011
$r_{0.002}$=0.141±0.063

k*=0.05, k*$_r$=0.002

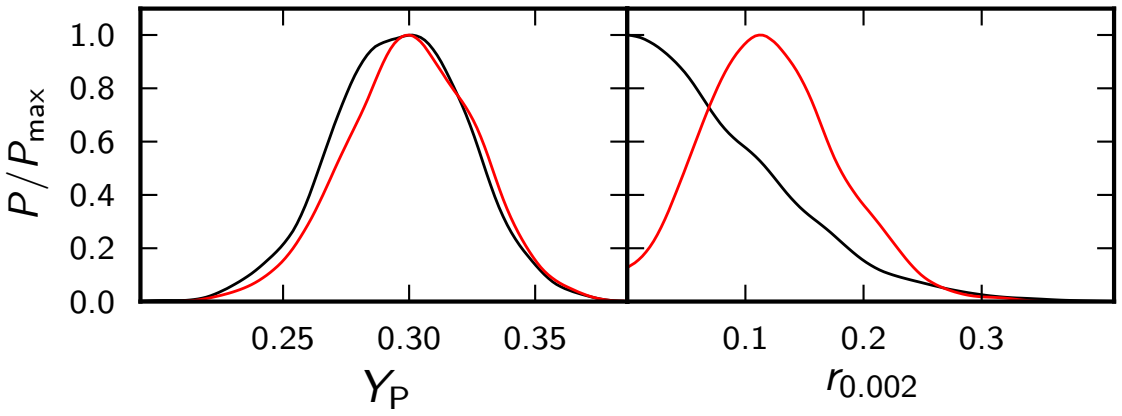
$$\mathcal{P}_{\mathcal{R}}(k) = A_s \left(\frac{k}{k_0}\right)^{n_s - 1 + (1/2)(dn_s/d\ln k)\ln(k/k_0)}$$

LCDM+r+Helium

Planck+WP, ΛCDM+r+yhe Planck+WP+$r = 0.16 \pm 0.06$, ΛCDM+r+yhe

Yhe=0.030±0.026
$r_{0.002}$<0.21 (95%)

Yhe=0.030±0.025
$r_{0.002}$=0.123±0.057

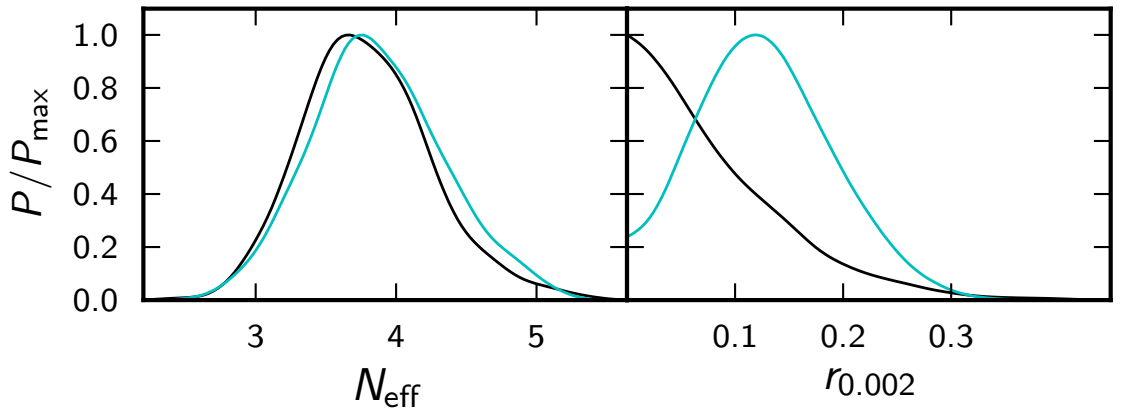


LCDM+r+number of relativistic species

Planck+WP, ΛCDM+r+nnu Planck+WP+$r = 0.16 \pm 0.06$, ΛCDM+r+nnu

N_{eff}=3.79±0.46
$r_{0.002}$<0.28 (95%)

N_{eff}=3.87±0.47
$r_{0.002}$=0.128±0.062



See also
Giusarma 2014