



Center for Astroparticle Physics
GENEVA



UNIVERSITÉ
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FACULTÉ DES SCIENCES

CIB as a window into primordial NG

Vincent Desjacques

CMB workshop, CERN, 19 May 2016

work in progress with



Marco Tucci



Martin Kunz

Primordial NG

- *Measure Primordial NG to distinguish between models of inflation (and other paradigms for the early Universe)*
- *CMB: close to linear 😊 but 2D 😞*
- *LSS: highly non-linear 😞 but 3D 😊*

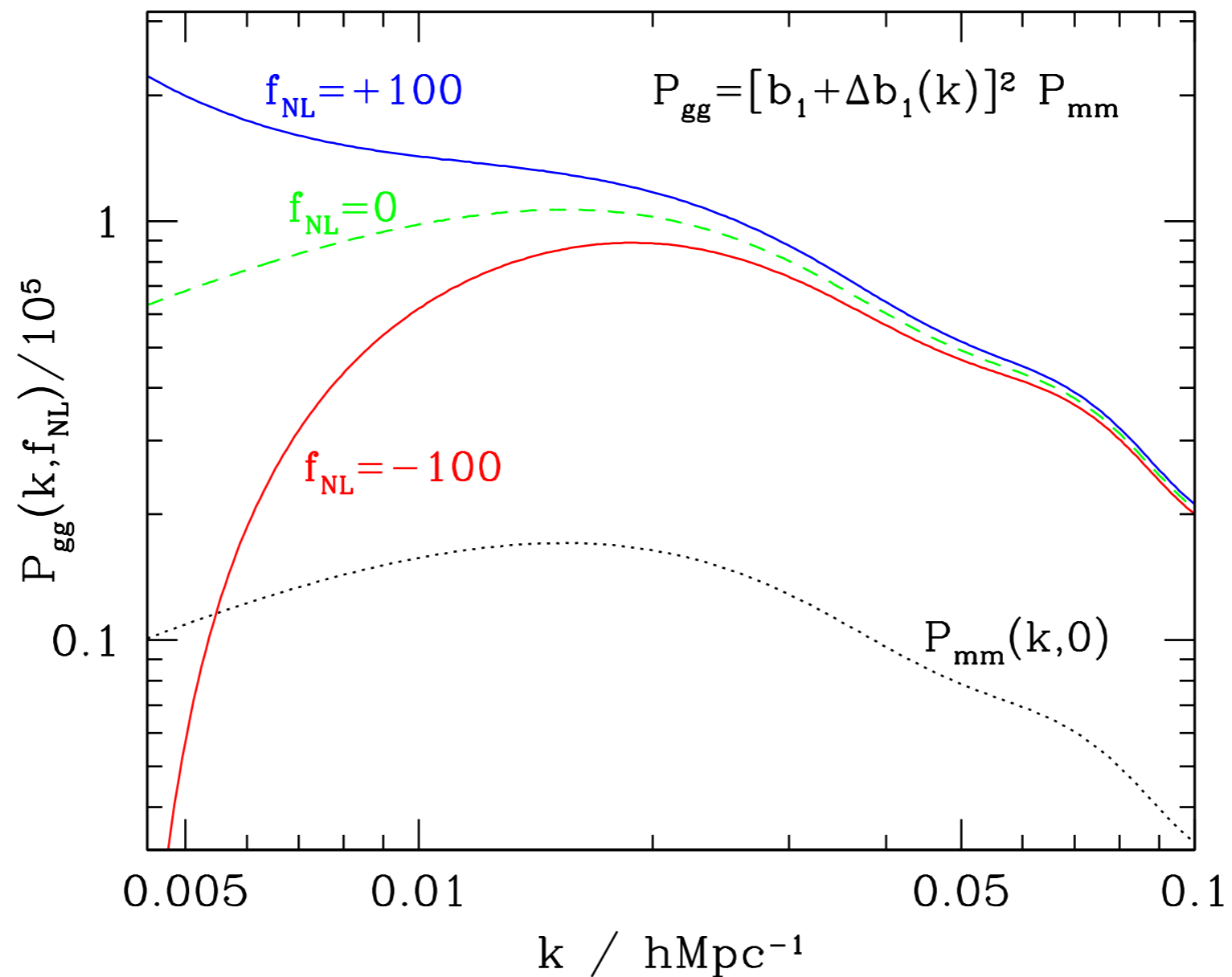
Primordial NG

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Many probes: cluster counts, galaxy bispectrum, non-Gaussian bias etc.

Non-Gaussian bias

- Scale-dependent bias induced by $f_{\text{NL}}\phi^2$: $\Delta b_1(k) \propto \frac{f_{\text{NL}}}{k^2}$



[Dalal et al. 2008]

PNG in the CIB

- *Very large comoving volume + low minimum halo mass “resolved”*



mitigate shot-noise + cosmic variance

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- *At first order in perturbations:*

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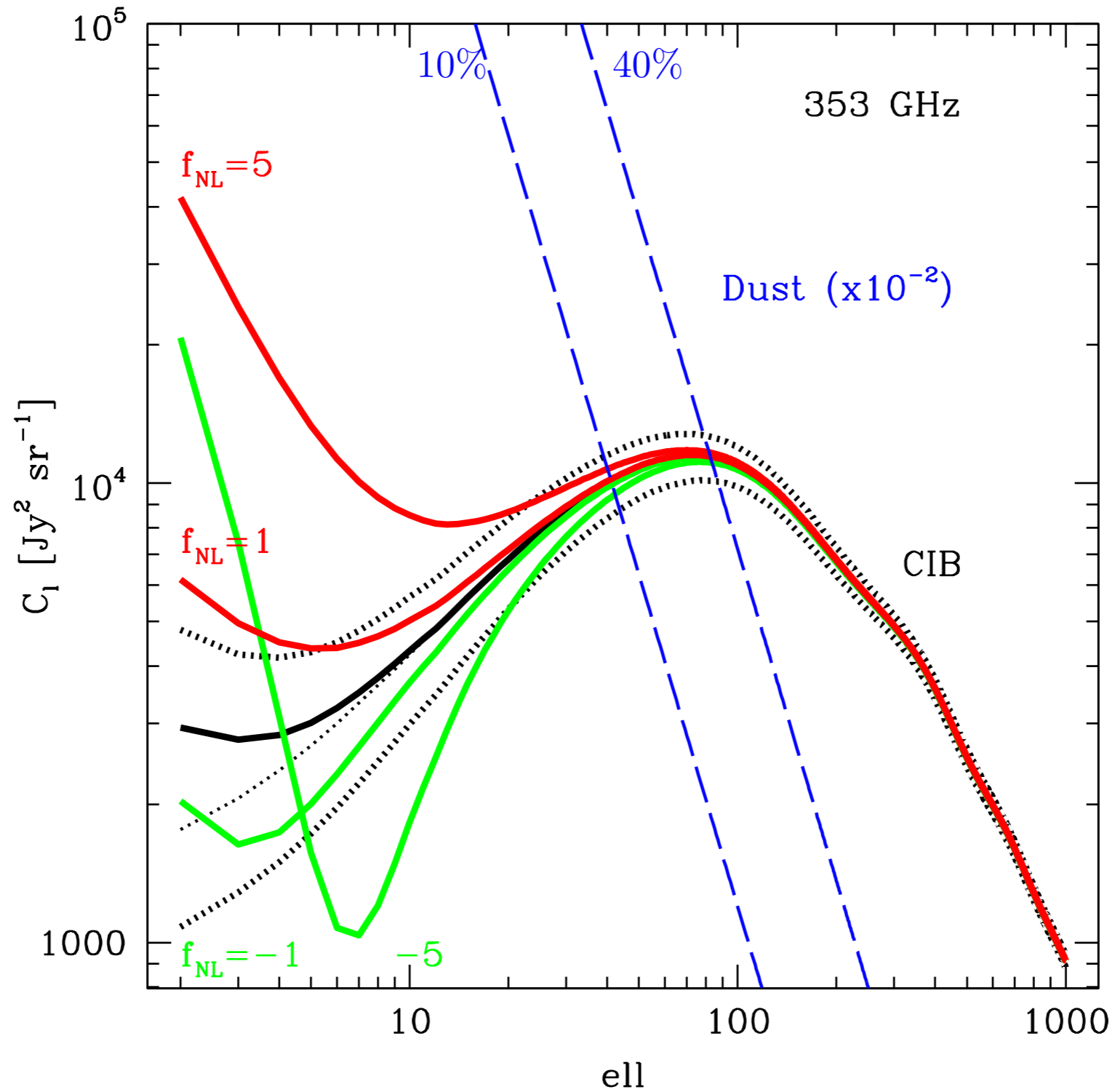
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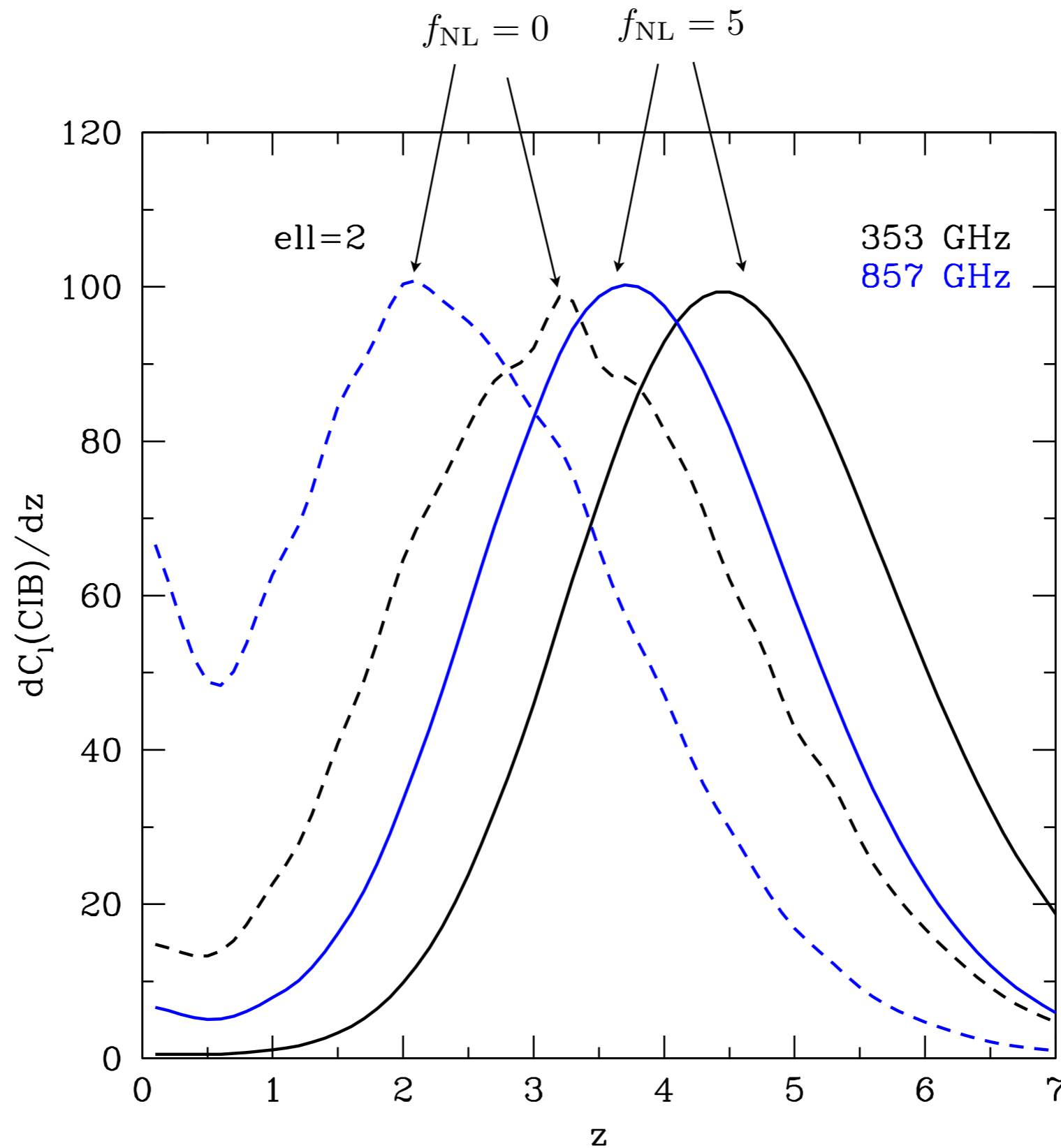
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- *GR projection effects:* $\mathcal{O}(f_{\text{NL}}^{\text{eff}}) \sim 0.3$

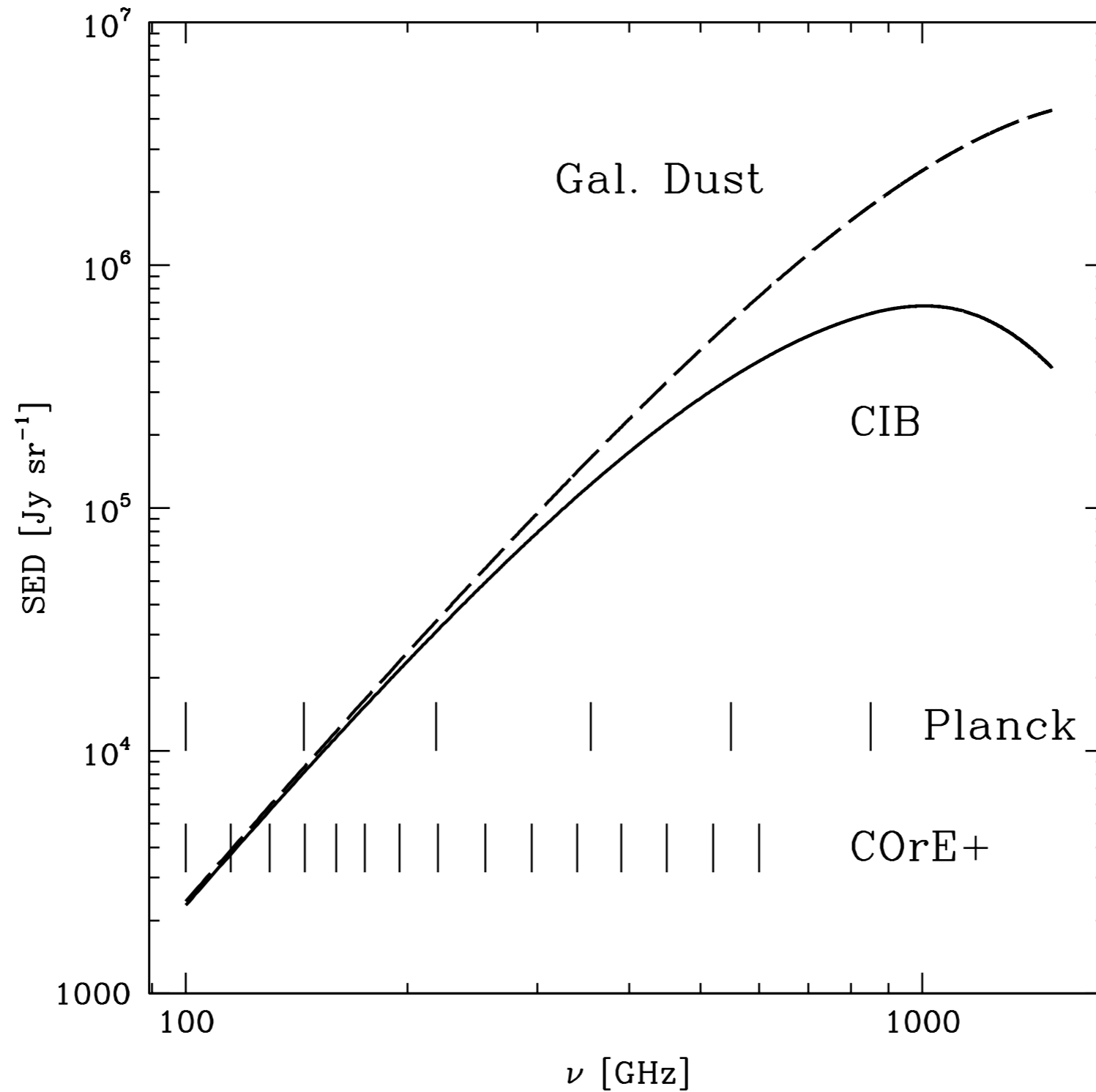
Non-Gaussian bias in CIB



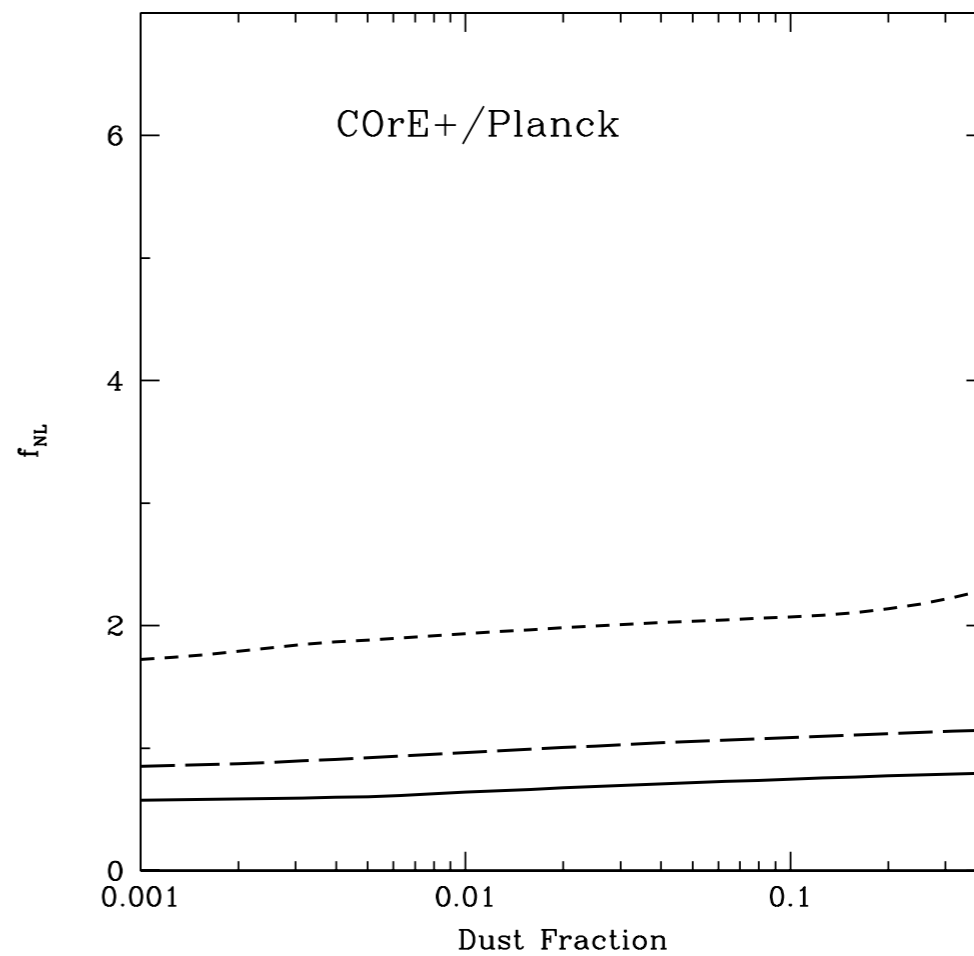
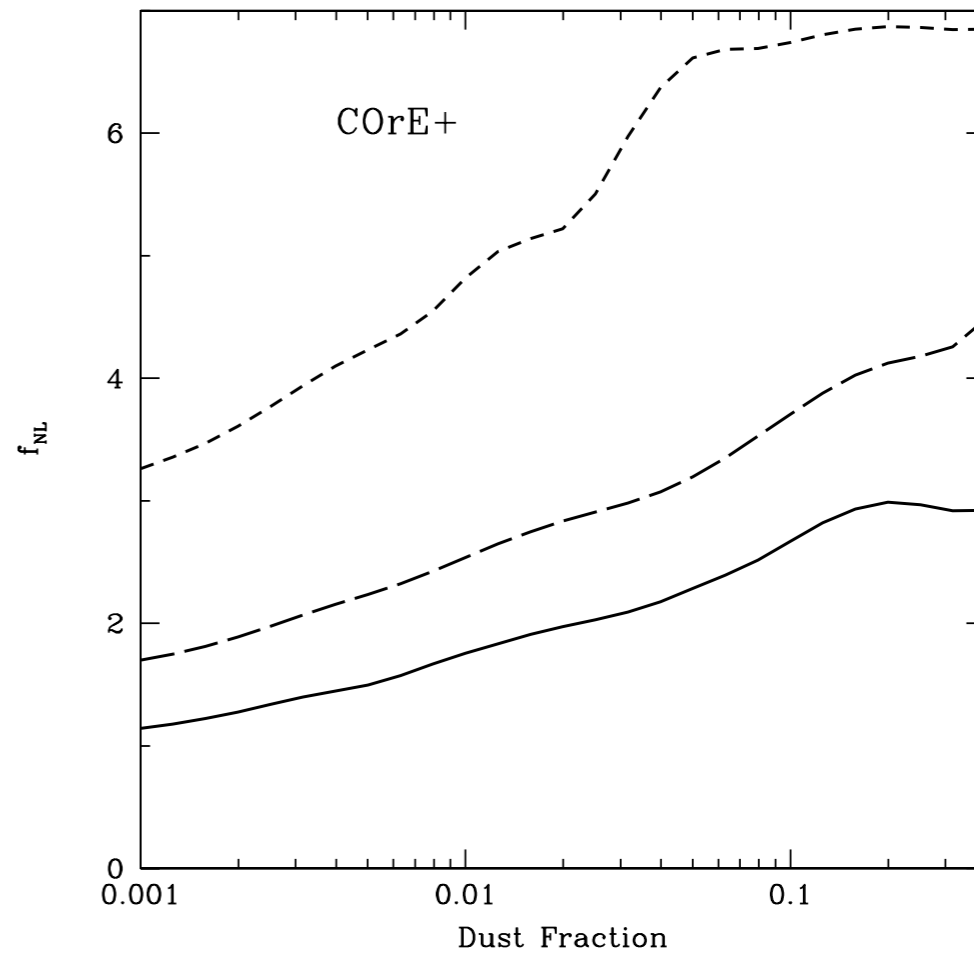
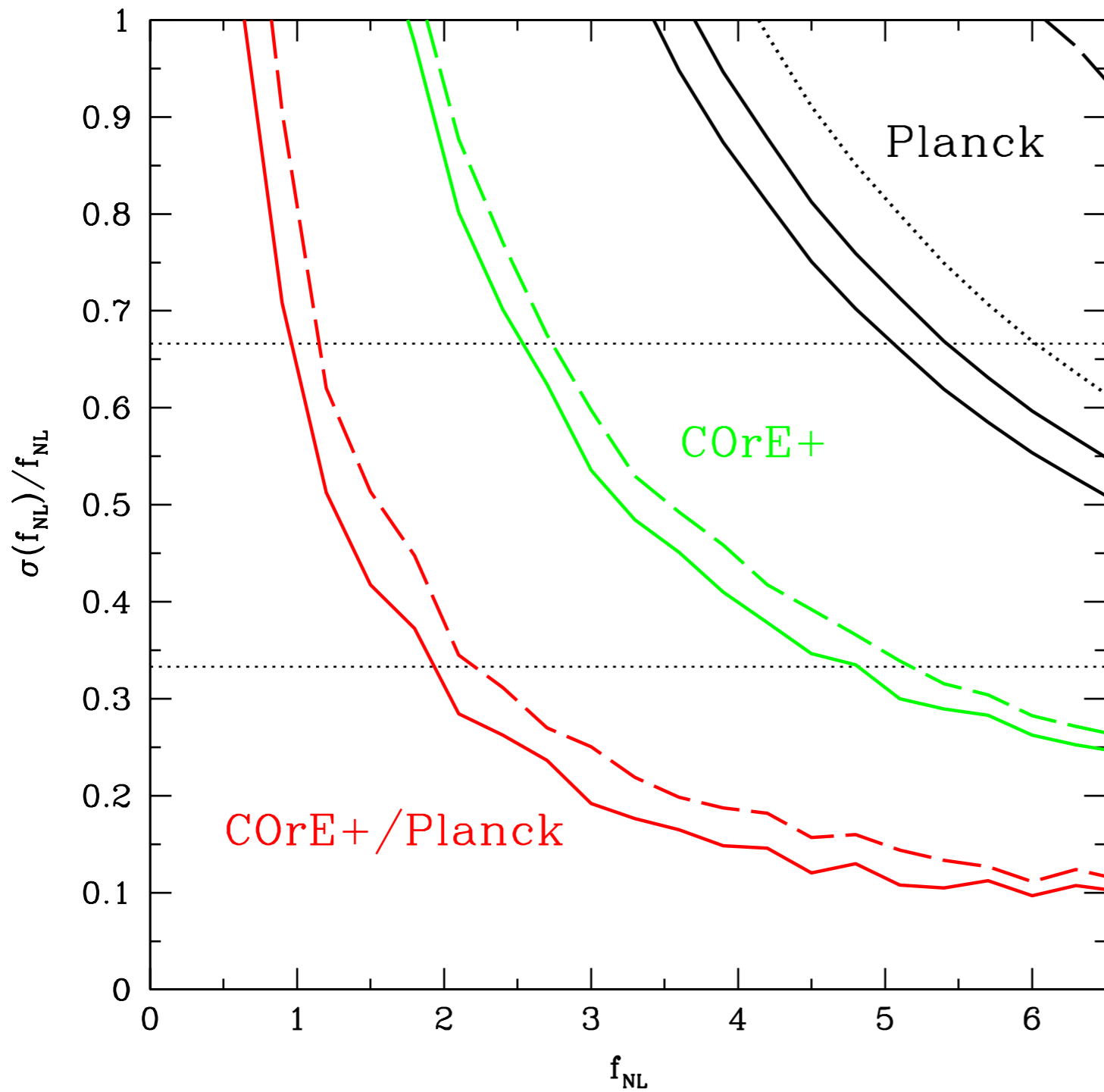
Adding frequencies \sim multi-tracers



Dust foreground removal



Fisher Forecast



Summary & Outlook

- *A combination of Planck + COrE+ could achieve*

$$\sigma(f_{\text{NL}}) \sim 0.5 - 0.6$$

with 40% of the sky provided dust emission is cleaned at 1% level

- *Possible to reach “natural” target $f_{\text{NL}} = 1$*
- *Having multiple frequency channels is crucial*
- *Theoretical uncertainties: M_{eff} etc.*