$N_{\rm eff}$ priors

(Dated: May 25, 2015)

Abstract

Try to understand the effect of priors on different parameters on the $N_{\rm eff}$ errors with a Fisher matrix approach. Where should you invest time and money if you really care about the value of $N_{\rm eff}$?

- We are now using a simplistic lensing noise but I have lensing noise with the usual Hu Okamoto formula. Iterative Seljack not there yet.
- We are varying τ n_s A_s $N_{\rm eff}$ H_0. The neutrino sector consists of one massive neutrino of $m_\nu = 0.083$ eV, $\Omega_\nu h^2 = 0.0009$
- Next TODO: Check for bug and errors code in its early stages. PCA? what prior is more important? Full MCMC should not be extremely hard with cosmosis.

INTRODUCTION

THEORY

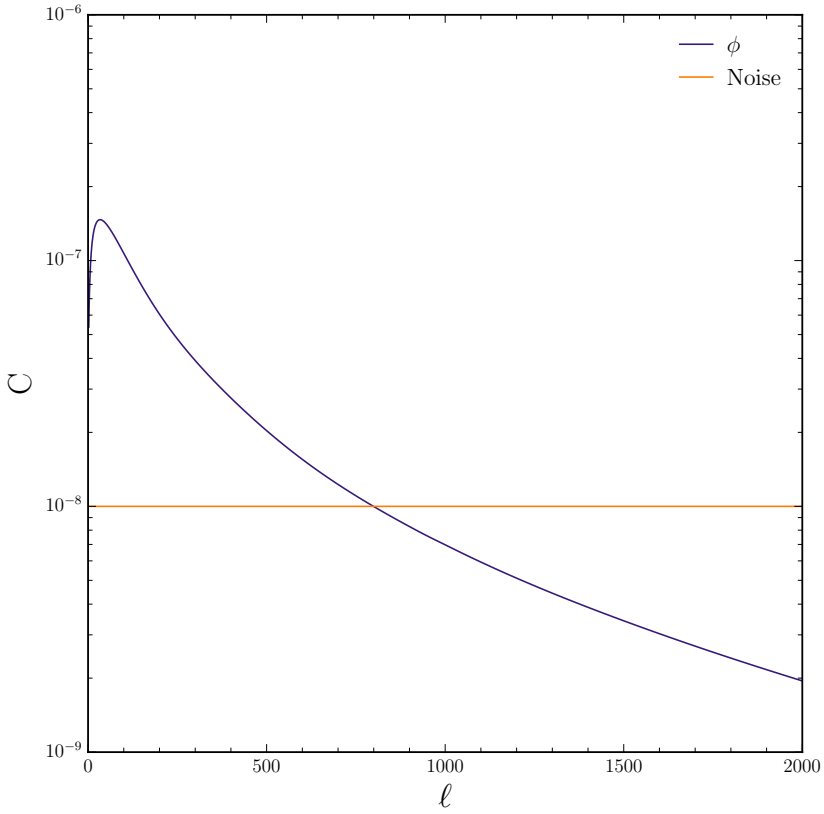

FIG. 1. Lensing potential power spectrum for our fiducial cosmology together with the lensing reconstruction noise N^{ϕ} used in this work.

$$s\ [\ \mu\mathrm{K.arcmin}\ ] \equiv \frac{\mathrm{NET}\ [\ \mu\mathrm{K}.\sqrt{s}\ ] \times \sqrt{f_{sky}\ [\ \mathrm{arcmin}^2\ ]}}{\sqrt{N_{\mathrm{det}} \times Y \times \Delta T\ [\ \mathrm{s}\ ]}}. \tag{1}$$

$$F_{ij} \equiv -\left\langle \frac{\partial^2 \log \mathcal{L}}{\partial\theta_i \partial\theta_j}\bigg|_{\boldsymbol{\theta}=\boldsymbol{\theta_0}} \right\rangle \tag{2}$$

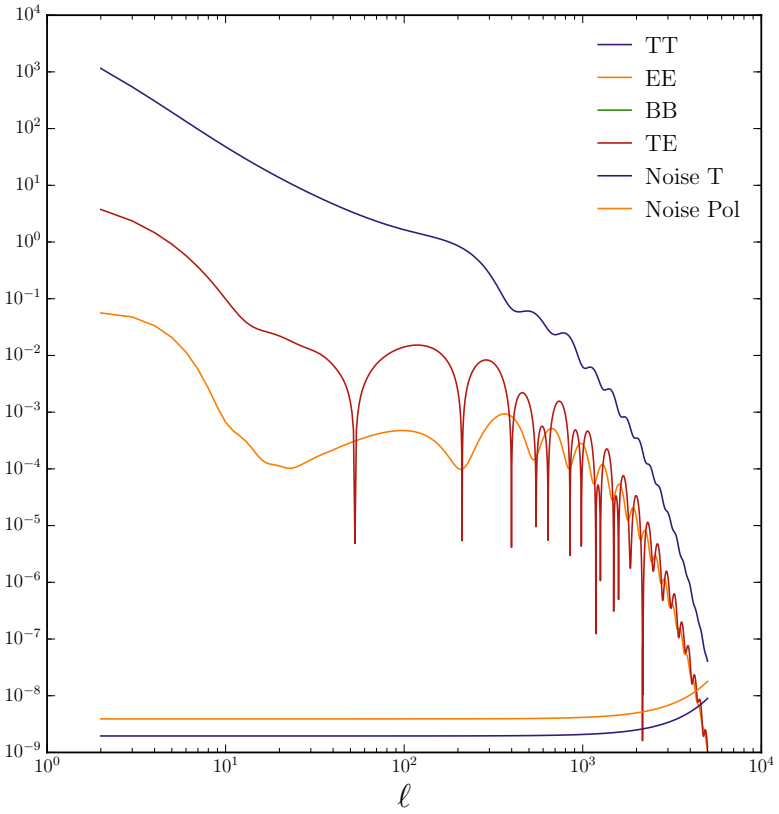

FIG. 2. CMB power spectrum for our fiducial cosmology together with the instrumental noise used in this work.

$$\mathbf{C}_\ell \equiv \begin{pmatrix} C_\ell^{TT} + N_\ell^{TT} & C_\ell^{TE} & C_\ell^{Td} \\ C_\ell^{TE} & C_\ell^{EE} + N_\ell^{EE} & 0 \\ C_\ell^{Td} & 0 & C_\ell^{dd} + N_\ell^{dd} \end{pmatrix}. \tag{3}$$

$$\sigma_i \equiv \sigma(\theta_i) = \sqrt{(\mathbf{F^{-1}})_{ii}} \tag{4}$$

$$F_{H_0 H_0} \to F_{H_0 H_0} + \frac{1}{(1\% \times H_{0,fid})^2}, \tag{5}$$

$$T_\nu = \left(\frac{4}{11}\right)^{1/3} T_\gamma \tag{6}$$

DATA

RESULTS

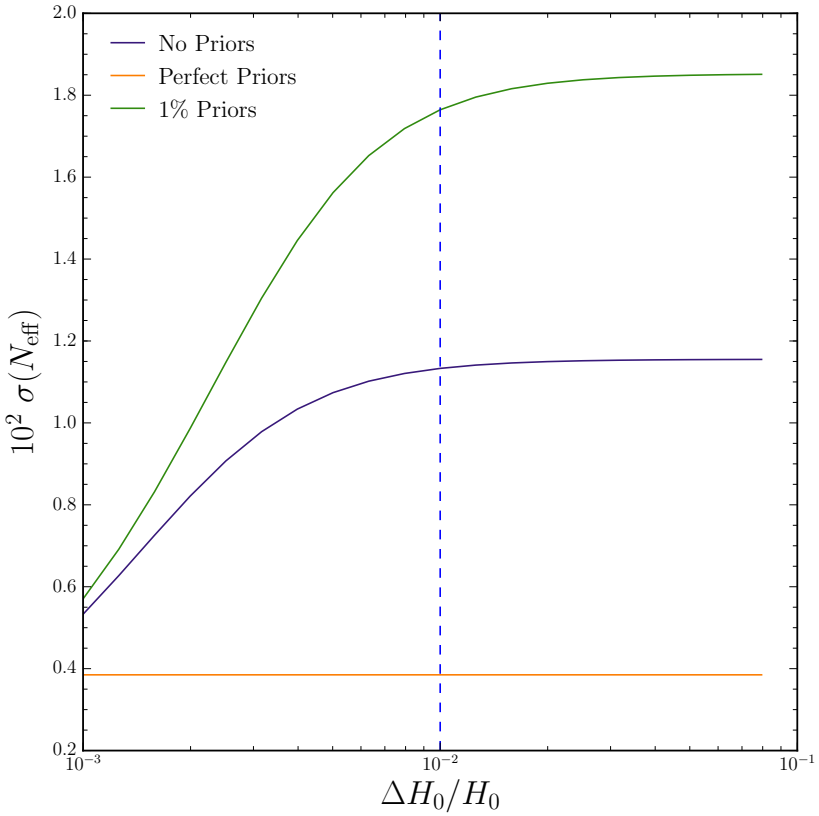

FIG. 3.

CONCLUSIONS

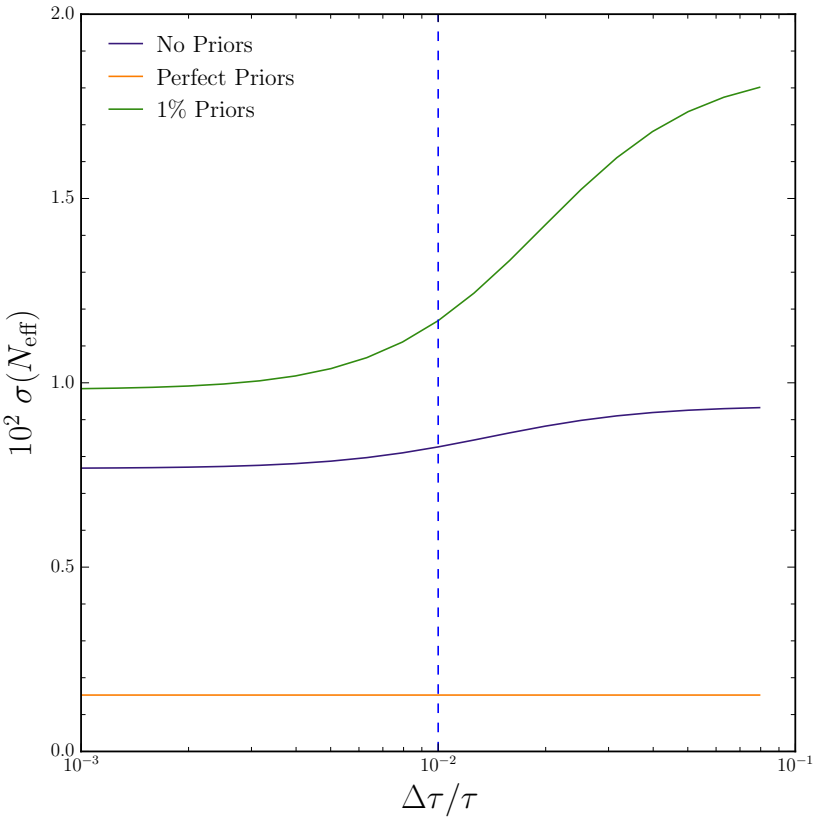
No Priors
Perfect Priors
1% Priors
$10^2\,\sigma(N_{\rm eff})$
$\Delta\tau/\tau$
2.0
1.5
1.0
0.5
0.0
10^{-3}
10^{-2}
10^{-1}

FIG. 4.