EFTCAMB & CosmoMC

The IFT School on Cosmology Tools

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New parametrization in EFTCAMB

$$S = \int d^4x \sqrt{-g} \frac{m_0^2}{2} \left[1 - \Omega(a) \right] R + S_m[g^{\mu\nu}, \Psi]$$
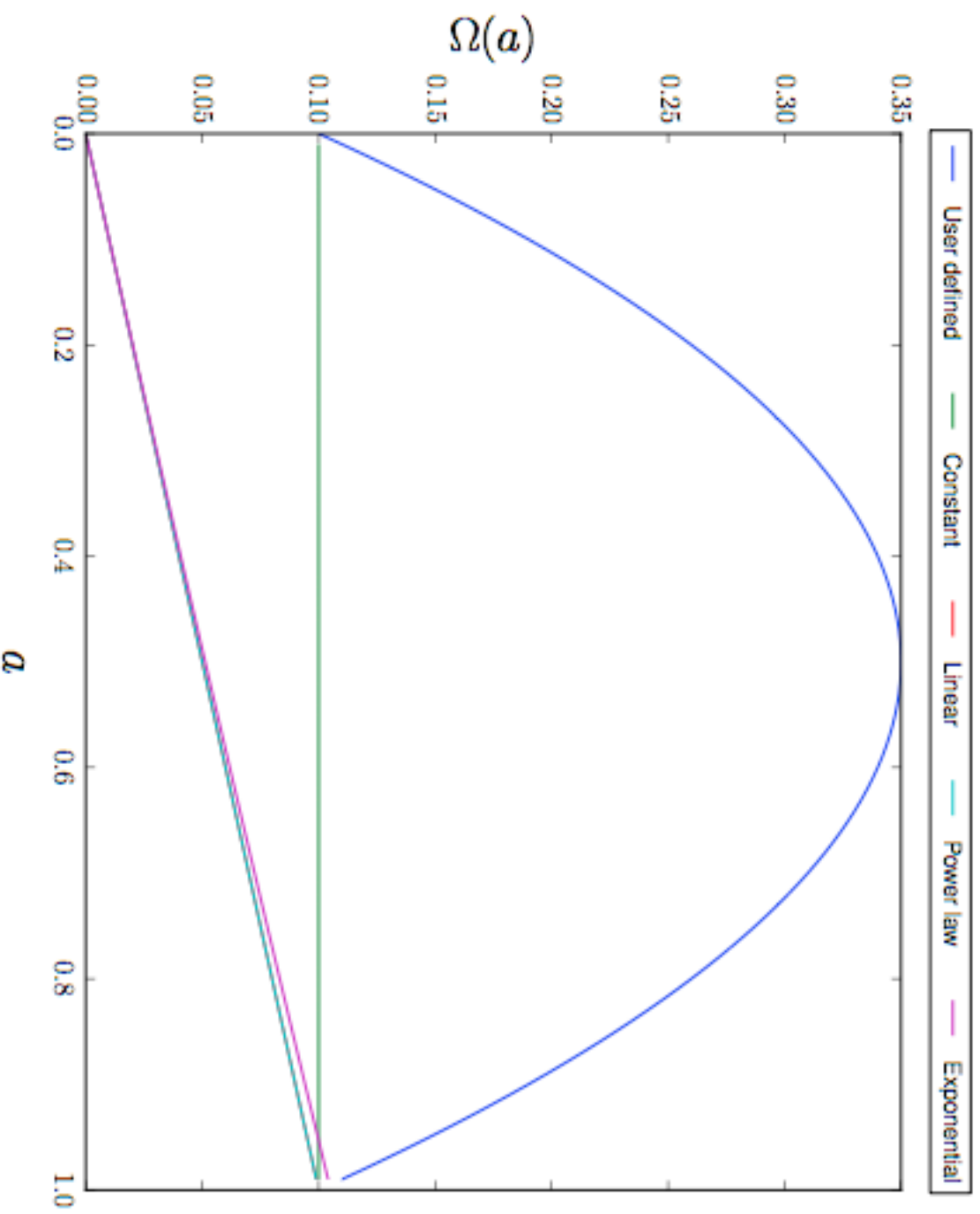
Existing parametrization

- Constant

$$\Omega(a) = \Omega_0$$

- Linear

$$\Omega(a) = \Omega_0 a$$

- Power law

$$\Omega(a) = \Omega_0 a^{\Omega_a}$$

- Exponential

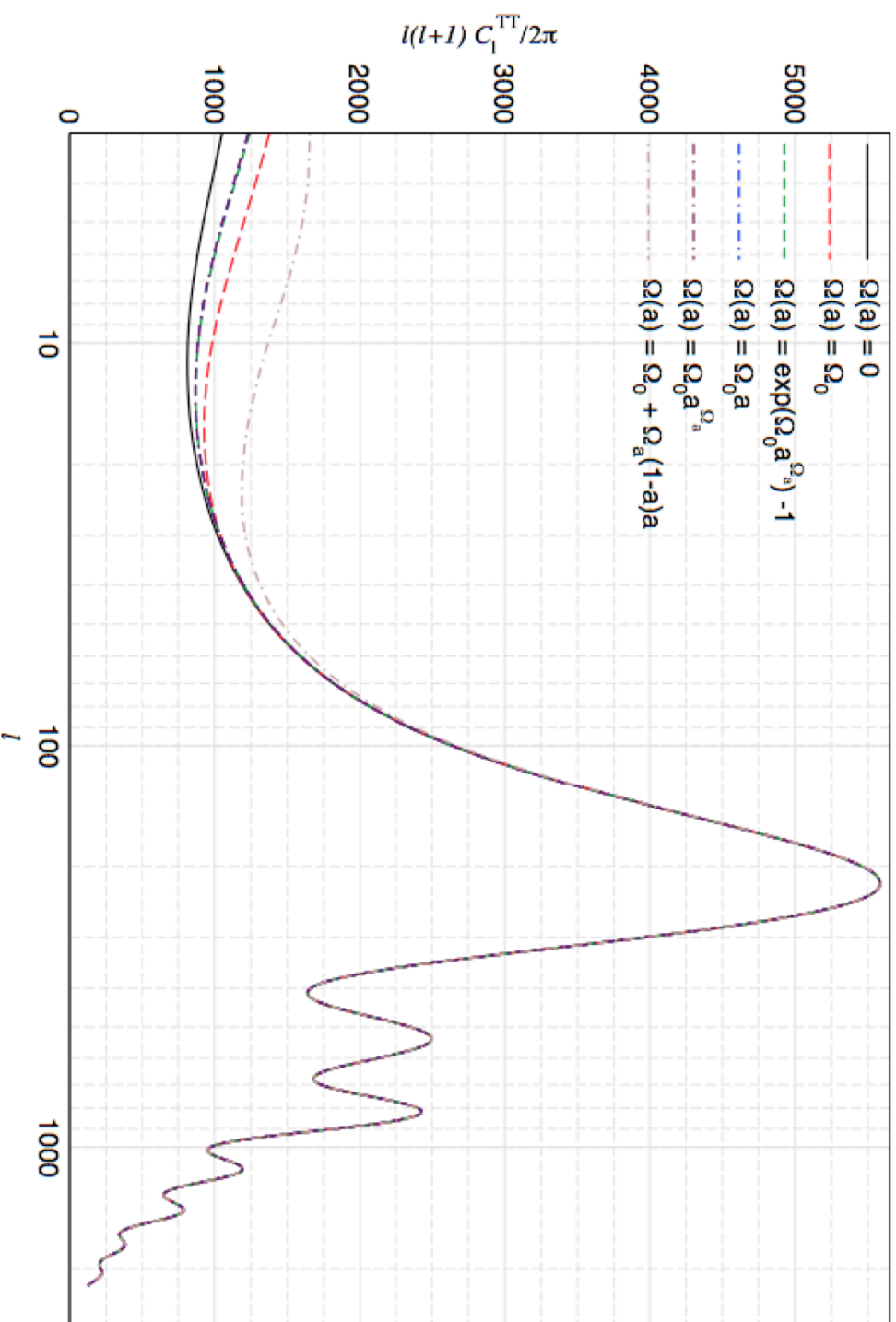$$\Omega(a) = \exp\left(\Omega_0 a^{\Omega_a}\right) - 1$$

New parametrization

$$\Omega(a) = \Omega_0 + \Omega_a a (1 - a)$$

New parametrization in EFTCAMB

$\Omega(a)$

a

User defined
Constant
Linear
Power law
Exponential

New parametrization in EFTCAMB

Legend:
- $\Omega(a) = 0$
- $\Omega(a) = \Omega_0$
- $\Omega(a) = \exp(\Omega_0 a^{\Omega_a}) - 1$
- $\Omega(a) = \Omega_0 a$
- $\Omega(a) = \Omega_0 a^{\Omega_a}$
- $\Omega(a) = \Omega_0 + \Omega_a(1-a)a$

Vertical axis: $l(l+1)\, C_l^{TT}/2\pi$

Horizontal axis: l

EFTCAMB + CosmoMC

Motivation

- Run Planck likelihood with the new parametrization

Result

```
TT from l=0 to l=        2508
Checking likelihood './data/clik/hi_l/plik/plik_dx11dr2_HM_v18_TT.clik' on test data. got -380.979 expected -380.979 (diff -8.68442e-09)
---
TT from l=0 to l=        2508
Checking likelihood './data/clik/hi_l/plik/plik_dx11dr2_HM_v18_TT.clik' on test data. got -380.979 expected -380.979 (diff -8.68442e-09)
---
TT from l=0 to l=        2508
[studa8@hydra0 cosmomc]$ tail stdout/job.632199.out
0.000000000000000000E+000  0.000000000000000000E+000
0.000000000000000000E+000  0.000000000000000000E+000
0.000000000000000000E+000  0.000000000000000000E+000
0.000000000000000000E+000  0.000000000000000000E+000
0.000000000000000000E+000
CAMB error Dverk error -3: the subroutine was unable to satisfy the error r
equirement with a particular step-size that is less than or * equal to hmin, w
hich may mean that tol is too small-- but most likely you've messed up the y a
rray indexing; compiling with bounds checking may (or may not) help find the pr
oblem.
MpiStop:                    6
```