DARK ENERGY SPECTROSCOPIC INSTRUMENT

U.S. Department of Energy Office of Science

Full Shape with FolpsD

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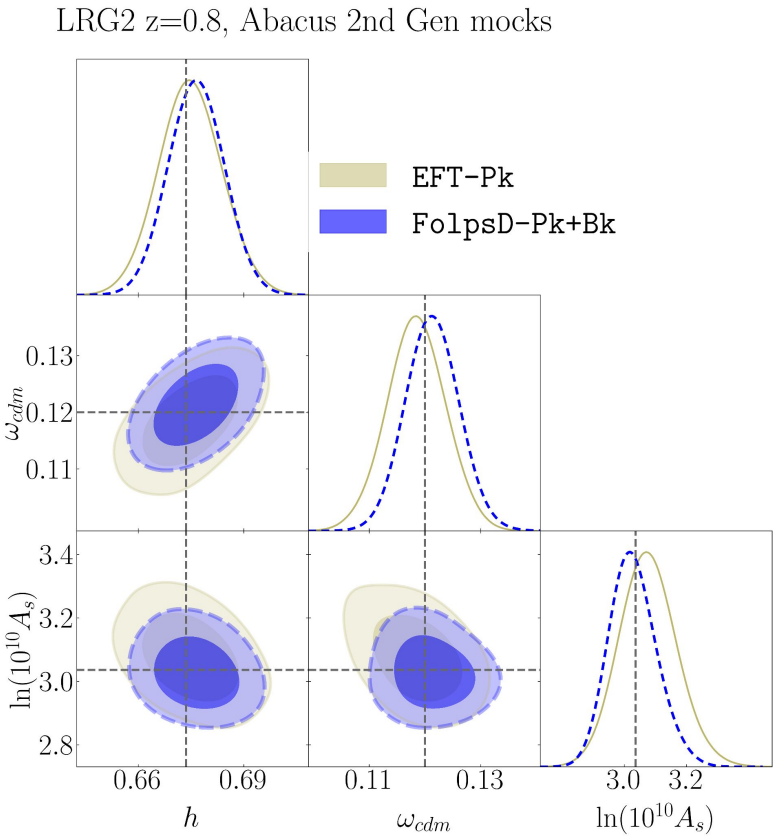
FolpsD Code: Overview

- Power spectrum + Bispectrum (Scoccimarro or Sugiyama)
- Fully implemented in Desilike
- Jax version tested outside NERSC
- Jit and Vmap working in desilike (helps with the convergence a lot!)

- Windowed Pk and Bk ready, need to be tested with desilike

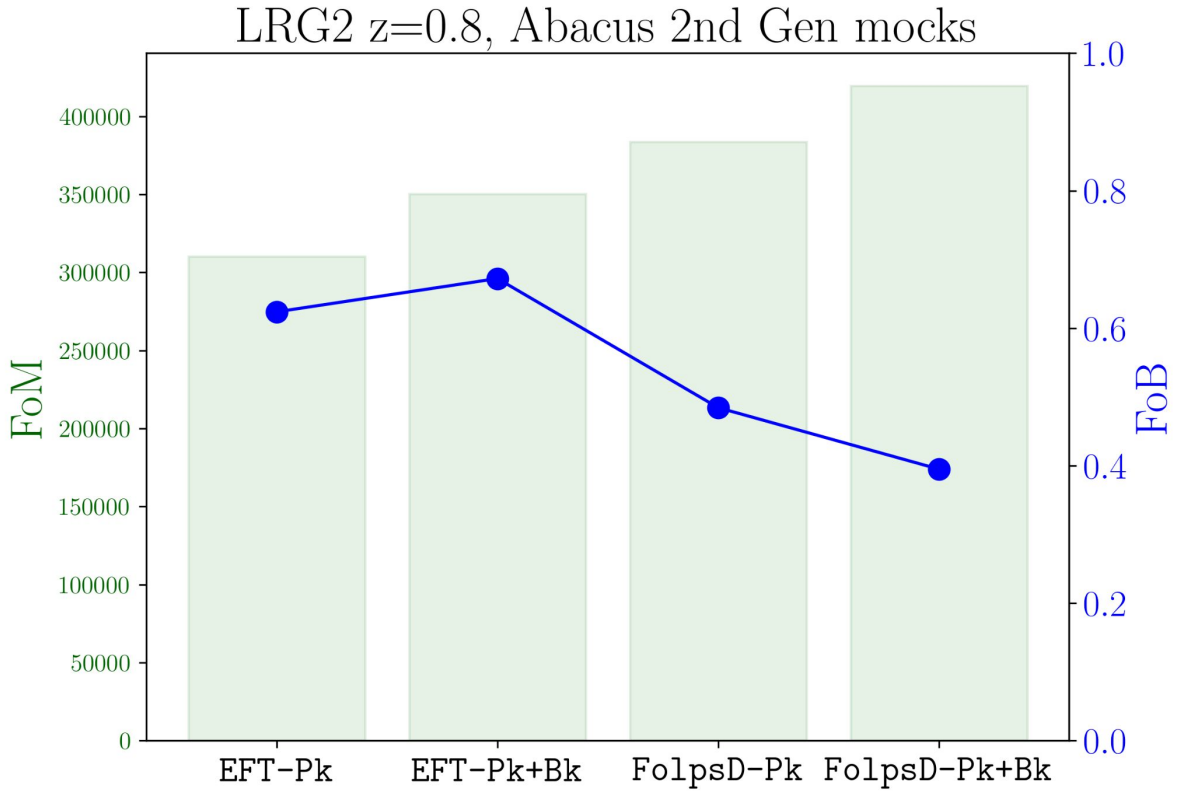
Results: Abacus2gen Mocks

FolpsD vs EFT (Abacus2gen Mocks LRG2 z0.800)

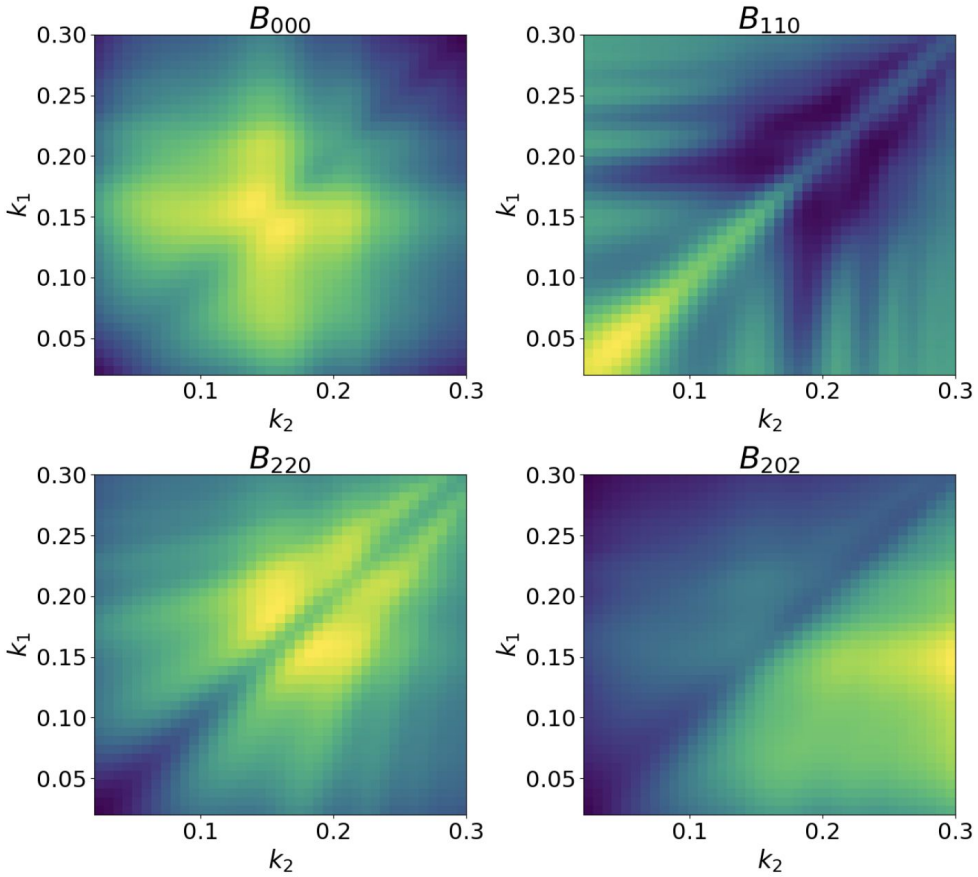


Tested for LRG1 and QSO mocks as well

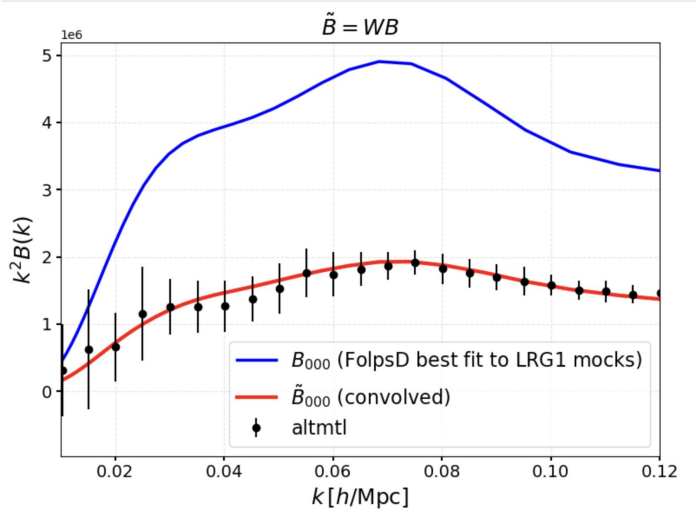
FOM-FOB


LRG2 z=0.8, Abacus 2nd Gen mocks
FoM
FoB
0
50000
100000
150000
200000
250000
300000
350000
400000
0.0
0.2
0.4
0.6
0.8
1.0
EFT-Pk
EFT-Pk+Bk
FolpsD-Pk
FolpsD-Pk+Bk

Windowed Bispectrum



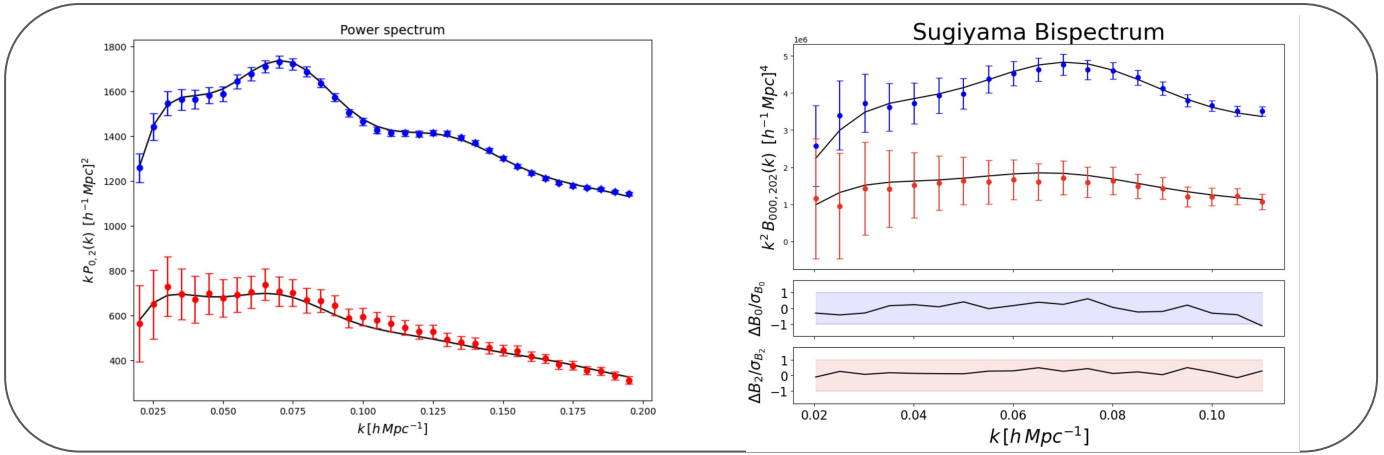
With Carol G.



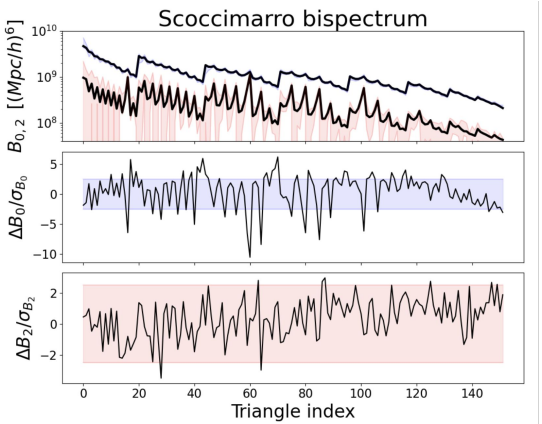
- Window matrices from Mike Wang et al 2411.14947.
- Model: best fit to LRG1 2nd Gen Abacus cubic mocks

Fitting to LRG2 power spectrum and Sugiyama bispectrum

Fit:



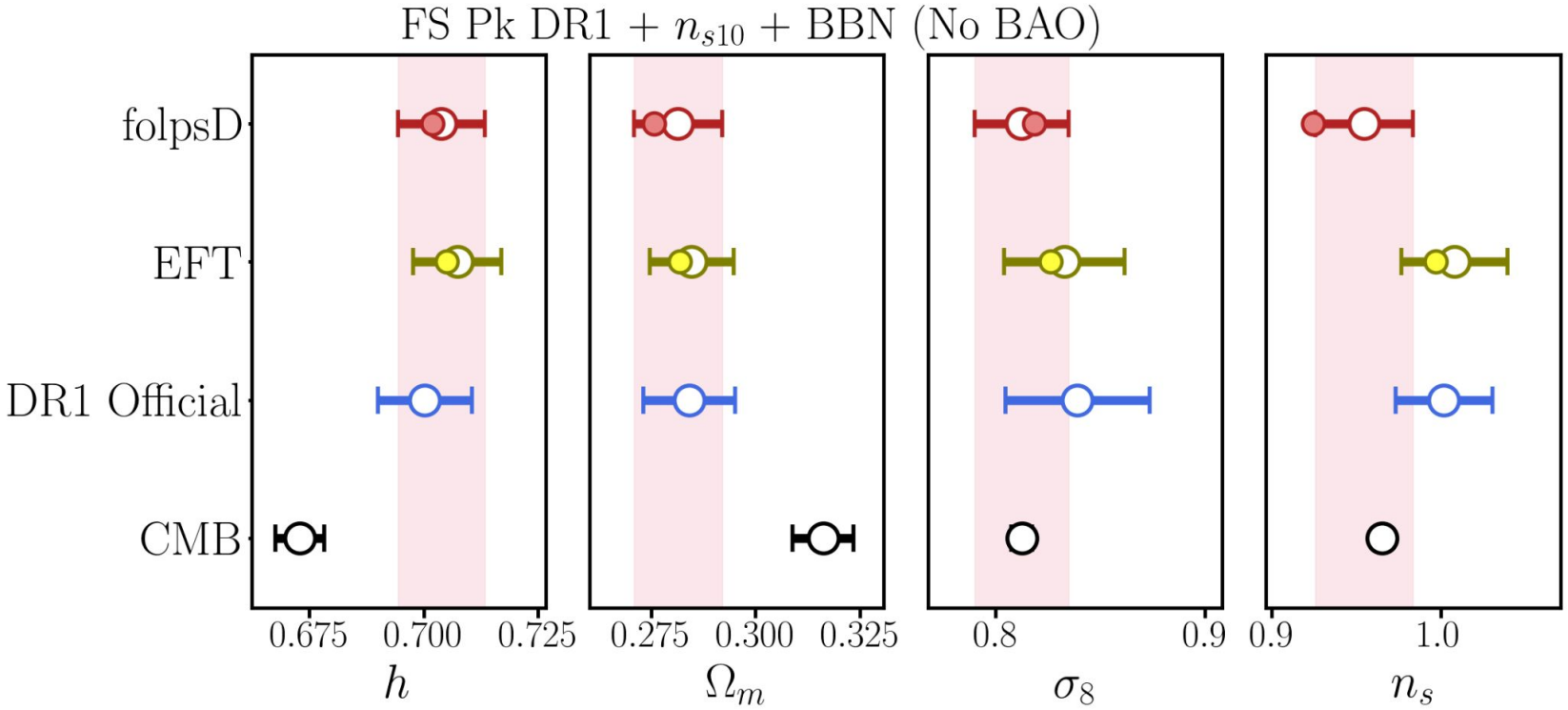
Derived:



Scoccimarro basis bispectrum from the Sugiyama best fits

Results: DR1 Full Shape

Results DR1



Improvement over DR1	15%	8%	35%	5%

Similar priors as used in Chudaykin et. al. (2507.13433) & b3 free

Backup Slides

EFT vs FolpsD

FolpsD = Damping($k_{||}$) x Folps

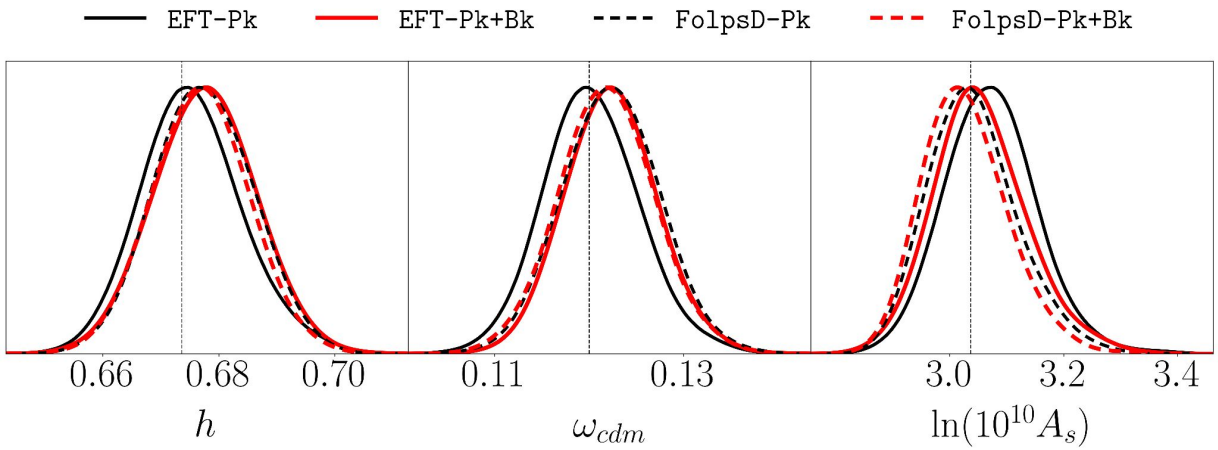
$$P(k,\mu) = \mathcal{D}(k^2\mu^2)\left[P_K(k,\mu) + P_{\text{1-loop}}(k,\mu)\right] + P^{\text{LO}}_{\text{ctr}}(k,\mu) + P_{\text{shot}}(k,\mu)\,.$$

$$\mathcal{D}(x^2) = \frac{1}{1+x^2},$$

$$x^2 = (X_{\text{FoG,p}}\, f\sigma_v k\mu)^2,$$

Other Tracers

LRG 1



QSO