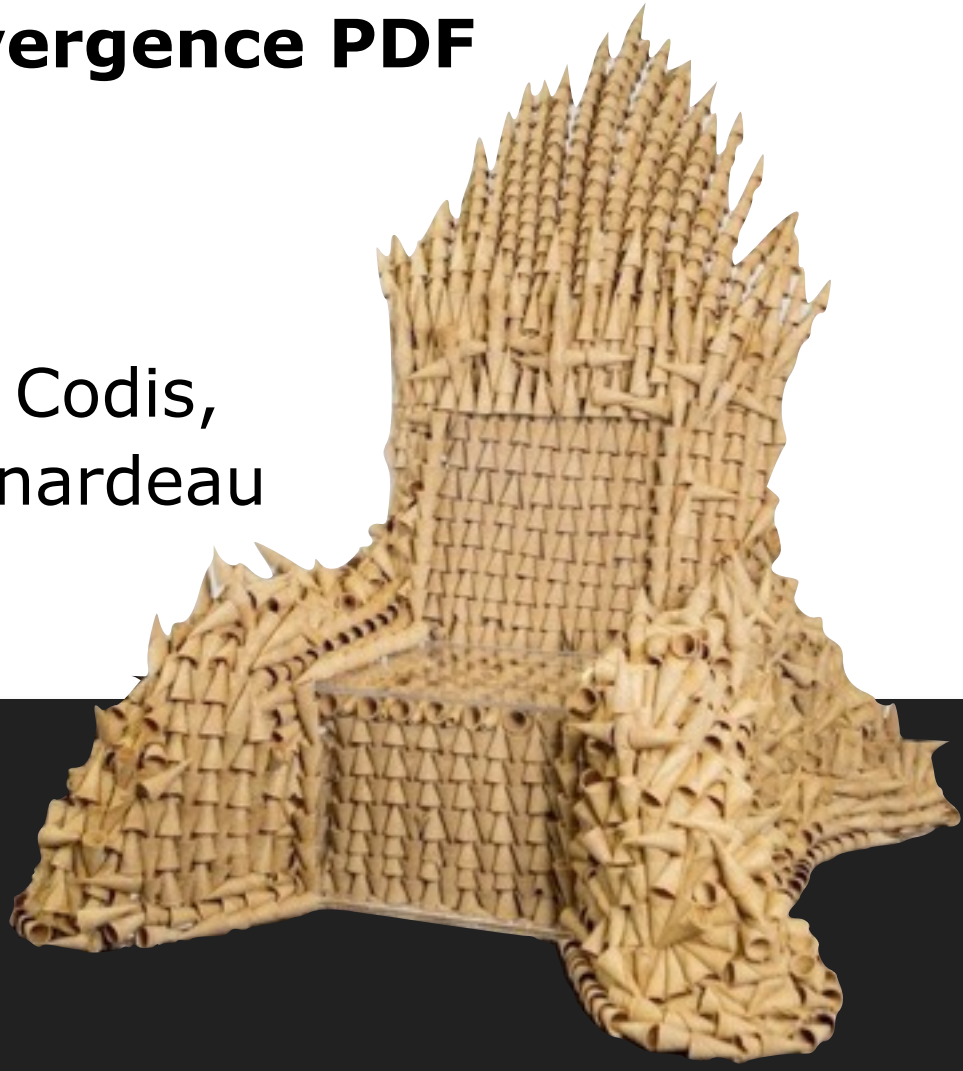
GAME OF CONES

Non-Gaussian WL Convergence PDF

arXiv: 1909.02615

with

A. Barthelemy, S. Codis,
R. Gavazzi, F. Bernardeau



Cora Uhlemann

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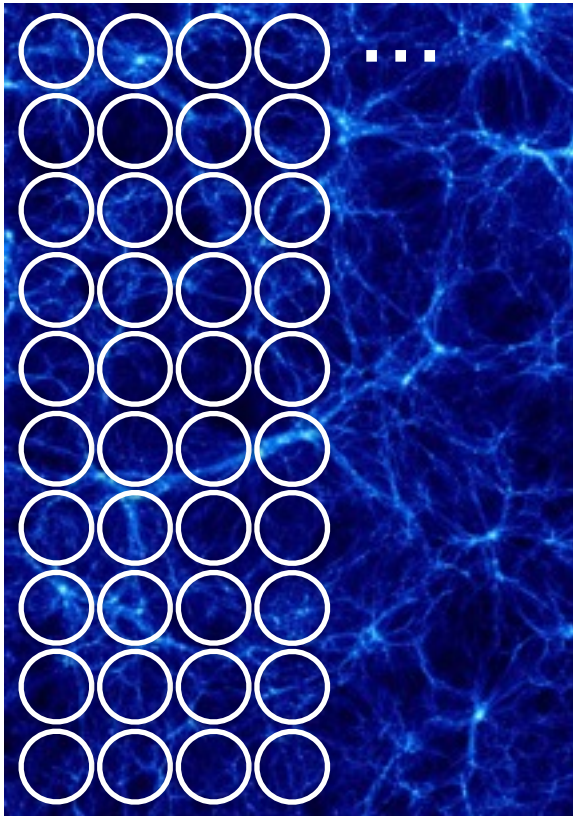
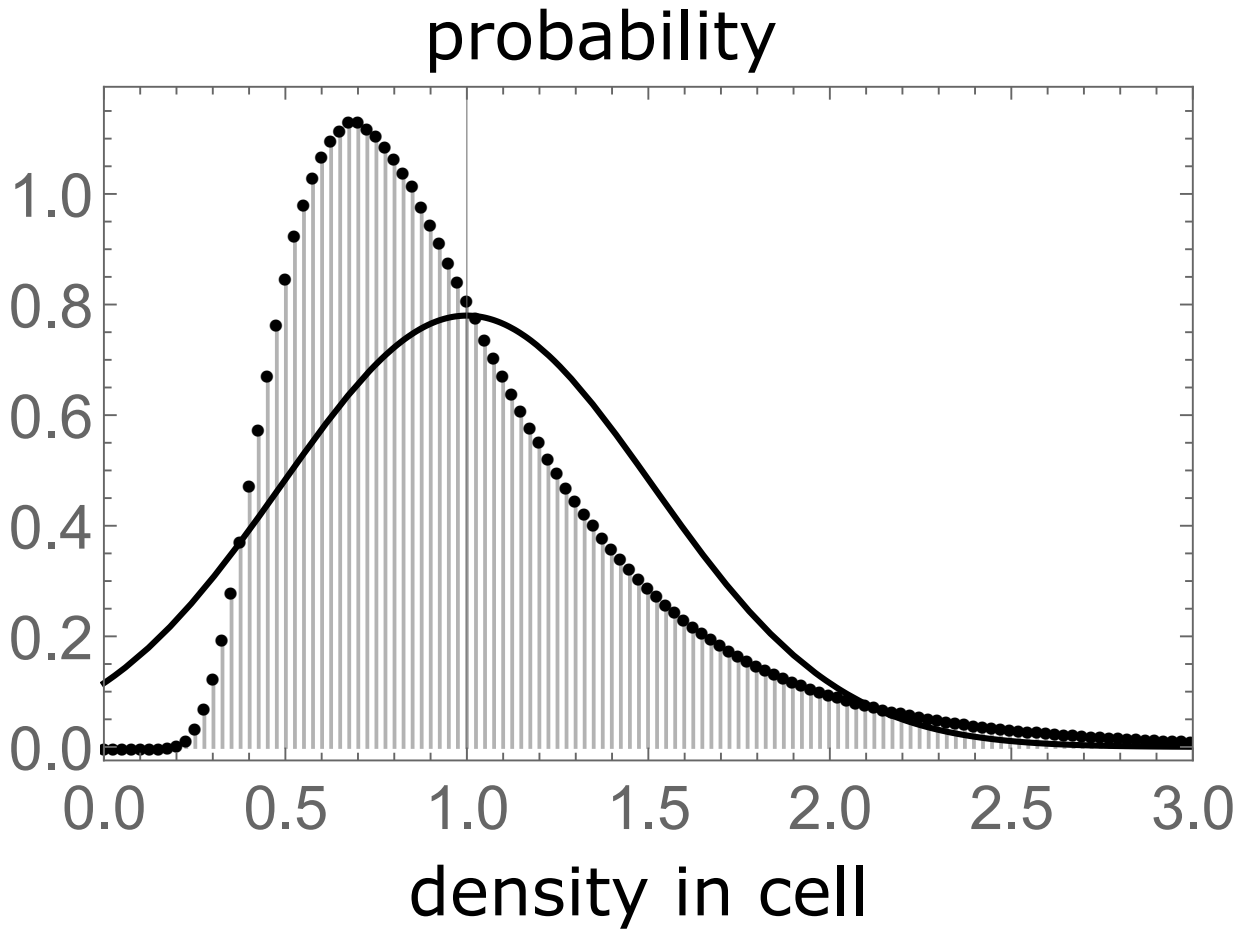
COUNTS-IN-CELLS

One-point statistics

non-Gaussian matter distribution

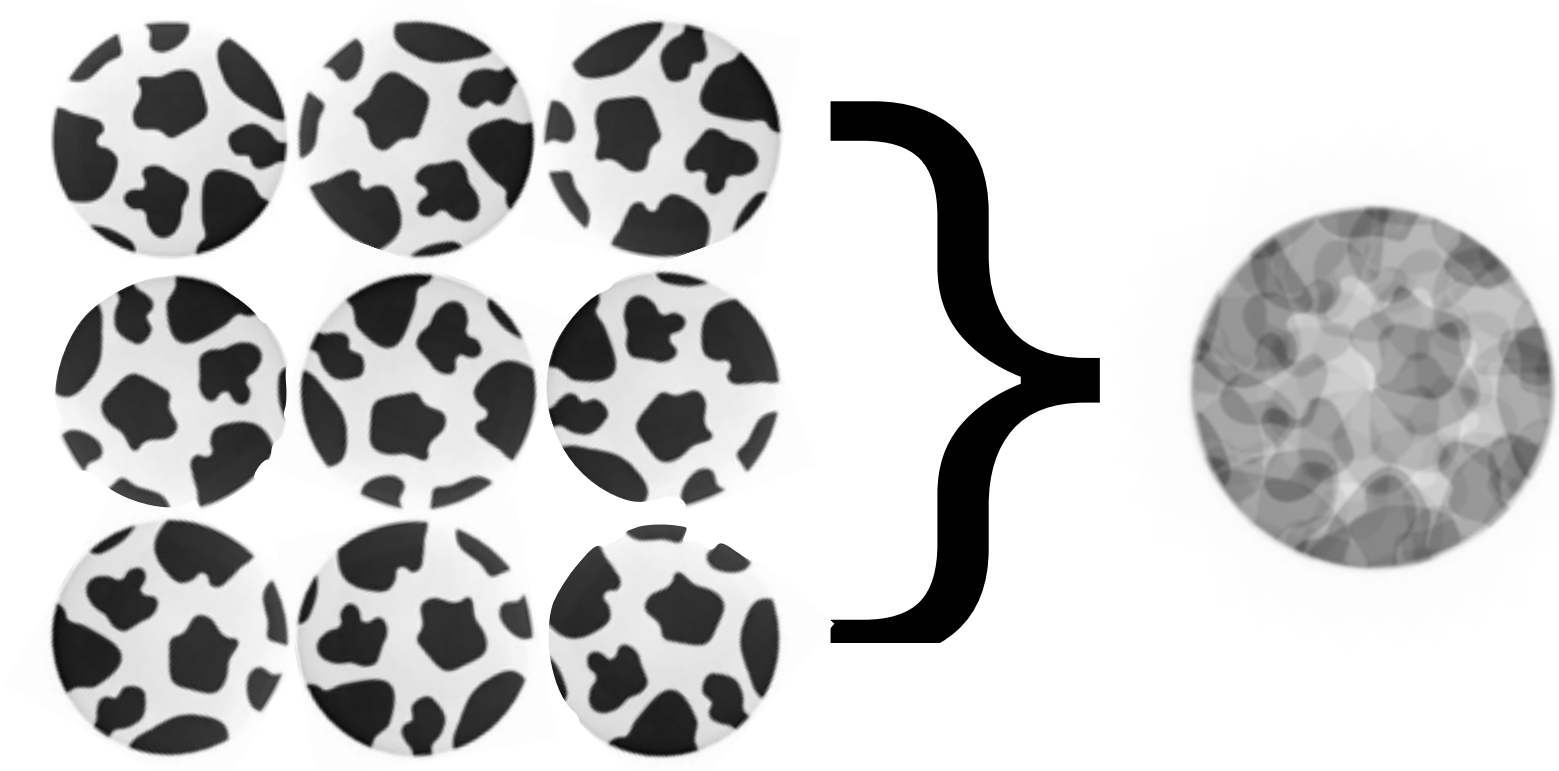




COUNTS-IN-CELLS

matter density in symmetric cells

symmetry statistics ↔ dynamics

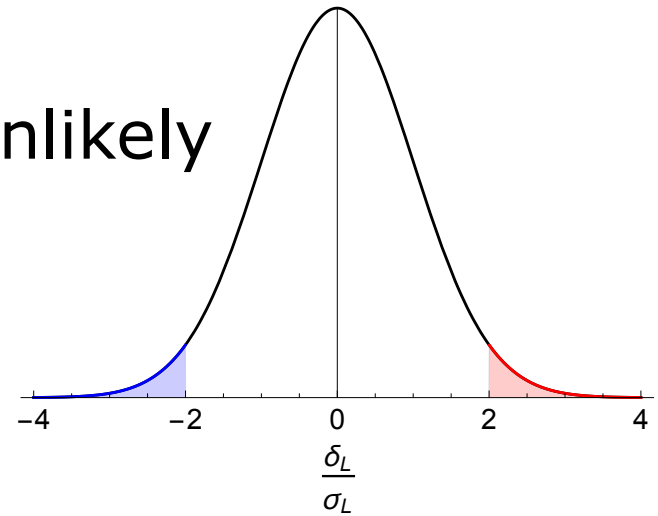


COUNTS-IN-CELLS

Large-deviation theory

initial PDF: large deviations exp. unlikely

$$\mathcal{P}_r^{\rm ini}(\delta_L) \sim \exp\left[-\frac{\delta_L^2}{2\sigma_L^2(r)}\right]$$



final PDF: most likely path dominates

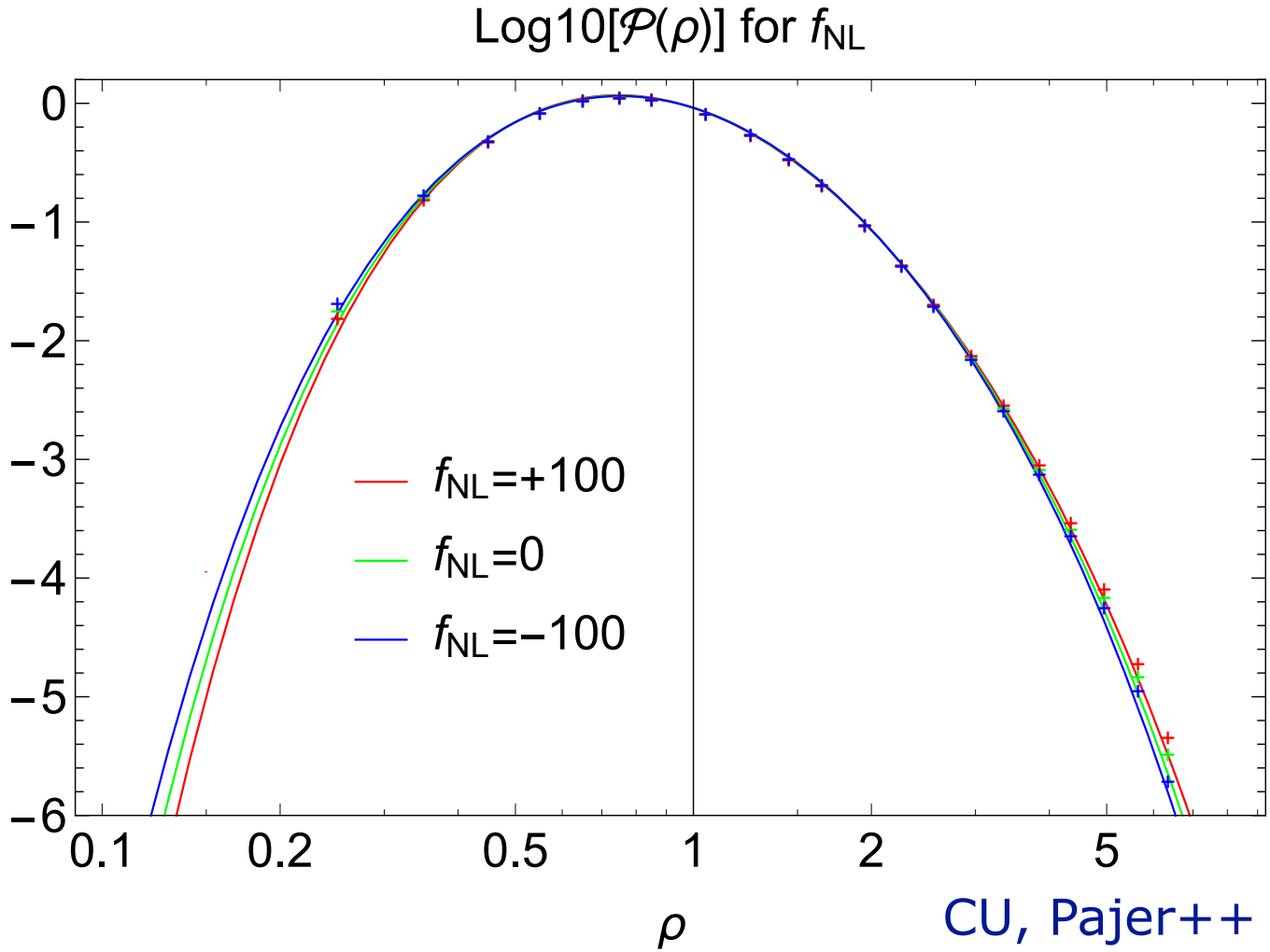
$$\mathcal{P}_{R,z}(\rho) \sim \exp\left[-\frac{\delta_L(\rho)^2}{2\sigma_L^2(z, r(R,\rho))}\frac{\sigma_L^2}{\sigma_{\rm NL}^2}\right]$$

expansion param

Bernardeau 94, Valageas 02
CU, Codis ++ 16, Ivanov++ 19

COUNTS-IN-CELLS

local primordial non-Gaussianity

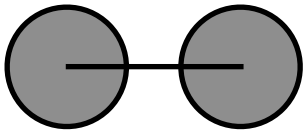


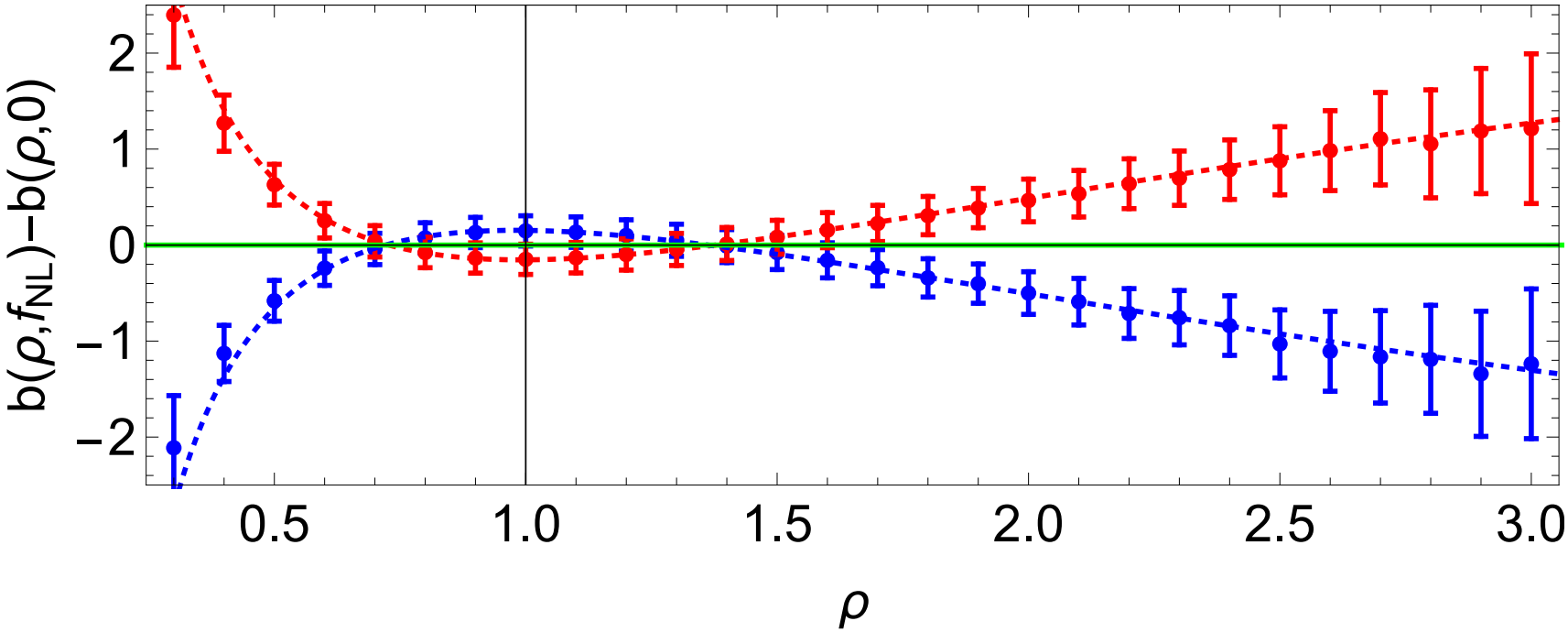
CU, Pajer++ 18

COUNTS-IN-CELLS

local primordial non-Gaussianity

density-dependent clustering

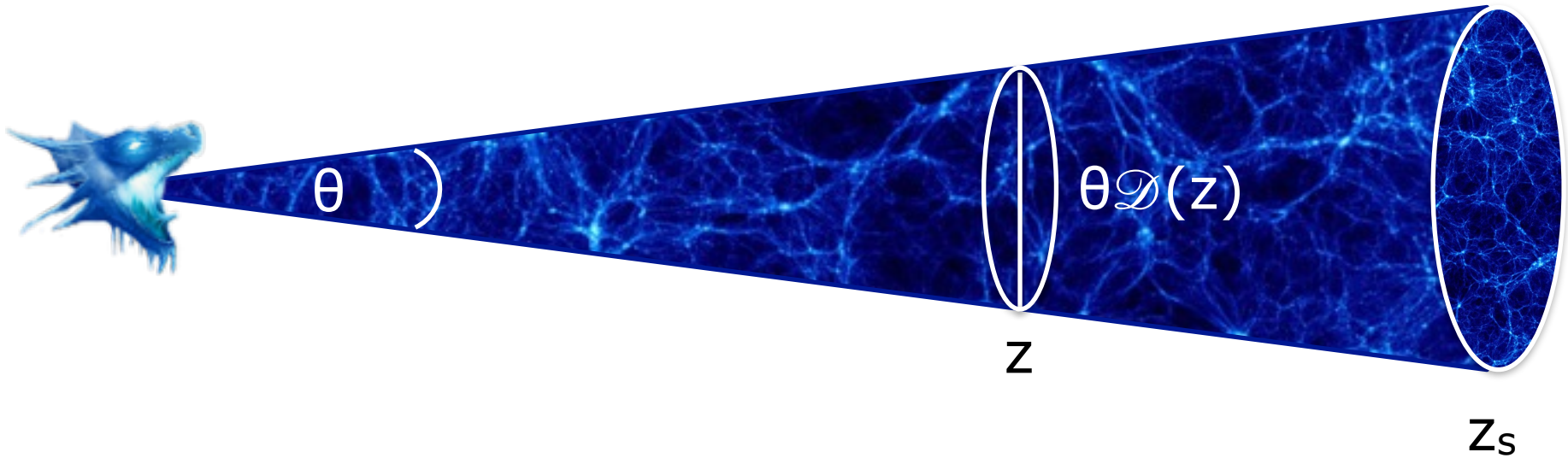




CU, Pajer++ 18

COUNTS-IN-CONES

weight matter density in slices

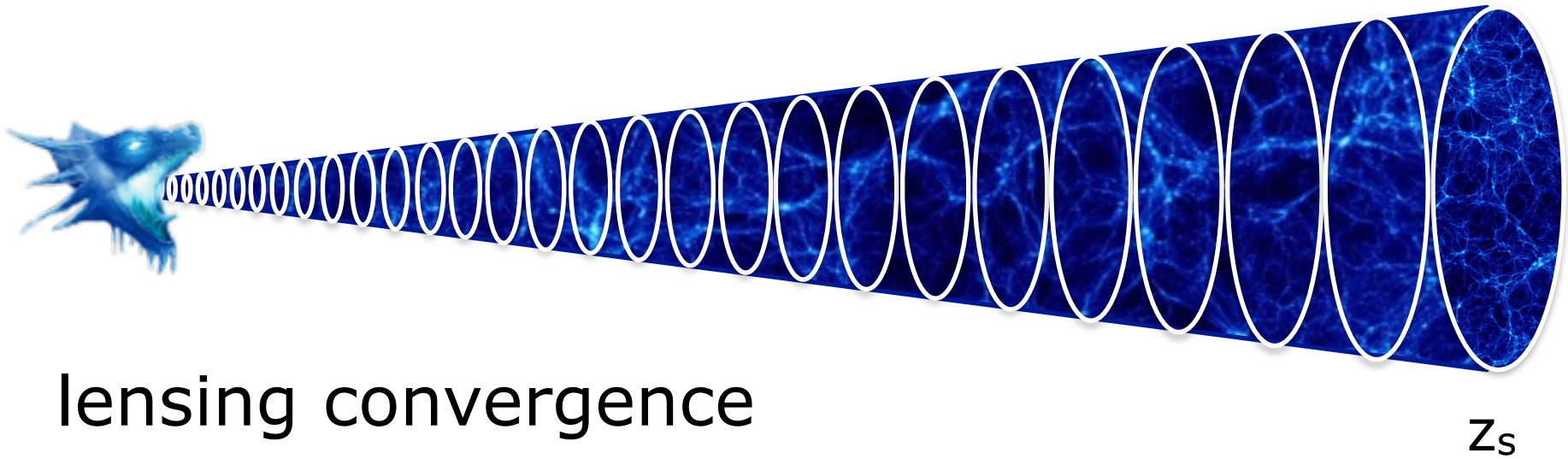


$$\delta^{\rm disk}_{<\theta\mathcal{D}(z)} w(z, z_s)$$

lensing weight

WL CONVERGENCE

weight matter density in slices



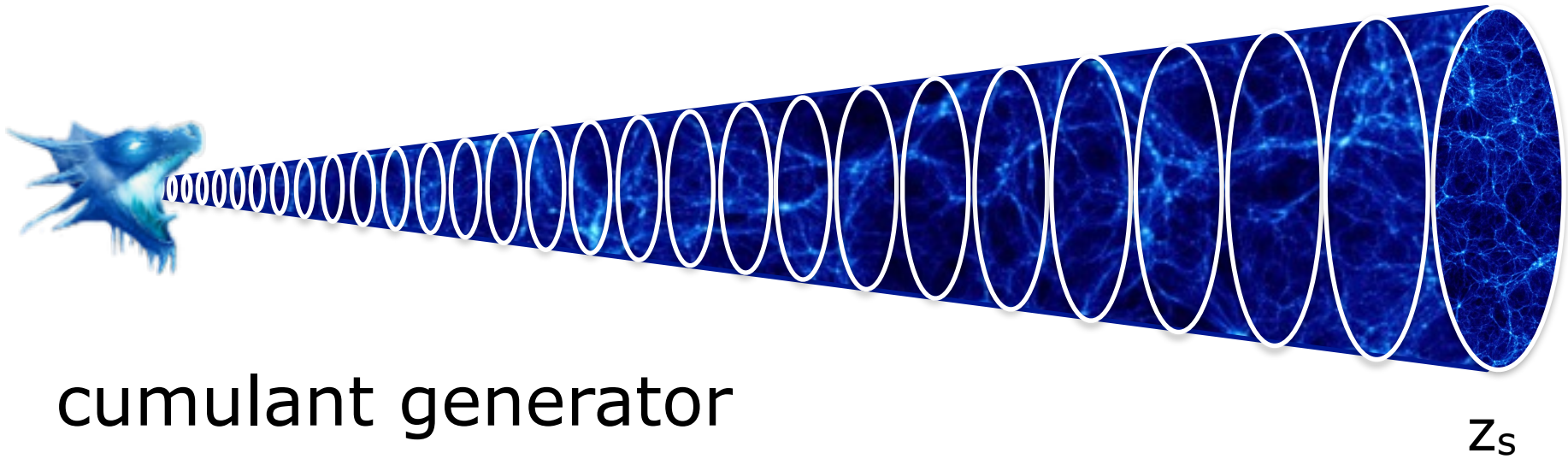
lensing convergence

$$\kappa_{<\theta} = \int_0^{\mathcal{D}(z_s)} d\mathcal{D}(z)\, \delta^{\rm disk}_{<\theta\mathcal{D}(z)} w(z, z_s)$$

Mellier 99

WL CONVERGENCE

weight matter density in slices

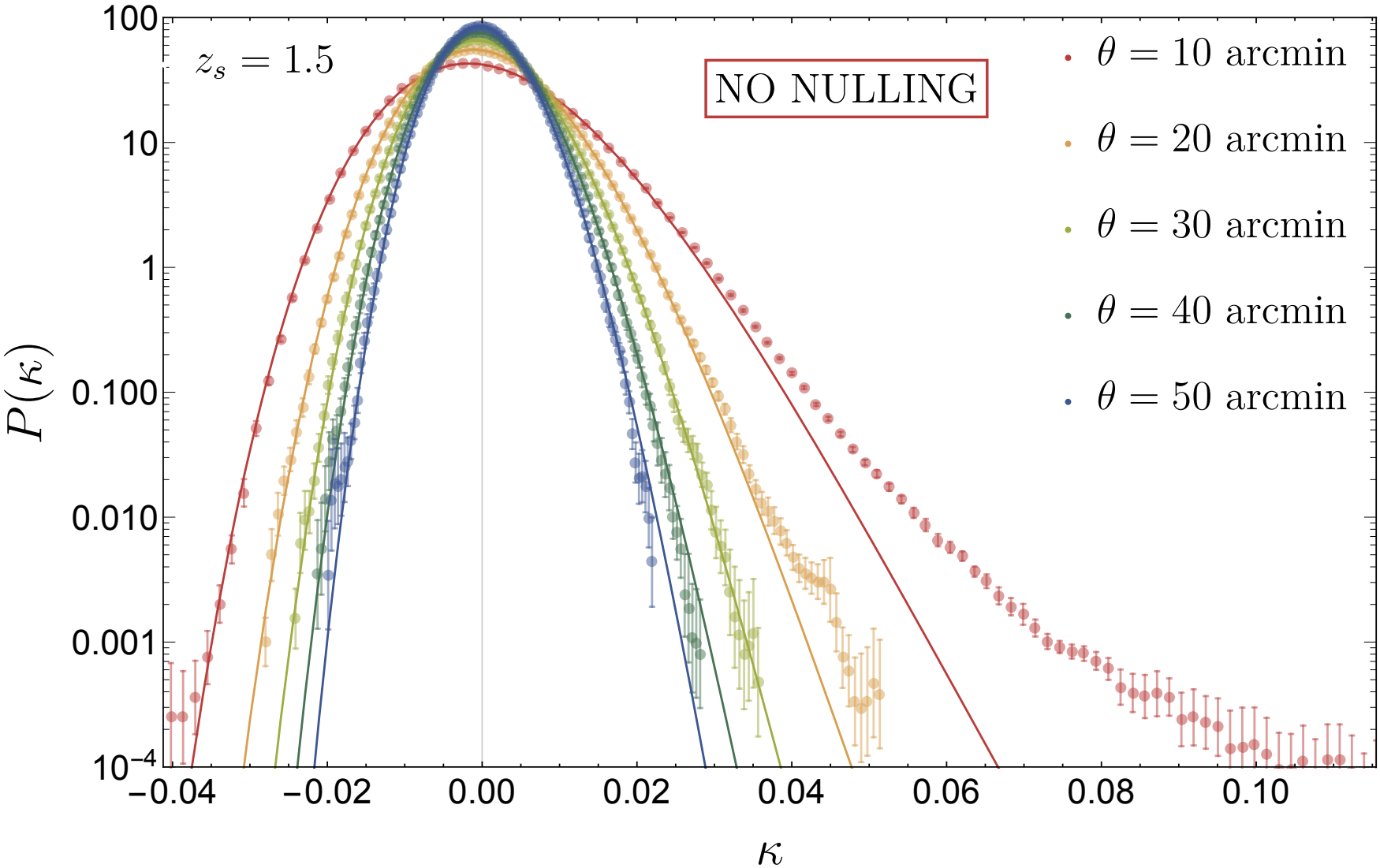


cumulant generator

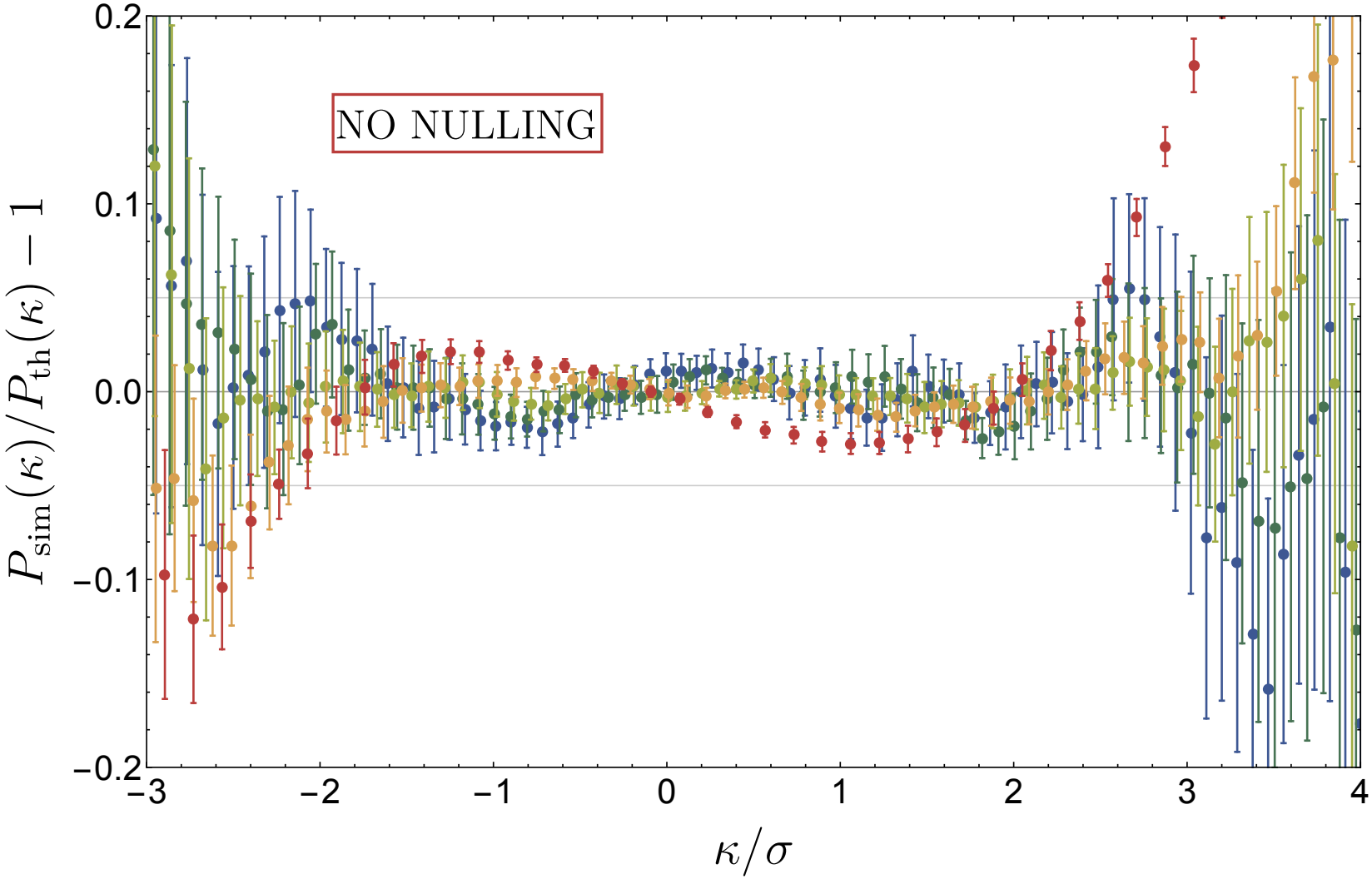
$$\phi^{\kappa}_{<\theta}(\lambda) = \int_0^{\mathcal{D}(z_s)} d\mathcal{D}(z)\, \phi^{\rm disk}_{<\theta\mathcal{D}(z)}(\lambda\, w(z, z_s))$$

→ PDF Bernardeau & Valageas 02

WL CONVERGENCE



WL CONVERGENCE



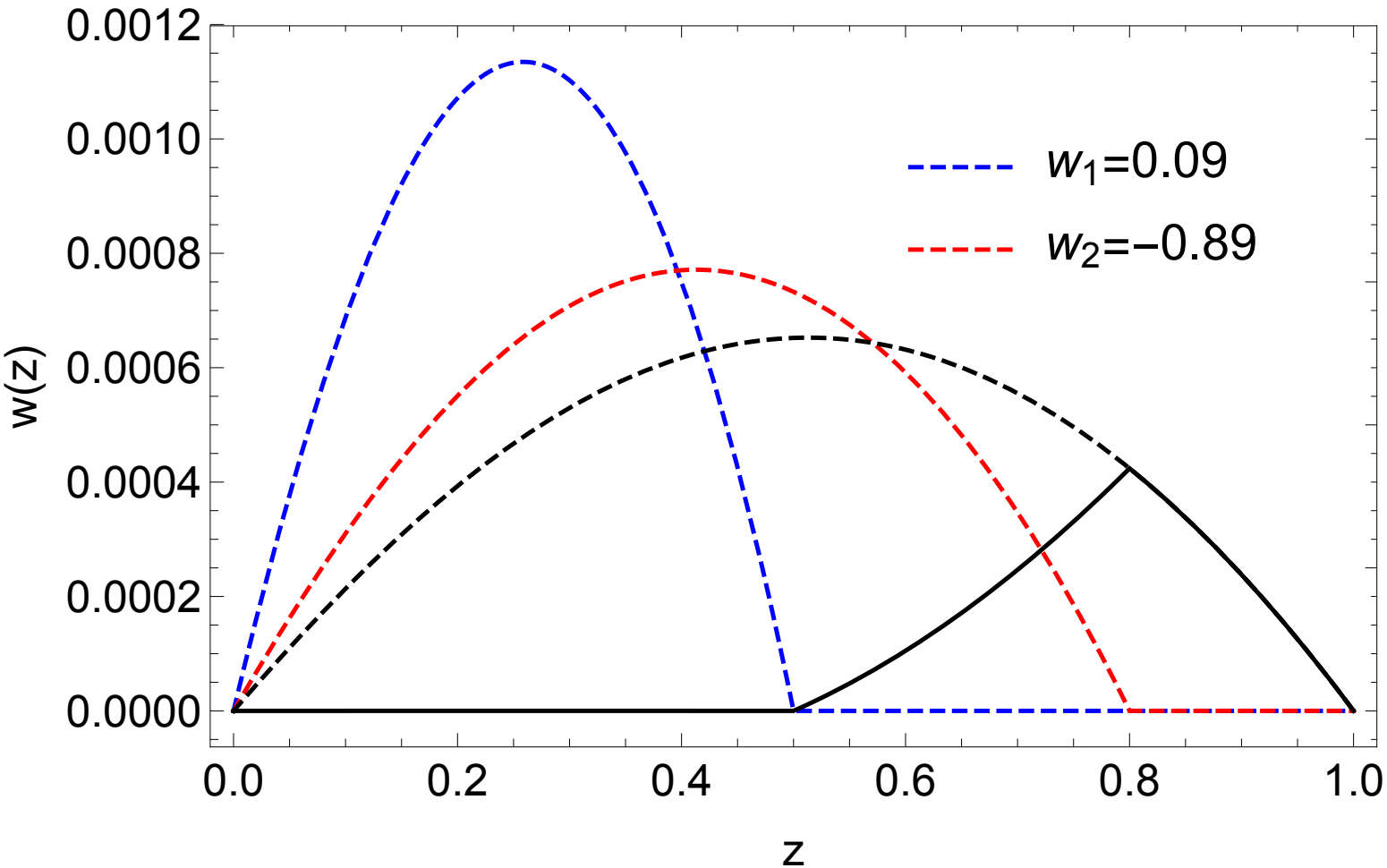
BEYOND THE WALL

$$\kappa_{<\theta} = \int_0^{\mathcal{D}(z_s)} d\mathcal{D}(z)\, \delta^{\rm disk}_{<\theta\mathcal{D}(z)}\, w(z, z_s)$$

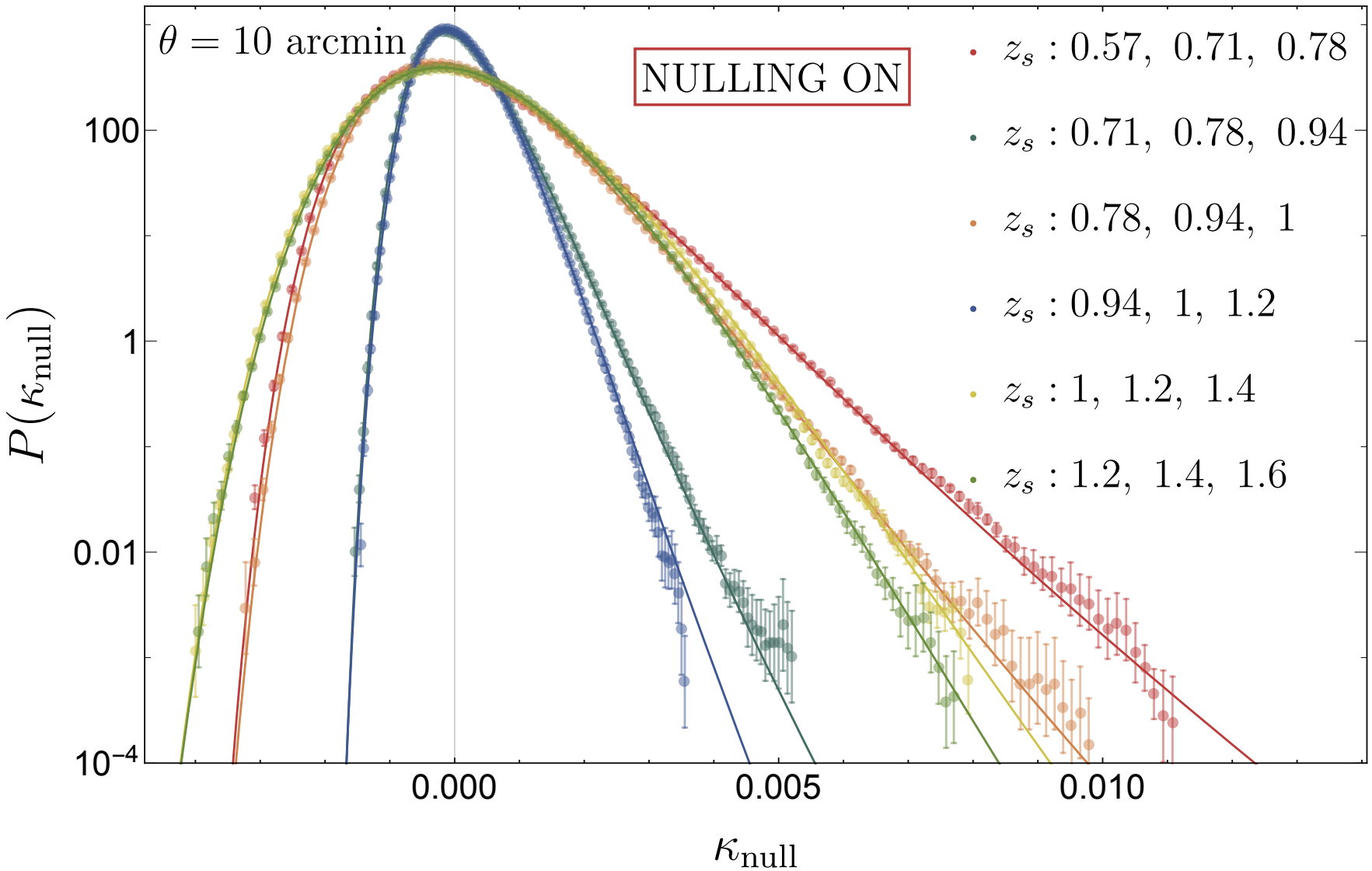
mix scales

NULLED CONVERGENCE

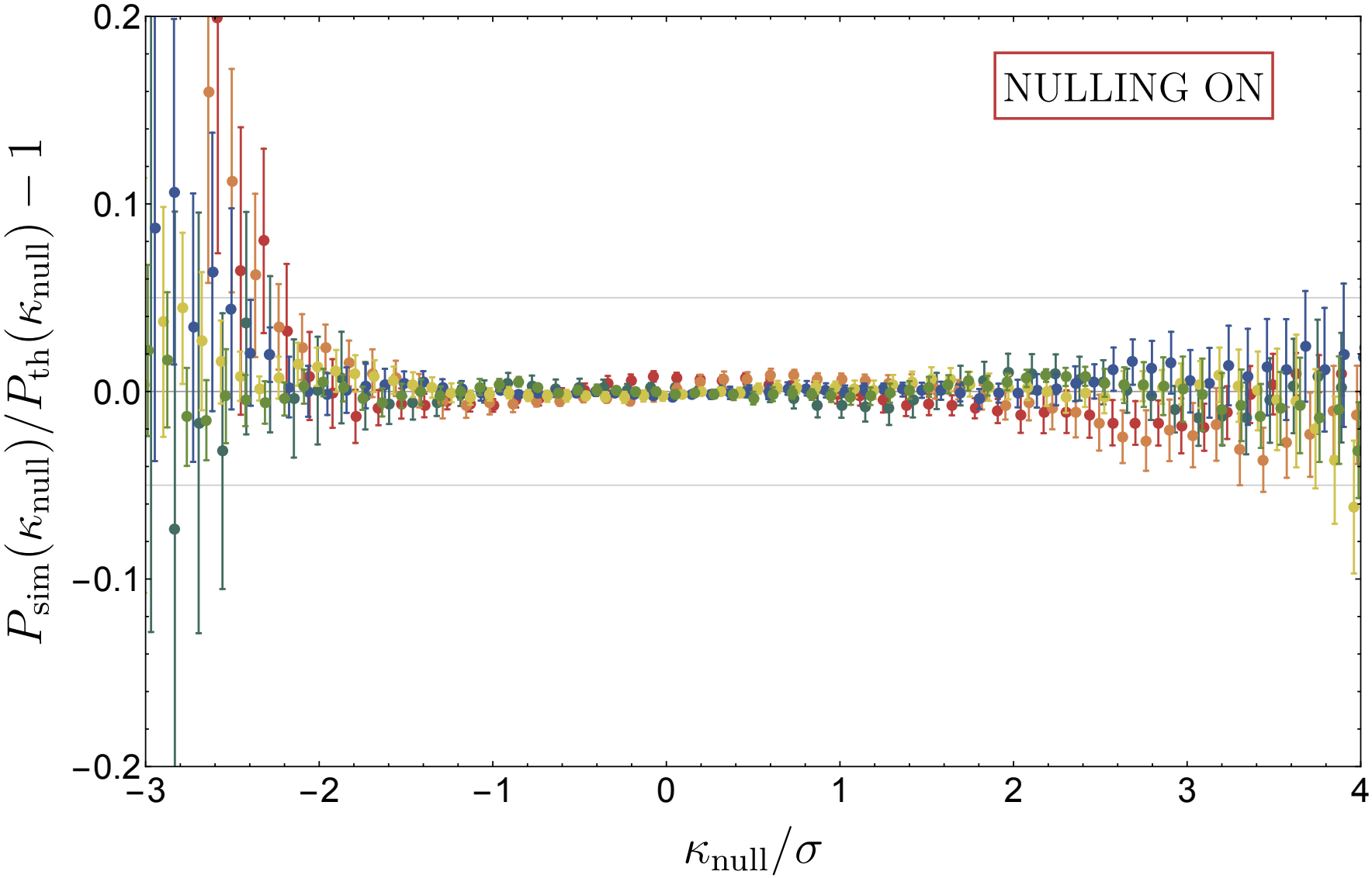
weight 3 source redshifts



NULLED CONVERGENCE



NULLED CONVERGENCE



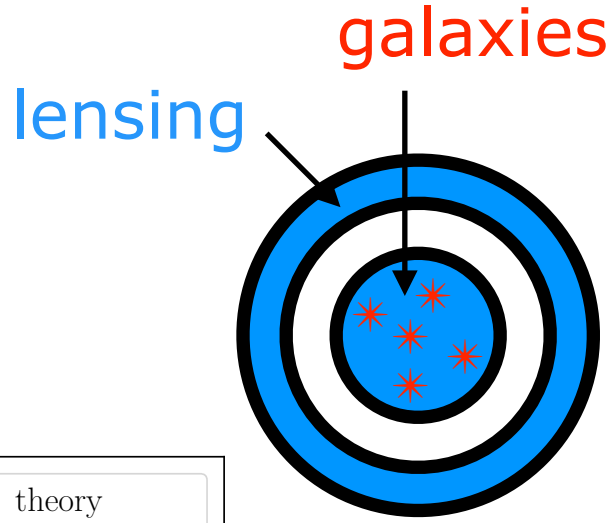
DATA IS COMING

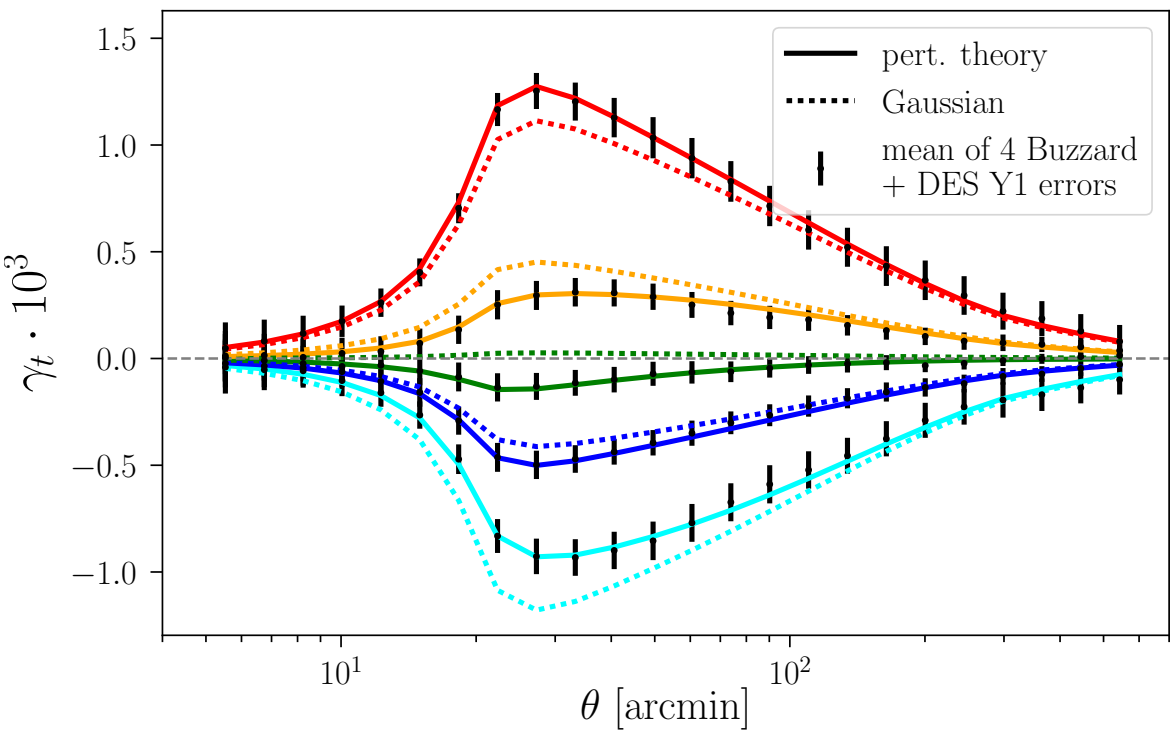
Density-split statistics

DESY1: 10% Euclid, nonG visible

competitive with 3x2pt

DES (Friedrich++ 18, Gruen++ 18)





RECAP: GAME OF CONES

Counts-in-cells

extra nonG information

robust & accurate predictions

Convergence PDF

WL convergence
from density slices

fight scale mixing
null small scales