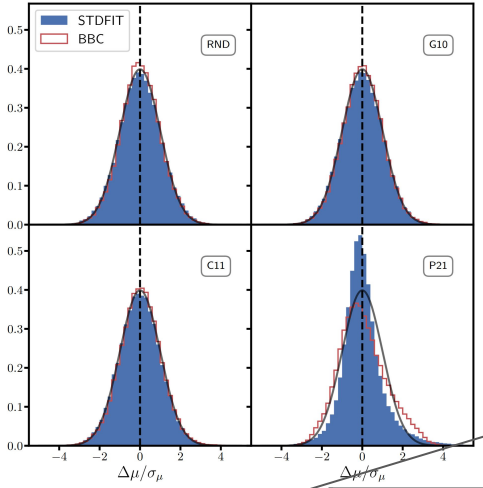
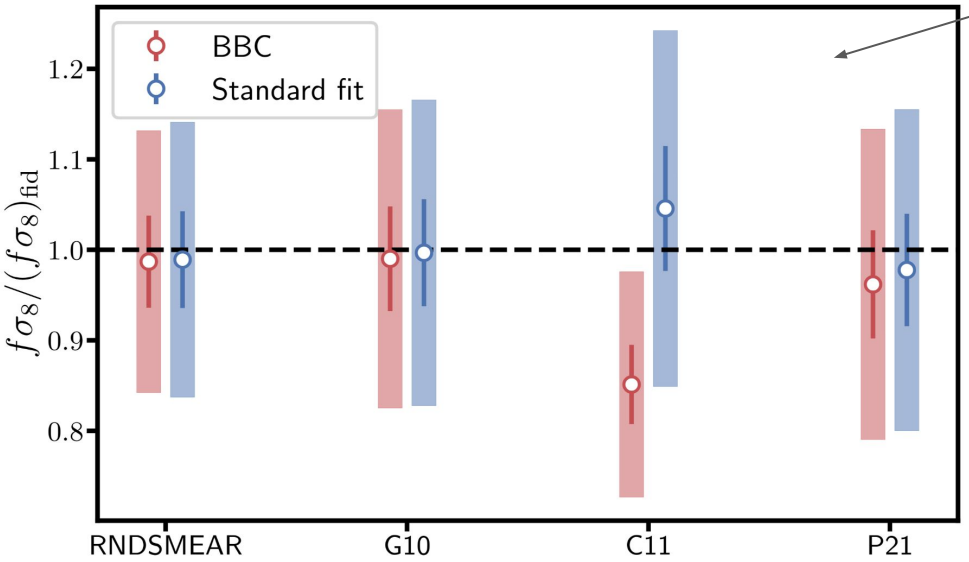
11/13/2024

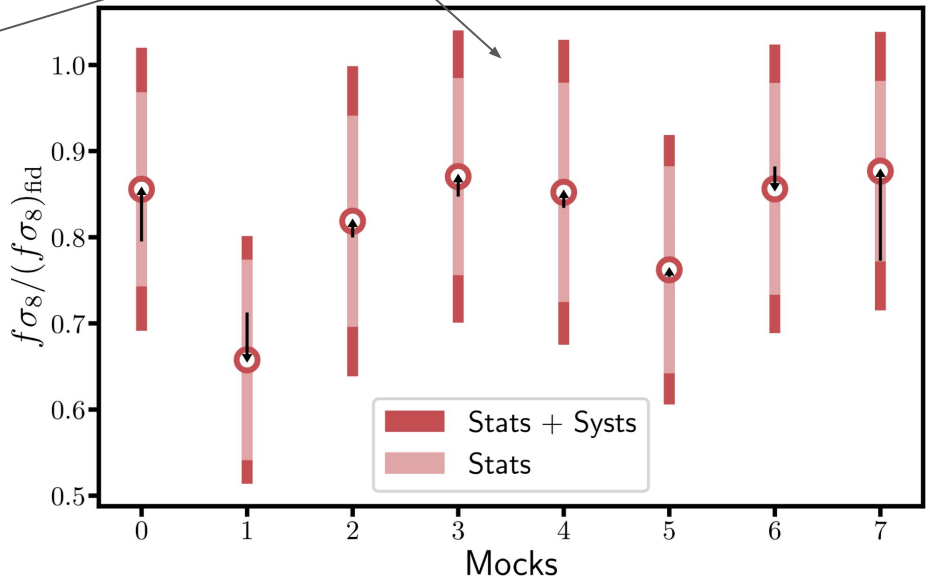
Paper writing

https://www.overleaf.com/read/dvrvchwvrxhp#63525a

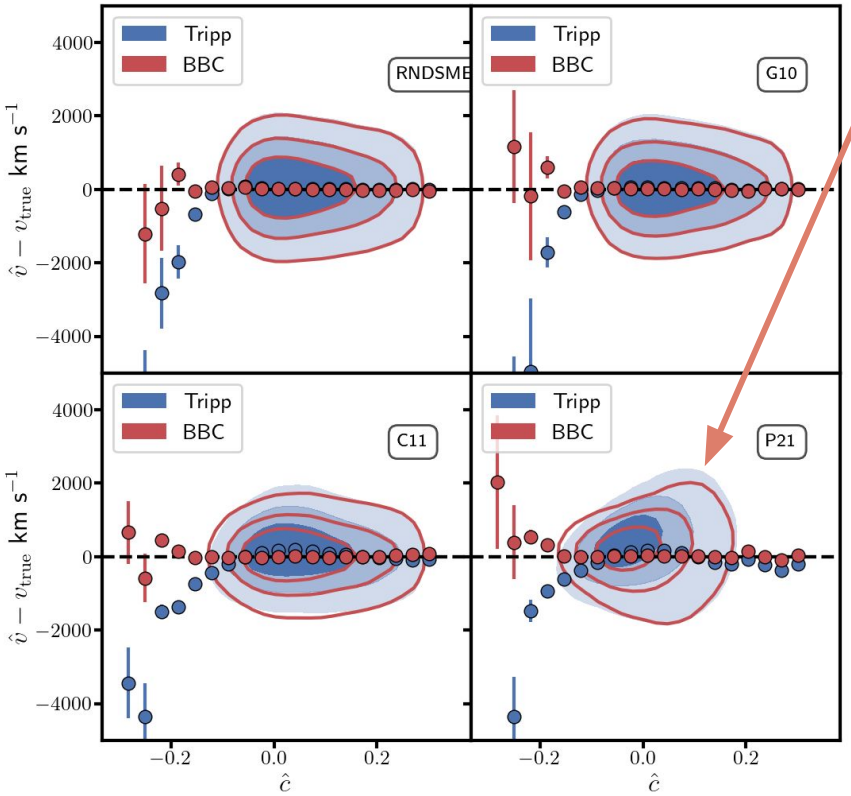


Main plots

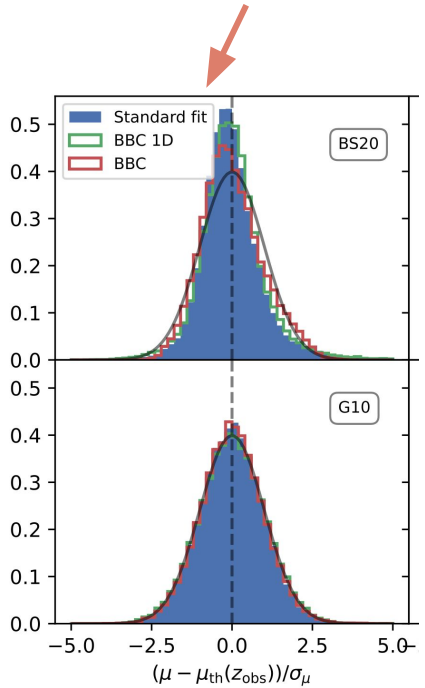




10/16/2024



Bias correction working <mu> = 0 in c bin, but non gaussian distribution !

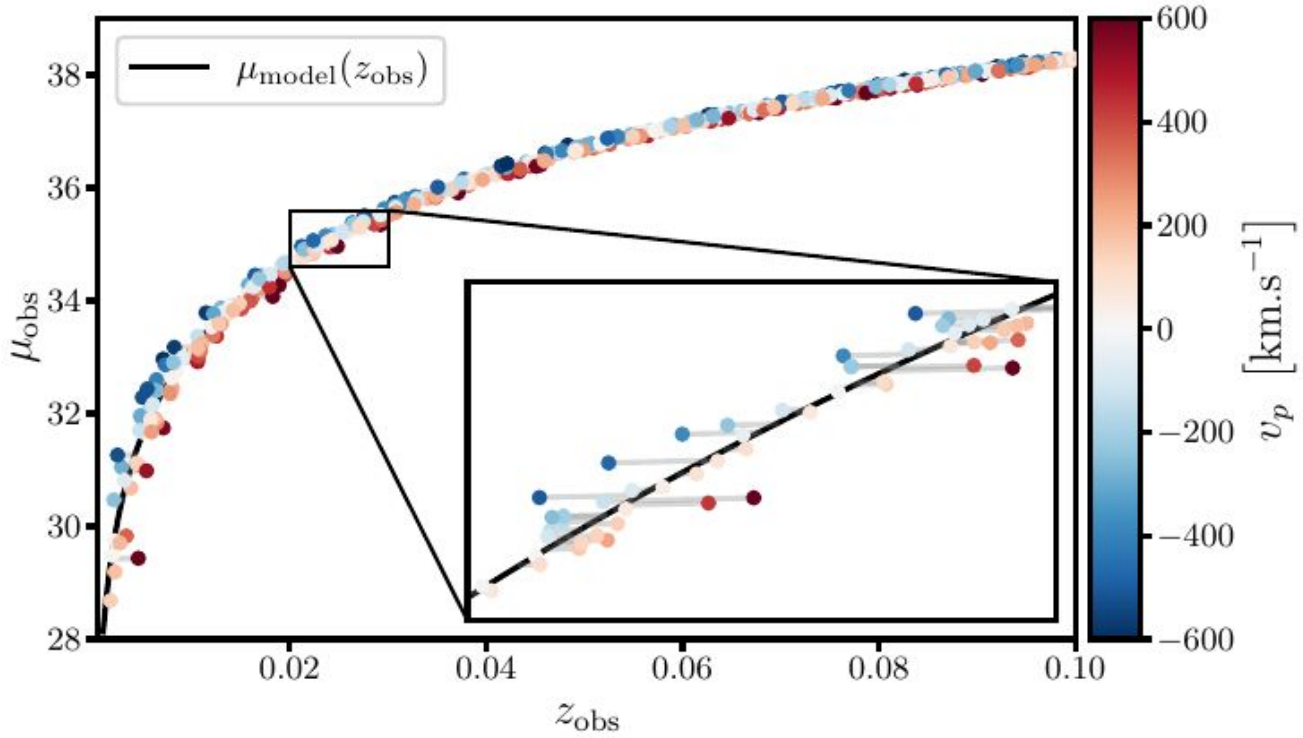


Few question for BBC experts:

- What does *bias on MU instead of mB,x1,c* means?
- What does use *avg mag from cosmology (not nommag0)* means?

Overview

PVs with SNe Ia : noise and probe



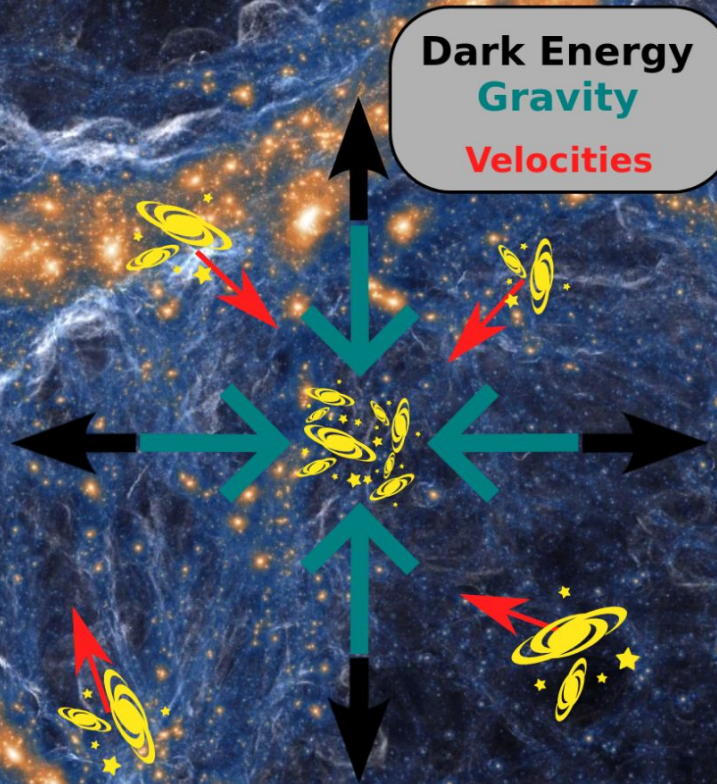
$f\sigma_8$ as a probe for general relativity

Velocities are linked to density through the continuity equation:

$$\nabla . v(\mathbf{x}) \propto f\sigma_8\tilde{\delta}(\mathbf{x})$$

where $f \equiv$ growth rate

General Relativity + ΛCDM:
$f \simeq \Omega_m^{\gamma}$ with $\gamma \simeq 0.55$



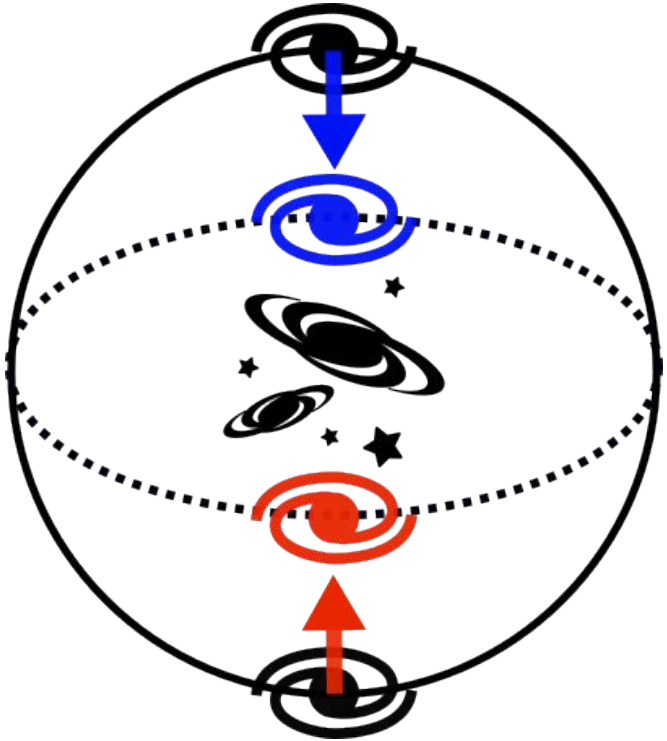
06/26/2024

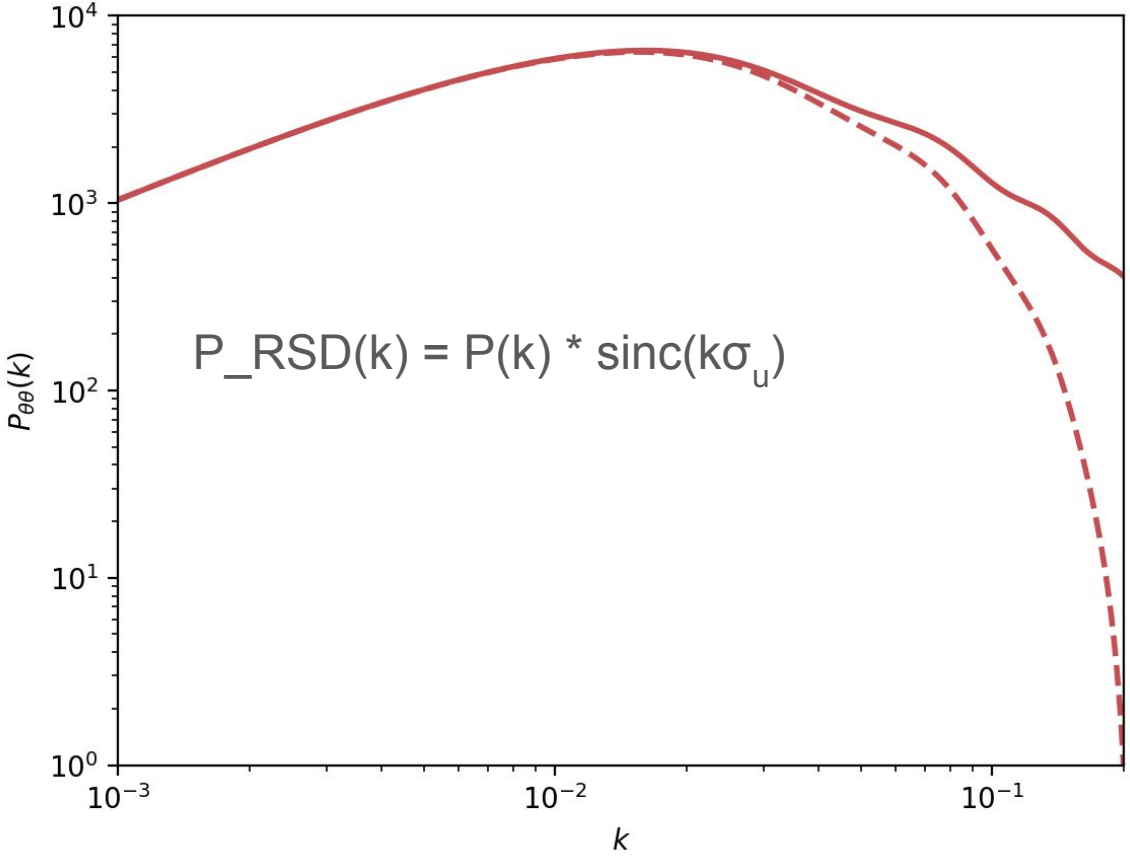
Week Recap

- Writing the growth-rate with BBC paper
- Fitting σ_u (the thorn in the side of growth-rate measurement) for Uchuu

06/26/2024

Week Recap

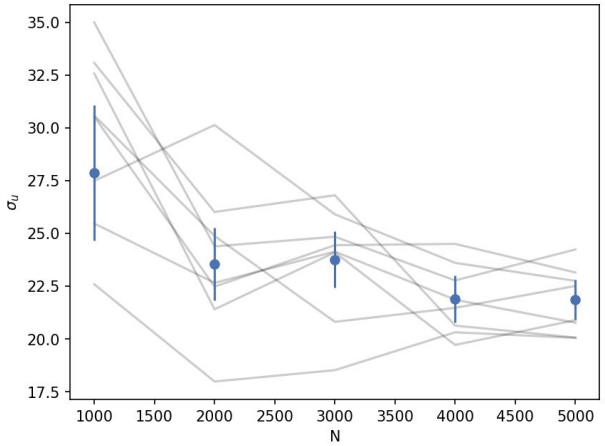




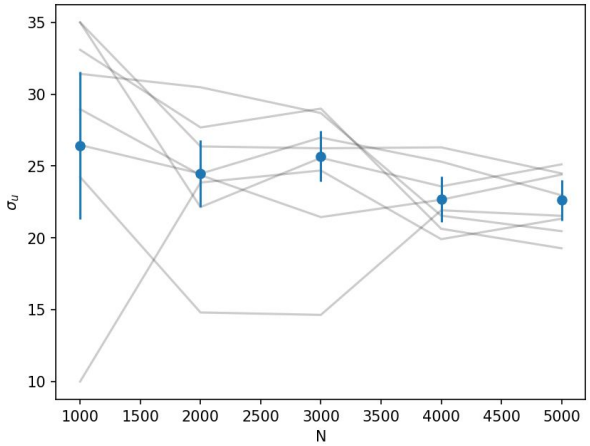
06/26/2024

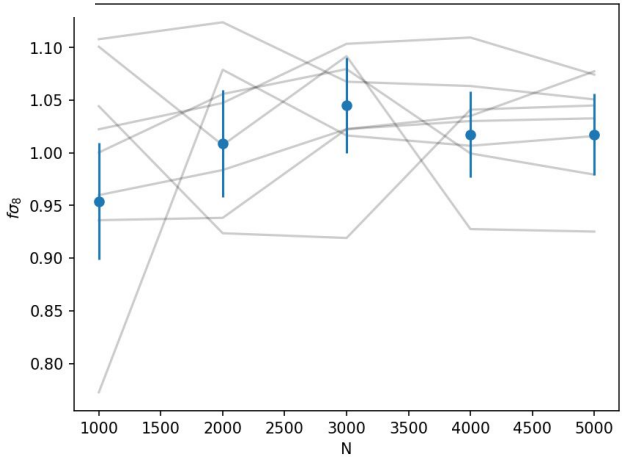
Week Recap

fs8 fixed



fs8 free





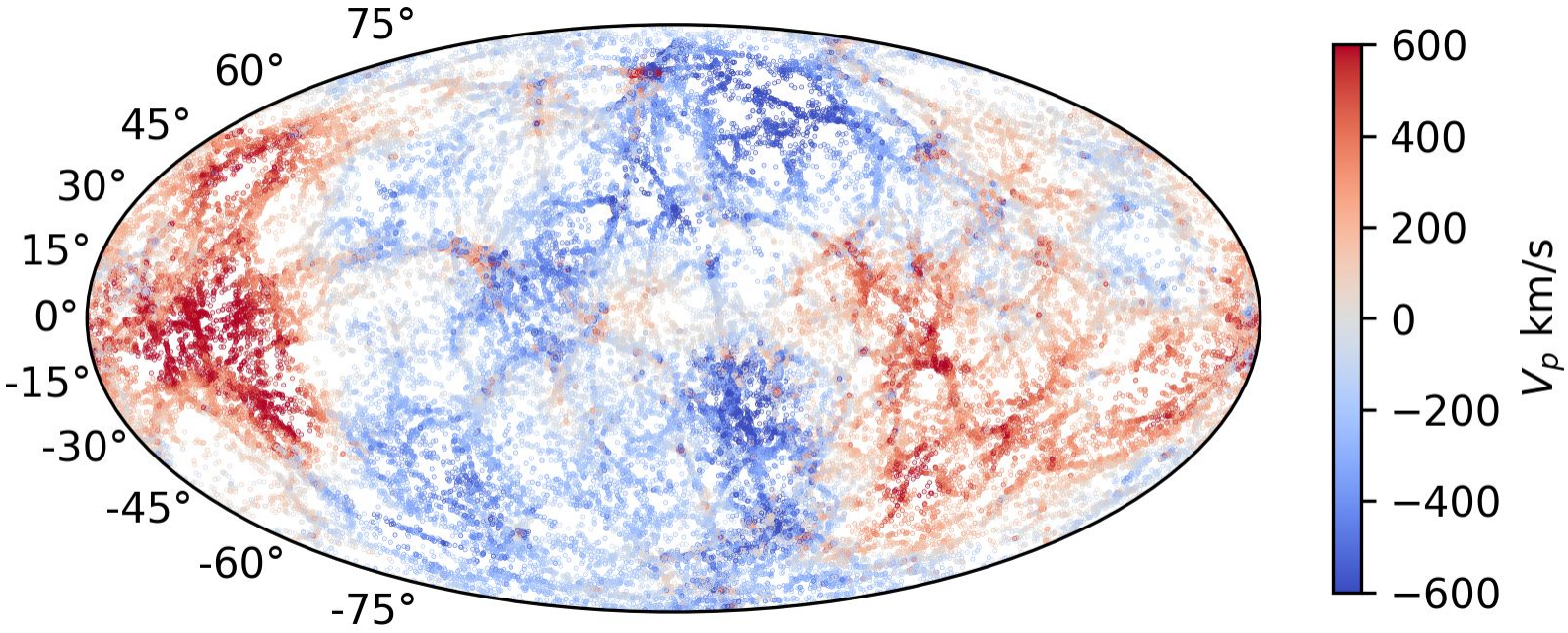
06/26/2024

Week Recap

- Code to apply selection to an existing SNANA sim
- Start writing simulation section for UGGs
- Have a look to correlation function of velocities in Uchuu

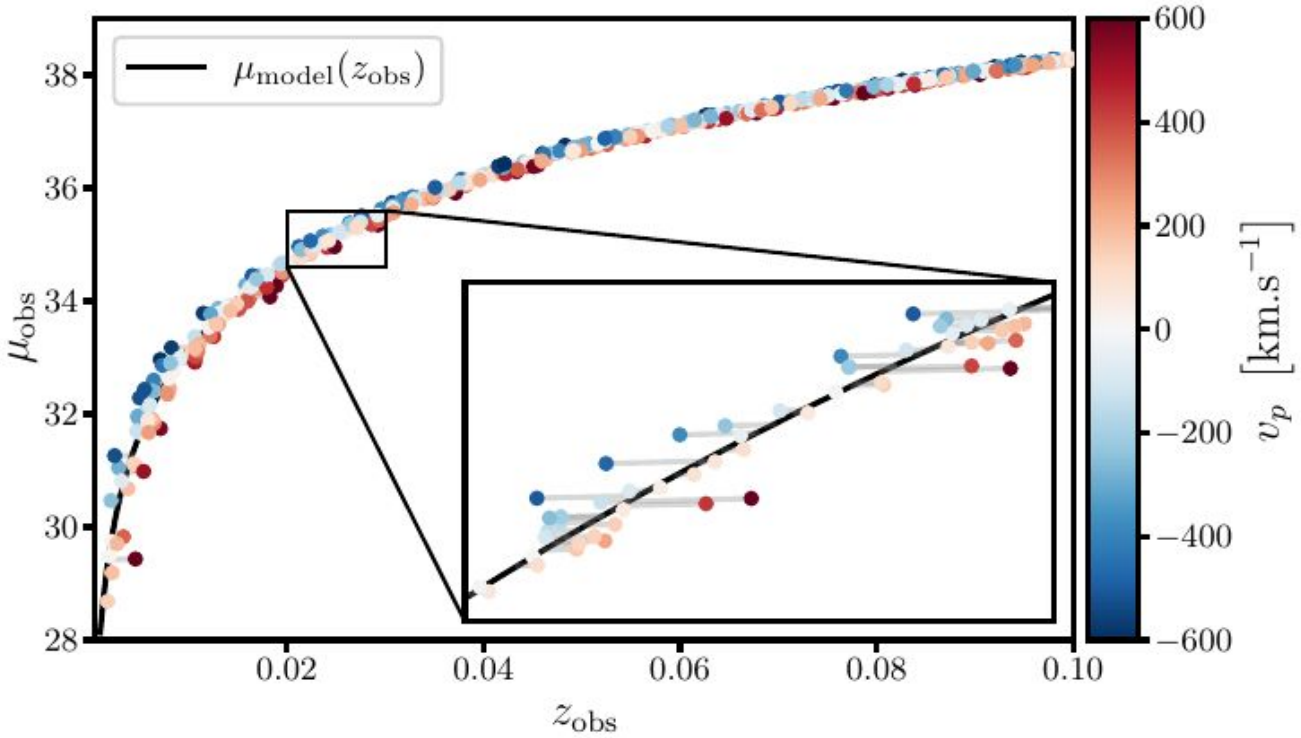
Week Recap

The PV field is correlated on large scales…



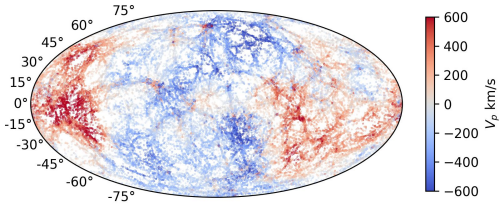
Week Recap

….And affect the Hubble Diagram of SNe Ia…



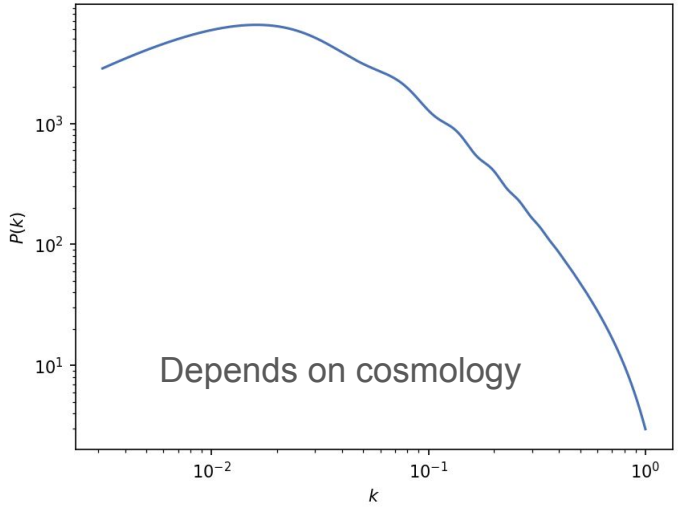
Week Recap

…but you can use this correlation to get cosmological constraints



$$C_{ij}^{vv} = \frac{H_0^2 f^2}{2\pi^2} \int dk P_{\theta\theta}(k) W(k; \mathbf{x}_i, \mathbf{x}_j)$$

Geometrical stuff



For projection of PVs // and perp to separation vector r :

$$\Psi_{\perp,\parallel}(r) = \frac{H_0^2 \Omega_0^{1.2}}{2\pi^2} \int_0^\infty P(k) K_{\perp,\parallel}(kr) dk \,, \qquad (2)$$

where

$$K_\perp(x) = \frac{j_1(x)}{x}, \quad K_\parallel(x) = j_0(x) - 2\frac{j_1(x)}{x},$$

and

$$j_0(x) = \frac{\sin x}{x}, \quad j_1(x) = \frac{\sin x}{x^2} - \frac{\cos x}{x}.$$

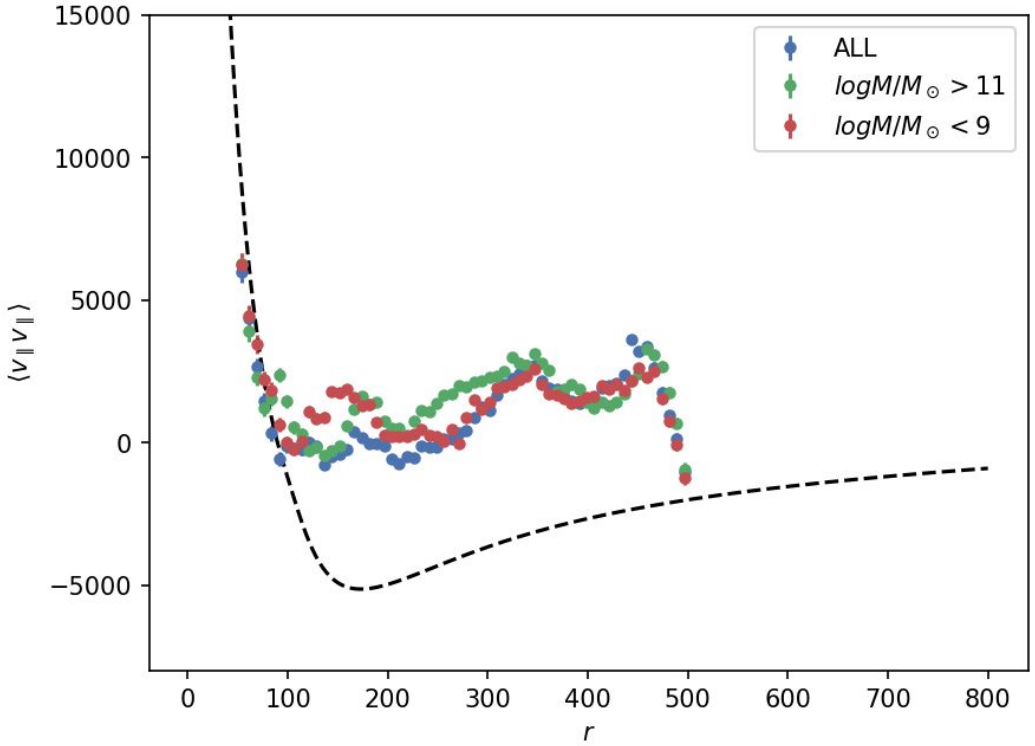
Week Recap

$$\langle v_{1,\parallel}(x) v_{2,\parallel}(x+r) \rangle = \frac{1}{N} \sum_i v_{1,\parallel} v_{2,\parallel}$$

Is the 2pts statistics different for galaxies of different masses ?

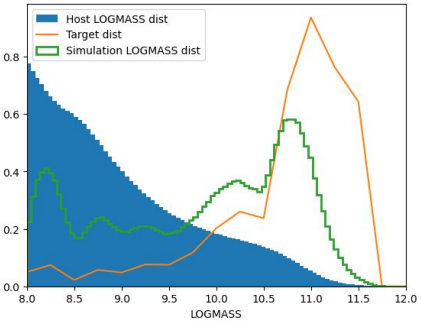
Good point: don't seems to depend on mass

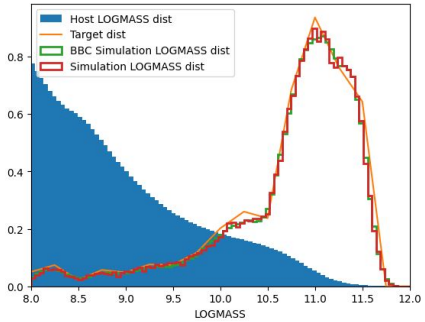
Bad point: don't fit the theoretical curve



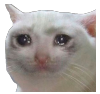
Week Recap

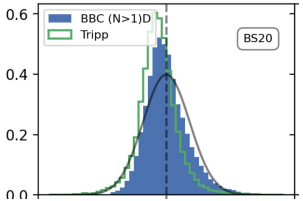
- Work on FS8 / BBC:
  - Solve a host distribution problem



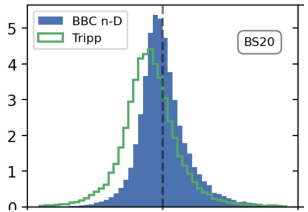


  - Solve minor problems inside pippin file (e.g. MW model in sim and fit conf were inconsistant) and reorganize for simulation in multiple mocks => 8 Mocks = 7 “data” mocks + 1 BBC sim mock
  - BS20 Problem still here (is it really a problem or should it be like this?)





HD Pull



HD Residuals

- Got back my ZTF paper referee report: No major fix to do!

04/30/2024

Week Recap

- Still stuck with the BS20 model problem… (NERSC is in maintenance today)
- New version of the simplified FoF that run faster => currently running on full mock. The goal is to find the expected vel scattering inside group, wrt mass, number of gal, etc… then compare with Erik's data.
- Trying to fit fs8 with current simulations: developing and debugging of FLIP (Field Level Inference Package)

Quick SNANA question:

In fitfiles some HOST_RA, DEC are set to -999 however from the hostlib these RA, DEC are correctly defined (even MW seems correctly computed for them). Did someone already encounter this behaviour?

04/17/2024

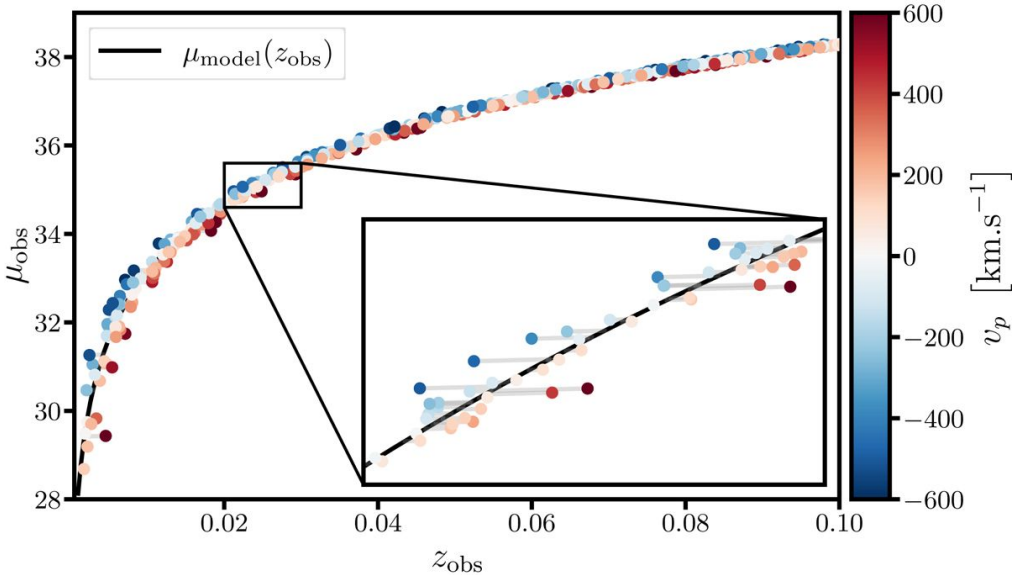
Week Recap

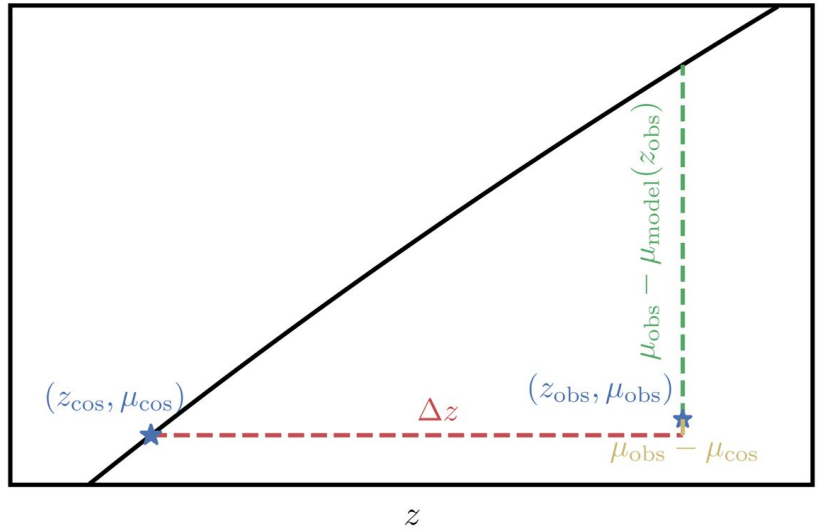
- Taking care of this cute little baby

- Get back to work on pec. vel. project

04/17/2024

Project: fsigma8 with LSST survey - BBC framework





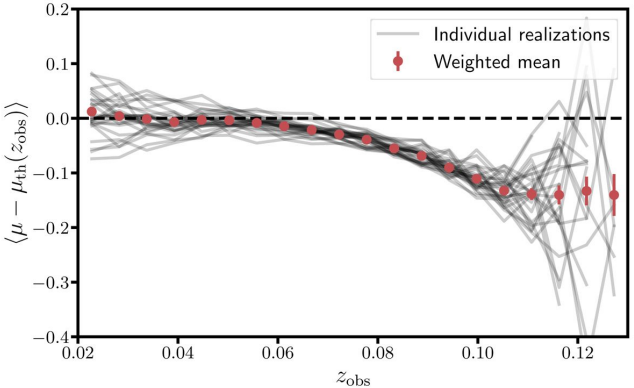
$$\hat{v}_i(\mathbf{p}_{\rm HD}) = -\frac{\ln(10)c}{5}\left(\frac{(1+z_i)c}{H(z_i)r(z_i)} - 1\right)^{-1} \Delta\mu_i(\mathbf{p}_{\rm HD}).$$

04/17/2024

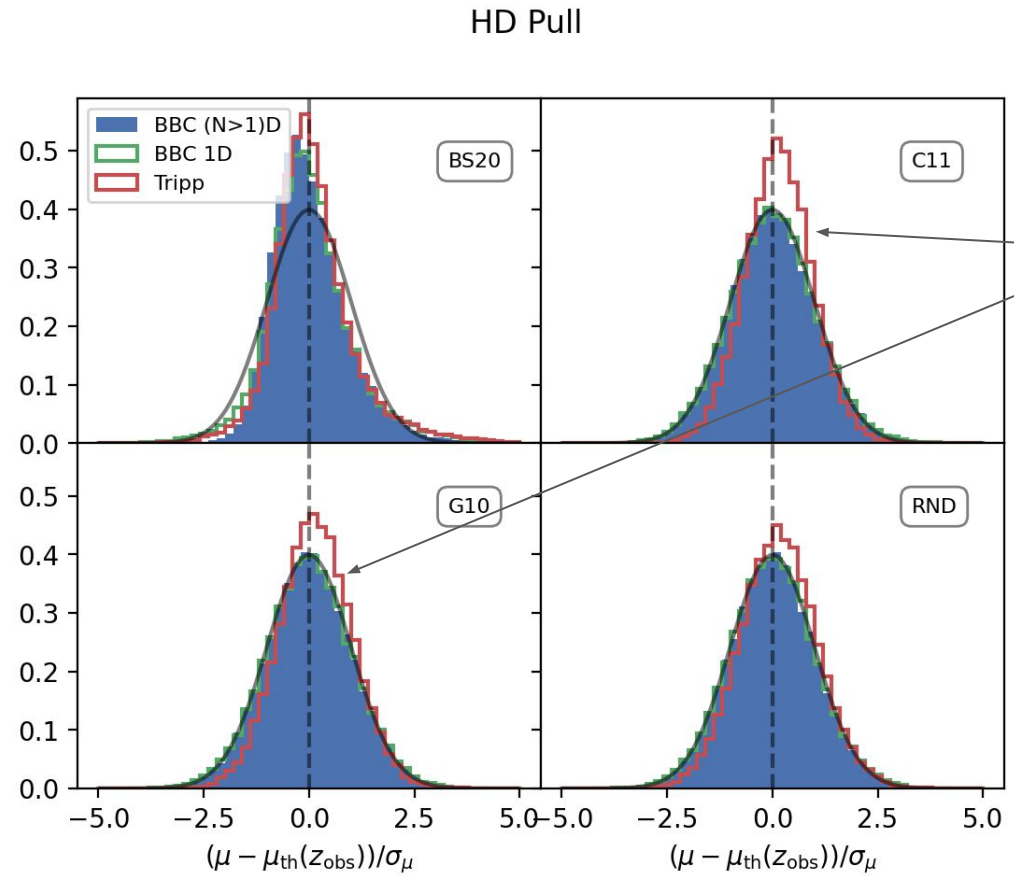
Until now: only sim that assume color indep-scattering but
color dep scattering brings : asymmetry in residuals, bias in std parameters, …

Primary Goal: see if the BBC framework help to correct these bias/compare with std method

Secondary goal: If we don’t have a complete sample due to mag-limited selection (typing/spec-z/photometry) could bbc correct for that without biasing pec. vel.?

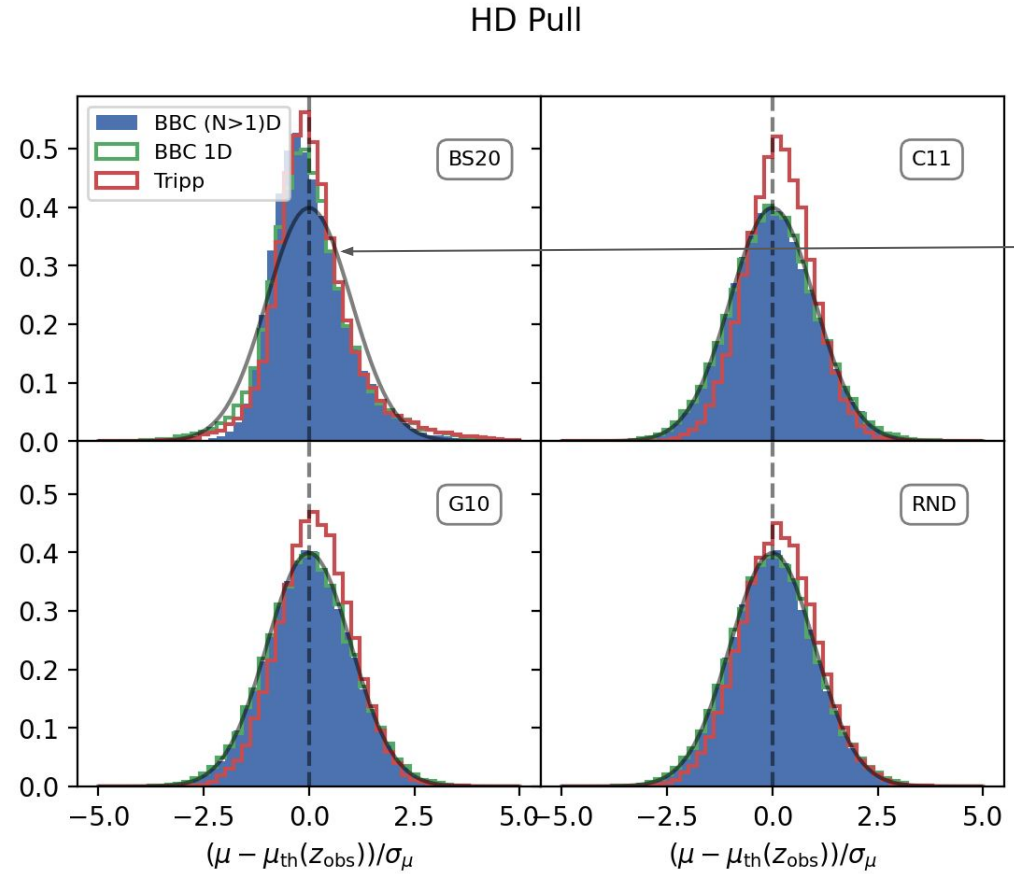


04/17/2024



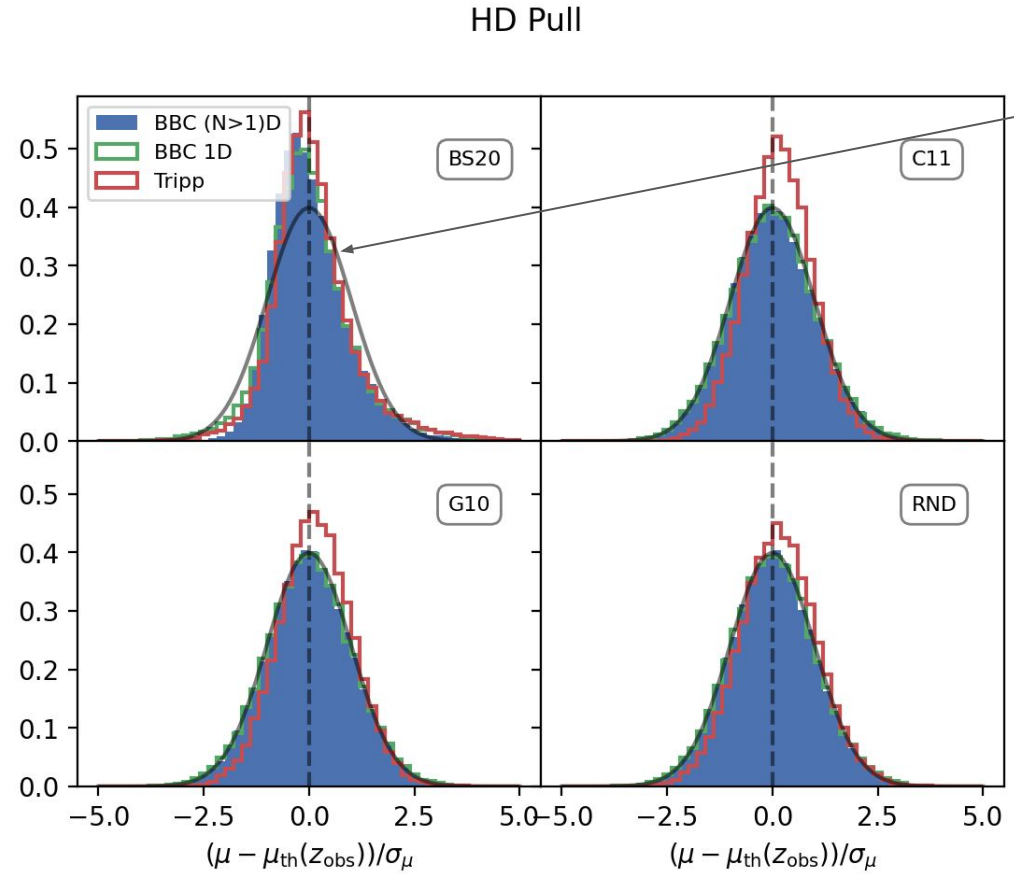
Bias correction seems to give better pull than standard tripp

04/17/2024



Problem with the 4D bias correction:
Currently trying to look at other config used on midway

04/17/2024



Problem with the 4D bias correction: Currently trying to look at other config used on midway

Bias seems color dependant and does not correspond to a simple error offset