

SHAM implementations

My SHAM model has 3 parameters:

1. σ , controls the $V_{\text{peak}}\text{-}M^*$ scatter (**V_{peak} scattering**)
2. V_{ceil} , prevent the most massive halos from having a galaxy (**$V_{\text{peak_scat}}$ truncation**)
3. V_{smear} , smear the peculiar velocity for the z uncertainty

SHAM implementations

Vpeak scattering:

1. Gaussian scatter:

$$V_{\text{peak_scat}} = V_{\text{peak}} * (1 + N(0, \sigma_2))$$

2. positive scatter:

if $N(0, \sigma_2) > 0$:

$$V_{\text{peak_scat}} = V_{\text{peak}} * (1 + N(0, \sigma_2))$$

else:

$$V_{\text{peak_scat}} = V_{\text{peak}} * \exp\{N(0, \sigma_2)\}$$

Vpeak_scatter truncation:

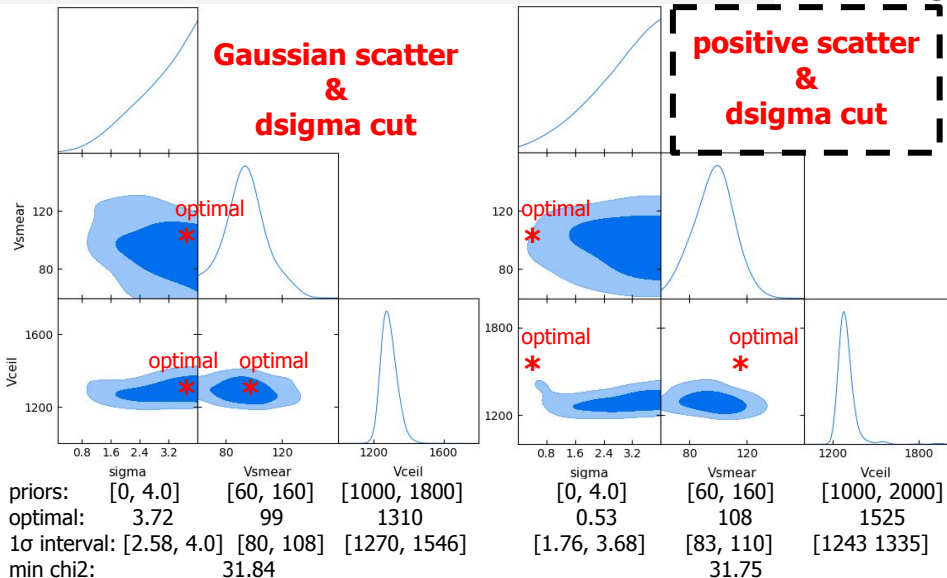
a. direct cut:

remove $V_{\text{peak_scat}} > V_{\text{ceil}}$

b. dsigma cut:

remove $V_{\text{peak_scat}} / \sigma > V_{\text{ceil}}$

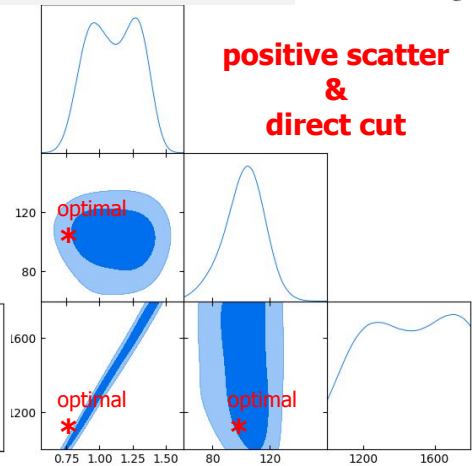
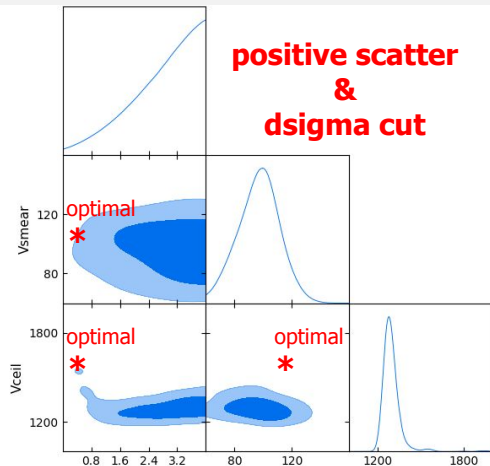
SHAM posteriors for LRG in SGC



SHAM posteriors for LRG in SGC

**positive scatter
&
dsigma cut**

**positive scatter
&
direct cut**

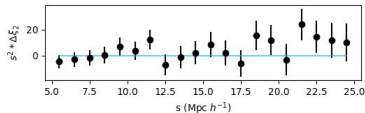
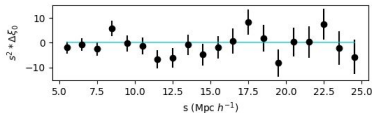
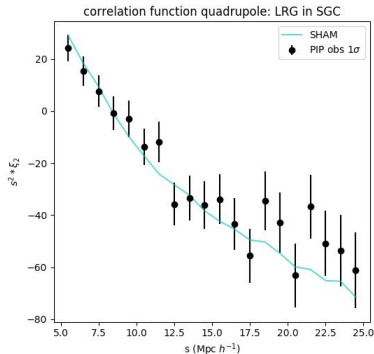
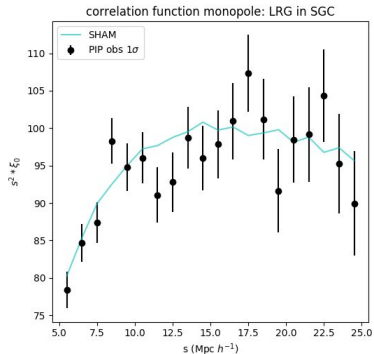


priors: [0, 4.0] [60, 160] [1000, 2000]
 optimal: 0.53 108 1525
 1 σ interval: [1.76, 3.68] [83, 110] [1243, 1335]
 min χ^2 : 31.75

priors: [0, 4.0] [60, 160] [500, 3000]
 optimal: 0.88 102 1176
 1 σ interval: [0.89, 1.32] [89, 116] [1182, 1679]
 min χ^2 : 31.50

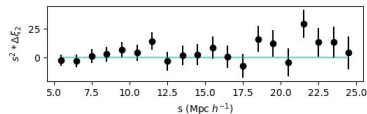
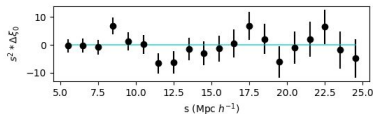
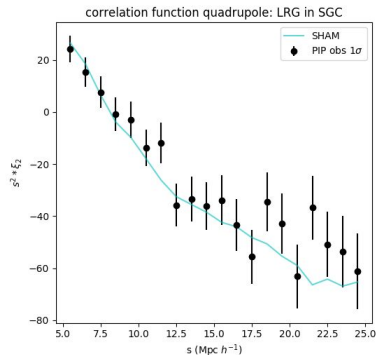
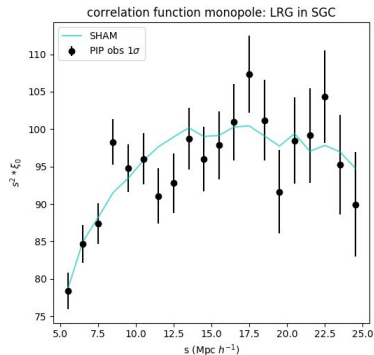
Optimal Multipoles for LRG in SGC

Gaussian scatter & dsigma cut



Optimal Multipoles for LRG in SGC

positive scatter & dsigma cut



Optimal Multipoles for LRG in SGC

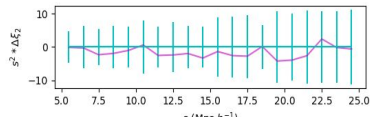
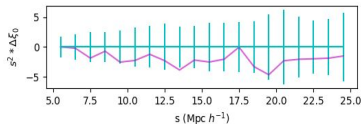
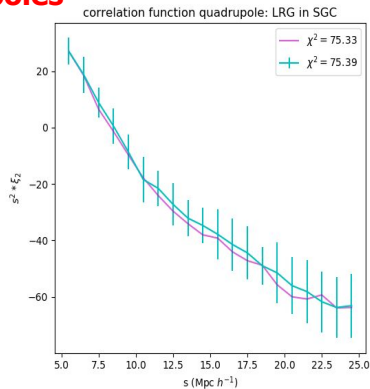
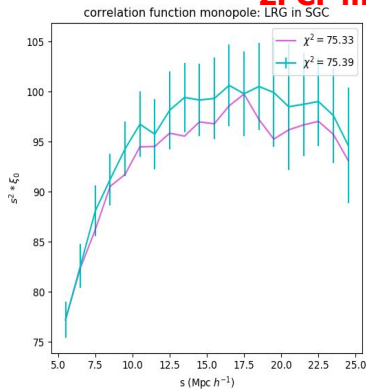
positive scatter & direct cut

SHAM for eBOSS LRG in SGC

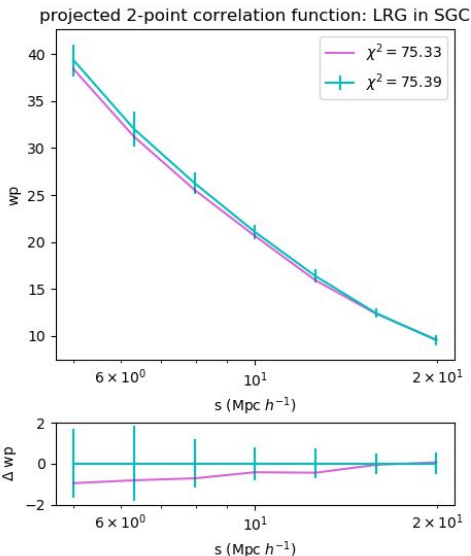
1. positive scatter + $\Delta\sigma$ still presents **“L” shape**;
the optimal parameters are far **beyond the 68%** confidence interval.
2. **None** of the prior can **avoid** the posterior **hitting the boundary**
3. despite the large difference between optimal parameters, the **best-fit 2PCF multipoles have no big difference (the close- χ^2 test conclusion)**

Reminder: Close-chi2 tests

2PCF multipoles

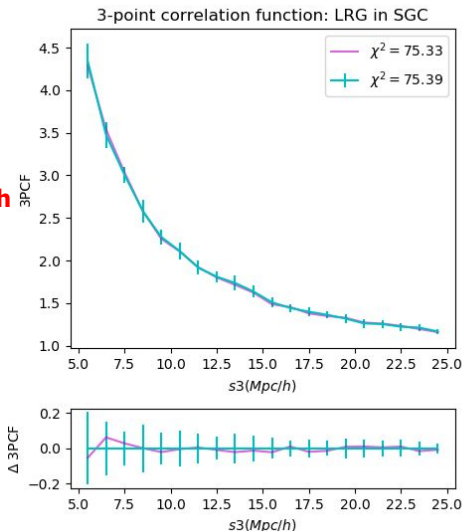


Reminder: Close-chi2 tests



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$s_1 = [5, 15] \text{ Mpc/h}$
 $s_2 = [15, 25] \text{ Mpc/h}$

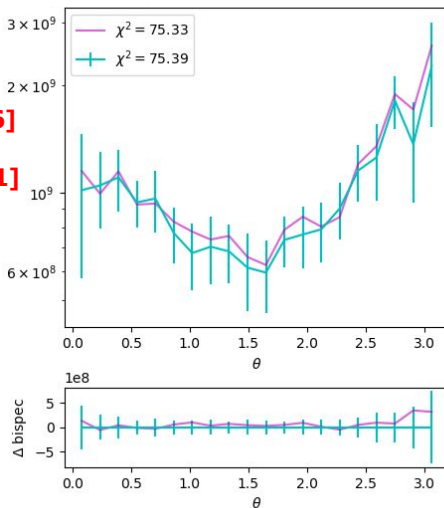


Reminder: Close-chi2 tests

bispectrum

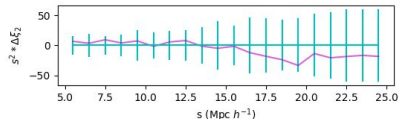
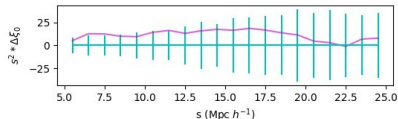
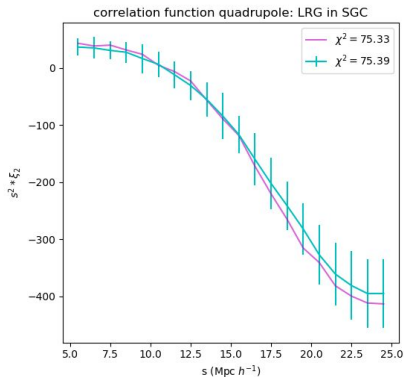
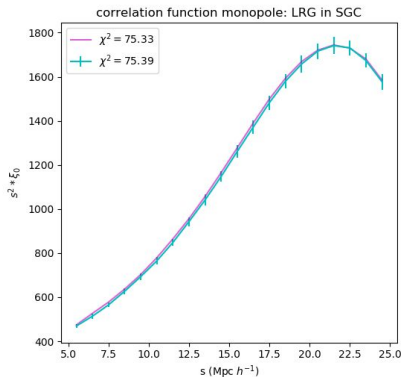
K1 = [0.04, 0.06]

K2 = [0.09, 0.11]



Reminder: Close-chi2 tests

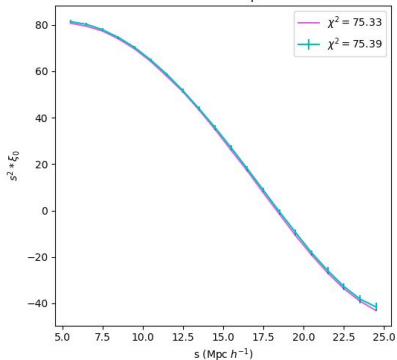
void 2PCF multipoles: $R_v = [0,15]$ Mpc/h



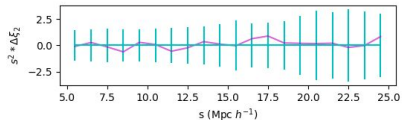
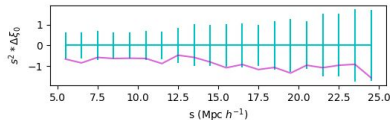
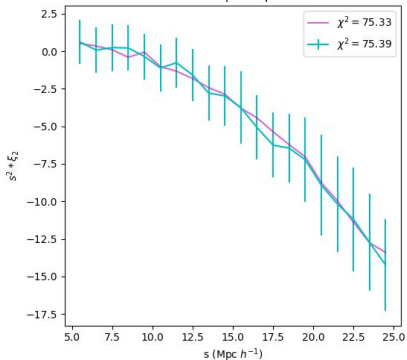
Reminder: Close-chi2 tests

void 2PCF multipoles: $R_v = [15, 30]$ Mpc/h

correlation function monopole: LRG in SGC



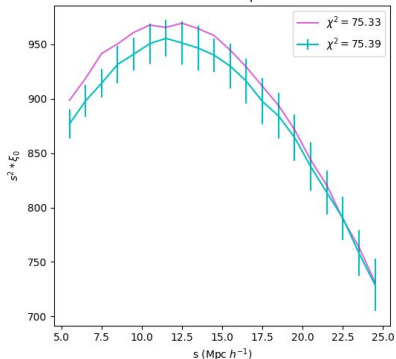
correlation function quadrupole: LRG in SGC



Reminder: Close-chi2 tests

void 2PCF multipoles: $R_v = [30, 1000]$ Mpc/h

correlation function monopole: LRG in SGC



correlation function quadrupole: LRG in SGC

