SHAM implementations

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My SHAM model has 3 parameters:

1. σ, controls the Vpeak-M* scatter (**Vpeak scattering**)
2. Vceil, prevent the most massive halos from having a galaxy (**Vpeak_scat truncation**)
3. Vsmear, smear the peculiar velocity for the z uncertainty

SHAM implementations

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Vpeak scattering:

1. Gaussian scatter:

Vpeak_scat = Vpeak*(1+$N(0,\sigma_2)$)

2. positive scatter:

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

Vpeak_scat = Vpeak*(1+$N(0,\sigma_2)$)

else:

Vpeak_scat = Vpeak*exp{$N(0,\sigma_2)$}

Vpeak_scat truncation:

a. direct cut:

remove Vpeak_scat >Vceil

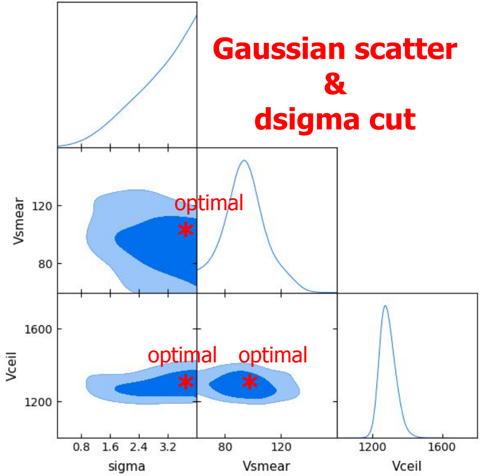
b. dsigma cut:

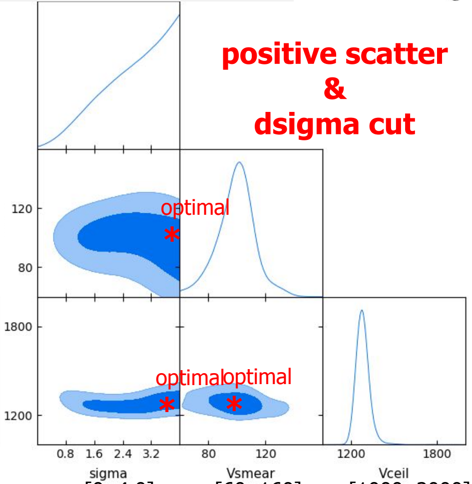
remove Vpeak_scat/σ >Vceil

SHAM for eBOSS LRG in SGC

1. despite the large difference between optimal parameters, the **best-fit chi2 have no big difference**
2. the narrow posterior of **Vceil** is **at the cost of sigma** constraints

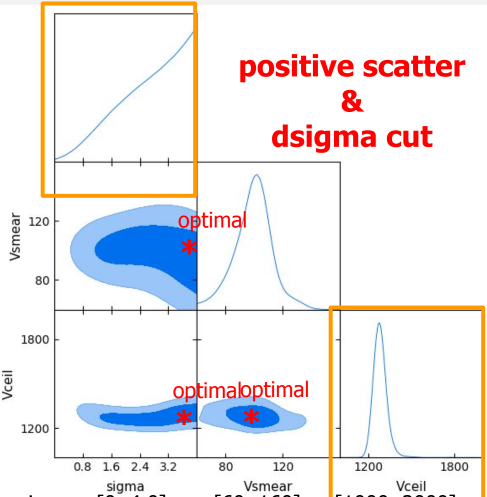
SHAM posteriors for LRG in SGC

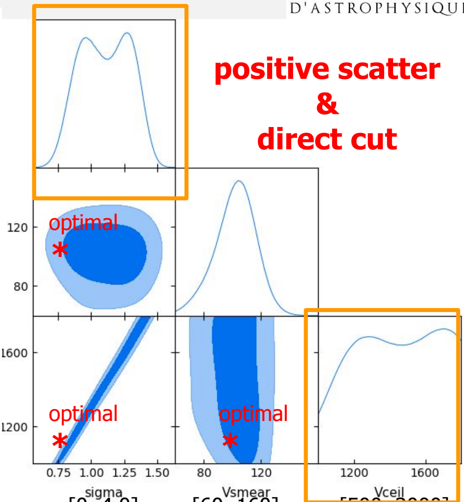




	sigma	Vsmear	Vceil	sigma	Vsmear	Vceil
priors:	[0, 4.0]	[60, 160]	[1000, 1800]	[0, 4.0]	[60, 160]	[1000, 2000]
optimal:	3.72	99	1310	3.74	99	1285
1σ interval:	[2.58, 4.0]	[80, 108]	[1270, 1546]	[1.60, 3.69]	[86, 111]	[1235, 1321]
min chi2:	31.84			29.31		

SHAM posteriors for LRG in SGC





	sigma	Vsmear	Vceil	sigma	Vsmear	Vceil
priors:	[0, 4.0]	[60, 160]	[1000, 2000]	[0, 4.0]	[60, 160]	[500, 3000]
optimal:	3.74	99	1285	0.88	102	1176
1σ interval:	[1.60, 3.69]	[86, 111]	[1235, 1321]	[0.89, 1.32]	[89, 116]	[1182, 1679]
min chi2:		29.31			31.50	

SHAM for eBOSS LRG in SGC

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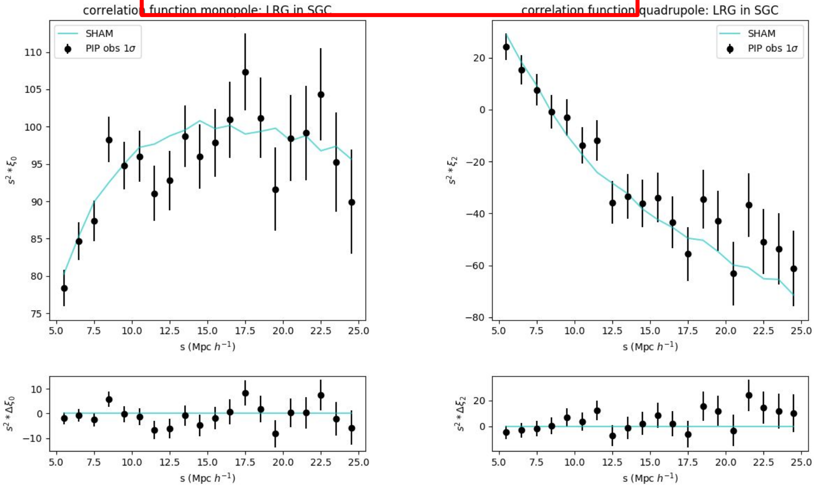
1. despite the large difference between optimal parameters, the $\boxed{\textbf{best-fit chi2 \& 2PCF have no big difference}}$
2. the narrow posterior of $\boxed{\textbf{Vceil}\text{ is }\textbf{at the cost of sigma}}$ constraints

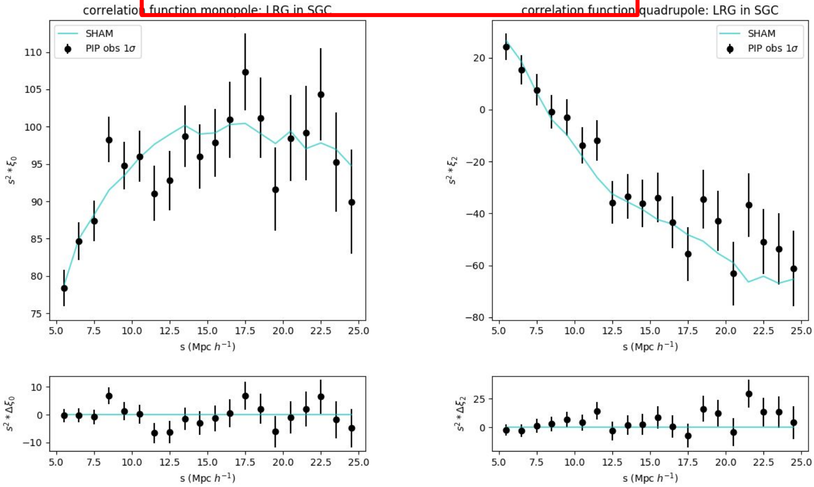
Optimal Multipoles for LRG in SGC

Gaussian scatter & dsigma cut



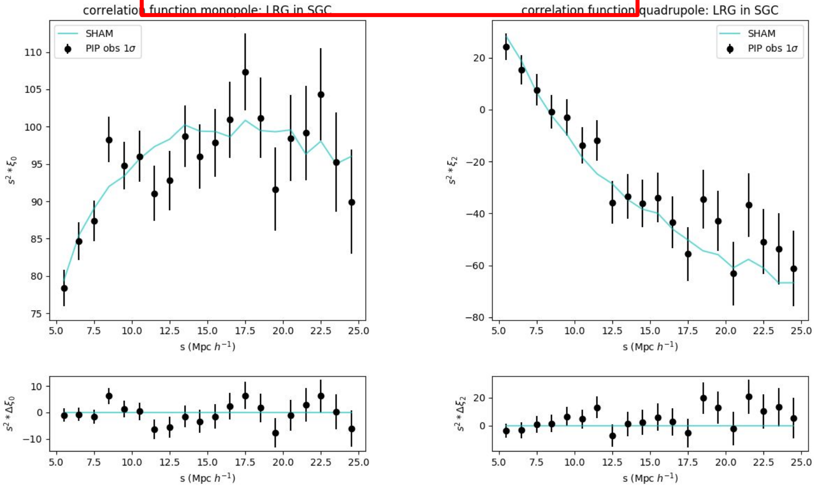
Optimal Multipoles for LRG in SGC

positive scatter & dsigma cut



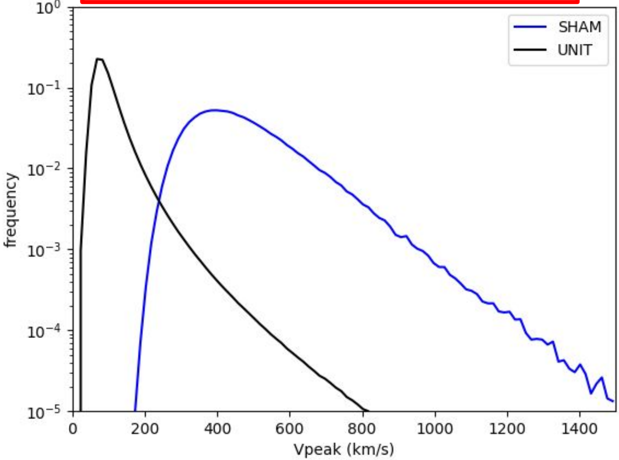
Optimal Multipoles for LRG in SGC

positive scatter & direct cut



Optimal Vpeak distr. for LRG in SGC

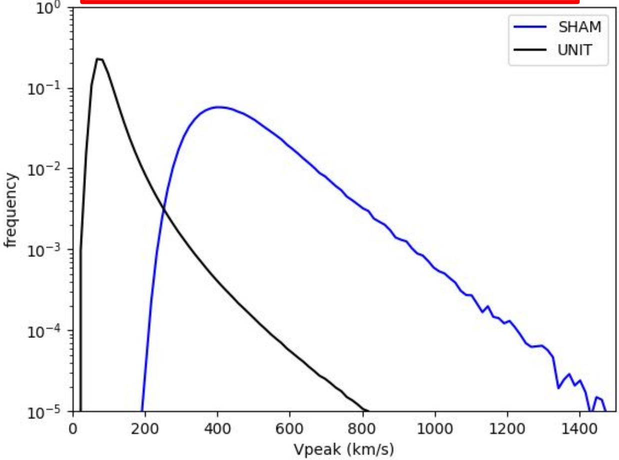
Gaussian scatter & dsigma cut



frequency = no. of SHAM halos in each bin/total no. of UNIT halos

Optimal Vpeak distr. for LRG in SGC

positive scatter & dsigma cut



frequency = no. of SHAM halos in each bin/total no. of UNIT halos

Optimal Vpeak distr. for LRG in SGC

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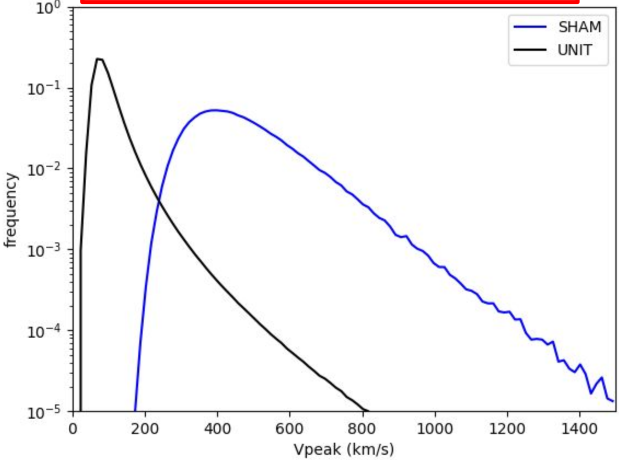
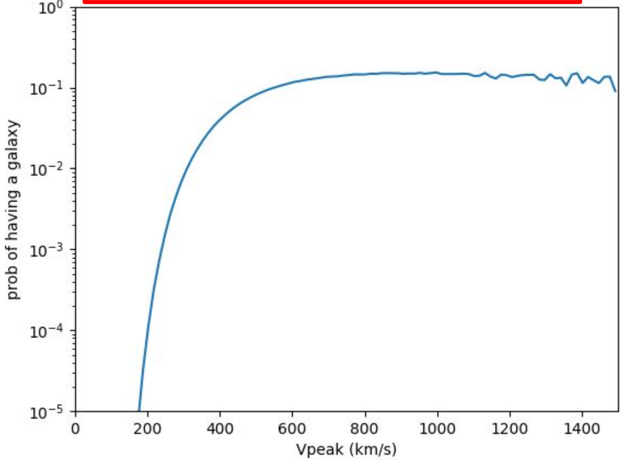
positive scatter & direct cut



frequency = no. of SHAM halos in each bin/total no. of UNIT halos

Optimal halo PDF for LRG in SGC

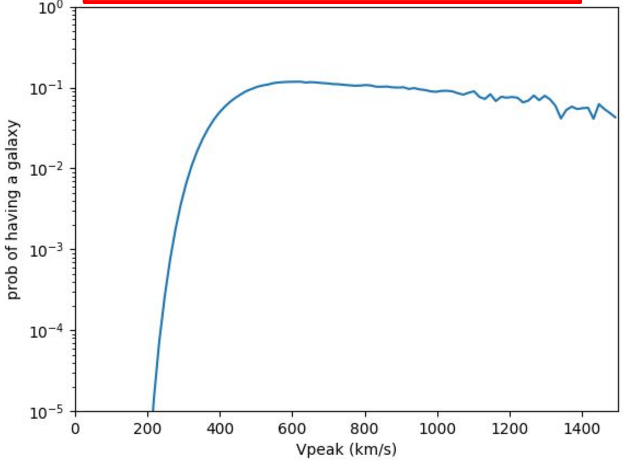
Gaussian scatter & dsigma cut



prob = no. of SHAM halos in each bin/no. of UNIT halos in each bin

Optimal halo PDF for LRG in SGC

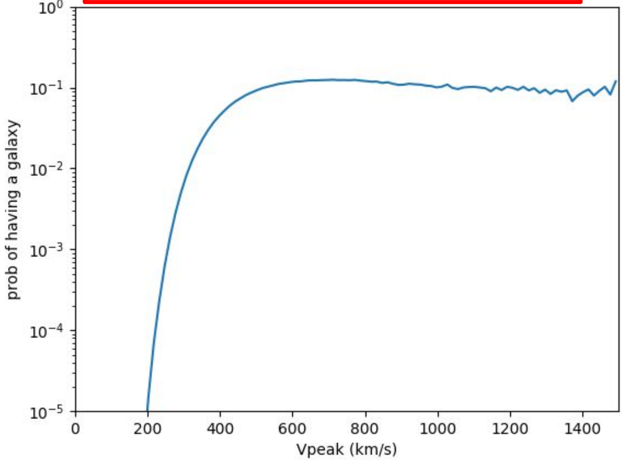
positive scatter & dsigma cut



prob = no. of SHAM halos in each bin/no. of UNIT halos in each bin

Optimal halo PDF for LRG in SGC

positive scatter & direct cut



prob = no. of SHAM halos in each bin/no. of UNIT halos in each bin

SHAM for eBOSS LRG in SGC

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1. despite the large difference between optimal parameters, the **best-fit catalogues have no big difference (hint: close-chi2 tests), so we'd better choose one that produces a better posterior**
2. the narrow posterior of **Vceil** is **at the cost of sigma** constraints

Reminder: Close-chi2 tests

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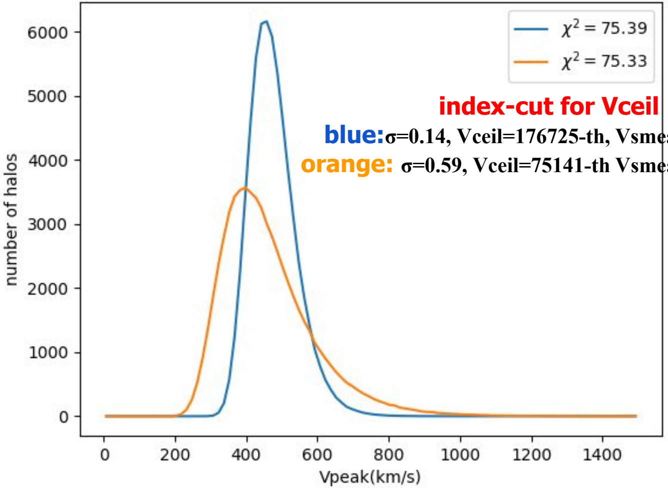
halo PDF



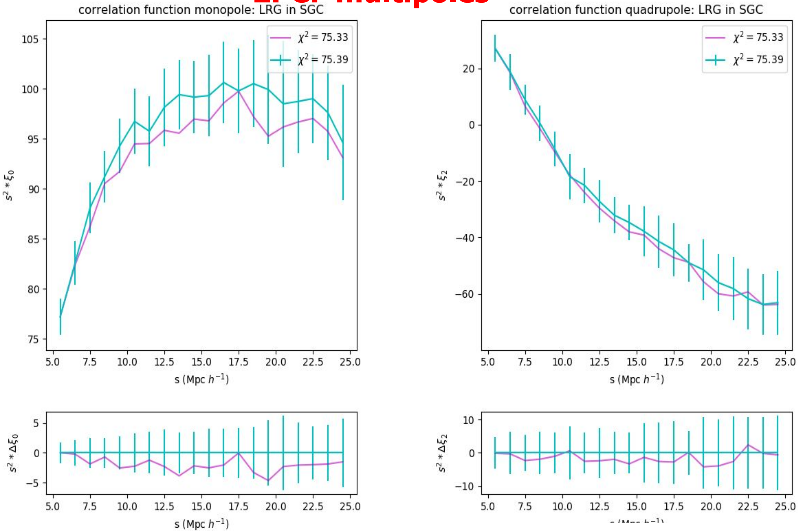
index-cut for Vceil

blue: σ=0.14, Vceil=176725-th, Vsmear=131km/s

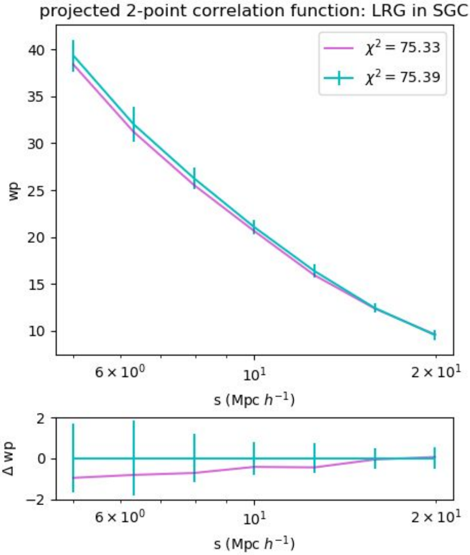
orange: σ=0.59, Vceil=75141-th Vsmear=110km/s

Reminder: Close-chi2 tests

2PCF multipoles



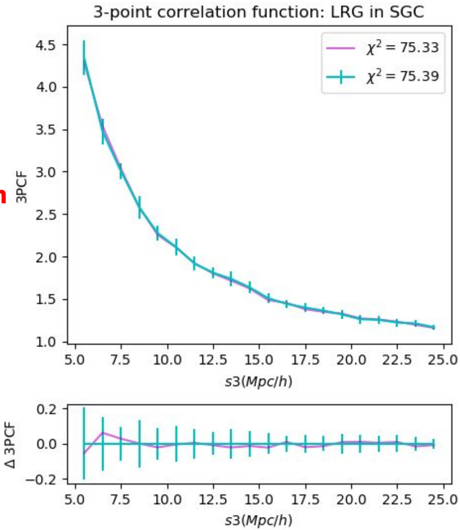
Reminder: Close-chi2 tests



Reminder: Close-chi2 tests

s1 = [5, 15] Mpc/h

s2 = [15, 25] Mpc/h

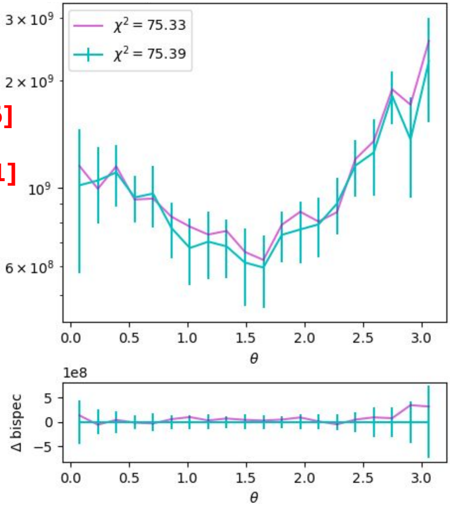


Reminder: Close-chi2 tests

bispectrum

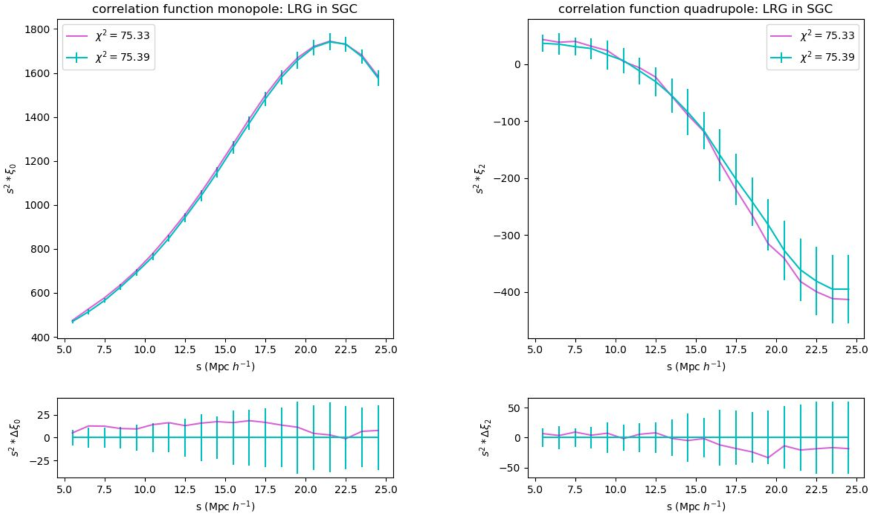
K1 = [0.04, 0.06]

K2 = [0.09, 0.11]



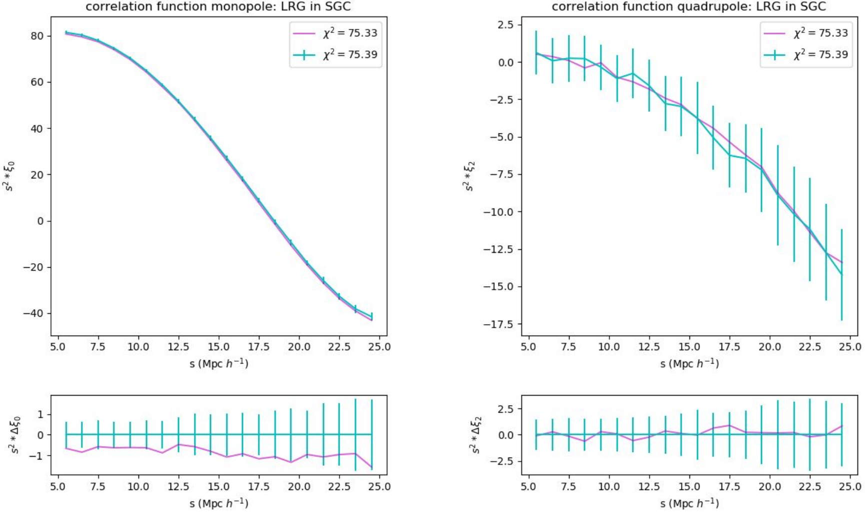
Reminder: Close-chi2 tests

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



Reminder: Close-chi2 tests

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



Reminder: Close-chi2 tests

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