Measuring BAO with DLAs and SBLAs

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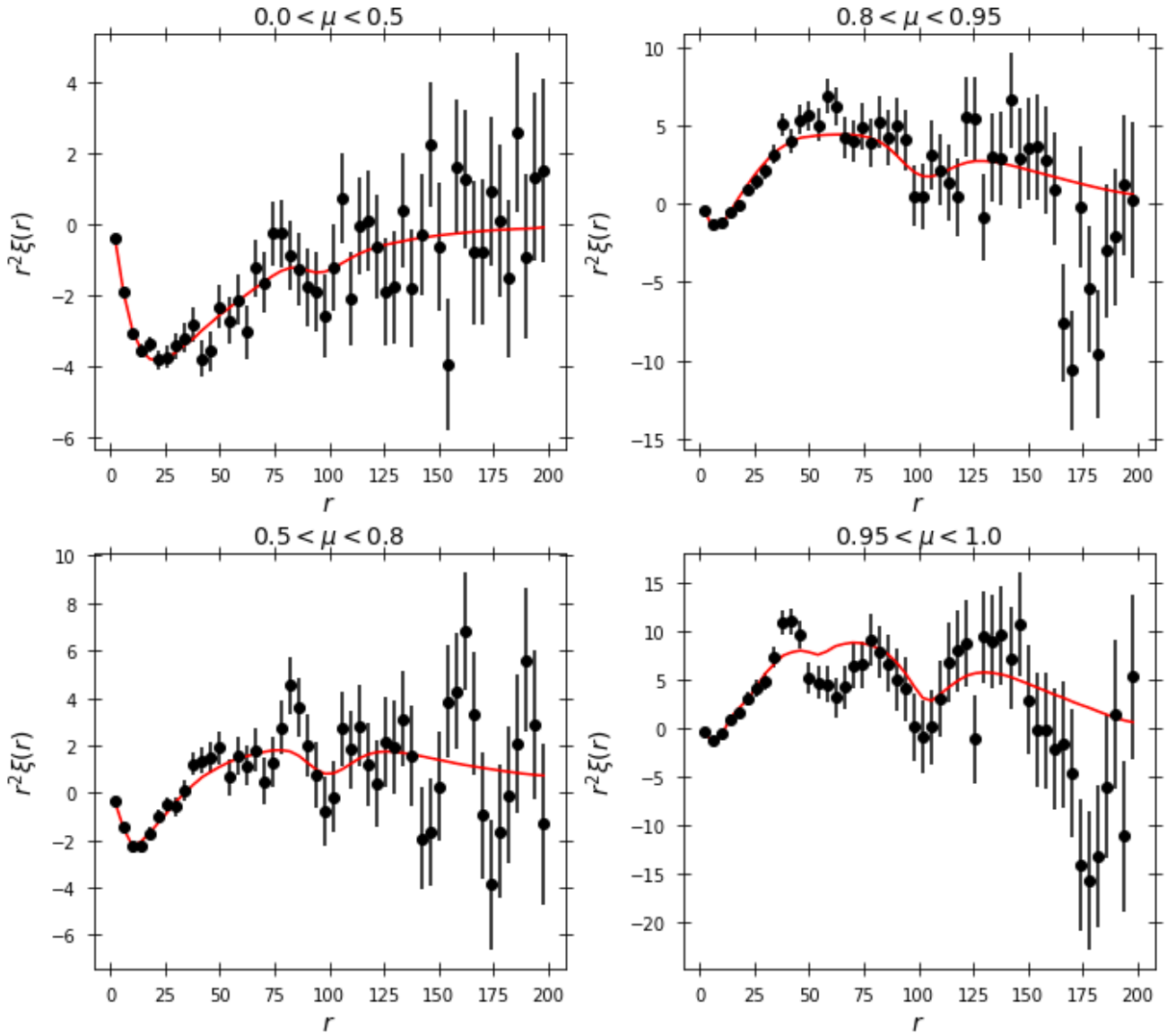
DLA superset, Lyα + Lyβ regions

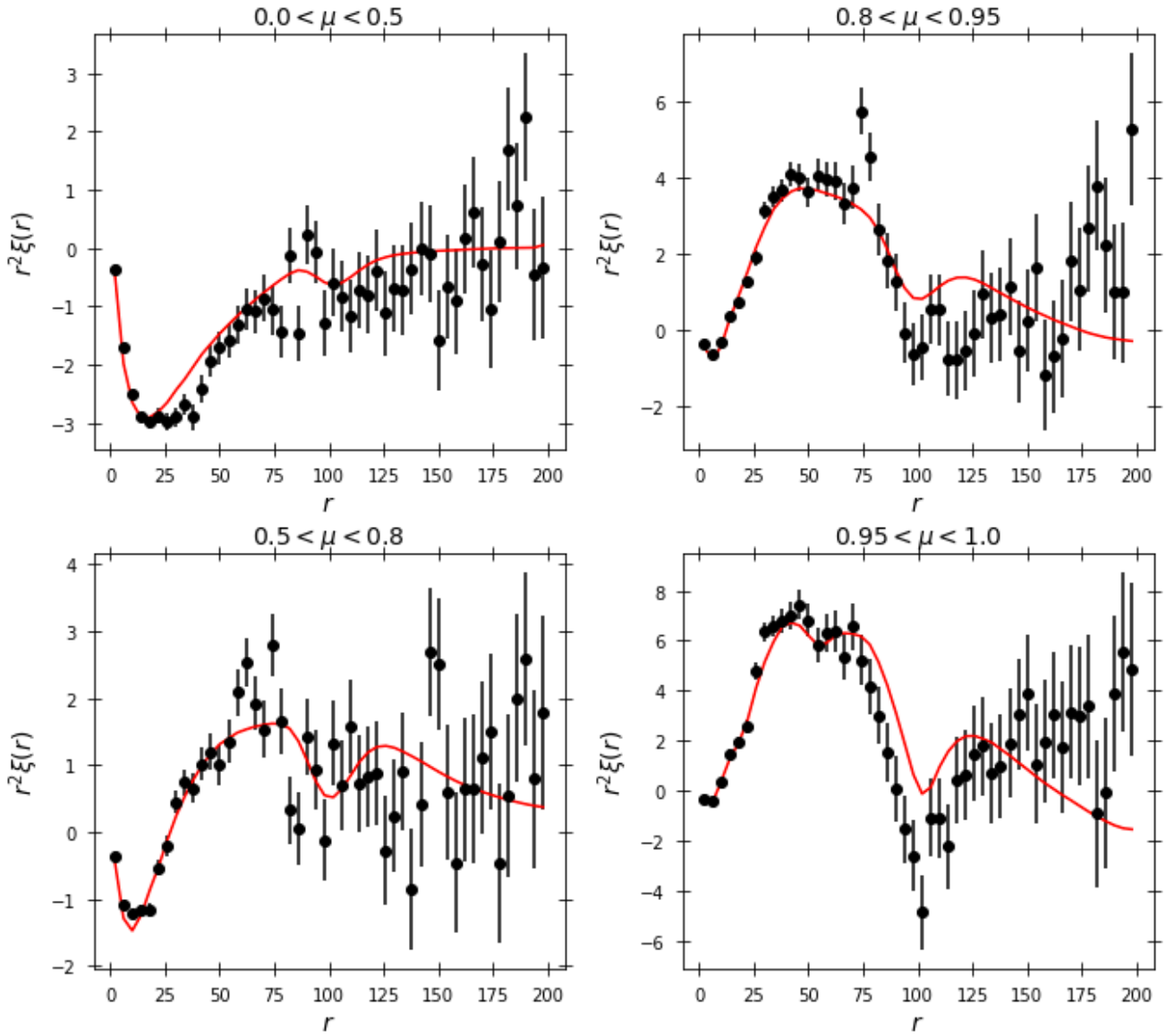


10 < r < 160 Mpc/h

ap = 0.995 +/- 0.069
at = 1.064 +/- 0.083

chi2 = 2558.1
dof = 2504-12
prob = 0.17

SBLA superset, Lyα + Lyβ regions



10 < r < 160 Mpc/h

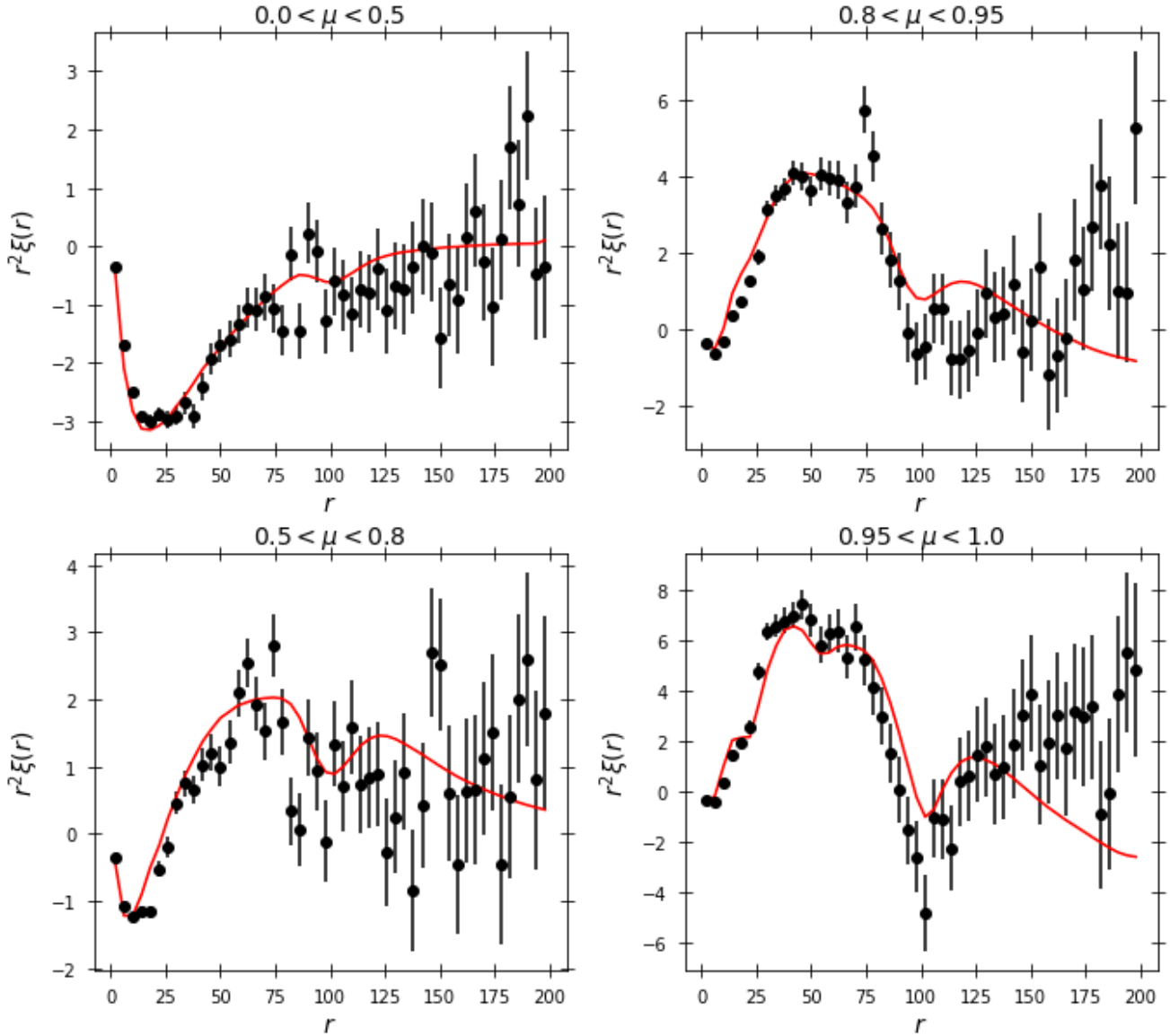
ap = 1.075 +/- 0.047
at = 0.990 +/- 0.068

chi2 = 2630.1
dof = 2504-12
prob = 0.03

Redshift error test

	SBLA	SBLAzerr_freezerr_gaus	SBLAzerr_freezerr
zeff	2.4	2.4	2.4
bias_eta_LYA	-0.225 +/- 0.0	-0.225 +/- 0.0	-0.225 +/- 0.0
beta_LYA	2.079 +/- 0.089	1.838 +/- 0.099	1.818 +/- 0.101
bias_eta_DLA			
beta_DLA			
bias_eta_SBLA	1.0 +/- 0.0	1.0 +/- 0.0	1.0 +/- 0.0
beta_SBLA	0.353 +/- 0.012	5.243 +/- 1.075	6.191 +/- 1.958
ap	1.076 +/- 0.049	1.041 +/- 0.112	1.023 +/- 0.125
at	0.99 +/- 0.067	1.12 +/- 0.262	1.16 +/- 0.312
L0_hcd	22.58 +/- 2.25	0.581 +/- 7.281	11.654 +/- 0.868
beta_hcd	0.769 +/- 0.21	0.383 +/- 0.13	0.371 +/- 0.146
bias_eta_SiII(1190)	-0.001 +/- 0.001	-0.0 +/- 0.048	-0.005 +/- 0.006
bias_eta_SiII(1193)	-0.002 +/- 0.001	-0.007 +/- 0.007	-0.005 +/- 0.006
bias_eta_SiII(1260)	-0.004 +/- 0.001	-0.024 +/- 0.006	-0.018 +/- 0.005
bias_eta_SiIII(1207)	-0.003 +/- 0.001	-0.014 +/- 0.006	-0.013 +/- 0.005
bias_gamma	0.873 +/- 0.077	3.615 +/- 0.384	4.425 +/- 0.721
bias_hcd	-0.015 +/- 0.005	-0.681 +/- 0.081	-0.817 +/- 0.149
sigma_velo_gaus_SBLA		12.543 +/- 0.402	
sigma_velo_lorentz_S			8.804 +/- 1.605
chi2/(ndata-npar)	2630.1/(2504-12)	2643.7/(2504-13)	2648.7/(2504-13)
probability	0.03	0.02	0.01

SBLA superset, Lyα + Lyβ regions



float bias_eta_sbla
fix beta_lya
10 < r < 160 Mpc/h

ap = 1.073 +/- 0.047
at = 0.996 +/- 0.071

chi2 = 2592.8
dof = 2504-12
prob = 0.08

bias_eta_sbla =
2.16 +/-0.172
before fixed to 1

beta_sbla =
1.131 +/- 0.184
before 0.353 +/- 0.012

Joined fit

Cross-covariance between SBLA x Lya and Lya x Lya (mean 0.2)
→ Cannot combine SBLA x Lya with Lya x Lya

How to solve this:

1. Mask SBLAs on Lya x Lya
   - Lya x Lya less constraining
   - but can recover the constraining levels when DLA+SBLA x Lya is added to the joined fit

2. Full covariance matrix
   - Can use the Lya x Lya as is
   - Full covariance matrix can be computed from subsampling
   - Also take into account small cross-covariance with QSO x Lya
   - Other tracers can be automatically added

Summary

- DLA-Lyα results are OK. BAO is weak, as expected, but no obvious issues
- SBLA-Lyα resultsstill have some issues to be understood. Float/ fix bias_eta_sblas?
- Redshift error model in P(k) might have some issues
- Cross-covariance prevents joined fit with Lya x Lya
  - Option 1: mask SBLAs in Lya forest
  - Option 2: compute full covariance matrix