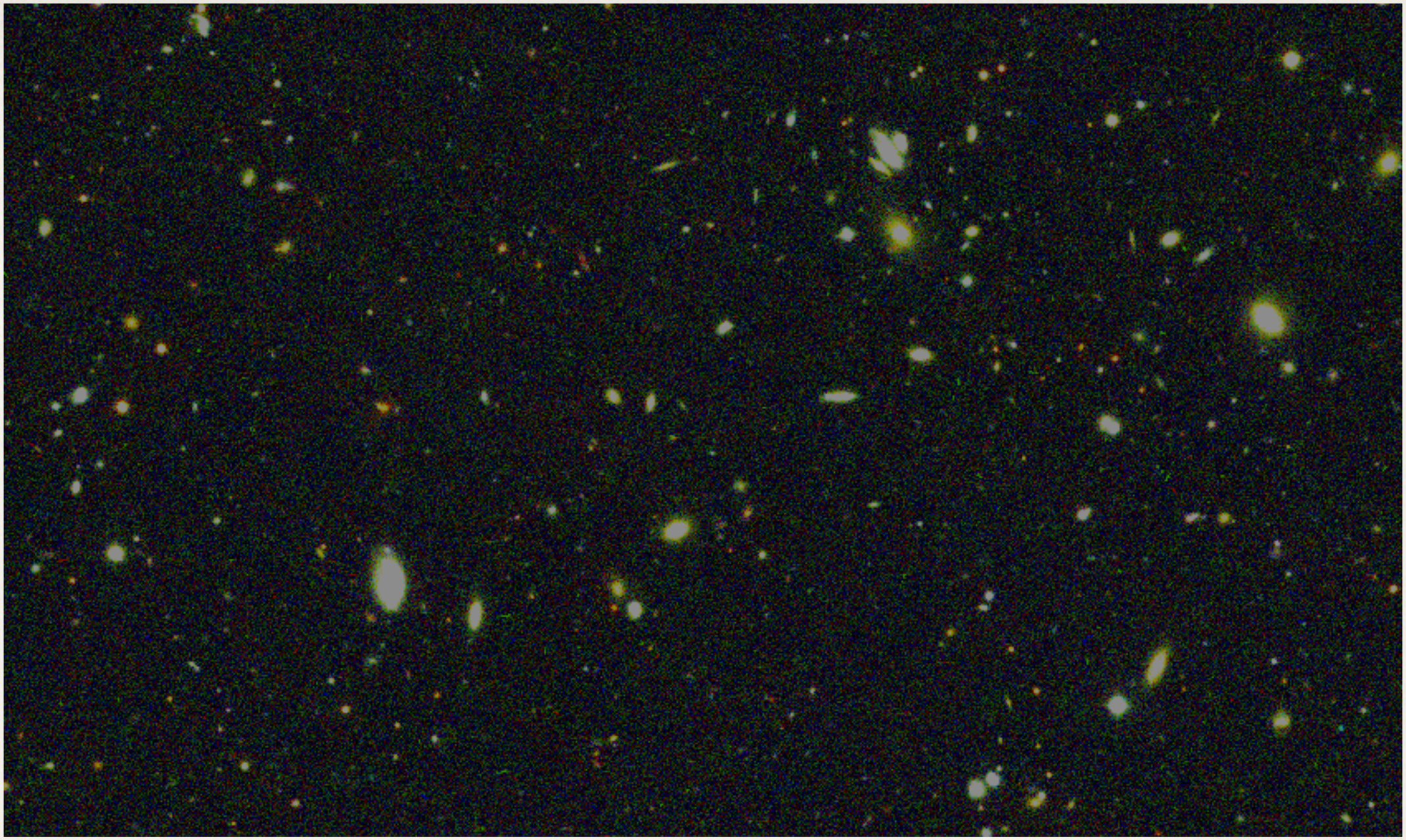


Cosmic Shear in RCS2

Ami Choi Royal Observatory Edinburgh

July 23, 2013
Ripples In The Cosmos, Durham, UK

Overview

- RCS2 Survey Description
- Catalogue Pipeline
- Preliminary Results
  - Angular cross-correlations between photometric and spectroscopic galaxies
  - Shear-shear correlations
  - Tangential shear around WiggleZ & BOSS galaxies
- Summary and Future Work

Red Sequence Cluster Survey 2

- 1000 deg^2 of g′r′i′ imaging on CFHT MegaCam; PI: Howard Yee
- r′~24.8, median seeing ~ 0.7″
- Core team science goal: use clusters to study *w*, lensed high-*z* galaxies, and cluster evolution
- http://www.astro.utoronto.ca/~gilbank/RCS2/

Re-processing of RCS2 with CFHTLenS pipeline

- WHY?
  - Measure lensing by large-scale structure
  - Geometry via shear-ratio test
  - Combining lensing + redshift-space distortions (see poster by Lars Koens!)
  - And MORE!

- WHO?
  - H. Hildebrandt, T. Erben, R. Nakajima (Bonn)
  - C. Heymans, A. Choi, B. Joachimi (Edinburgh)
  - L. van Waerbeke, J. Harnois-Deraps (UBC)
  - M. Viola (Leiden)
  - T. Kitching (MSSL)
  - L. Miller (Oxford)
  - C. Wolf (RSAA, ANU)
  - C. Blake (Swinburne)

Image and Catalogue Pipeline

- Lensing quality data reduction with automated masking (Erben+2013)
- Bayesian galaxy model fitting with *lensfit* (Miller+2013)
- Gaussianised photometry and template-fitted photo-z (Hildebrandt +2012)
- Stringent systematics tests: 85% fields pass (Heymans+2012)

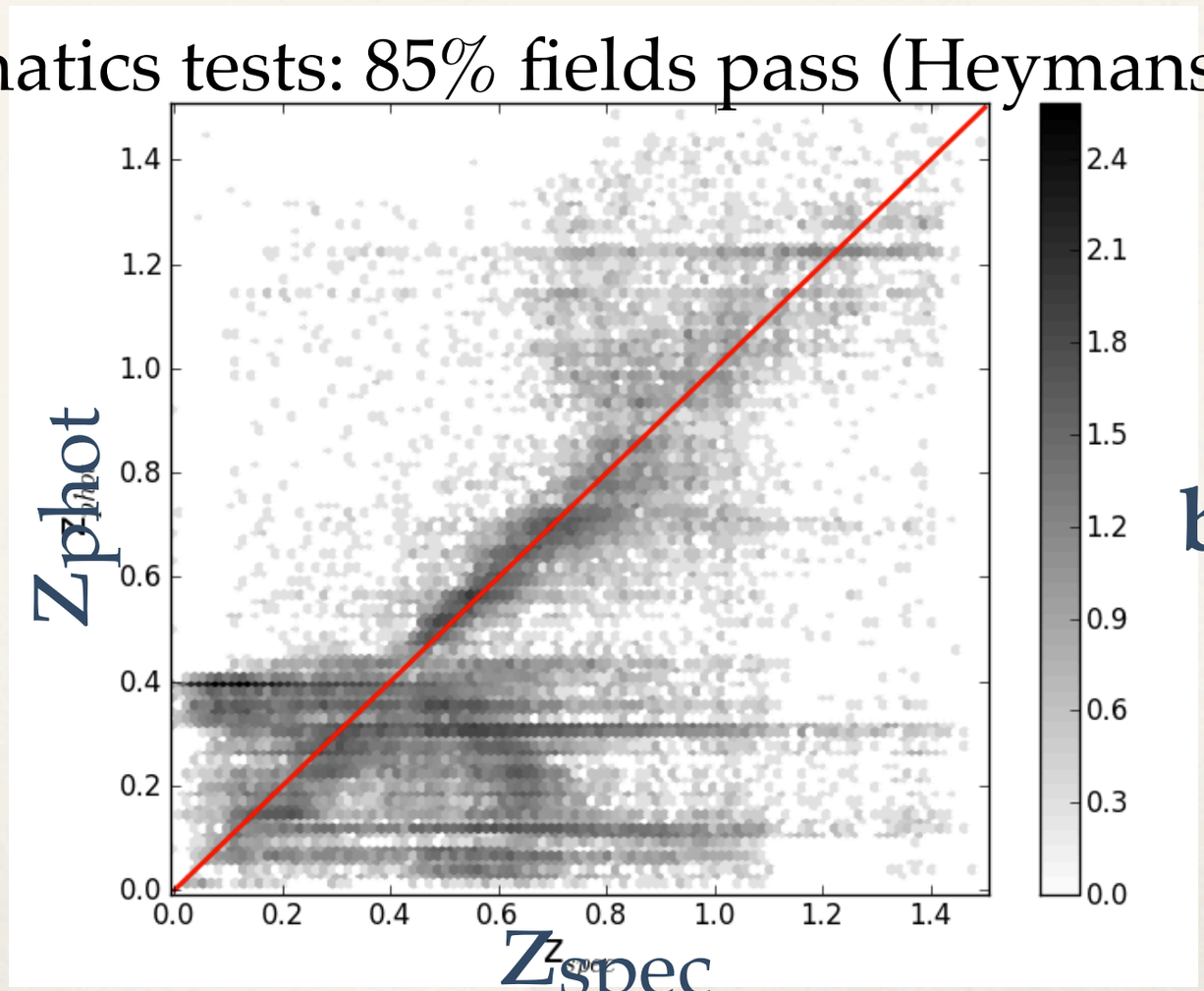
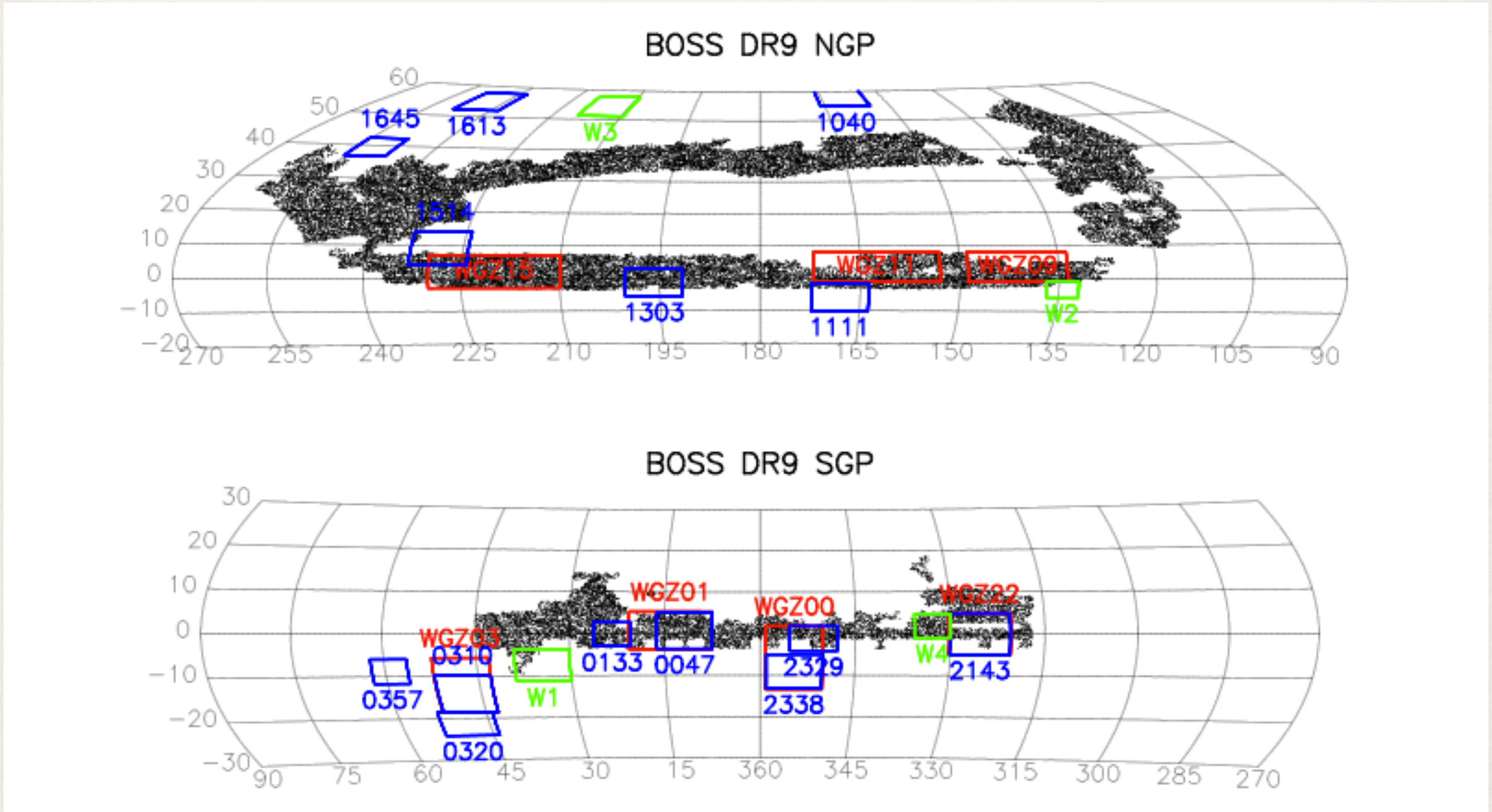


photo-z with 4 bands and no u-band difficult!

Some RCSLenS Numbers

566	effective area after removing overlaps and masks (deg^2)
380	effective area w/photo-z after removing overlaps and masks (deg^2)
0.6	median redshift
244	overlap w/WiggleZ (deg^2)
217	overlap w/BOSS DR9 (deg^2)
7.8	effective galaxies/ $arcmin^2$

Overlap with Spectroscopic Surveys

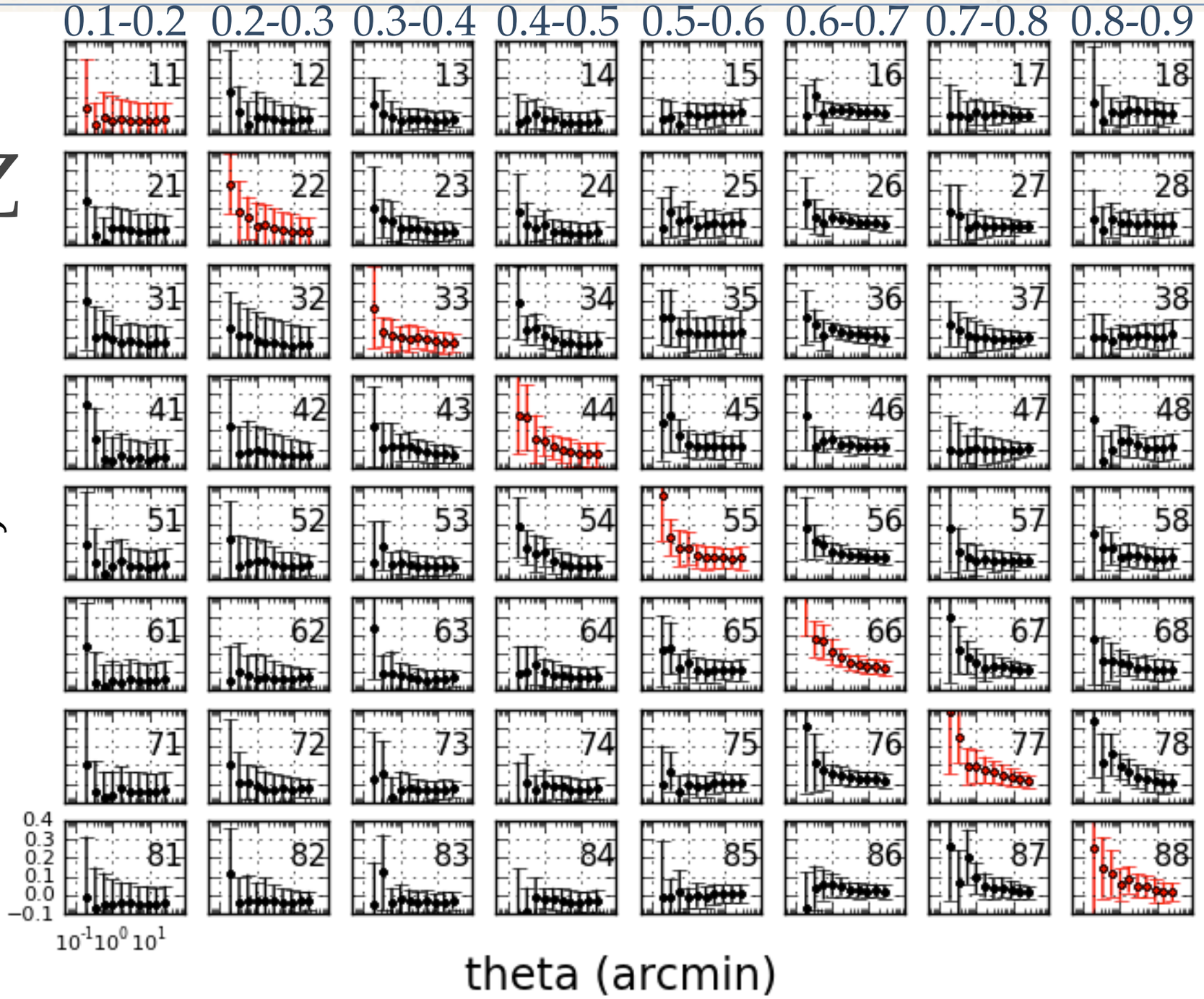


Credit: Chris Blake

Preliminary Results:

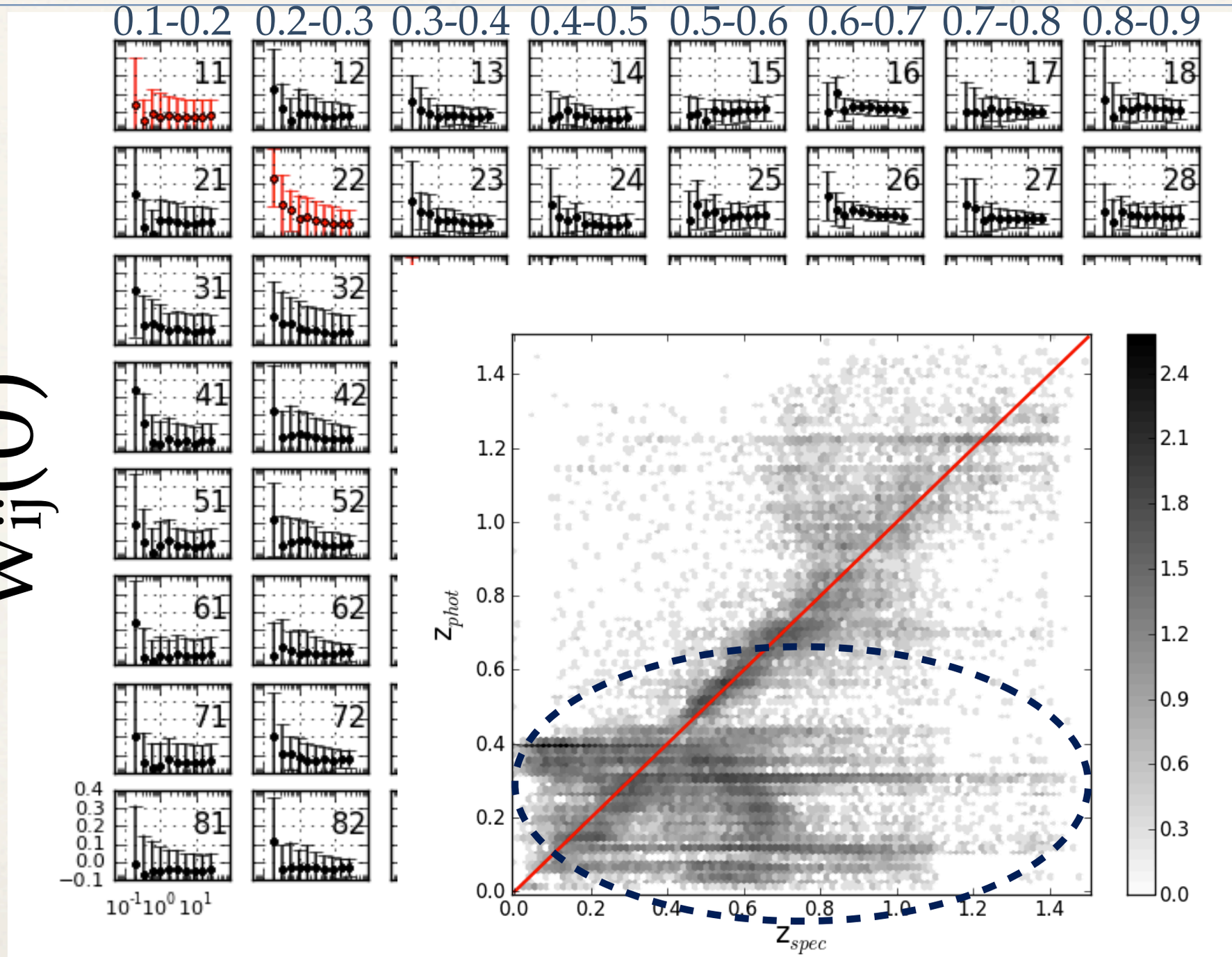
Cross-Correlating Spectroscopic and Photometric Samples

RCS x WiggleZ

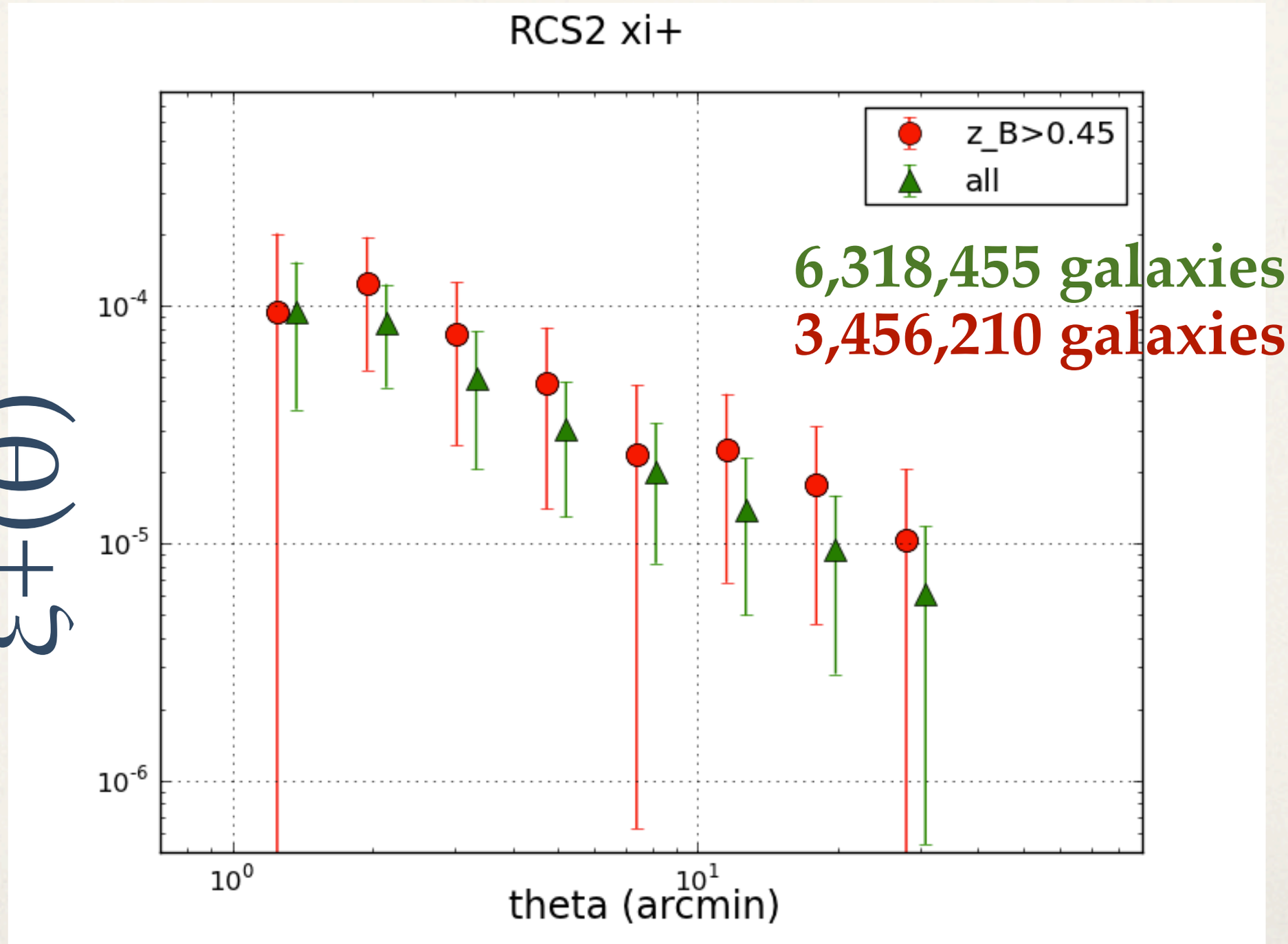


Preliminary Results:

Cross-Correlating Spectroscopic and Photometric Samples

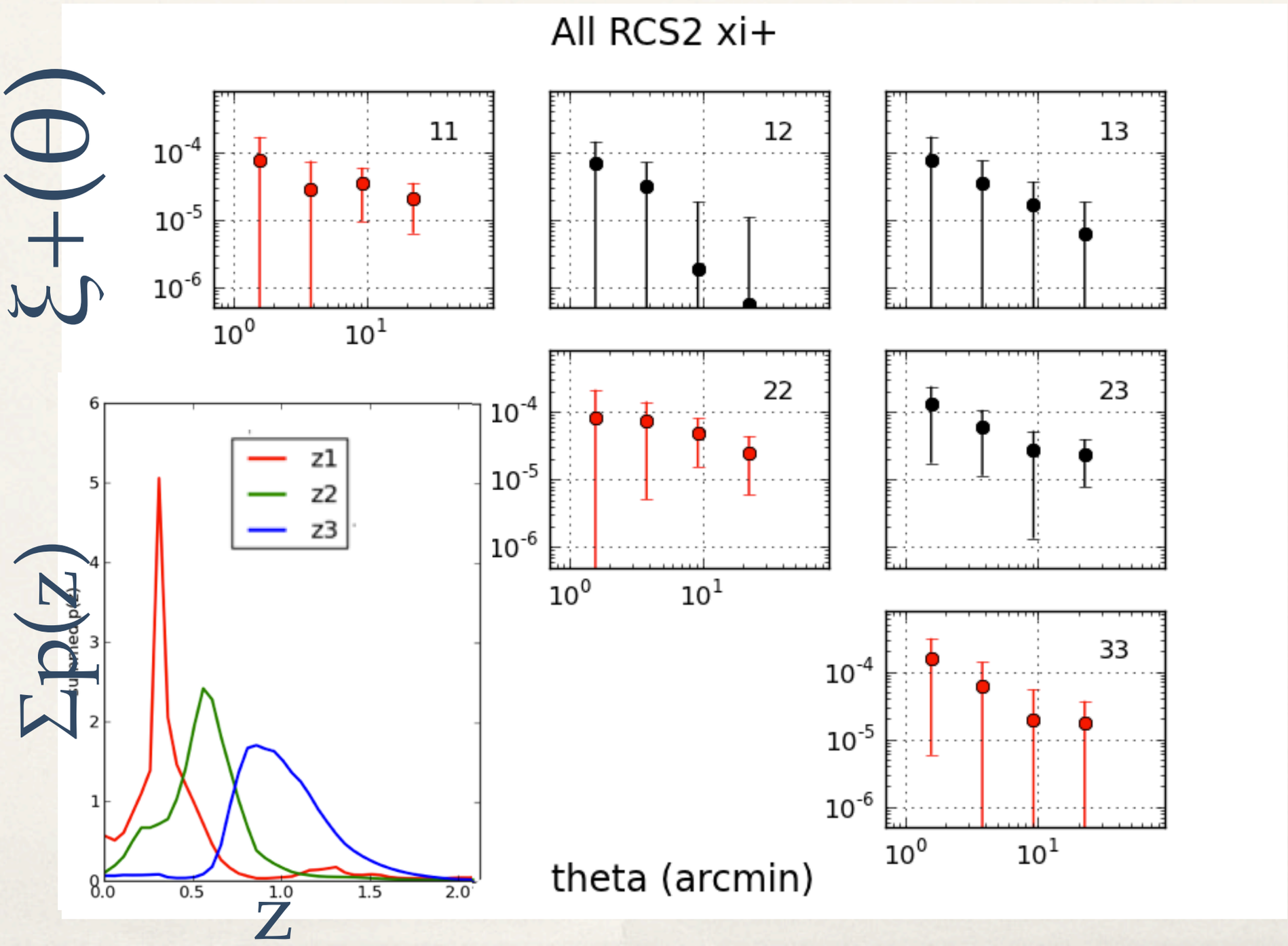


Preliminary Results:
2-D Shear-Shear Correlation Function



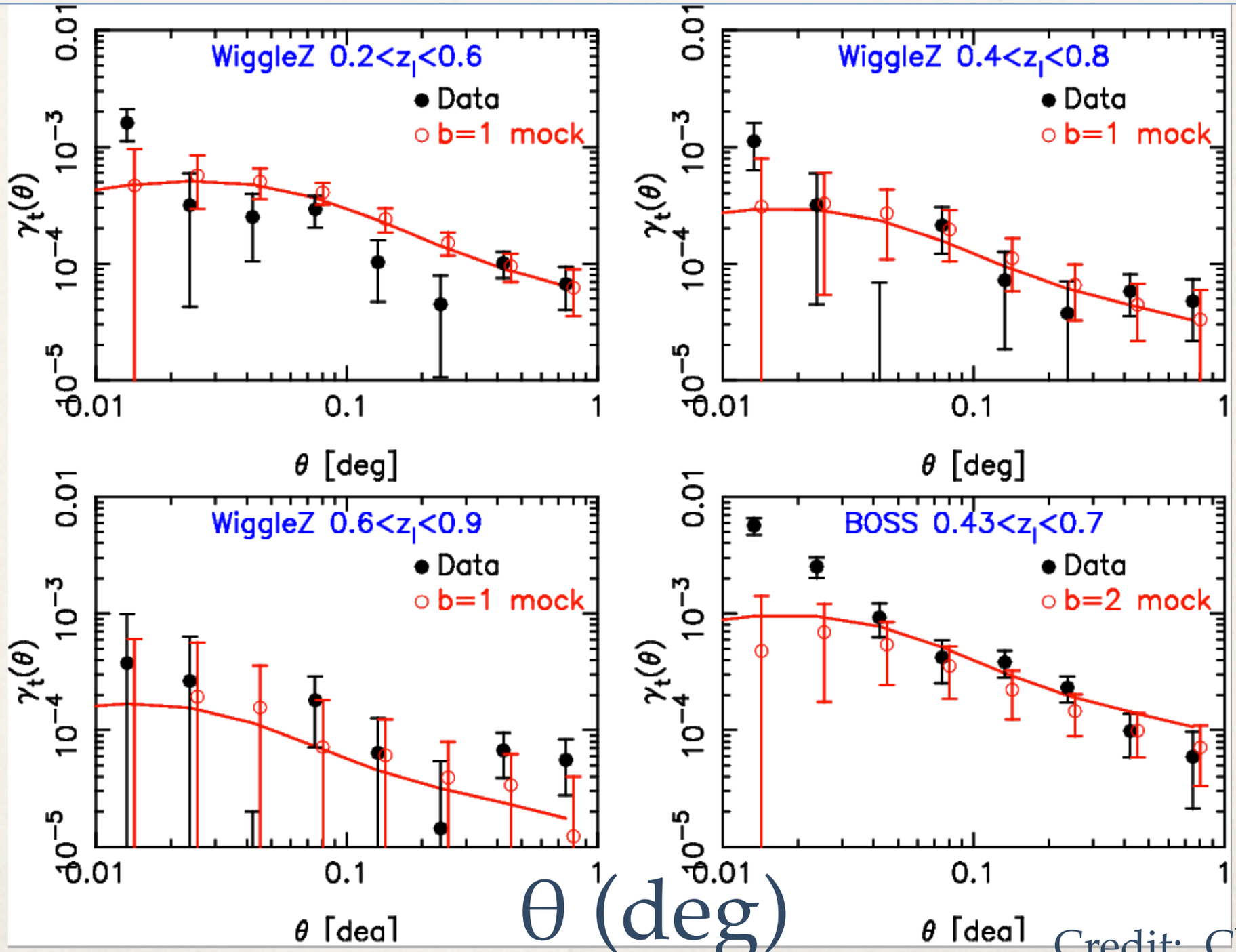
Preliminary Results:

Tomographic Shear-Shear Correlation Functions



Preliminary Results:

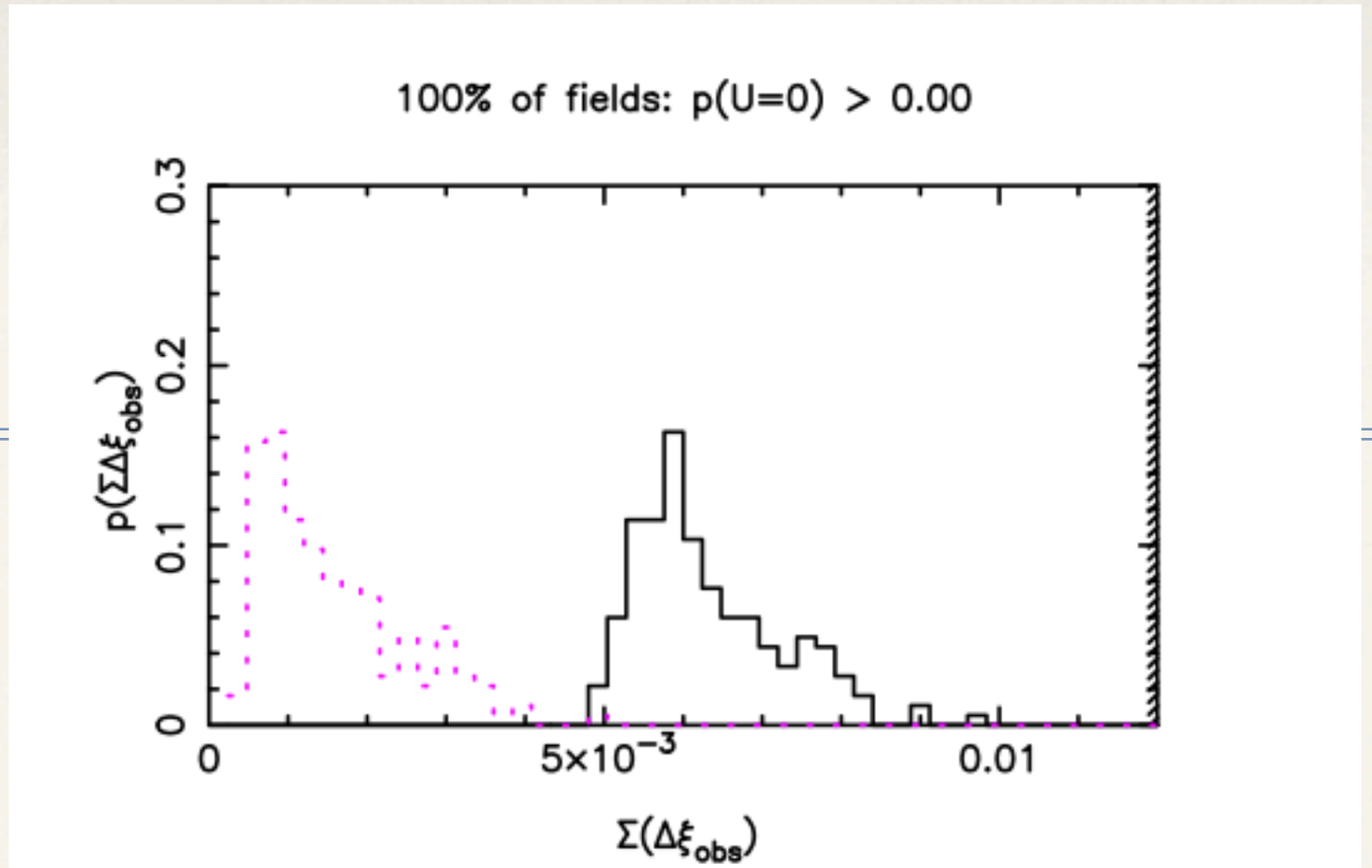
Tangential Shear for Galaxies in WiggleZ and BOSS



Credit: Chris Blake

Summary and Ongoing Work

- RCS2 is a valuable precursor to ongoing surveys like KiDS and DES, as it is similar depth and has lensing-quality resolution
  - Currently investigating true redshift distributions of photo-z selected tomographic bins
- Ongoing investigation to improve redshift estimation in low-z range.
- Combine with deeper CFHTLenS to improve statistical power of the tomography and constrain cosmological parameters and intrinsic alignments



Credit: Catherine Heymans