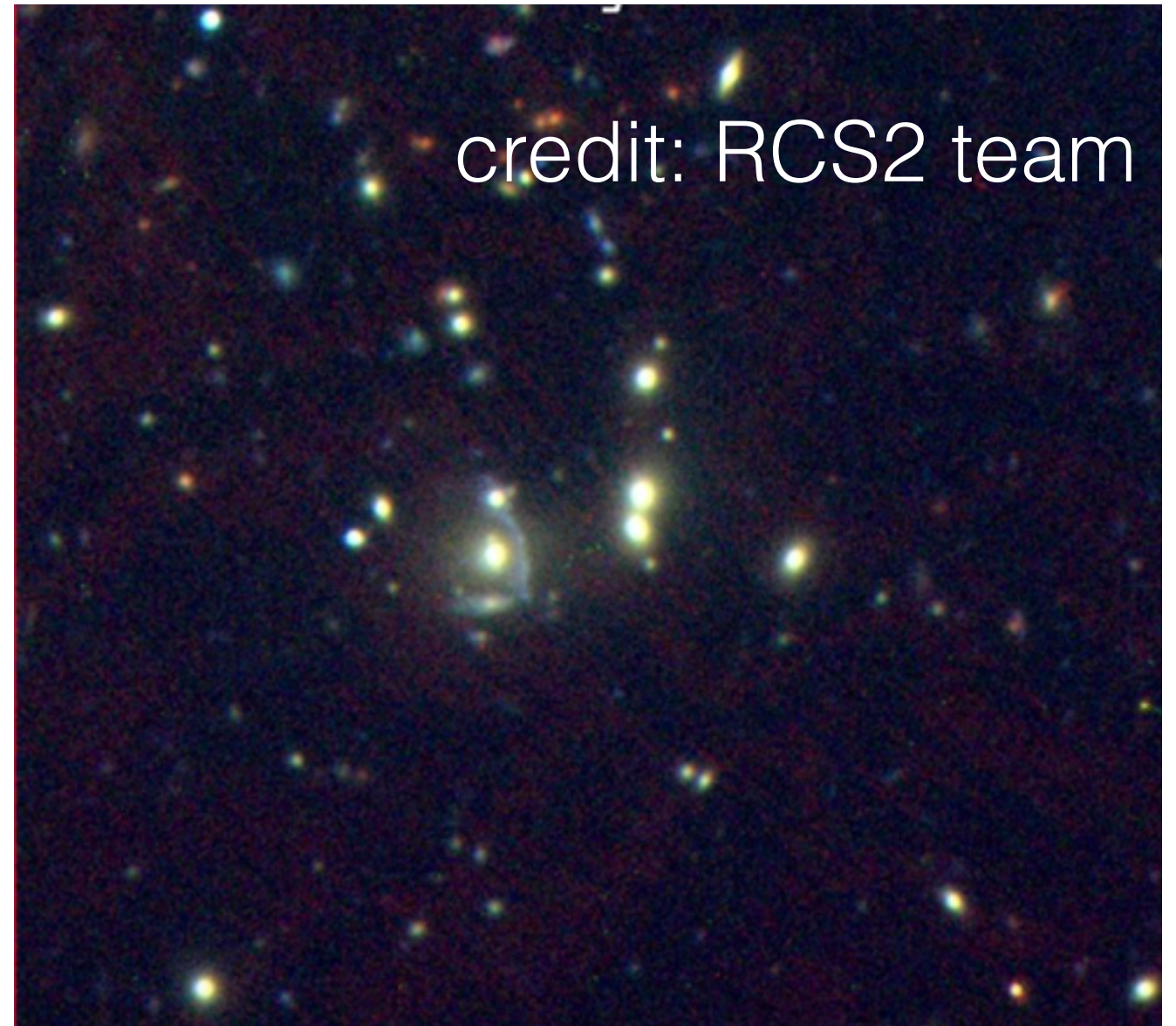


Cosmology with RCSLenS



Ami Choi

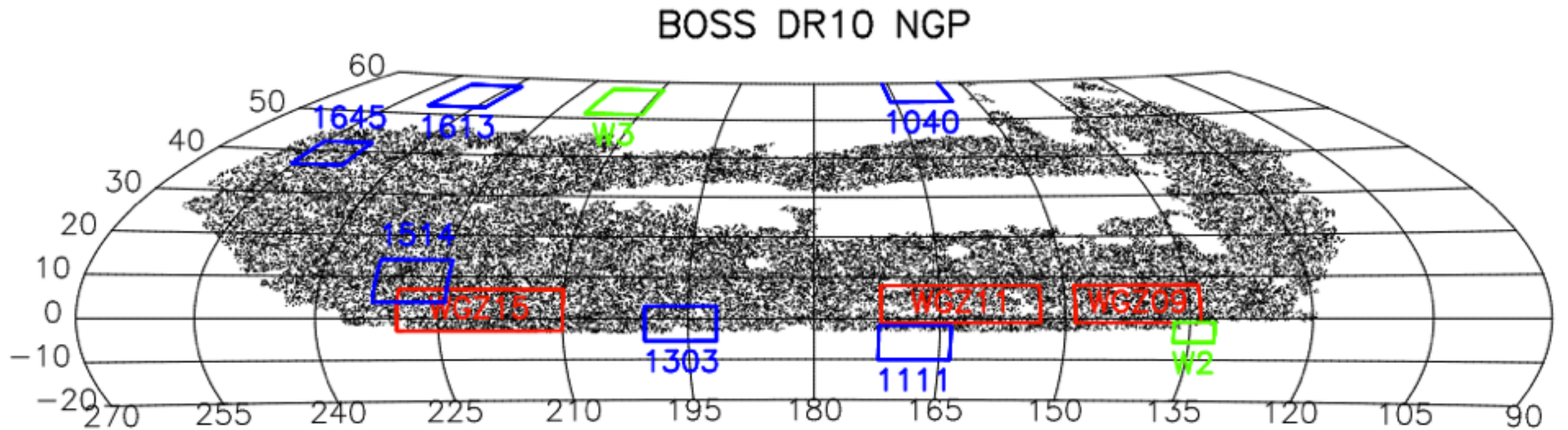
in collaboration with many, including C. Heymans, H. Hildebrandt, C. Blake, S. Joudaki, M. Viola, T. Erben, L. Miller, L. van Waerbeke, A. Buddendiek, J. Harnois-Deraps, B. Joachimi, T. Kitching, R. Nakajima, T. Troester, A. Hojjati



Diving into the Dark, Cairns
Thursday, July 21 2016

Overlapping Datasets

CFHTLenS + BOSS, RCS + BOSS, WiggleZ

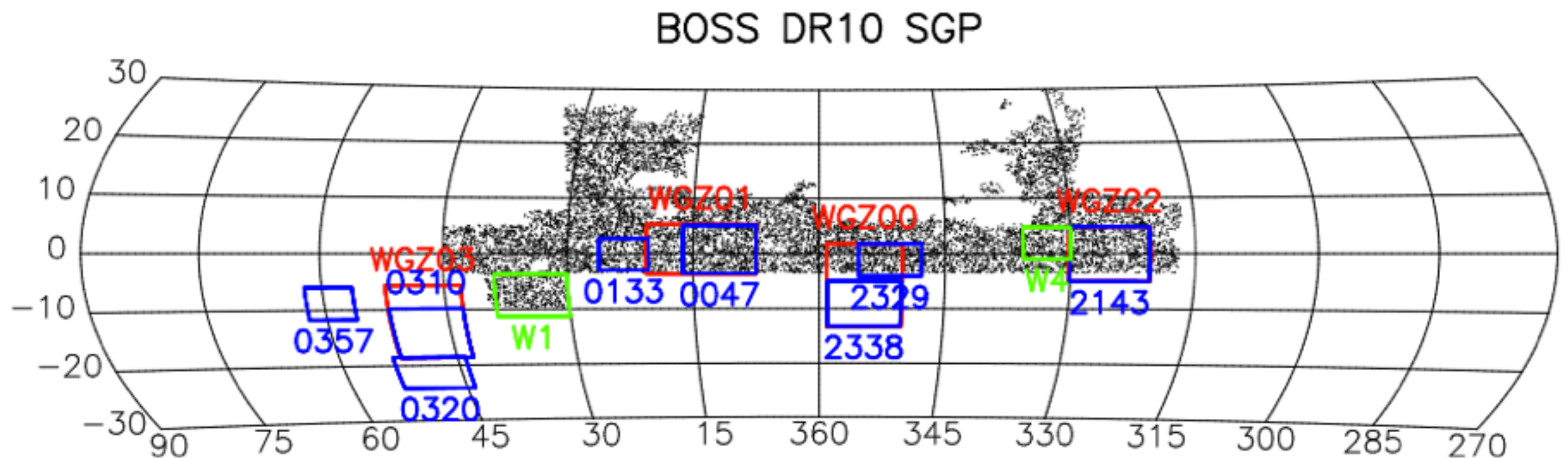


CFHTLenS

RCSLenS

WiggleZ

BOSS



Credit: Chris Blake

CFHTLenS/RCSLenS

154	effective area after removing overlaps and masks (deg ²)	572
154	effective area w/ photo-z after removing overlaps and masks (deg ²)	384
0.9 (0.7)	median redshift (eff. lens. sample)	0.6 (0.4)
	overlap w/WiggleZ (deg ²)	181
87	overlap w/BOSS DR10 (deg ²)	184
~14 (11)	effective galaxies/ arcmin ²	~8 (5.5)

Accepted/submitted

- Testing gravity through E_G — Blake+2015 (arXiv: 1507.03086)
- Large-scale galaxy-matter correlations — Buddendiek+2015 (arXiv:1512.03625)
- Testing $n(z)$ through angular cross-correlations — Choi+2015 (arXiv: 1512.03626)
- Cosmic distances from shear ratios — Kitching+2015 (arXiv: 1512.03627)
- Description of survey and pipeline — Hildebrandt, Choi +2016 (arXiv: 1603.07722)
- Cross-correlation with CMB lensing — Harnois-Deraps+2016 (arXiv: 1603.07723)

In preparation

- Cross-correlation with tSZ—Hojjati, Troester+2016
- Cross-correlation with gamma-rays—Troester+2016
- Cosmic shear & systematics (longer time-scale)
 - 4-filter photo-z without u -band not ideal
 - single-exposure surveys not ideal

NOTE: Catalogues with redshifts and shapes publicly available at CADC (many thanks to Stephen Gwyn)

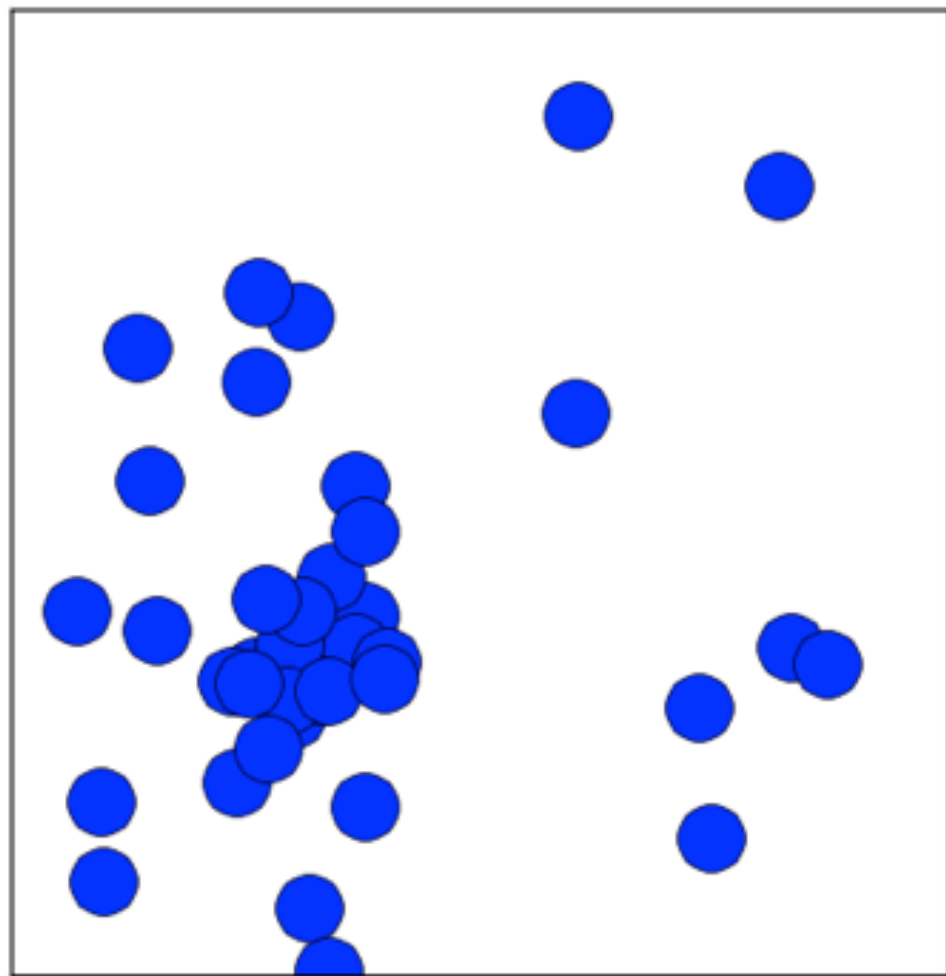
see link at <http://arxiv.org/abs/1603.07722>
and via www.rcslens.org

Testing $n(z)$ through angular cross-correlations
between spec- z and photo- z surveys

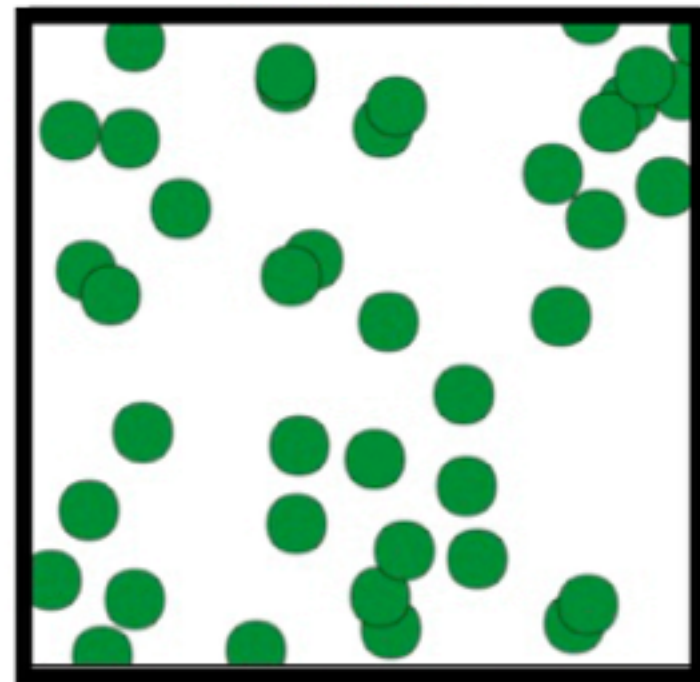
— Choi+2015 (arXiv: 1512.03626)

Angular Clustering

$? < z < ?$

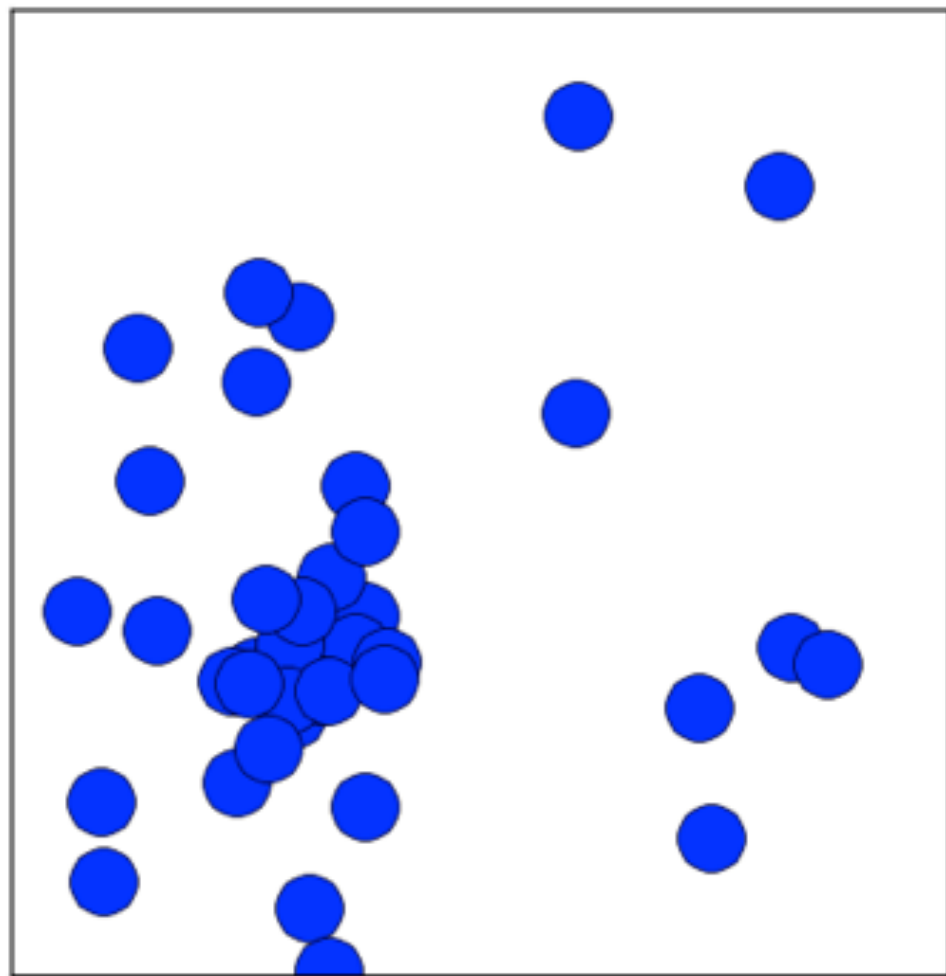


$0.1 < z < 0.3$

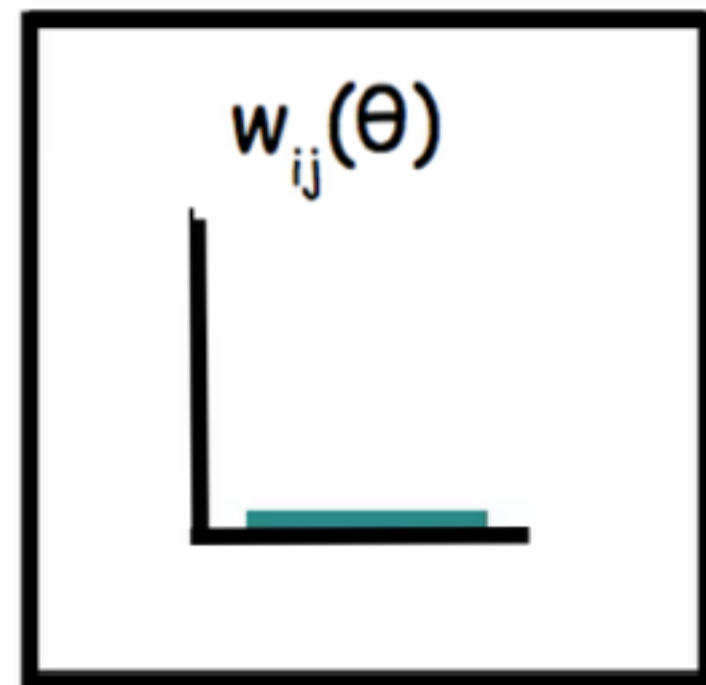
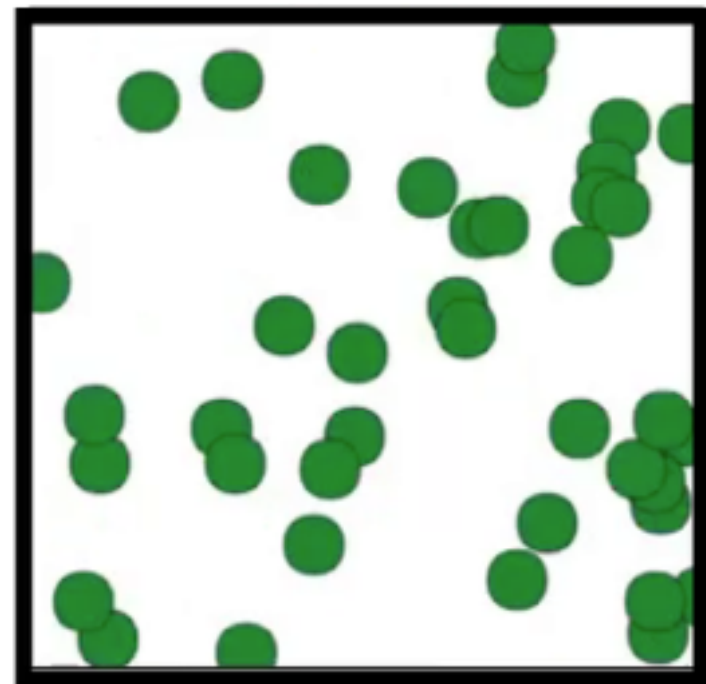


Angular Clustering

$? < z < ?$

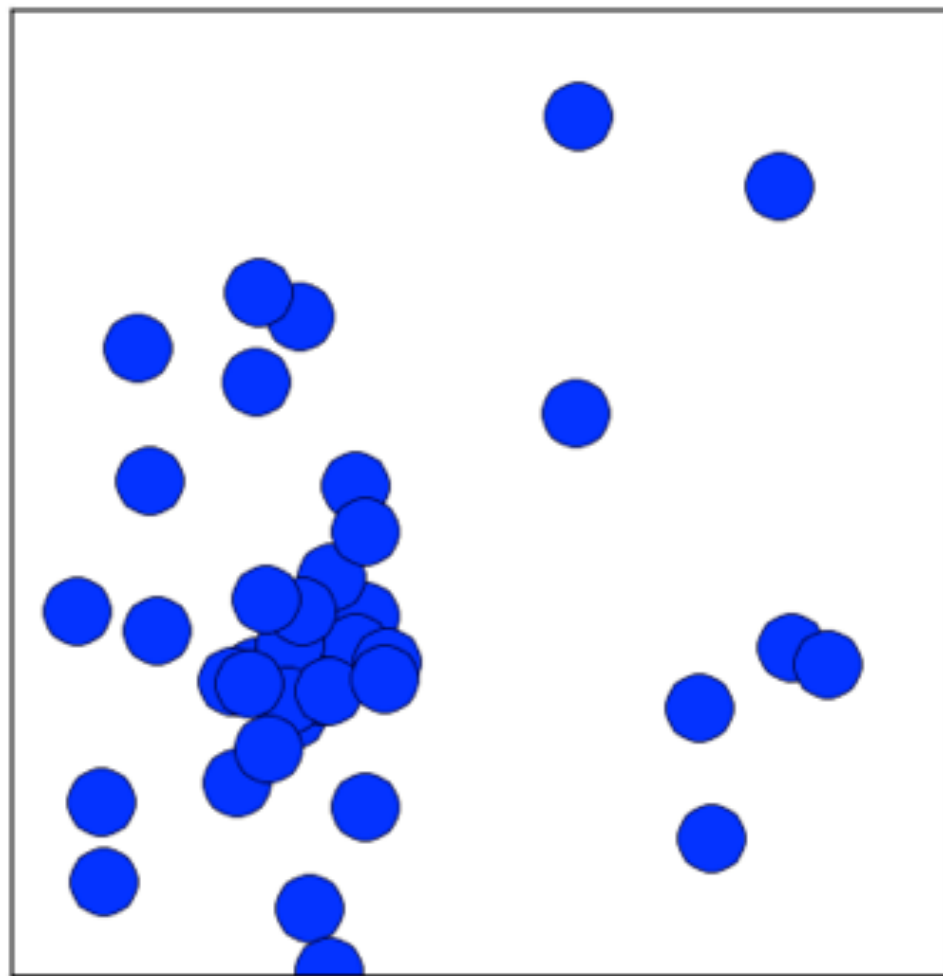


$0.3 < z < 0.5$

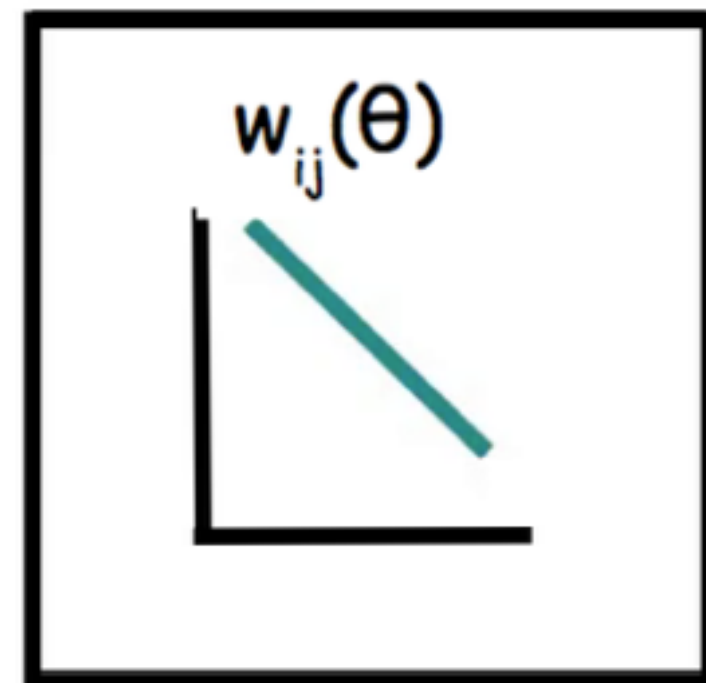
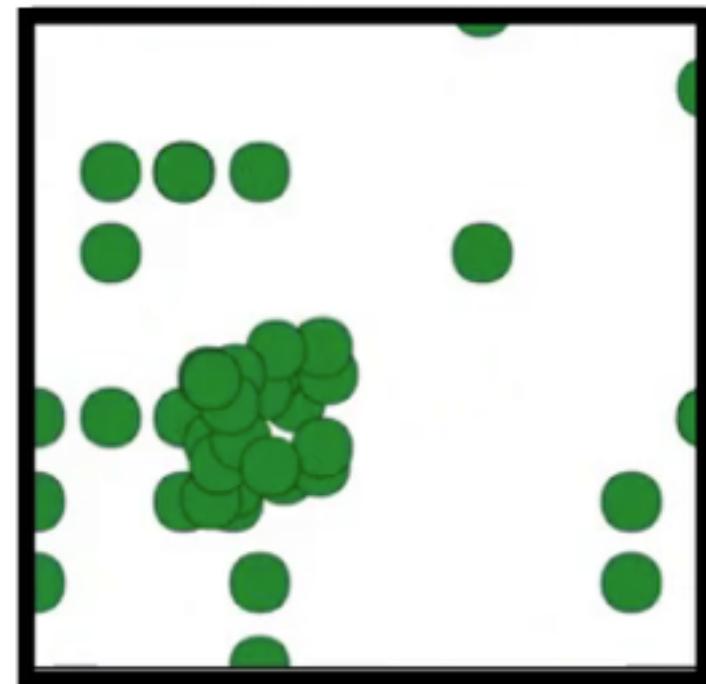


Angular Clustering

$? < z < ?$

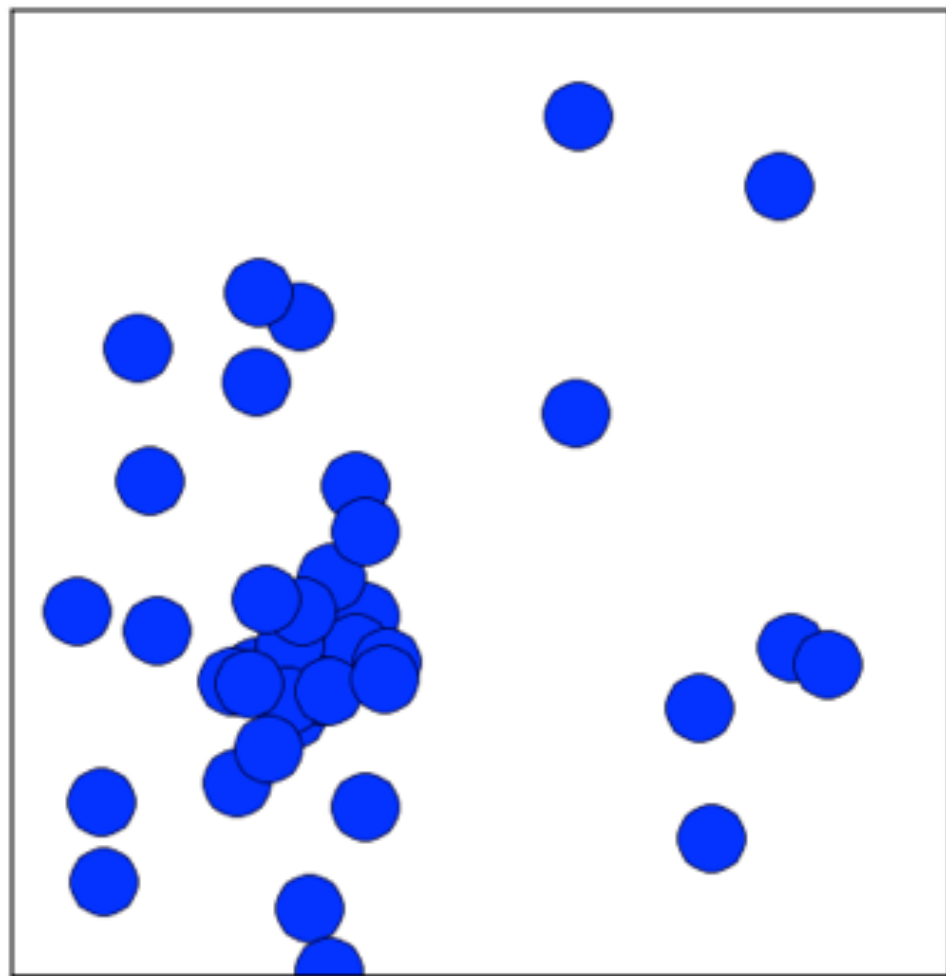


$0.5 < z < 0.7$

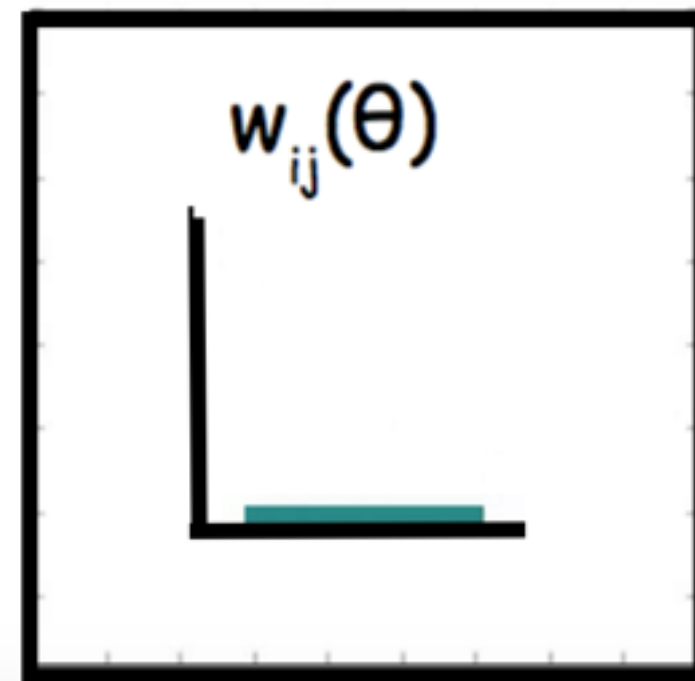
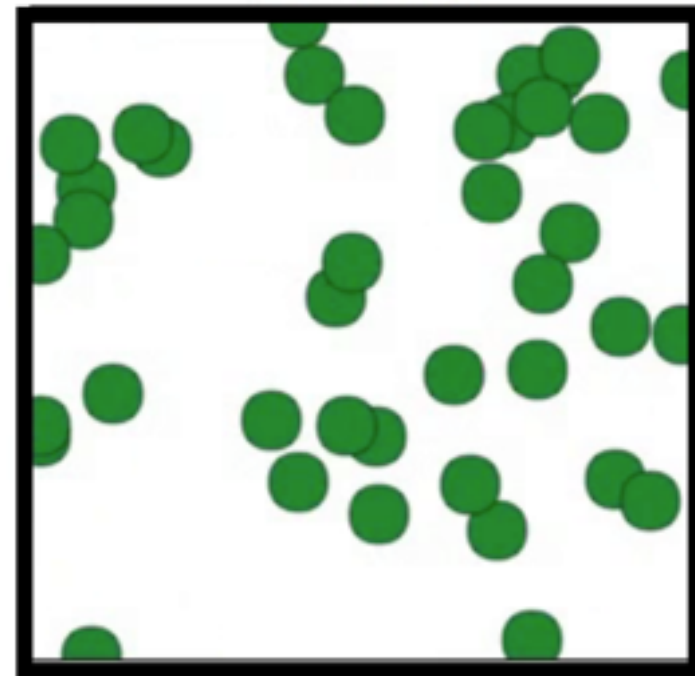


Angular Clustering

$? < z < ?$



$0.7 < z < 0.9$

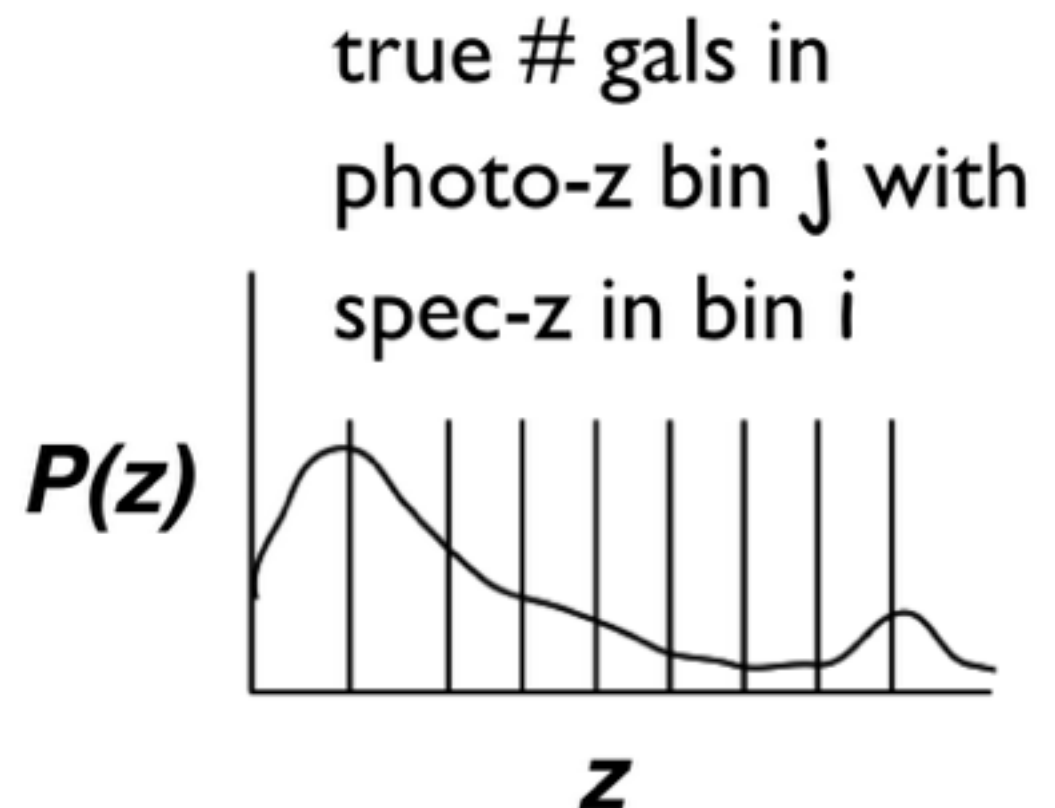
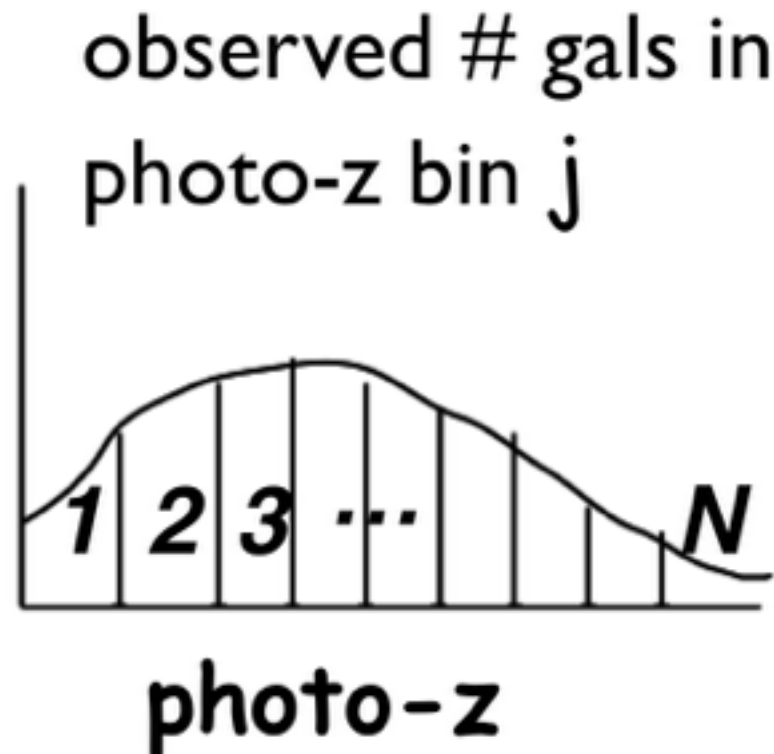


New Consistency Check

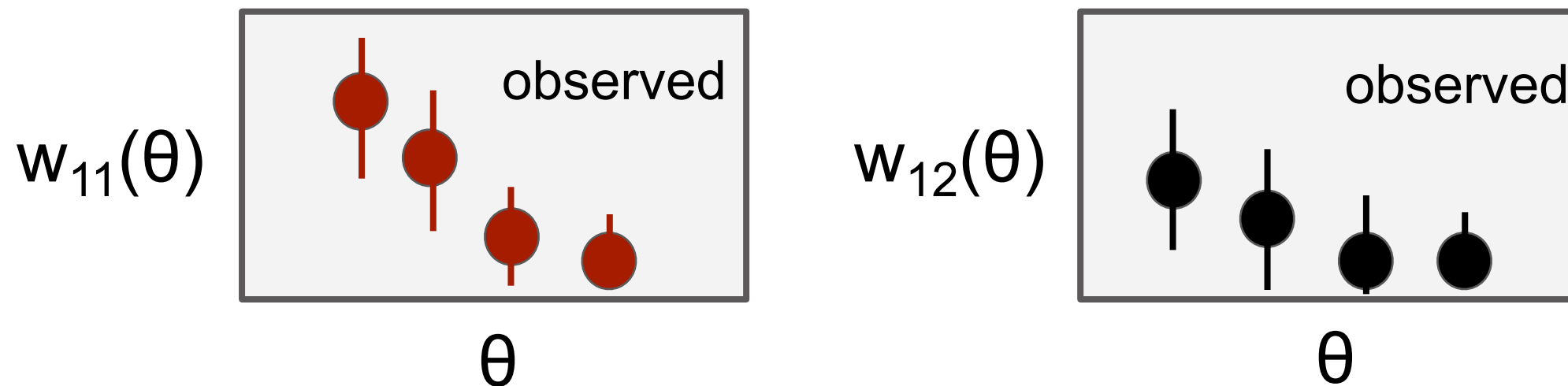
Let's say we have a way to estimate photo- z , with a probability distribution $p(z)$ and corresponding single estimate z_B .

New Consistency Check

Use estimate of the photometric redshift distribution $p(z)$ to determine ‘contamination’ fraction of given redshift bin.



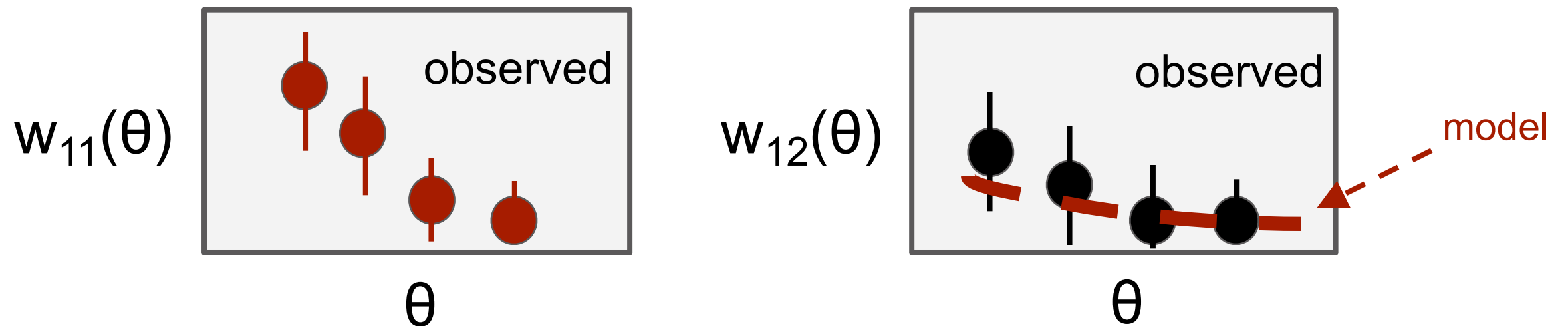
New Consistency Check



subscript ij : i is spectroscopic redshift bin, j is photometric redshift bin

Multiply observed data points of $w_{11}(\theta)$ by the contamination fraction to model $w_{12}(\theta)$.

New Consistency Check



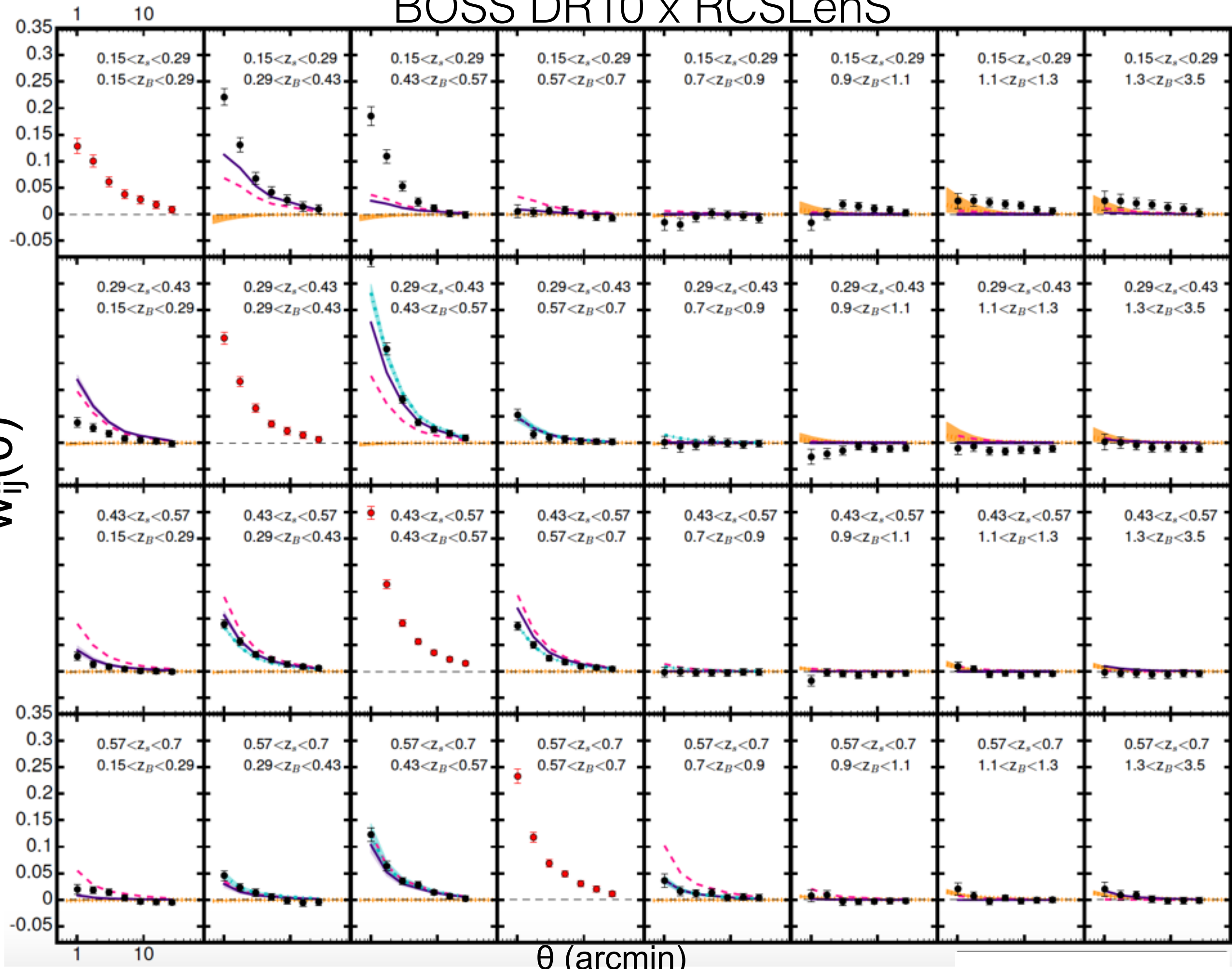
subscript ij : i is spectroscopic redshift bin, j is photometric redshift bin

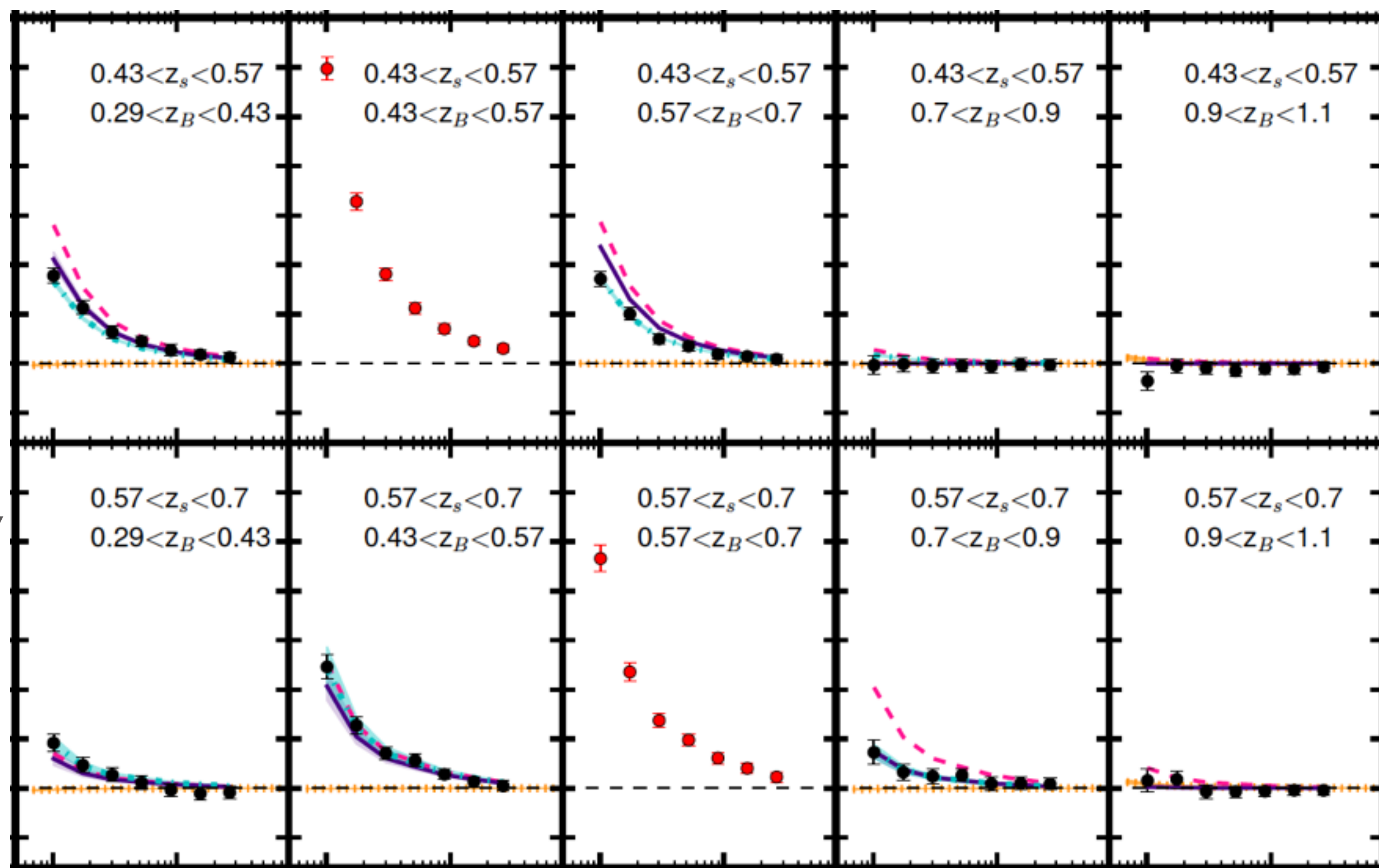
Multiply observed data points of $w_{11}(\theta)$ by the contamination fraction to model $w_{12}(\theta)$.

Compare with the observed data points of $w_{12}(\theta)$.

BOSS DR10 x RCSLenS

$w_{ij}(\theta)$



$w_{ij}(\theta)$ photo-z increasing
→spec-z increasing
↓

magnification

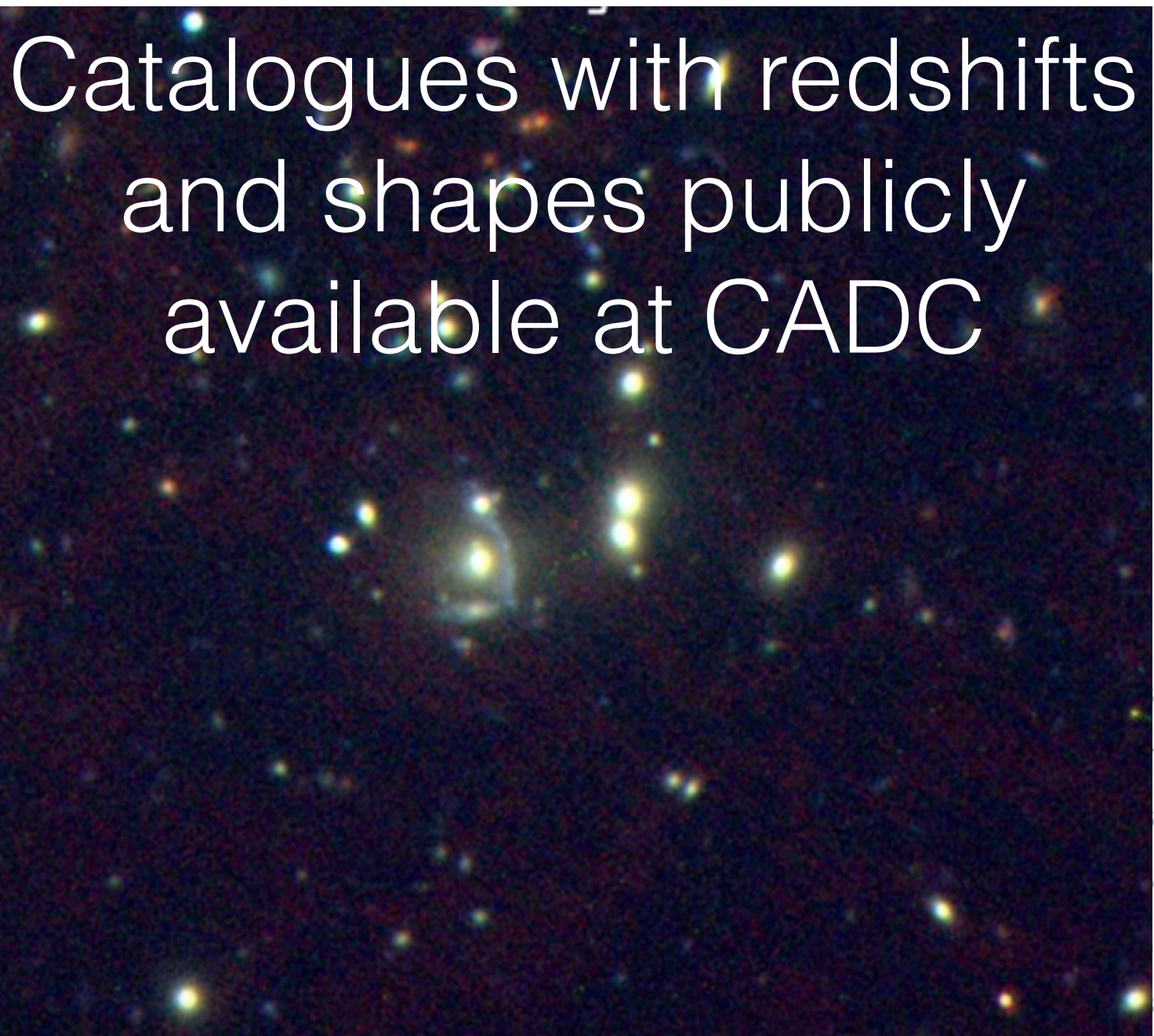


Gaussian

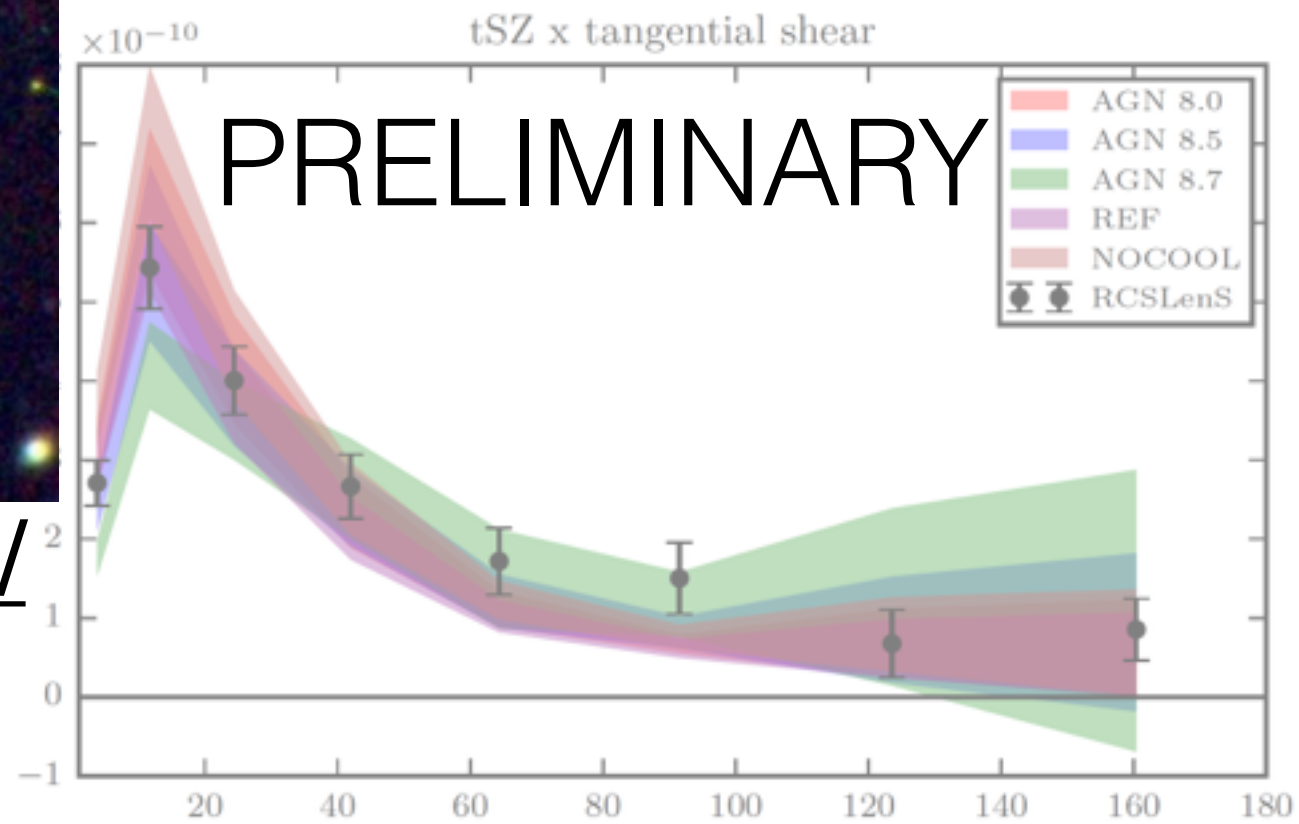
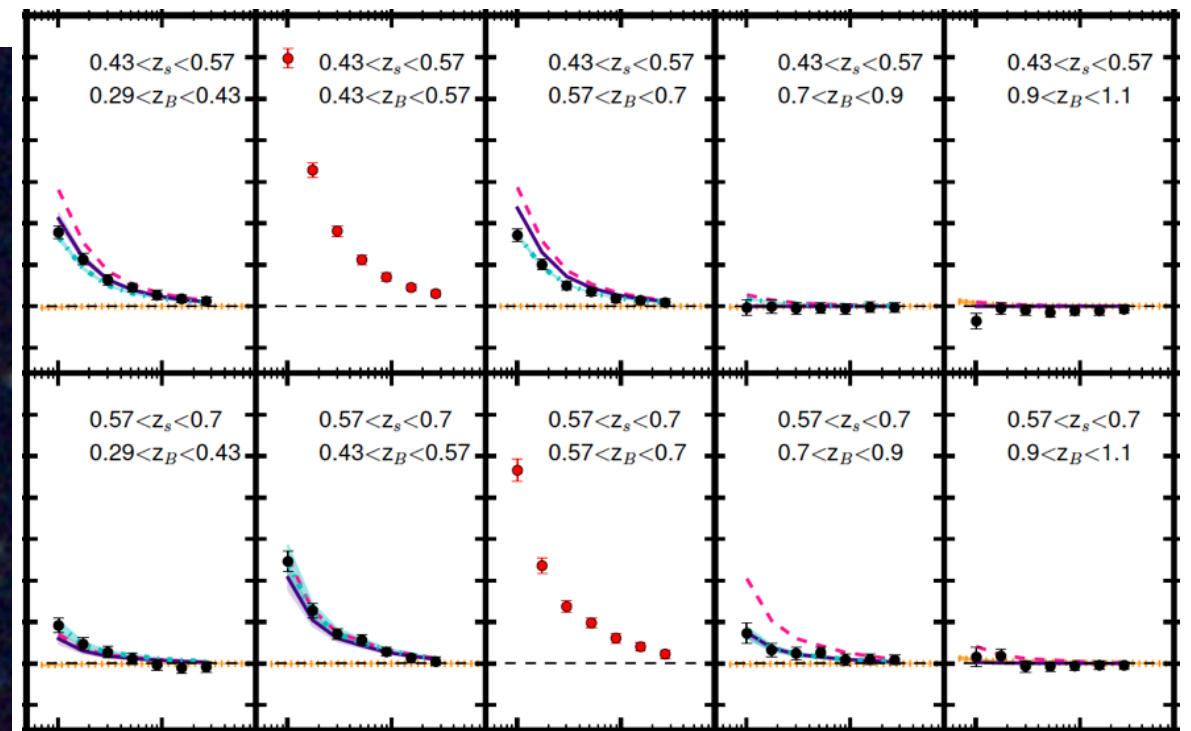
original $\Phi(z)$ best fit $\Phi(z)$ θ (arcmin)

see Joudaki et al. 2016
for how these best fit $n(z)$
propagate to cosmology

Summary



Catalogues with redshifts
and shapes publicly
available at CADC



see link at <http://arxiv.org/abs/1603.07722>

and via www.rcslens.org