## Clustering Redshifts & Measuring Survey Completeness



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## What are clustering redshifts?

- Clustering redshifts are a way of measuring the redshift distribution for a set of galaxies via crosscorrelation with a spectroscopic sample
- First outlined in Newman (2008)
- Alternative to photometric redshifts
- Does not rely on photometry but purely angular positions of objects

## How does the method work?

- Galaxies at same redshift = high crosscorrelation amplitude
- Split spectroscopic sample (e.g. BOSS) in to multiple bins
- Measure the crosscorrelation in each bin



## Testing the method

- BOSS: 1.5 million redshifts z < 0.7
- Unknown sample: bluest ~140,000
- Reference sample: remaning ~800,000
- Different biases



https://www.sdss3.org/surveys/boss.php

## Testing the method

#### It works!

- BOSS: 1.5 million redshifts z < 0.7
- Unknown sample: bluest ~140,000
- Reference sample: remaning ~800,000
- Different biases



## Application to SDSS data

- Want to apply this to some real data
- Take all 200m SDSS galaxies (r < 21) and split in to bins of r-i
- Recovered the distribution of all bins

#### Example recovery of 1 bin



# Application to SDSS data

- All SDSS galaxies (r < 21) mapped out in r-i and z
- Makes sense that red galaxies (right) are at higher z



## Completeness

#### BOSS LOWZ



#### **BOSS CMASS**



Reid et al (2016)

## Completeness

- Since already mapped out SDSS galaxies with r-i, completeness is easy to calculate
- The fraction of total galaxies targeted in survey as a function of colour
- Initial results
- Completeness accurately mapped out

