New Observational Windows to Enhance DESI and LSST

co-Chairs: Rachel Mandelbaum and Dan Scolnic

November 15, 2017

We can organize talks into a handful of topics

- Projects for which higher level of coordination is beneficial
  - Time-dependent coordination
  - Other
- Cross-survey preparation
- Projects for which access to other facilities is necessary
  - Supporting dark energy cases
  - Enabling dark energy cases
- Projects aimed at mapping peculiar velocity field

We can organize talks into a handful of topics

- Projects for which higher level of coordination is beneficial
    - Time-dependent coordination
    - Joint pixel processing, photo-z training
- Cross-survey preparation
    - Calibration
    - Photo-z training
- Projects for which access to other facilities is necessary
    - Supporting dark energy cases
        - Subaru PFS, Shifted/Narrow-band filters
    - Enabling dark energy cases
        - Strong lens SNe
        - Strong lens QSOs
- Projects aimed at mapping peculiar velocity field
   - Taipan survey. Using SNe.

Projects for which higher level of coordination is beneficial

Time-dependent coordination:

1. How much scheduling coordination between LSST and WFIRST can we do? [Perlmutter's talk]
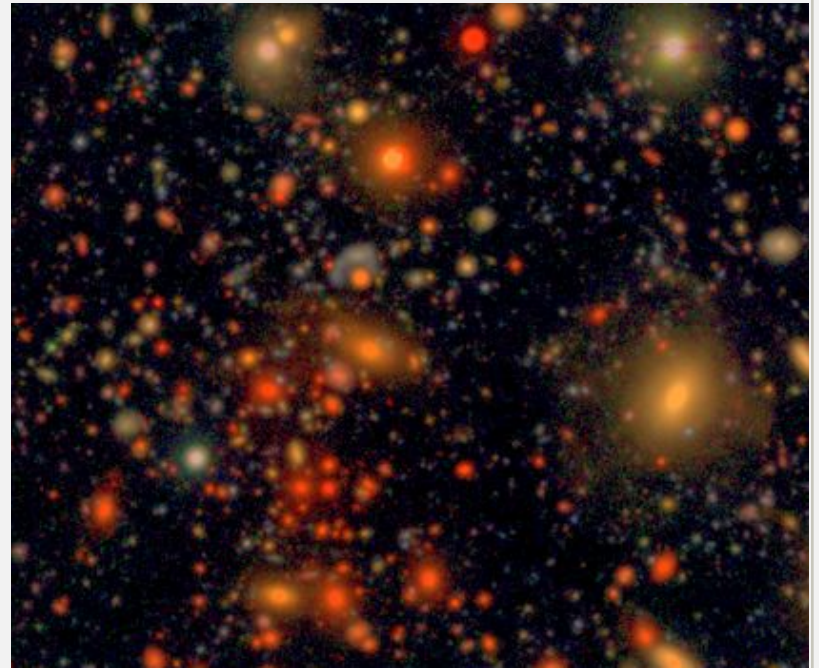
2. How open to target-of-opportunity (TOOs) will surveys be? [Soares-Santos talk]

Ask: Setting up coordination plans between surveys and for TOOs is very beneficial
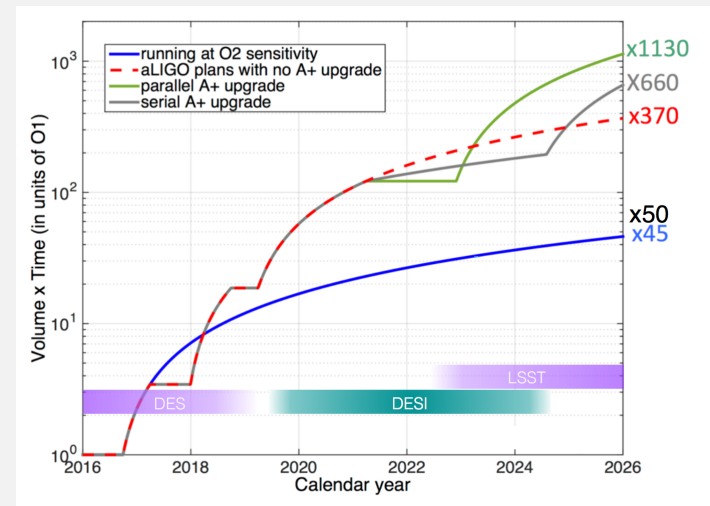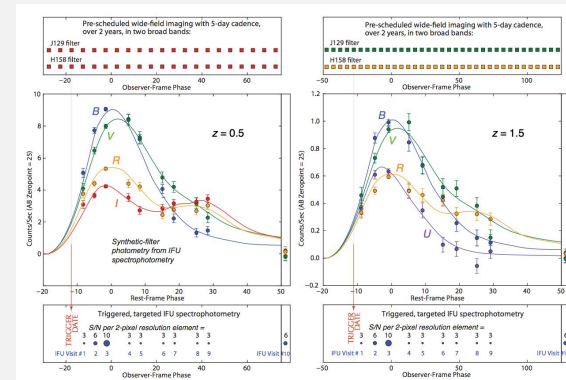
Joint pixel processing, photo-z training

- Joint pixel processing (Euclid/LSST/WFIRST) [Dawson,Melchior talk]:

  - For... will... pho...

  - Cos... by t...

- WFIRS... photo-z... focusin... ground-based spectroscopy is challenging [Perlmutter talk]

|	b.i	b.ii	b.iii		c.V
	LSST Deconfusion, optimal photometry for phot-z, cross-mission color selection, dust corrections				
	Lupton (Princeton) & Ferguson (STScI)	Lupton & Ferguson	Melchior (Princeton)		
	Dawson, Melchior, Schneider, Schulz, B. Lee, Appleton	Dawson, Melchior, Ferguson, Schneider, B. Lee, Grillmair, Armus	Dawson, Ferguson, Koekemoer, Lupton, Schulz		

Cross-survey preparation

For SNeIa cosmology, calibration dominant systematic uncertainty.

1. Can develop network of standard stars to improve calibration of LSST and WFIRST.

2. Can design better laboratory measurements of NIR system throughput.

Ask: Small-scale investments external and before survey has arguably largest benefit to SNIa cosmology. [Scolnic talk]

Bohlin 2014
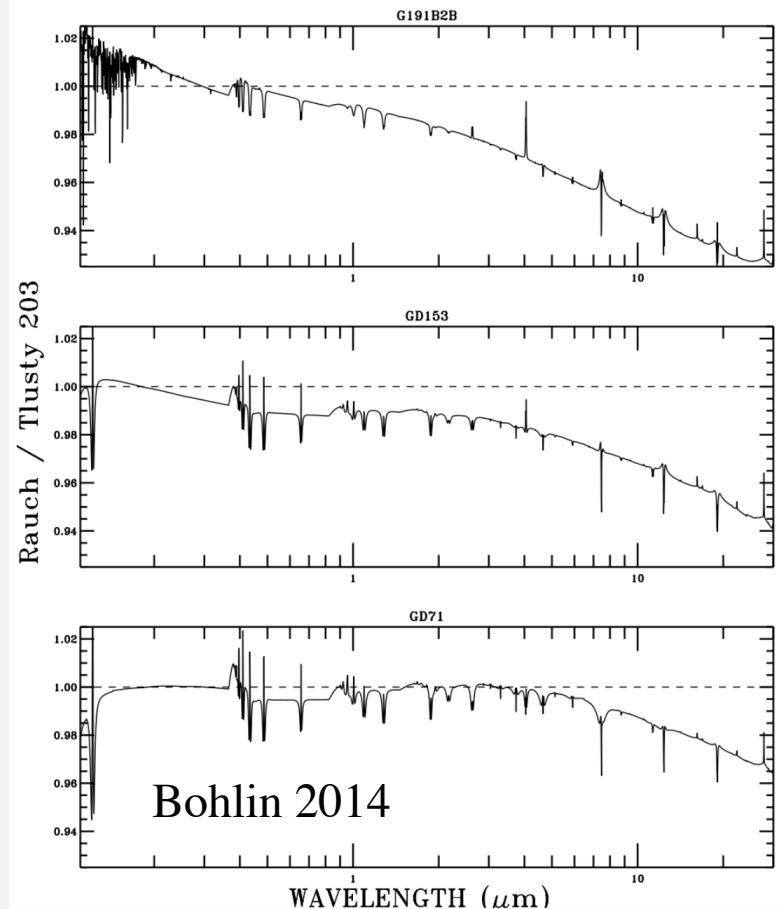
Cross-survey preparation: photo-z training

- Even before LSST comes online, will be beneficial to identify resources that can be used to build up the photo-z training dataset

  - Useful for WFIRST as well

- See Newman+15 white paper for calculations of time needed on various telescopes

- Use SOM methods from Capak+ to optimize how those resources are used: target grey areas in SOM space

Median spec-z, confidence > 95% redshifts
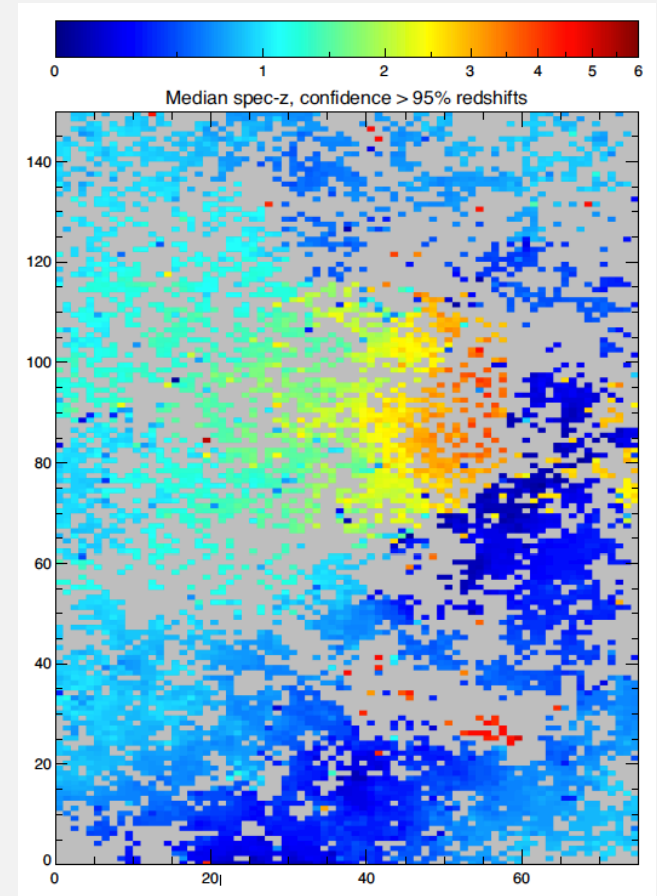
Supporting Dark Energy Science Cases: Subaru PFS, shifted broad-band filters

- Goal: photo-z improvement (both), BAO (PFS only)

- Subaru PFS [Seljak talk]: target off of LSST, buy time (or trade for LSST membership) to get redshifts for photo-z training or calibration — different observing strategies and cost

  - Focus on higher z galaxies that become accessible due to redder wavelength coverage and larger aperture than DESI

  - May enhance BAO measurements by going to higher z

- Shifted broad-band filters [Lin,Frieman talk]:

 - Improve photo-z (purchasing new filters, time on DECam)

Enabling dark energy measurements

Two new strong lens approaches, measuring H0 and w with independent and orthogonal constrains to other probes:

1. Strong Lens QSOs. Ask: ~1 day time series on *dedicated* 4m telescope. Can cherry pick best systems. [Treu talk]

2. Strong Lens SNe. Needs time series of resolved images. Ask: AO IFU instrument on existing 2-4m, good amount of telescope time. [Goldstein talk]
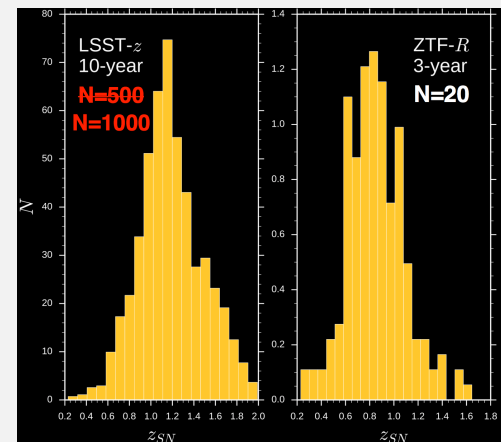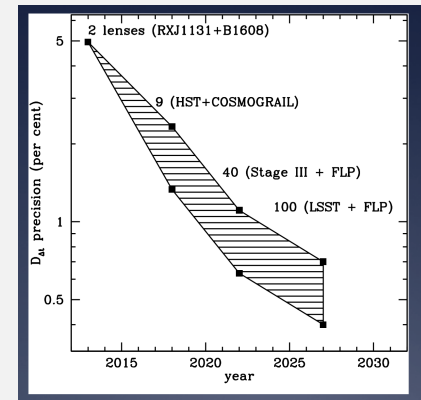
Projects aimed at mapping peculiar velocity field

Peculiar velocities are a separate but important tool for measuring H0 and fs8

Two approaches talked about:

1. The Taipan Survey will measure Fundamental Plane Relation to z~0.1. Help with peculiar velocities for SNe and standard sirens. No Ask - this is already happening. [Said talk]

2. Using SN distances. Use SNe from LSST for discovery. Ask: 50K SNe follow-up with smaller telescopes to get distances [Kim talk]
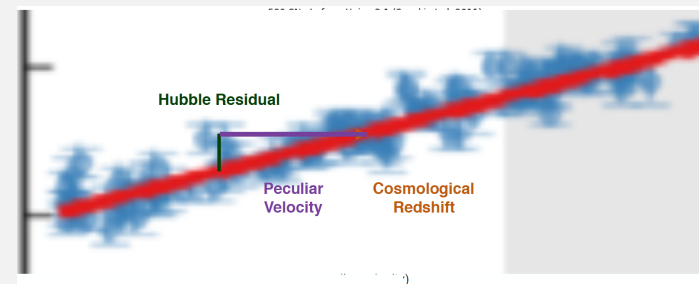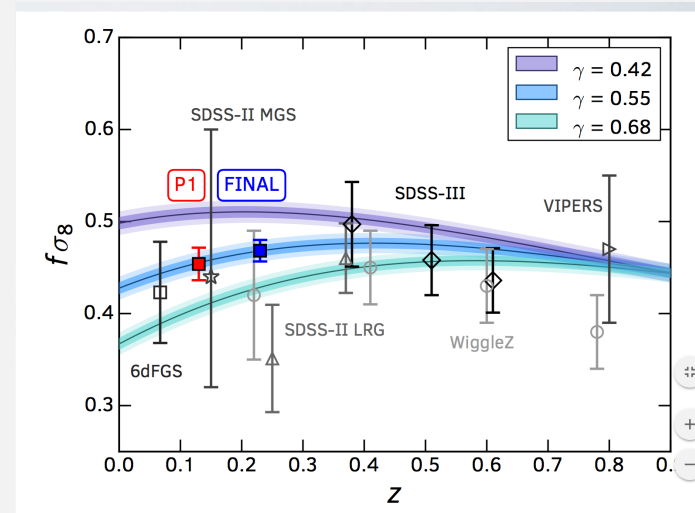
Still open questions for turning this into a white paper.

- Projects for which higher level of coordination is beneficial
  - Time-dependent coordination
  - Joint pixel processing, photo-z training
- Cross-survey preparation
  - Calibration
  - Photo-z training
- Projects for which access to other facilities is necessary
  - Supporting dark energy cases
    - Subaru PFS, Shifted/Narrow-band filters
  - Enabling dark energy cases
    - Strong lens SNe
    - Strong lens QSOs
- Projects aimed at mapping peculiar velocity field
  - Taipan survey. Using SNe.

For time-dependent coordination, what is right way to get that started?

Is there a mechanism to help these out now?

How do we decide what is right way to prioritize plans?