Three broad ‘use cases’

- Galaxy evolution survey(s)
- Cluster survey(s)
- Community fibres

Galaxy evolution concept

- Understand how stellar mass grows in dark halos
- Understand how gastrophysical processes (SF, AGN activity, post-starburst signatures, galaxy morphologies) depend on environment, epoch
- Connect z=0.8, 0.5, ~0 [SDSS]
    - Focus on M*>1e10 solar masses

- Baseline ~10 setups on each of ~6 fields to sample densely enough to get good group catalogs
- need ~4 hours per setup to reach R~23 at S/N of a few per pixel [need continuum]. ~40 [30-60] hours/field.
    - Yields z, emission line diagnostics (SF, AGN, occasional metallicities)
    - Will have subset with spectra in all setups for ultra-deep stellar population spectroscopy, velocity dispersions and SFH/stellar metallicity.
- ~250 hours (D/G); Yields 100k galaxies in each redshift range.

Characterization of clusters

- Massive (>10k) cluster samples from Planck, PanSTARRS-1, DES, LSST
    - Redshifts from BCGs (free + community fibres)

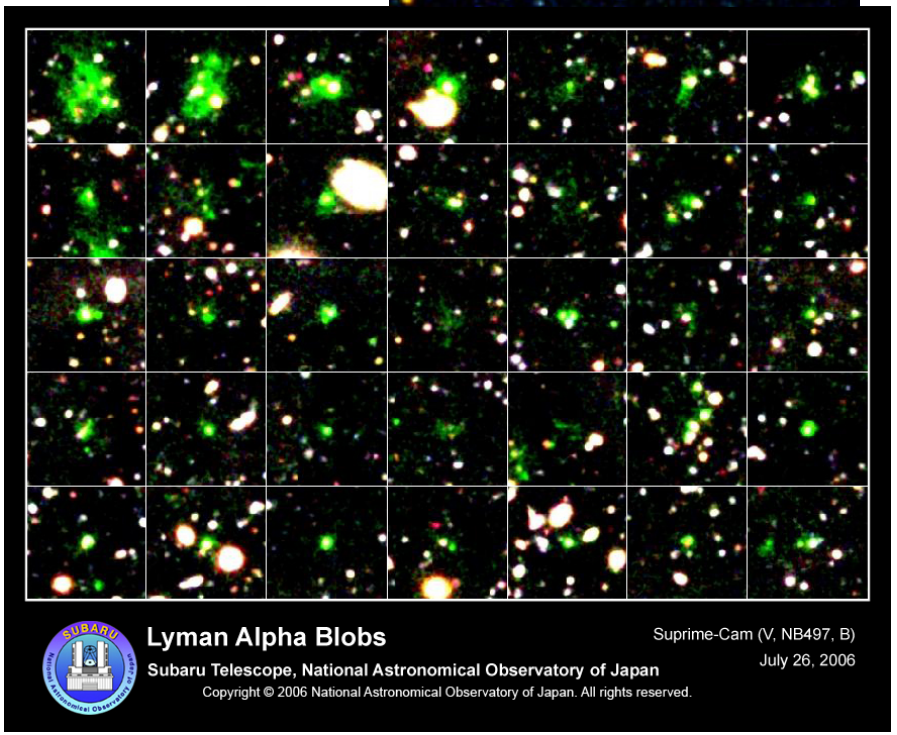
- Globular clusters in Virgo cluster (stellar populations)
- Z~0.2 clusters, map cluster+background; v. detailed dynamics + weak lensing with galaxies with spectra only
- Z~0.2-0.4; infall regions into clusters, try to understand SFR/ fundamental planes
- Z~1; starbursting galaxies in supercluster regions [does large scale structure >>halo size influence galaxy evolution?]
- Each of these is ~100-200 hour (D/G) timescales

PI surveys + community fibres

Identification of rare objects

- Very bright LBGs (lensed and unlensed)
  - ~10 fibres/setup Identifying ideal galaxies for detailed followup (discovering a sample of cB58s), gold plated examples of the physics
- Very IR-luminous starbursts / obscured QSOs
  - ~100 fibres What triggers starburst activity / SMBH accretion?
- High mass 1.0<z<1.5 galaxies
  - Nail down bright end of luminosity function
  - Hundred fibres

Community Fibres



Constraints

- Software be able to calibrate, extract and co-add observations significantly deeper than those of the BigBOSS Key Project; e.g., no more than 20% above Poisson noise for co-adds of 100 background-limited spectra in non sky-lines (something like that, or to be able to have 'systematic' S/N of 20 at R~23.5, in principle). Control of sky systematics 2 mags below the normal BigBOSS Key project limit is important to this community.
- Flux calibration good over wavelength range; goal of a few% - requirement that the procedure is clearly written down, and that flux calibrated spectra are reproducible (modulo FWHM variations as a function of wavelength).
- Excellent data quality control (for understanding single emission lines, blank fibres).
- Parent astrometric solution, or imaging catalogs, available for observation planning.
- Measure FWHM on the focal plane – requirement for at least one passband, ideally three matched to spectrograph wavelength ranges
- Mechanism for implementing timing constraints (reverberation mapping, AGN variability)
- Don't want to lose red or blue throughput
- Pipeline operates at the limit of bright sky background (e.g., bright time)

Data products

- Access to co-add and calibrated individual epoch spectra and metadata; interpolated sky spectrum + error spectrum; calibration (flux/arc) – calibration data immediately public. Guide camera data available.
- All software tools available
- Redshift templates include a wide range of galaxy types (or to be easily extendable)

Overall concerns

- Mechanism in place to allocate and schedule small/ medium/large proposals, different timescales (smaller projects executed on a semester-by-semester basis; larger projects as multi-year surveys) – how to balance BigBOSS Key project usage, longer surveys, shorter quick projects, flexibility vs. practicality
- Availability of significant community time straight from year 1, and extension available for ~3 years extra?
- High-resolution ODI imaging for galaxy and cluster survey fields [morphologies]