allocating fibers to other classes of sources

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DESpec @ KICP 31 May 2012

SDSS experiences; scaling

basic statistics for galaxies, active galactic nuclei, stars

 legacy science case for DESpec

 LAMOST, SuMiRe PFS, BigBOSS SDSS experiences; scaling

SDSS (I & II)

640 fibers 100 per sq. deg. R = 1800 $\lambda\lambda = 380 - 920$ 3" fibers I.4" seeing tel × spec \equiv 1 $S/N \sim 10$ visits = 1

DESpec

4000 fibers 1000 per sq. deg. R = 3300 $\lambda \lambda = 600 - 1000$ I.5" fibers 0.9" seeing $2.6 \times 1.5 \times 1.5 \approx 6$ S/N ~ 3 visits = |?

TABLE 26 Breakdown of Fiber Allocation for a Typical Plate		
Target	Number of Fibers	
Total	640	
Sky	32	
Spectrophotometric standards	8	
Reddening standards	8	
Hot subdwarf standards	≈ 2	
Galaxies:		
Main galaxy sample $r < 17.8$	\approx 420	
LRG sample	≈ 60	
Total	≈ 480	
Quasar candidatesi < 19.0	≈ 80	
Unreserved:		
ROSAT All-Sky Survey sources	≈ 5	
Stars	≈15	
Serendipity objects	\approx 7–8	INFECTION IN THE REAL PROPERTY OF THE REAL PROPERTY
Quality-assurance targets	$\approx 2-3$	
Total	≈30'	

basic statistics for galaxies, active galactic nuclei, stars







galaxy redshift distribution

Ilbert, O. et al. 2009 ApJ, 690, 1236.





Schneider, D. et al. 2010 AJ 3139, 2360.

quasar redshift distribution



Robin, A. et al. 2003 A&A 409, 523.

star counts



legacy science case for DESpec

some considerations for targets:

large solid angle

appropriate source density

completeness & uniformity

target selection with and without a u band

Legacy science such as the galaxy mass function as a function of redshift requires a selection that is both well understood and inclusive (flux, color, size, surface brightness).

The galaxies selected by photo-z for cosmology may not comprise a good sampling for this kind of investigation. We will need to reserve fibers for sky measurement, spectrophotometric standard stars.

How many fibers will be available for legacy science?

average surface density of "cosmology" targets clustering of targets patrol radius of positioner number of visits

Suppose 3% or 10% of the fibers were used for legacy science targets. How would they be allocated for the best overall science return?

 legacy science case for DESpec (continued) sample galaxies not selected for cosmology (e.g. outliers) quasars (more generally, stellar objects with odd colors) low-metallicity stars (more generally, rare classes of stars) Q-Q, Q-gal close pairs time domain eROSITA, VISTA, WISE, Herschel, ...



LAMOST Galactic science

gravitational potential of MW; synergy w/ GAIA

substructures in Galactic halo: dwarf galaxies globular clusters tidal debris of accreted dwarfs

tidal radii of dwarf galaxies extremely metal-poor stars thin disk & thick disk globular cluster environments Dec. 10

SuMiRe PFS legacy science

(Chair: Akiyama)

- 9:00 9:35 Dusty Galaxies: PFS key-sciences with Herschel-ATLAS galaxies (Matsuhara) [pdf]
- 9:35 10:10 Galactic Archaeology with SuMIRe HSC/PFS (Chiba) [pdf]
- 10:10 10:30 break
- 10:30 11:05 QSO/AGN study with PFS (Imanishi) [pdf]
- 11:05 11:30 Galaxy Formation with the PFS Cosmology Survey: The Potential for Hybrid Strategies (Bundy) [pdf]
- 11:30 12:00 New science with PFS (Menard) [pdf]
- 12:00 13:30 lunch break
- (Chair: Motohara)
- 13:30 14:05 Ly alpha Forest Science & Cosmology (Suzuki) [pdf]
- 14:05 14:25 Search for extremely metal-poor galaxies with HSC, PFS, and TMT (Nagao)
- [pdf]

BigBOSS legacy science

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- 3.2.2 Strong Lensing and Galaxy Structure
- 3.2.3 A Blind Spectroscopic Survey
- 3.2.4 Stacked Spectra as a Function of Photomet...
- 3.2.5 A Deep, Magnitude-Limited Sub-Survey
- 3.2.6 Galaxy Clusters
- 3.2.7 The Brightest High-z Galaxies: Giants and...
- 3.2.8 Correlation of Galaxy Properties with Envir...
- 3.3 AGN Science
 - 3.3.1 Global Quasar Census
 - 3.3.2 Dual Super-Massive Black Holes
 - 3.4 IGM Science
- 3.5 Galactic Archaeology
 - 3.5.1 The Milky Way
 - 3.5.2 M31
- 3.6 Stellar Science
 - 3.6.1 Blue Horizontal Branch Stars
 - 3.6.2 White Dwarf Stars
 - 3.6.3 Other Stellar Samples
- 3.7 BigBOSS and the Transient Sky
 - 3.7.1 LSST Supernovae Survey