The Southern Cosmology Survey Analysis Pipeline

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Hot electron gas imposes a unique spectral signature

SZE Signature (Observable)

NO SZ Contribution in Central Band

145 GHz decrement

1.4° x 1.4°
Hot electron gas imposes a unique spectral signature

SZE Signature (Observable)

NO SZ Contribution in Central Band
Hot electron gas imposes a unique spectral signature

NO SZ Contribution in Central Band

SZE Signature (Observable)

270 GHz increment

1.4° x 1.4°
ACT: Atacama Cosmology Telescope

- Next to the ALMA site
- 5200 meter elevation
- One of driest places on planet
- Gently sloping topography $\Rightarrow$ low turbulence
- Logistical support available
- Only 26 hours travel from East Coast to site.
Blanco Optical Imaging of ACT and SPT common area

Sky Observable by ACT
Unobservable Sky

2008 Observations
2009 Observations
Blanco Optical Imaging of ACT and SPT common area

Sky Observable by ACT
Unobservable Sky

2008 Observations
2009 Observations

Blanco Coverage
Blanco Optical Imaging of ACT and SPT common area

- Common ACT/SPT/APEX-SZ area region (P.I. Joe Mohr - 2005B)

- 2 x 50 deg² patches in the southern sky, at RA:05hr and RA:23hr and DEC: -55 deg, with CTIO Blanco 4-m, in 4 bands (g,r,i,z)

- Awarded 45(+15) nights over a 3-year period, extended to 4th year.

- We have processed/analyzed the public data from first 3 years at RA: 23hr and 05hrs using a custom-build pipeline developed at Rutgers.

- We have achieved astrometric and photometric calibration for 1st thru 3rd year data in both fields: total ~70 deg² (41+29).

- Images + catalogs will be made public to the community. (~2010).
05hr field (112 Tiles)
05hr field (112 Tiles)
05hr field (112 Tiles)

- Total area: \(~41\ \text{deg}^2\)
- Comprised of 112 CTIO/MosaicII tiles
- Photometrically calibrated to \(\text{dmag} \sim 0.1\)
- Astrometric accuracy better than 0.2 arcsec between tiles.
- Statistically complete to \(i \sim 22.5\ \text{mag}\)
23hr field (78 Tiles)
23hr field (78 Tiles)
23hr field (78 Tiles)

- Total area: \(\sim 29 \text{ deg}^2\)
- Comprised of 78 CTIO/MosaicII tiles
- Additional XMM/Galex/Spitzer partial coverage
Composite \((g,r,i)\) color image 23hr field
Composite \((g,r,i)\) color image 23hr field
How do we go from

Raw Mosaic → Massive Cluster

$z=0.37$, $M=1.6 \times 10^{15}$ Msun
SCS/Rutgers Pipeline Outline

NVO Server Raw Data

- Bias, Dome Flats
- Bad Pixel Masks
- Super Sky Flats
- Fringe Removal i,z - bands
- Astrometry Plate + WCS

- Photometric Solution Zero - Point
- Standard Stars Fields

- Photometric Redshifts
- Source Detection (SExtractor)

- Image Combination + Mosaics (SWarp)

- Science Fields

- Cluster Finder

- Cluster’s members, Richness/Mass Proxy
SCS/Rutgers Pipeline Outline

- Based on existing routines (Terapix, Pyraf)
- Only open source code (Python, Numpy, etc)
- Modular an easy to modify
- Used by other groups (PUC) on Mosaic data.
- Hopefully parts can be useful for ODI pipeline development.
End