

VST ATLAS

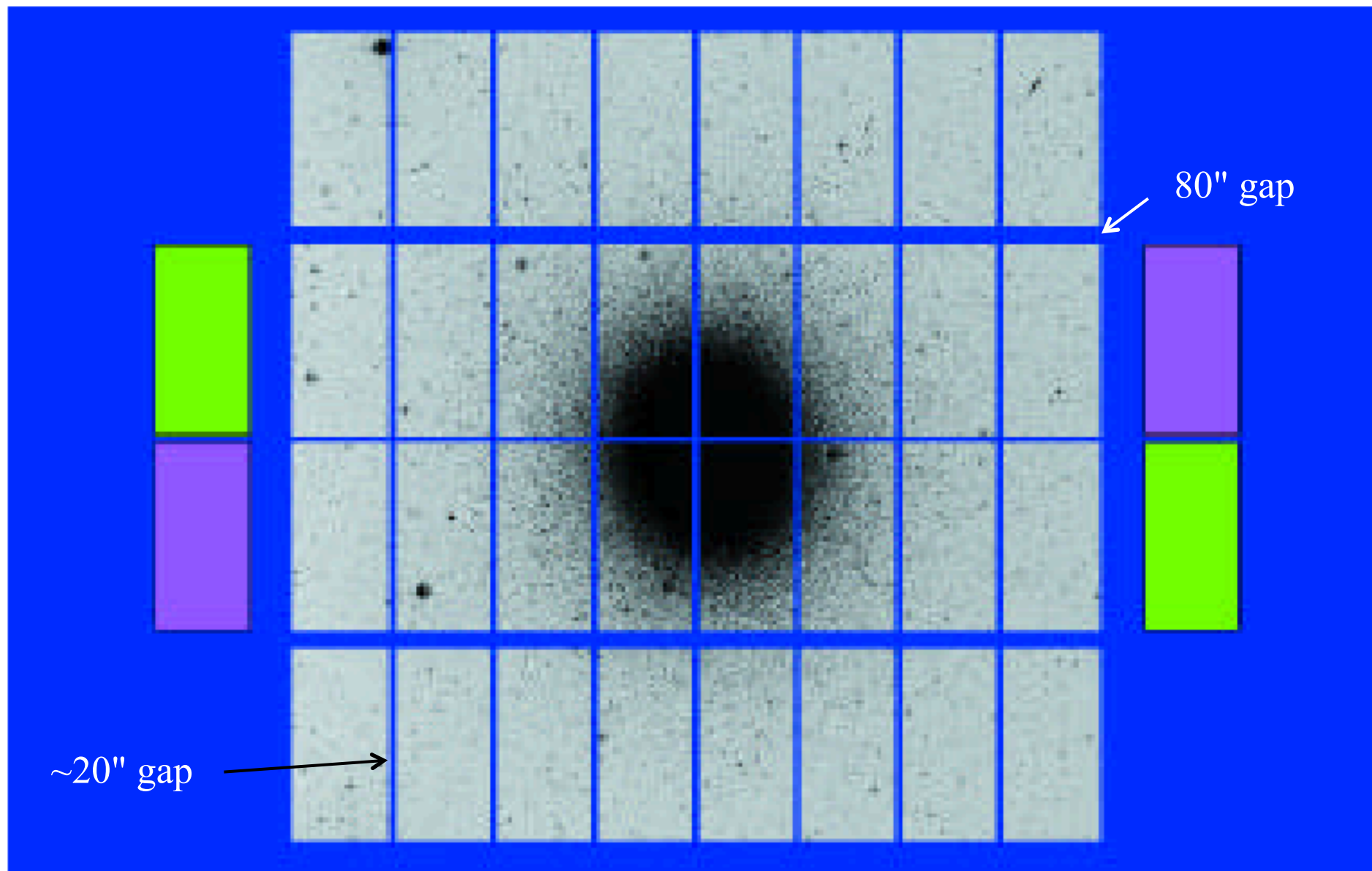
Mike Irwin, Bob Mann, Nigel
Metcalfe, Tom Shanks, et al

Featuring Utane Sawangwit, PhD

VST ATLAS Survey

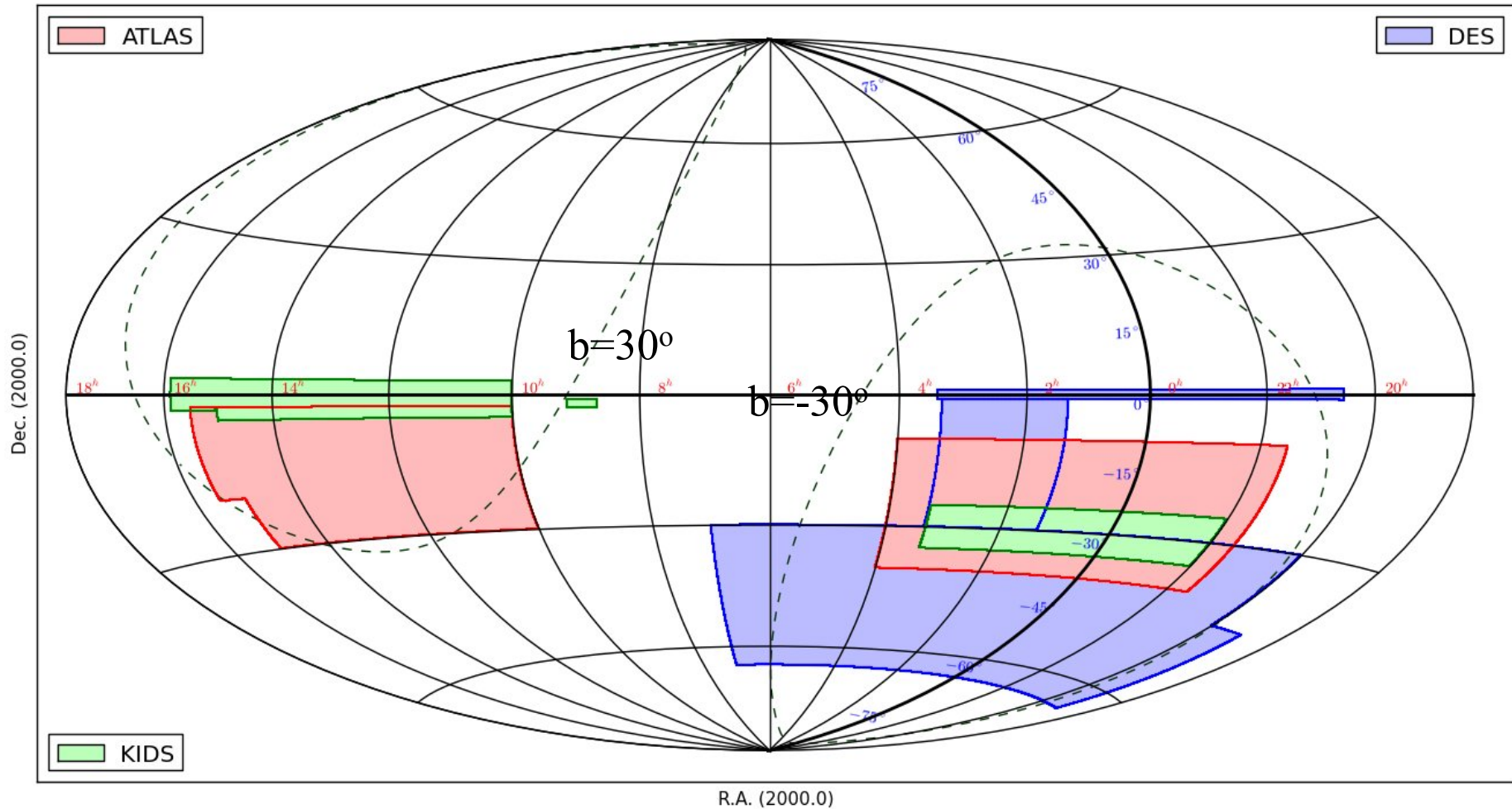
- * VST ATLAS (+VHS) → Southern SDSS in ugriz (+YJHK)!
- * Exposures u: 2x60s, g: 2x50s, riz: 2x45s – one filter per hourly concatenations – ugr (dark), iz (gray.bright)
- * Newsflash – ESO Chilean VST time doubles u exposure to 4x60s
- * 2-tile dither – 84" in Dec, 24" in RA
- * Offsets 58' in RA and Dec – 2' overlap
- * 1"-1."4 seeing – better than SDSS median 1."4 –complements KIDS
- * No guide star needed so no overhead
- * ~45 nights per year for 2 years – accelerated!
- * Footprint ~2500deg² in SGC and ~2000deg² in NGC

OmegaCAM



VST ATLAS Survey Area

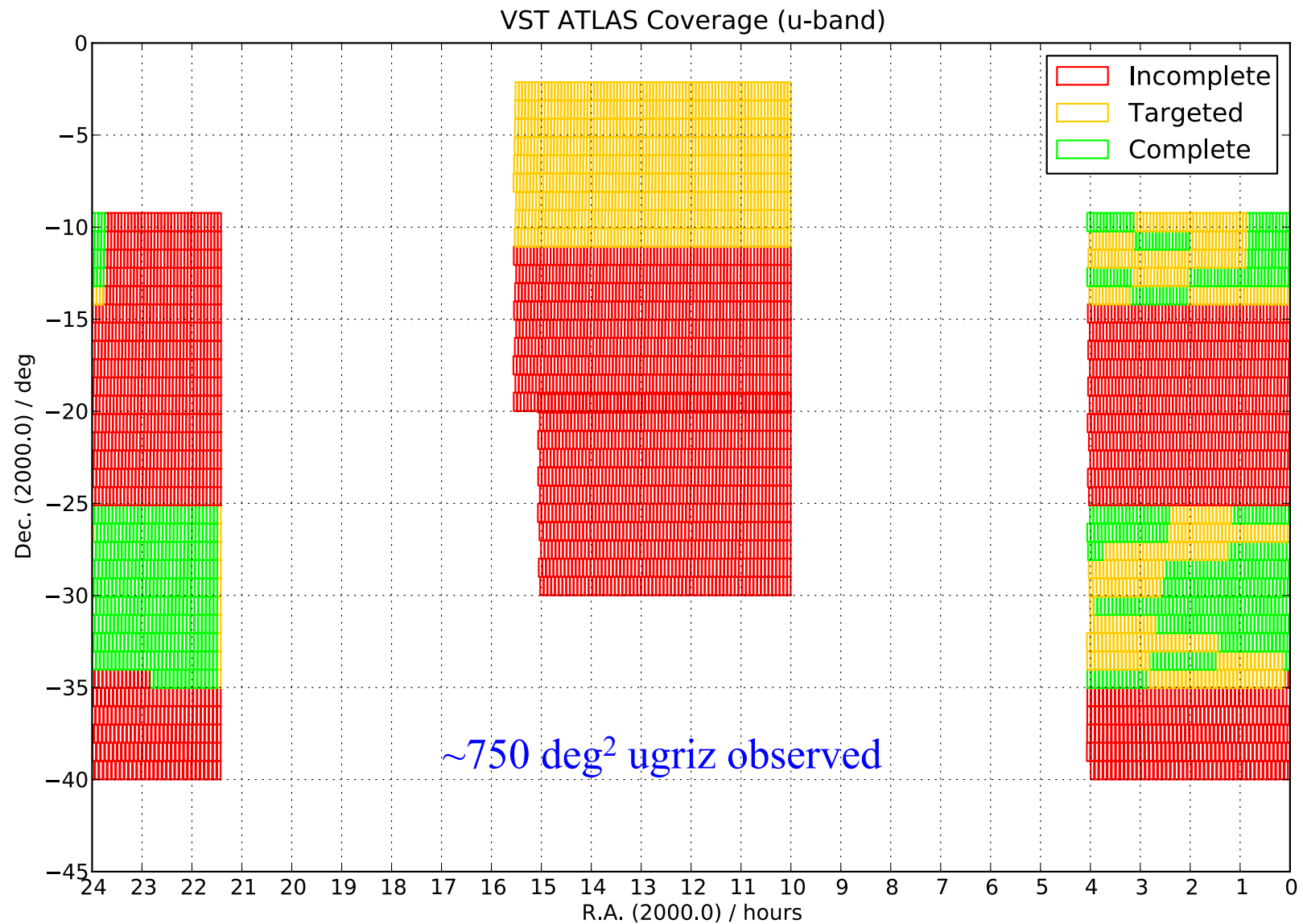
VST ATLAS Survey



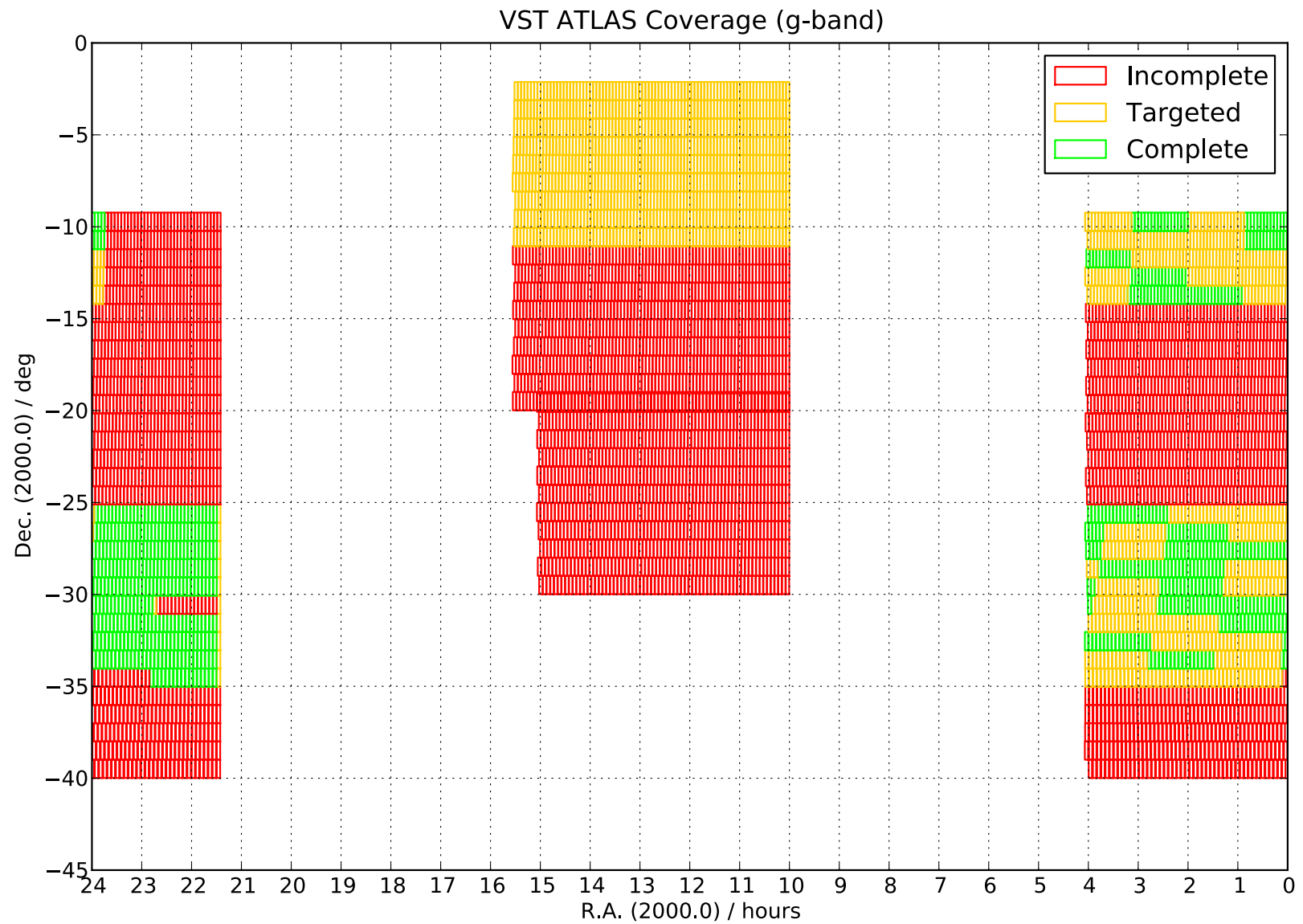
VST ATLAS Core Team

- * CASU (Mike Irwin et al, Cambridge) does the basic reduction using the VST Data Flow pipeline
- * Steve Maddox (Nottingham) leads the overall global calibration process
- * Nigel Metcalfe + Peter Draper (Durham) – OB submission + QC on the ATLAS products
- * WFAU (Bob Mann et al, Edinburgh) to provide archiving facilities, additional to the ESO archive

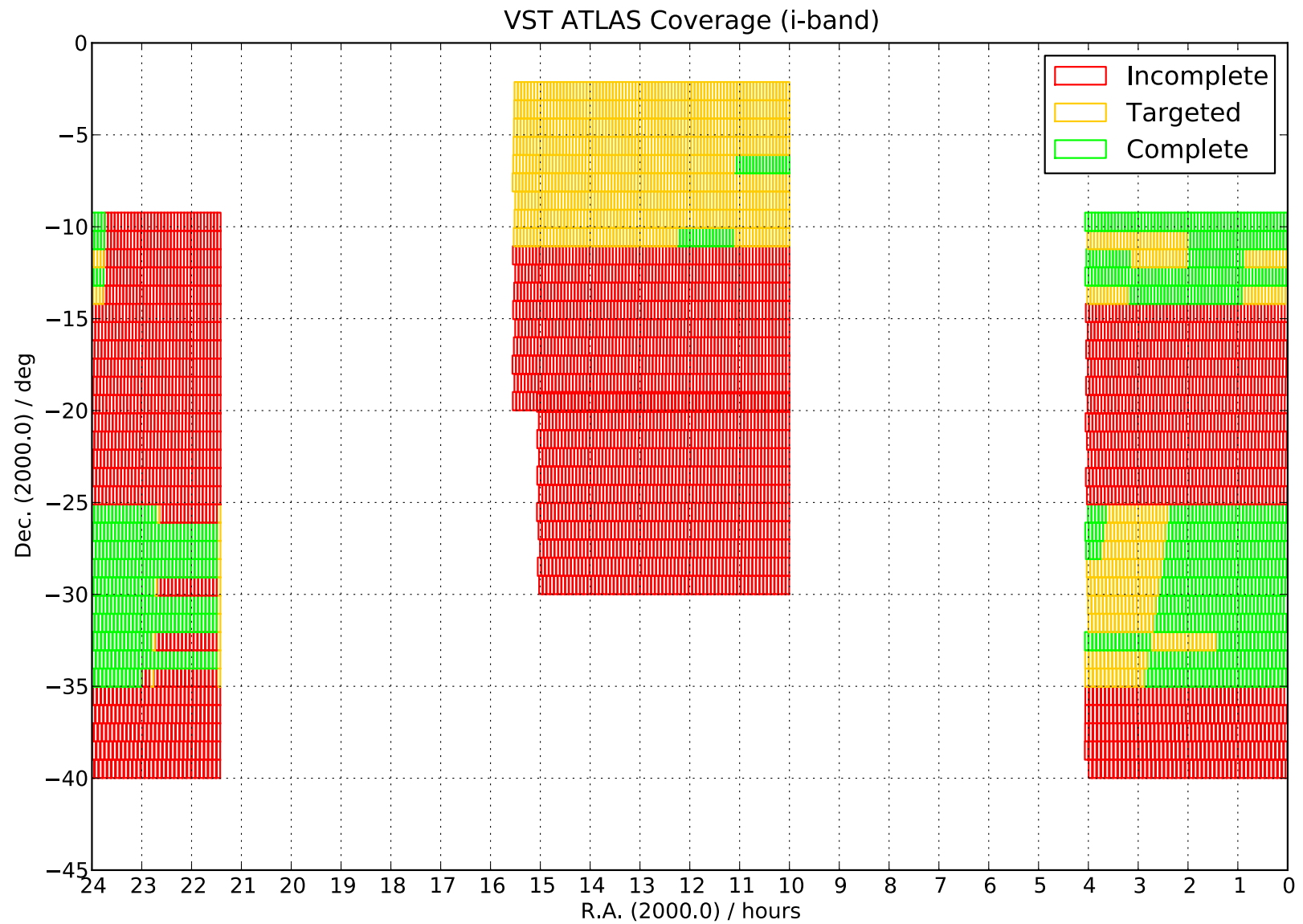
VST ATLAS Status



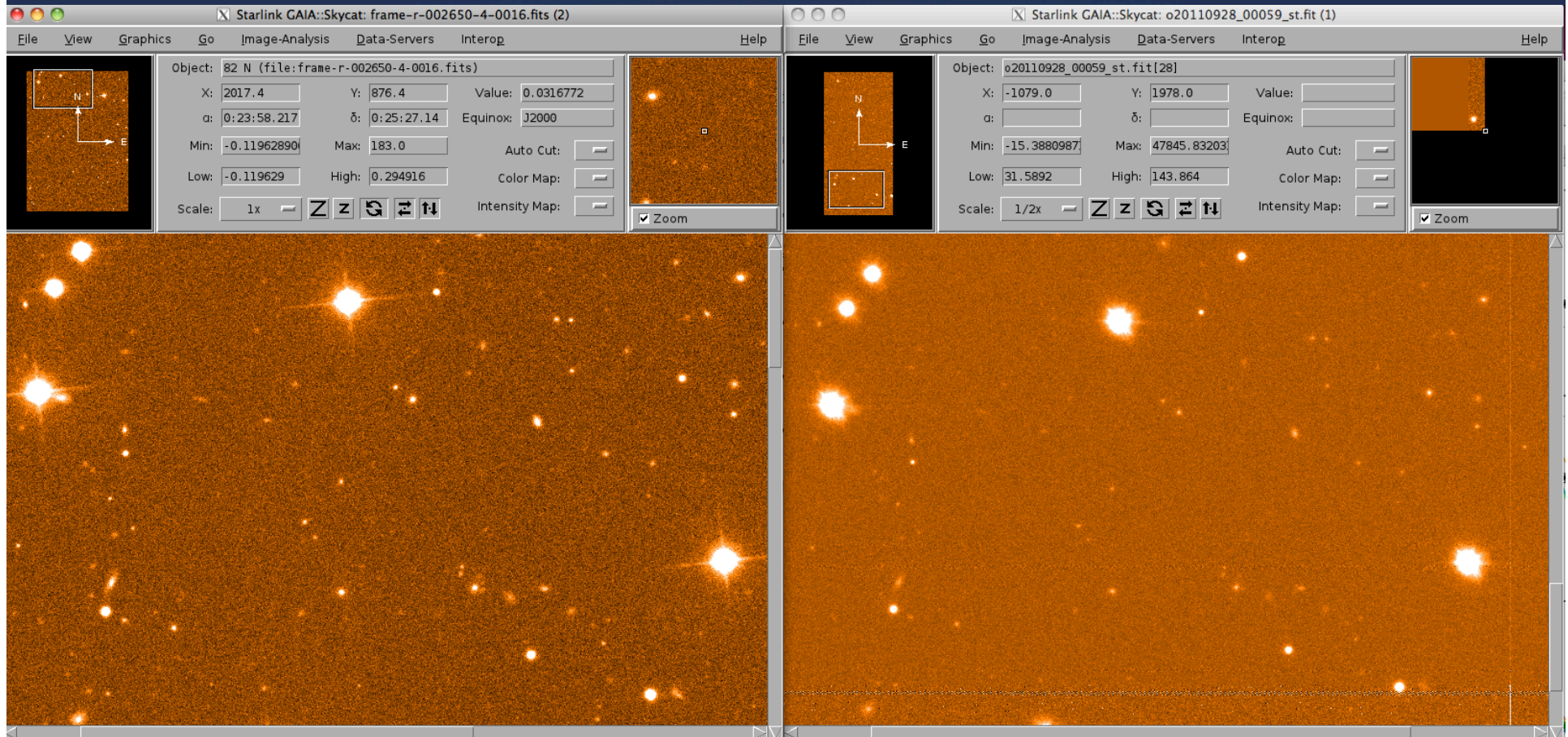
VST ATLAS Status



VST ATLAS Status



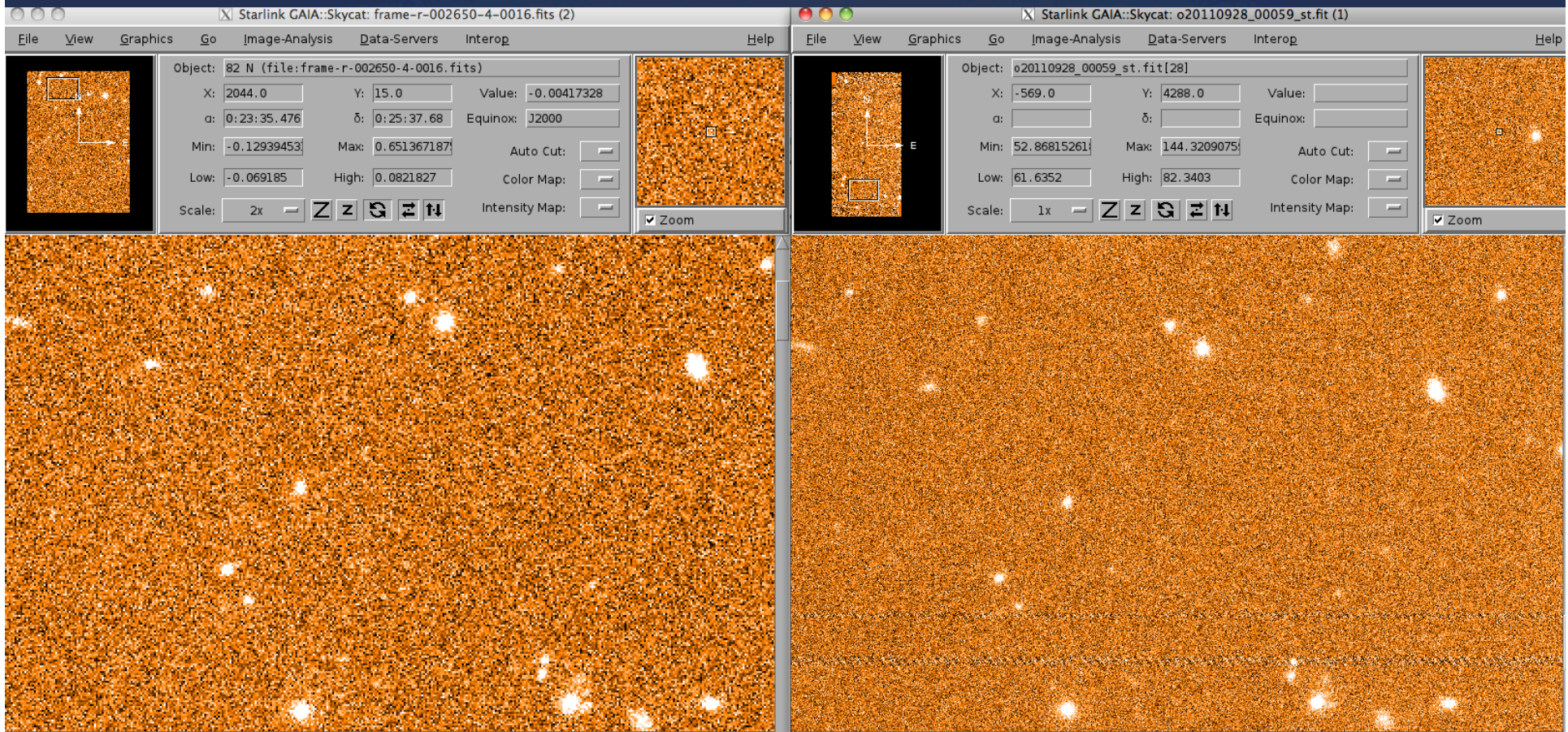
SDSS-ATLAS no-zoom - r



SDSS

ATLAS

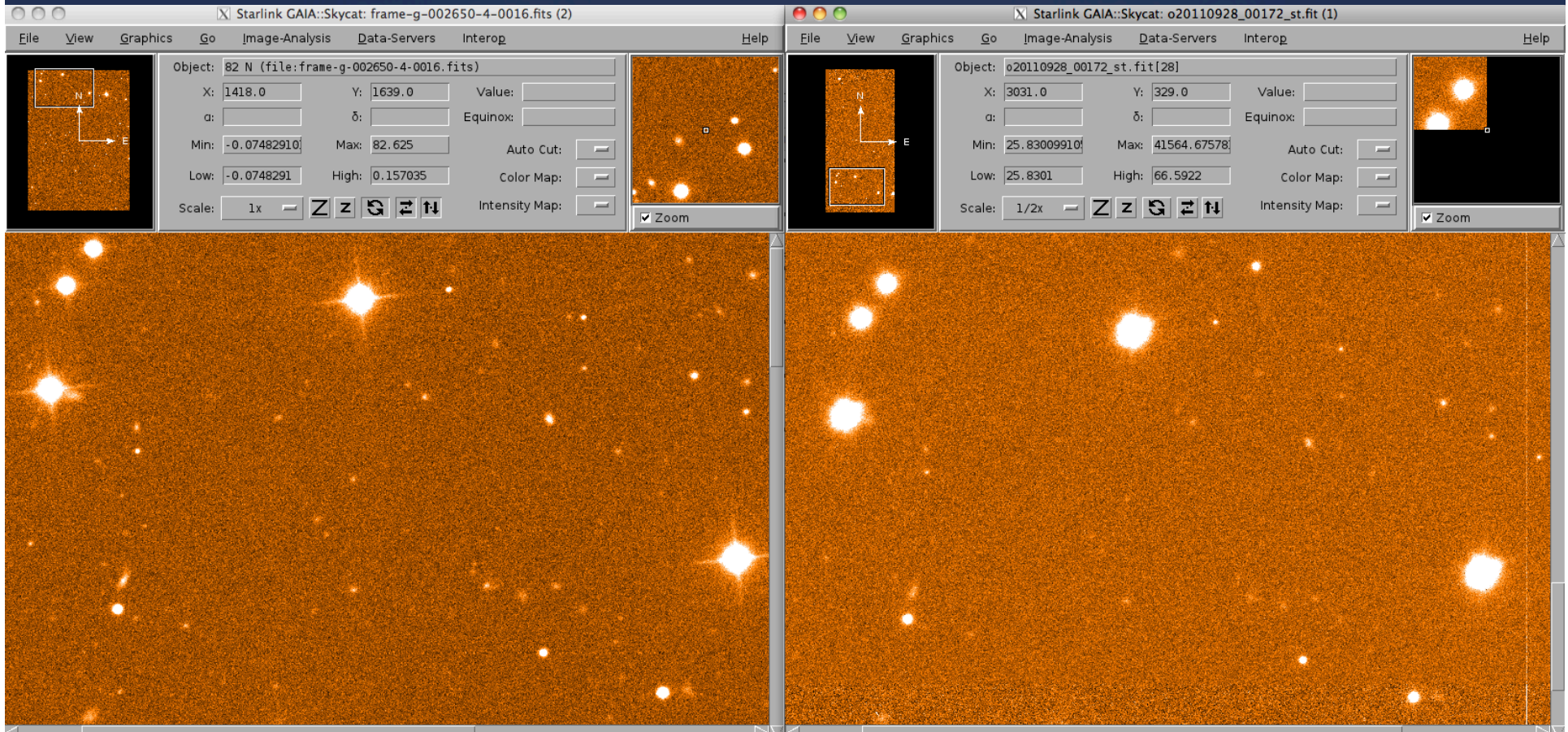
SDSS-ATLAS zoom - r



SDSS

ATLAS

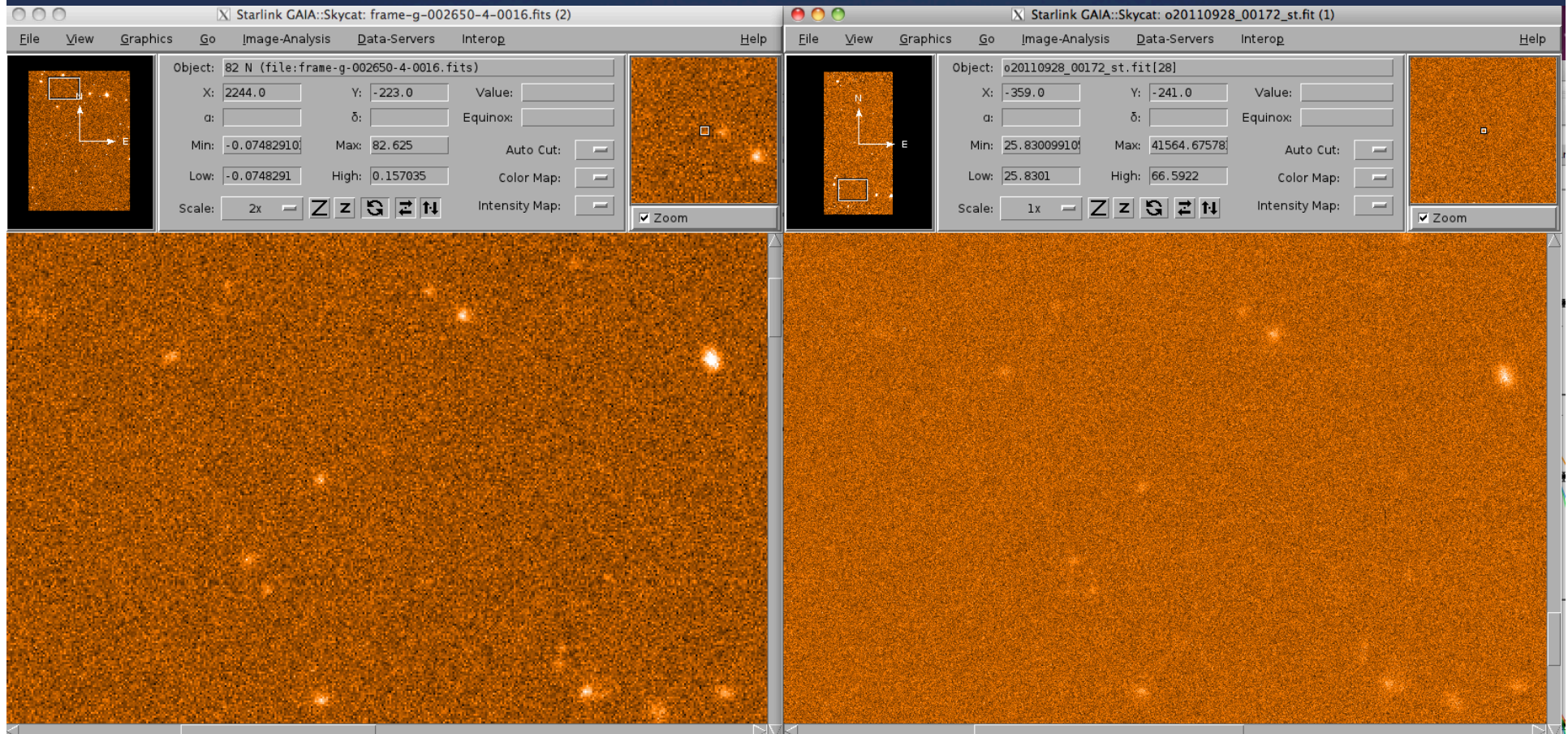
SDSS-ATLAS no-zoom - g



SDSS

ATLAS

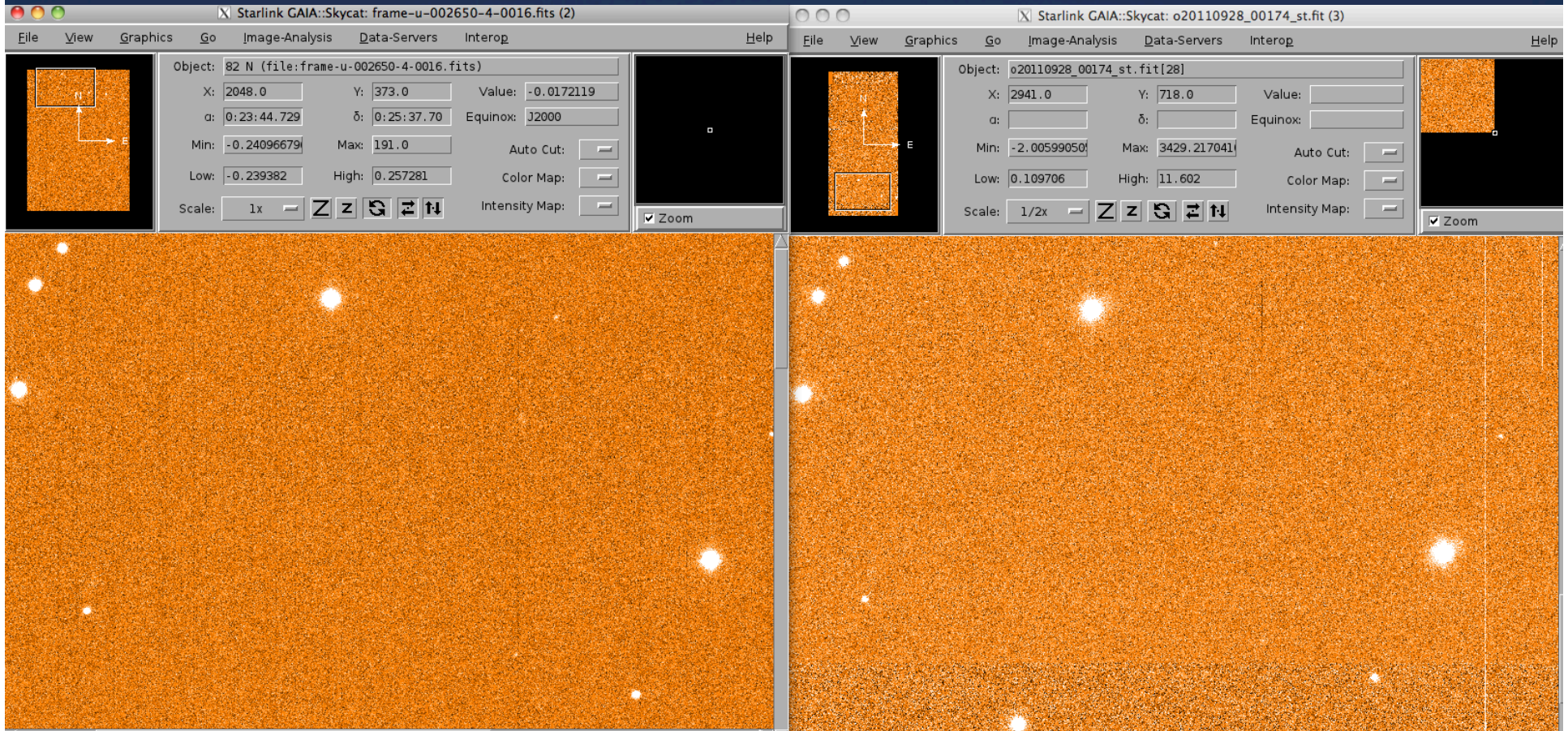
SDSS-ATLAS zoom - g



SDSS

ATLAS

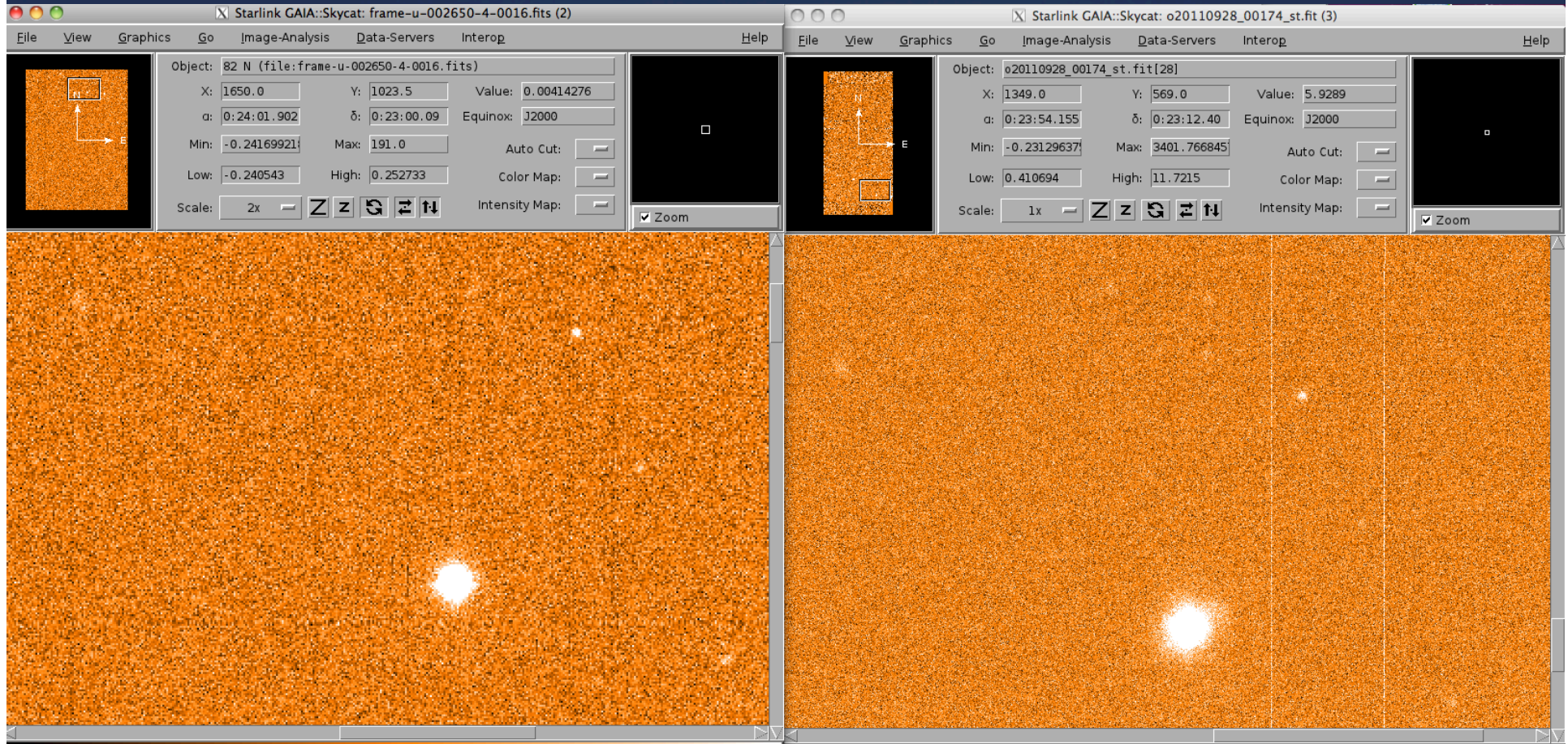
SDSS-ATLAS no-zoom- u



SDSS

ATLAS

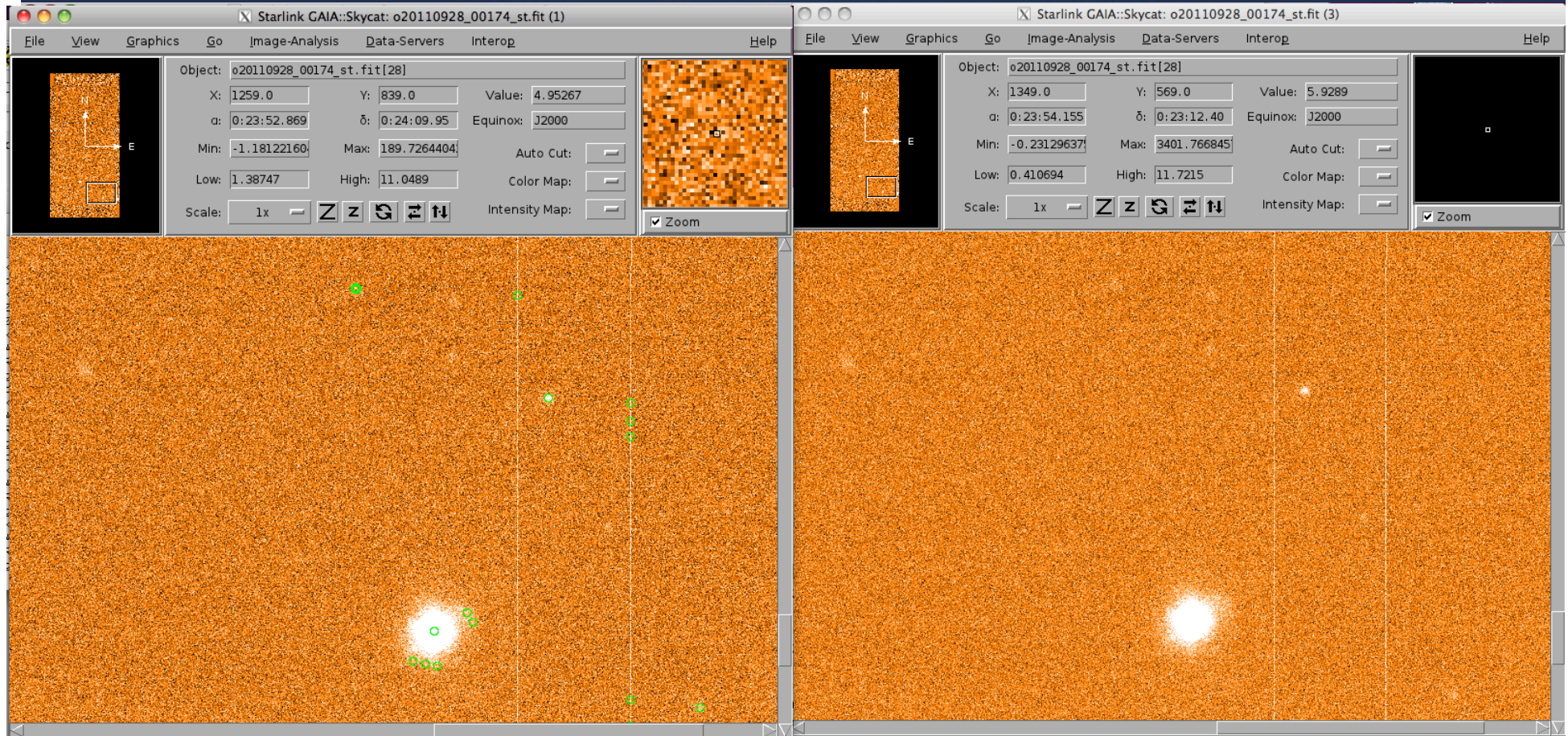
SDSS-ATLAS zoom - U



SDSS

ATLAS

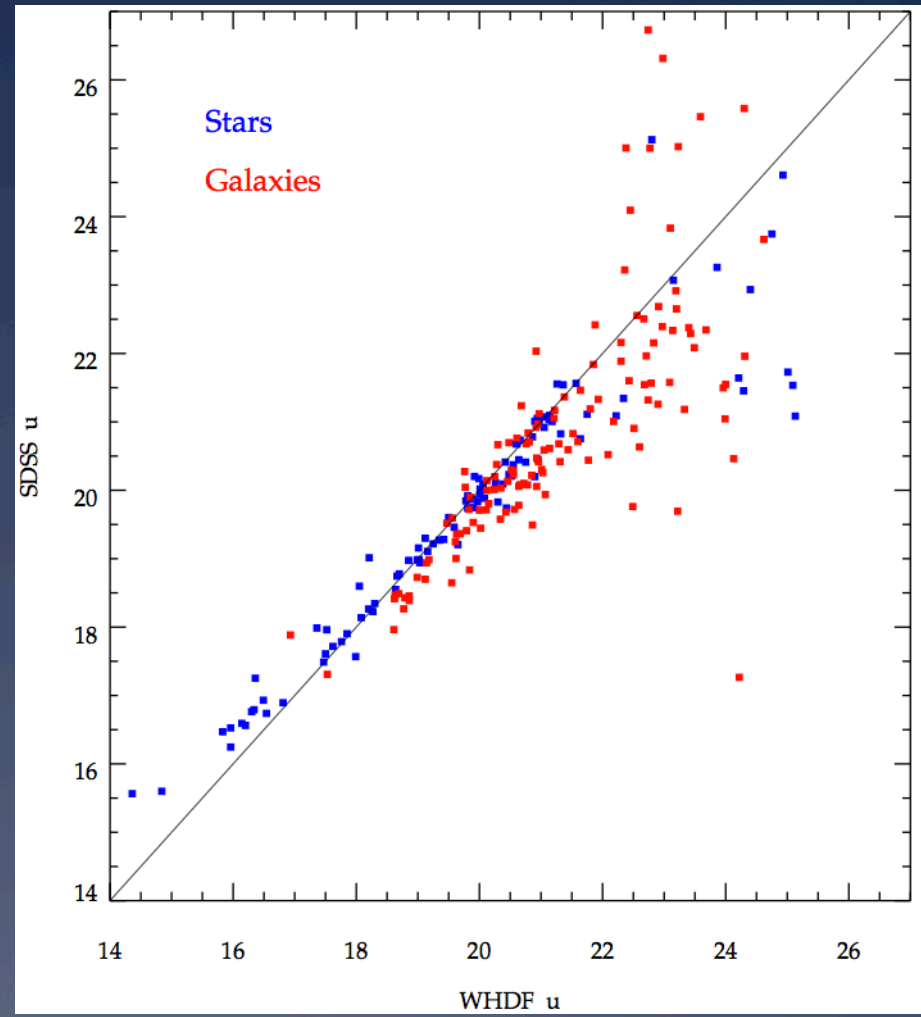
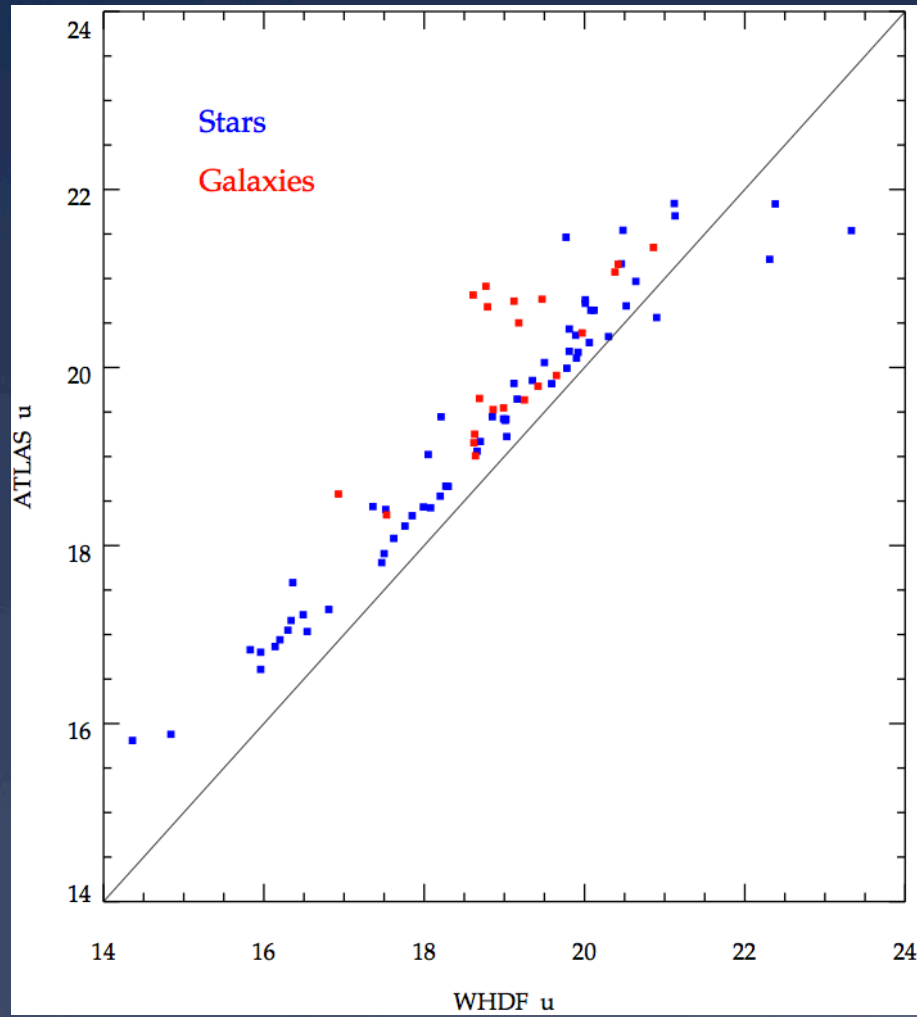
ATLAS CASU ids



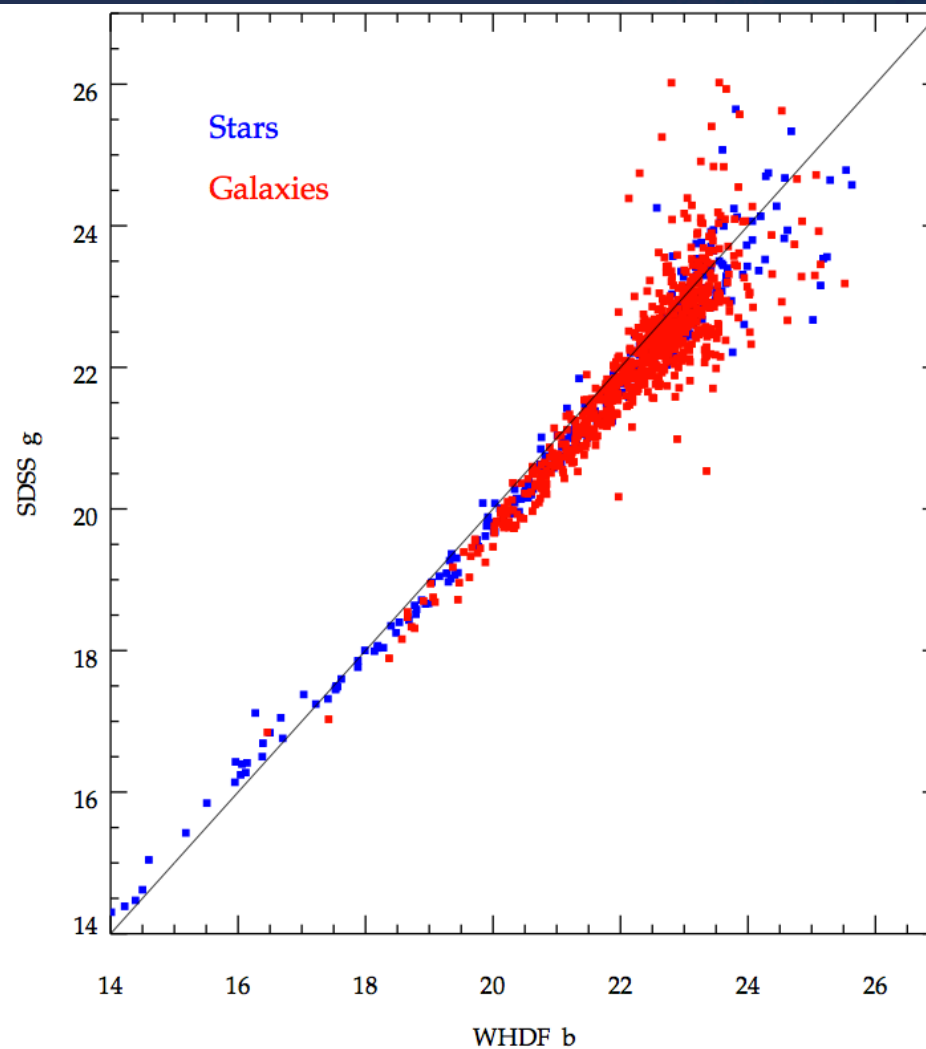
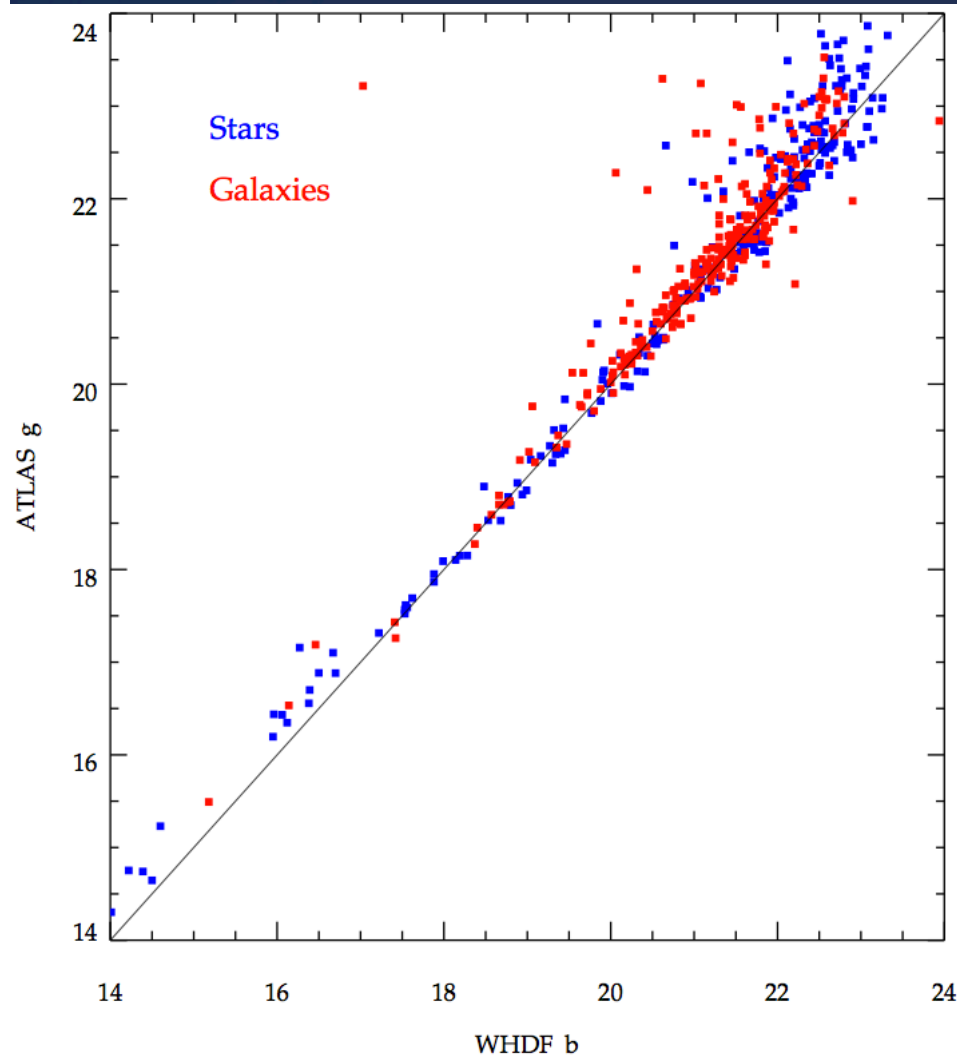
ATLAS ids

ATLAS

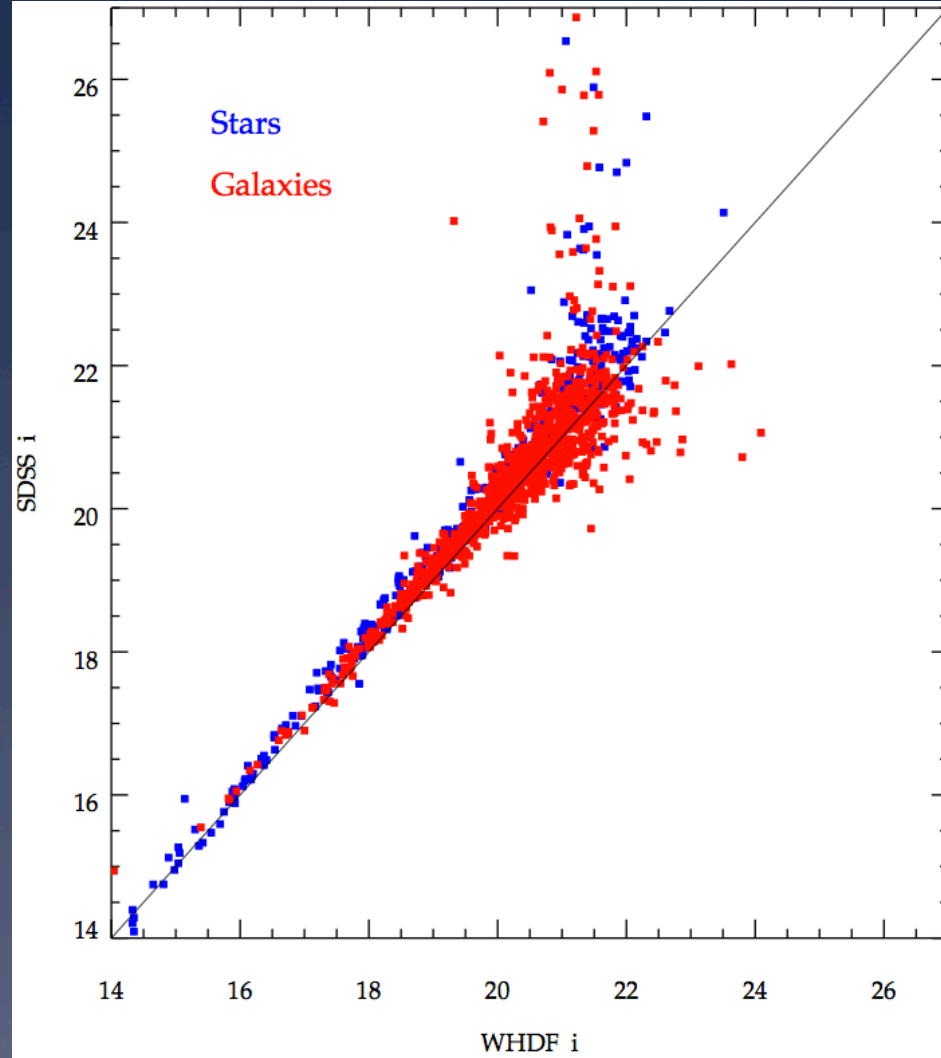
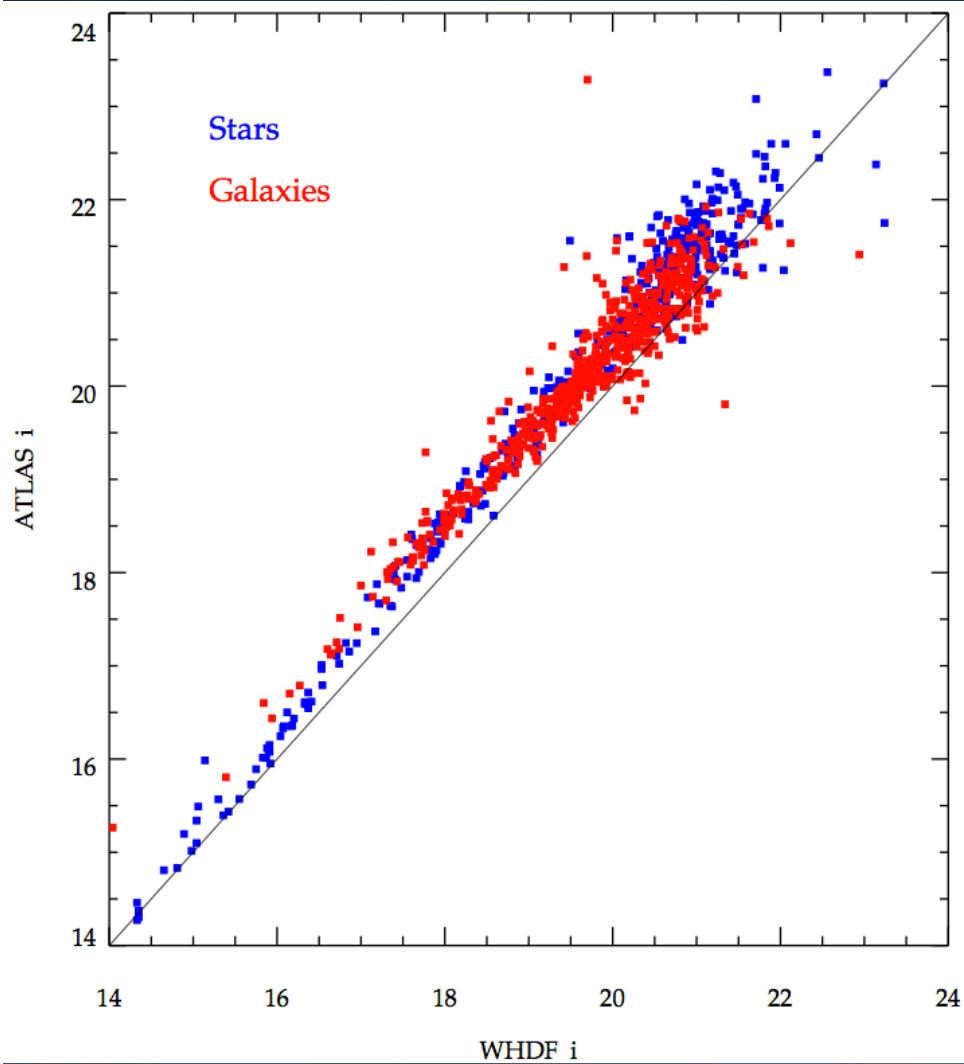
WHDF ν ATLAS + SDSS - U



WHDF ν ATLAS + SDSS – b vs g



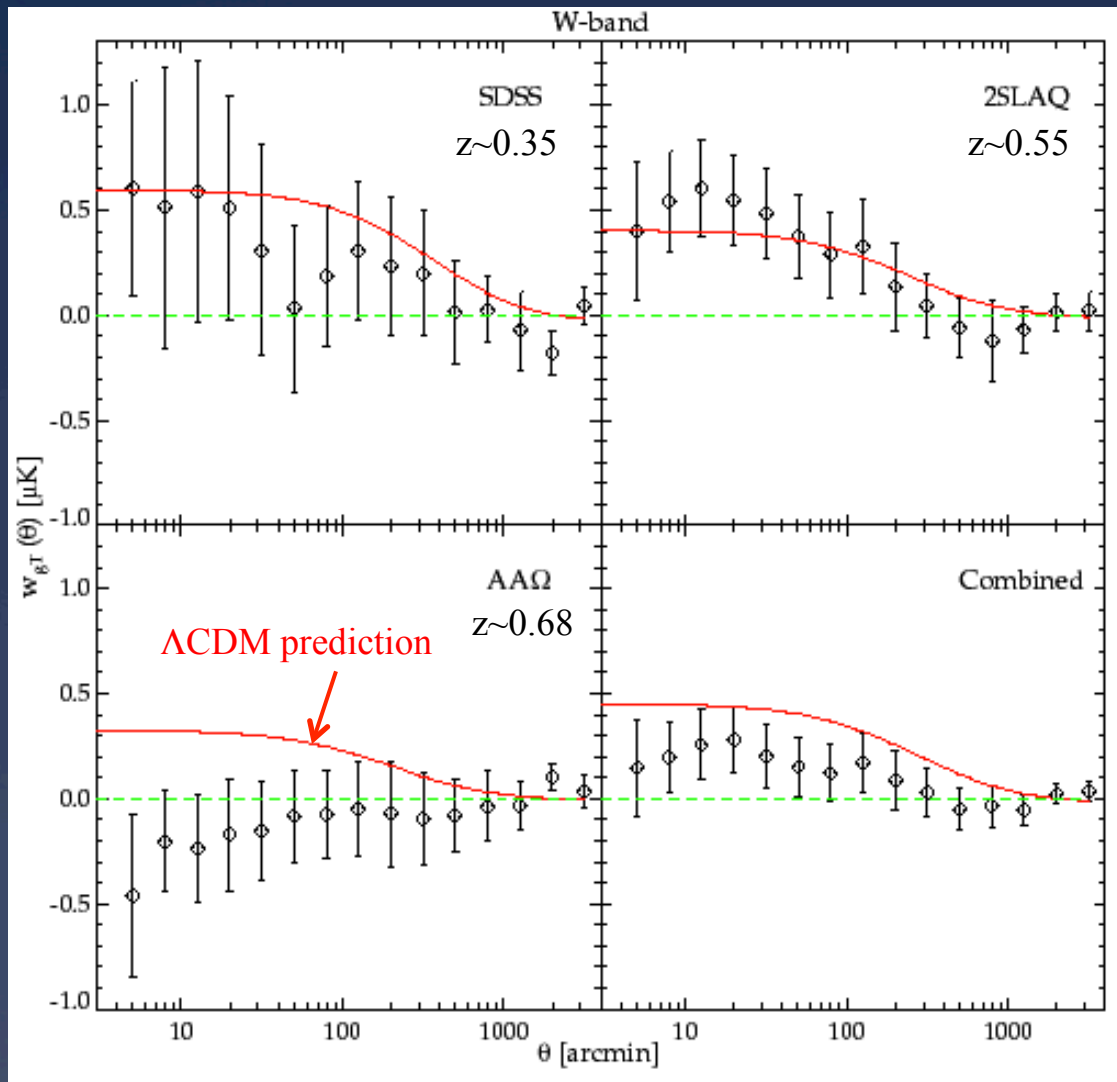
WHDF vs ATLAS+SDSS - i



ATLAS Science Summary

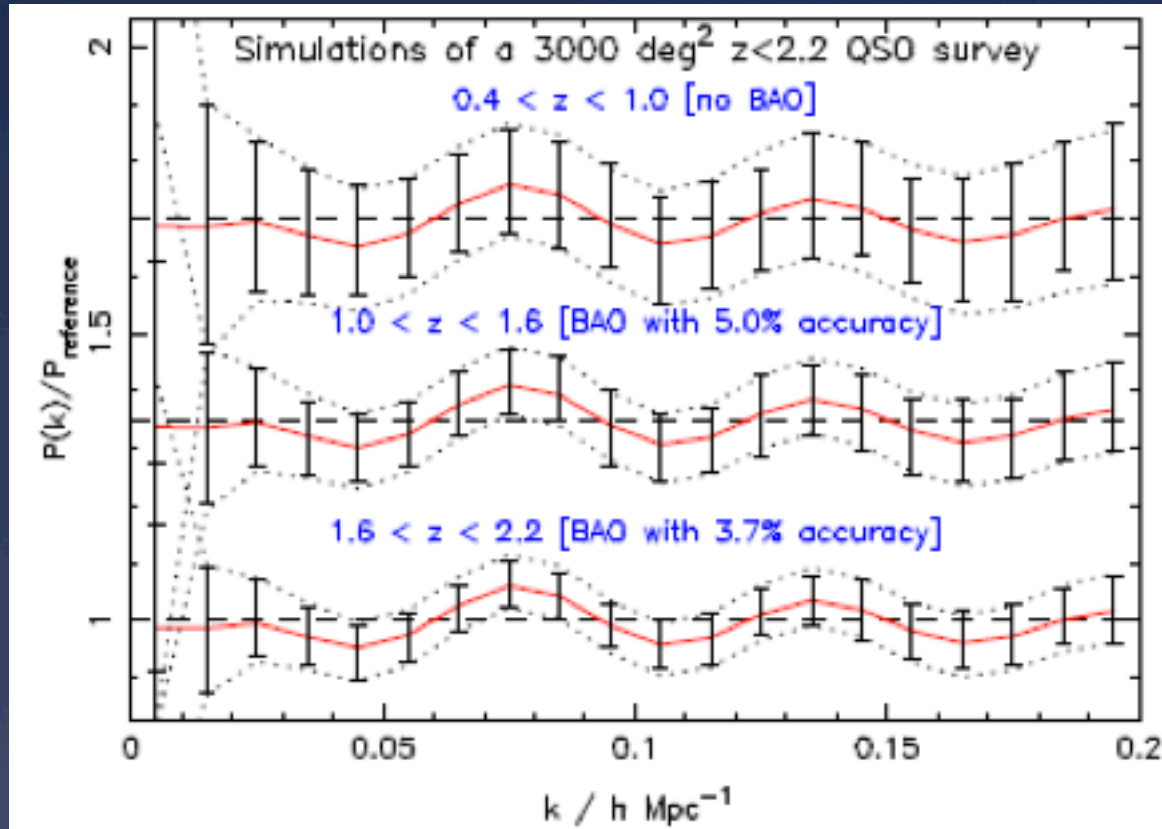
- * VST ATLAS – "Southern Sloan" – SDSS depth + $\sim 1.''2$ resolution in ugriz over $\sim 4500 \text{deg}^2$
- * Cosmology Package to rival WFIRST!
 - * BAO at $z \sim 1.5$ via ATLAS+2dF UVX QSO clustering
 - * Gravitational Growth rate at $z=1-3$ via QSOs
 - * ISW and Non-Gaussianity via LRGs
 - * QSO Lensing vs galaxy ugrizYJHK photo-z
- * Other Science
 - * Stellar Streams + Galactic Archaeology
 - * $Z \sim 7$ QSOs via ATLAS+VHS z dropouts
 - * Beyond the Great Attractor + Fornax etc

ISW test of 2011 Nobel Prize!



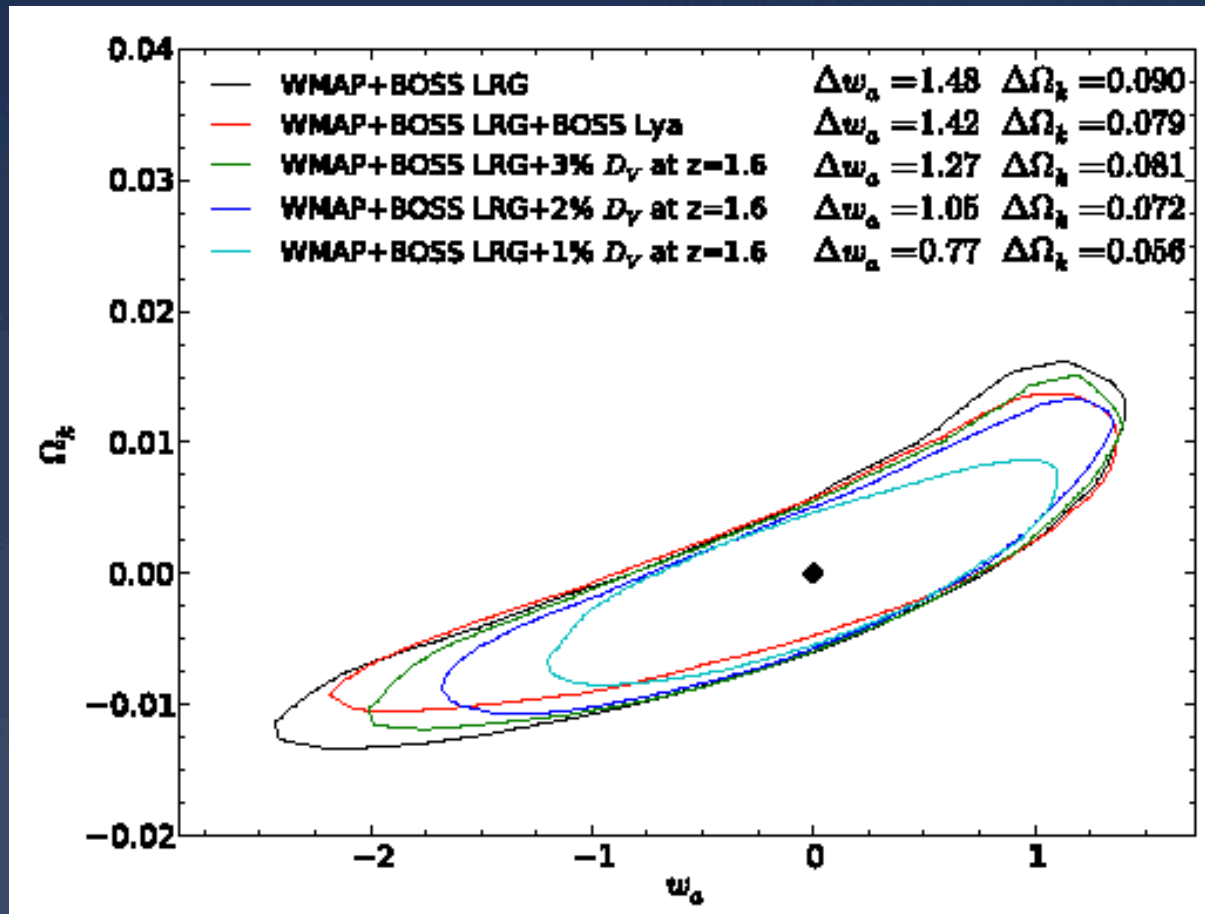
- * Cross-correlated 3 LRG samples with CMB
- * 2 showed ISW
- * 1 didn't
- * Combined sample as consistent with no ISW as ΛCDM prediction!

2QDES BAO vs BOSS



- * 80deg⁻²
+3000deg²
- * $\Rightarrow \pm 3\%$ BAO
- * 100deg⁻² and
4500deg²
- * $\Rightarrow \pm 1.7\%$ BAO

2QDES BAO vs BOSS



* 80deg^{-2}
+ 3000deg^2

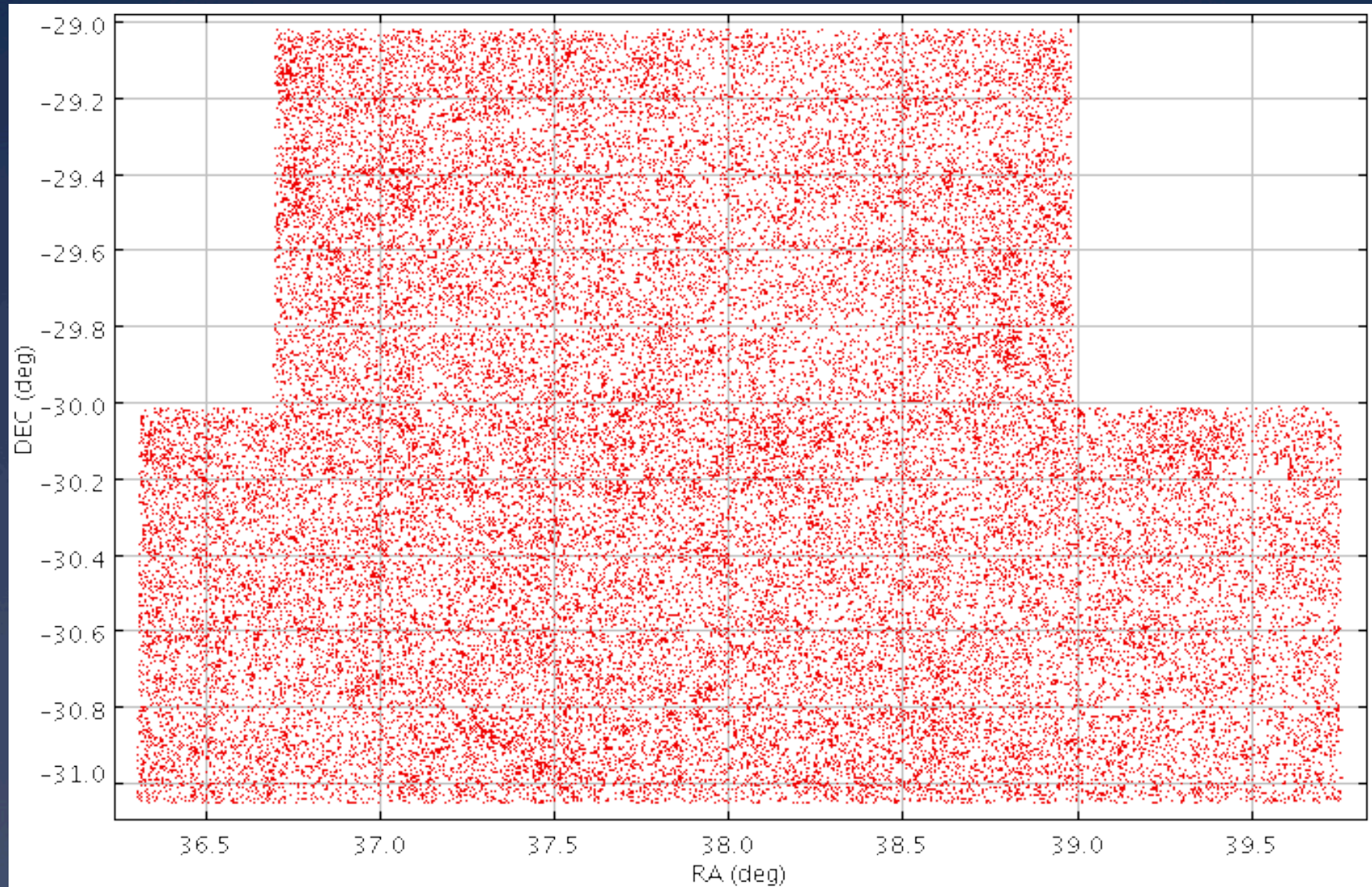
* $\Rightarrow \pm 3\%$ BAO

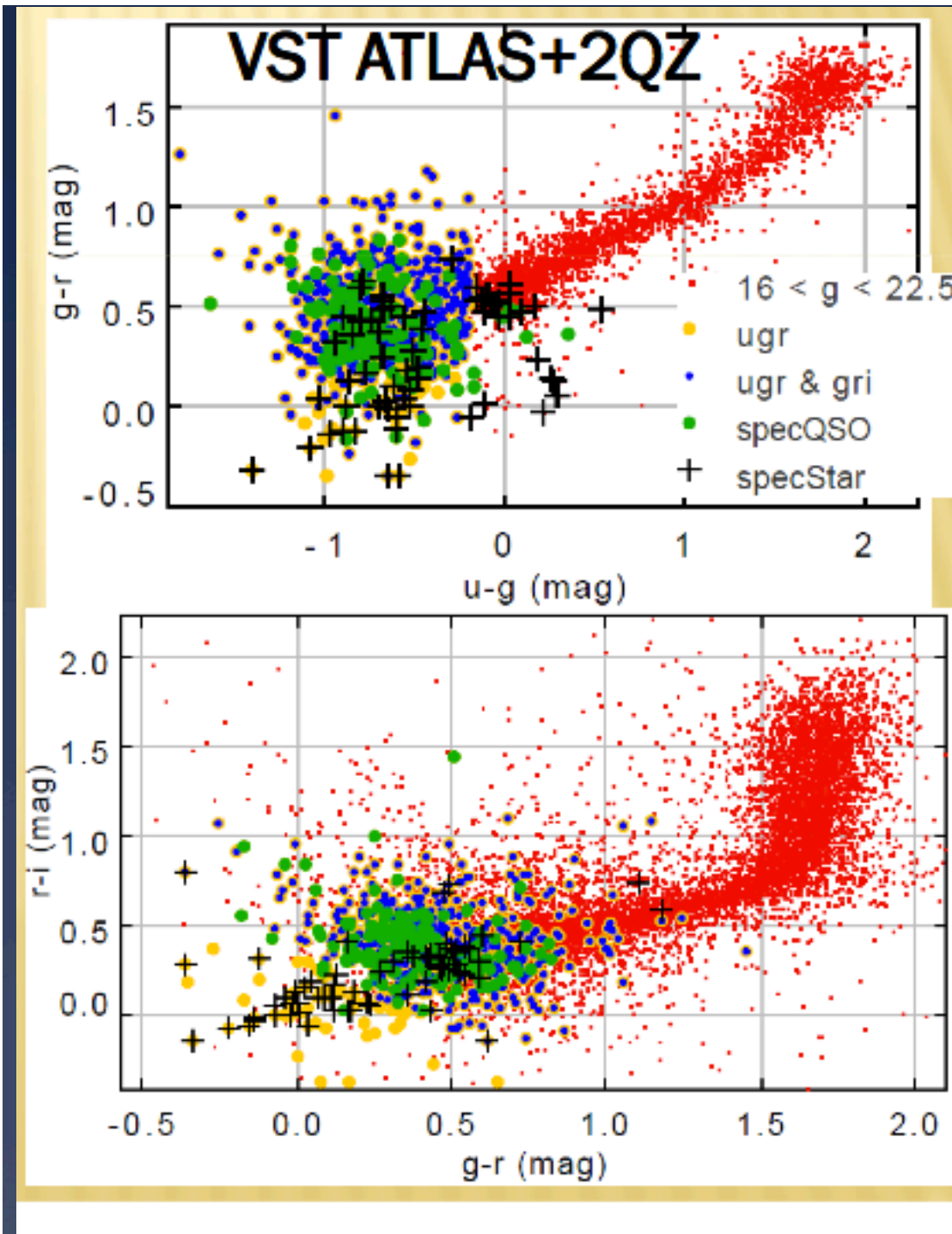
* 100deg^{-2} and
 4500deg^2

* $\Rightarrow \pm 1.7\%$ BAO

* Beats BOSS!

VST ATLAS 2QDES Pilot





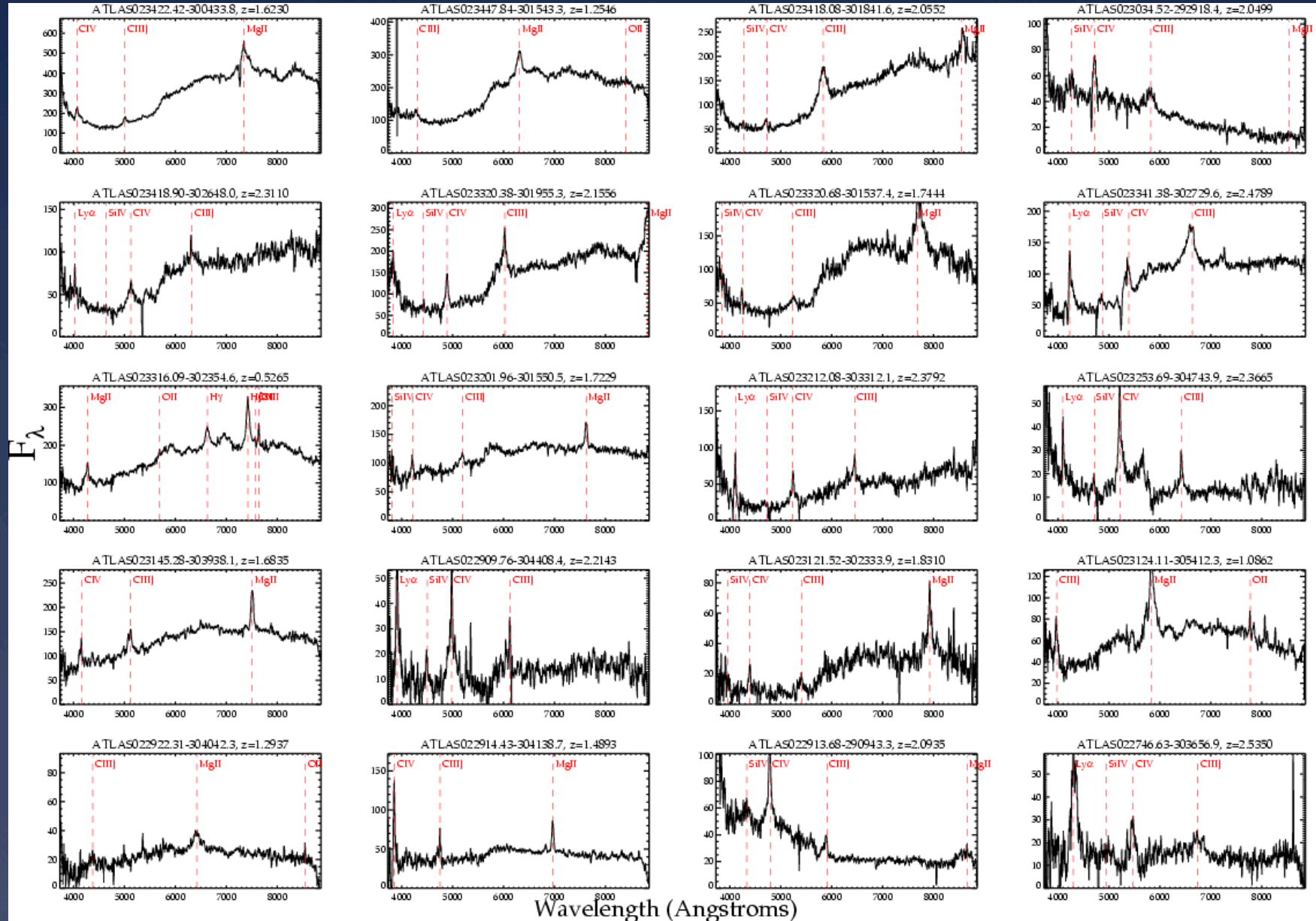
ATLAS ugr QSO selection

- * Simple selection in ugr and gri
- * + KDE selection of Bovy et al
- * Limit $g < 22.5$

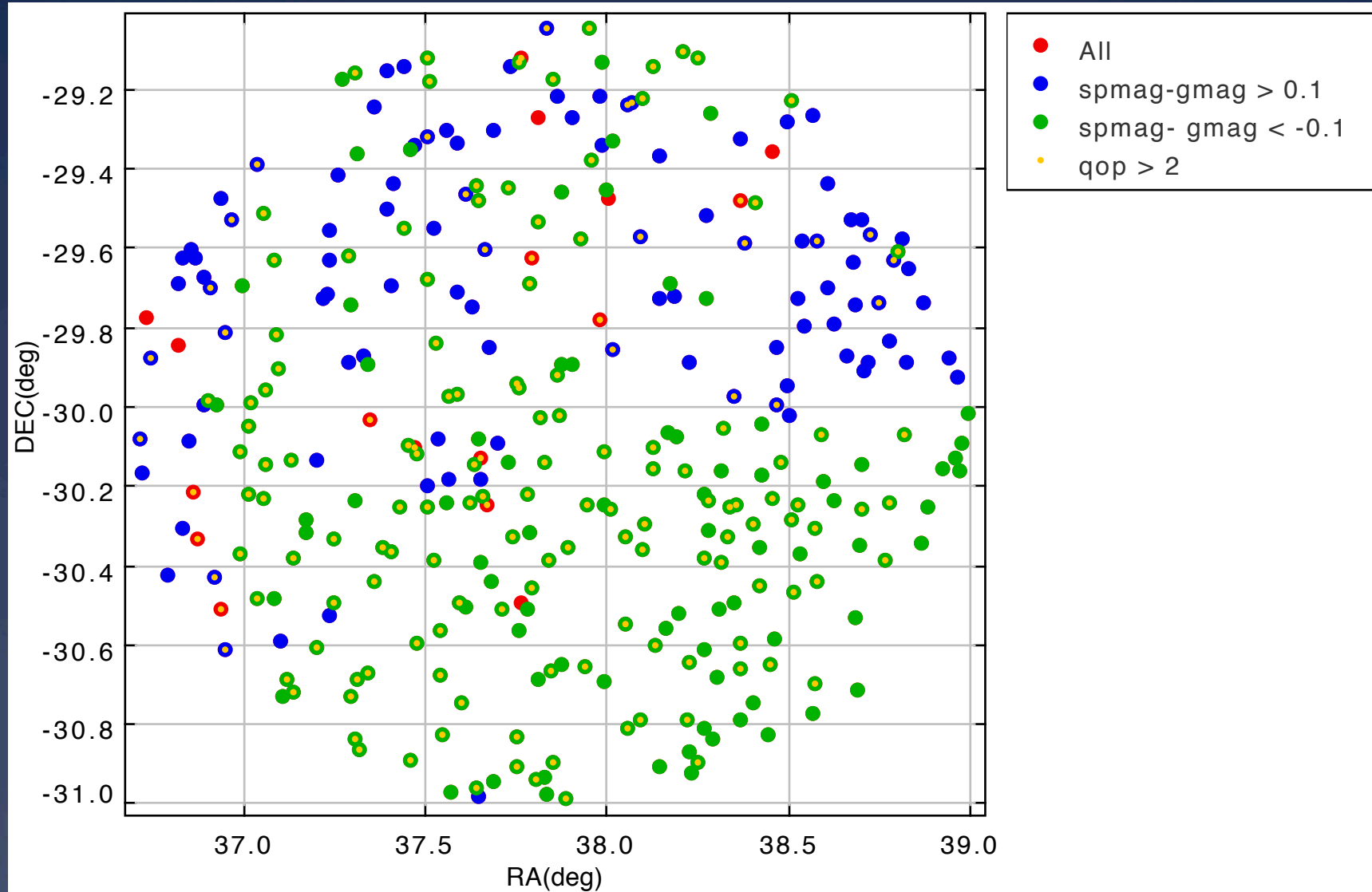
2QDES Pilot

- * 50 min exposure in 20 December AAT Director's night
- * ATLAS field observed at RA 2h30 Dec-30
- * 176 high quality QSO spectra observed!
- * 59% QSO in fibres 1-200 but 38% QSO in fibres 201-400
- * 2dF fibre positional problem
- * Assuming 59% -> already achieving $\sim 75 \text{deg}^{-2}$
- * Compare to 100deg^{-2} required to beat BOSS

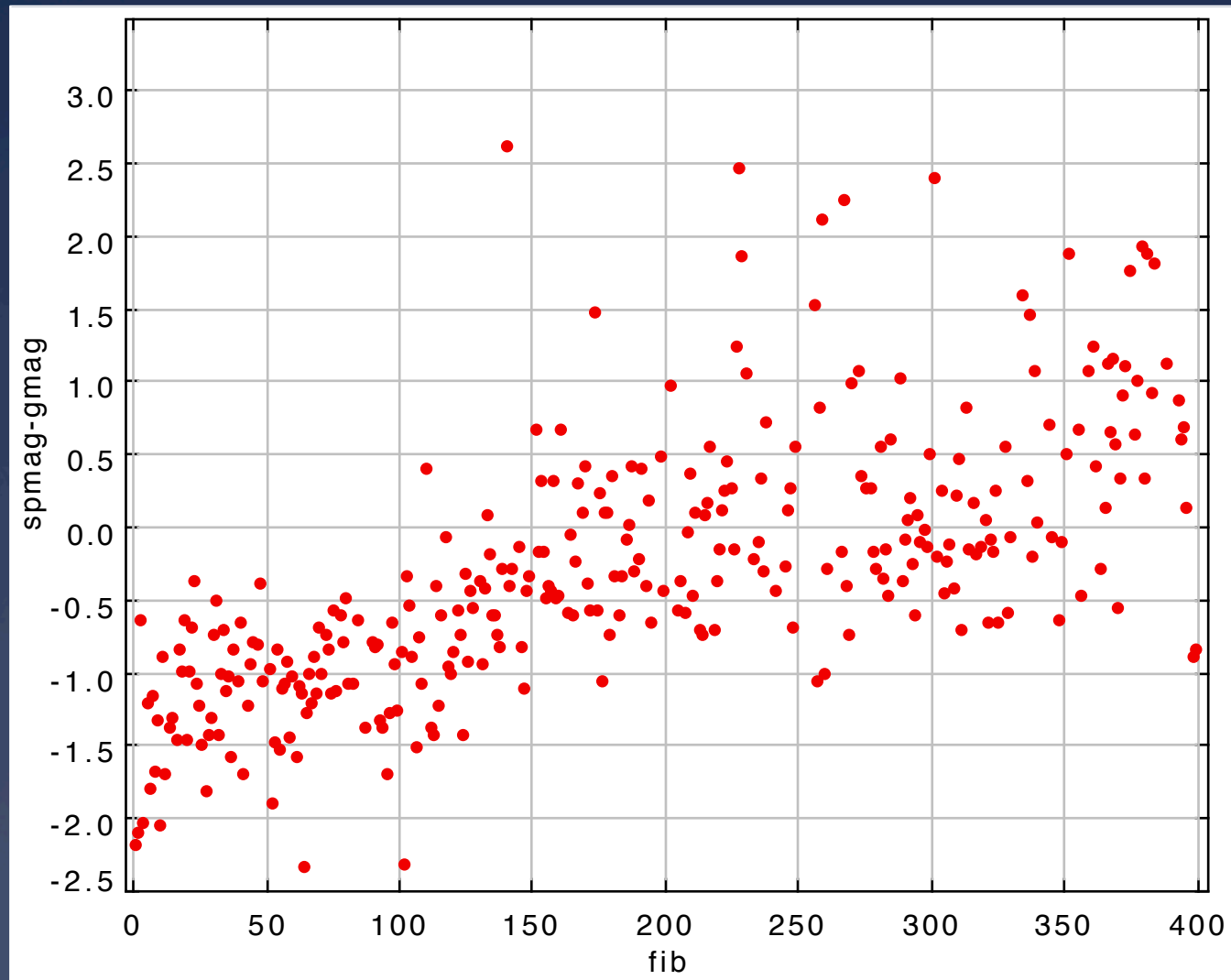
Sample QSO Spectra



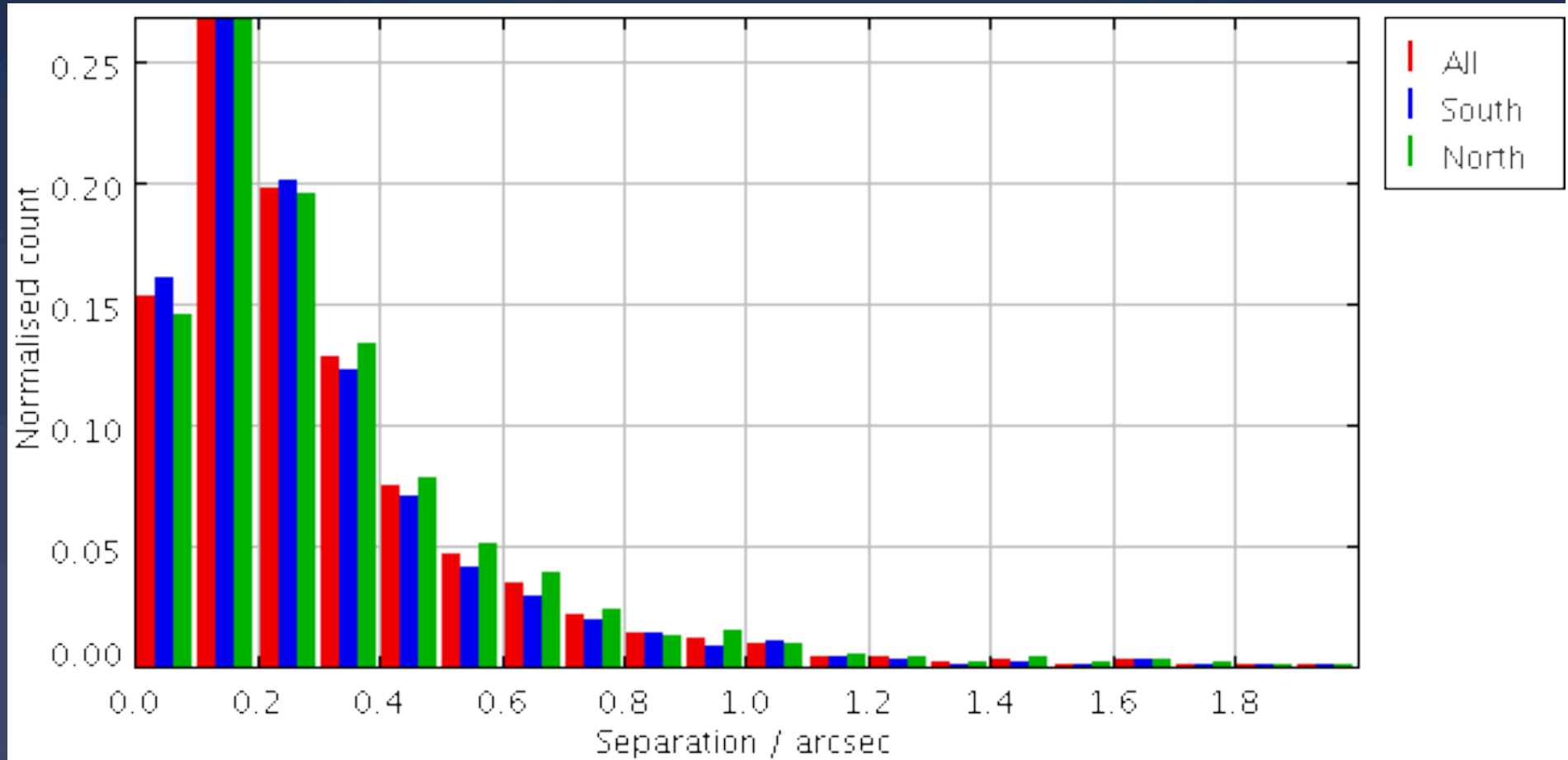
VST ATLAS 2QDES Pilot



Fibre-ATLAS mag v fibre no.



2MASS vs ATLAS astrometry



Summary

- * 500deg² surveyed by ATLAS in SGC KIDS-S already
- * More or less achieving SDSS depth in ugriz
- * Chilean proposal to double u exposure time accepted
- * CASU up-to-date with (preliminary) pipeline processing - flat-fielding still improving
- * 2QDES survey of ~0.5million QSOs still a possibility