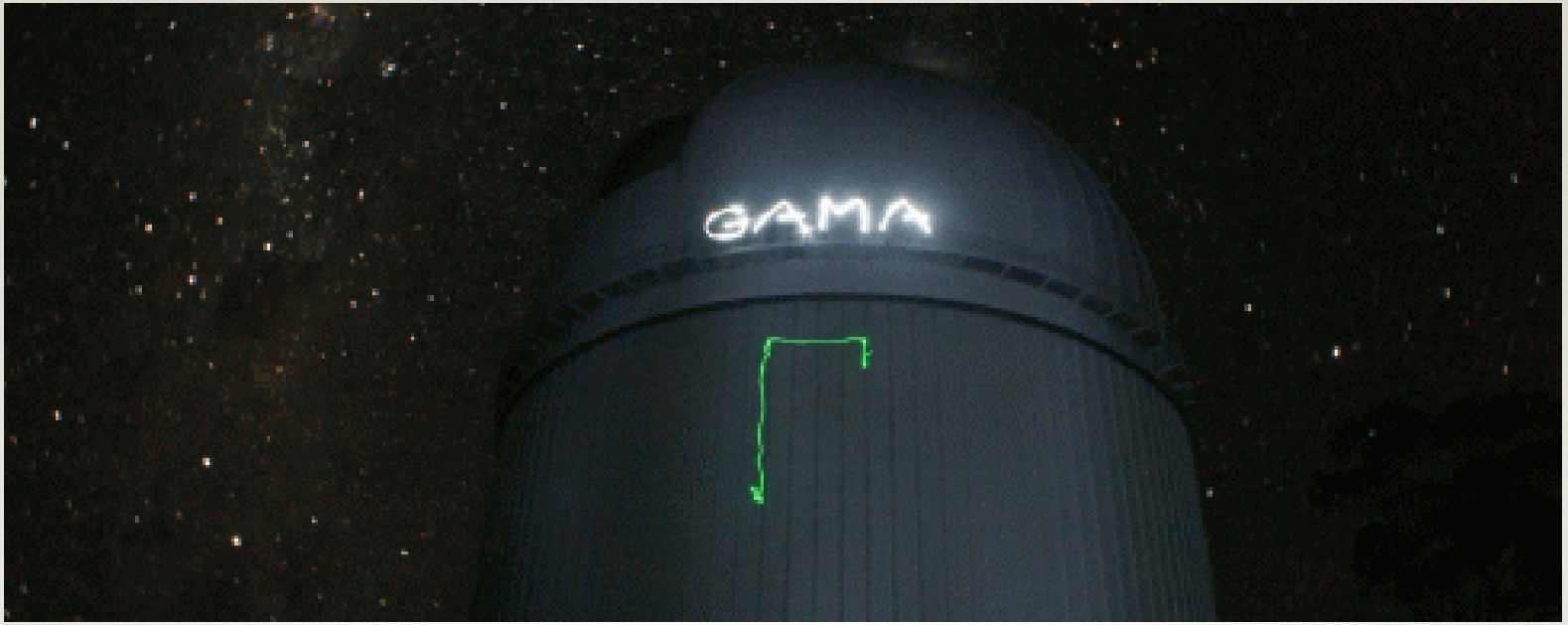


The Galaxy And Mass Assembly Survey

Joe Liske

The GAMA World

What is GAMA?

A comprehensive, multi-wavelength, state-of-the-art survey of the low-redshift Universe,
exploiting the latest generation of ground and space-based wide-field survey facilities
to study cosmology and galaxy formation and evolution.

GAMA = spectroscopic survey + alliance of imaging surveys

Key improvements over previous survey:
Spectroscopy: 2 mag deeper, multi-pass
Imaging: near-complete wavelength coverage, ~2× better resolution


VISTA
UKIRT
AAT
WISE
HERSCHEL
VST
SDSS
ASKAP
GALEX
XMM
GMRT
VIKING
UKIDSS
LAS
H-ATLAS
KIDS
DINGO
MIS
XXL
GAMA

GAMA Science Goals

Key goals:

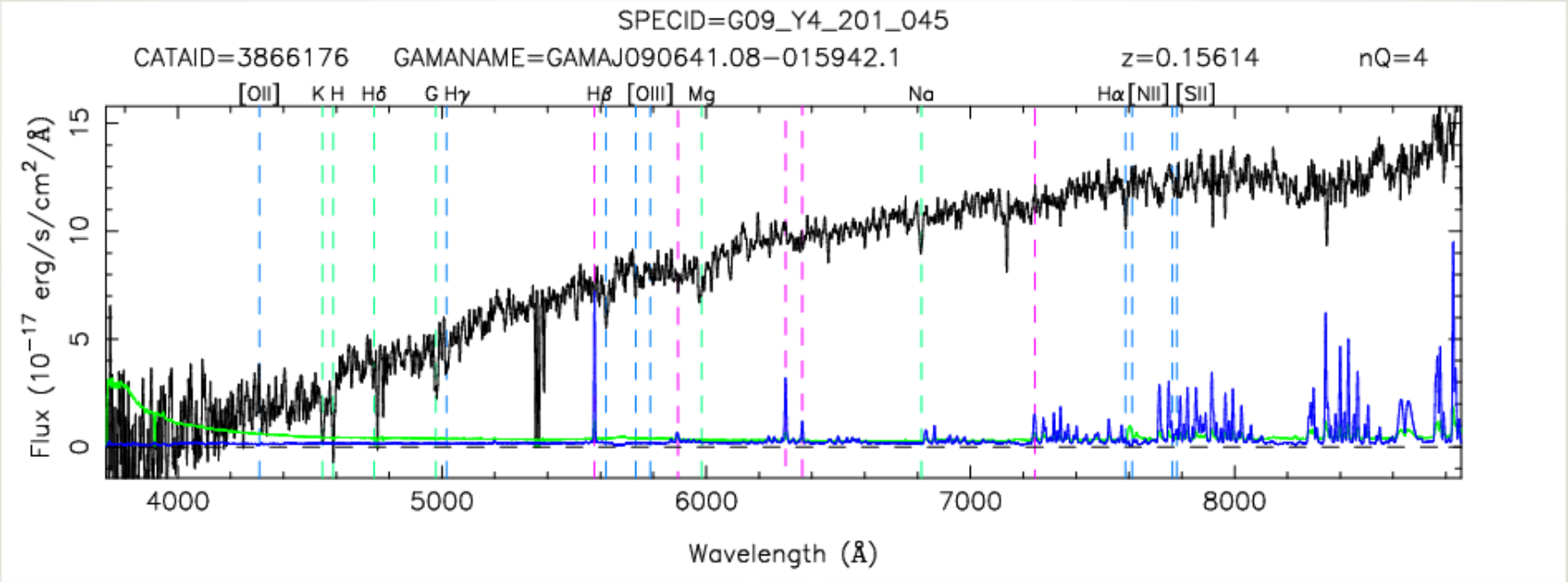
- To test modified theories of gravity by measuring the growth rate of structure; the CDM model by measuring the halo mass function; and galaxy formation models by measuring the star formation efficiency in groups.
- To measure the connection between star formation fuelling, stellar mass build-up and feedback processes.
- To uncover the detailed mechanisms that govern the build-up of the stellar content of galaxies.
- To directly measure the recent galaxy merger rate as a function of mass, mass ratio, local environment and galaxy type.

Additional goals:

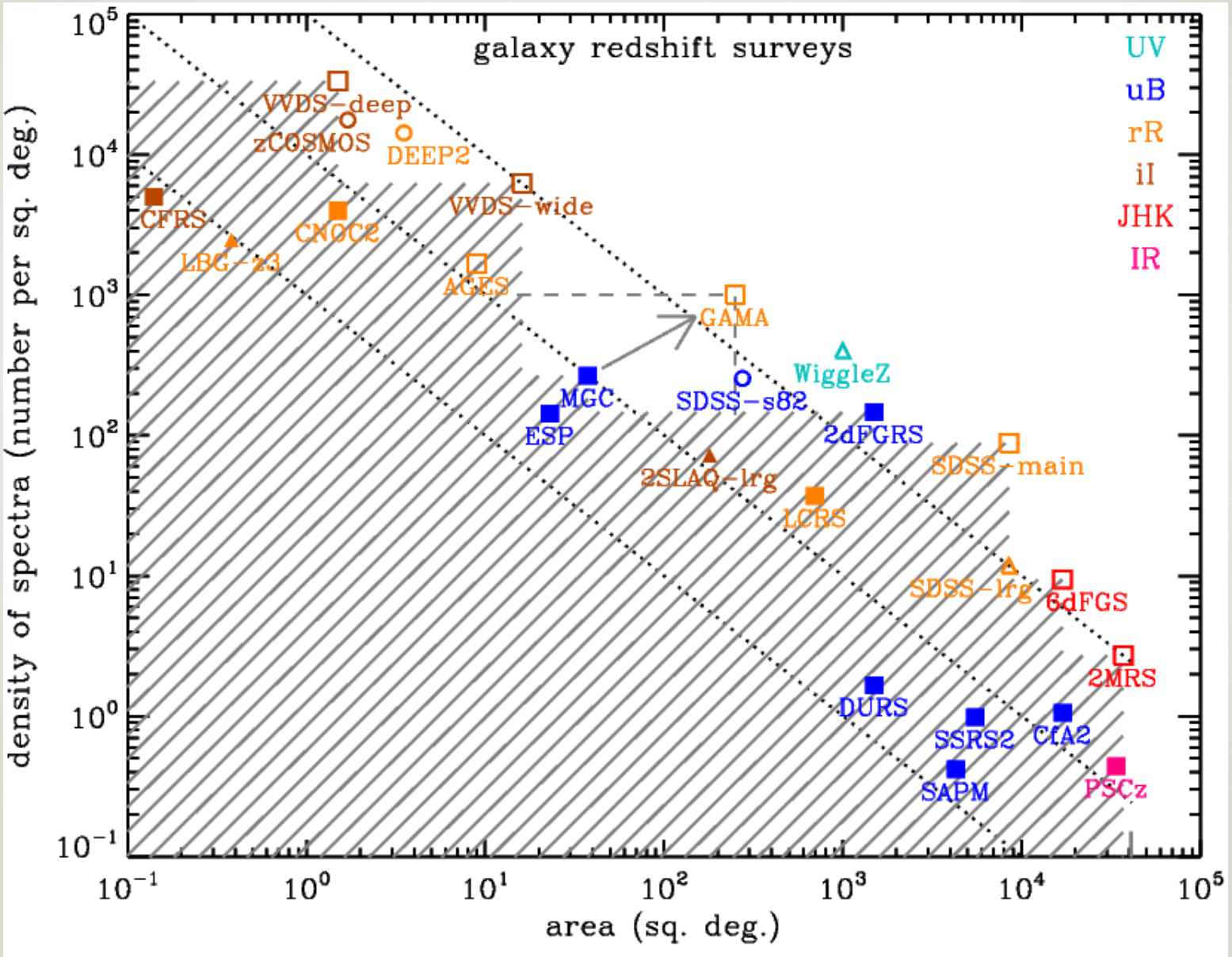
- Stellar mass function to Magellanic Cloud masses by type and environment
- Properties of galaxy components (bulge-disk decomposition)
- Comparing SFH with evolution of HI content
- Dust content of the local Universe: dust-mass function
- Dust-obscured SF: sub-mm luminosity function
- Evolution of cosmological HI density
- HI mass function
- Comprehensive study of the co-evolution of the stars, gas and dust
- Creating a legacy dataset for the low-redshift Universe

GAMA Spectroscopy

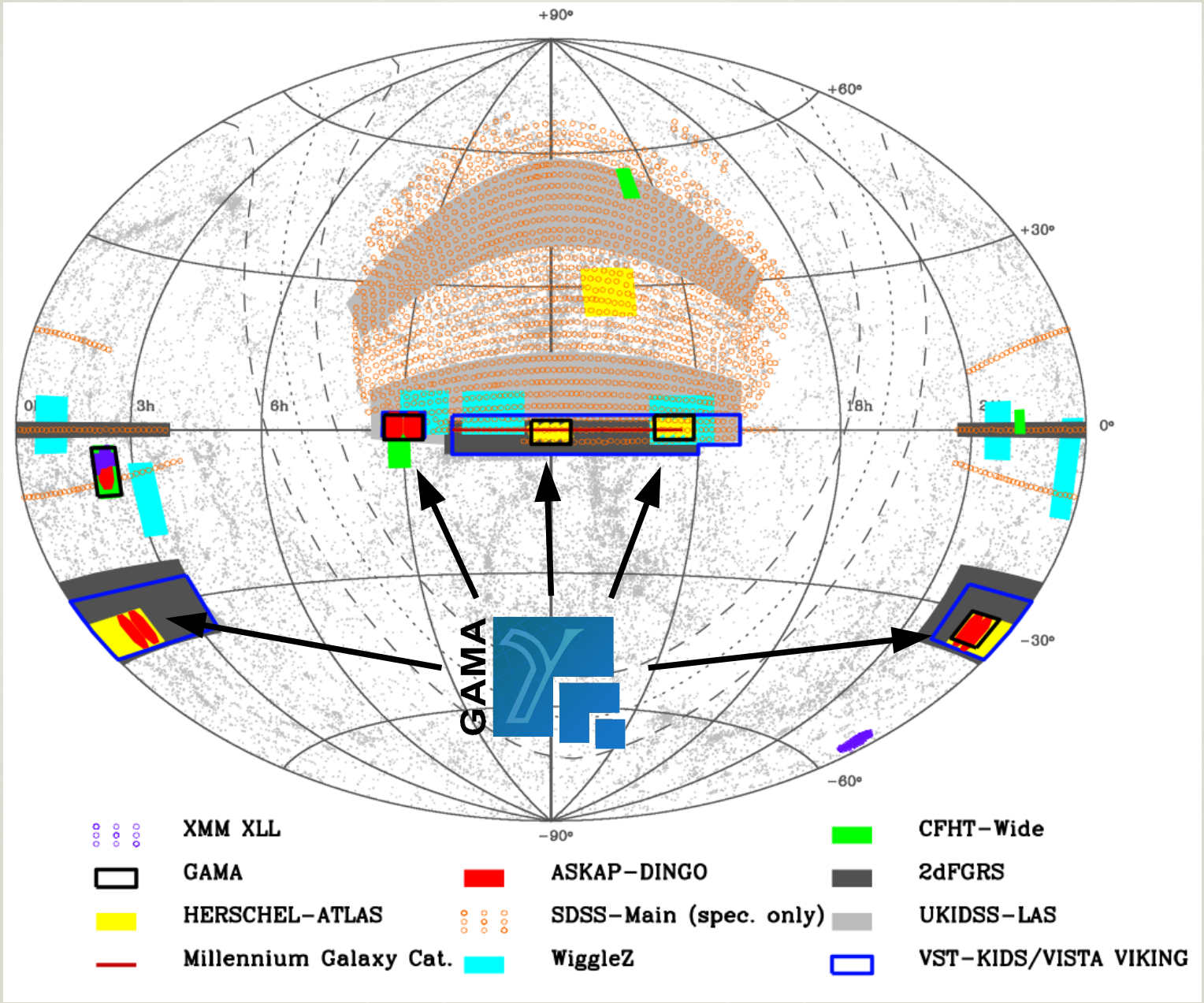
- Fibre spectroscopy using AAT/AAOmega (2dF successor)
- Area: ~310 deg^2 split over 5 regions
- Main sample: ~340k galaxies to r < 19.8 mag and K_{AB} < 17.5 mag (selected from SDSS and UKIDSS-LAS)
- <z> ~ 0.27
- R = 1300, 370 < λ < 880 nm



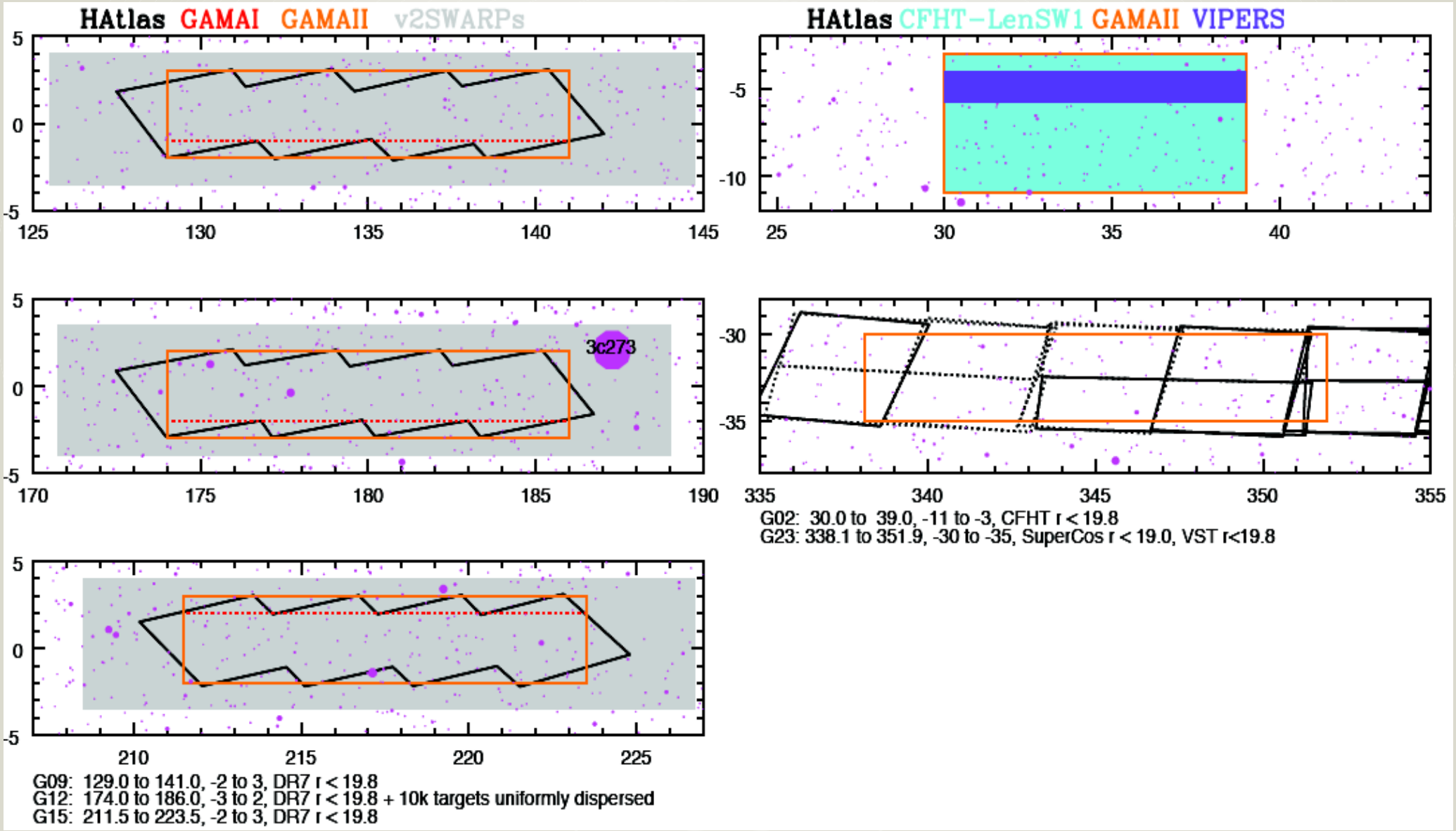
How does GAMA fit in?



The GAMA Survey Regions

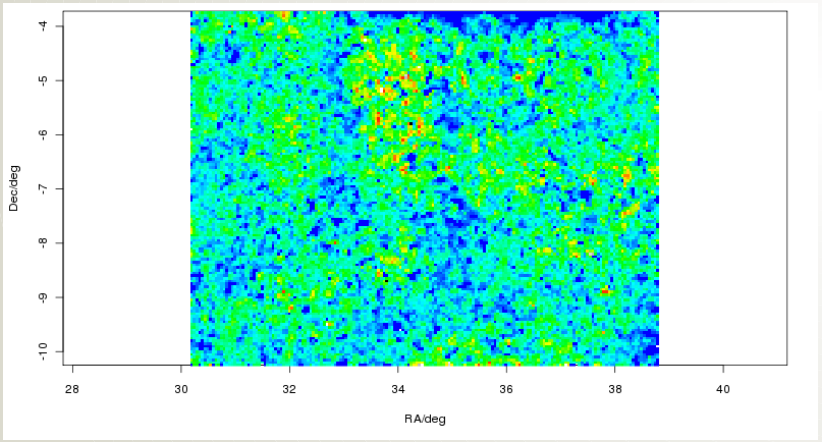


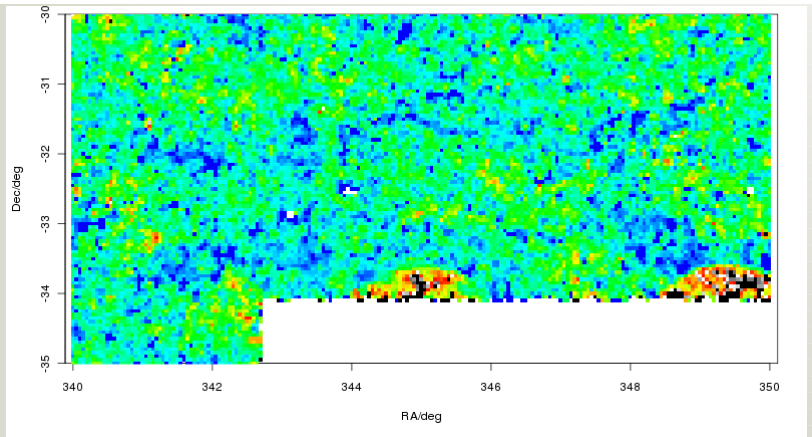
The GAMA Survey Regions

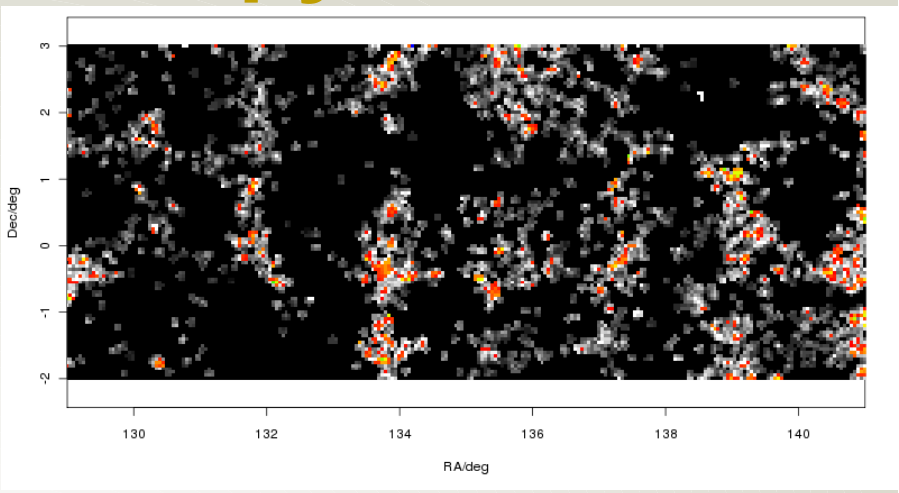


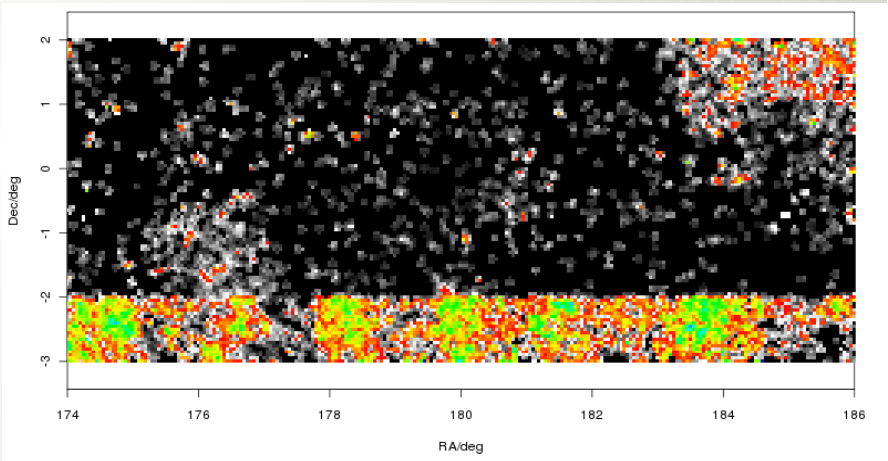
Status of the Spectroscopy

- 153 nights: good quality redshifts for 215,459 unique galaxy targets
- Completeness: G02: 19%
  G09: 96%
  G12: 96%
  G15: 91%
  G23: 25% to r < 19.0









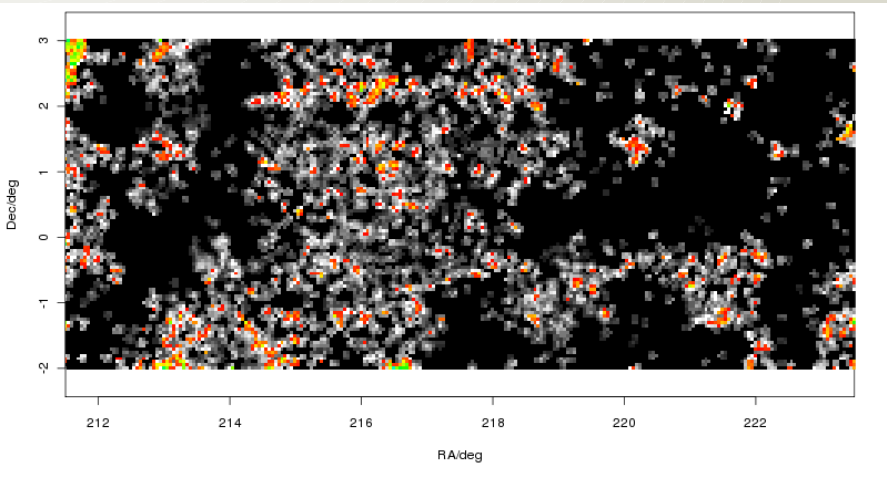


Photo-z vs Spec-z

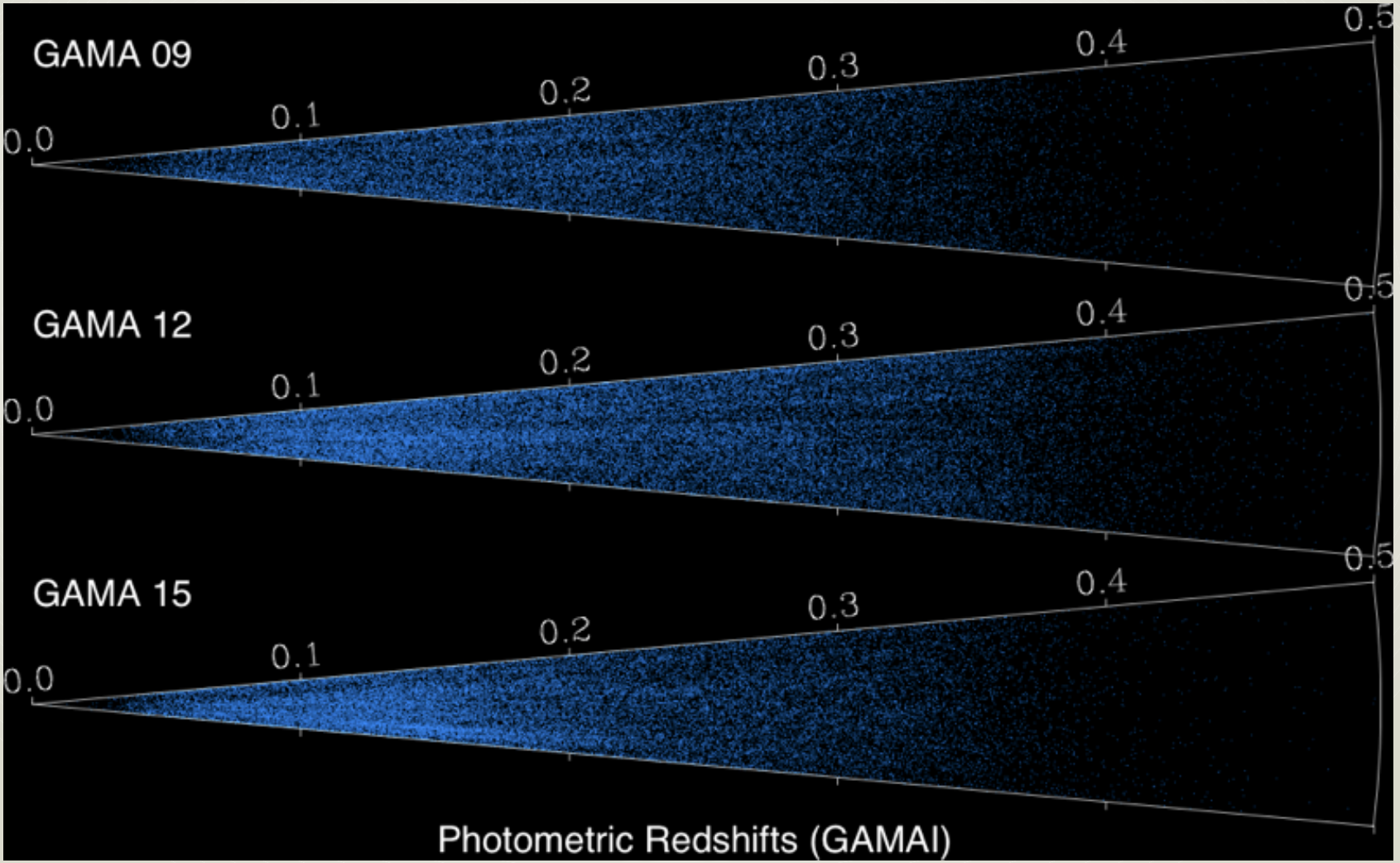
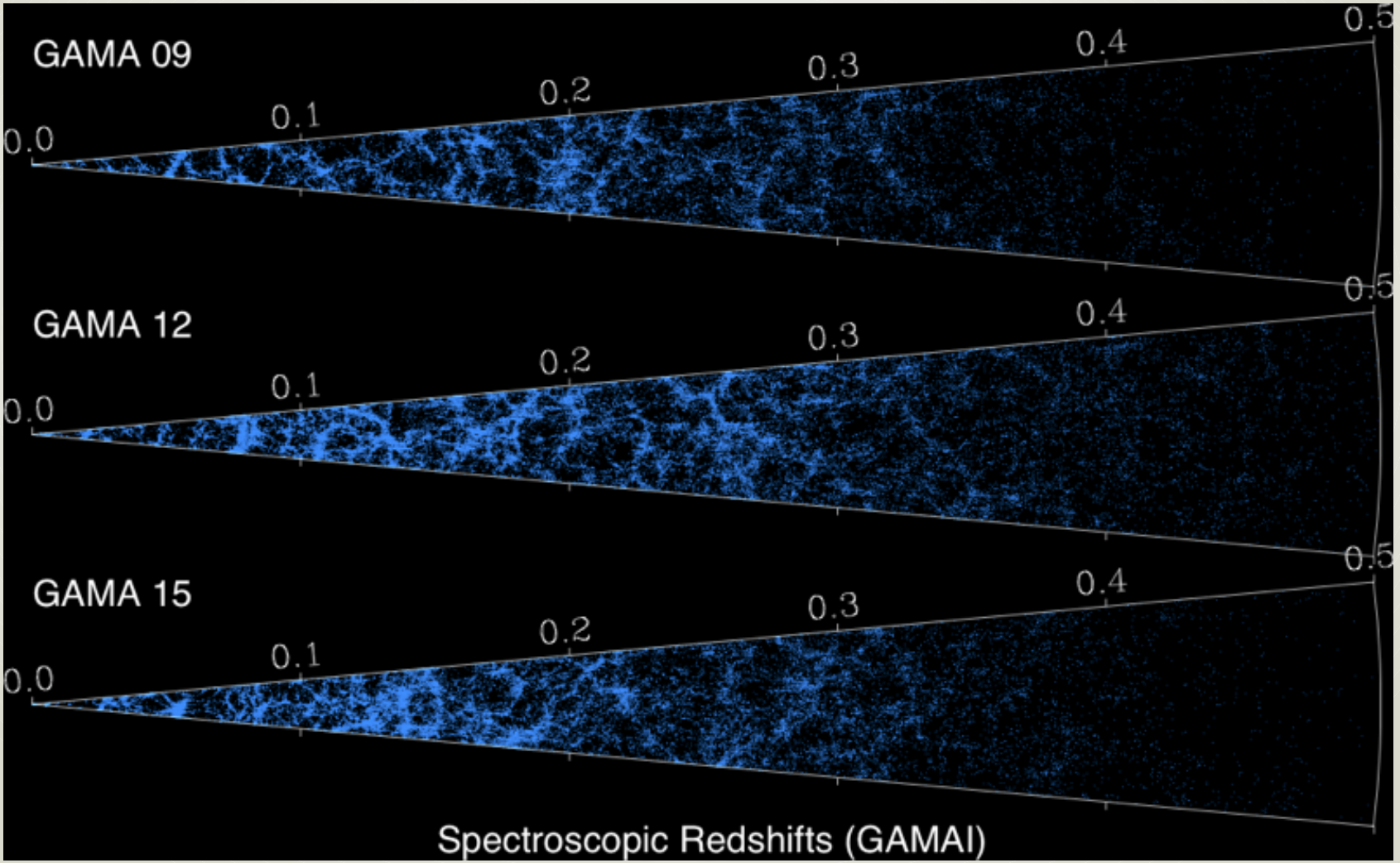
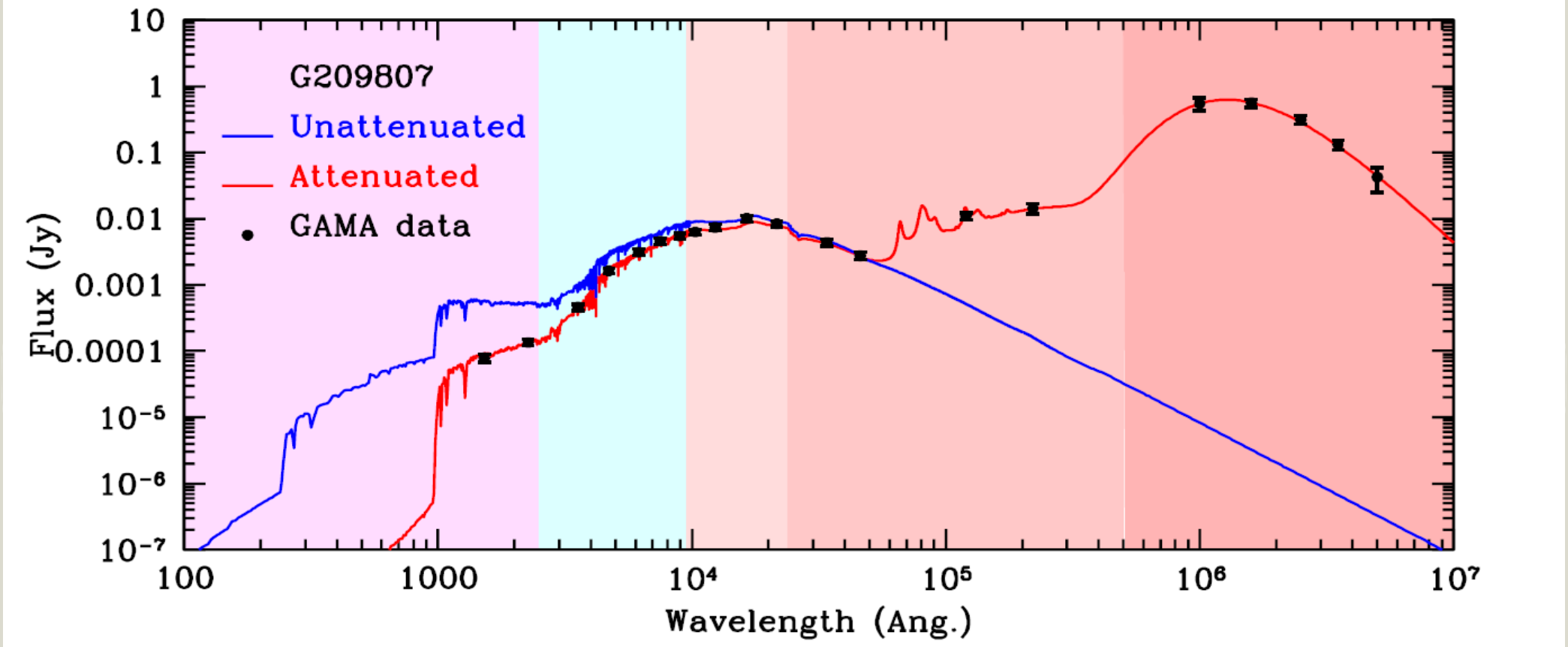
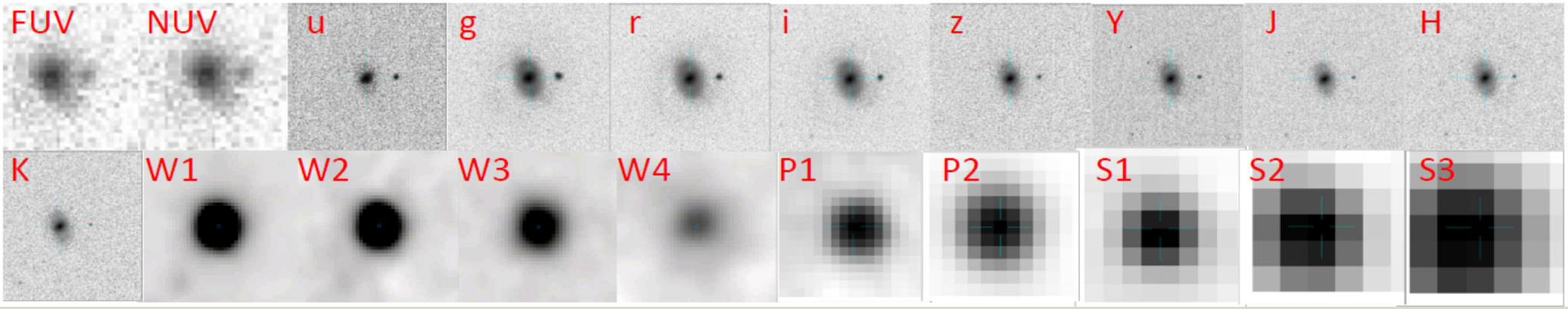


Photo-z vs Spec-z

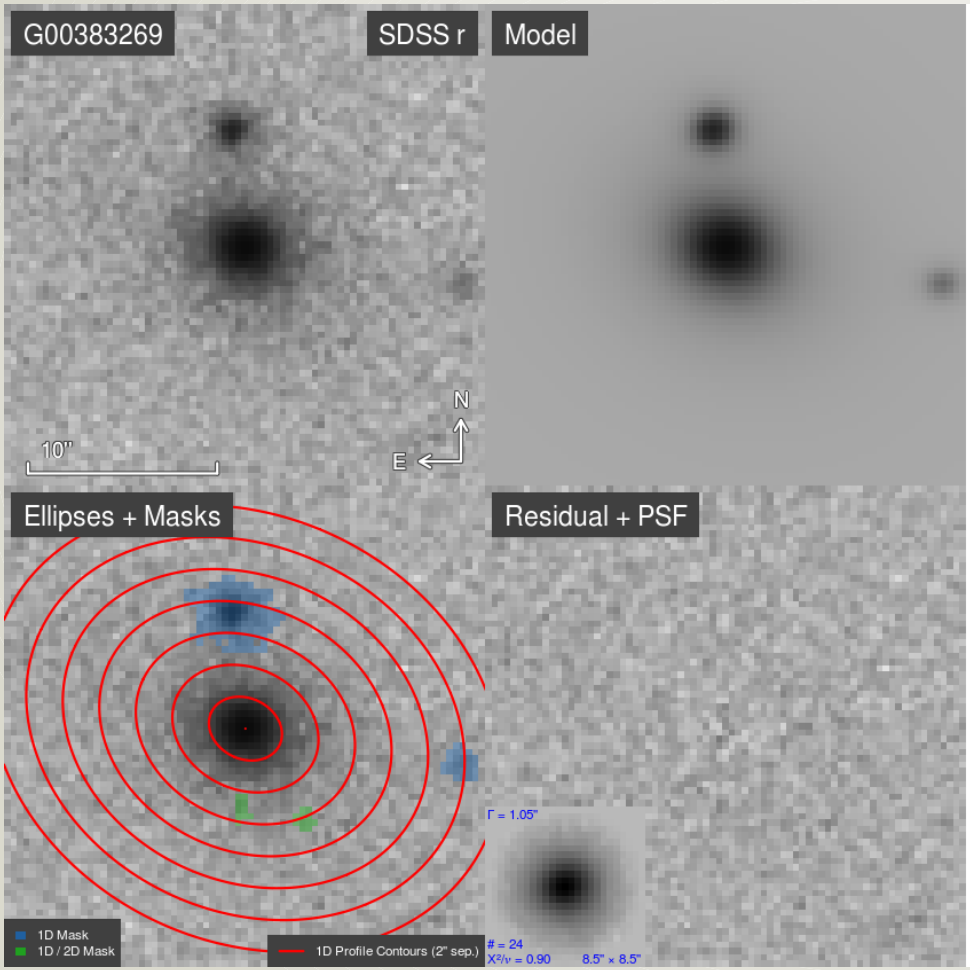


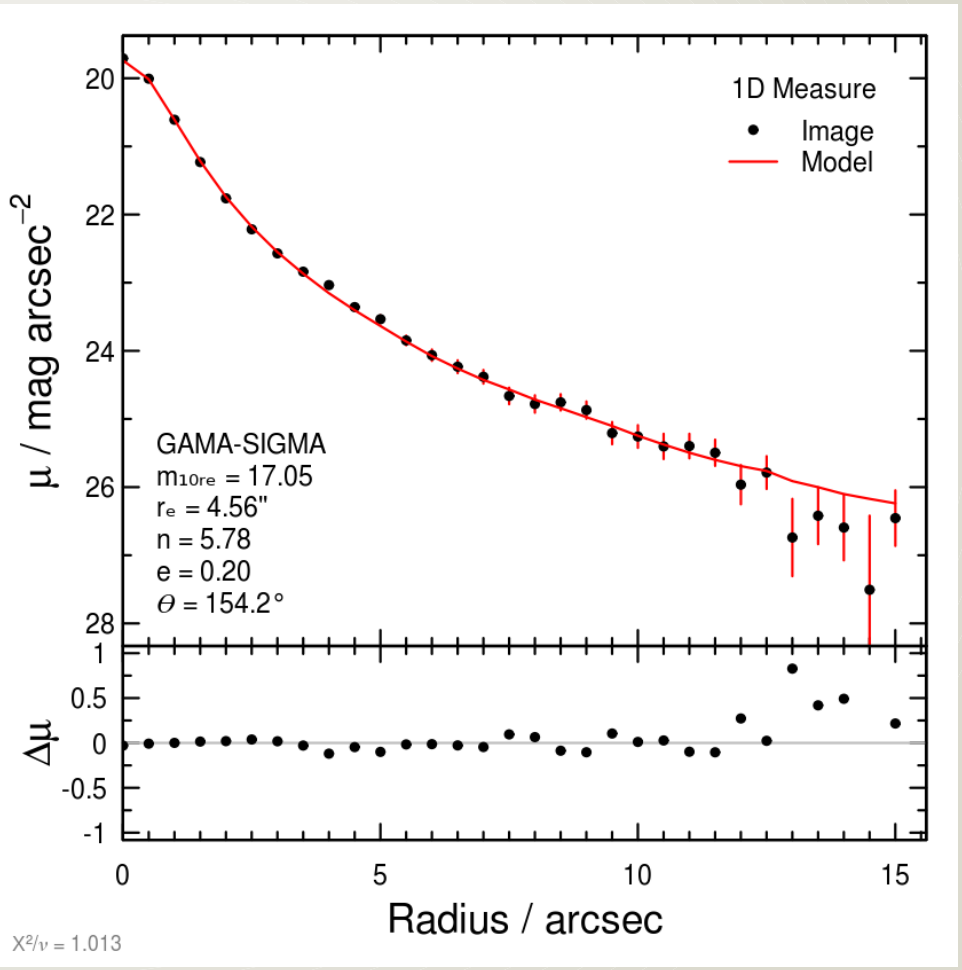
GAMA Photometry





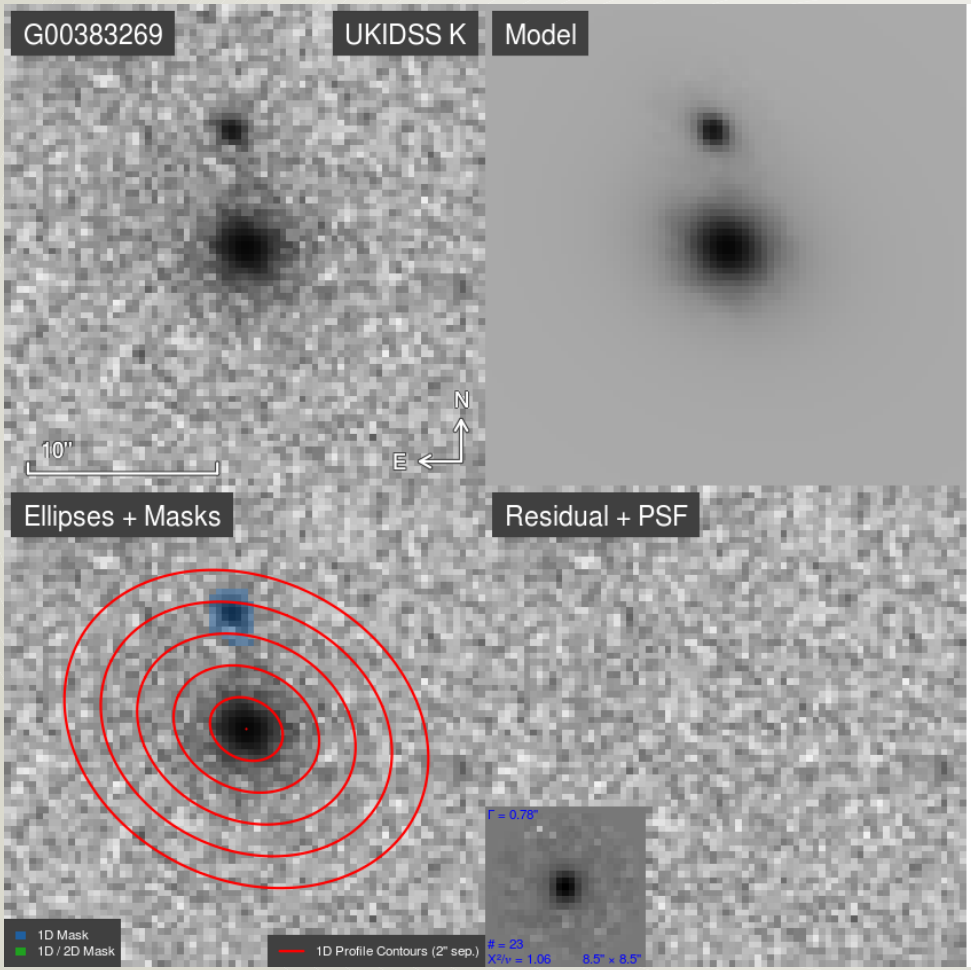
Sersic Photometry

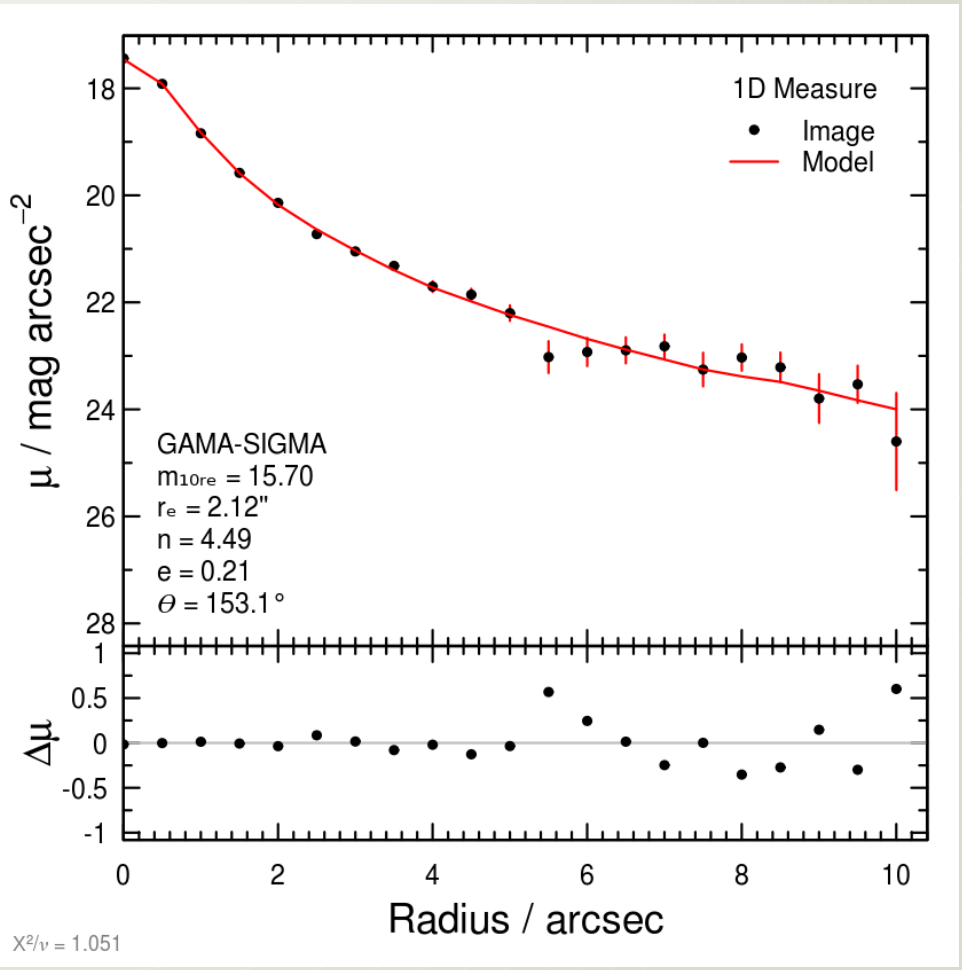




Kelvin et al (2012)

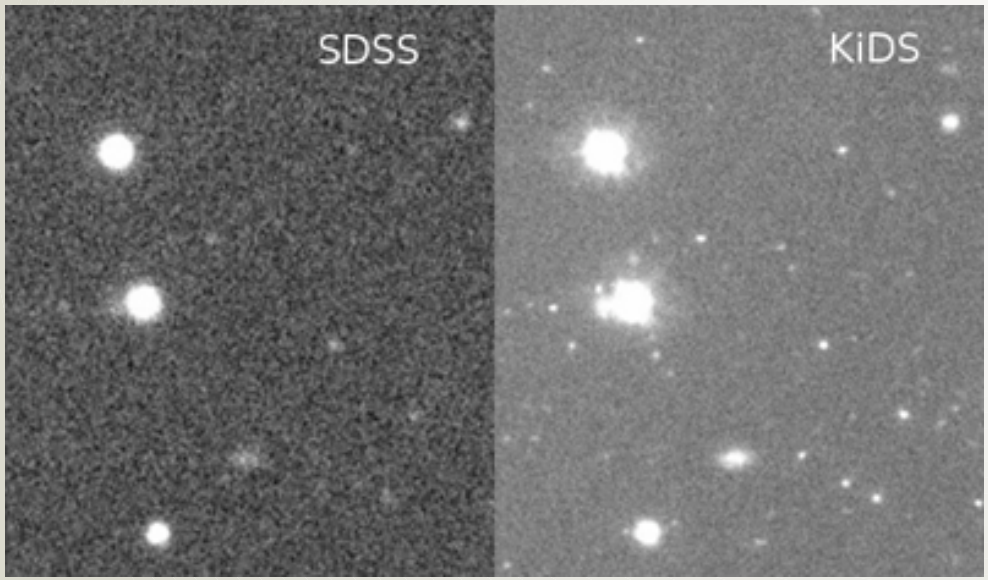
Sersic Photometry

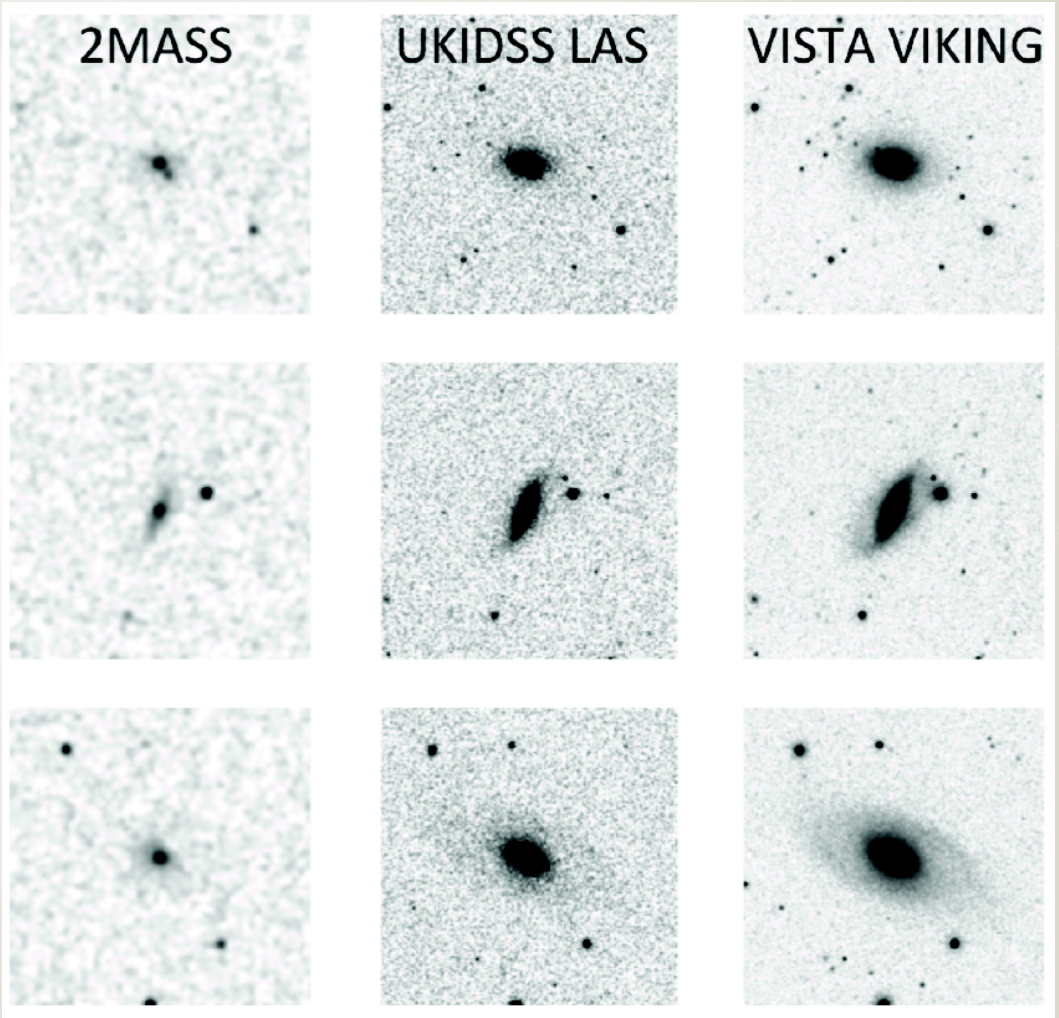




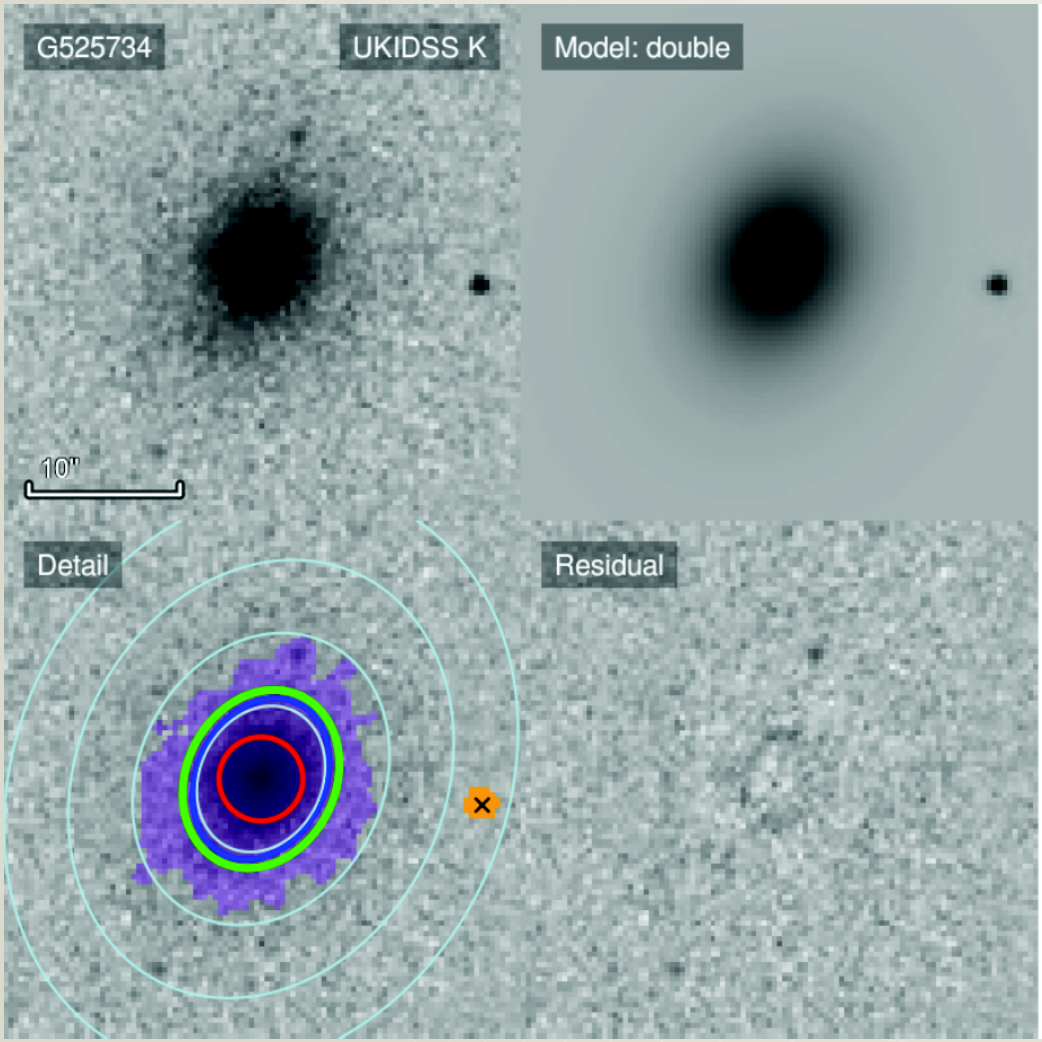
Kelvin et al (2012)

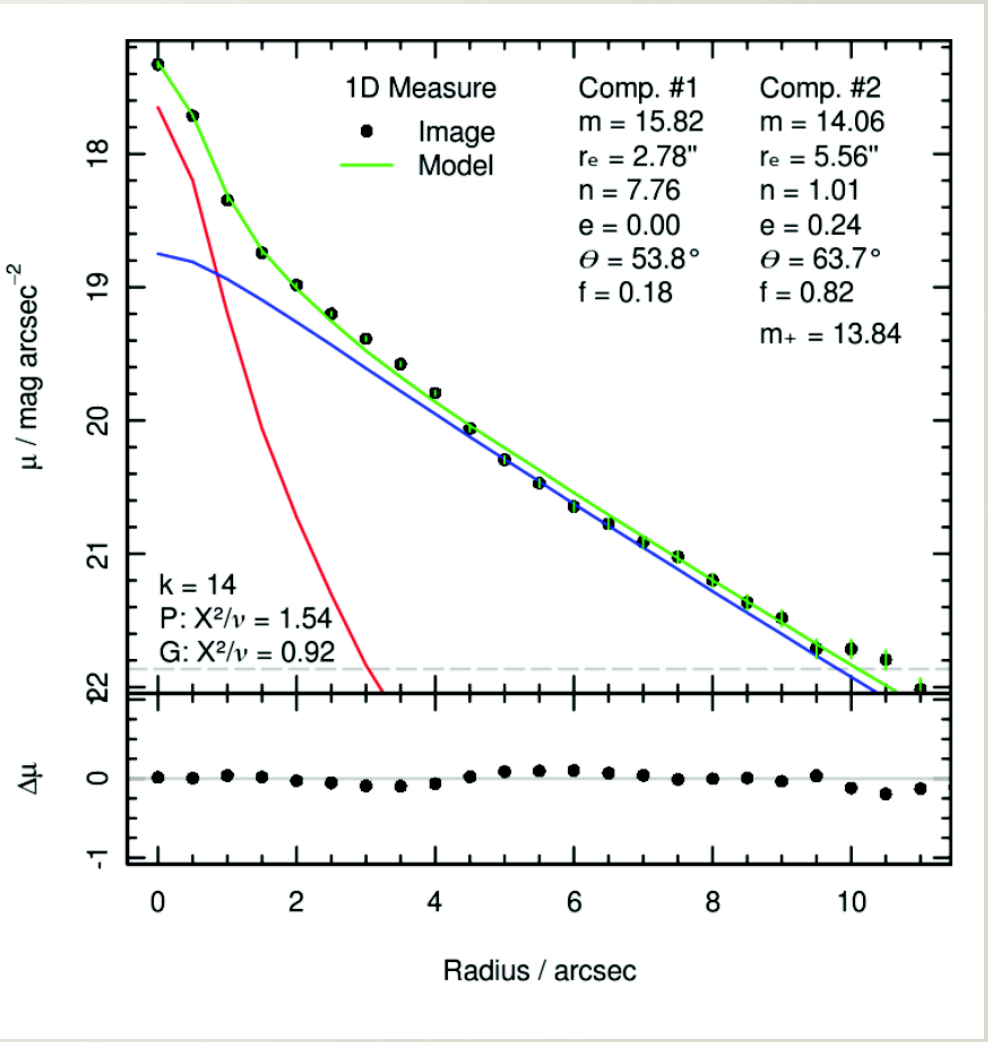
Improved image quality: KIDS / VIKING





B/D decomp: UKIDSS vs VIKING





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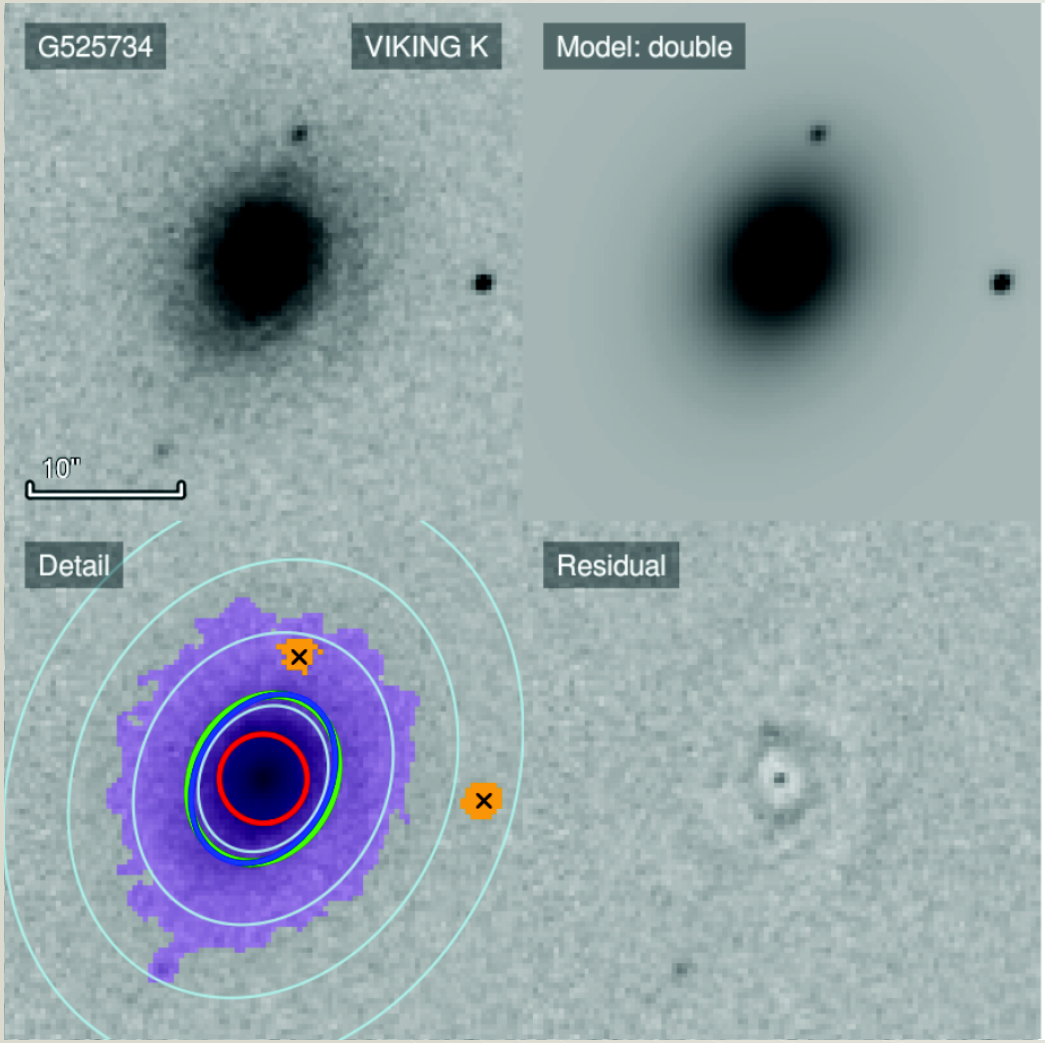
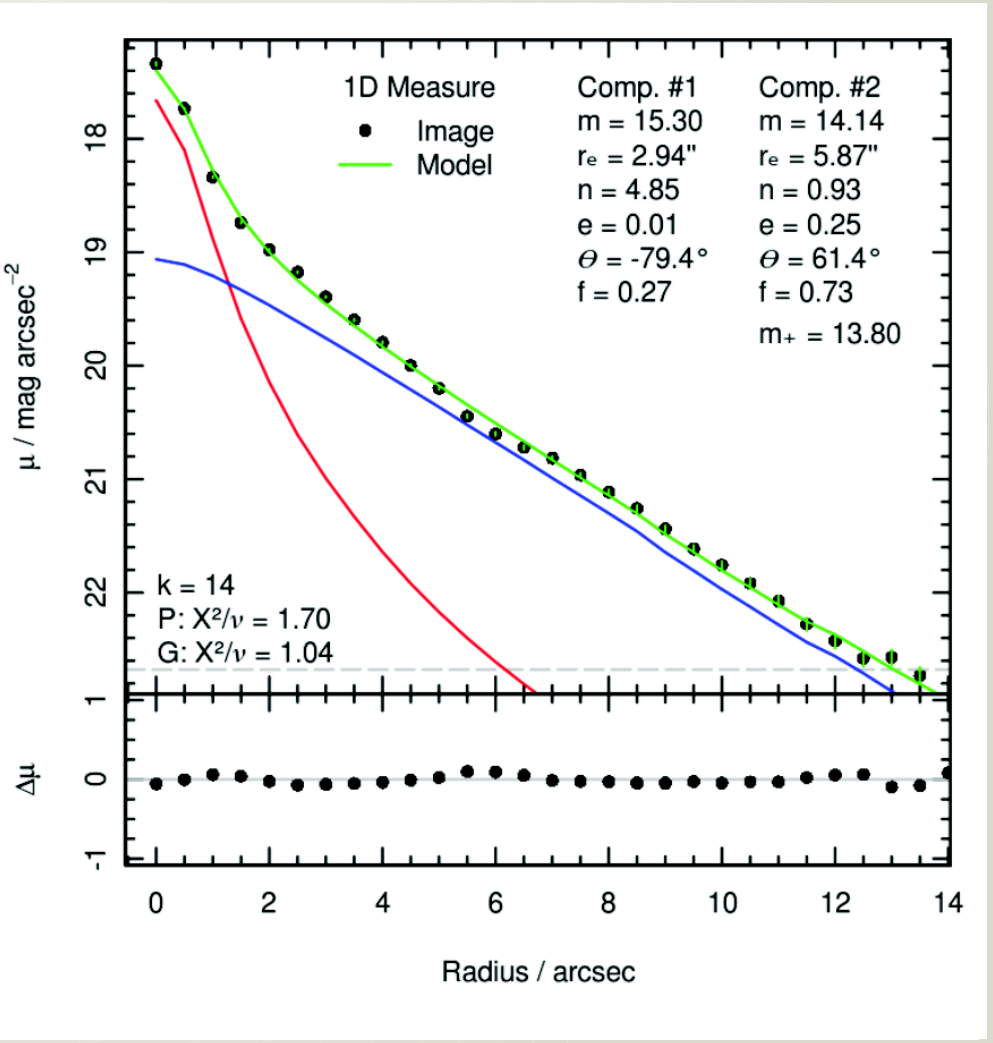
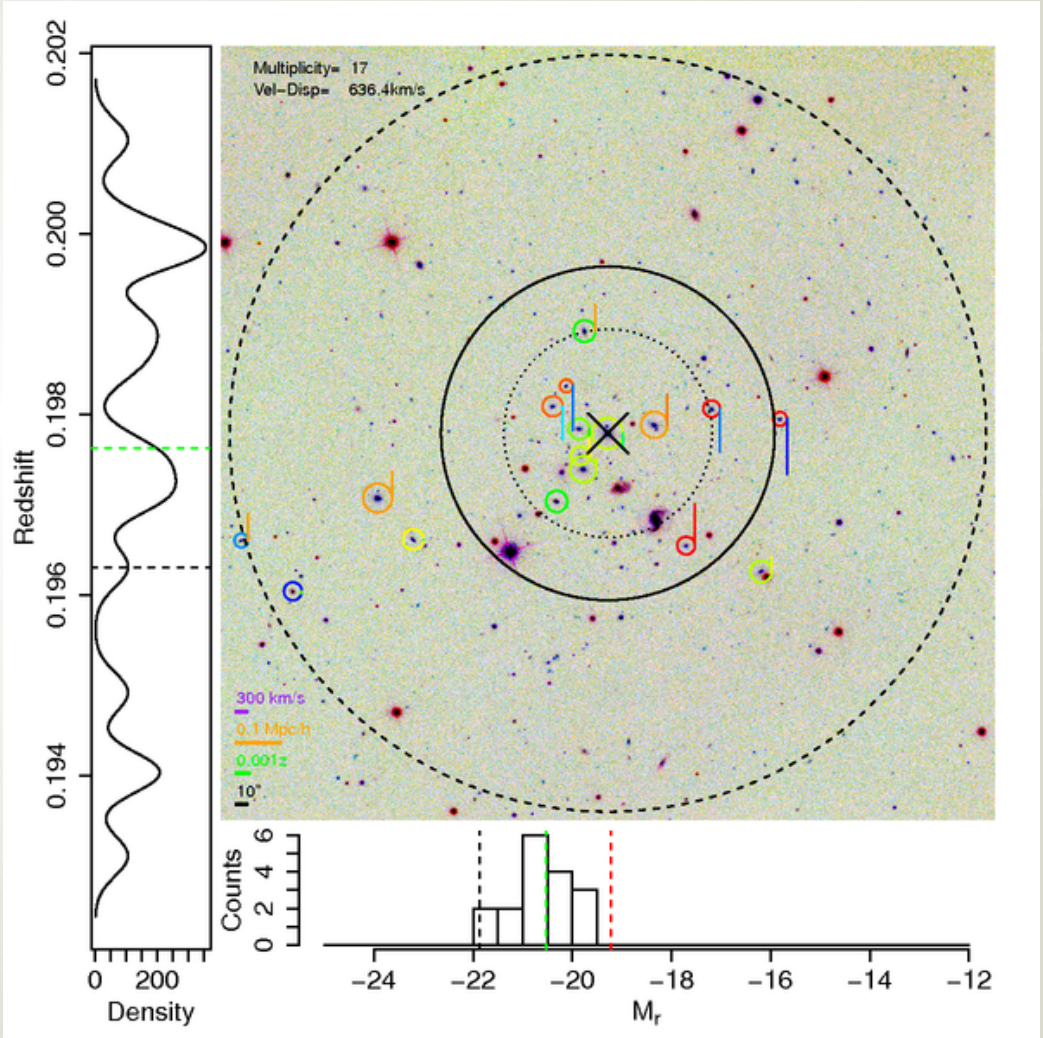




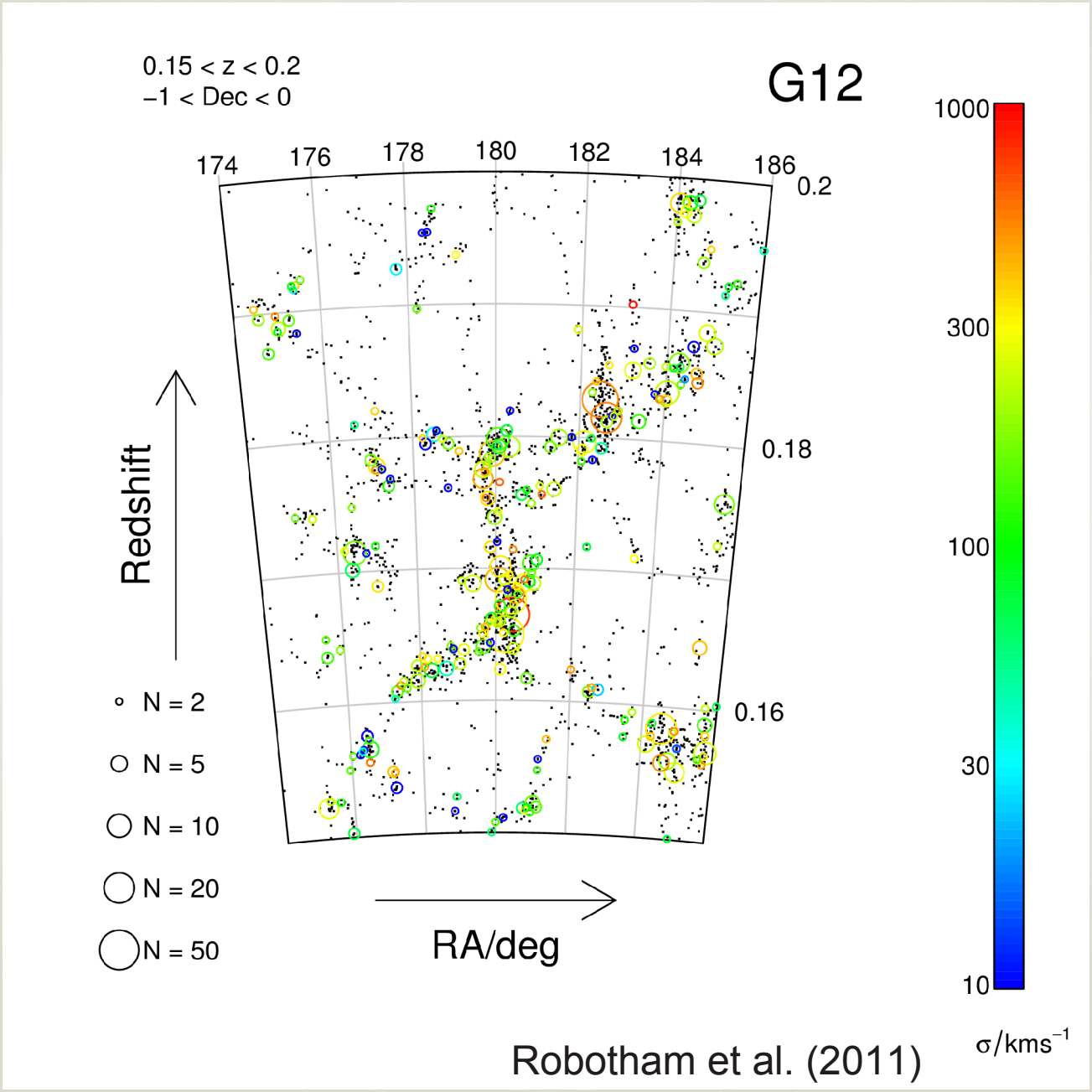
GAMA Galaxy Group Catalogue

- FoF algorithm to define groups
- Extensively tested against mocks
- 14,388 groups
- 1591 groups with N > 4



Robotham et al. (2011)

GAMA Galaxy Group Catalogue



Robotham et al. (2011)

Science

20 papers published using the first 68 nights of data only:

- Christodoulou et al.....Colour and Luminosity dependent clustering
- Foster et al.....Mass-metalicity relation
- Driver et al.....Cosmic Spectral Energy Distribution z<0.1
- Robotham et al.....Milky Way Analogues
- Wijesinghe et al.....Star-formation rate variations
- Alpaslan et al.....Caustic Masses
- Kelvin et al.....Sersic analysis
- Baldry et al.....Stellar mass function
- Loveday et al.....Luminosity functions (ugriz)
- Taylor et al.....Stellar Masses
- Prescott et al.....Satellite distribution
- Robotham et al.....Group Catalogue
- Gunawardhana et al.....SFR and IMF
- Wijesinghe et al.....UV index
- Brough et al.....Blue fuzzies
- Driver et al.....Survey diagnostics
- Hill et al.....Photometry
- Wijensinghe et al.....Dust obscuration
- Baldry et al.....Input catalogue
- Robotham et al.....Tiling

+ 13 papers by H-ATLAS / VIKING

Data Release 2 coming up (Nov)

- Spectra and redshifts to r < 19.0 in G09, G12; r < 19.4 in G15 (72,225 objects)
- Emission line and SFR measurements (Hopkins et al., submitted)
- ugrizYJHK aperture matched photometry (Hill et al. 2011)
- Sersic photometry (Kelvin et al. 2012)
- GALEX photometry (Seibert el al., in prep)
- Stellar masses (Taylor et al. 2011)
- Group catalogue (G15 only, Robotham et al. 2011)
- Environment measures (Brough et al., in prep)

www.gama-survey.org

G209807

$r = -15.2+/0.01$

$z = 0.0539$

$n = 3.15$

$R_e = 3.48''$

$M_r = -22.0+/-0.02$

$\log M_* = 10.8+/-0.1$