Mass and Luminosity Functions from the Finalised 6dF Galaxy Survey

Heath Jones (AAO)

- 5 years of Observing: May 2001 to Jan 2006
- 137k spectra measured across 4/5 of the southern sky
- 124k robust extragalactic redshifts
- Previous Data Releases: Dec 2002, Mar 2004, May 2005

Image © AAC

Final Data Release: Oct/Nov 2006

Mass and Luminosity Functions from the Finalised 6dF Galaxy Survey





Australian Research Council



2MASS

Institute 🛞

Astronomy

MICRON ALL SK

for

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The 6dF Galaxy Survey:

- The 6dFGS is a combined redshift and peculiar velocity survey, incorporating...
 - → NIR-selected redshift survey of the local universe
 - Peculiar velocity survey using FP distances
 - Additional redshift surveys of other 'interesting' source samples.

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 - Additional redshift surveys of other 'interesting' source samples.
- Survey strategy...
 - survey whole southern sky with |b|>10°
 - primary redshift survey: 2MASS galaxies to K_{tot}<12.75</p>
 - secondary samples: H<13, J<13.75, r<15.6, b<16.75</p>
 - 11 additional samples: radio, X-ray, IRAS...
 - Peculiar velocity survey: ~15,000 brightest early-type galaxies

Final 6dFGS Sky Coverage



We aimed for 1598 fields over that part of the southern sky with |b|>10°.

1542 fields were observed (96%) of which 1464 (95%) yielded usable data.

Final 6dFGS Sky Coverage





Redshift Maps:



Redshift Maps:





- satisfactory as a general luminosity distribution.
- However, we have found significant deviations from the Schechter form across

Luminosity Functions: Near-Infrared and Optical



- -25 Schechter function satisfactory as a general approximation of the
- However, we have found significant deviations from the Schechter form across

Galaxy Colours vs Redshift: K and b_J-samples



Galaxy Colours vs Luminosity: K and b_J-samples



K-band Stellar Mass Function:



Near-Infrared (NIR) luminosities are close tracers of the stellar mass function of collapsed structures

NIR light is dominated by the older and cooler stars comprising the bulk of stellar mass.

 Mass-to-light ratios are better constrained in NIR passbands.

 Extinction and cosmological kcorrections are also smallest in the NIR.

K-band Stellar Mass Function: Comparison



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K-band Stellar Mass Function: Changing IMF



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6dFGS Public Data Releases: Past and Upcoming

Data Release 2 (April 2005): Spanning Jan 2002 – Oct 2004
→ 89211 spectra; 83014 unique redshifts; 936 fields

Final Data Release (Oct/Nov 2006): All data: May 2001 – Jan 2006
→ ~137k spectra; ~130k unique redshifts; 1464 fields

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Database

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FITS files

Database Access

AAO 6dF pages

RSAA 6dFGS pages

Publications



IFA ROE

6dF Galaxy Survey Database

http://www-wfau.roe.ac.uk/6dFGS/



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6dFGS Online Database:

Searchable using either SQL query commands or a WWW form

- Each source has its own multiextension FITS file
- The different target catalogues are also fully searchable online