Galaxy And Mass Assembly (GAMA)

The case for a new redshift survey of 250 thousand galaxies
(using AAOmega, the 2dF upgrade on the AAT)
Team

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• Co-Is: many, e.g. … Steve Bamford, Edd Edmondson, Nick Cross, … UKIDSS, KIDS, VIKING, ICC
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SDSS: redshifts to 0.2 from the main galaxy sample
SDSS(\textsc{main}) + 2dFGRS

- Cosmological parameters, LSS clustering
- Luminosity functions
- Effect of environment
- Star formation histories
- Bimodality in colour / emission lines
- Galaxy properties: AGN, metallicity, post-starburst, etc.
GAMA primary science goals

- Group halo mass function
- Galaxy stellar mass function
- Merger rates
- Selection
  - $r<19.8$ ($\sim 1000 / \text{deg}^2$)
  - $K<17.0(18.9_{\text{AB}})$ & $19.8<r<20.5$ ($\sim 300 / \text{deg}^2$)
- Area: 200 square degrees
Halo mass function: using group finder, velocity dispersions, mock catalogues.
Figure adapted from Eke et al. 2006
SF efficiency decreasing

0.008 < z < 0.1
PEGASE.2 magnitudes for SSPs:
- up to 12 Gyr
- log (stellar mass) = 7.5
- redshift = 0.008

- low metallicity
- high metallicity

GAMA selection

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Merger rates

- Close pairs (sky and redshift space)
- Asymmetric light distribution (imaging from VST-KIDS and VISTA-VIKING)
Spectroscopy

• Requires ~ 150 nights of time on AAT using AAOmega.
• Problem: UK-led science but the UK’s share of AAT is going down!
• ? 75 nights from standard TAC and 75 nights purchased directly ?
  – Other options?
GAMA

- **PIs:** Driver (St Andrews), Baldry (LJMU), Hopkins (Usyd), Liske (ESO), Nichol (Ports.), Norberg (Edin.), Peacock (Edin.) + 16 Co-Is
- **Associated groups:** UKIDSS LAS, VST KIDS, VISTA VIKING, ICC
- **Building on success of the 2dFGRS, SDSS and MGC**
- **200 sq degrees (2x100 sq deg. chunks each 4x25deg), 250k galaxies**
- **General science:**
  - A study of structure on 1kpc-1Mpc scales, where baryon physics is critical
  - Tracing how mass (stars and cold gas) follows light
  - Provide a definitive zero redshift benchmark for the JWST and the SKA
- **Specific goals:**
  - the CDM Halo mass function from group velocity dispersions
  - the stellar mass function into the dwarf regime
  - the HI mass function and associate gas/stellar mass ratios
  - the baryonic mass function and baryon to dark matter ratios
  - determine the galaxy merger rates as a function of mass ratio
- **Provision of a SDSS/2MASS like public database incorporating:**
  - Optical: ugrí (VST), spectra (AAT)
  - Near-IR: ZYJHK (VISTA)
  - Radio: 21cm (xNTD, SKADS)
Galaxy Evolution versus Environment and Mass

Hopkins & Beacom 2006

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