Star Formation and AGN Activity in Interacting Galaxies: A Near-UV Perspective

Caroline Scott, Sugata Kaviraj
Imperial College
AIM:

- Use near-UV (NUV) measurements to study star formation in interacting galaxies
- Investigate whether properties such as mass/morphology/environment affect resulting star formation
- Test for observational evidence of ‘ignited’ AGN activity
Why NUV?

- Sensitive to recent star formation < ~1 Gyr
- H-alpha limited by finite fibre size
• SDSS DR7 closepairs
• Spectroscopic and photometric survey
• 5 optical bands: u, g, r, i, z
• Extracted by small angular separation < 30 kpc and Δz < ~500 km s\(^{-1}\) (Patton et al. 2005)

• Crossmatched with GALEX data for Near-UV (allows NUV-r colours)
• K-corrected SDSS/GALEX mags (Blanton et al. 2007)
• Derived mass estimates (Wang et al. 2006)
• Derived SFRs from NUV mags (Iglesias-Paramo et al. 2006)
• Crossmatched with environment catalogue (Yang 2007)
• BPT analysis
• SDSS fracdev_r parameter for morphology
• Projected separation, also wide pairs (0-150kpc)
Stellar masses:

- ~0.2 dex higher for close pairs
- Lies within 0.3 dex mass error from mass calculation
Iglesias-Páramo et al. (2006):
\[ \log \text{SFR}_{\text{NUV}} (\text{M}_\odot \text{ yr}^{-1}) = \log \text{L}_{\text{NUV}} (\text{L}_\odot) - 9.33 \]
$$d(\text{SSFR}) = \text{SSFR(\text{bin in question})} - \text{SSFR(90-130kpc bin)}$$
\[ d(\text{SSFR}) = \text{SSFR(bin in question)} - \text{SSFR(90-130kpc bin)} \]

Low masses: \(6.30 \times 10^{-11}\text{yr}^{-1}\) (a factor of 4.25 increase)

High masses: \(1.91 \times 10^{-12}\text{yr}^{-1}\) (a factor of 2.46 increase)
Environment

\[ d(\text{SSFR}) = \text{SSFR}(\text{bin in question}) - \text{SSFR}(90-130\text{kpc bin}) \]

Field: \(4.69 \times 10^{-11}\text{yr}^{-1}\) (a factor of 2.11 increase)
Group: \(3.05 \times 10^{-12}\text{yr}^{-1}\) (a factor of 1.61 increase)
Clusters: No significant increase
All masses

High masses only (>10^{10}M_\odot)

Field, High masses only

Group, High masses only

Decline of 2.03% in Seyferts

Rise of 3.20% in Seyferts

Overall decline of 2.77%
Summary and Conclusions

- GALEX NUV and SDSS optical measurements to study galaxy close pairs
- Mass: factor of 4.25 SSFR increase for low mass pairs, factor of 2.46 increase for high mass pairs
- Environment: factor of 2.11 SSFR increase in SSFR in field, factor of 1.61 increase in groups
- Spirals generally show more RSF, increases much more rapidly with final stage ellipticals
- Decline of 2.03% in the Seyfert fraction in field, Decline of 2.77% in the Seyfert fraction in groups (preceded by a 3.20% rise in the 15-30kpc sep. bin)