SFR Relation with Galaxy Environment and Colour at z between 0.03 and 0.1

Premana W. Premadi and A. Sitti Maryam

Department of Astronomy, Institut Teknologi Bandung, Bandung 40132, Indonesia
email: premadi@as.itb.ac.id

1. Introduction

This work is a preliminary result of our attempt to examine the use of SFR in the study of galaxy evolution. For this purpose we use the Sloan Digital Sky Survey Data Release 2 (SDSS DR2) Abazajian *et al.* (2004) and the SFR Catalogue generated from this data set by Brinchmann *et al.* (2004) and Kaufmann *et al.* (2003). Following Kewley *et al.* (2001) we use the Diagnostic Diagram, log ([OIII]/Hβ) vs log ([NII]/Hα), to separate the star forming galaxies from other emission lines sources such as AGN. Choosing only those with S/N > 3 out of the Brinchmann *et al.* (2004) catalogue, we arrive at about 200 thousand galaxies as our starting SFR subsample. With 0.05 < z < 0.22 and limit at r = 17.77, the subsample can be used to reconstruct the properties of a volume limited sample of galaxies with M* = 6 10^{10} M$_\odot$. We benefit from the fact that Brinchmann *et al.* (2004) SFR Catalogue has already been aperture-corrected using the likelihood distribution P(SFR/Li/colour) scheme. For the environment, we use the data generated by Kaufmann *et al.* (2003), and arrive at about 40 thousand target galaxies. In this work the environment is characterised by the number (N=0-30) of neighbouring galaxies within a projected radius of 2 Mpc and velocity difference of 500km/s from each target galaxy, and the magnitude limit is 14.5 < r < 17.77.

2. Results

Our resulting correlation between SFR and N shows rough downward slope at the lower N, followed by gentler downward slope at higher N, which is similar to the result shown by Gomez *et al.* (2002) and supports the more general finding that SFR goes down as density increases. As an important part of our work, we complement our study of SFR vs. density with a study of SFR vs. colour, where colour is expected to represent galaxy morphological type. The colours of the galaxy are taken in u-g and g-r, and we use Strateva *et al.* (2001) scheme to identify the galaxies as either early type or late type. We plot the SFR against u-r colour to see the dependence of SFR on colour. For the late type, the SFR decreases towards the red with a rather tight correlation, whereas for the early type the SFR still goes down but with larger scatter. The composite figure shows the relation between SFR and various environment, colour, and redshift.

References

Abazajian *et al.*, 2004, *AJ* 128.
Brinchmann *et al.*, 2004, *MNRAS* 351.
Gomez *et al.*, 2002 *ApJ*, 584.
Kaufmann *et al.*, 2003 *MNRAS*, 341.
Kewley *et al.*, 2001 *AJS*, 132.
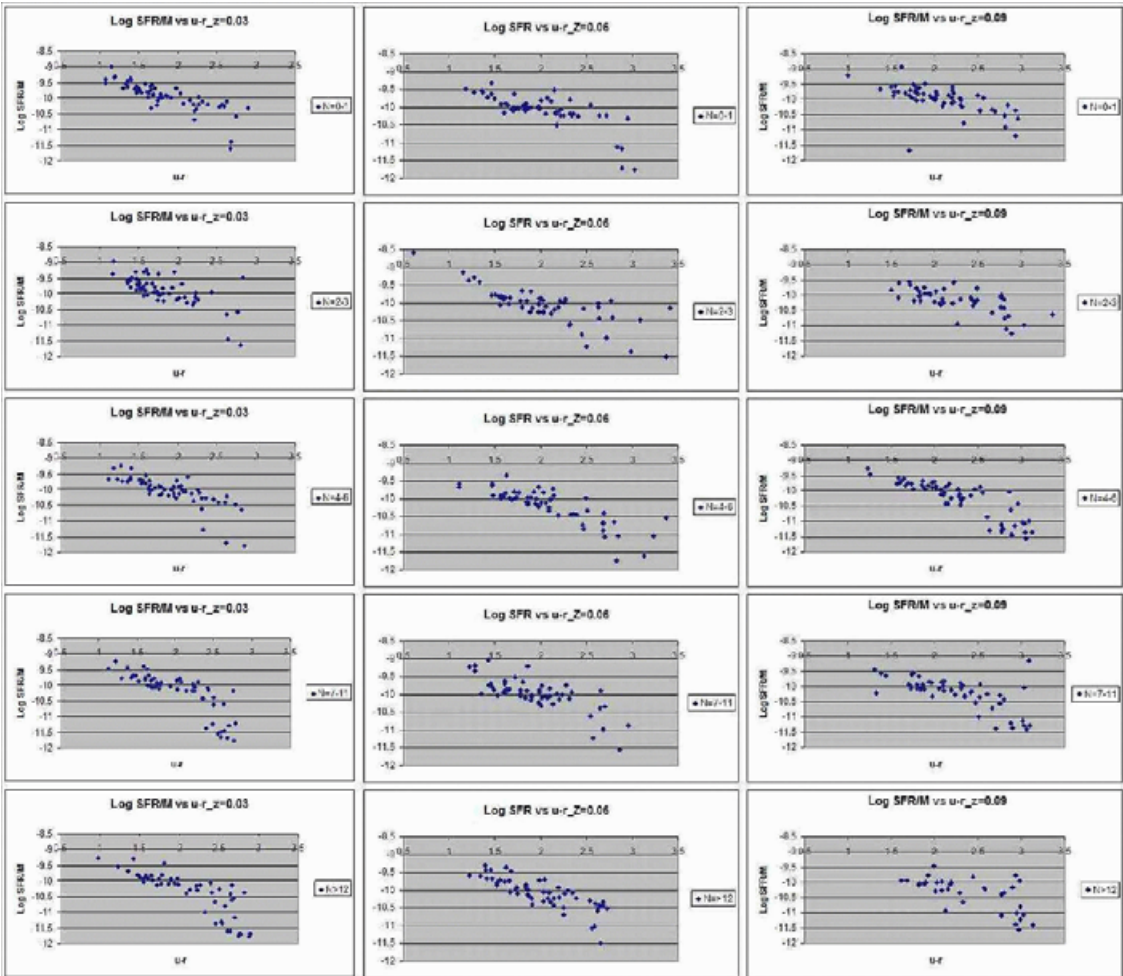Strateva *et al.*, 2001, *AJ* 122.

Figure 1. SFR relation with environment, colour, and redshift.