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Star Formation Rates of a $z \sim 1$ DEEP2 Galaxy Sample from LIRIS Multi-slit Hα Spectroscopy

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Abstract. We present preliminary results of Hα near-infrared (NIR) spectroscopy of 16 galaxies with redshifts in the range $0.8 \leqslant z \leqslant 1.0$ drawn from the DEEP2 Galaxy Redshift Survey. The spectra were taken using the multi-slit mode of LIRIS (Long-slit Intermediate Resolution Infrared Spectrograph), installed at the 4.2-m WHT. Twelve out of 16 spectra yield robust ($> 5\sigma$) Hα detections. We compare star formation rates (SFRs) from Hα luminosities to those derived from DEEP2 rest-frame UV measurements. This study is part of a larger program to obtain accurate Hα luminosities of about 50 star-forming galaxies at $z \sim 1$ in the Extended Groth Strip. Our scientific goals are the measurement of SFRs from Hα, and the comparison and calibration of Hα and other SFR tracers at $z \sim 1$. The study will be complemented with galaxy stellar masses, reddening estimates, galaxy morphologies and metallicities.

Keywords. Galaxies: evolution, galaxies: high-redshift, infrared: galaxies

1. Preliminary results

We selected galaxies for which we expected to detect Hα in the J-band, based on [O II] emission line detections in DEEP2 (Davis *et al.* 2003) optical spectra, and with redshifts such that Hα will appear in regions of good atmospheric transmission. We obtained J-band spectra of these galaxies using LIRIS multi-slit mode (Manchado 2004). We carried out spectroscopic reduction and calibrations, we measured Hα integrated fluxes and derived Hα luminosities. We also derived rest-frame UV luminosity densities from DEEP2 B-band magnitudes. SFRs from Hα and UV luminosities were then obtained using Kennicutt (1998) conversions. Our SFRs inferred from Hα are smaller than the UV SFRs in most cases (see on-line figure 1), and no extinction correction has been applied yet. Other studies of the UV continuum - Hα SFR relation at high redshifts (e.g. Glazebrook *et al.* 1999) had found completely opposite results, with underestimations of the UV SFRs by a factor of 2 or 3 (from no extinction corrected data). One reason for this discrepancy is that we have not yet applied aperture corrections to make up for our 0.9 arcsec wide slit. However, other sources of discrepancy should be studied to explain these differences.

References

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2. On-line section

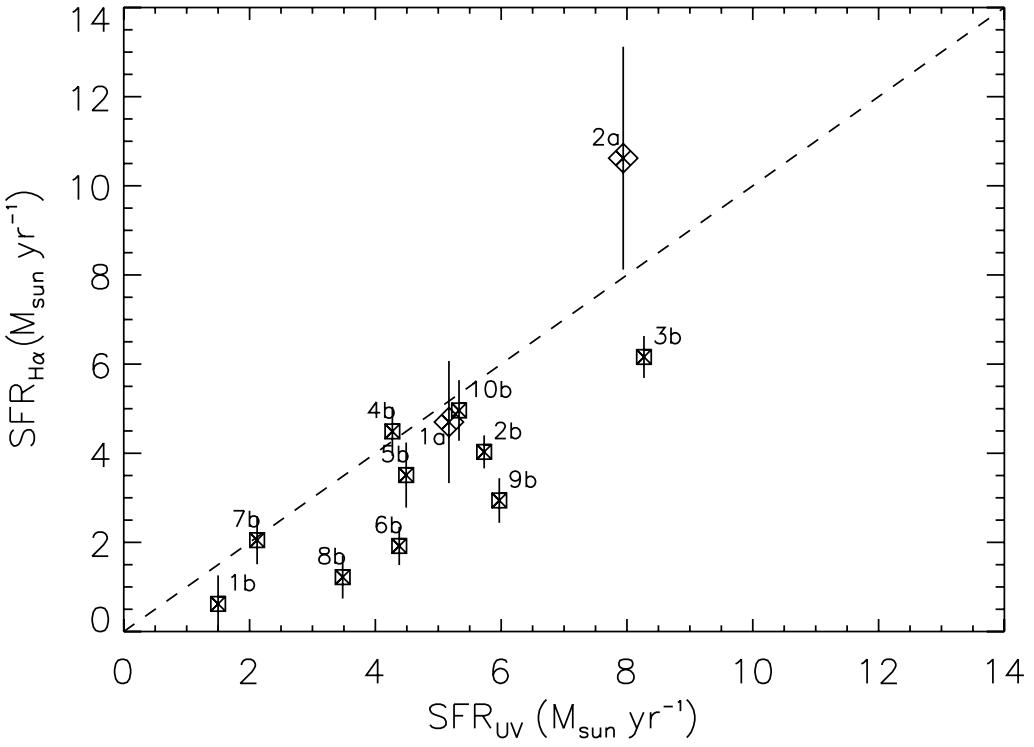

Figure 1. Comparison of the SFRs obtained from Hα and from the UV continuum luminosities for the individual galaxies in our LIRIS-DEEP2 sample. The dashed line represents the relation SFR(Hα) = SFR(UV) using Kennicutt (1998) conversions. No aperture or extinction corrections have been applied yet.

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