Title:	Star Formation Rates of Star Forming Galaxies in the Extended Groth Strip
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Issue Date:	10-Sep-2018
Publisher:	IISERM

Abstract:	Galaxy formation and evolution is an important open astrophysical problem in mod- ern cosmology. Optical and Infrared studies of the deep fields (the Groth Strip, the Subaru Deep field, COSMOS etc) have helped make huge advancements in the un- derstanding of galaxy formation and evolution. Probing star formation in galaxies at different redshifts helps to trace the amount of gas being converted to stars at different points of time, which is an important aspect of galaxy evolution. Most of the studies use ultraviolet/infrared/optical spectral lines, e.g., OII, OIII, Hα lines, or continuum emission, e.g., U band flux, as probes for star formation in galaxies. These probes are susceptible to dust attenuation because of the dust present in the source galaxy, the inter stellar medium, the inter galactic medium and the Milky Way. The extinction due to dust leads to an under estimation of the star formation rate. Al- though the re-emission by dust in the Infrared region can be used to estimate the total star formation rate (SFR), this requires the knowledge of the wavelength dependent dust attenuation factor, which is poorly known. However, multiwavelength studies of galaxies have been done and have given interesting results on star formation, dust attenuation and galaxy evolution. Emission in the radio window from these galaxies is unaffected by dust. The non-thermal emission from normal galaxies is synchrotron radiation from relativistic electrons and thermal emission is free-free emission from HII regions. The emission in the radio window in normal galaxies is not dominated by stellar populations older than 100 million years. This means that radio emission gives an estimate of the recent star formation rate, whatever be the history of star formation in the galaxy. These reasons make radio emission an excellent probe to study star formation in galaxies as an unobscured estimator. The rest frame 1.4 GHz luminosity has been found to have a tight correlation with infrared luminosity ([1]), holding up to z~4, which can be used to estimate the star formation rate in intermediate to high redshift galaxies in a way unaffected by the dust. However, at intermediate to high redshifts, the emission from these galaxies is too faint for these galaxies to be detected individually with sensitivity of present day radio telescopes. To study the emission from such sources, a stacking analysis of the sources has to be used, which pushes the sensitivity levels way below the ones achievable by present day radio telescopes for direct imaging. The information obtained by stacking analysis is statistical in nature, but since we are interested in studying the behavior of typical star forming galaxies and not individual galaxies, this is not a heavy price to pay. For our analysis I have made a deep continuum L band image of the Extended Groth Strip (EGS) at 1.4GHz in AIPS, using 57 hours of on-source data from Giant Meterwave Radio Telescope (GMRT), India under the supervision of Prof. Jasjeet Singh Bagla at IISER, Mohali, India. This data is a subset of the data taken with GMRT for the study of HI 21 cm emission from galaxies at z<0.4 in the EGS, being undertaken by Prof. Nissim Kanekar (NCRA-TIFR, Pune), Prof. Jayaram Chengalur (NCRA-TIFR, Pune) and Prof. Jasjeet Singh Bagla (IISER Mohali).I would also like to point out in passing that there is still no deep low-frequency radio continuum image of the EGS, since the best present VLA 1.4 GHz image of this field has a RMS noise of 20 μJy/Bm ([2]) which is far more than the other extra-galactic deep fields. We have used a radio stacking analysis to study the behavior of star formation rate of the typical star forming galaxies up to z = 1.4 in the EGS. The sources to be used for stacking were identified using the DEEP2 survey catalogue ([12]). The current analysis that we have done is for the GSB data with a bandwidth of 32 MHz. With the stacking analysis we have studied the behavior of median total SFR and specific SFR with redshift, colour and stellar mass. We have also studied the behavior of dust extinction as a function of redshift, stellar mass and colour.