



Spitzer 70- μm Emission as a SFR Indicator for Sub-Galactic Regions

<http://www.firstlight.cn> 2010-10-03

We use Spitzer 24 μm , 70 μm and ground based H α data for a sample of 40 SINGS galaxies to establish a star formation rate (SFR) indicator using 70 μm emission for sub-galactic ($\sim 0.05-2 \text{ kpc}$) line-emitting regions and to investigate limits in application. A linear correlation between 70 μm and SFR is found and a star formation indicator SFR(70) is proposed for line-emitting sub-galactic regions as $\Sigma(\text{SFR}) \left(M_{\odot} \cdot \text{yr}^{-1} \cdot \text{kpc}^{-2} \right) = 9.4 \times 10^{-44} \Sigma(70) \left(\text{ergs} \cdot \text{s}^{-1} \cdot \text{kpc}^{-2} \right)$, for regions with $12 + \log(\text{O}/\text{H}) \gtrsim 8.4$ and $\Sigma(\text{SFR}) \gtrsim 10^{-3} \left(M_{\odot} \cdot \text{yr}^{-1} \cdot \text{kpc}^{-2} \right)$, with a 1- σ dispersion around the calibration of ~ 0.16 dex. We also discuss the influence of metallicity on the scatter of the data. Comparing with the SFR indicator at 70 μm for integrated light from galaxies, we find that there is $\sim 40\%$ excess 70 μm emission in galaxies, which can be attributed to stellar populations not involved in the current star formation activity.

[存档文本](#)