

R10a Age and Dust Degeneracy for Starburst Galaxies Solved?

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A spectral evolution model of galaxy that includes both stars and dust effects is newly built. Applying the model to 22 nearby starburst galaxies, we have shown that far infrared luminosity of galaxies helps to break the age-dustiness degeneracy. We have derived the unique solution of age and the dustiness for starbursts with an optical depth $\tau_V \leq 5$. The resulting starburst ages and the optical depths are in the range $10 \leq t \text{ (Myr)} \leq 400$ and $0.7 \leq \tau_V \leq 4.8$. The result is robust and almost independent of the details of dust distribution, extinction curve, and the burst strength. With a rapidly growing sensitivity of submillimeter detectors, it would become possible in near future to determine the age and τ_V of star-forming galaxies at redshifts $z \simeq 3$ and beyond. Accurate estimates of τ_V for Lyman-break galaxies might require a substantial revision of the previously claimed picture of star formation over the Hubble time.