R04a   Luminosity function of supernova host galaxy

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A massive star comes to the end of its life as a core-collapse supernova (CCSN). Substantial research has revealed the stellar properties of galaxies which host CCSNe through follow-up spectroscopy, such as the host stellar mass and host star formation rate (SFR). And it has been known that CCSN has a preference on late-type galaxies with star-forming activities in previous statistical studies. However, the luminosity function of CCSN host galaxy has not yet been understood, which is of importance as a statistical tracer on the large scale.

In this work, we performed spectral energy distribution (SED) fitting by CIGALE based on the Hyper Suprime-Cam Subaru Strategic Program (HSC-SSP) photometry, with which stellar masses and SFRs are estimated for spectroscopically confirmed CCSN hosts from the Sloan Digital Sky Survey-II (SDSS-II) Supernova Survey. The completeness of our samples is evaluated, and the luminosity functions are derived by the $1/V_{max}$ estimator in terms of galaxy luminosity, stellar mass, and SFR. Moreover, thanks to that SDSS-II provides a rather complete sample set of supernova Type Ia (SNIa) and that HSC-SSP provides galaxy photometry with relatively higher signal-to-noise ratios (SNRs), we are also able to improve the SNIa host luminosity function in the same fashion. The comparison between host properties of CCSN and those of SNIa is also discussed. This study can provide us an insight into the host environment of CCSN and that of SNIa by statistical means.