

### [7GC-17] The Luminosity of Type Ia Supernova as a Function of Host-Galaxy Morphology

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We have employed SNANA supernova analysis package to make YONSEI Supernova Catalogue 1, which contains distance modulus, light-curve shape parameters, and color or extinction values of each supernova. This database is used to study the dependence of Type Ia supernovae (SNe Ia) luminosities on the host-galaxy morphologies. The redshift range of this catalogue is  $0.010 < z < 1.555$ , and we use three light-curve fitters: SALT2, MLCS2k2 ( $R_v = 3.1$ ), and MLCS2k2 ( $R_v = 1.7$ ). We find a systematic difference in the Hubble residual (HR) of  $0.12 \pm 0.031$  mag between E-S0 and Scd/Sd/Irr host-galaxies, and of  $0.16 \pm 0.044$  mag between passive and star-burst host-galaxies. This difference is significant over the  $3\sigma$  level. Considering the significant difference in the mean age of stellar population between these morphological types, the difference in the HR reported here suggests that the evolution effect of SNe Ia luminosity should be considered in the cosmological application of SNe Ia data.

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### [7GC-18] Detecting the Signature of the First Stars through Planck CMB Polarization Observation

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We present the first simulations of cosmic reionization that include the first stars and their radiative feedback that limited their formation, in a volume large enough to capture the spatial variations that affected the process and its observability. We show that these first stars made reionization begin much earlier than without, and was greatly extended, which boosts the intergalactic electron-scattering optical depth and the large-angle polarization fluctuations of the cosmic microwave background (CMB) significantly. Although within current WMAP uncertainties, this will enable Planck see the signature of the first stars at high redshift, currently undetectable by other probes.