THE ASTROPHYSICAL JOURNAL
Published by the University of Chicago Press

Title Cosmological Results from High-*z* Supernovae

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Identifiers *The Astrophysical Journal*, volume 594, part 1 (2003), page 1
DOI: 10.1086/376865
Bibcode: 2003ApJ...594....1T

Abstract The High-*z* Supernova Search Team has discovered and observed eight new supernovae in the redshift interval z=0.3−1.2. These independent observations, analyzed by similar but distinct methods, confirm the results of Riess and Perlmutter and coworkers that supernova luminosity distances imply an accelerating universe. More importantly, they extend the redshift range of consistently observed Type Ia supernovae (SNe Ia) to $z\approx1$, where the signature of cosmological effects has the opposite sign of some plausible systematic effects. Consequently, these measurements not only provide another quantitative confirmation of the importance of dark energy, but also constitute a powerful qualitative test for the cosmological origin of cosmic acceleration. We find a rate for SN Ia of $(1.4\pm0.5)\times10^{-4}h^3\mathrm{Mpc}^{-3}\mathrm{yr}^{-1}$ at a mean redshift of 0.5. We present distances and host extinctions for 230 SN Ia. These place the following constraints on cosmological quantities: if the equation of state parameter of the dark energy is w=-1, then H0t0=0.96±0.04, and ΩΛ-1.4Ω M=0.35±0.14. Including the constraint of a flat universe, we find ΩM=0.28±0.05, independent of any large-scale structure measurements. Adopting a prior based on the Two Degree Field (2dF) Redshift Survey constraint on ΩM and assuming a flat universe, we find that the equation of state parameter of the dark energy lies in the range -1.48<w<-0.72 at 95% confidence. If we further assume that w>-1, we obtain w<-0.73 at 95% confidence. These constraints are similar in precision and in value to recent results reported using the *WMAP* satellite, also in combination with the 2dF Redshift Survey.