CMAGIC: A Novel Aproach to Type Ia Supernovae.

Gerson Goldhaber
LBNL and University of California at Berkeley

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Abstract

We have discovered several new properties of Type Ia supernovae which will impact future dark energy studies.[1] We show that fits to the color-magnitude relation of Type Ia supernovae after optical maximum can provide more accurate calibrations of extragalactic distance scales and extinction values. We obtain a linear region on the color-magnitude plot, corresponding to the color evolution, towards the red. The begining and end epoch of this linear region depend on the stretch value, higher stretch (or lower Δm_{15} and hence brighter SNe) correspond to longer linear regions. Beyond this region, as the SN enters the nebular phase, a second linear region begins during which the SN is evolving towards the blue. These features hold for all color combinations of the U, B, V, R and I filters. The magnitude B_{BV} at the color $B - V = 0$ shows less scatter on a Hubble diagram than the conventional magnitude B_{max}. In addition B_{BV} is less sensitive to extinction then B_{max}.

[1] L. Wang, G. Goldhaber, G. Aldering, S. Perlmutter, 2003, ApJ, 590, 944.