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Investigating the Gaussianity of Supernova SALT2 Summary Statistics

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ABSTRACT
Write an abstract.

1 INTRODUCTION

In the years since the discovery of the acceleration of our universe (Riess et al. 1998; Schmidt et al. 1998; Perlmutter et al. 1999), supernova cosmology continued to grow as an important cosmological probe. Recent supernova studies offer far greater statistical power than ever before, systematics are better understood, and the very phenomenon of supernova are described with improved models (Guy et al. 2007; Conley et al. 2011; Betoule et al. 2014; Rubin et al. 2015).

SNLS (Astier et al. 2006; Sullivan et al. 2011)

ESSENCE (Wood-Vasey et al. 2007)

Pan-STARRS (Tonry et al. 2012; Scolnic et al. 2014; Rest et al. 2014)

SDSS-II (Frieman et al. 2008; Kessler et al. 2009; Sollerman et al. 2009; Lampeitl et al. 2010; Campbell et al. 2013)

Harvard-Smithsonian Center for Astrophysics survey (CfA, Hicken et al. 2009)

Carnegie Supernova Project (CSP, Contreras et al. 2010; Folatelli et al. 2010; Stritzinger et al. 2011)

Lick Observatory Supernova Search (LOSS, Ganeshalingam et al. 2013)

Nearby Supernova Factory (SNF, Aldering et al. 2002)

HST used in (Riess et al. 2007; Suzuki et al. 2012)

Modern results systematic limited (Conley et al. 2011; Suzuki et al. 2012; Scolnic et al. 2014)

Efforts overcome (Ivezić et al. 2007; Regnault et al. 2009; Tonry et al. 2012)

DES

Compilations:

Suzuki 2012: Union 2.1 For citing SALT2, cite Guy2007, Guy2010, Mosher2014

Few sentences on cosmology.

Use of supernova in cosmology.

DES supernova (segue to precision)

Precision measurements, systematics more important than ever.

Thus motivation

2 MOTIVATION

SALT2 and other models

why summary stats are used (instead of light curve data)

fitting methodologies

highlight Previous studies using summary statistics and their data sets.

Assumed gaussianity.

3 METHODOLOGY

to investigate, go to lowest level and simulate light curves

to start with, realise only canonical supernova from abs mag with some scatter, using WMAP9 cosmology. Do this for shallow and deep fields, and fit the light curves using different methods.

state skewness introduced as z increases and ston decreases

which creates difference when between mean and max likelihood

section detailing the bias as a function of redshift (and ston if possible).

4 COSMOLOGICAL IMPACT

Fit cosmology against simulated SN

Do for des shallow and deep, using survey area to produce z dist plus extra low-z sample (0.05<z<0.2). simulate from light curves, apply selection effect of ston>5to cull bad fits. have <x> shallow.

toy cosmology model. adopt α and β values for Phillips correction from Betoule2014, assume known gaussian intrinsic scatter, have Ω_m, w and M_B as cosmology parameters - marginalise over M_B.

Show cosmology results.

5 CONCLUSIONS

The last numbered section should briefly summarise what has been done, and describe the final conclusions which the authors draw from their work.

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