La Silla/QUEST Low Redshift Supernova Survey

CSPII Meeting

C Baltay July 31, 2015

The Low Redshift Supernova Collaboration

- Supernova discovery surveys:
  - LSQ, PTF, ASAS,CSP, others
- Spectroscopic follow up:
  - CSPII, PESSTO, others
- Lightcurves:
  - CSP(Swope, duPont), LCOGT (1m telescopes,9 tot)

Progress and Plans

- LSQ Supernova survey started Dec 2011
- CSPII started Sept 2011, finished May 2015
  - Will continue to get galaxy templates
- PESSTO approved for 4 years
  - Apr 2012-Apr 2016
- LCOGT continuing
- Plan to end LSQ April 2016

Spectroscopic Typing of LSQ Candidates

Source of Spectra	Total Spectra	Total Supernovae	Type Ia	Type Ib,c	Type II
PESSTO	322	274	198	17	59
Other	137	116	77	12	27
Total	459	390	275	29	86

390/459 = 85% of spectra taken are supernovae

Light curve Analysis at Yale

- Thanks to Carlos Contreras, who spent a few weeks at Yale with Emma Walker to develop a set of analysis programs
- Analysed the first 33 Swope lightcurves

First Results from the La Silla-QUEST Supernova Survey and the Carnegie Supernova Project

E. S. Walker[1], C. Baltay[1], A. Campillay[2], C. Citrenbaum[1], C. Contreras[2,4], N. Ellman[1], U. Feindt[3], C. González[2], M. L. Graham[7], E. Hadjiyska[1], E.Y. Hsiao[4], K. Krisciunas[5], R. McKinnon[1], K. Ment[1], N. Morrell[2], P. Nugent[6,7], M.M. Phillips[2], D. Rabinowitz[1], S. Rostami[1], J. Serón[2], M. Stritzinger[4], M. Sullivan[8], B.E.Tucker[9]

First results published ApJS 219, 13 (2015)

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SALT2.4 fits to LSQ13ry
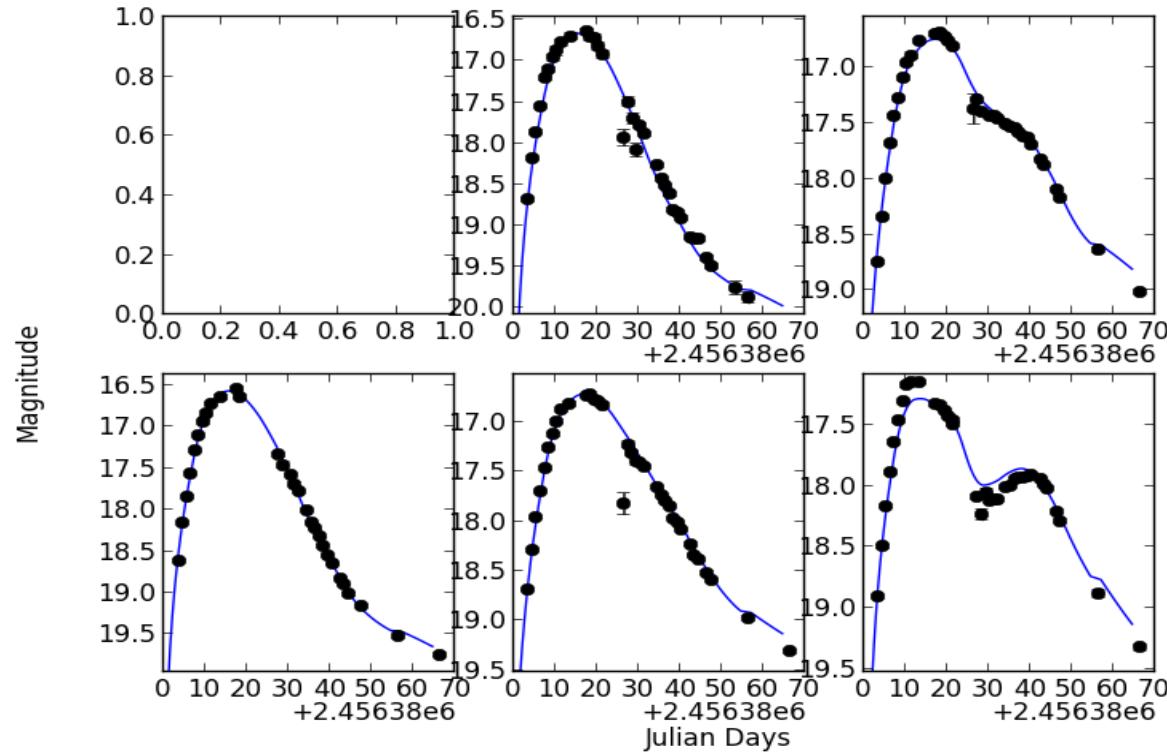
Light curves for supernova LSQ13ry
in filters u, B, r (top row) and g,V,i (bottom row).

Hubble Diagram of first 31 LSQ SNe
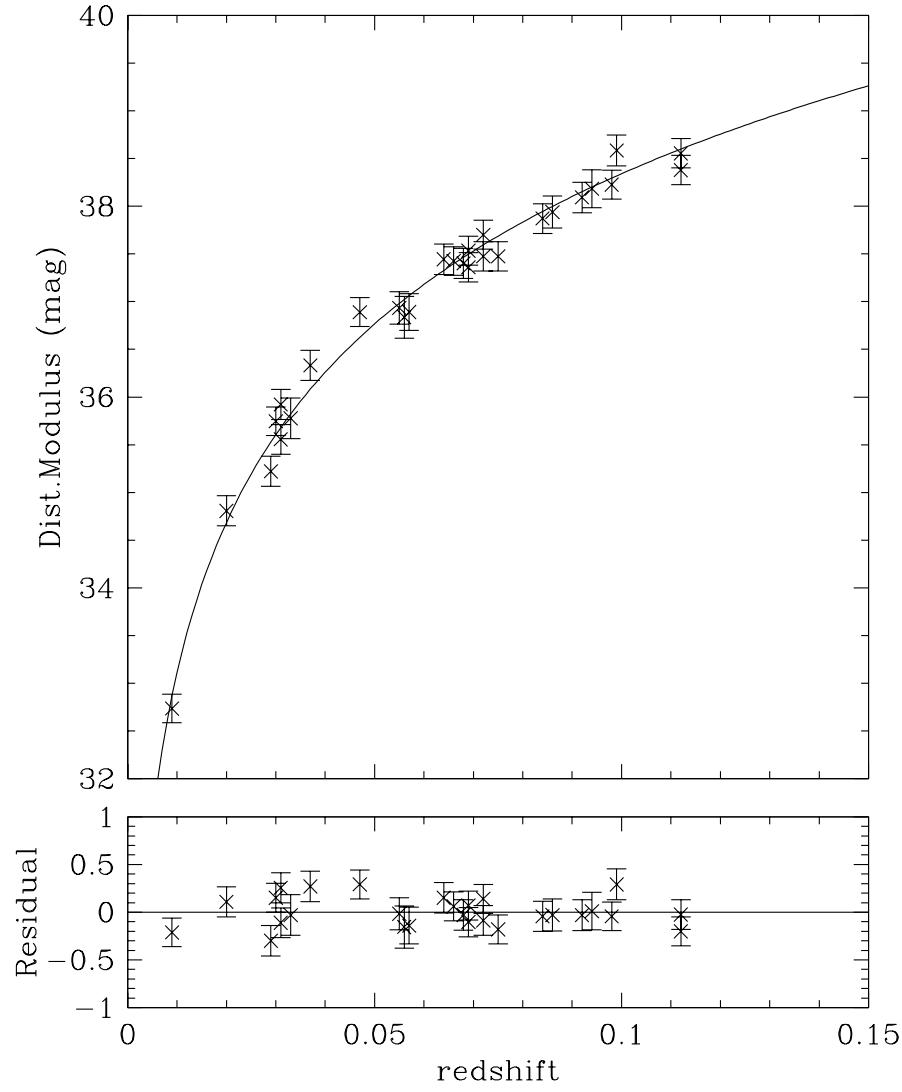
Results of the χ² Fit

Quantity	Best Fit Value
M	-19.07 ± 0.03
α	0.13 ± 0.05
β	2.23 ± 0.30
σ(intrinsic)	14%

$\mu = m_B{}^* - M + \alpha x_1 - \beta c$ where $x_1 = 10(s-1)$

Values of M, α, β and intrinsic spread are quite sensitive to which supernova are included in fit and the systematic errors assumed

LCOGT Lightcurves

Discovery Source	Type Ia lightcurves
LSQ	79
Other	61
Total	140

LCOGT 1 m telescopes

Telescope No	Location
4	Cerro Tololo, Chile
5	"
9	"
8	McDonald Obs. Texas
10	Sutherland Obs. South Africa
12	"
13	"
3	Siding Springs, Australia
11	"

We are just starting to calibrate these telescopes to get extiction coefficients and color terms

Also need to put the natural system of these telescopes into SALT2

First few LCOGT Supernova

Have adapted Carlos' analysis code to LCOGT data
First round of crude calibration of Cerro Tololo
Telescopes 4, 5, and 9
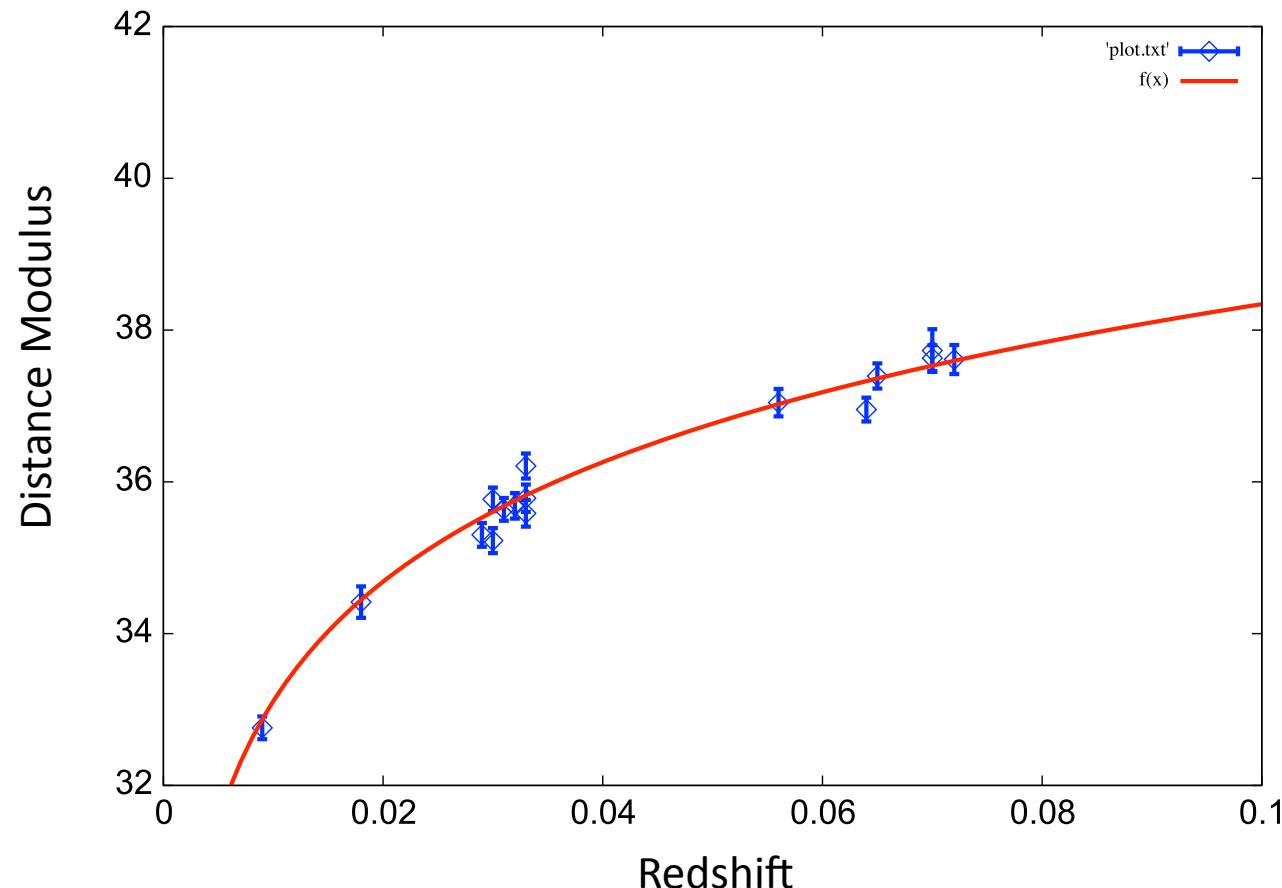
CSPII Type Ia Lightcurves

Discovery Source	Optical only	Some NIR	Total
LSQ	20	58	78
Other	96	64	160
Total	116	122	238

How do we plan to analyze these data ??