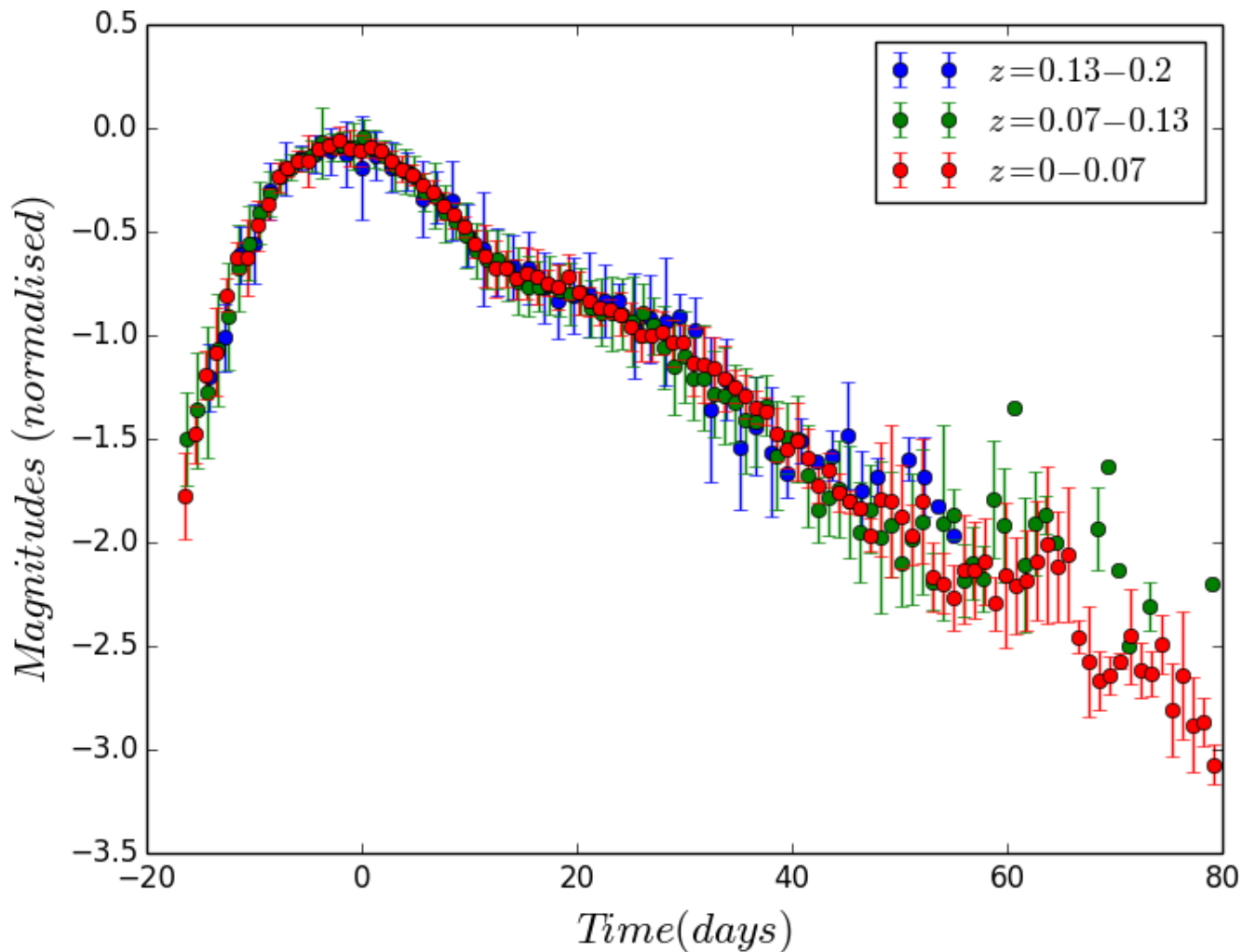


The R-band Hubble diagram -work in progress

Seméli Papadogiannakis

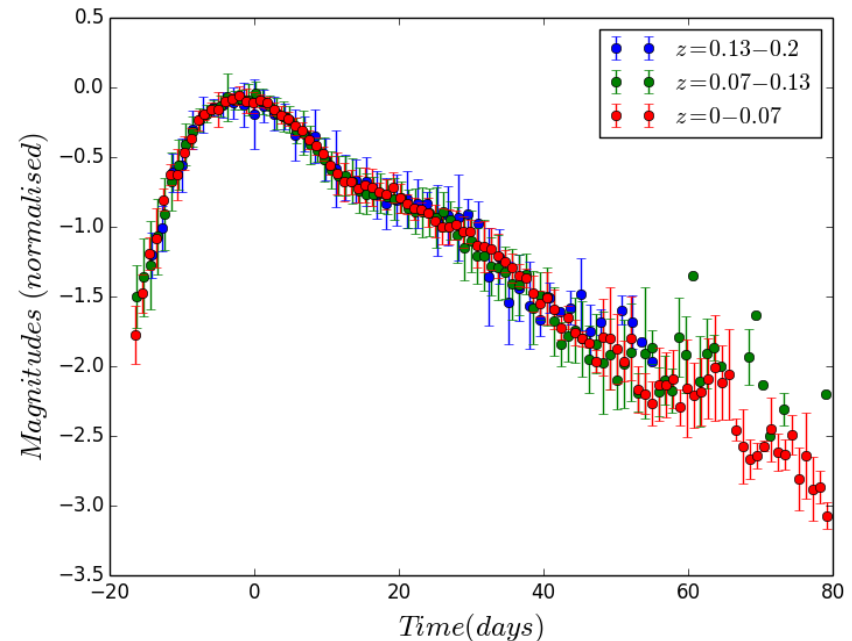


Building the R-band template



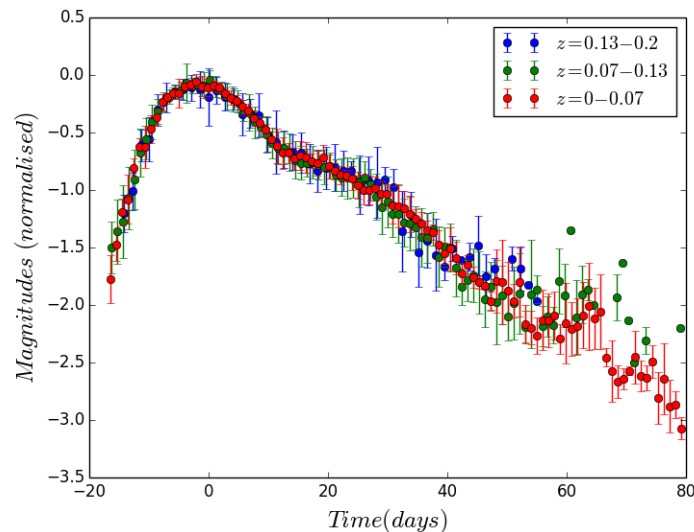
Selection criteria:

- More than 10 data points in the lightcurve. 3 before max and 5 post max.
- At least 4 points within 5 days of maximum.
- Data in lightcurve spanning at least 15 days.



Building the template

- Template built from -17 to +80 days wrt maximum
- All lightcurves normalised in amplitude (to zero) and shifted in time.
- Initial fit with a well-sampled SN and then fitted to each other.
- K-corrections applied from Hsiao et al. 2007 templates.

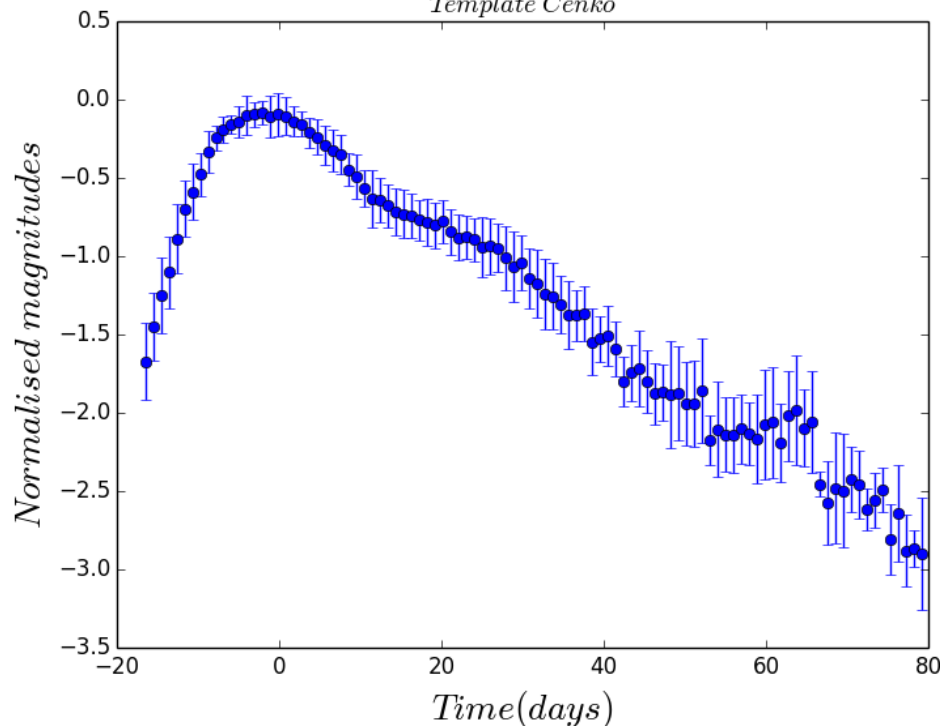


Comparing photometries

Only **2013** sample used (**95** type Ia).

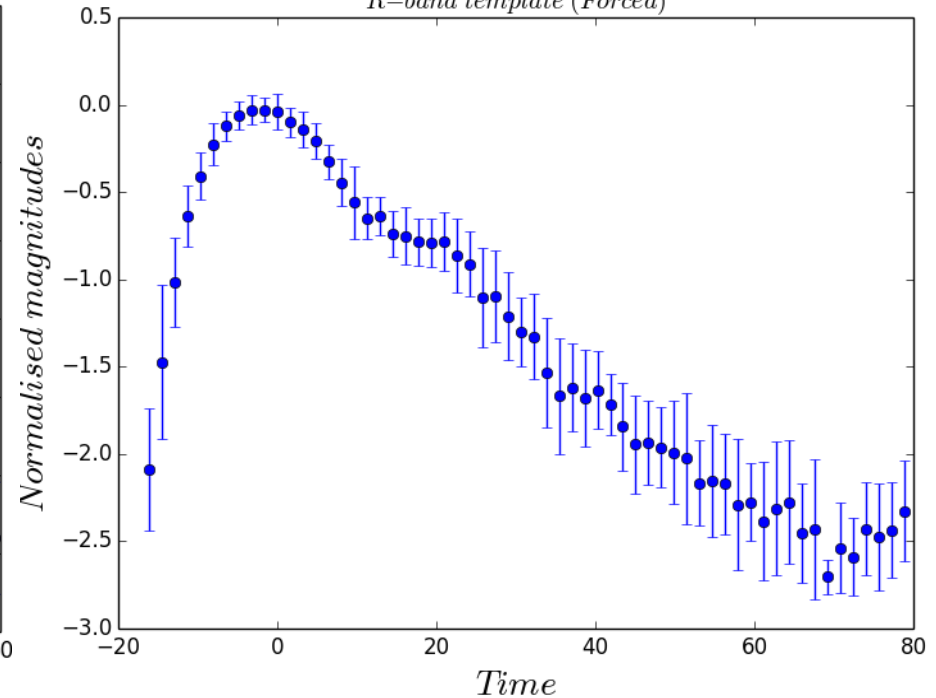
Cenko pipeline
75 SNe left at the end

Template Cenko

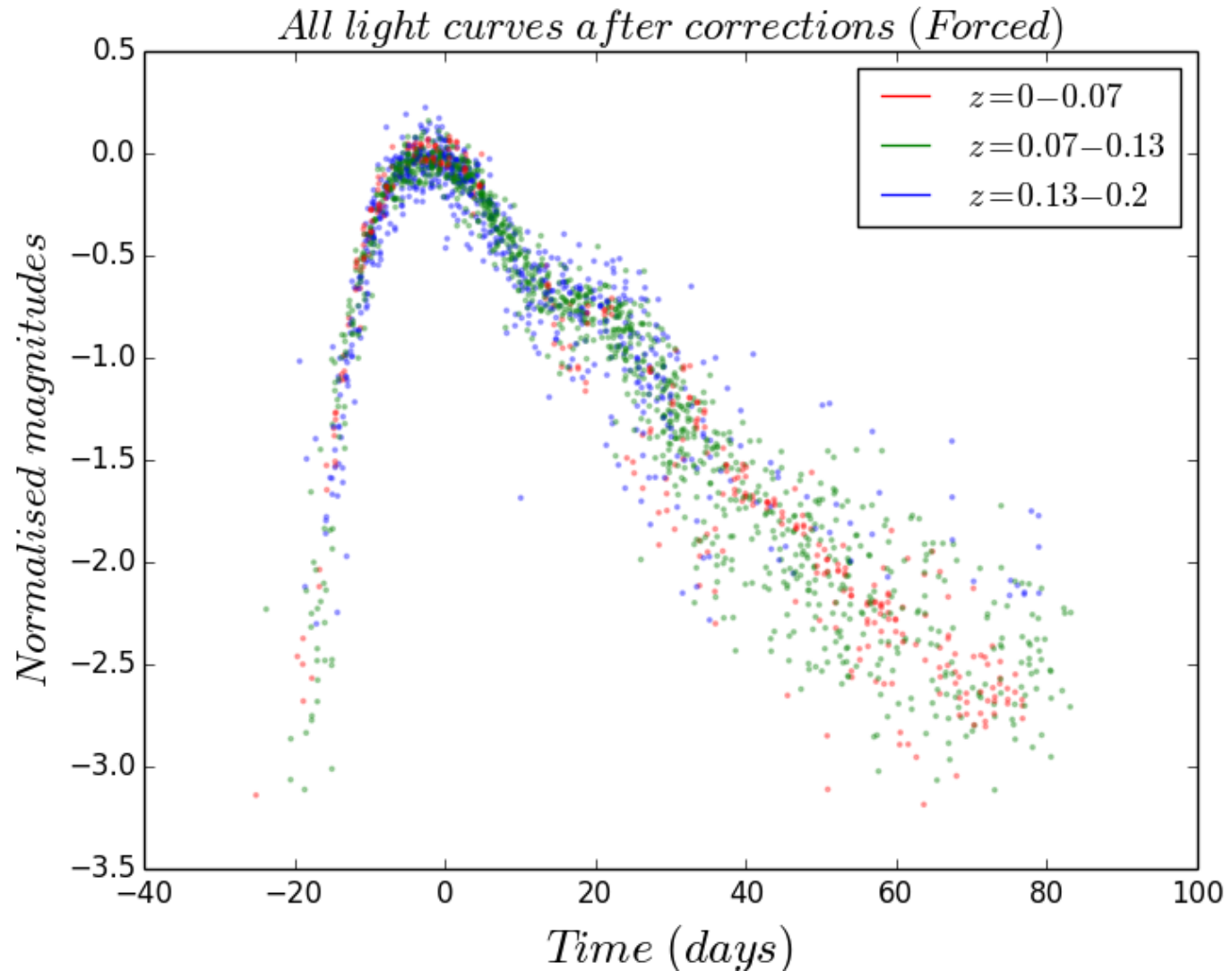


Forced photometry
28 SNe left at the end
(Due to bad initial alignment-to be fixed)

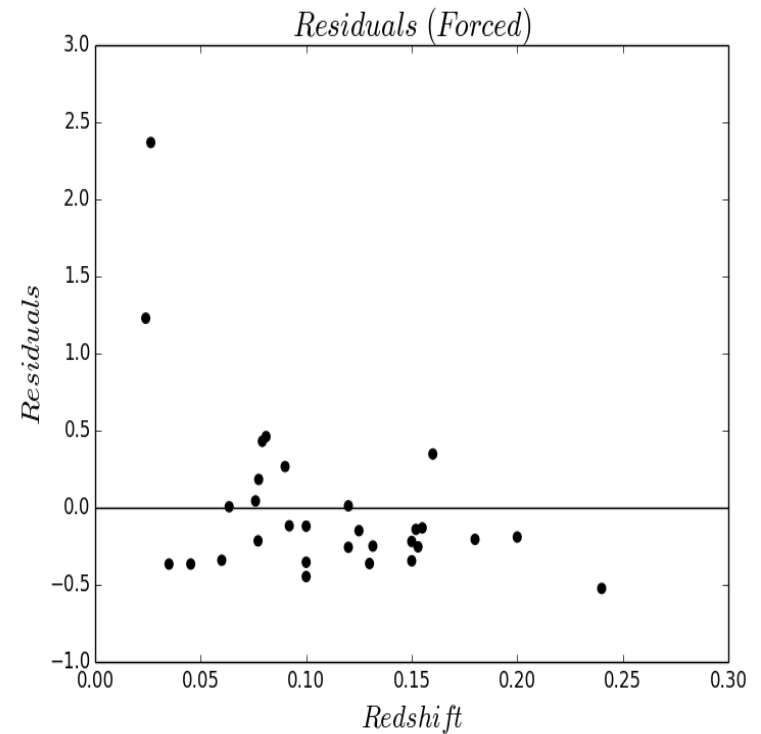
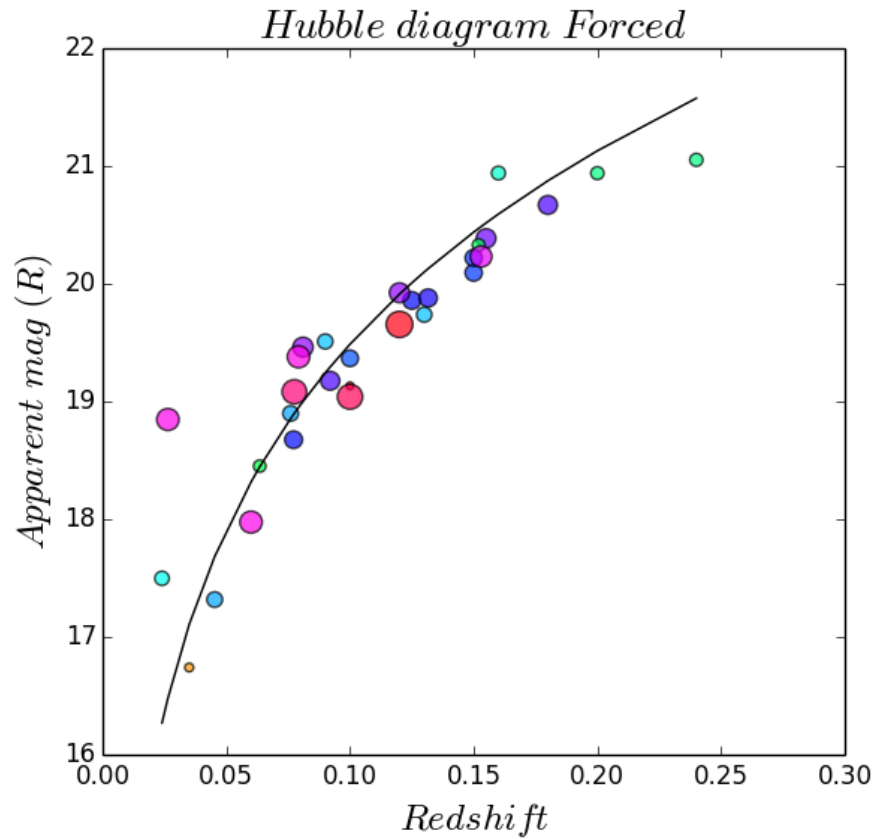
R-band template (Forced)



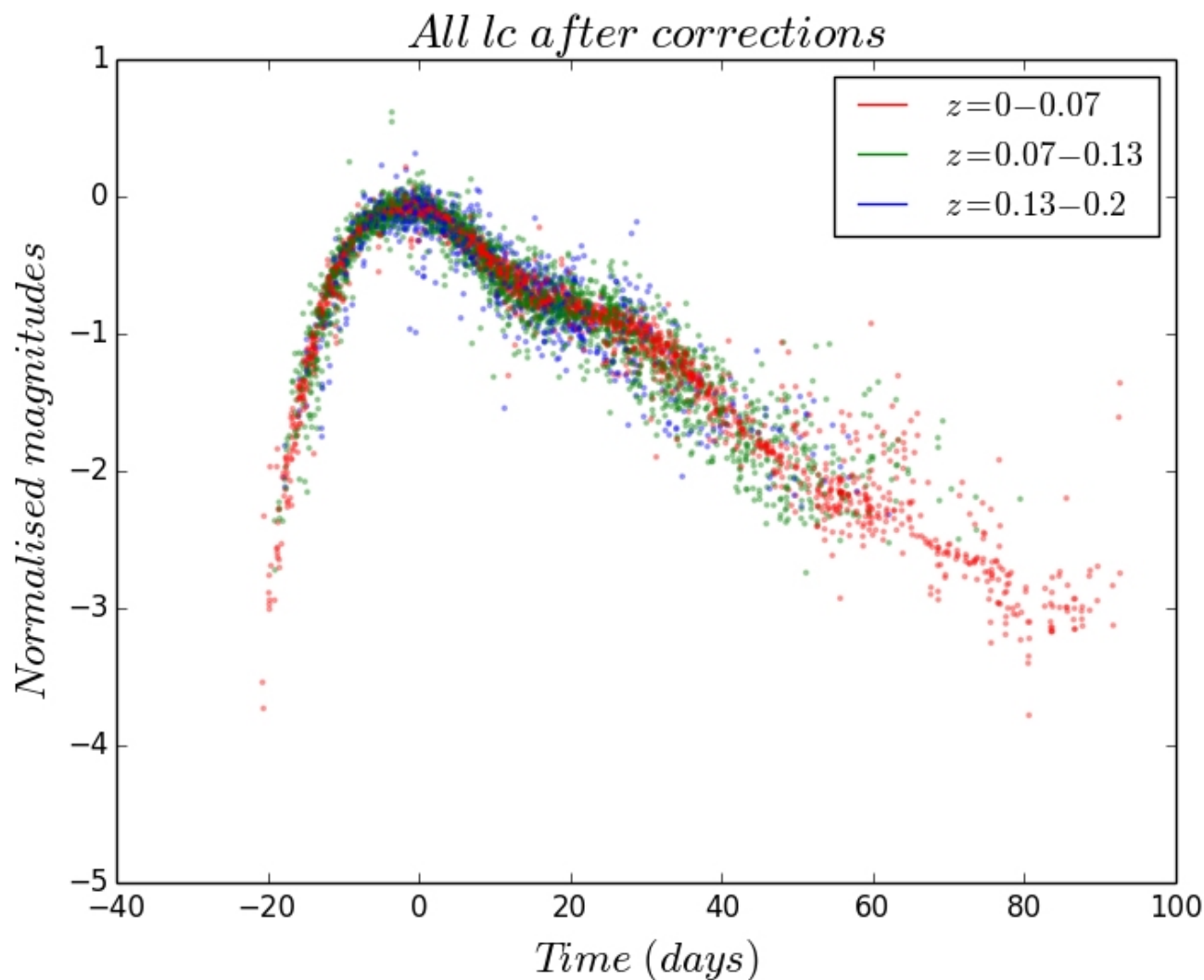
Forced photometry (PSF)



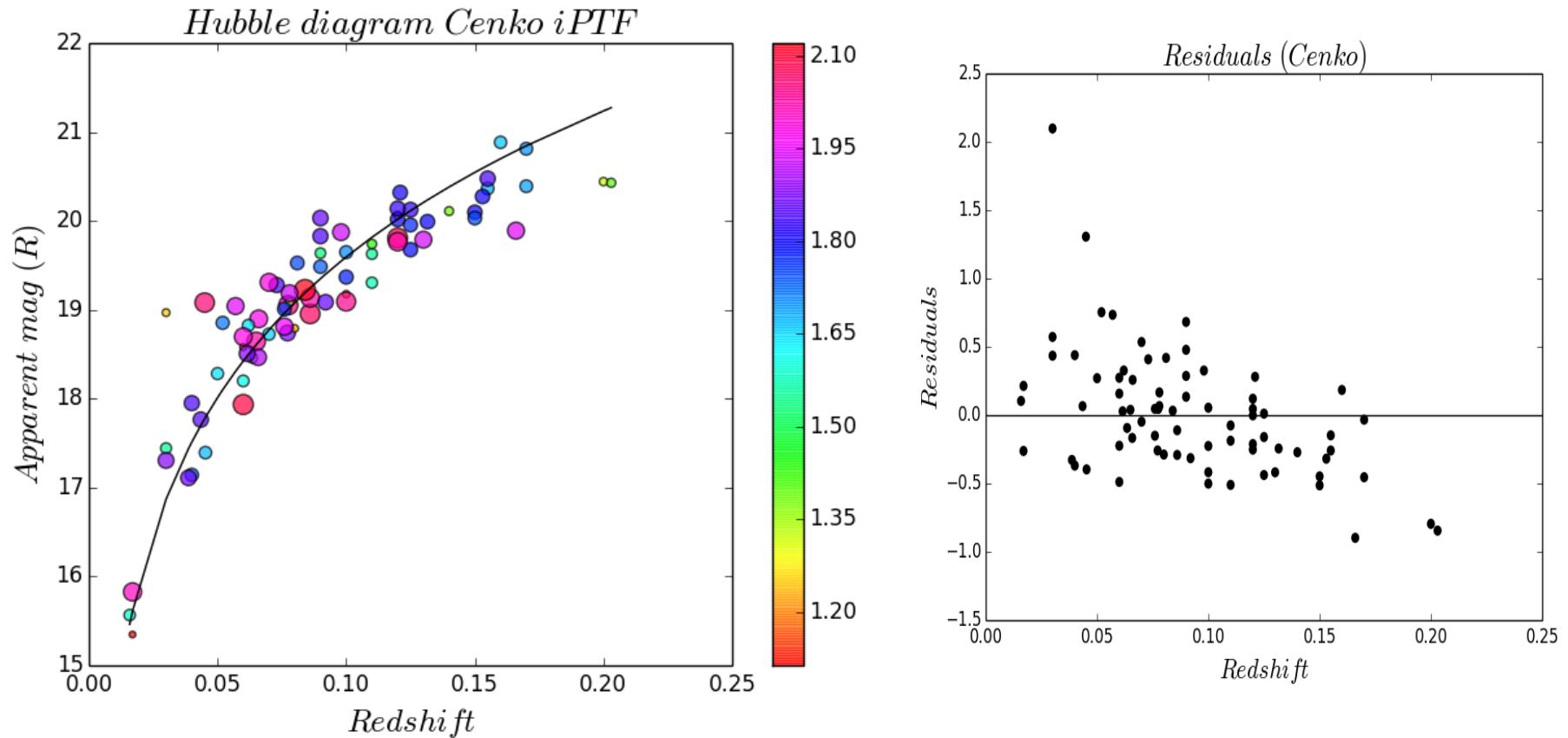
Hubble diagram (Forced)



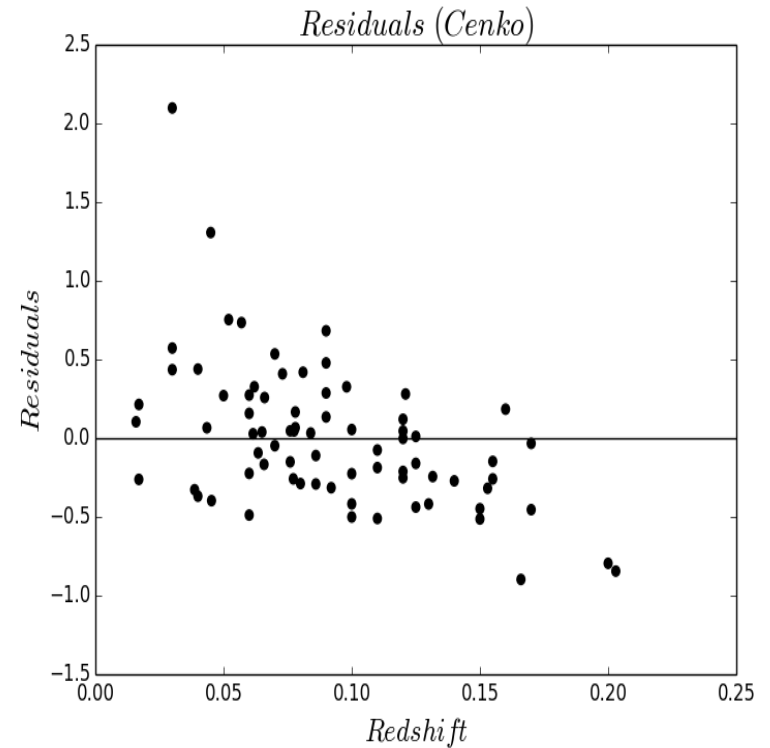
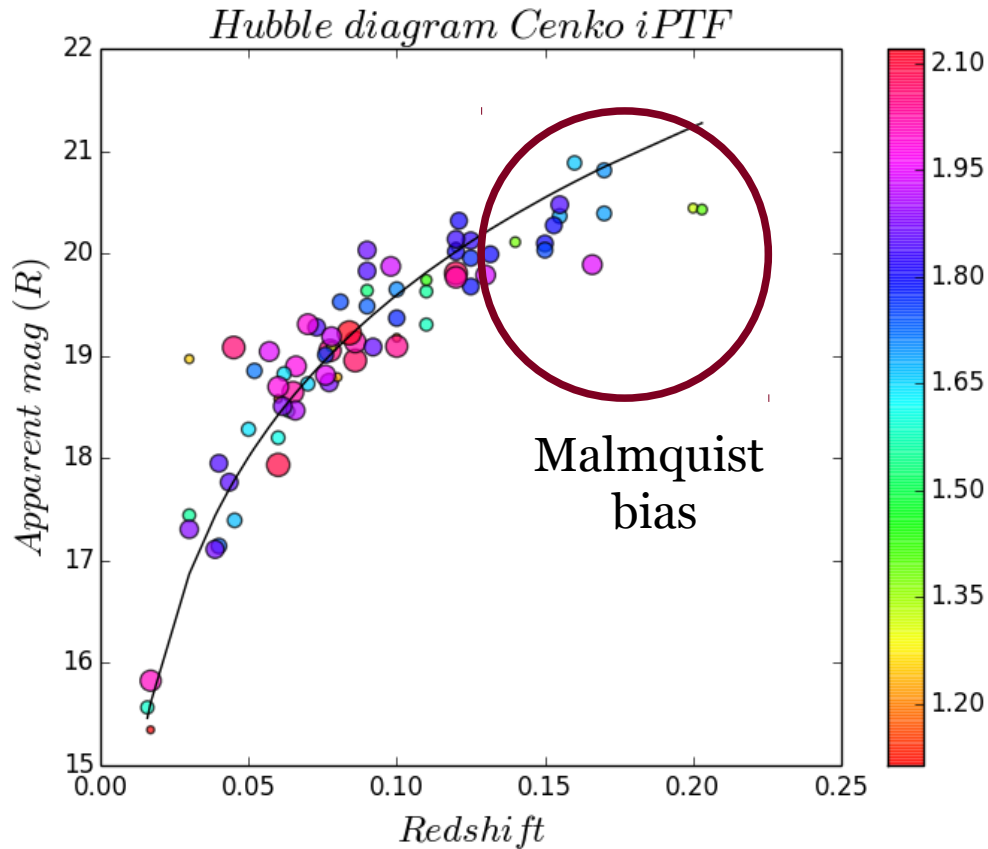
Cenko pipeline (PSF)



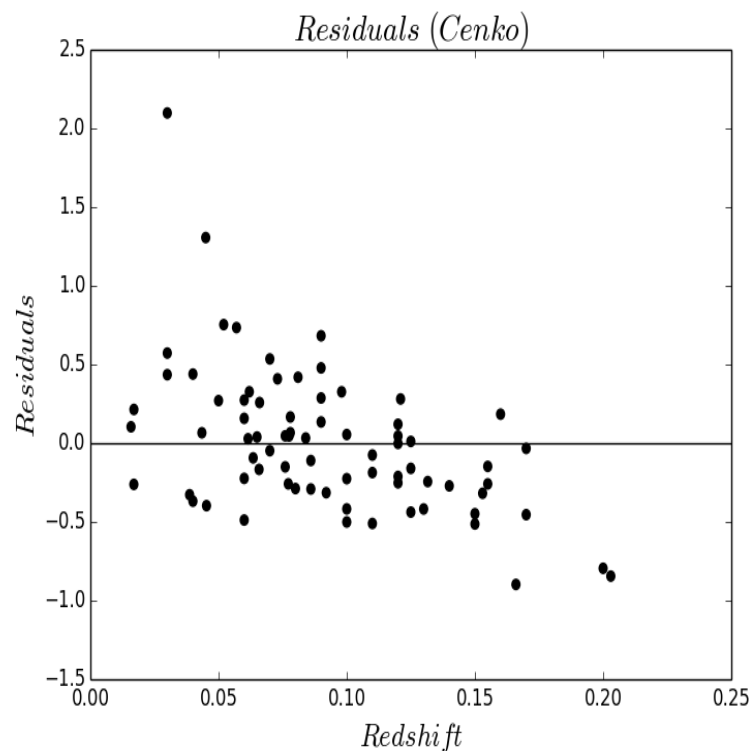
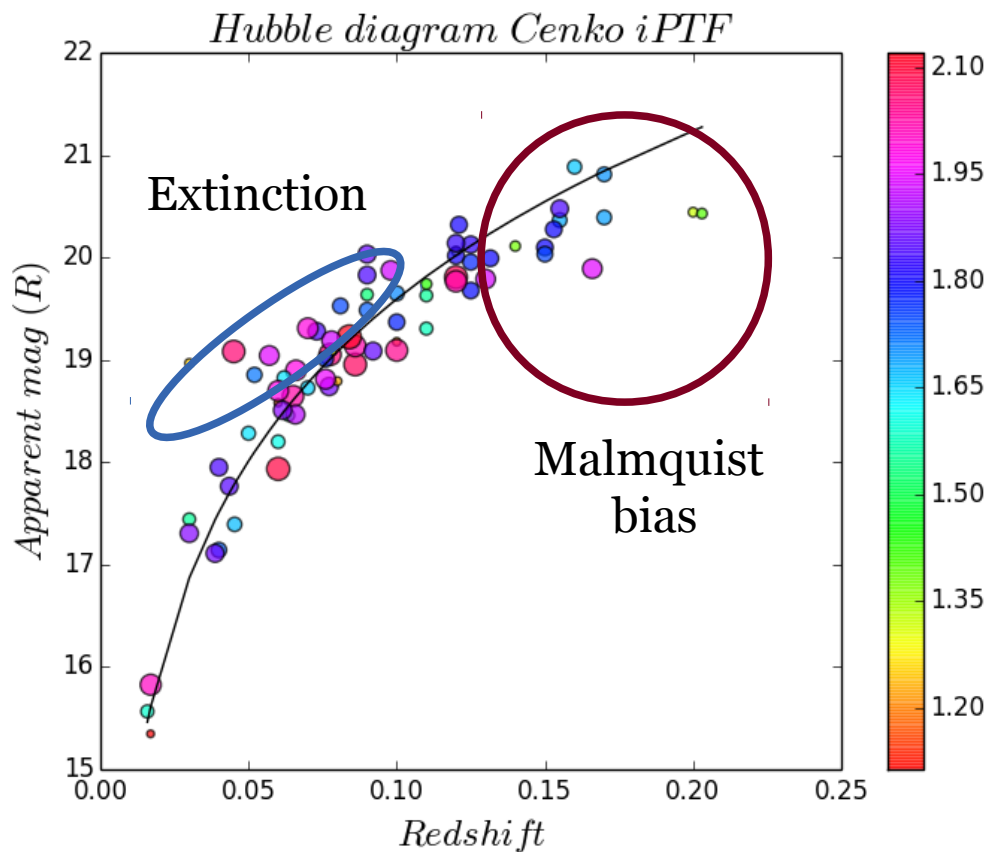
Hubble diagram (Cenko)



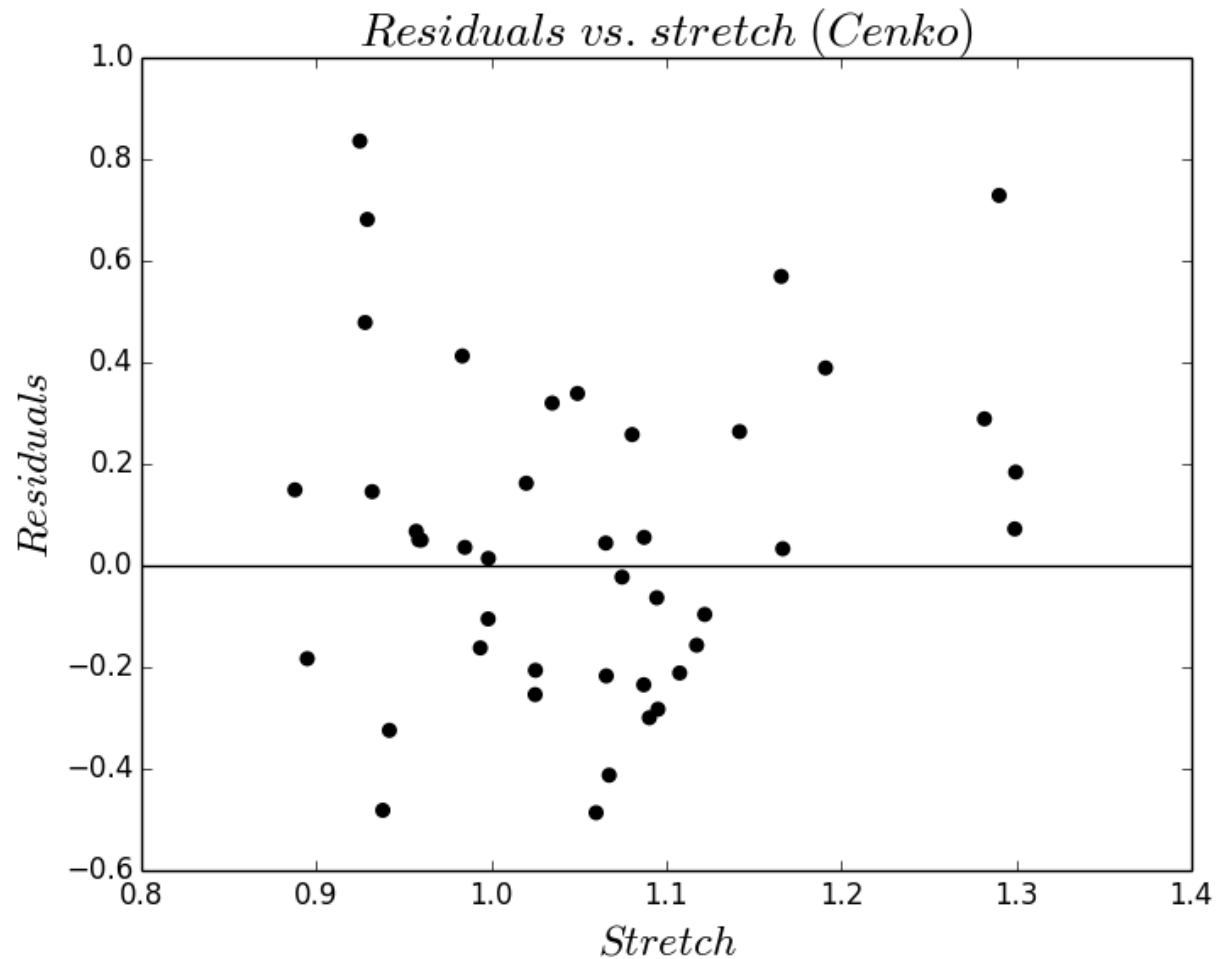
Hubble diagram (Cenko)



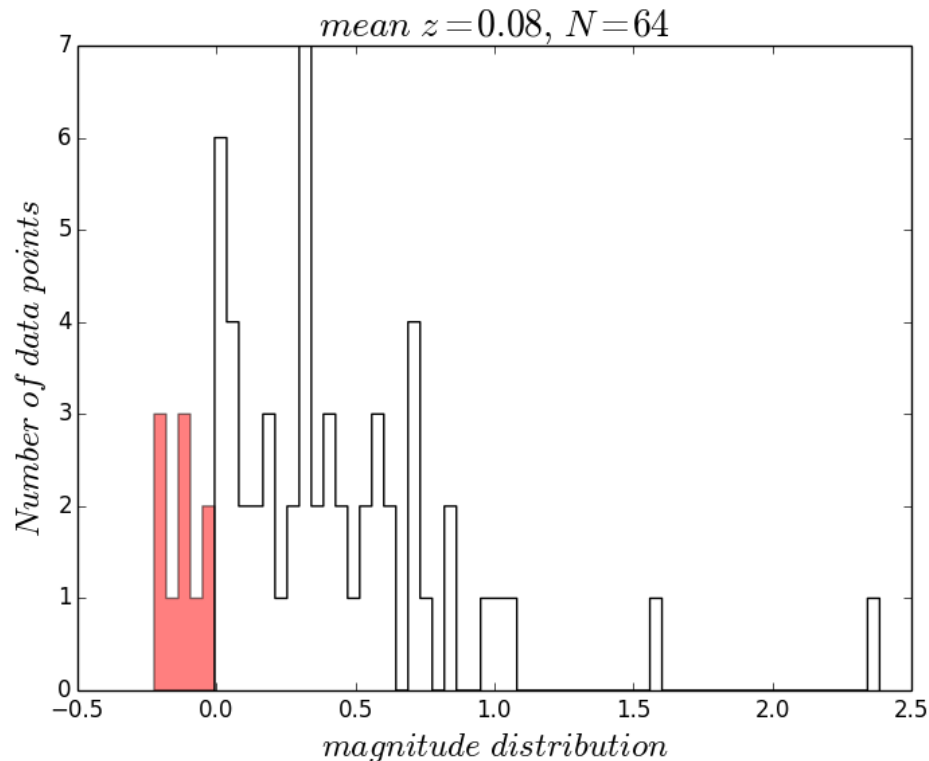
Hubble diagram (Cenko)



Hubble residuals vs. Stretch factor.¹²

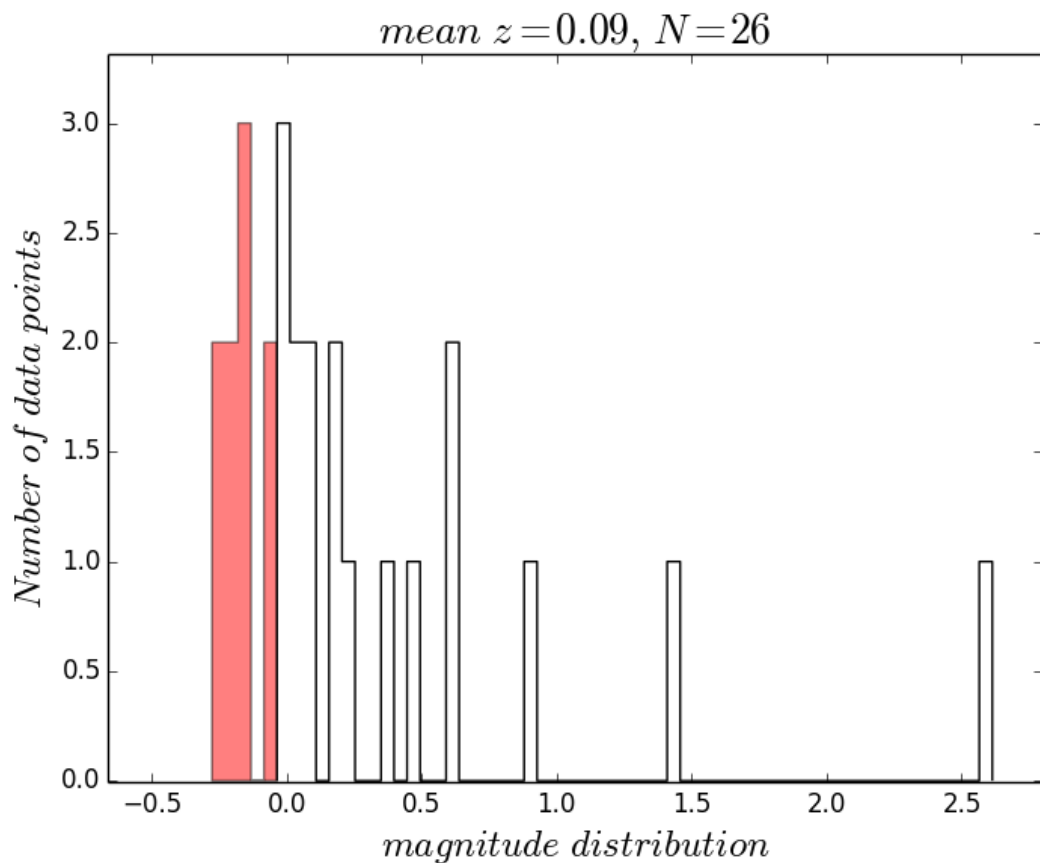


Intrinsic scatter of R-band Hubble diagram



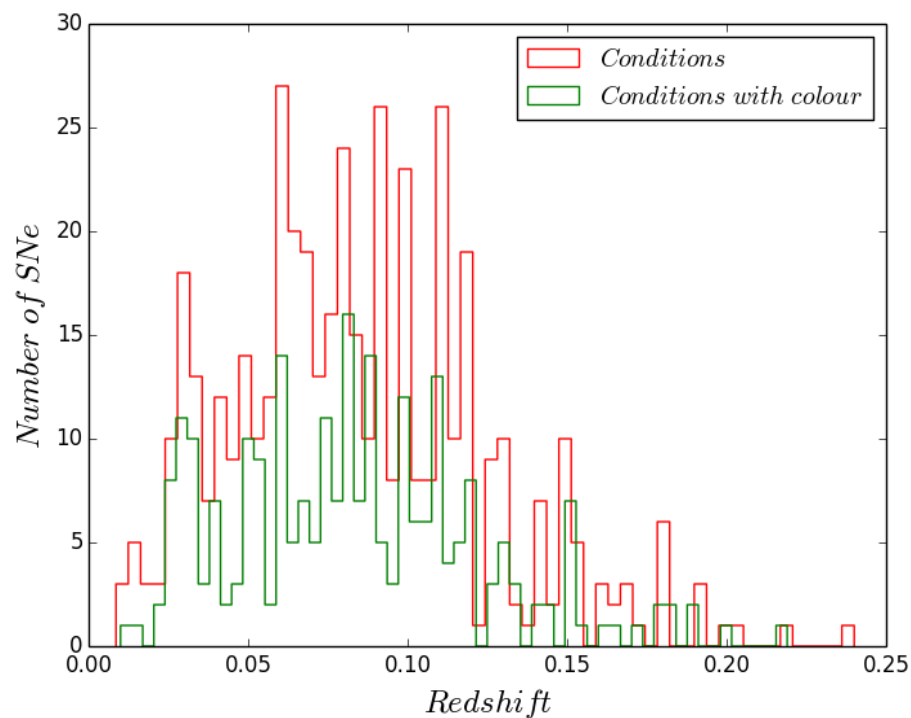
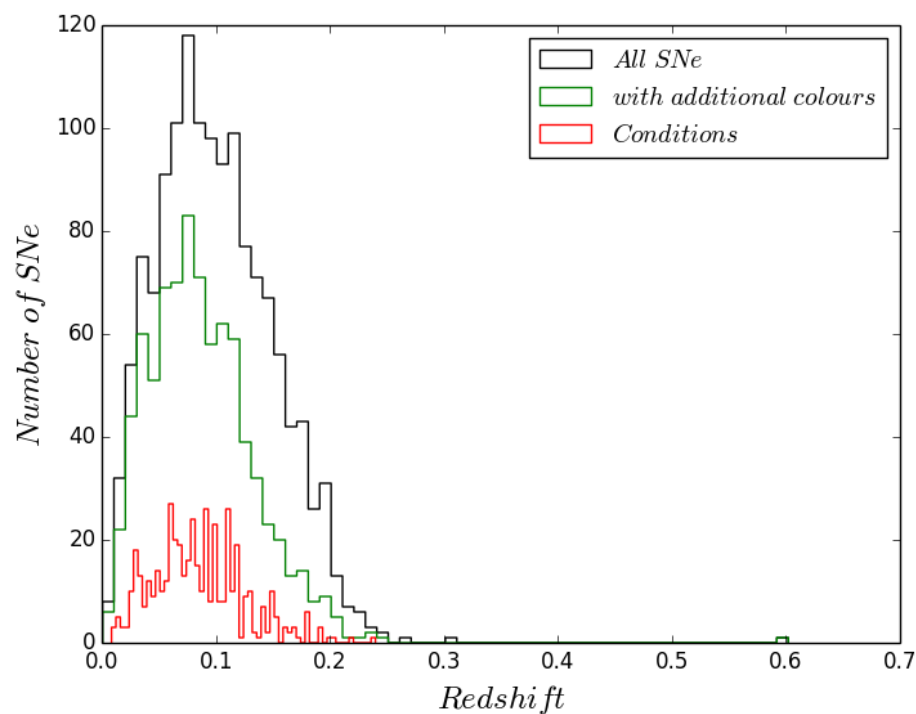
Cenko Intrinsic scatter:
 ~ 0.1 mag (10 Sne)
 with $z < 0.1$

Intrinsic scatter of R-band Hubble diagram



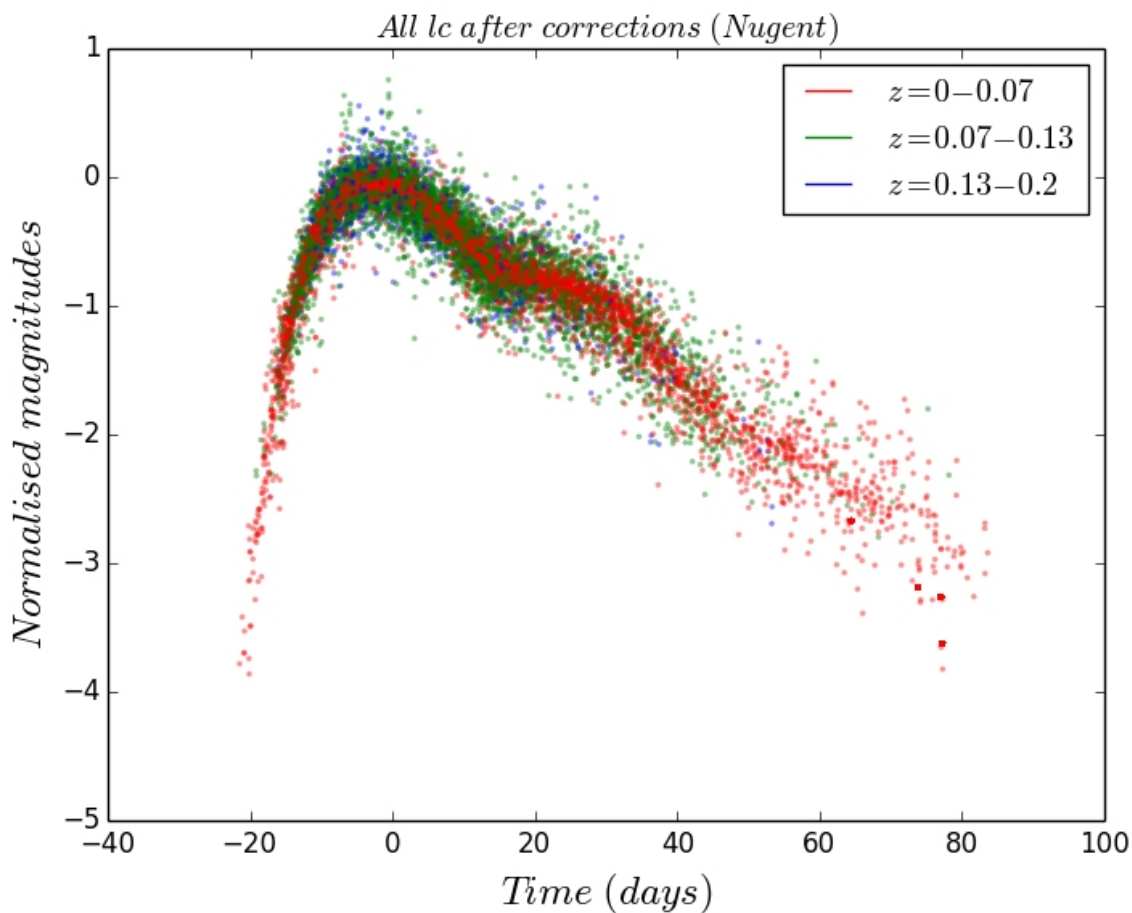
Forced Intrinsic scatter:
 ~ 0.15 mag (9 Sne)
 with $z < 0.1$

PTF + iPTF sample



Nugent template

532 SNe fulfill the selection criteria.
354 SNe left at the end.



· With PTF+iPTF
sample can get better
statistics

Future prospects:

- R-band Hubble diagram less affected by extinction but can still be probed to high z
- Using synthetic colours from spectra to map the extinction in the R-band (for the SNe without more bands), and further expand the sample.
- With iPTF/ZTF we have the potential to provide the first homogeneous 3π survey of the local expansion.
- Study homogeneity of expansion.
- Anisotropies in the local universe can probe distribution of DM and DE?
- Explore "Hubble bubble" possibility.