

***The results of analysis of
Ia supernovae redshift
distribution on data of the
Asiago Supernova and
Open Supernova
Catalogues***

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The advances in the understanding of the SN phenomena:

- **the intensive study of nearby SNe, first of all SN 1987A, have raised new more fundamental questions with regard to progenitor evolution, explosion mechanism and nucleosynthesis;**
- **the calibration of the absolute magnitudes of a few SNIa obtained using the Cepheid variables found in their parent galaxies, and the discovery of empirical relations between the absolute magnitudes at maximum and the shape of the lightcurves;**
- **the shape of the lightcurves of SNIa have renewed the interest for the using of SNIa as distance indicators up to cosmological distances: the homogeneous subsample characteristics understanding is necessary for the investigation of any astrophysical objects redshift distribution, for example, GRB.**

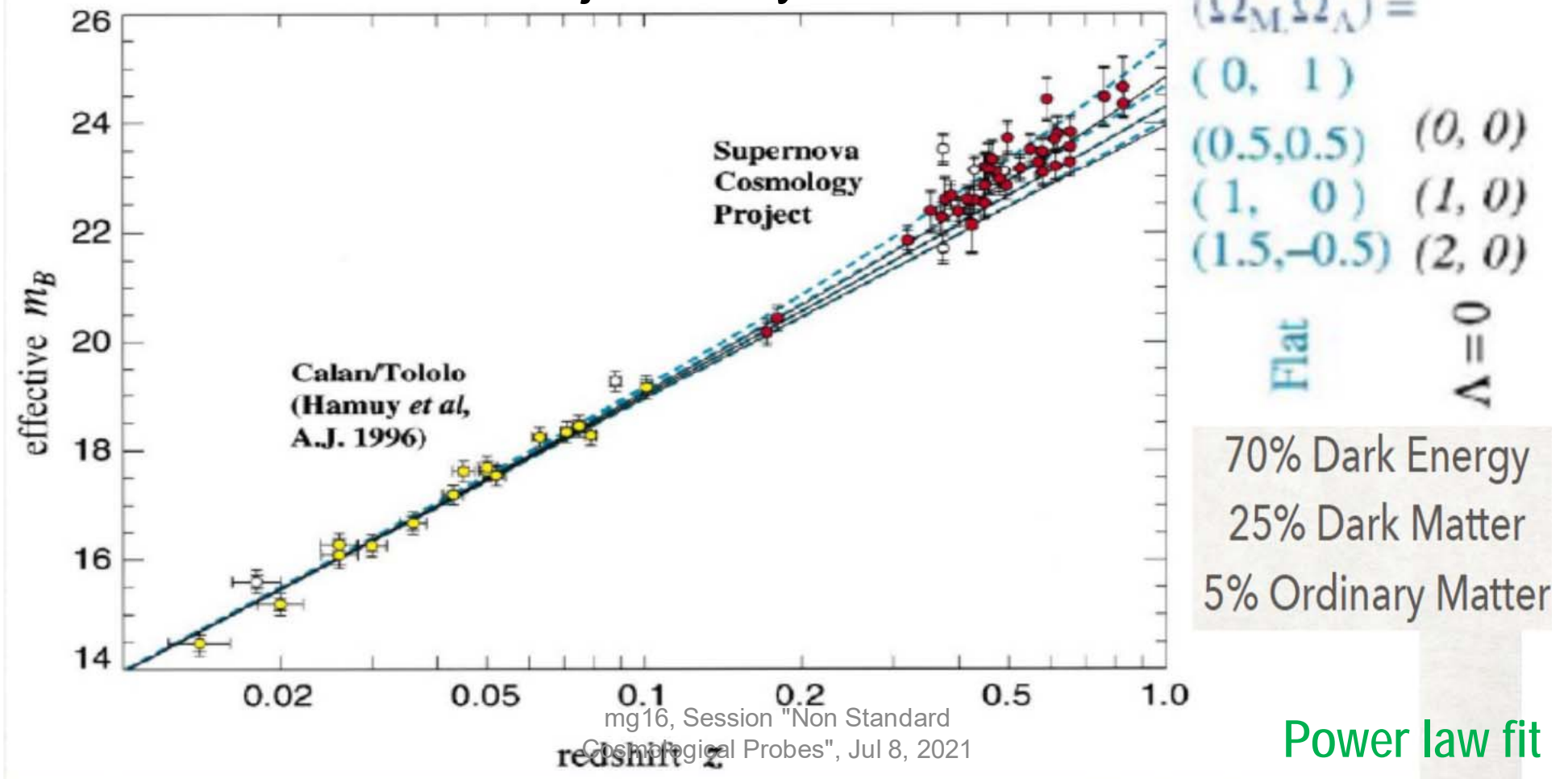
The type Ia supernovae → homogeneous subsample

(suggestion that these luminous events might be used as standard candles for cosmological measurements occurs since the earliest studies of supernovae in 1938).

mg16, Session "Non Standard
Cosmological Probes", Jul 8, 2021

Such wide interest has triggered new, deep SN searches.

The shape of redshift distribution for uniform sources set in our Metagalaxy defined by cosmological parameters and properties of space is Euclidean at small redshifts and de-Sitter at $z > 0.7$. Firstly the parameters of our Metagalaxy Ω and Λ were determined due sample of Ia supernovae from the Supernova Cosmology Project analysis in 1998.



4 datasets : Asiago Supernova Catalog, Open Supernova Catalog, Dark Energy Survey Supernova Program , The Combined Pantheon Sample
Now Asiago Supernova Catalog contain data of

Adelmann-McCarthy

Altavilla

Antezana

Arbour

Armstrong

BAOSS

Boles

CFHT-LSSP

Chassagne

Chen

EROS

ESCC

ESSENCE

Gal-Yam, Maoz

GOODS, HZST

HZSST

Itagaki

LOSS

LOTOSS

Madgwick

Martin

Miknaitis

Monard

MSACSST

Mueller

NGSST

NSF

Puckett

Quimby

Riello

Schwartz

SCP

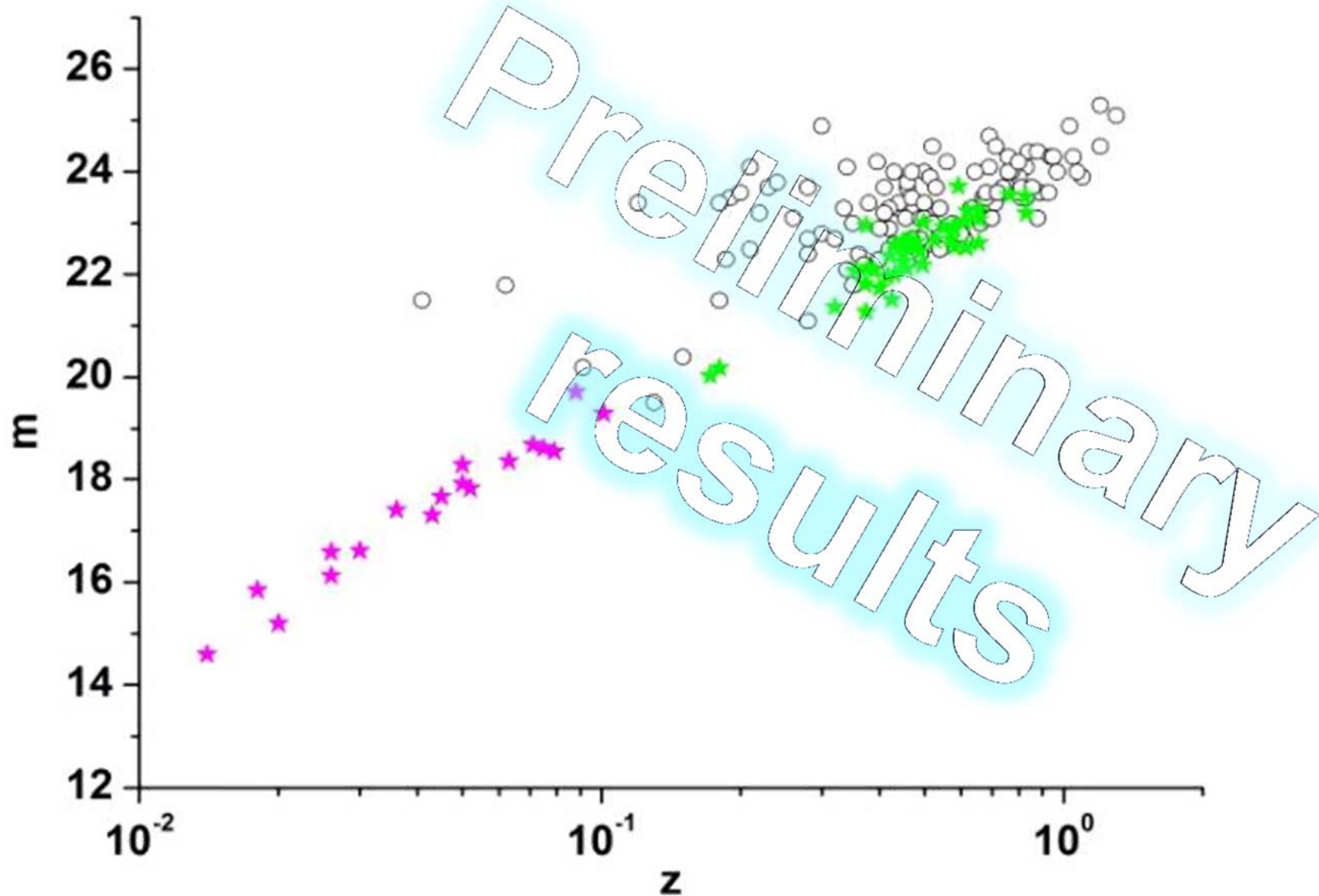
SDSS-II

Wood-Vasey

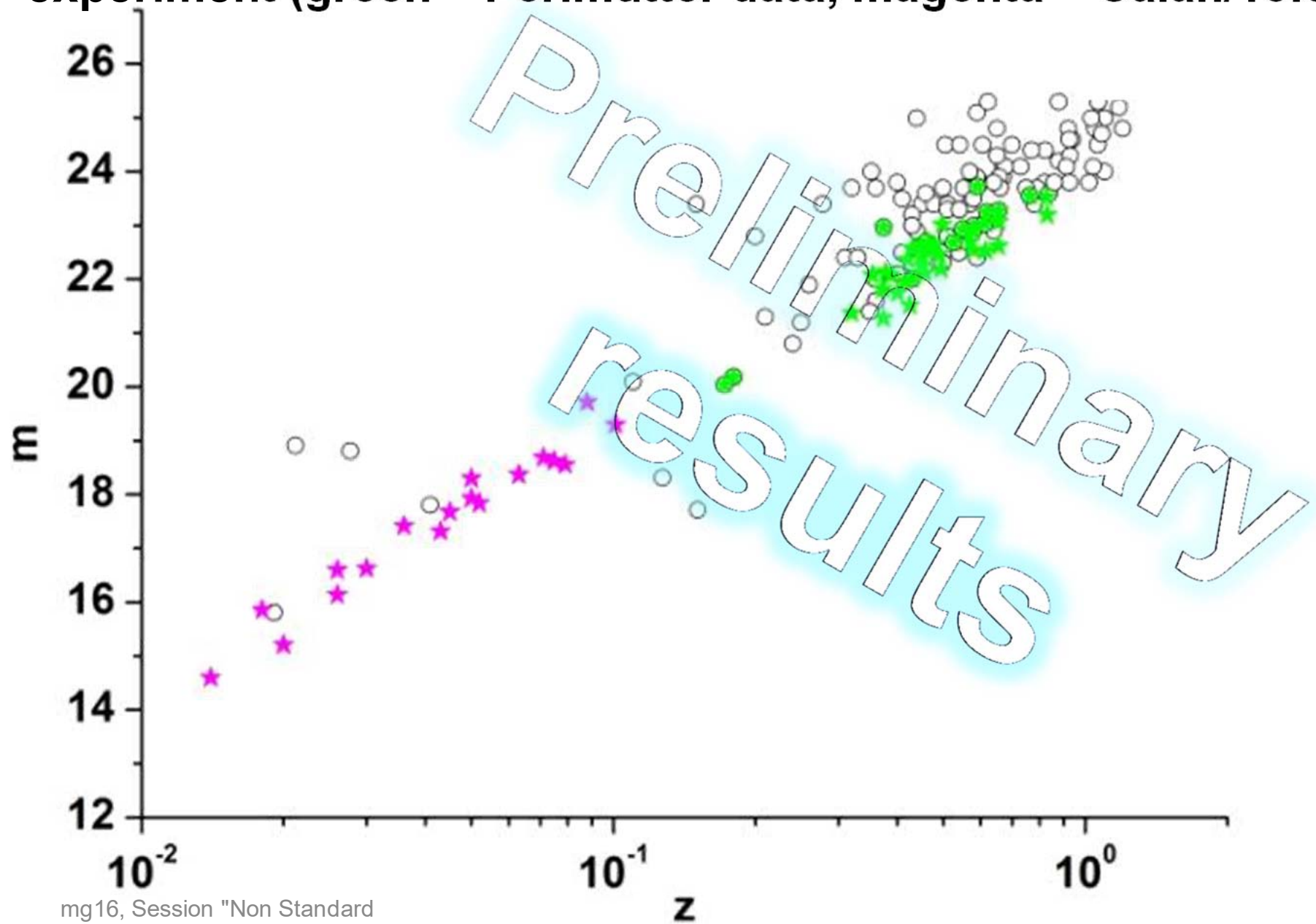
Now the Open Supernova Catalog (OSC) contain data of 67796 SN

1. Asiago Supernova Catalog;
2. • Caltech Core-Collapse Program (CCCP);
3. • Cambridge Photometry Calibration Server (CPCS);
4. • Carnegie Supernova Project (CSP);
5. • CfA Supernova Archive;
6. • Gaia Photometric Science Alerts;
7. • Latest Supernovae (Rochester Astronomy);
8. • Nearby Supernova Factory (SNF);
9. • OGLE-IV Transient Detection System;
10. • Panoramic Survey Telescope & Rapid Response System (Pan-STARRS);
11. • SDSS Supernova Survey;
12. • Sternberg Astronomical Institute Supernova Light Curve Catalogue;
13. • Supernova Hunt (SNHunt);
14. • Supernova Legacy Survey (SNLS);
15. • The Online Supernova Spectrum Archive (SUSPECT);
16. • UC Berkeley Filippenko Group's Supernova Database (SNDB);
17. • Weizmann Interactive Supernova data REPOSITORY (WiSeREP).

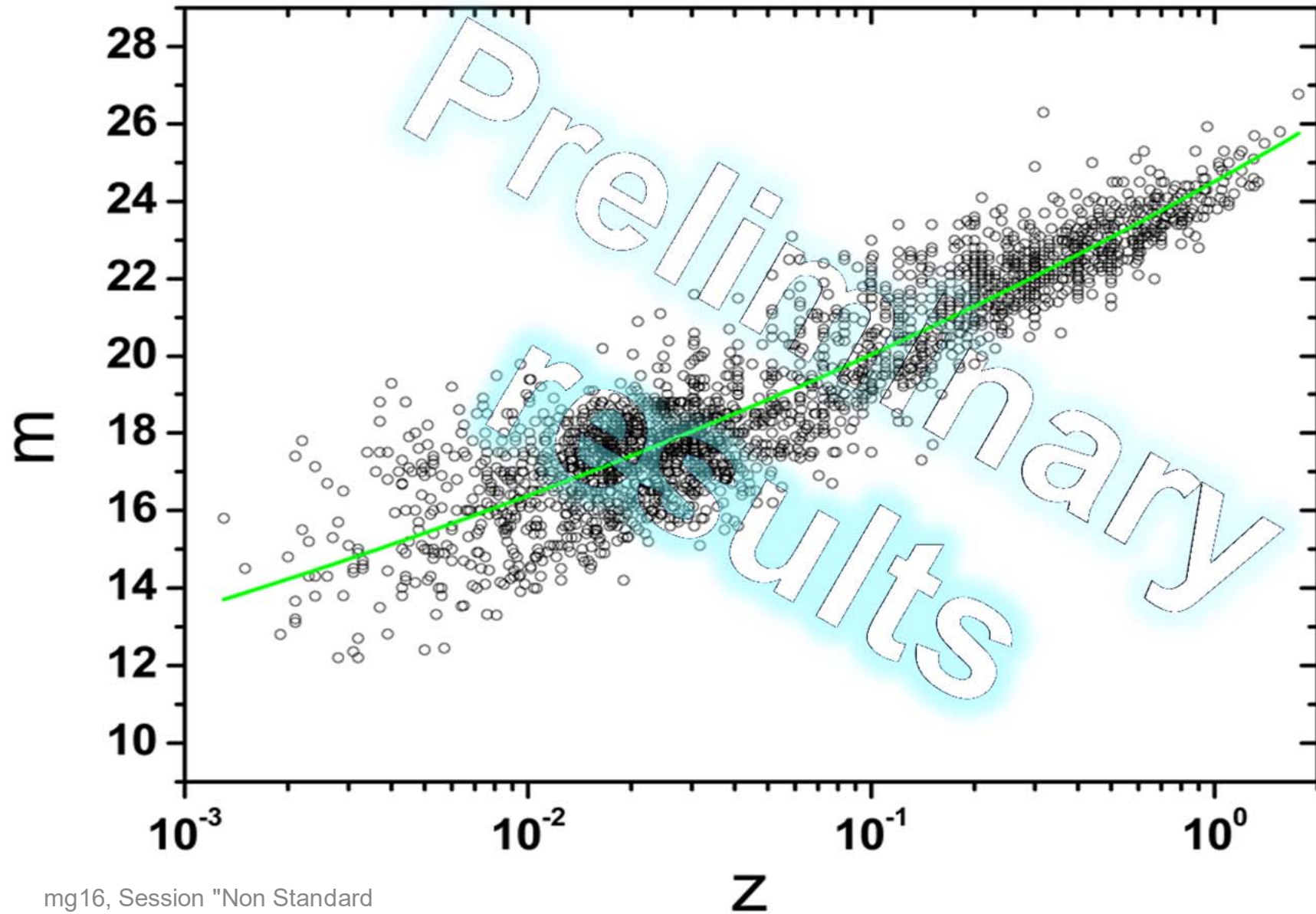
Plot of magnitude dependence on redshift for HZSST experiment (green – Perlmutter data, magenta – Calan/Tololo)



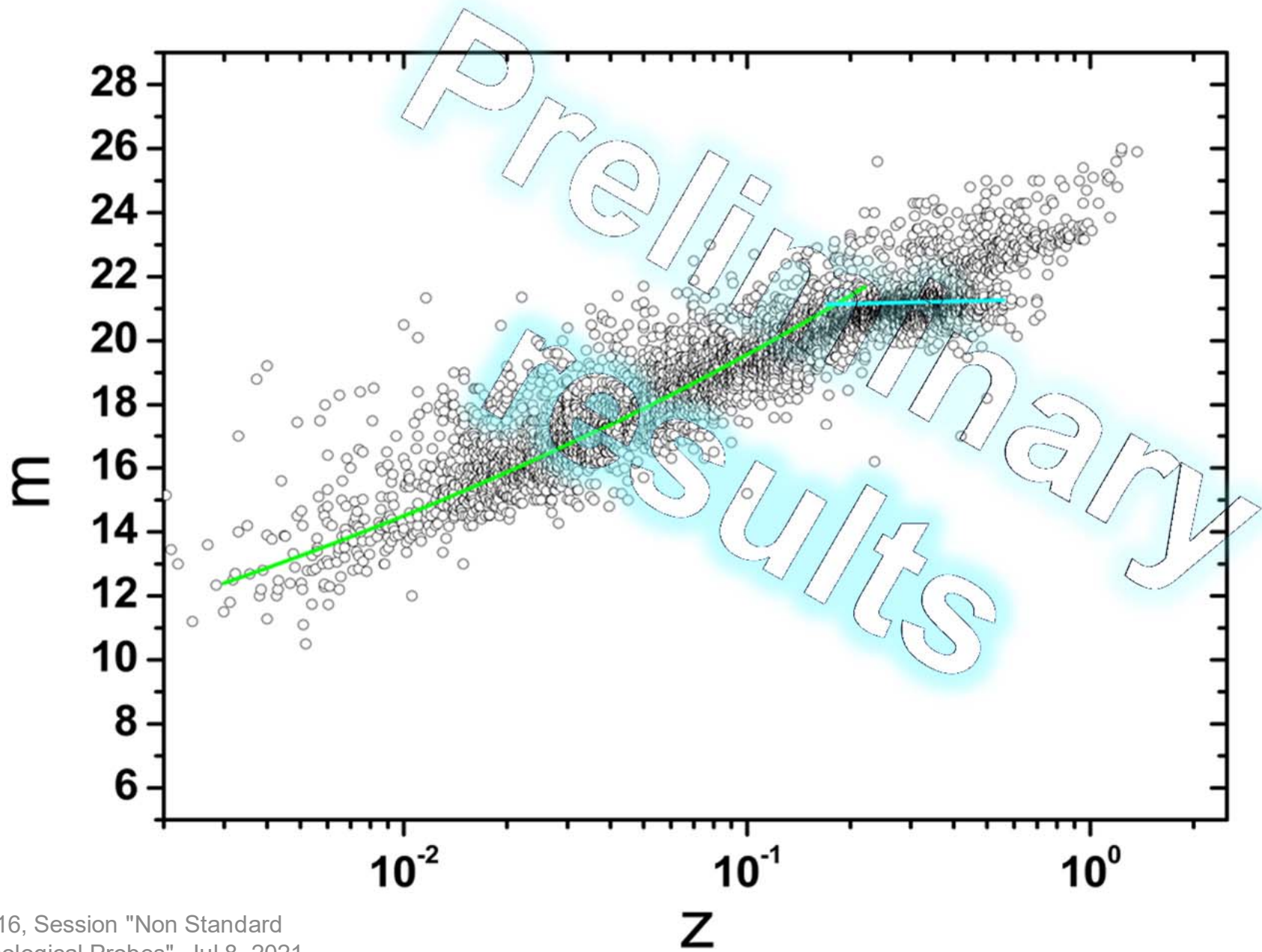
Plot of magnitude dependence on redshift for SCP experiment (green – Perlmutter data, magenta – Calan/Tololo)



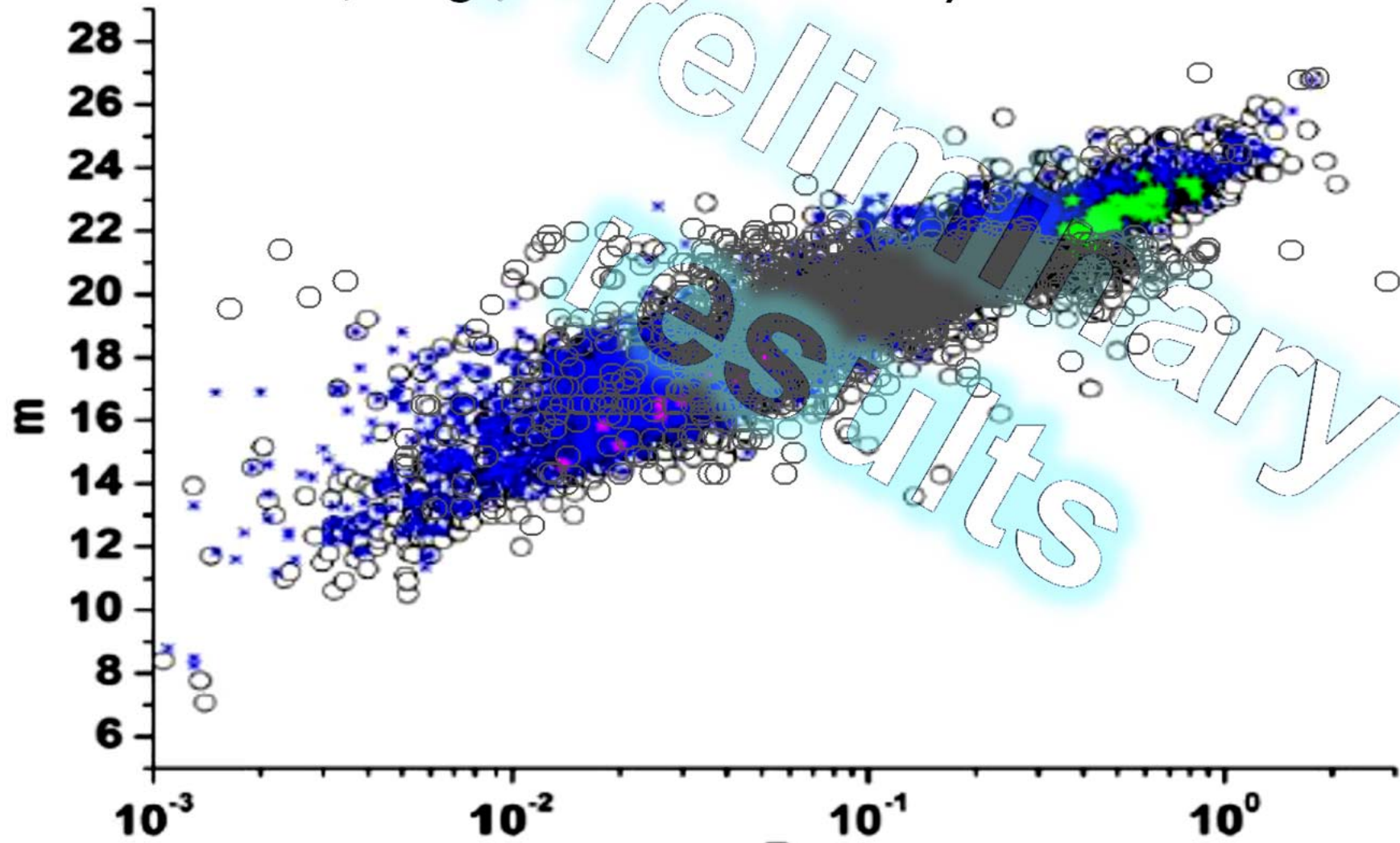
Magnitude dependence on redshift for Asiago Supernova Catalogue subset



Magnitude dependence on redshift for Open Supernova Catalog subset

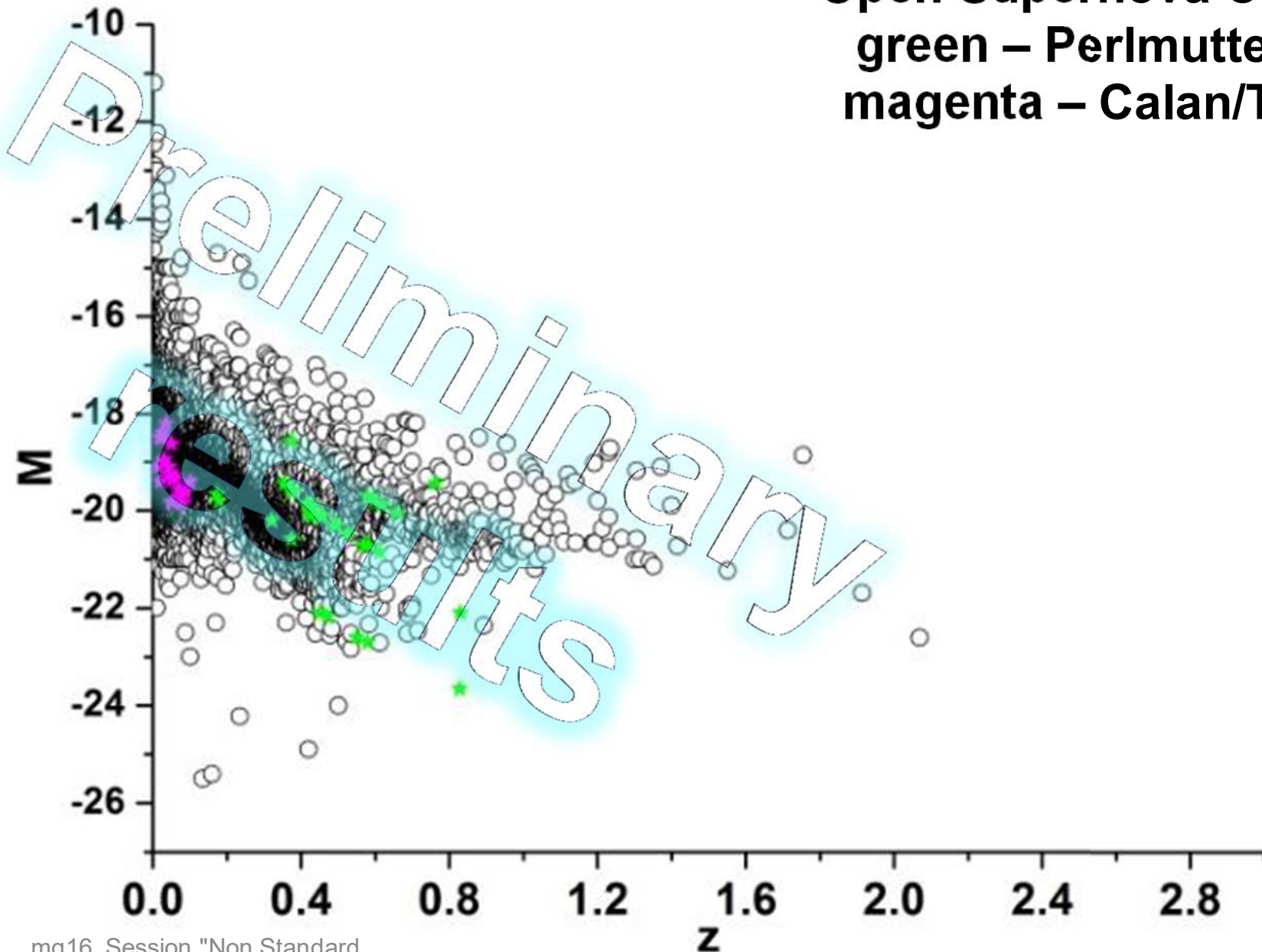


Plot of magnitude dependence on redshift (black - Open Supernova Catalog, blue - Asiago Supernova Catalog, green - Perlmutter data, magenta - Calan/Tololo)

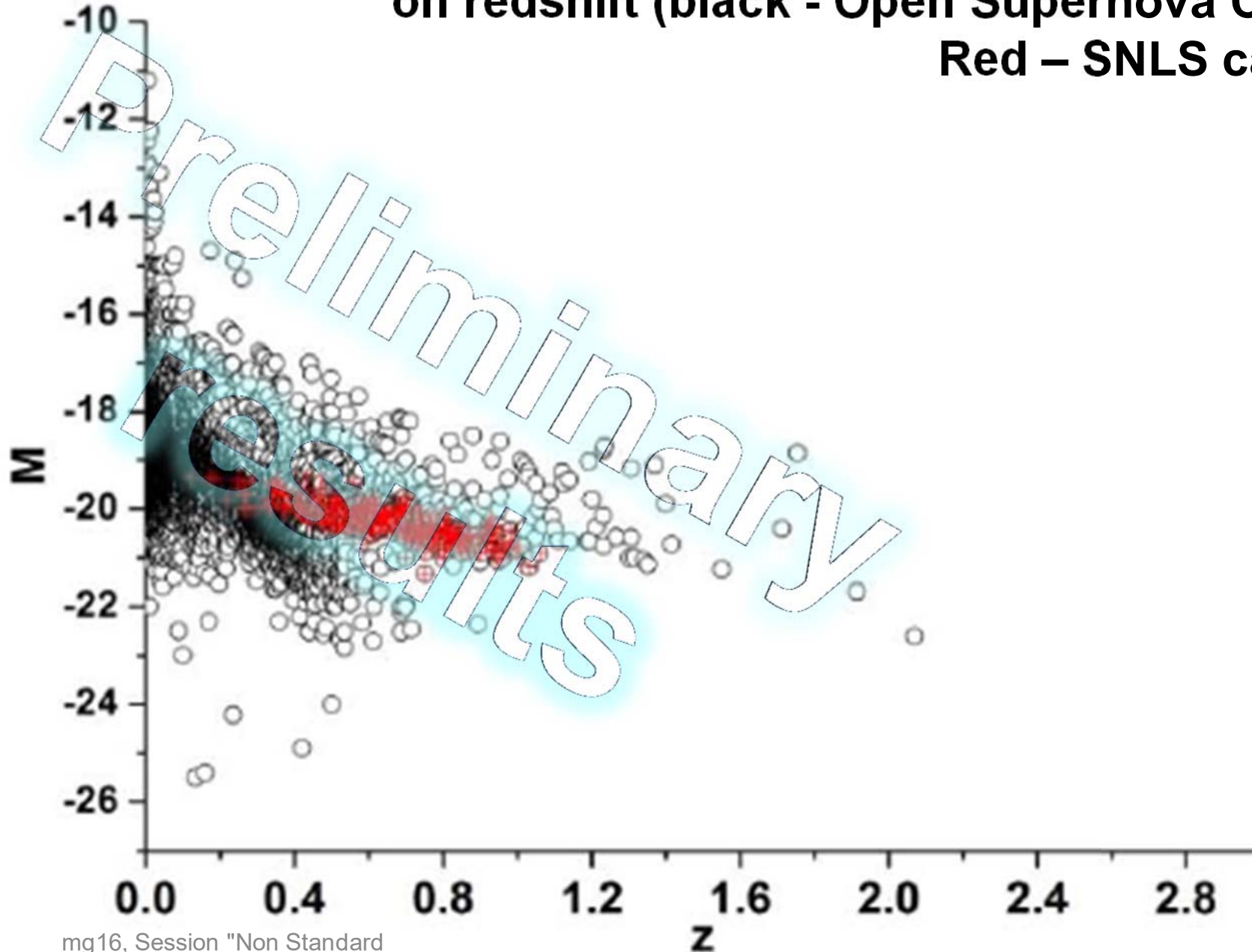


the sample OSC has a branch in the field of $z \sim 0.2-0.4$.

Plot of absolute magnitude dependence on redshift (black - Open Supernova Catalog, green - Perlmutter data, magenta - Calan/Tololo).



Plot of absolute magnitude dependence on redshift (black - Open Supernova Catalog, Red - SNLS catalog).



CONCLUSIONS

The preliminary results of data analysis shows that several peculiarities are presented in Ia supernovae redshift distribution at $z > 0.4$.



**Different scenarios of Type Ia SNe explosions
(Single Degenerate, Double Degenerate)????**

Absorption in the Galaxy, in host galaxies?????

Appearance of H_0 or S_8 tensions?

**Deviations that occur over
redshift ranges as small as about 0.05 and as large as the full
observed redshift range of about 2.3 ??????**

Really changing of the parameters of our Metagalaxy???

**Next: Dark Energy Survey Supernova Program and The
Combined Pantheon SAMPLE data analysis...**

References

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<https://sne.space/>

Thank you for attention!