

# SweetSpot: NOAO Near-Infrared Survey of Type Ia Supernovae in the Nearby Hubble Flow

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*Supernova Through the Ages*



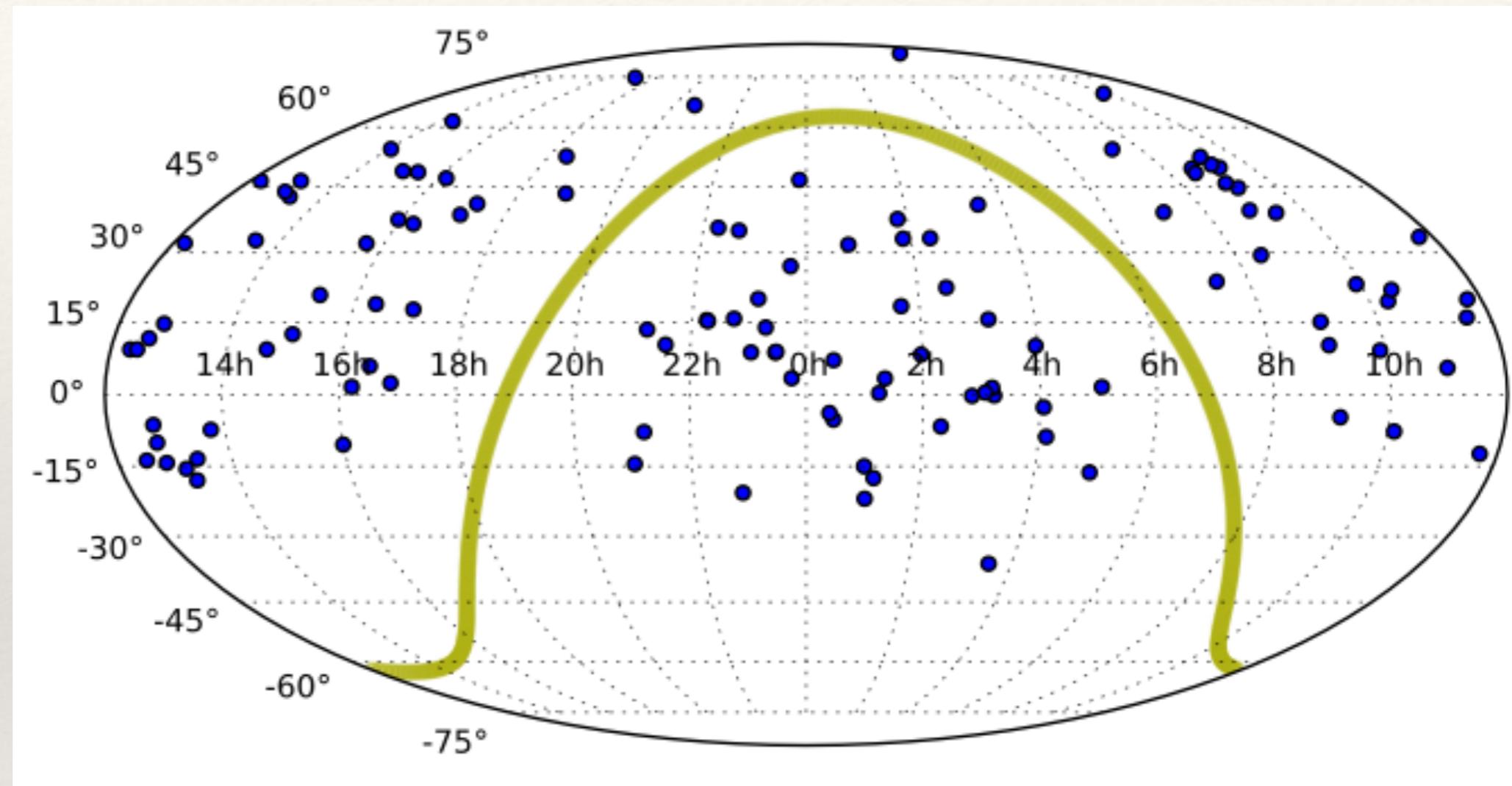
# SweetSpot: 3-year 72-night NOAO Survey on WIYN+WHIRC

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- ❖ H-band NIR Hubble diagram to  $z \sim 0.08$
- ❖ Quantify how standard SN Ia are in the NIR, particularly in H.
- ❖ Test correlations between optical luminosity and host galaxy mass, SFR, and environment in NIR
- ❖ Improve understanding of colors of SNeIa
- ❖ Provide a standard well-calibrated NIR rest frame reference for future higher redshift surveys.

# Survey Results: Location on the Sky for 115 objects

- ❖ 88.5 nights
- ❖ 114 SNeIa
- ❖ 1 SN Ibn



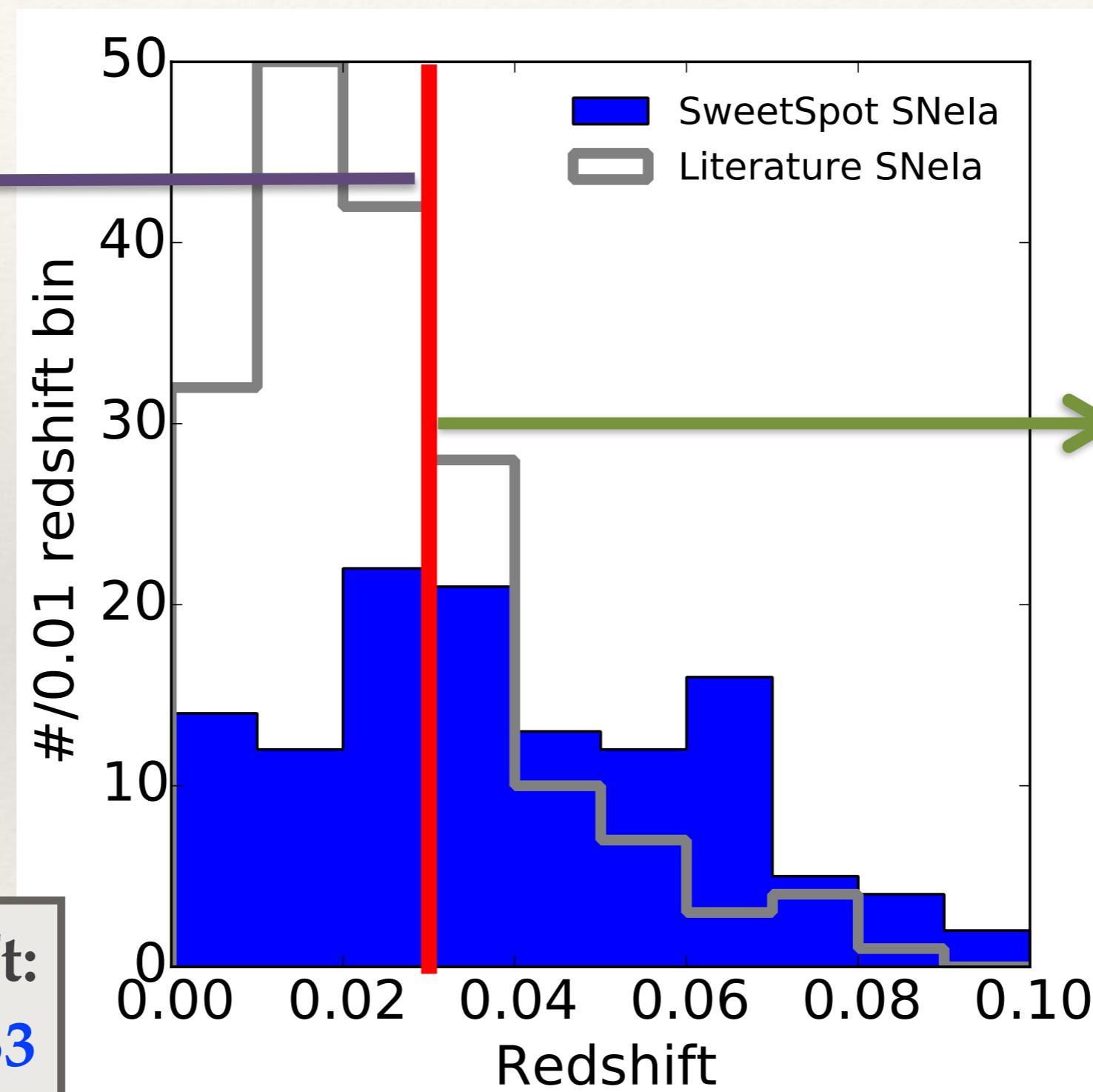
Milky Way

SweetSpot Supernovae

# Redshift Distribution

Update to include Stanishev?

Peculiar Velocity is large relative to expansion of the Universe



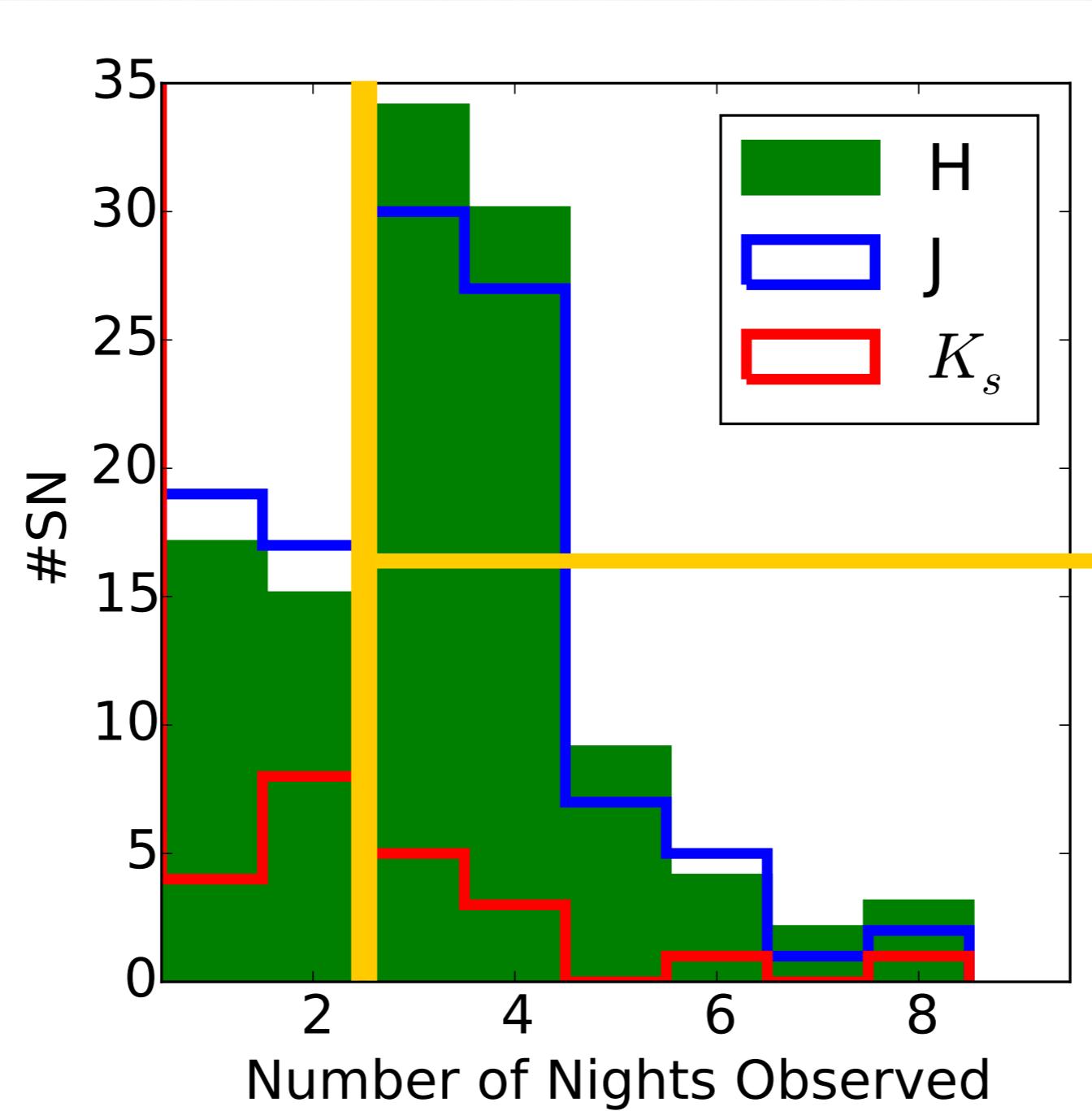
Median redshift:  
**SweetSpot: 0.033**  
Literature: 0.019

Expansion of the Universe dominates

# Goal: At least 3 measurements per filter

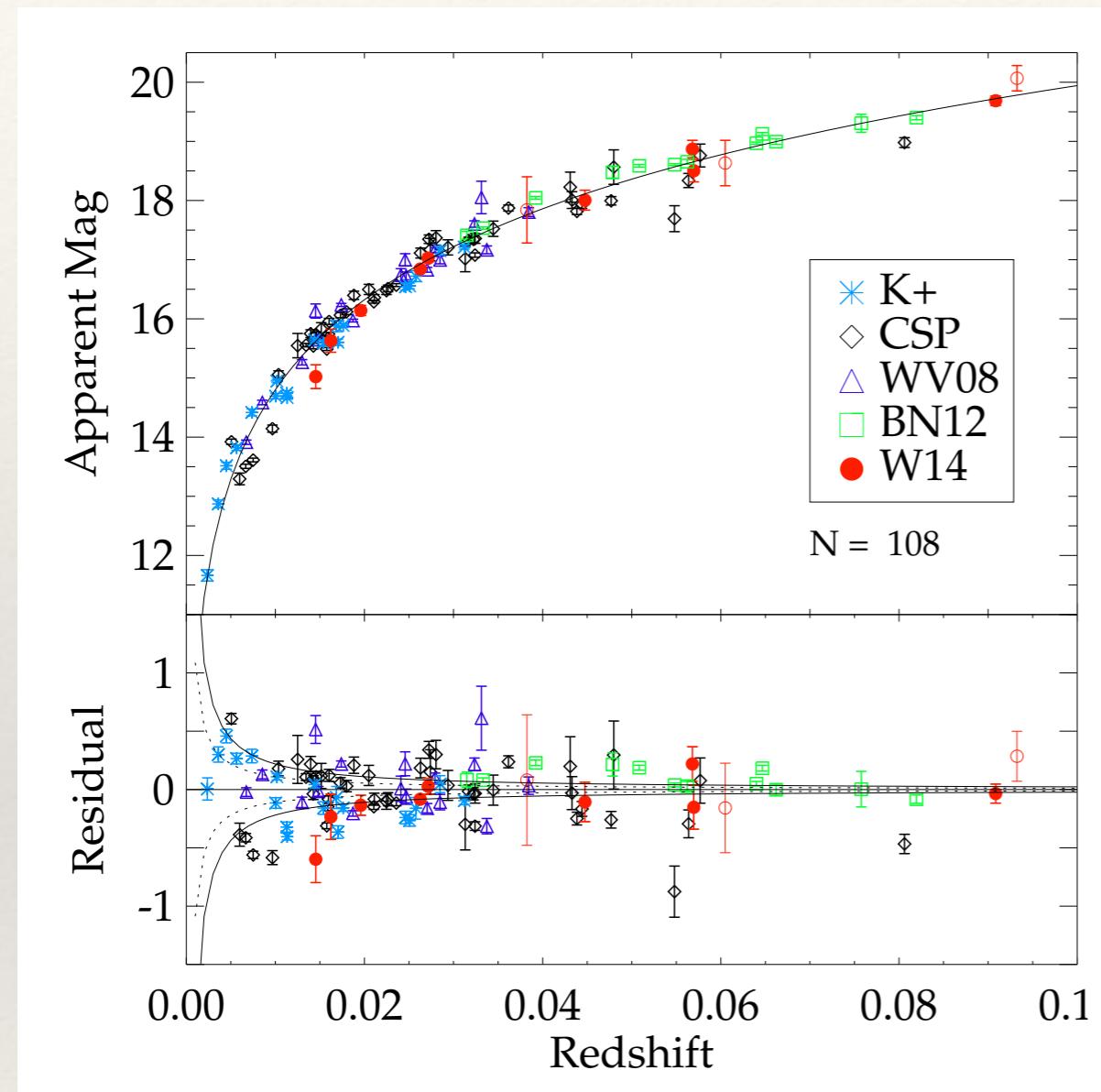
How many  
Super-LOTIS  
observed  
SN??

How many started  
within 2 weeks of B-  
band maximum?



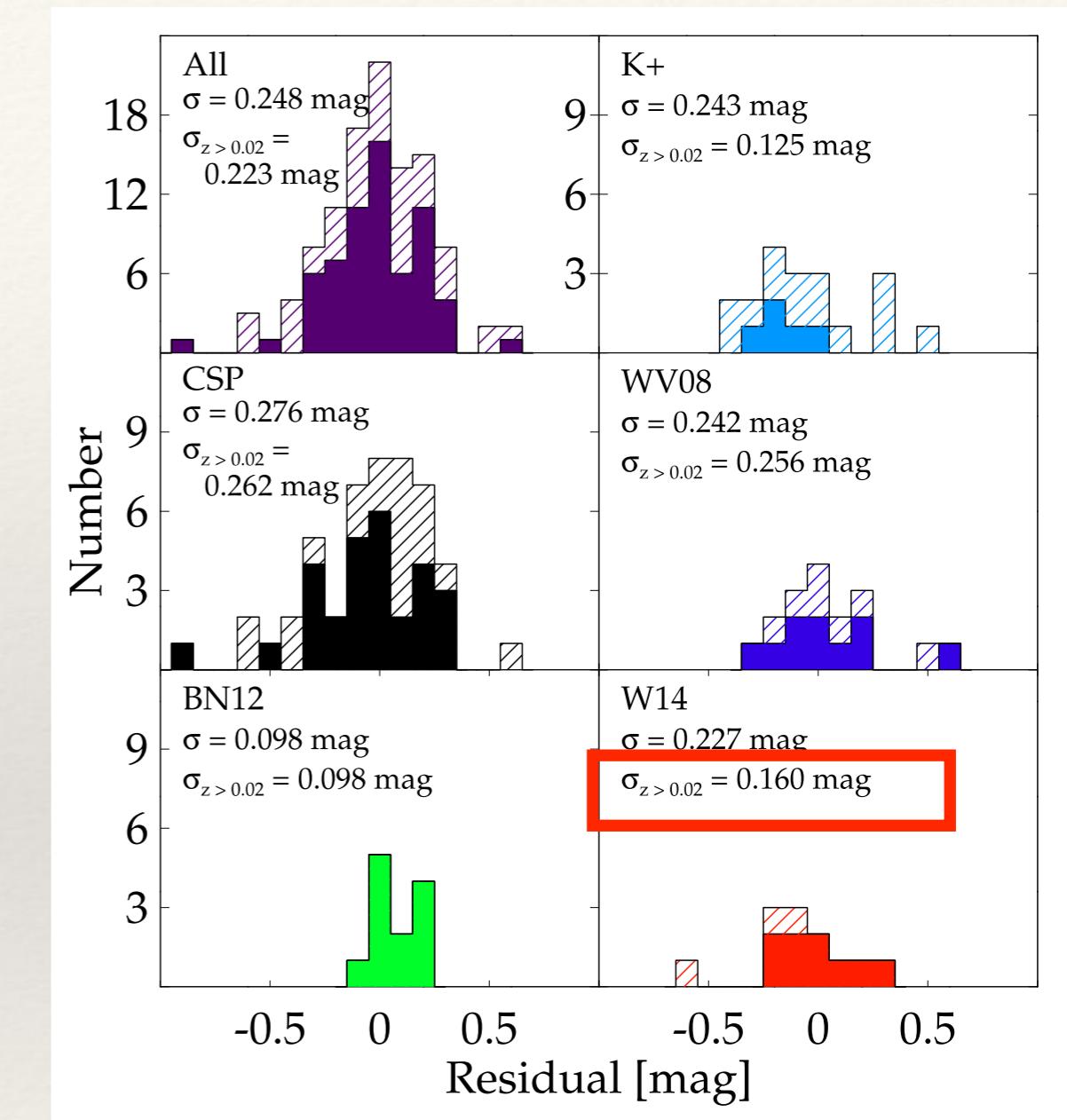
More  
Accurate

# Pilot: Weyant et al (2014)



**See previously:**

**Krisciunas+2004ab, Wood-Vasey  
+2008, Folatelli+2010, Kattner  
+2012, Barone-Nugent+2012**



**Not included:**  
**74: Friedman+2015**  
**16: Stanishev+2015**

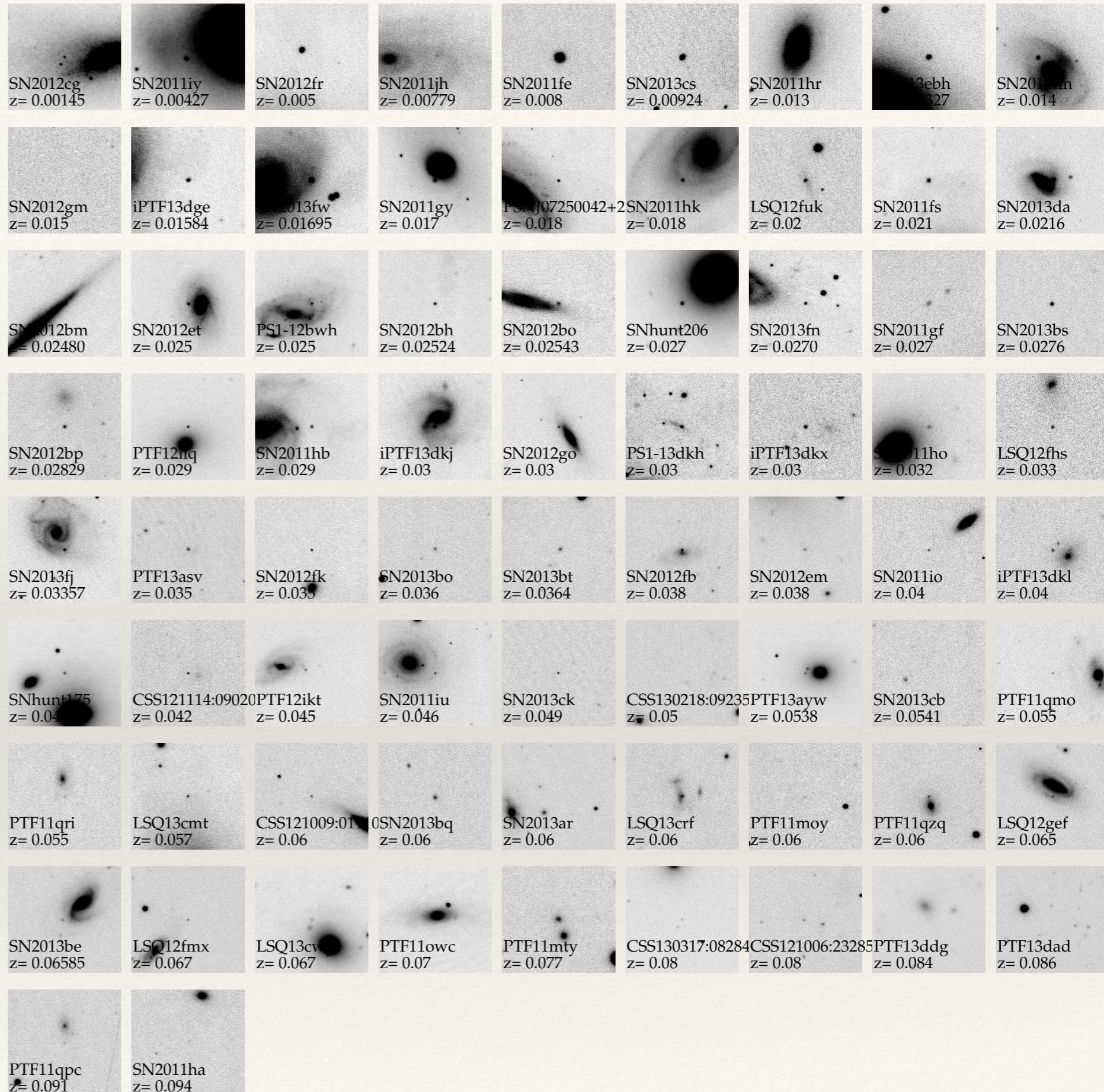
stats + cut outs

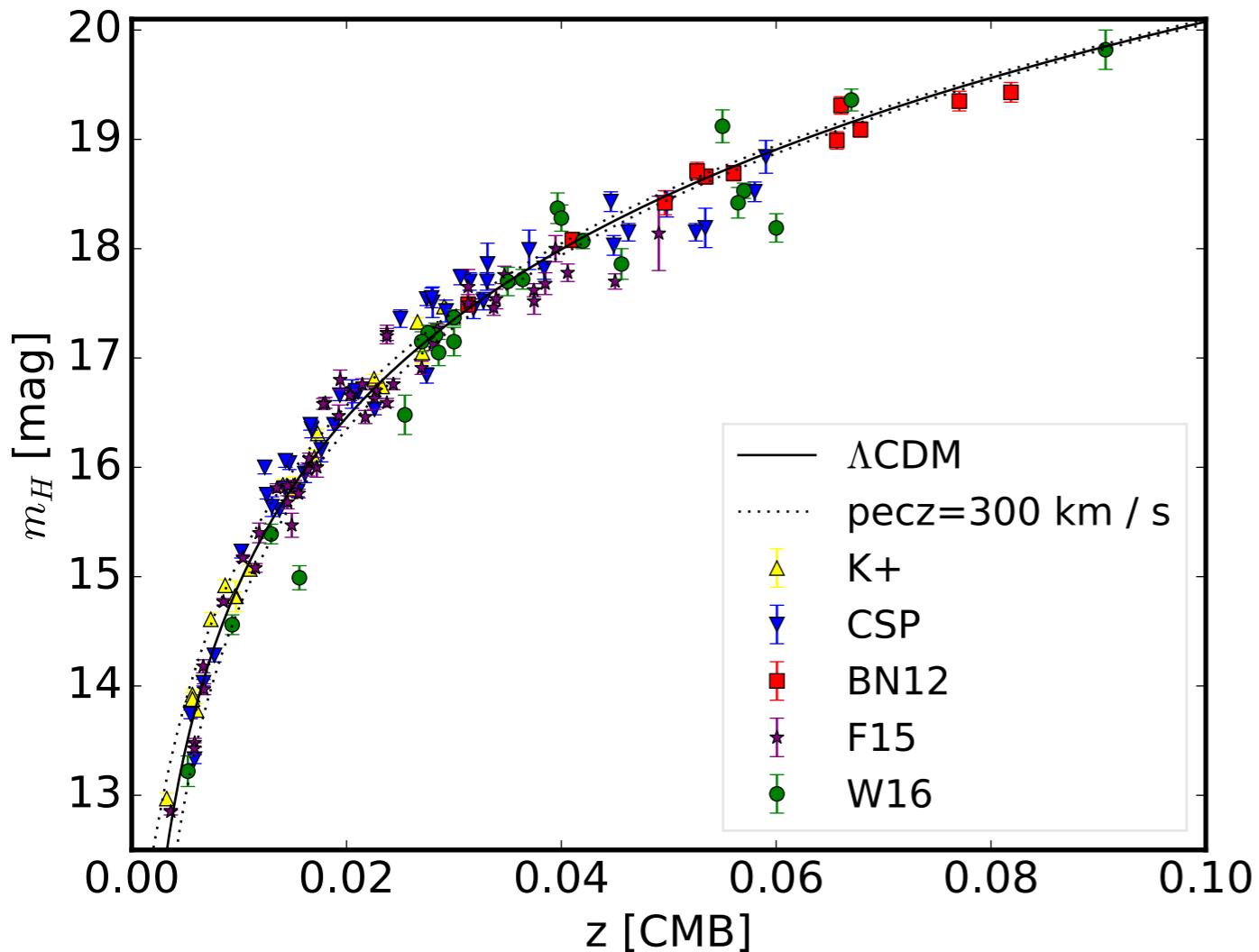
# DR1

❖ Calibrated Images  
of 74 SNeIa

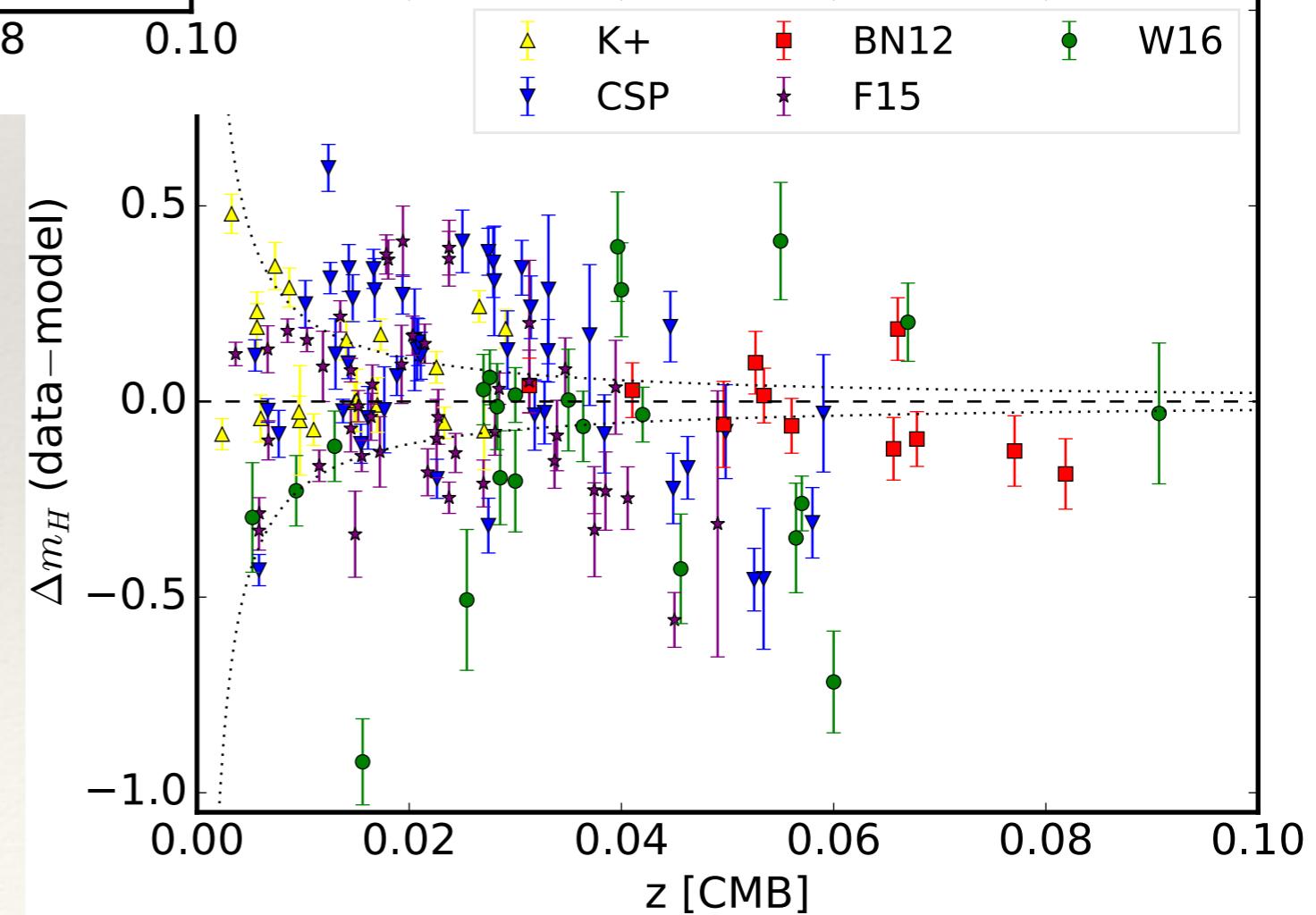
❖ 30 light curves

❖ Weyant et al  
(2016) in prep

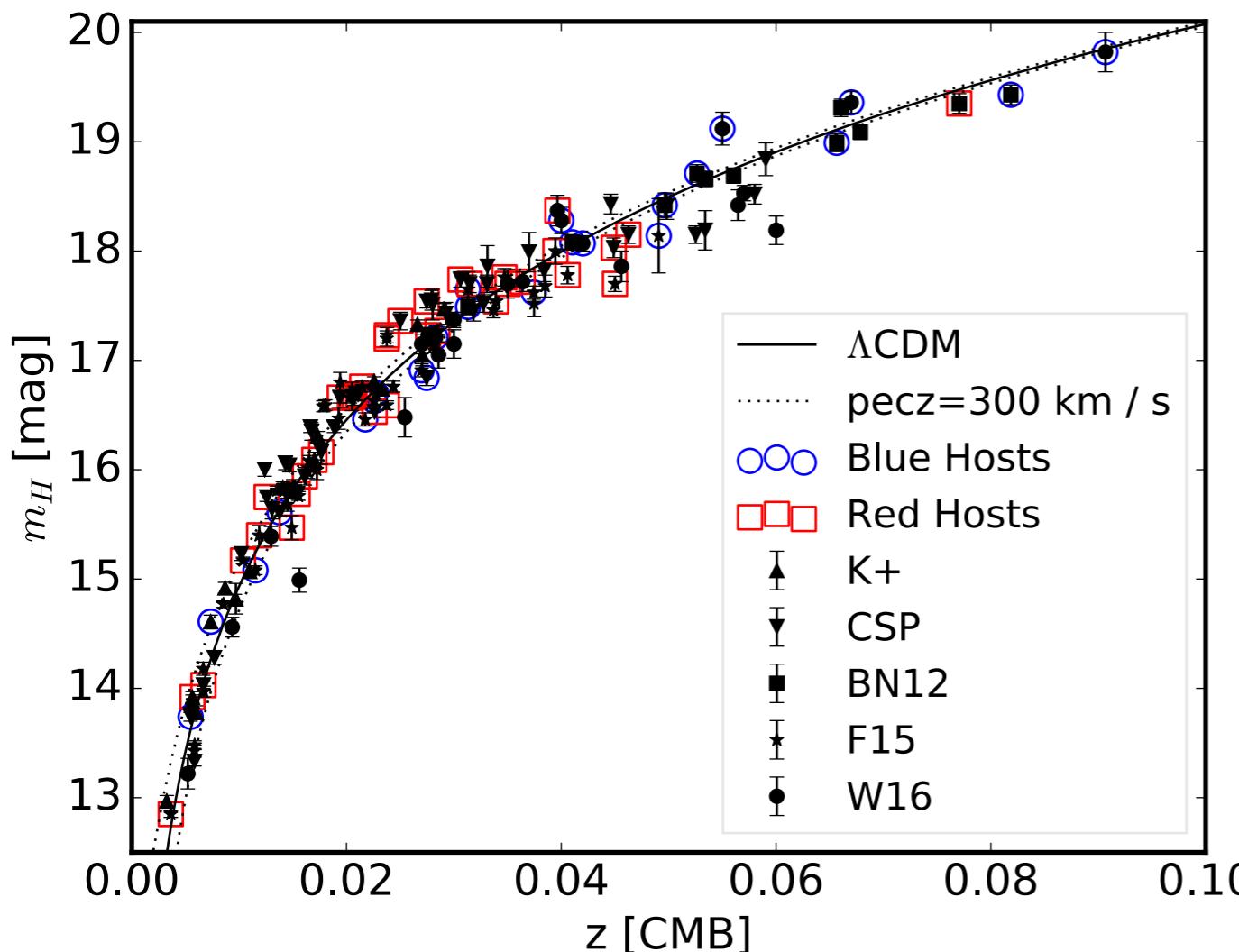




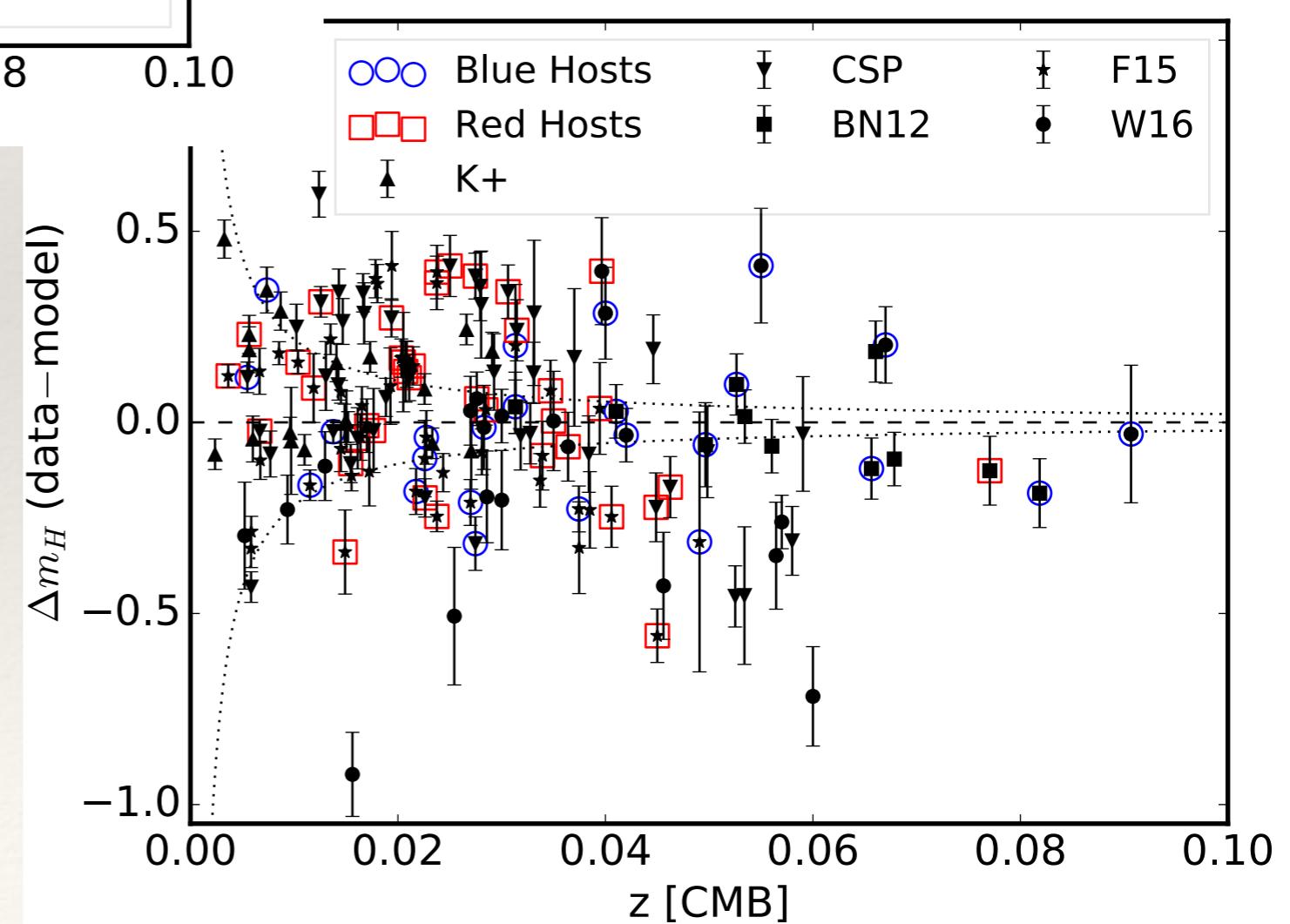
# Latest Hubble Diagram



Wood-Vasey & Ponder  
et al (in prep)



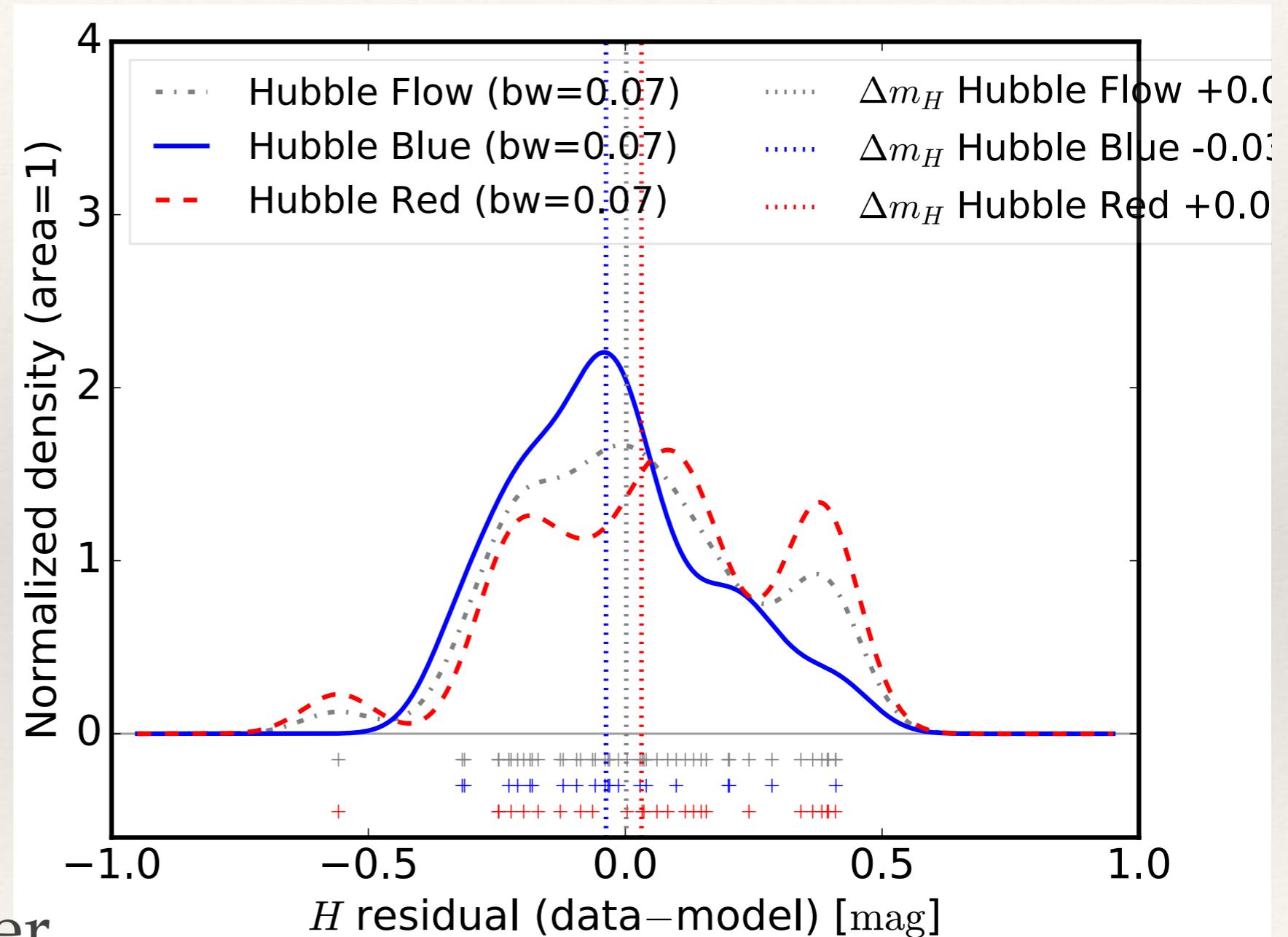
## Host galaxy properties



❖ Wood-Vasey &  
Ponder et al (in prep)

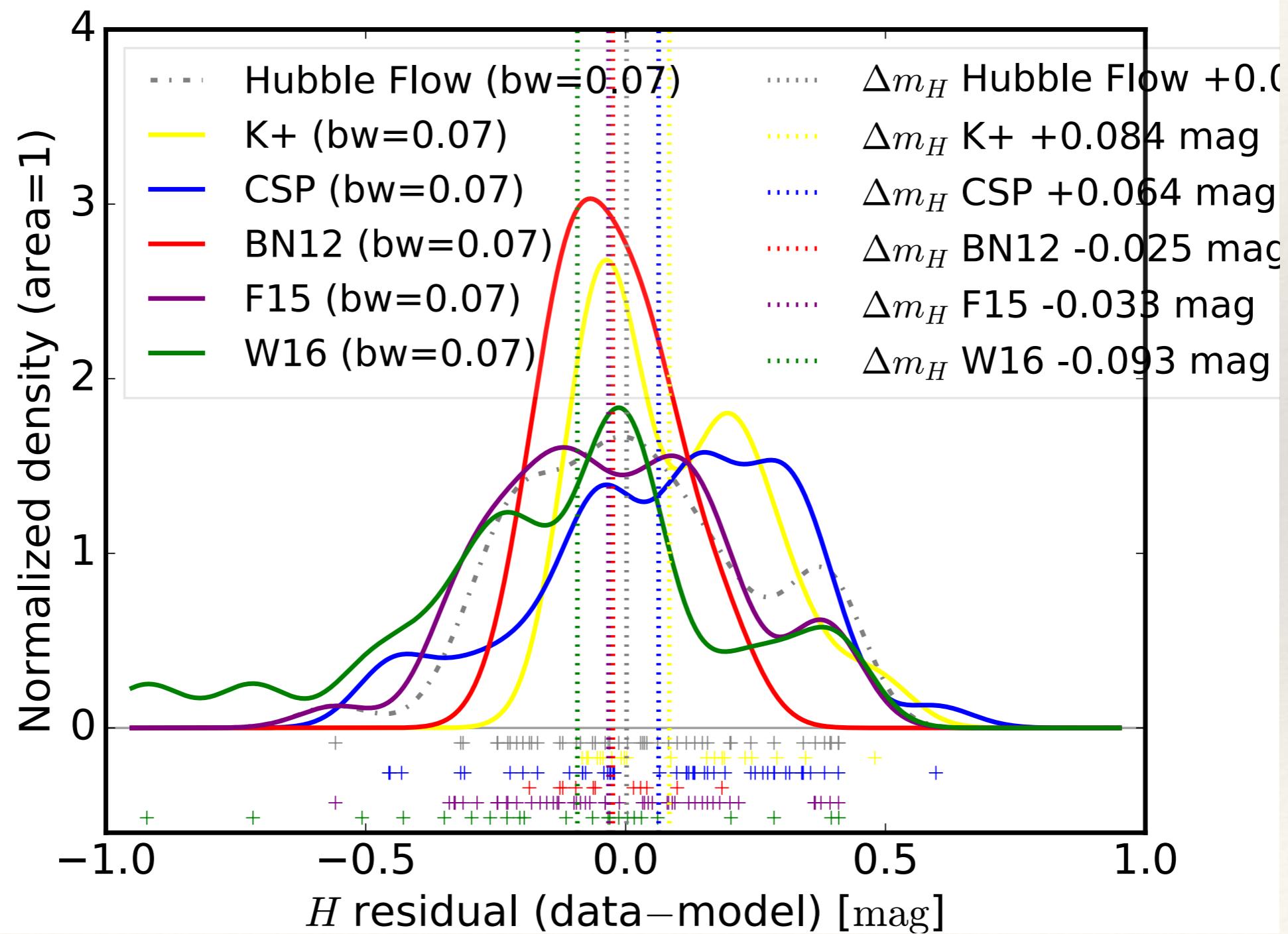
# Host Galaxy Color FIX LEGEND

- ❖ Real? Or product of low number statistics?

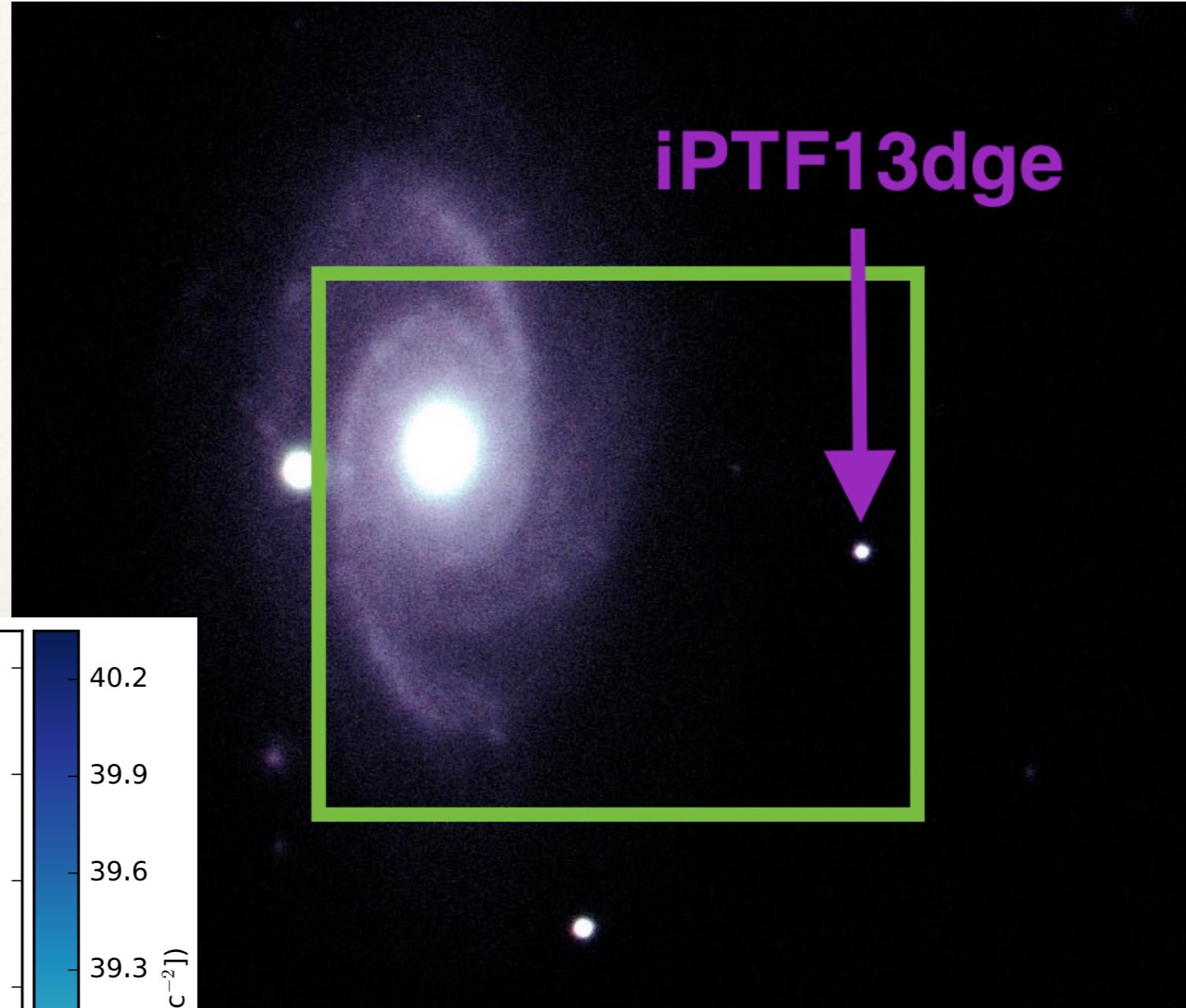
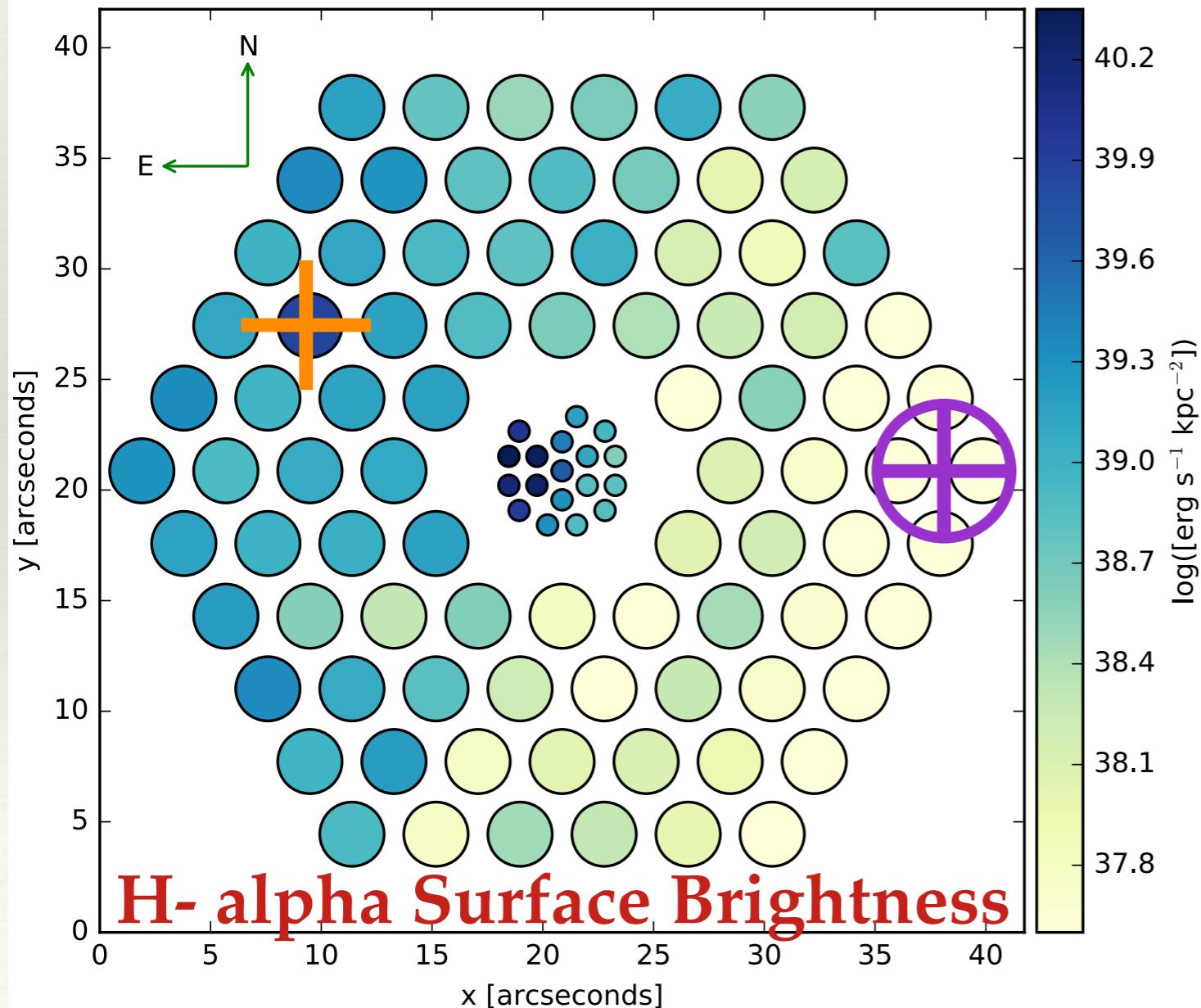


# Differences between surveys on same order of magnitude as Host galaxy Color relation

## FIX LEGEND



# HexPak: IFU Spectra of 32 Host Galaxies



Preliminary

Ponder et al (in prep)

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# Summary

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- ❖ SweetSpot will add 114 SNeIa to NIR dataset.
  - ❖ DR1 with 30 light curves Fall 2016
  - ❖ DR2 with full data set including host galaxies coming in 2017
- ❖ Will host galaxy correlations hold in NIR?
  - ❖ Examining host galaxy color, mass, and SFR indicators through GALEX and local H-alpha measurements

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# Thank you!

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