MOS and Cosmology with HII Galaxies

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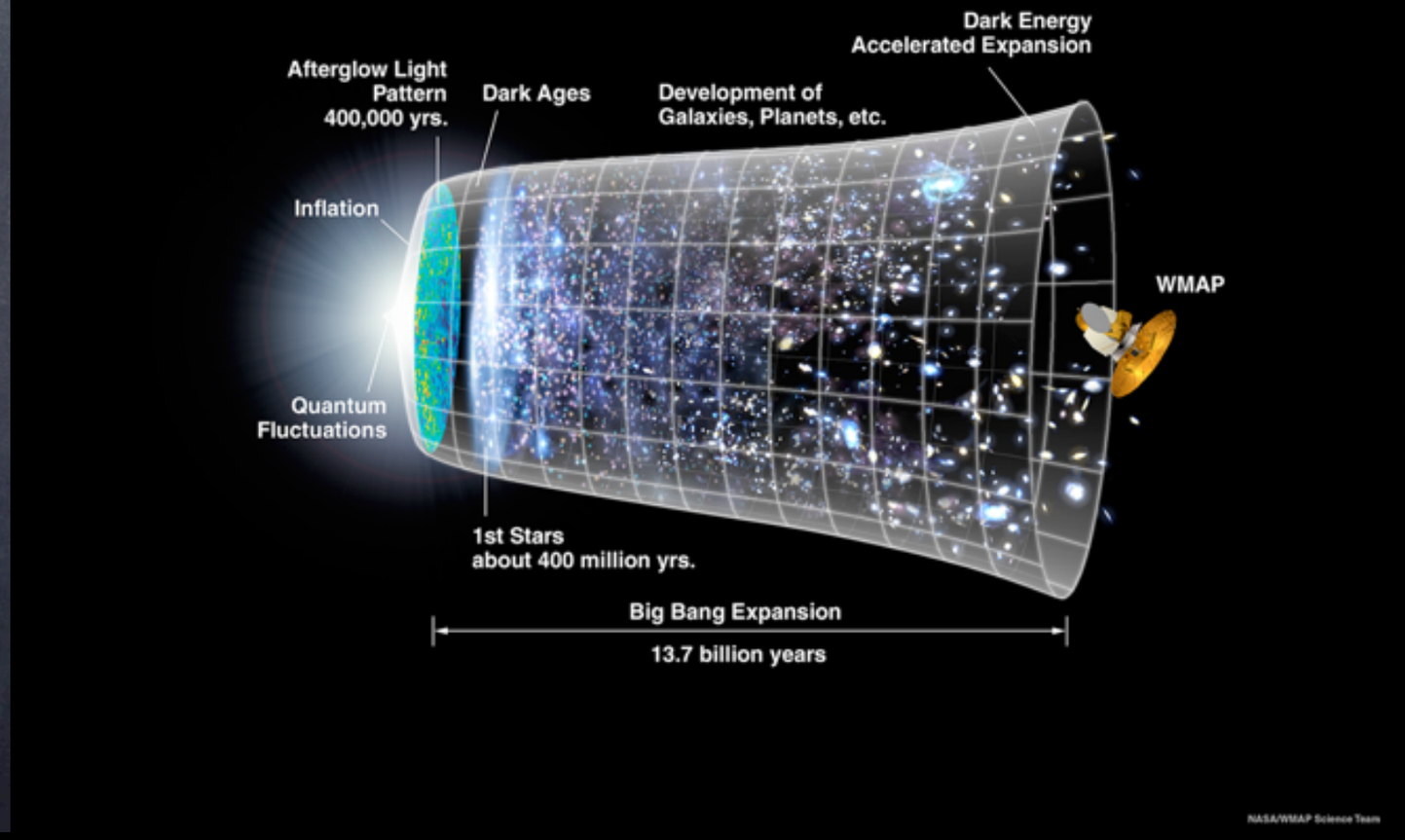
Guillermo Haro 2018 Workshop

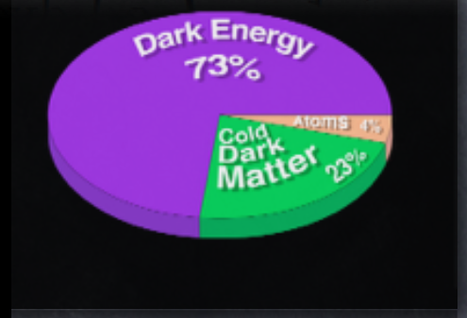
September 7th

A Picture of our Universe

$$R_{\mu\nu} - \frac{1}{2}g_{\mu\nu}R + \Lambda g_{\mu\nu} = -\kappa T_{\mu\nu} \quad + \quad ds^2 = dt^2 - a^2(t)\left[\frac{dr^2}{1-kr^2} + r^2(d\theta^2 + \sin^2\theta d\phi^2)\right]$$

$$H^2(z) = H_0^2\left[\Omega_r(1+z)^4 + \Omega_m(1+z)^3 + \Omega_k(1+z)^2 + \Omega_w \exp\left(3\int_0^z \frac{1+w(x)}{1+x}dx\right)\right]$$





$$p_w = w(z)\rho_w$$

$$w(z) = w_0 + w_1 f(z)$$

$$f(z) = z/(1+z)$$

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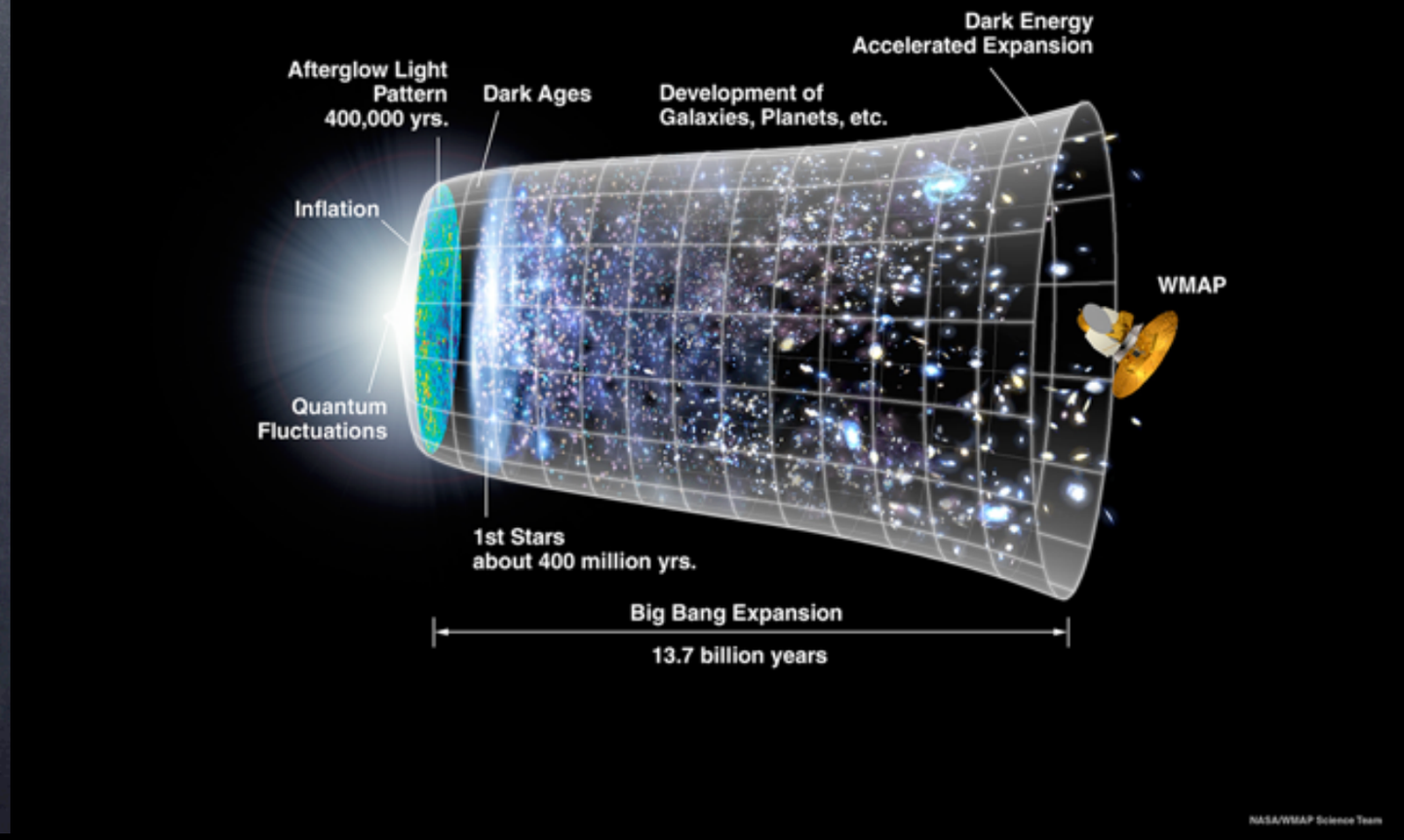

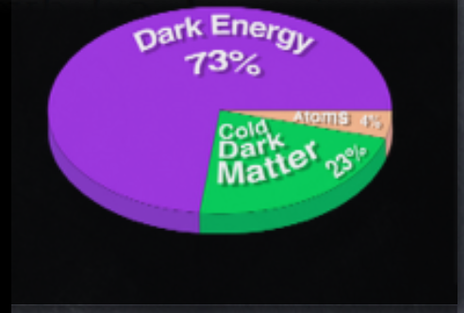

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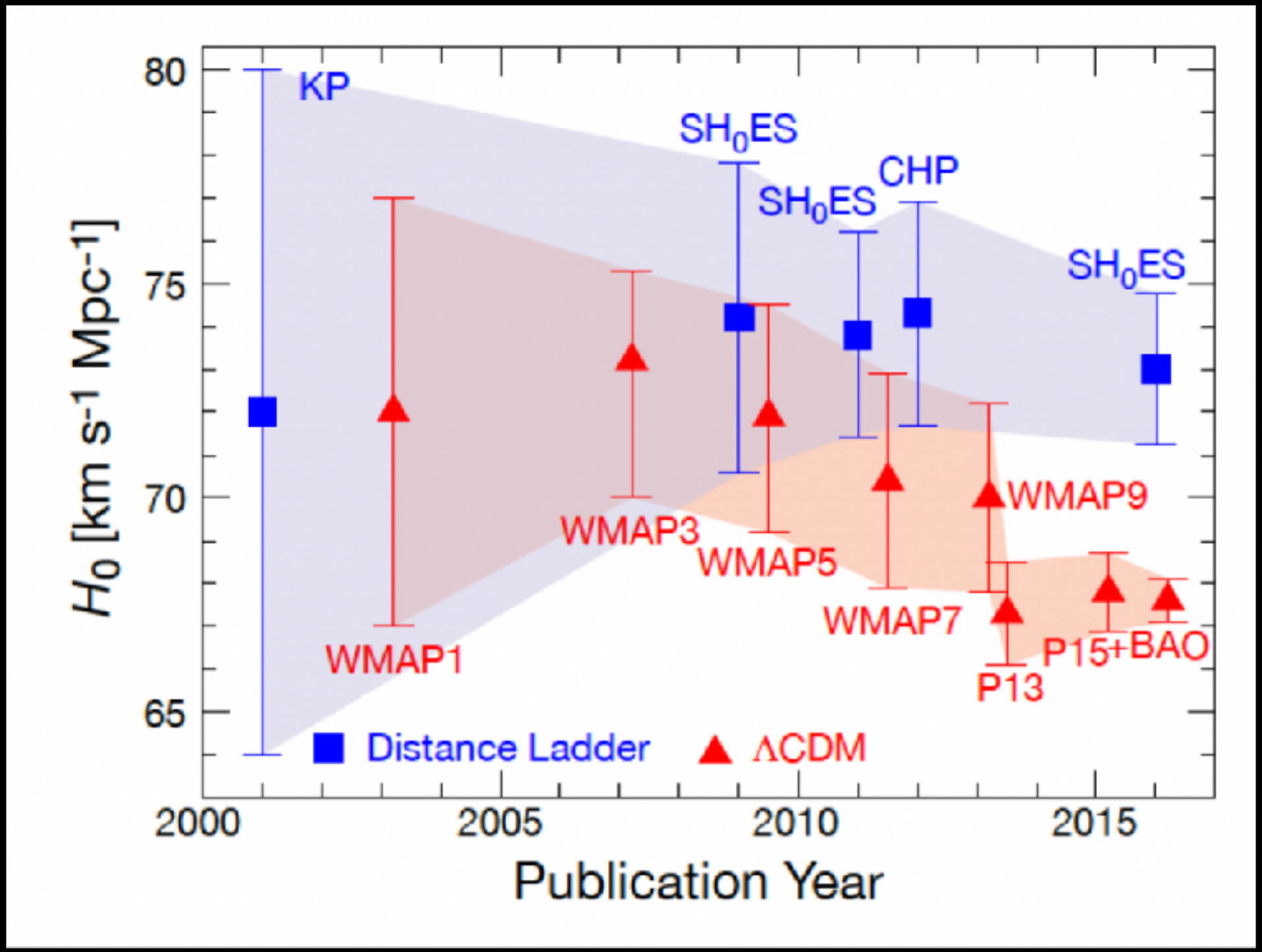
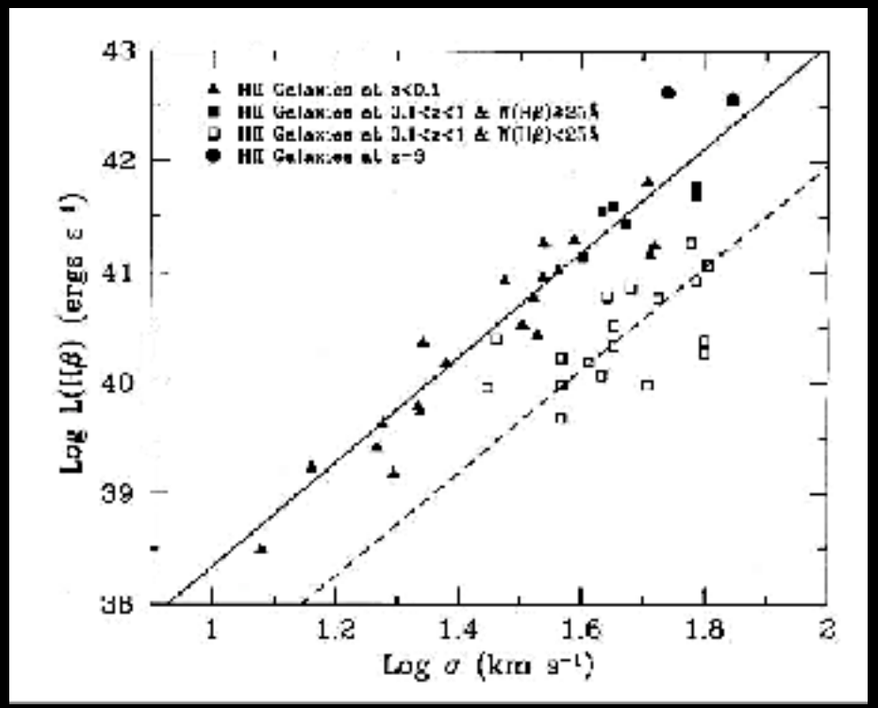
The Hubble Constant

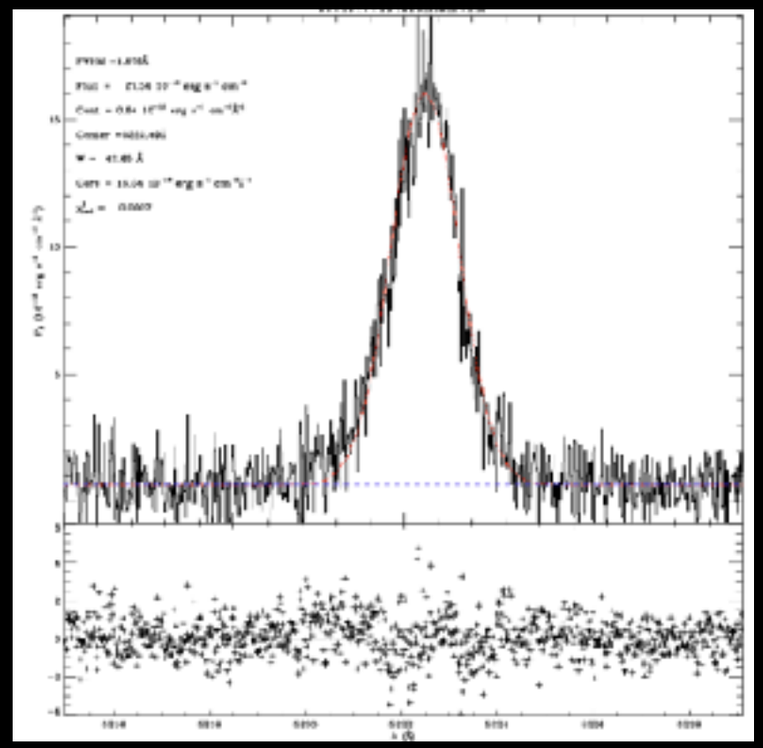


From Freedman 2017

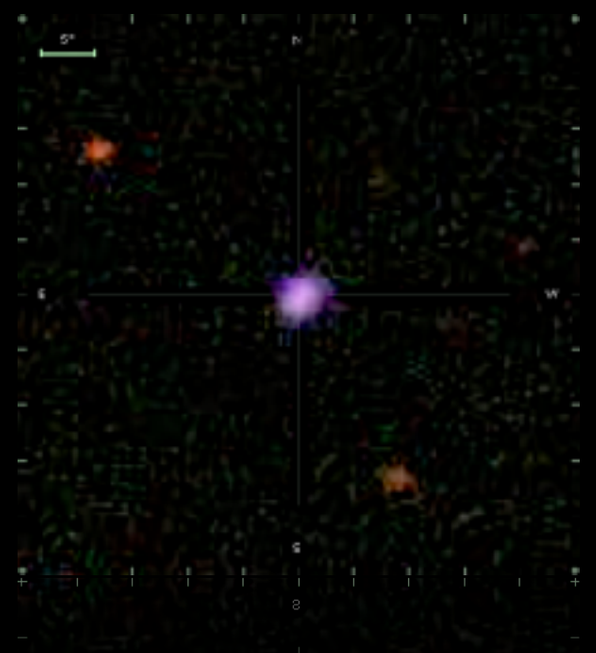
What is an H II Galaxy?

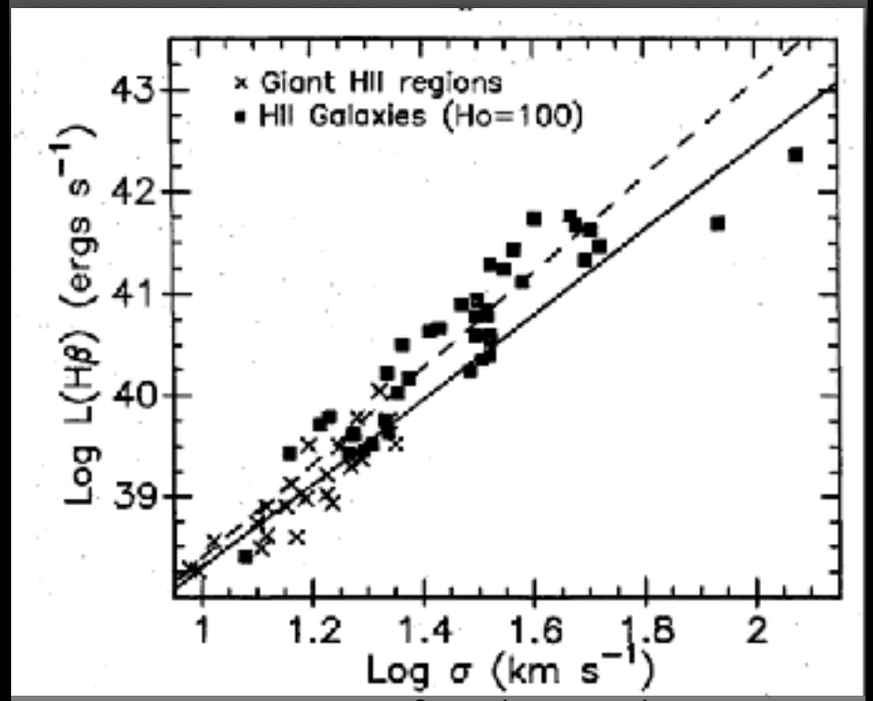


From Melnick et al. 2000

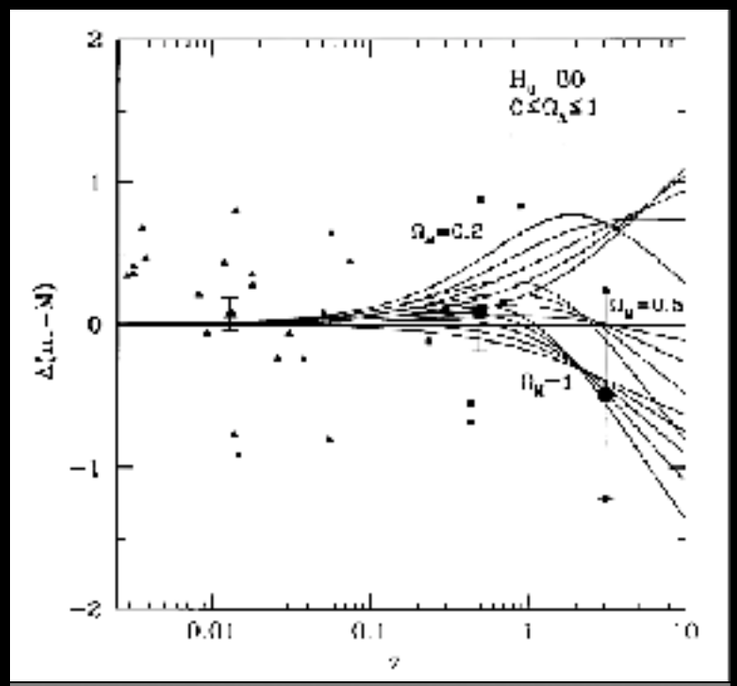


SDSS J084414.22+022621.2





From Melnick et al. 1988



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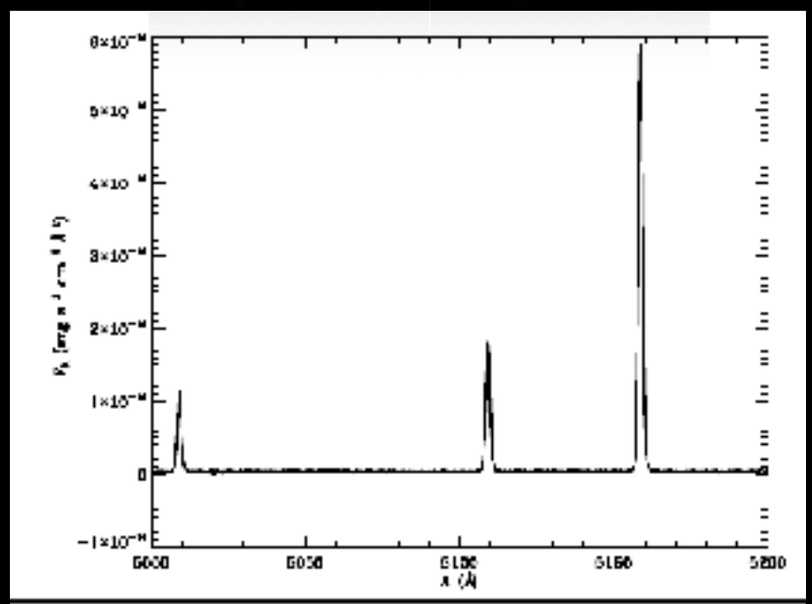

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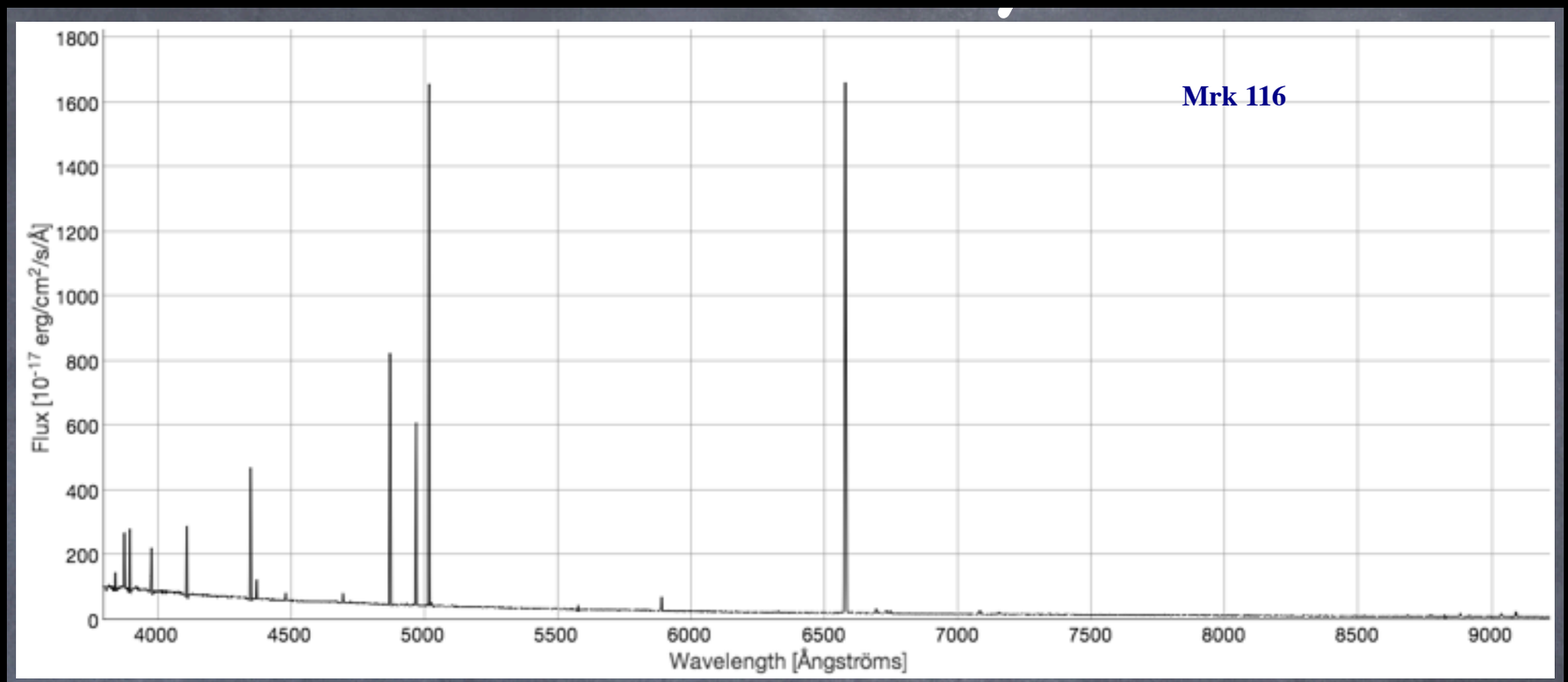

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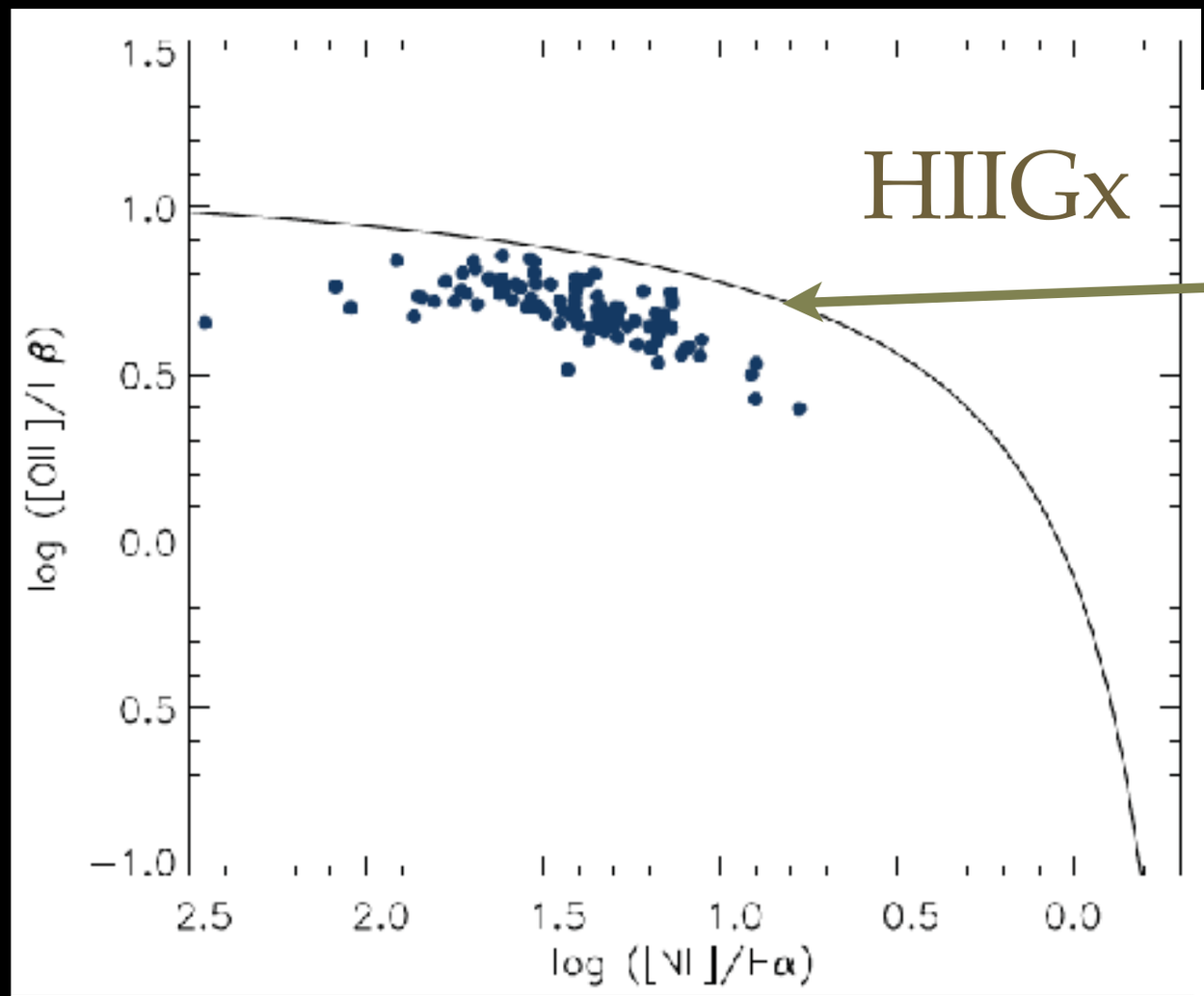

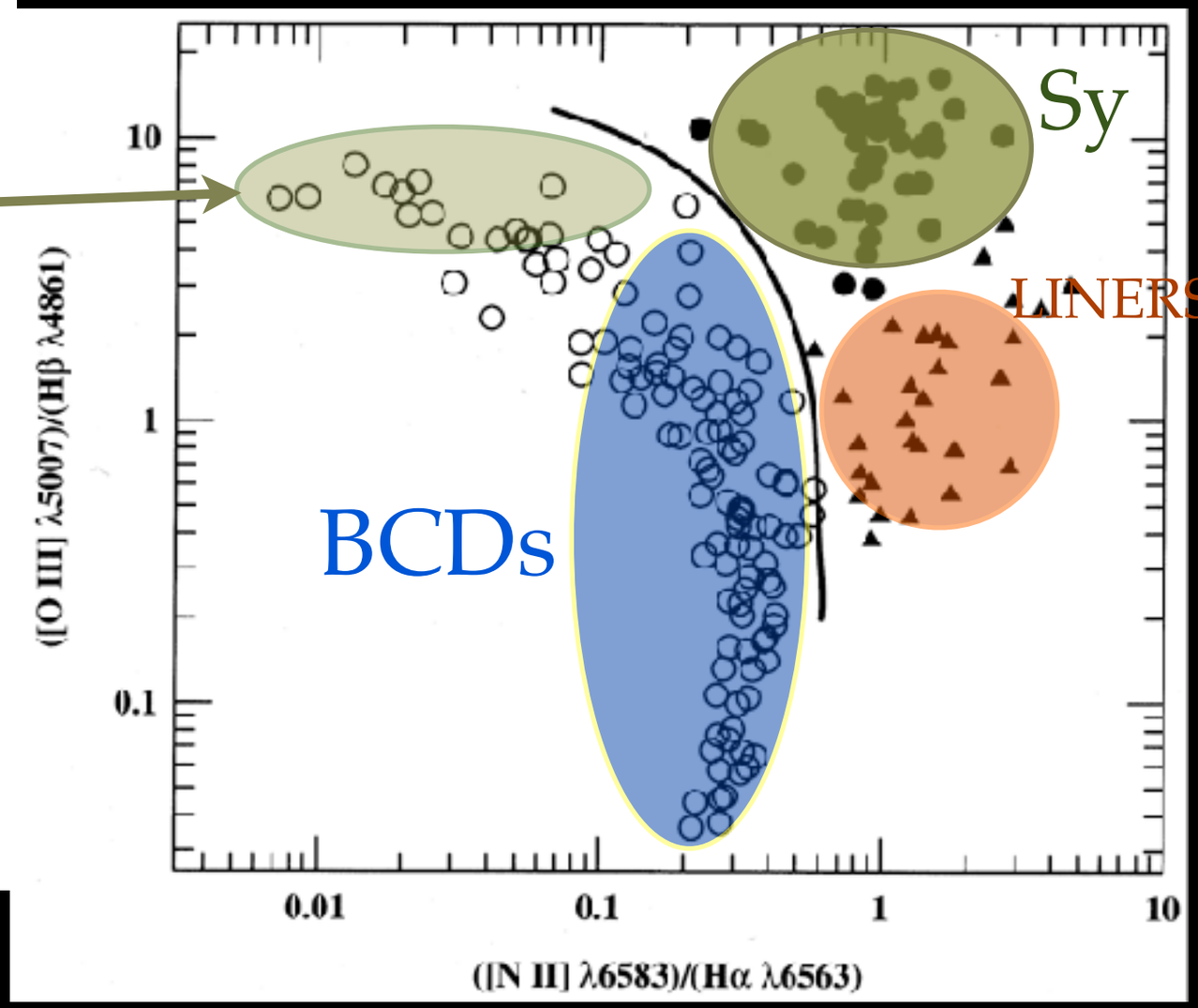

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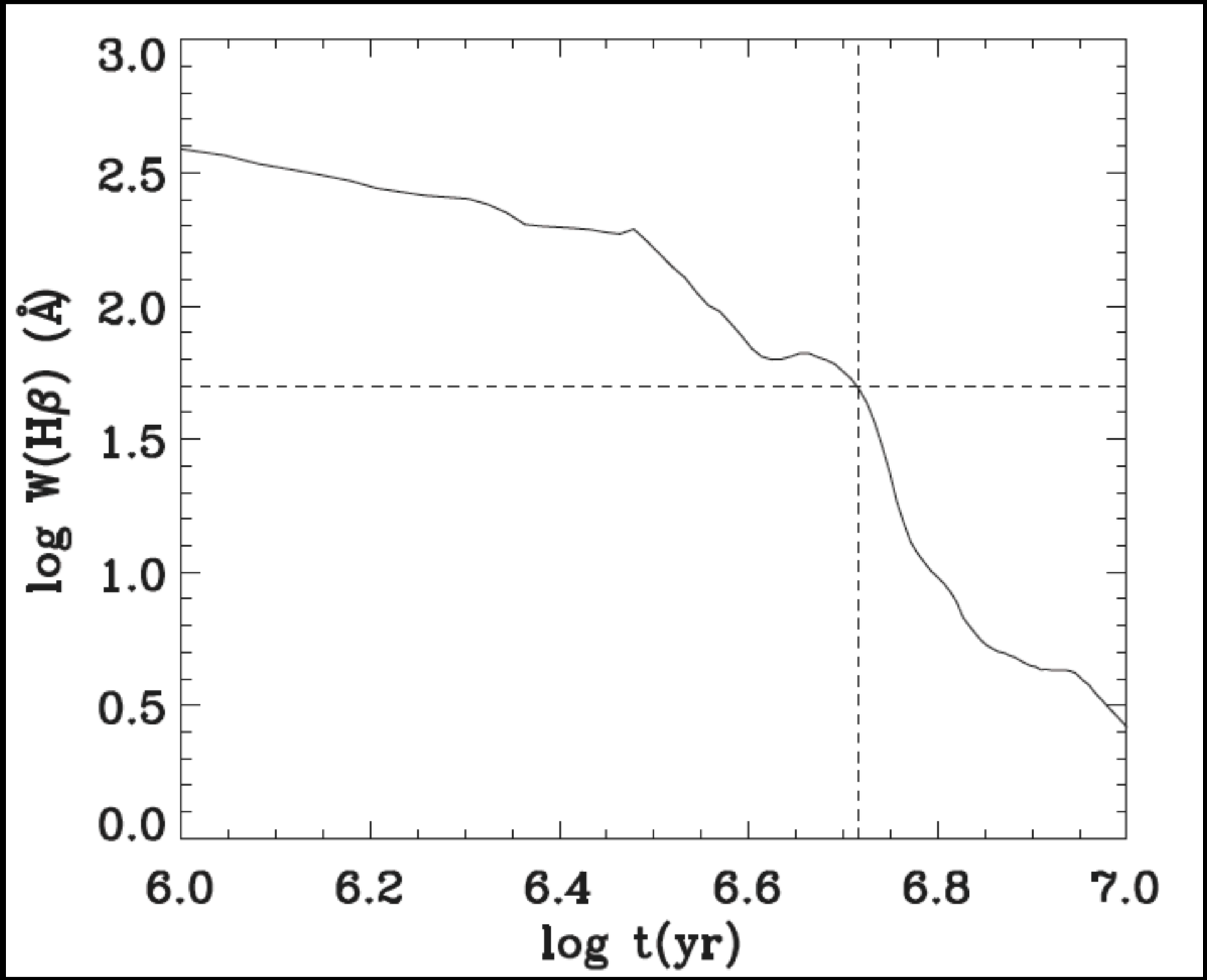
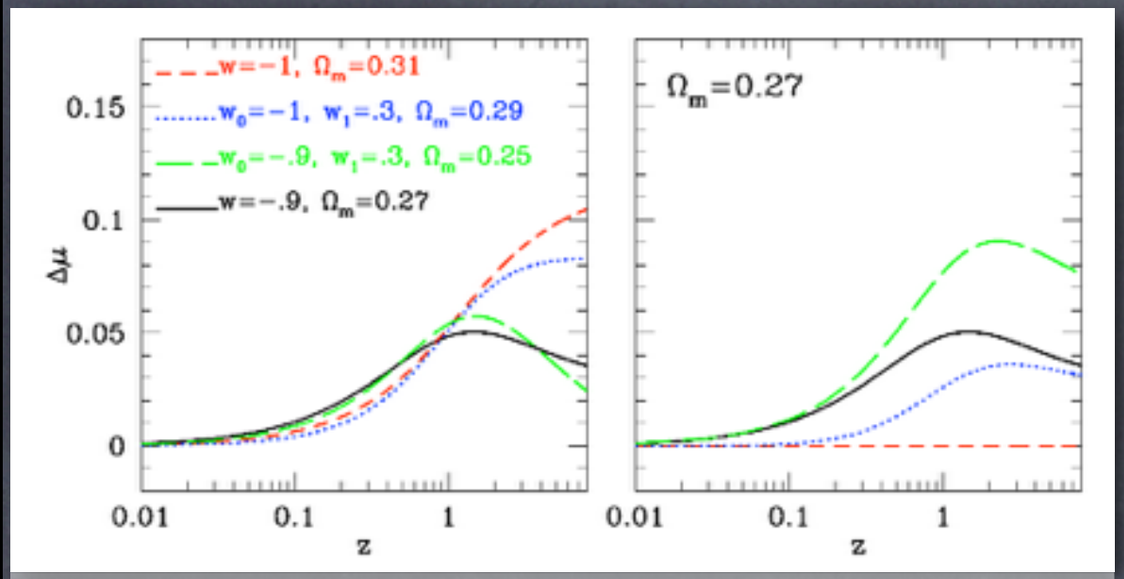
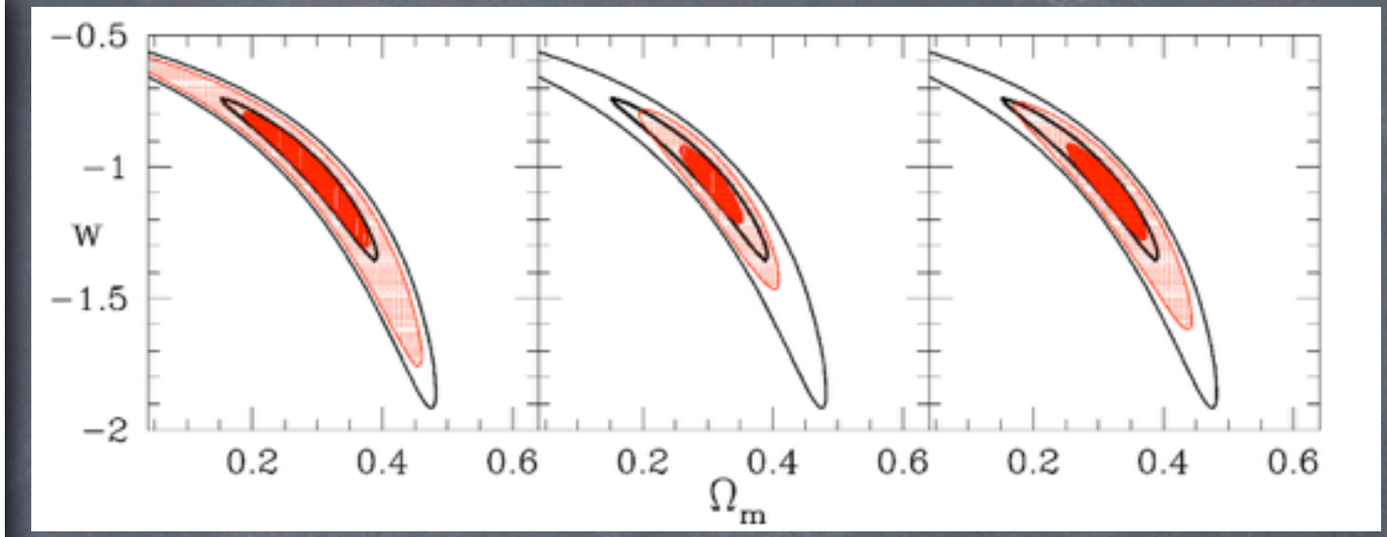


Why H II galaxies?



From Plionis et al. 2011



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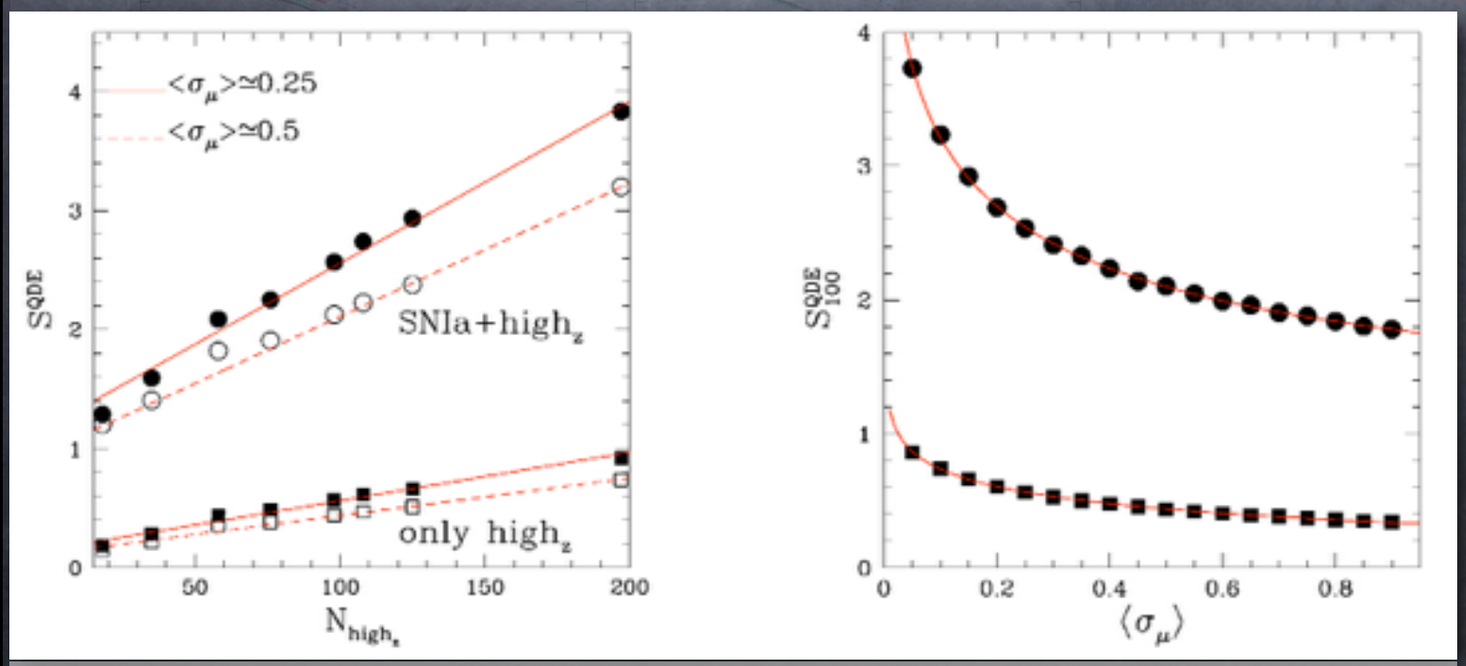

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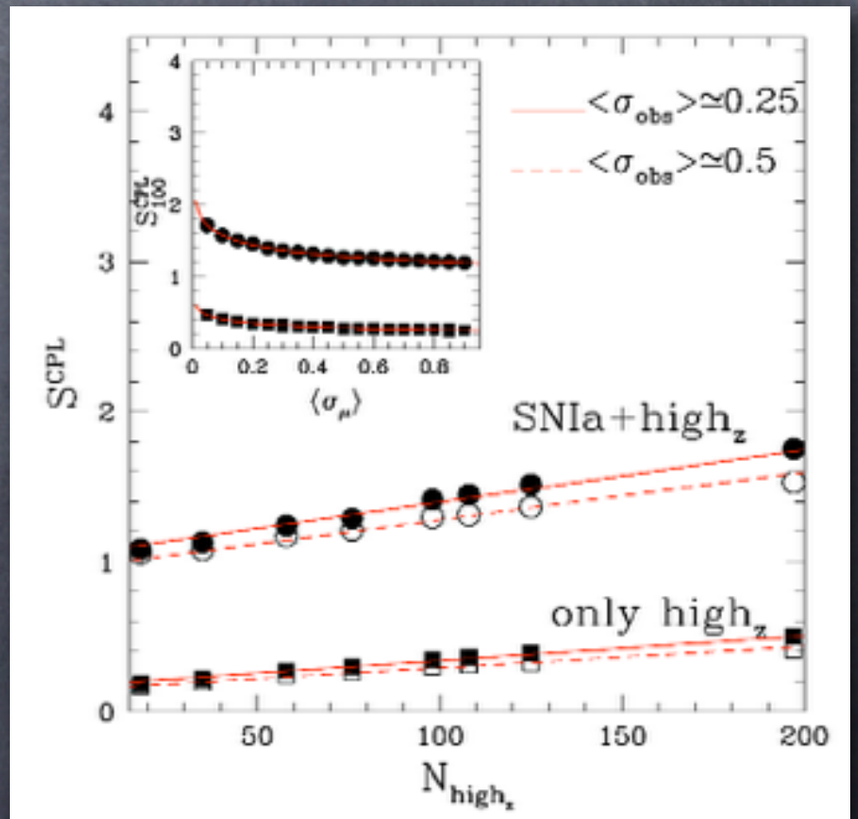
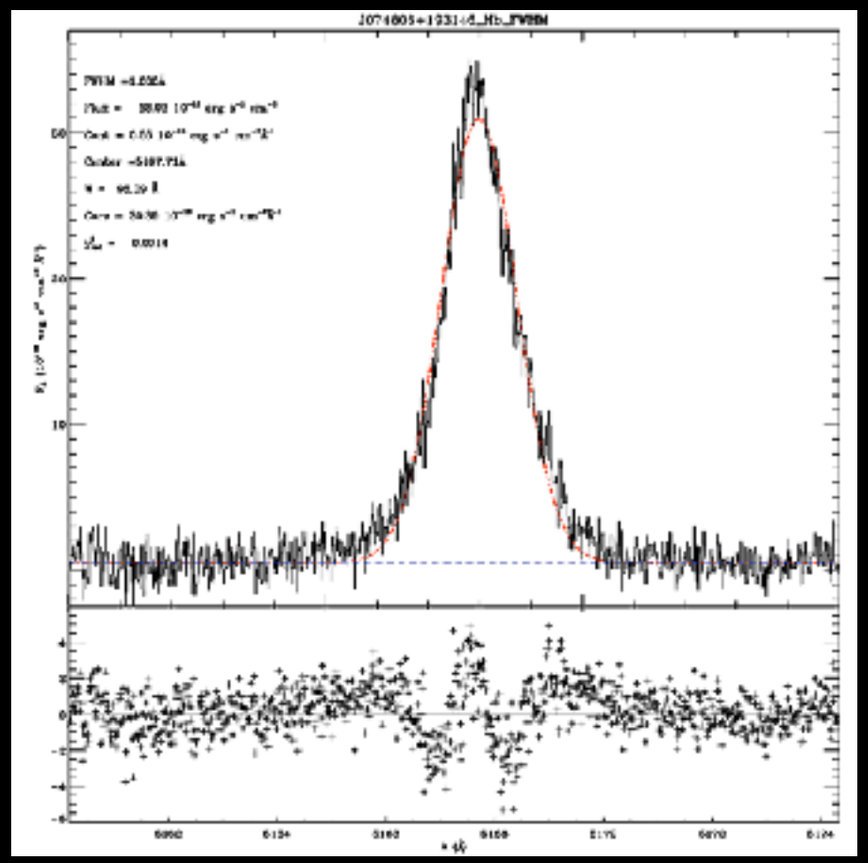
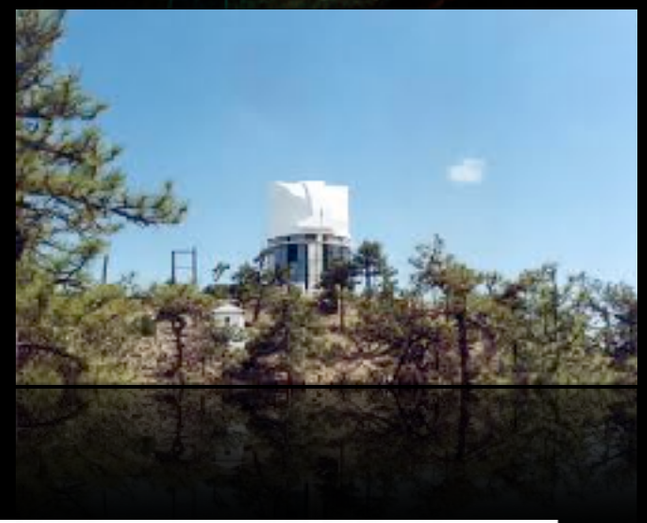
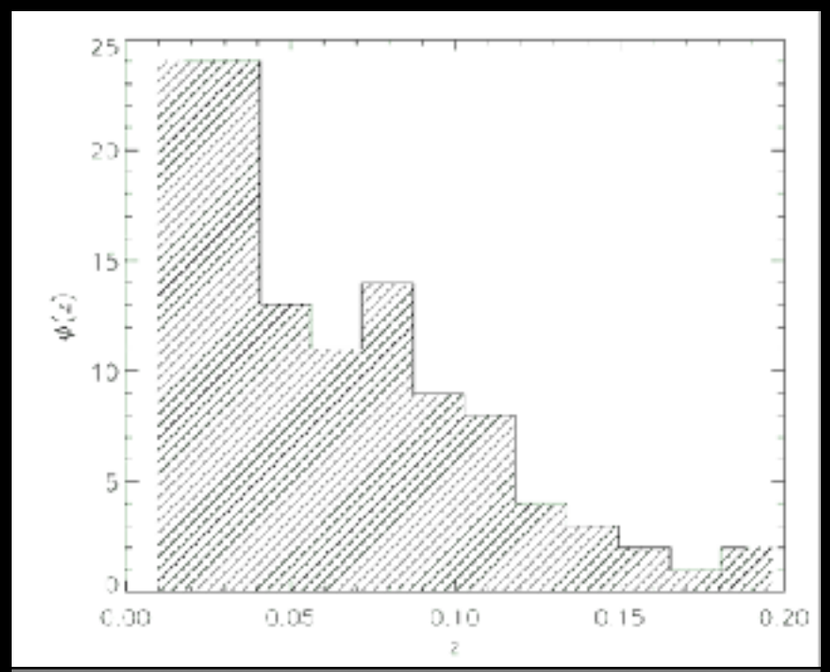


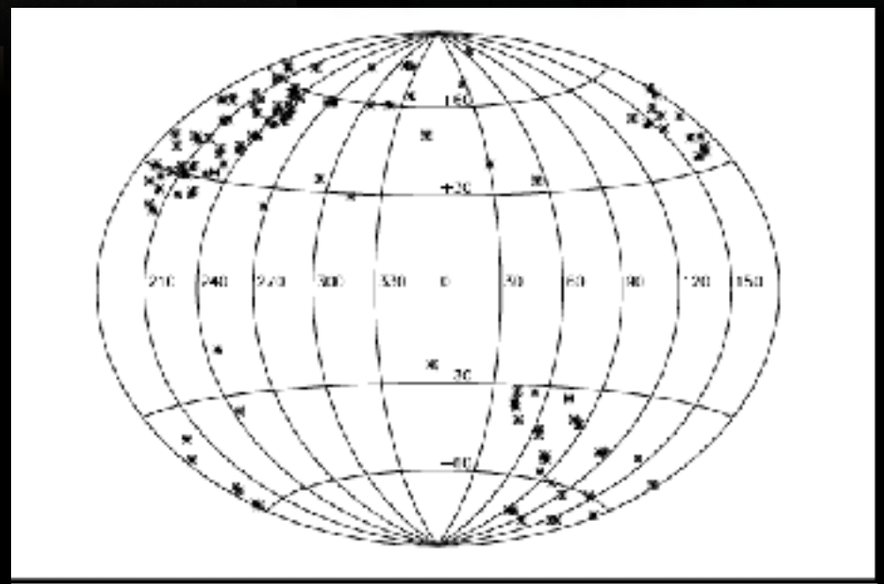
From Plionis et al. 2011

Observations

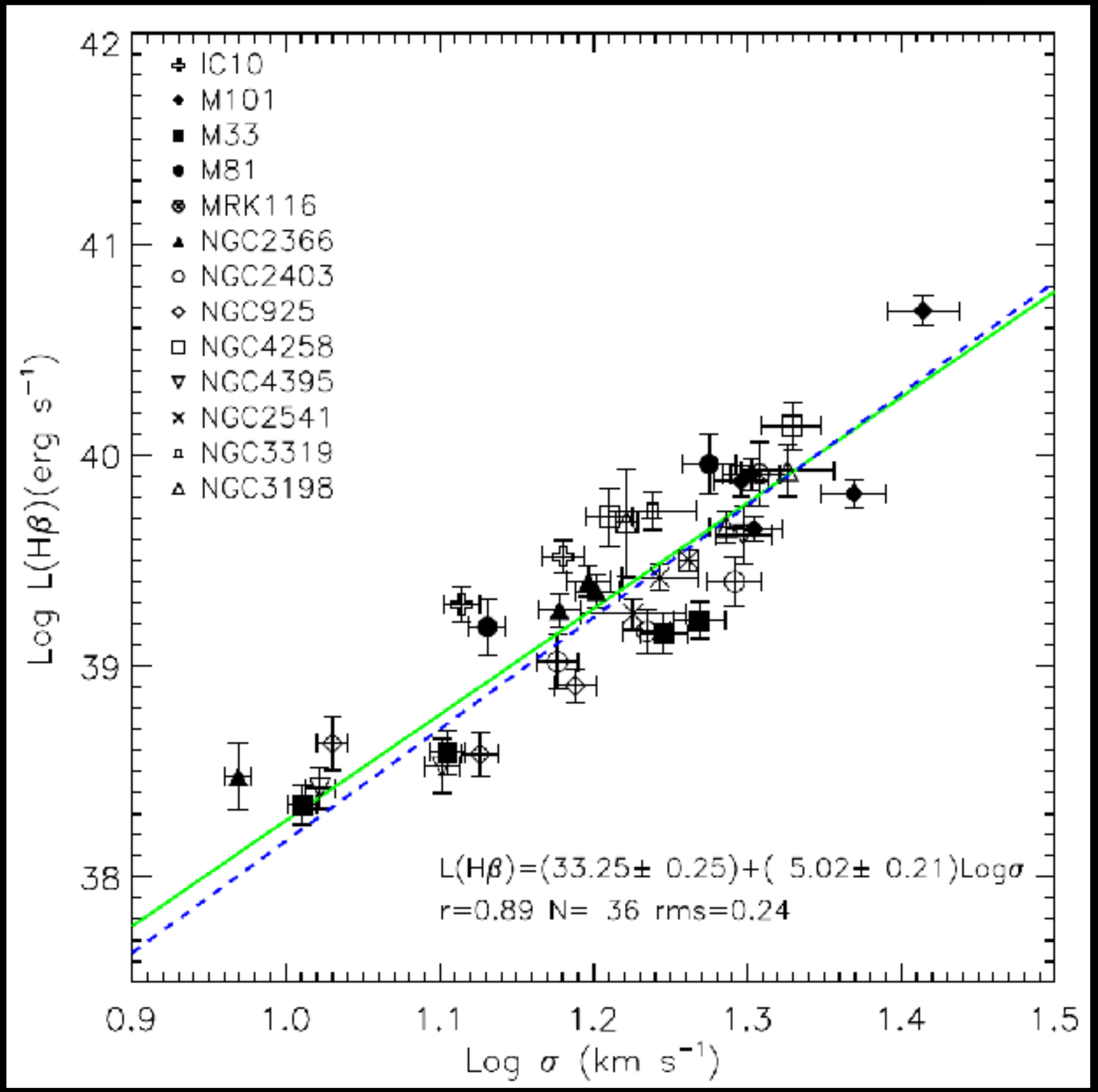






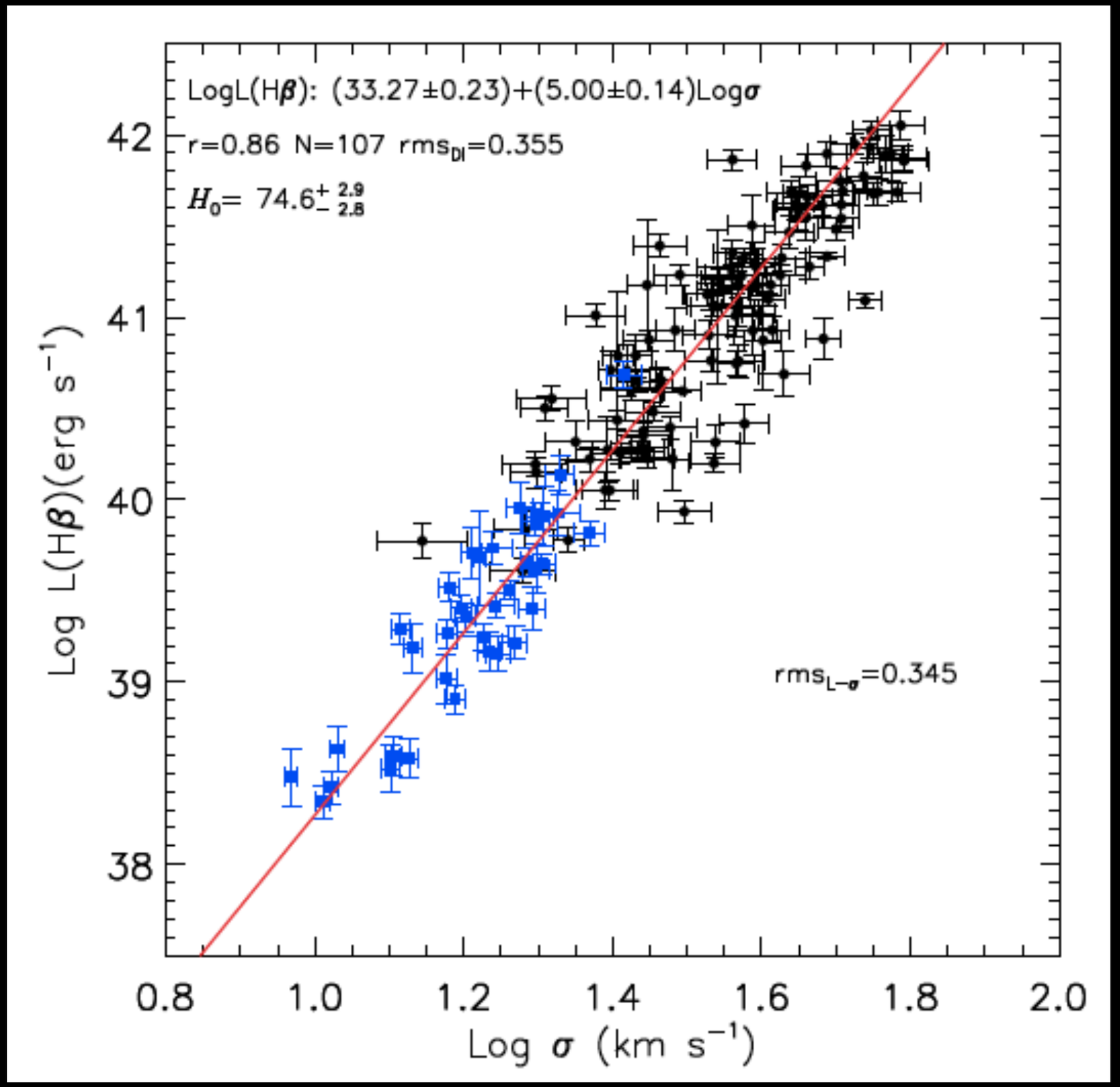


The ‘Anchor’ Sample



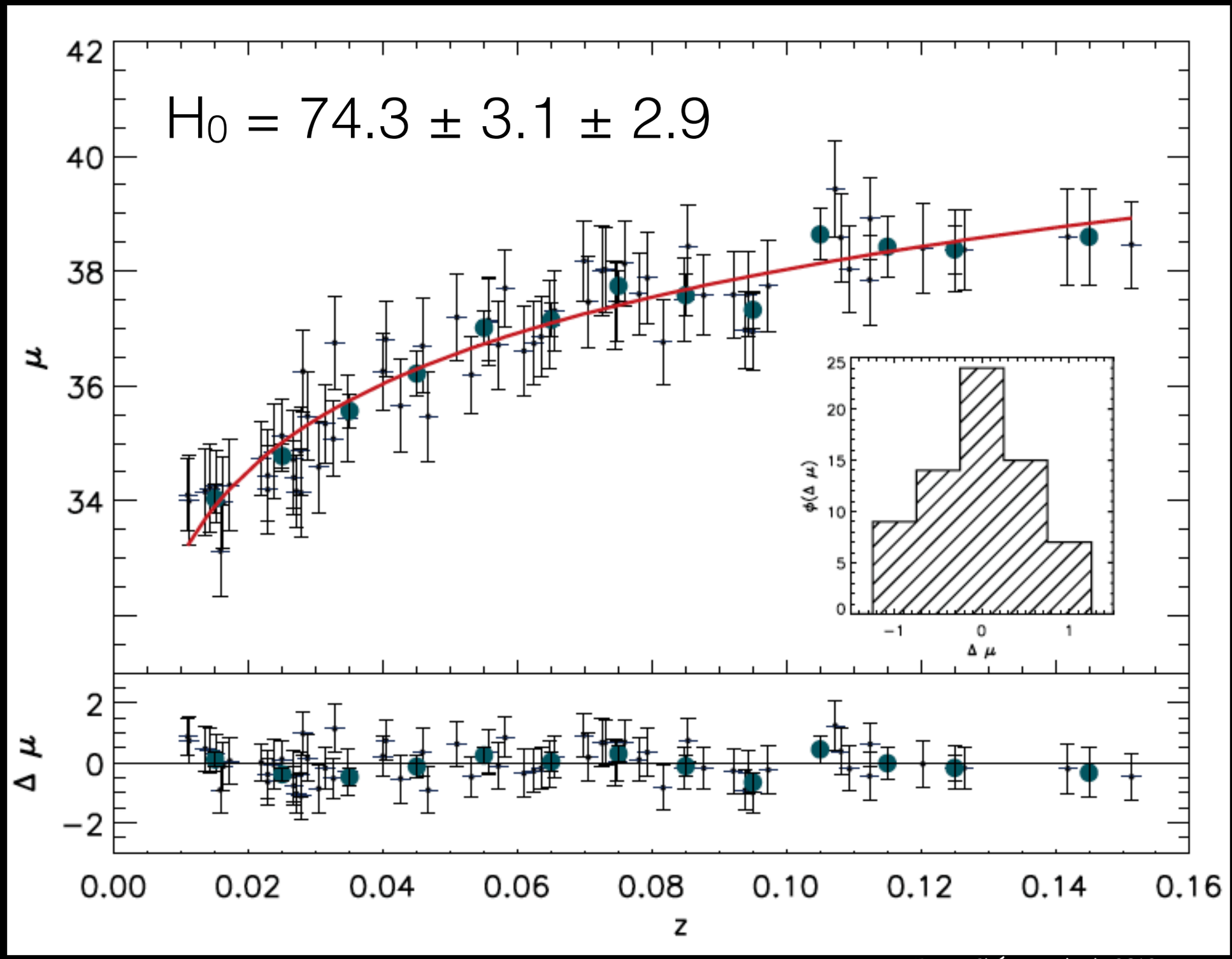
From Fernández-Arenas et al. 2018

The ‘Anchor’ + Local Samples



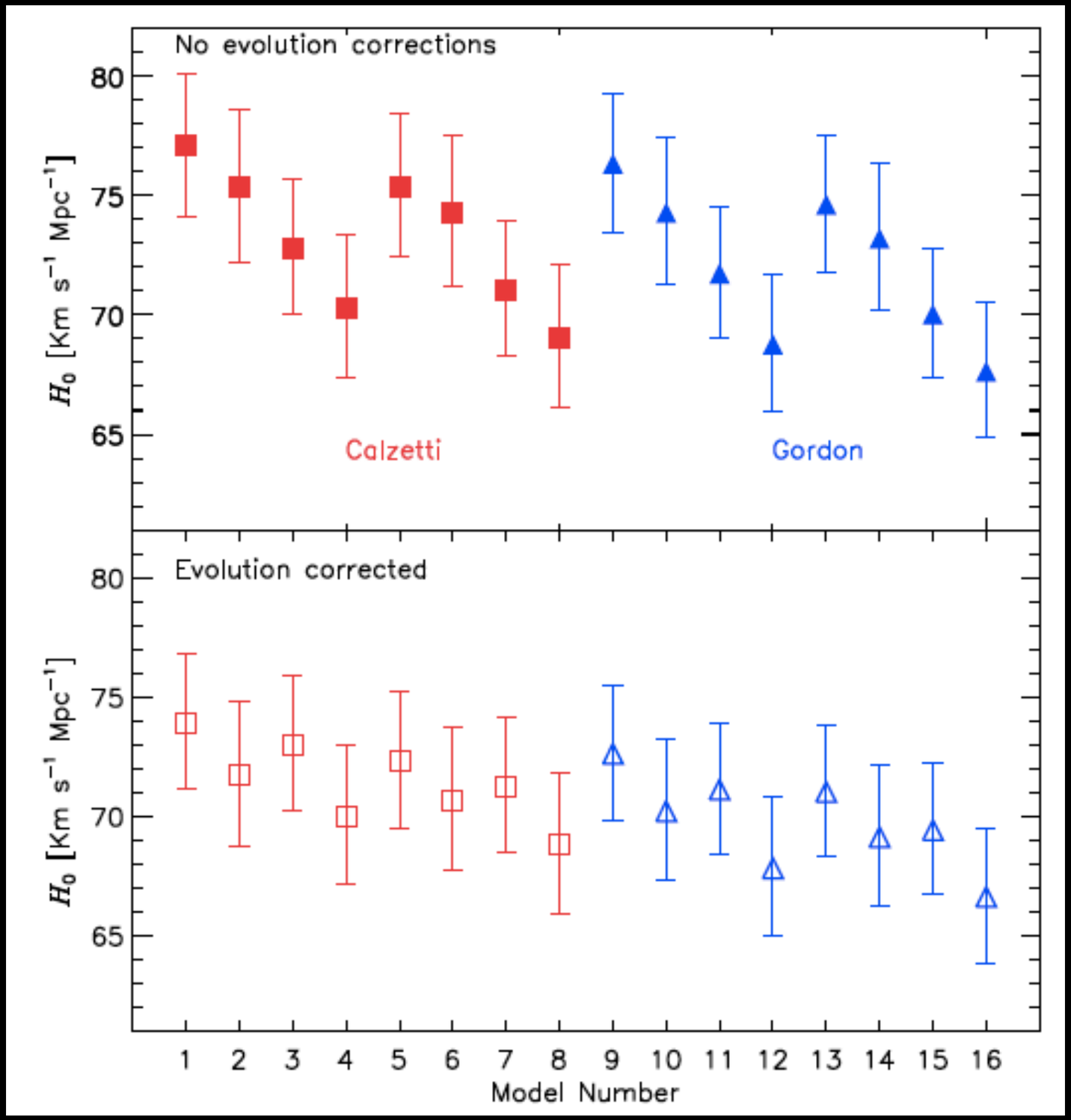
From Fernández-Arenas et al. 2018

Chávez+2012 H_0 determination



From Chávez et al. 2012

Fernández-Arenas+2018 H_0 determination



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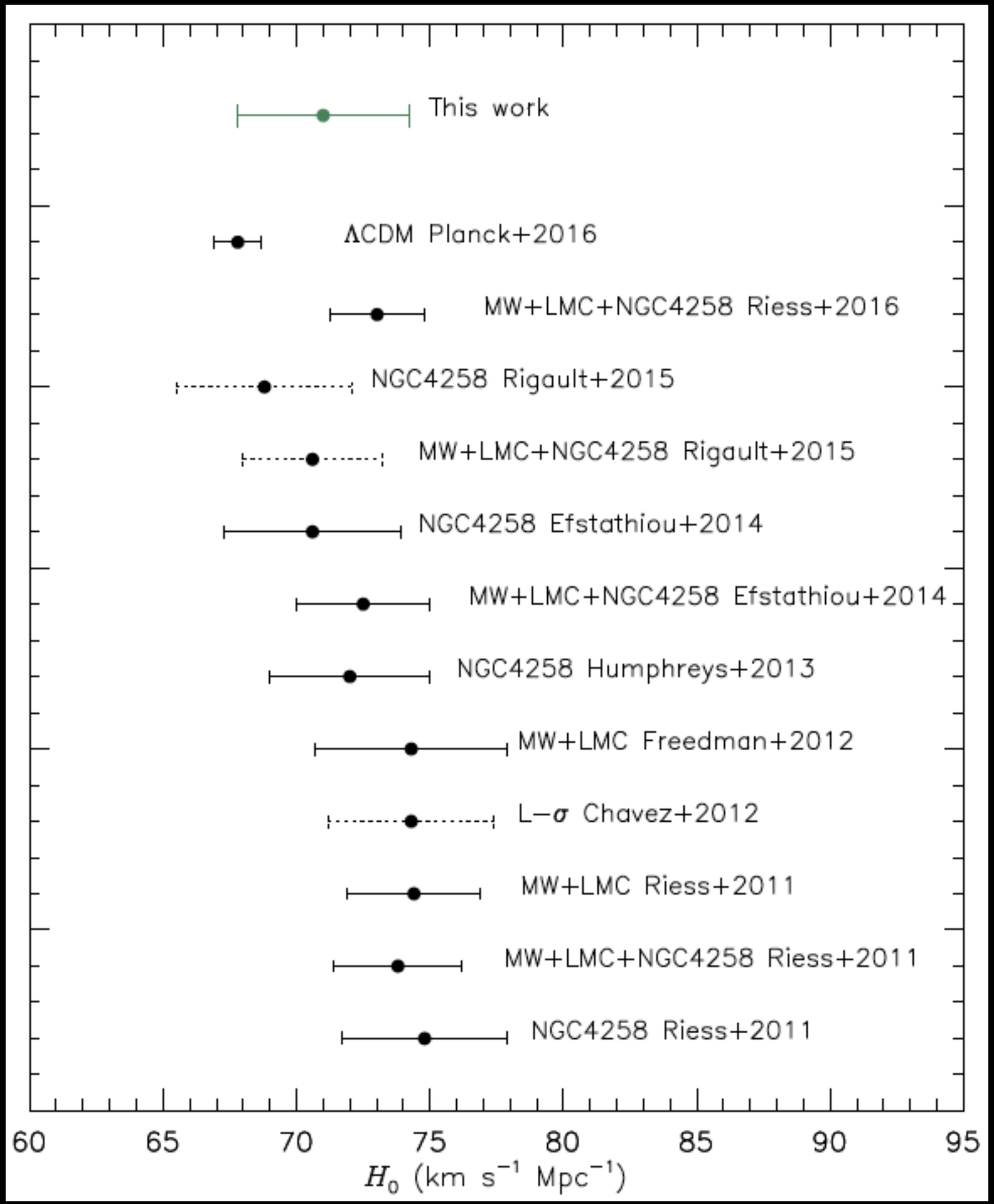
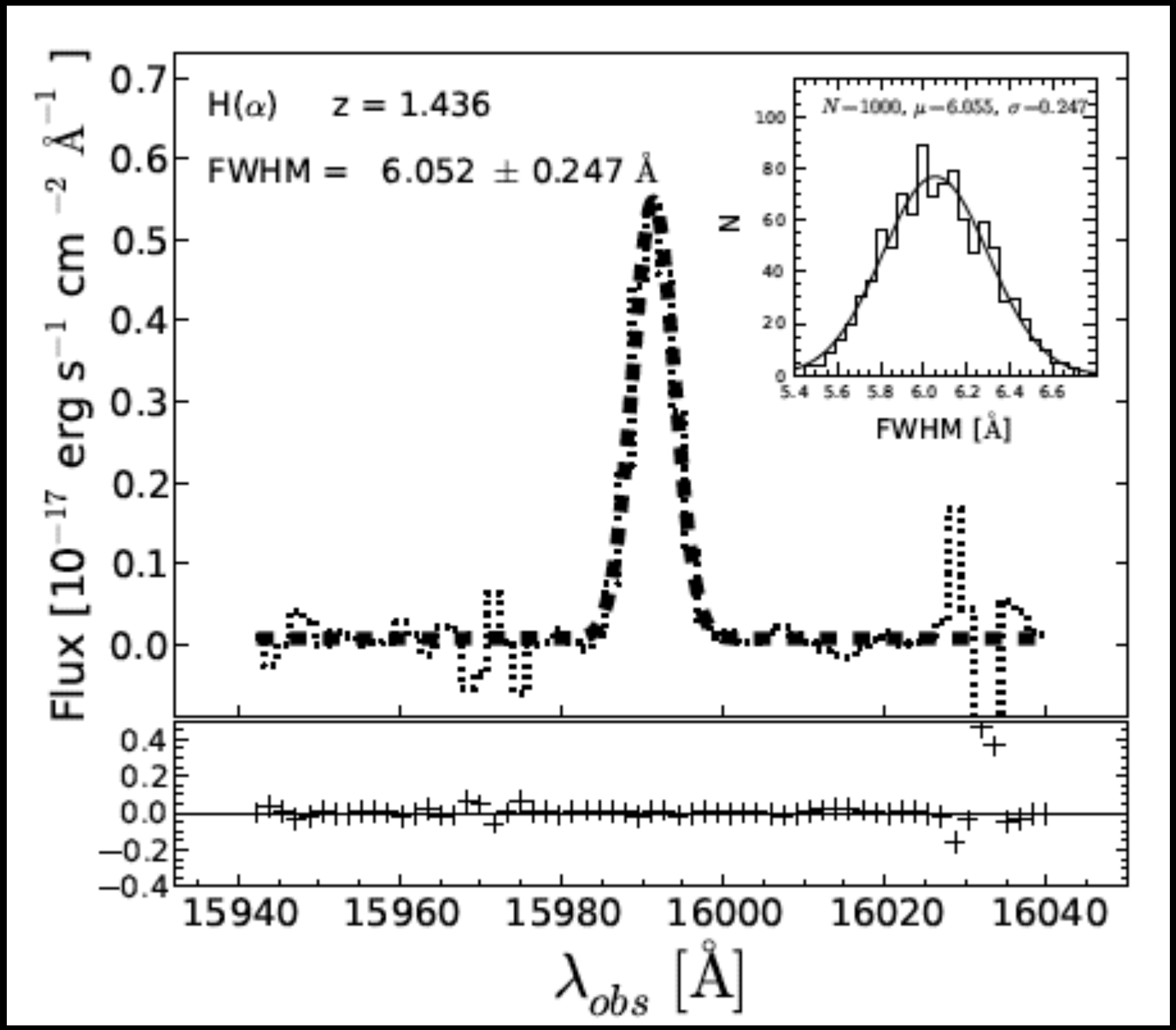
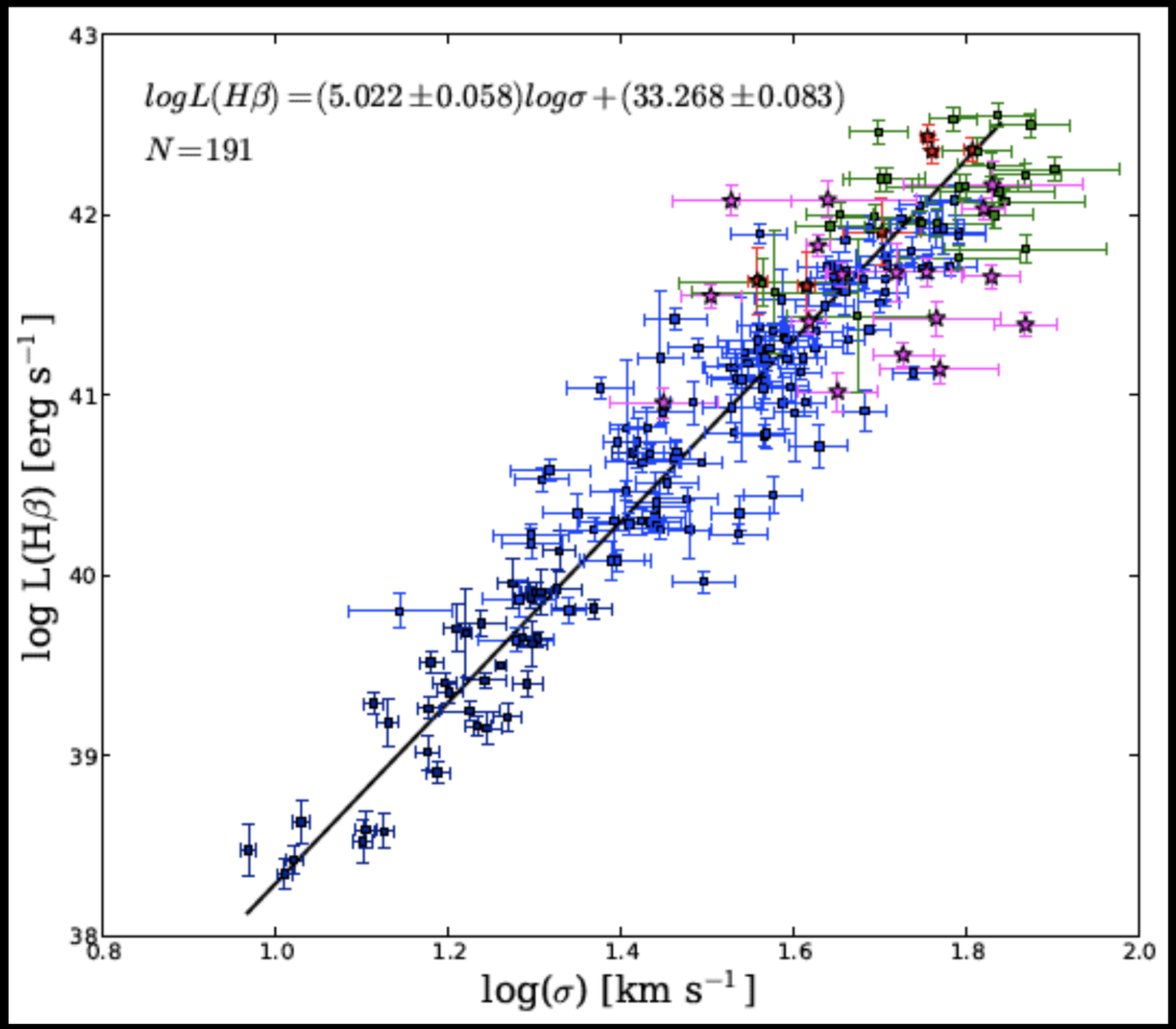


From Fernández-Arenas et al. 2018

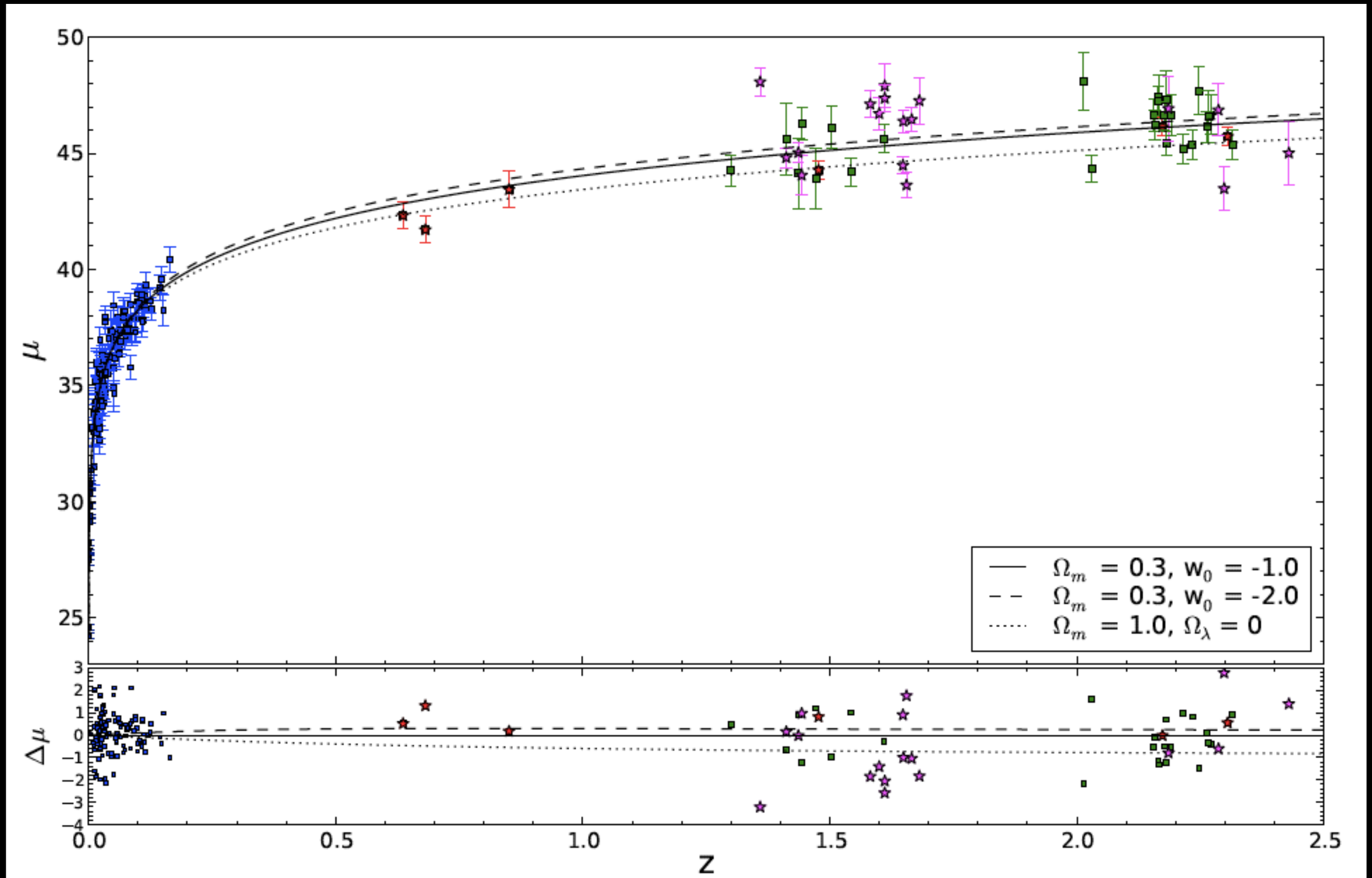
The intermediate and high-z samples



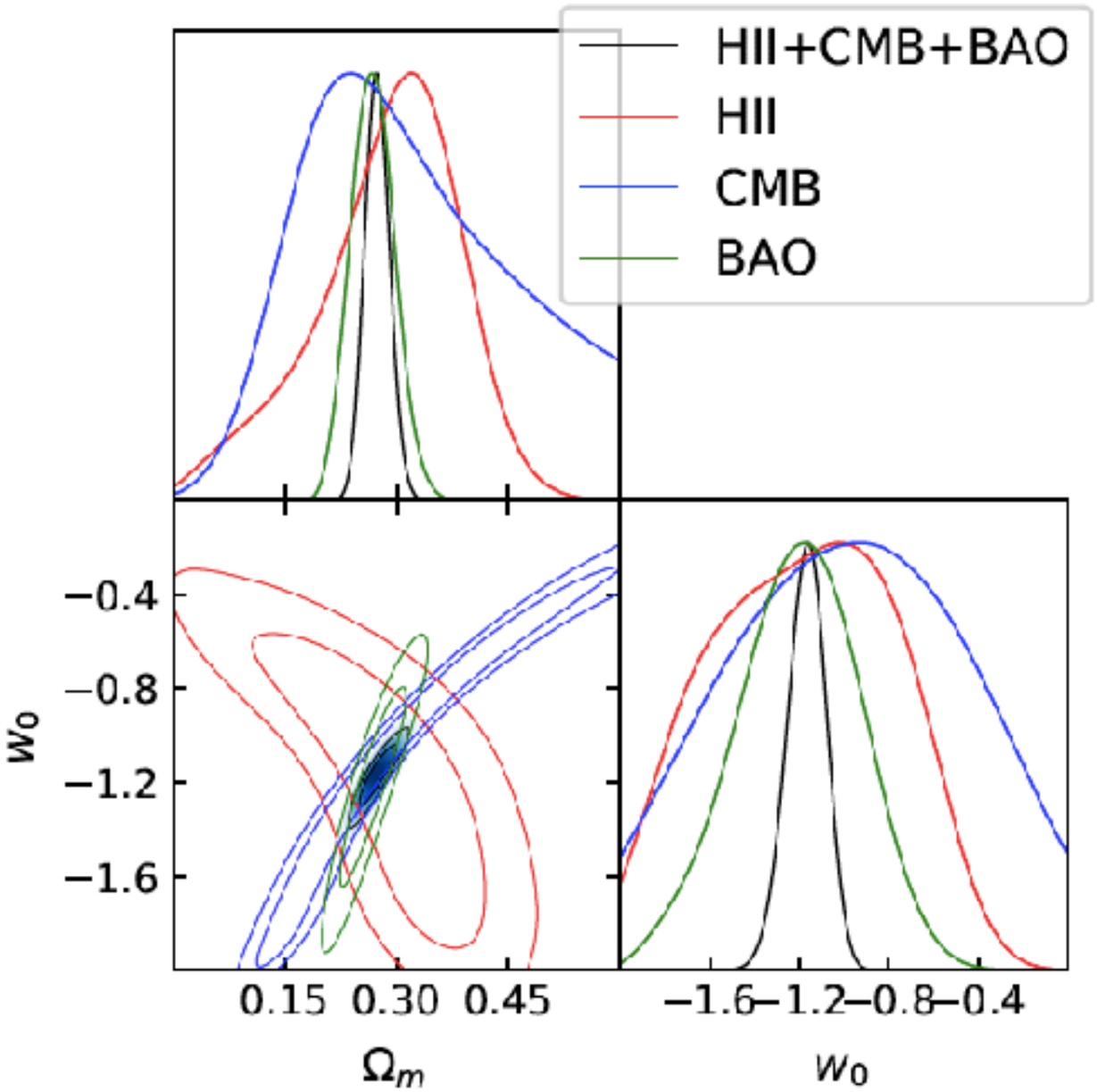
The Local + high-z Samples

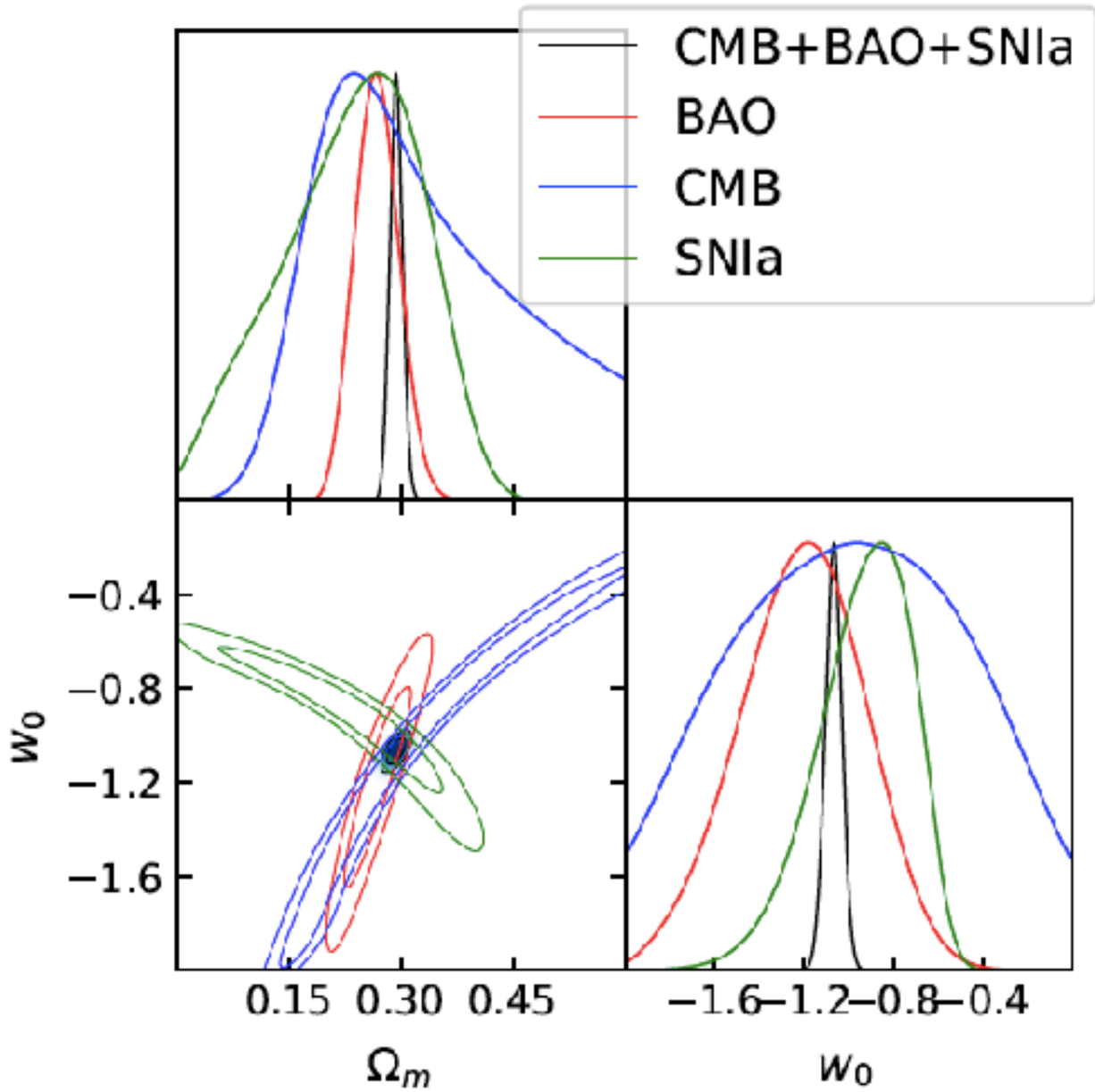


The Local + high-z Samples



Cosmological parameters





Time allocated in KECK and VLT

VLT Telescope:

2 half nights in the period 95A with KMOS → Visitor mode. Lost due to rain!!!!.

16 hours in the period 97A with KMOS.Priority A, first Q → Service mode. Observing period from 3/2016 to 9/2017(extended) Almost all the data have been collected.

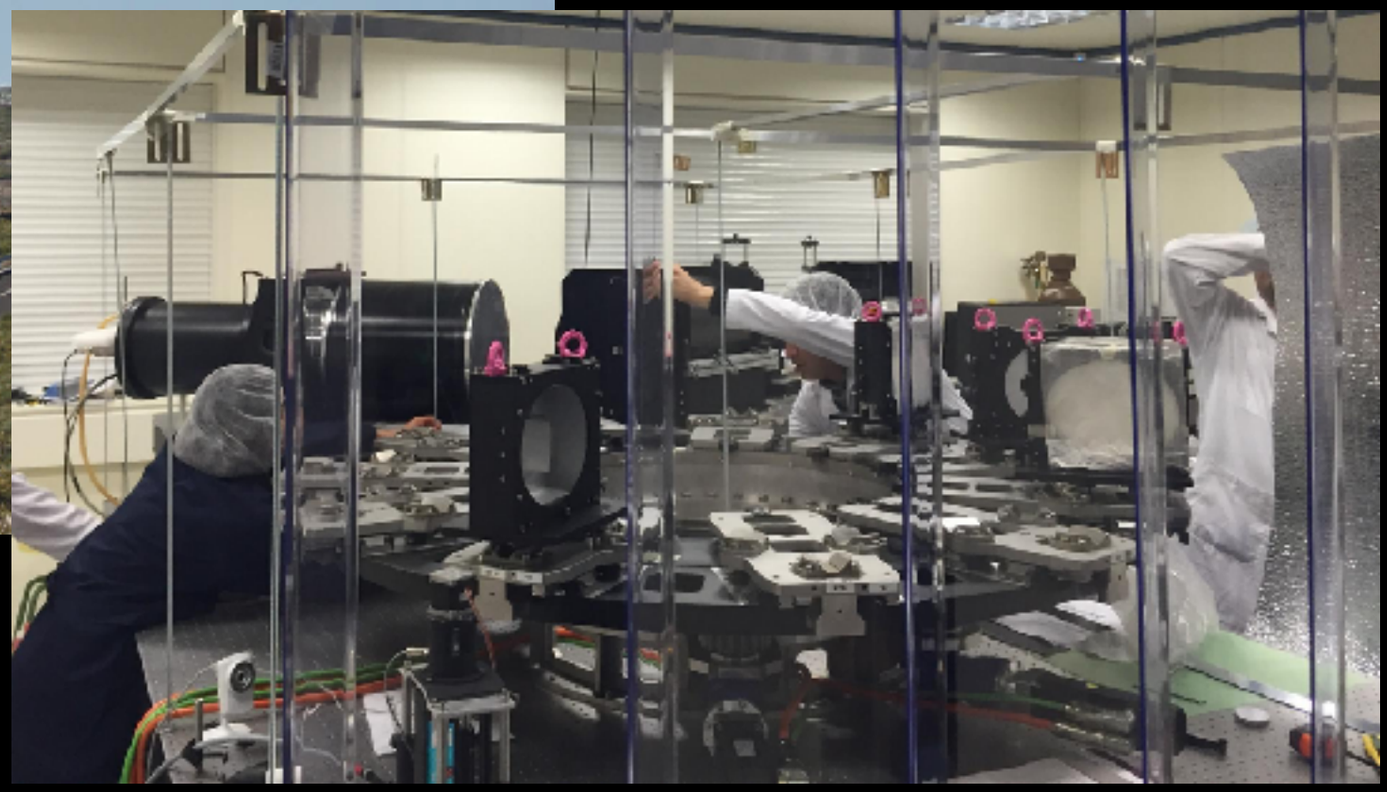
39 hours in the period 98A with KMOS.Priority A, first Q → Service mode. Observing period from 10/2016 to 3/2017

KECK Telescope:

1 night with MOSFIRE in January 27th, 2016. → Visitor mode. Data reduced.

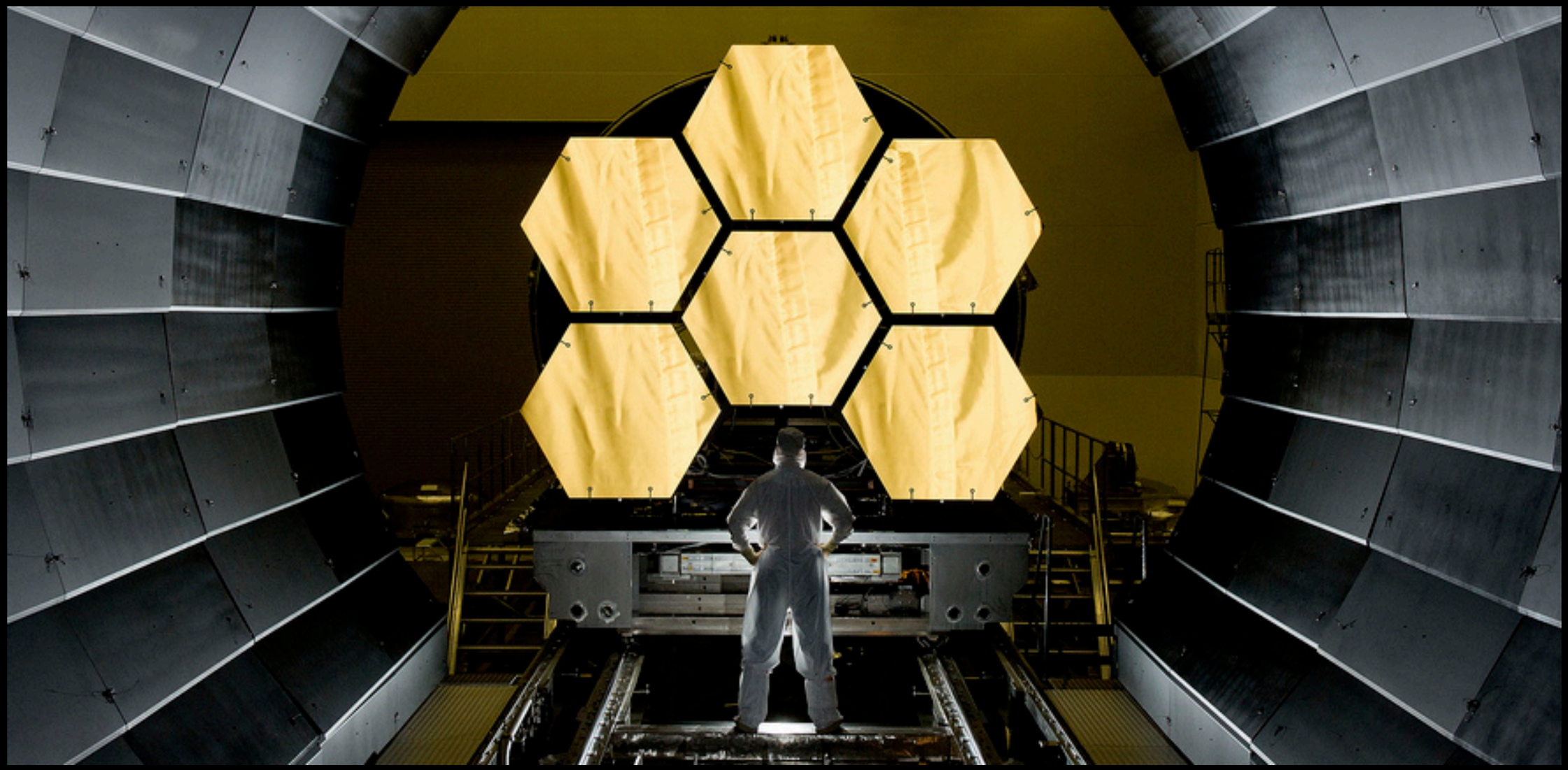
Future Work

Intermediate Redshift



Future Work

High Redshift



Concluding Remarks

- We present constraints to the value of H0 from a sample of local GEHR and HII Galaxies, the results mostly agree with the local determination from SNIa.
- We present constraints to the parameters of the DE EoS from a sample of HII galaxies from the local Universe and up to redshift 2.5. Our constraints agree very well with the results form other well developed methodologies.
- With near future expectations of observations of 500 high-z HII galaxies, we predict a ten-fold increase of the current FoM for the QDE parametrisation and four-fold increase of the corresponding FoM for the CPL parametrisation.

References

- Fernández-Arenas D., et al., 2018, MNRAS, 474, 1250
- Chávez R., et al., 2016, MNRAS, 462, 2431
- Terlevich R., et al., 2015, MNRAS, 451, 3001
- Chávez R., et al., 2014, MNRAS, 442, 3565
- Chávez R., et al., 2012, MNRAS, 425, L56
- Plionis M., et al., 2011, MNRAS, 416, 298