New insights on the evolution of EW(Ha) and sSFR up to z~5

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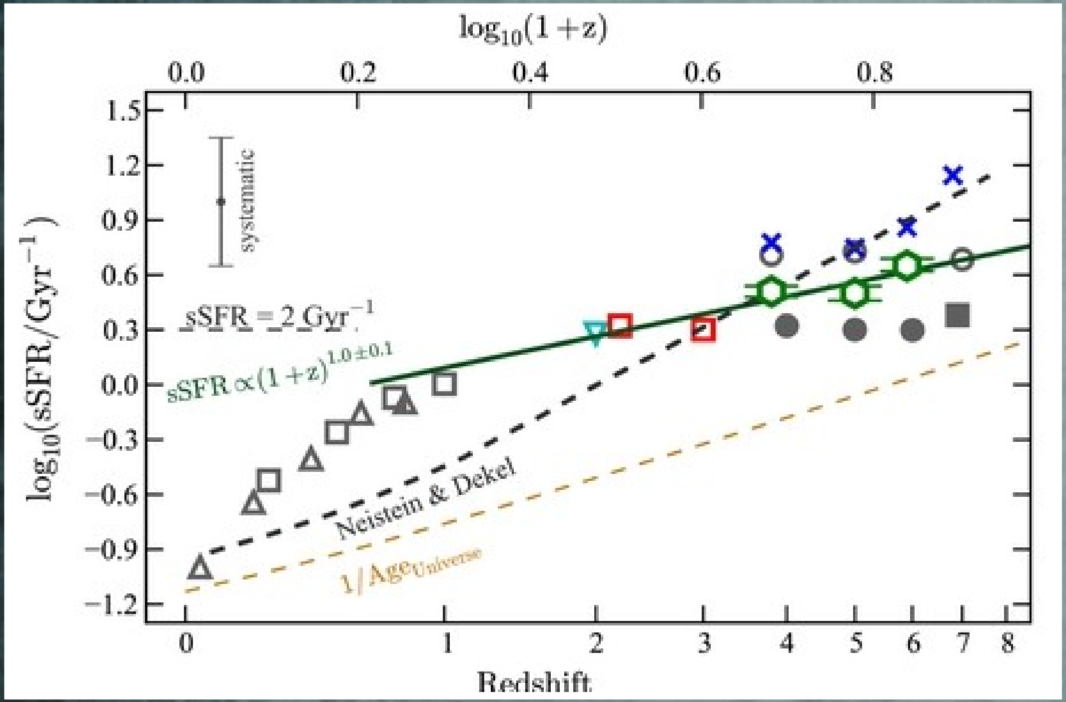
Motivation: about sSFR

Gonzalez+2014



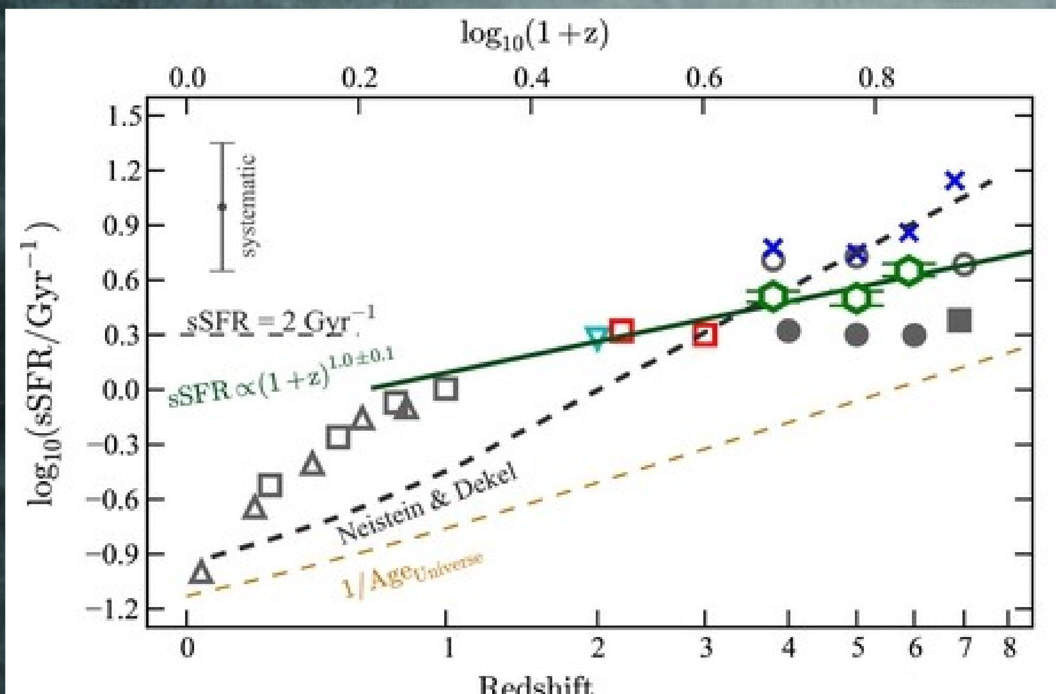
Numerical simulations and semi-analytic models predict that the sSFR should closely match the inflow rate of baryonic material: $\propto(1+z)^{2.25}$

(e.g Dekel+2009)

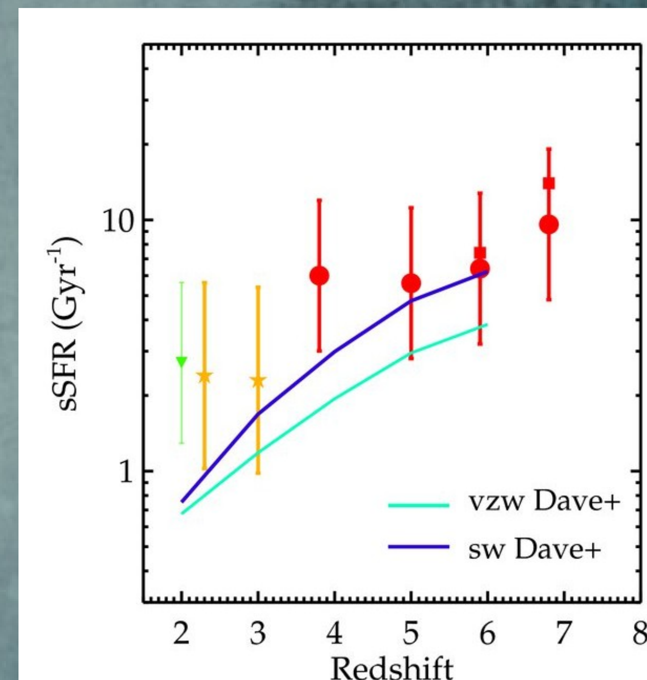
Expected increase of 10x in sSFR in galaxies of fixed stellar mass over 2<z<7

Motivation: about sSFR

Gonzalez+2014



Stark+2013

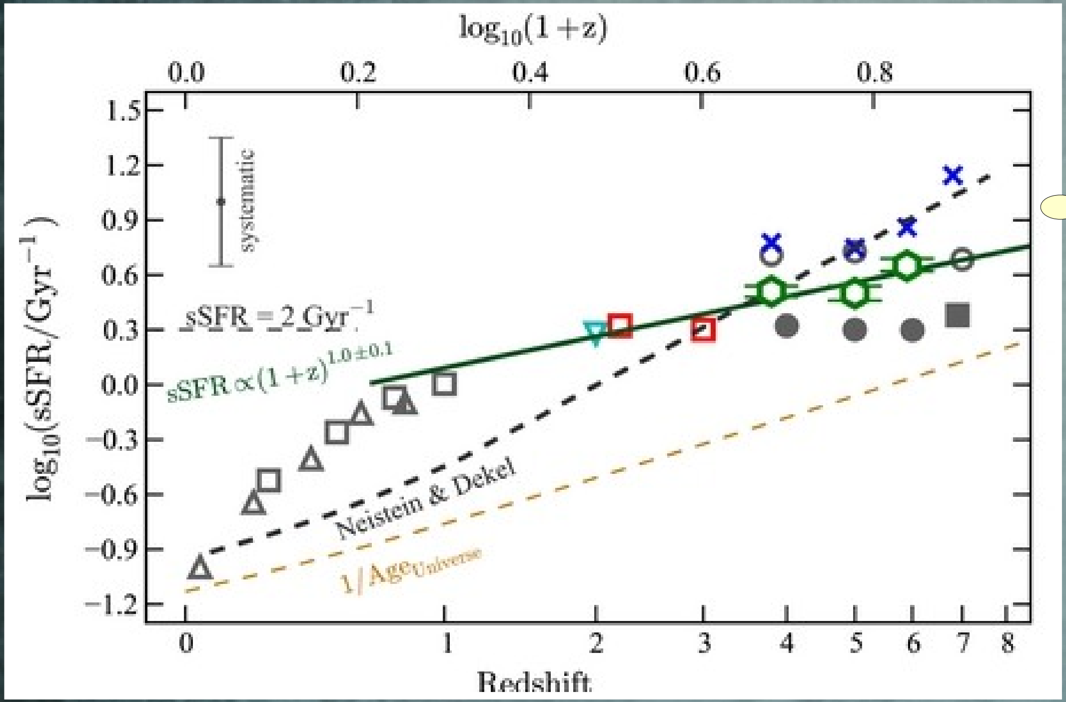


Dave+2011 models including feedback: better constrains at high z but fail at lower z

See also Lehnert+2015

Motivation: about sSFR

Gonzalez+2014



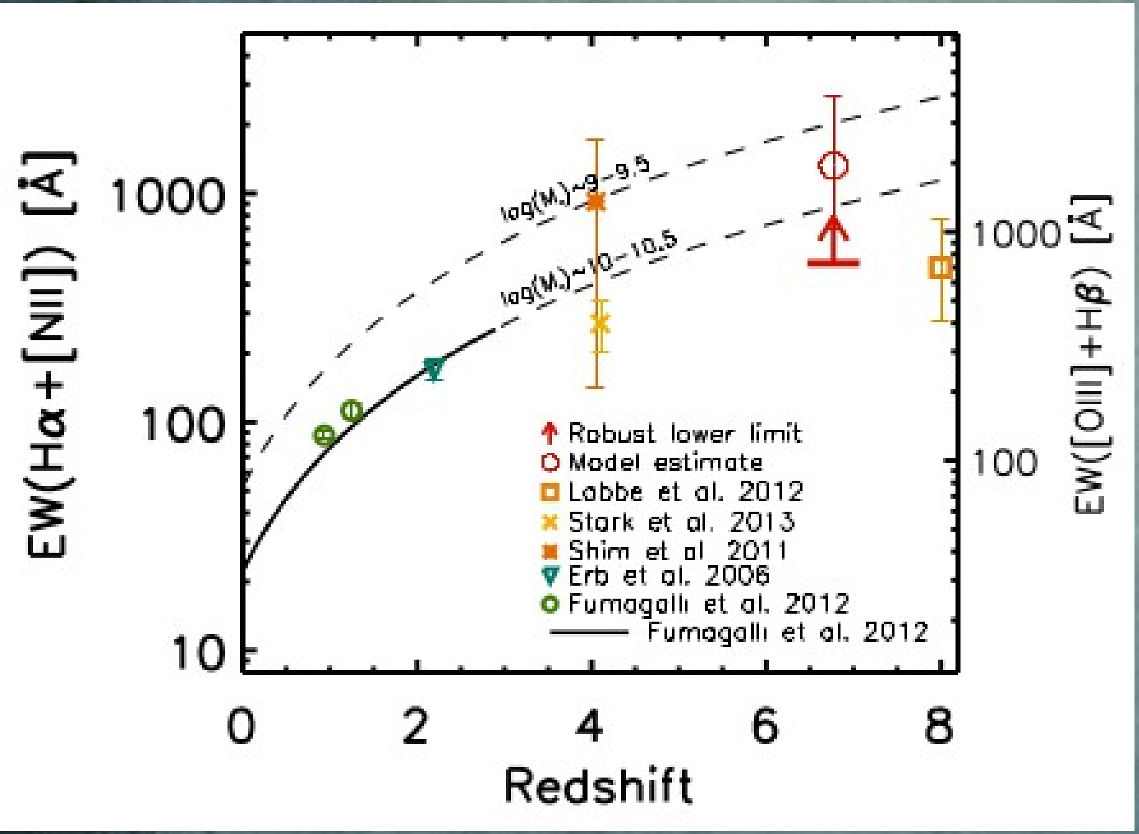
sSFR=SFR/M
$M_{stellar}$, SFR:
SED fitting?

SFR
Stellar population models
IMF
Dust attenuation

Nebular emission

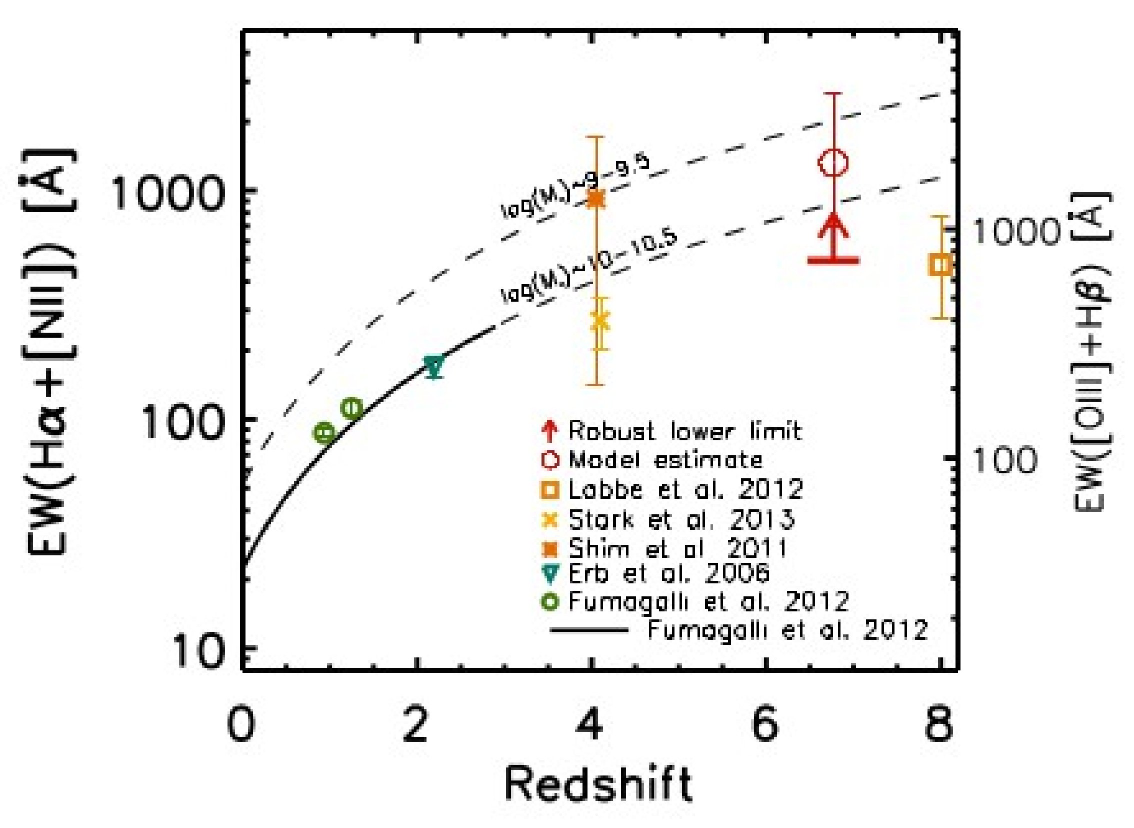
Motivation: about EW(Hα)

Smit+2014



Motivation: about EW(Hα)

Smit+2014



EW=F(Hα)/f_{cont}

F(Hα) ~ SFR

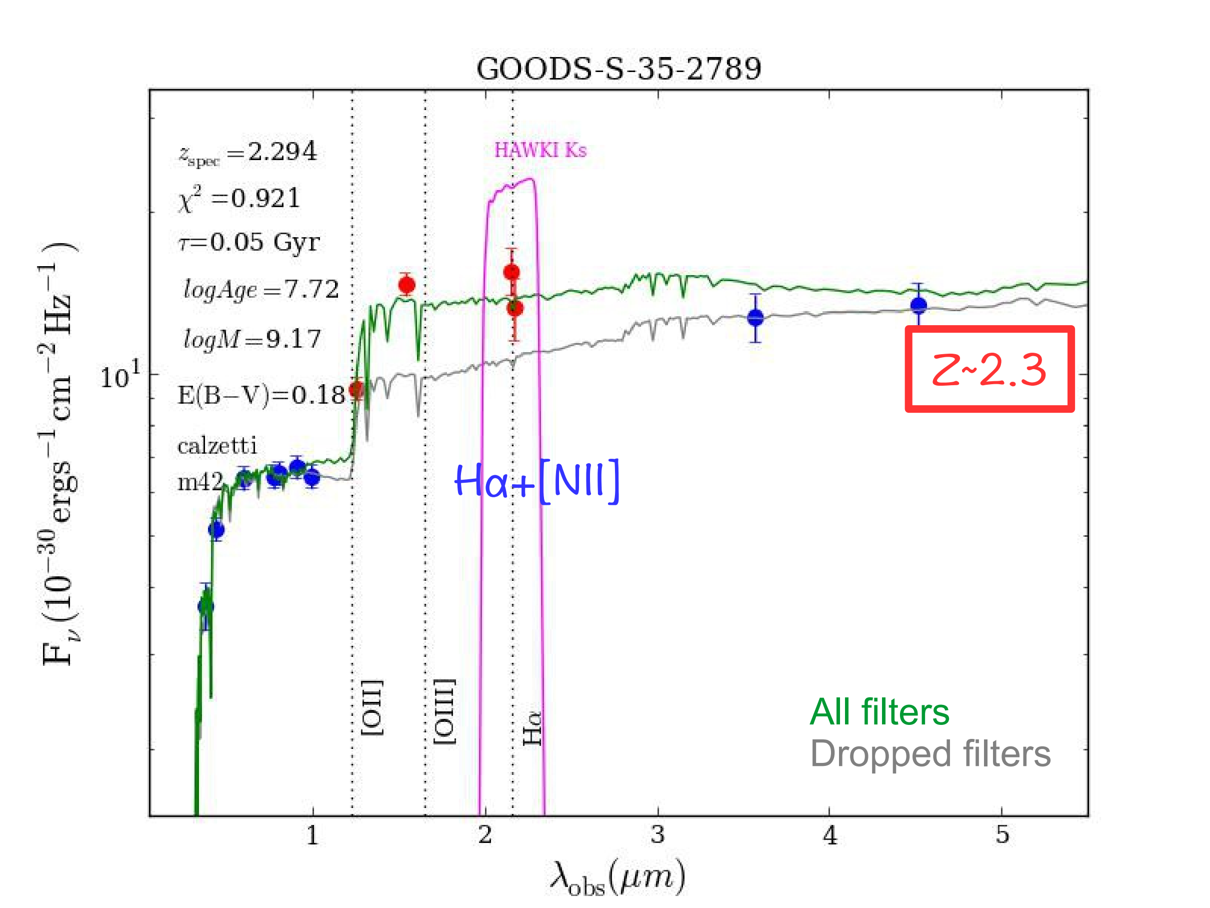
f_{cont} ~ $M_{stellar}$

EW(Hα) a reasonably proxy for the sSFR

Observed increase of 5x

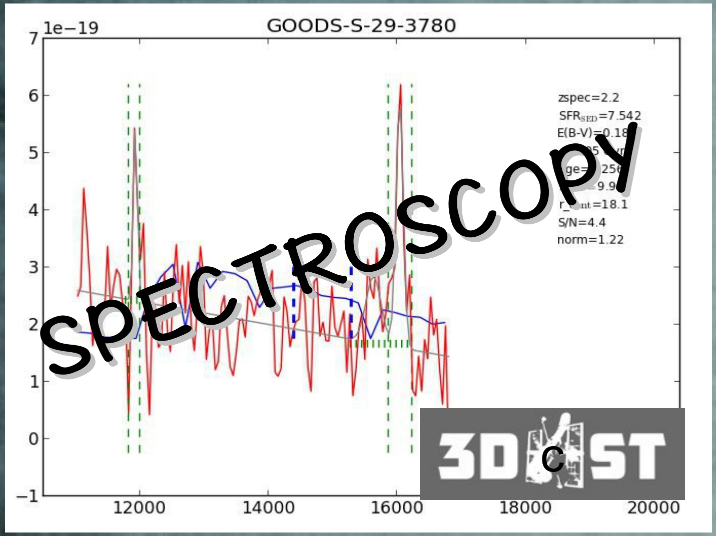
>>Compatible with the evolution at z<2

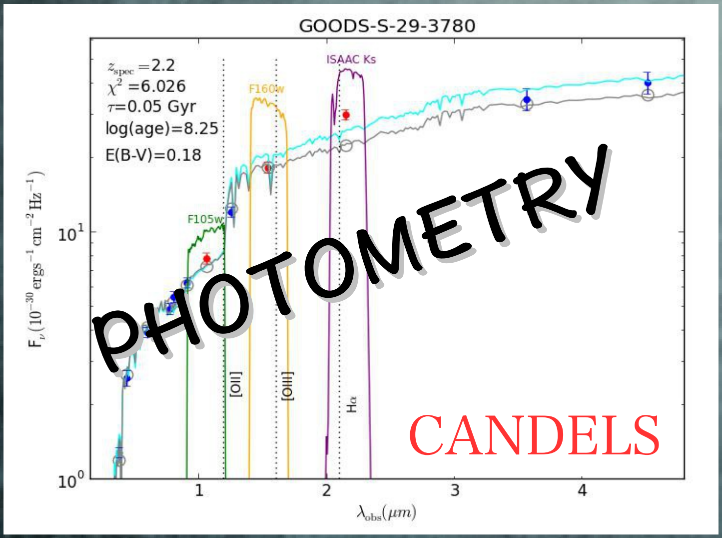
>>Incompatible with sSFR



A clear flux excess is detected in the photometric bands where the nebular emission lines are expected: flux in the continuum from the SED

Aim of this work

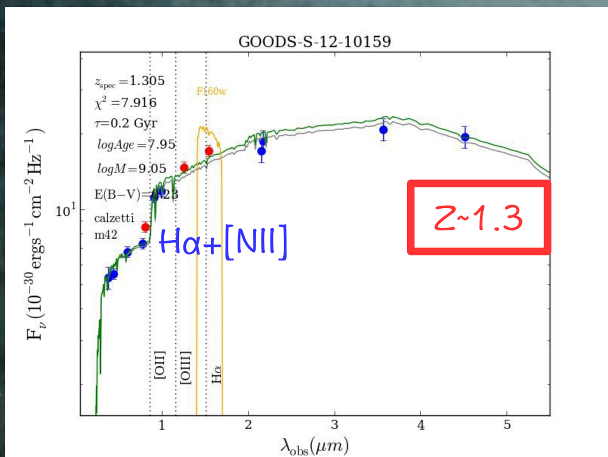


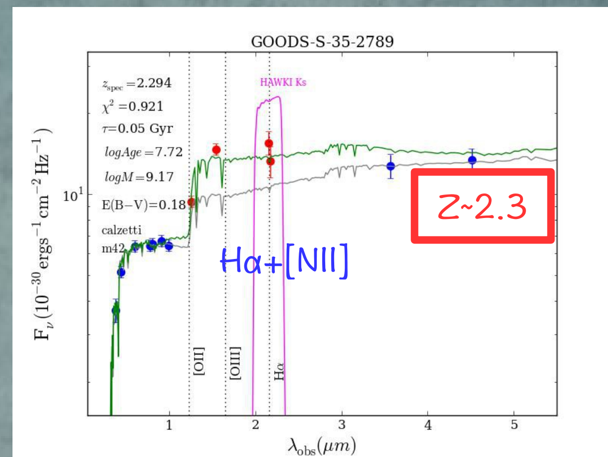


Can we infer EWs?

Photometric data: CANDELS

GOODS-S: Guo+2013
UDS: Galametz+2013



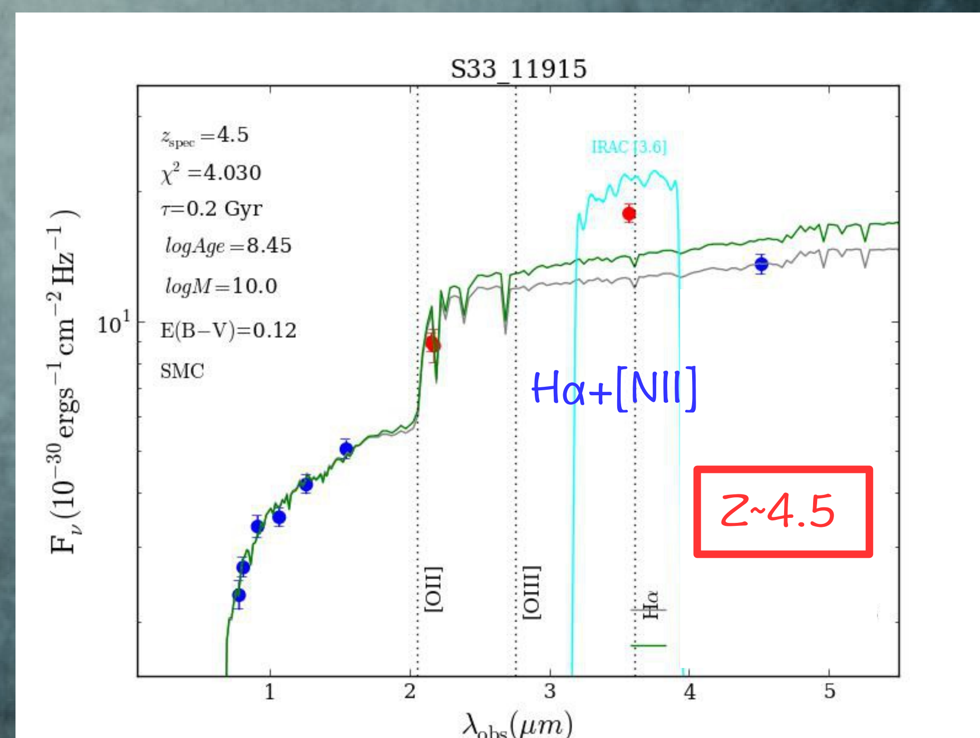


LePhare (Ilbert+2009)

Bruzual & Charlot 2003
Chabrier IMF
Exponential declining τ SFH
Solar/subsolar metallicity
Calzetti/SMC attenuation
Spectroscopic redshifts <<<

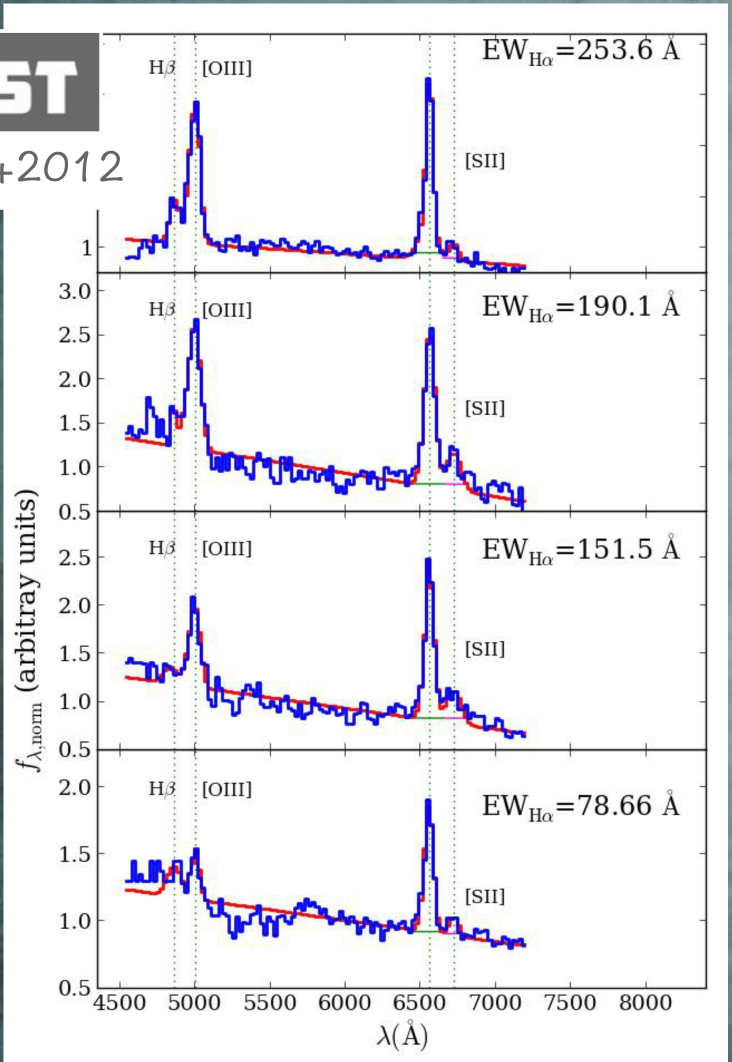
>>> Deep HAWKI-Ks data from the HUGS survey (Fontana+2014)

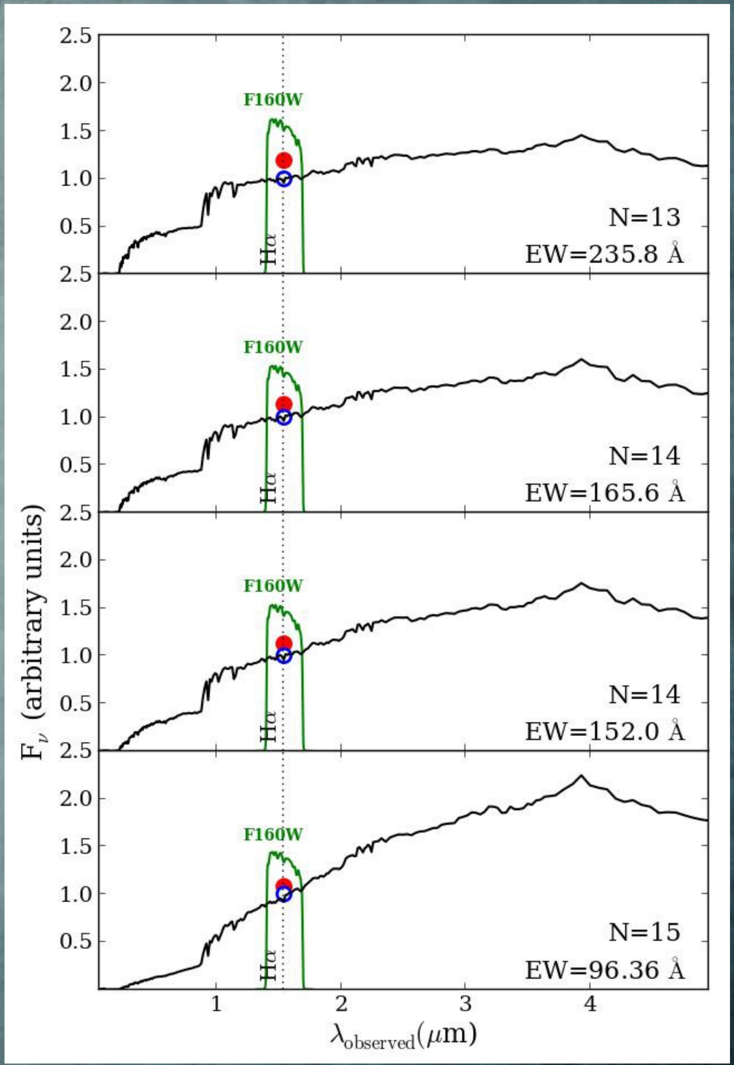
Redshift	Band
Z~1.3	H
Z~2.2	K
Z~4.5	IRAC-CH1



Testing with SF galaxies at z~1.3

Brammer+2012

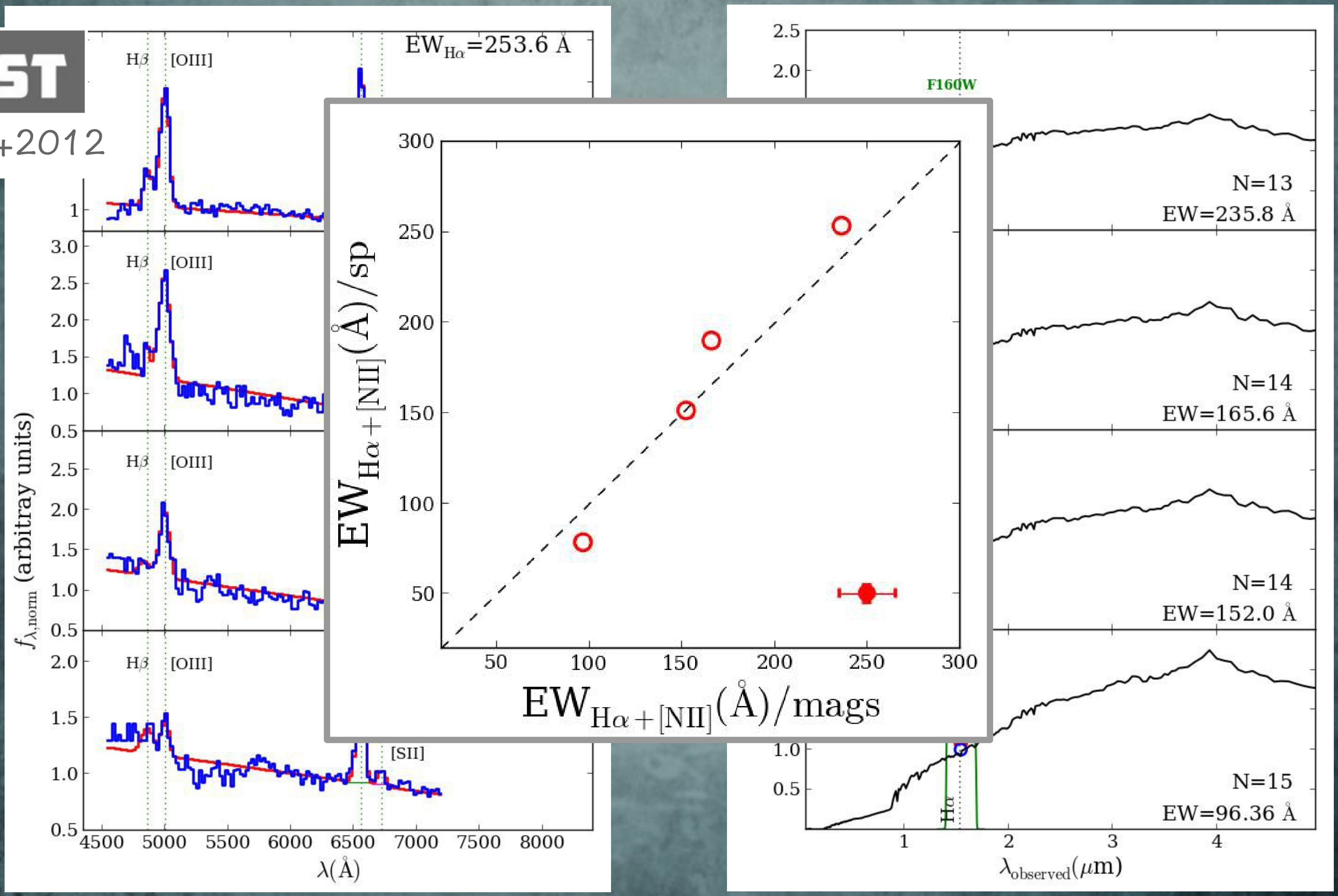




Low-resolution nIR spectra with
the WFC3 G141 grism on the HST

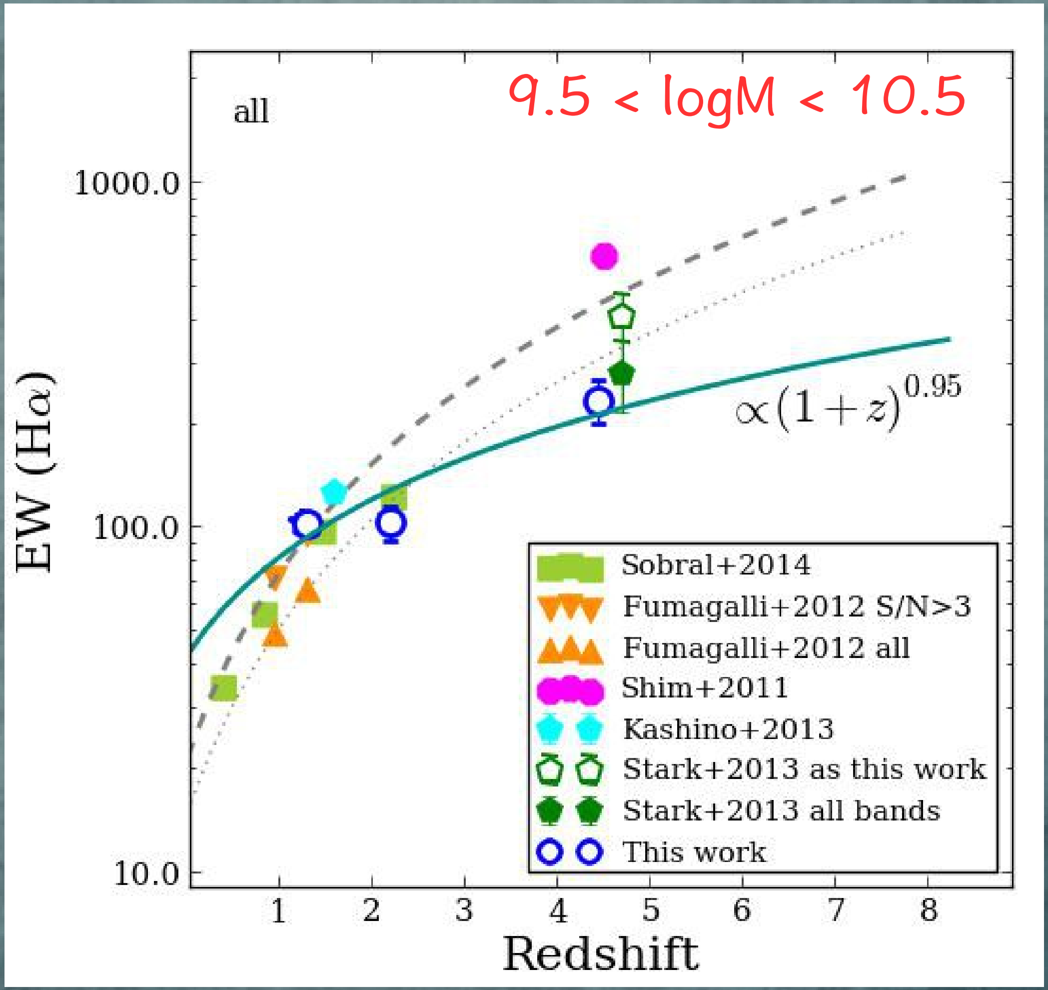
Testing with SF galaxies at z~1.3

Brammer+2012

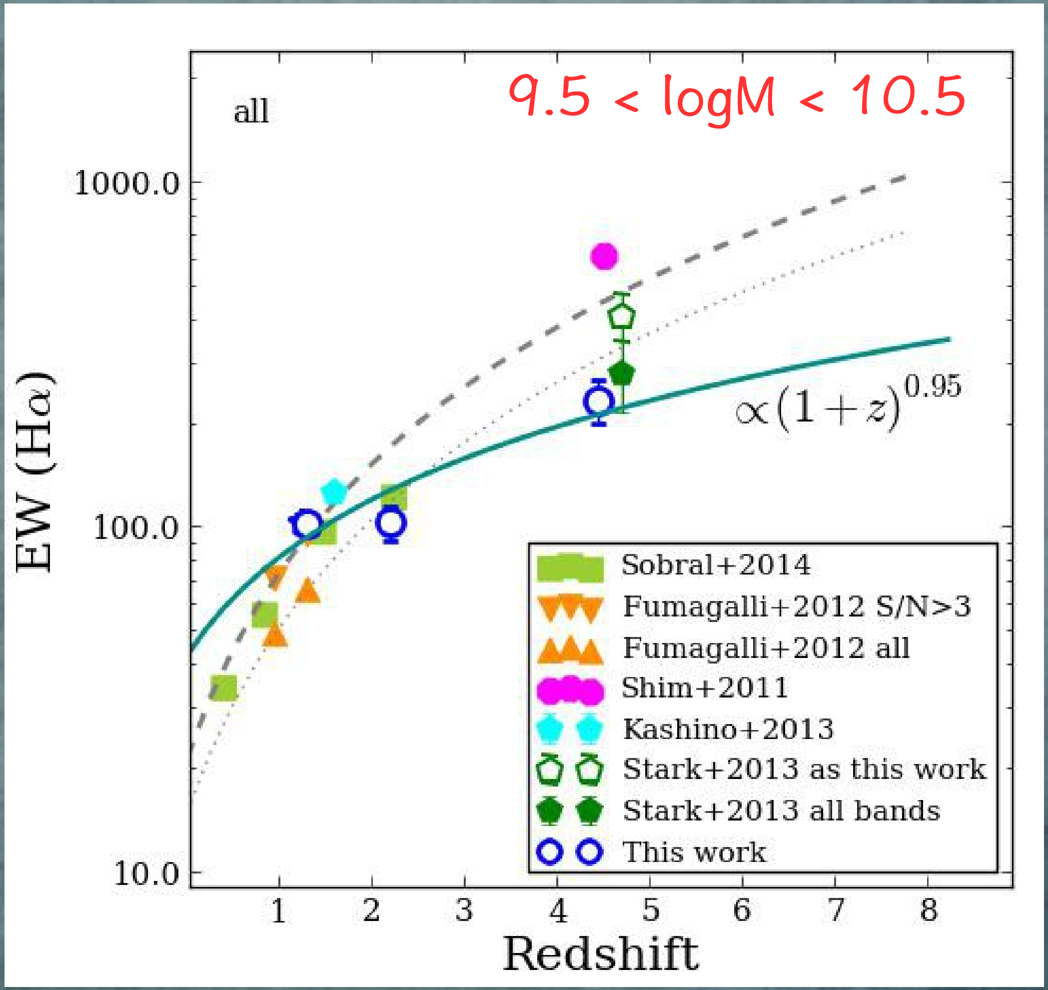


Low-resolution nIR spectra with the WFC3 G141 grism on the HST

EW(Hα) vs redshift

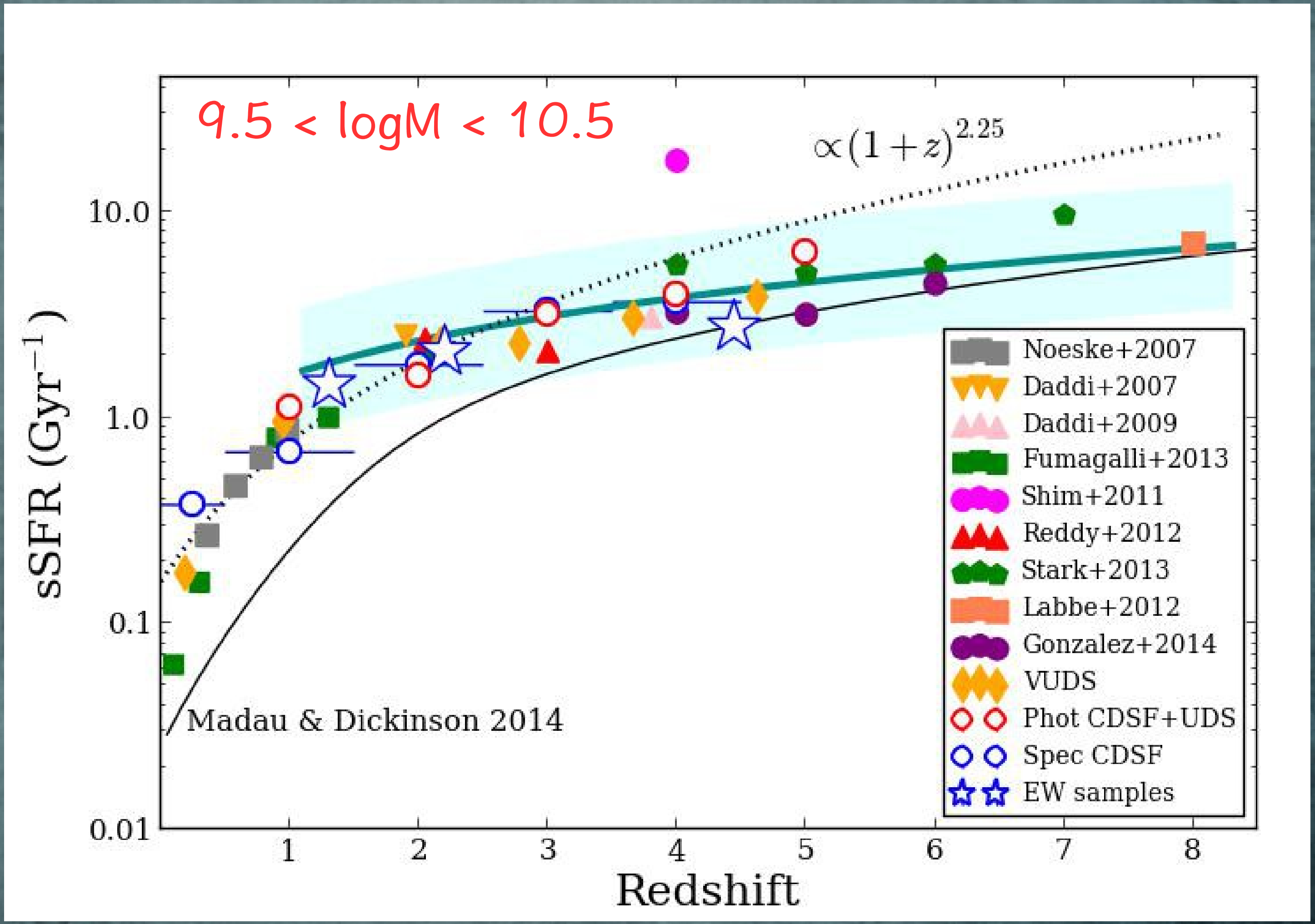


EW(Hα) vs redshift

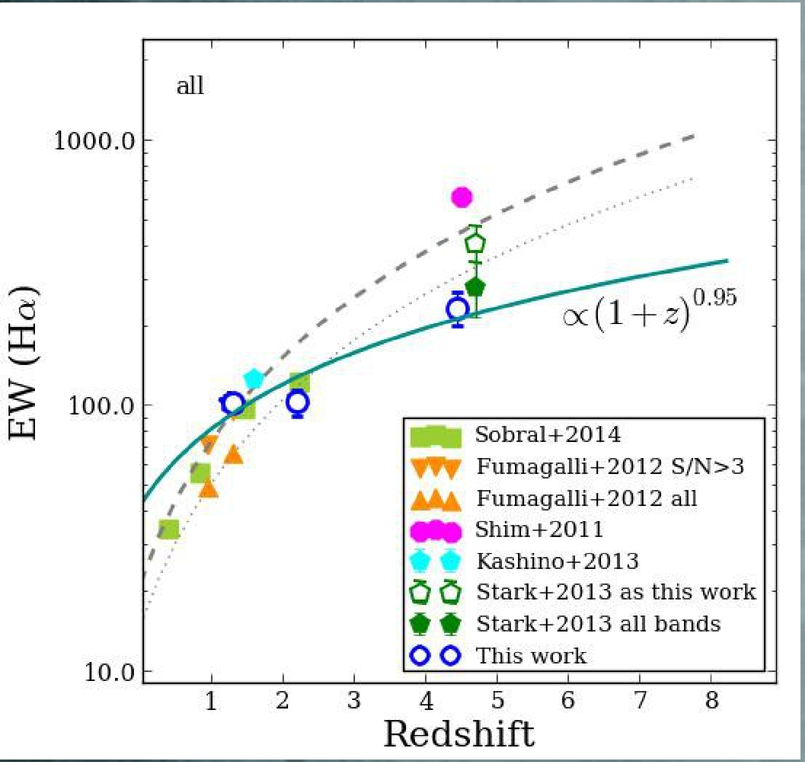


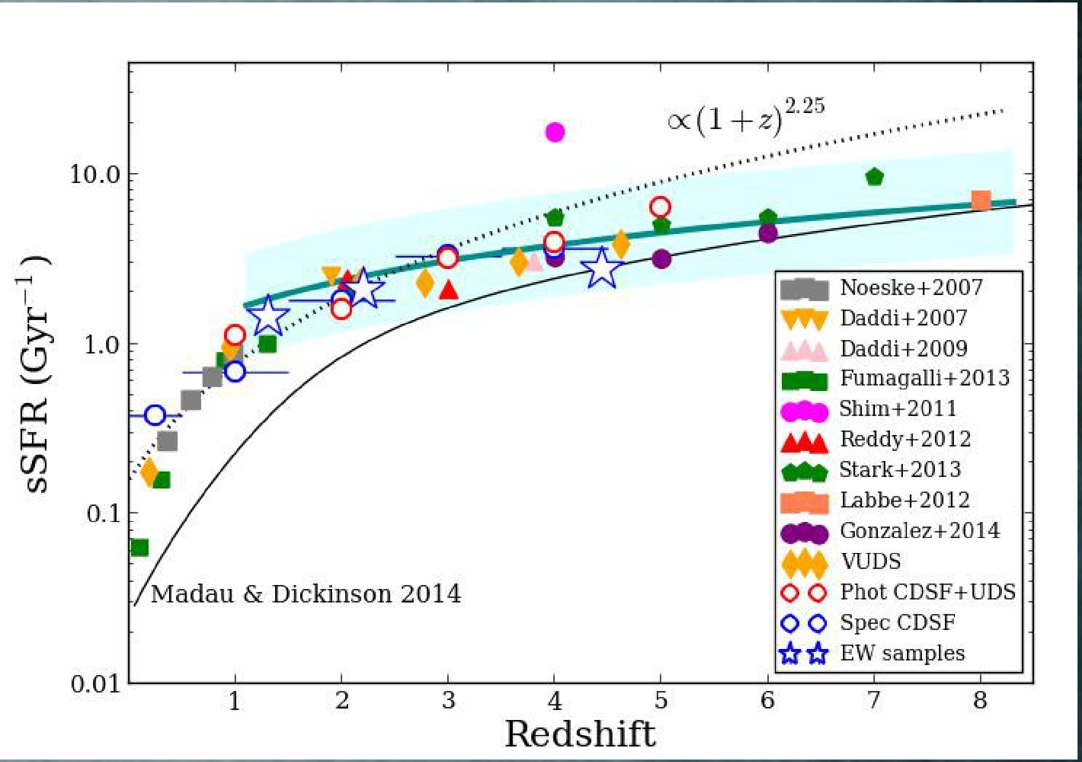
Shim+2011
~0.2dex brighter
IRAC [3.6]

sSFR vs redshift



Evolution with redshift





Summary

We have combined spectroscopic and photometric data in a sample of galaxies at redshifts z~1.3 to recover:

- Fluxes of the continuum and the emission lines
- SFRs
- EW(Hα)

The evolution of the EW(Hα) and sSFR with z is similar and

- $\propto (1+z)^{\sim 2.2}$ for galaxies at $z<3$
- $\propto (1+z)^{\sim 1.0}$ for galaxies at $z>3$

Star-forming galaxies