

Some Numbers for Starters

In 10^{11} solar masses of old stars (e.g. E/S0 galaxy), two WDs are made per year. The **observed** rates for thermonuclear events in them are:

- 20 Classical Novae (Hydrogen fuel, triggered by accretion) per year
- One Type Ia Supernovae every 250 years (so 5000 CN for every Ia), or one in 500 WDs explode! (0.04 SNUK)

Other rate estimates are:

- Helium novae (Eddington-limited) every 25 years (so 1 in 500 CN)
- One large He explosion (mass nearly 0.1 solar masses) every ~ 1000 years ($< 1/10$ th the Ia rate)
- Calculated WD-WD merger rates of all kind are 1 every 100-500 years

THE K-BAND GALAXY LUMINOSITY FUNCTION^{1,2}

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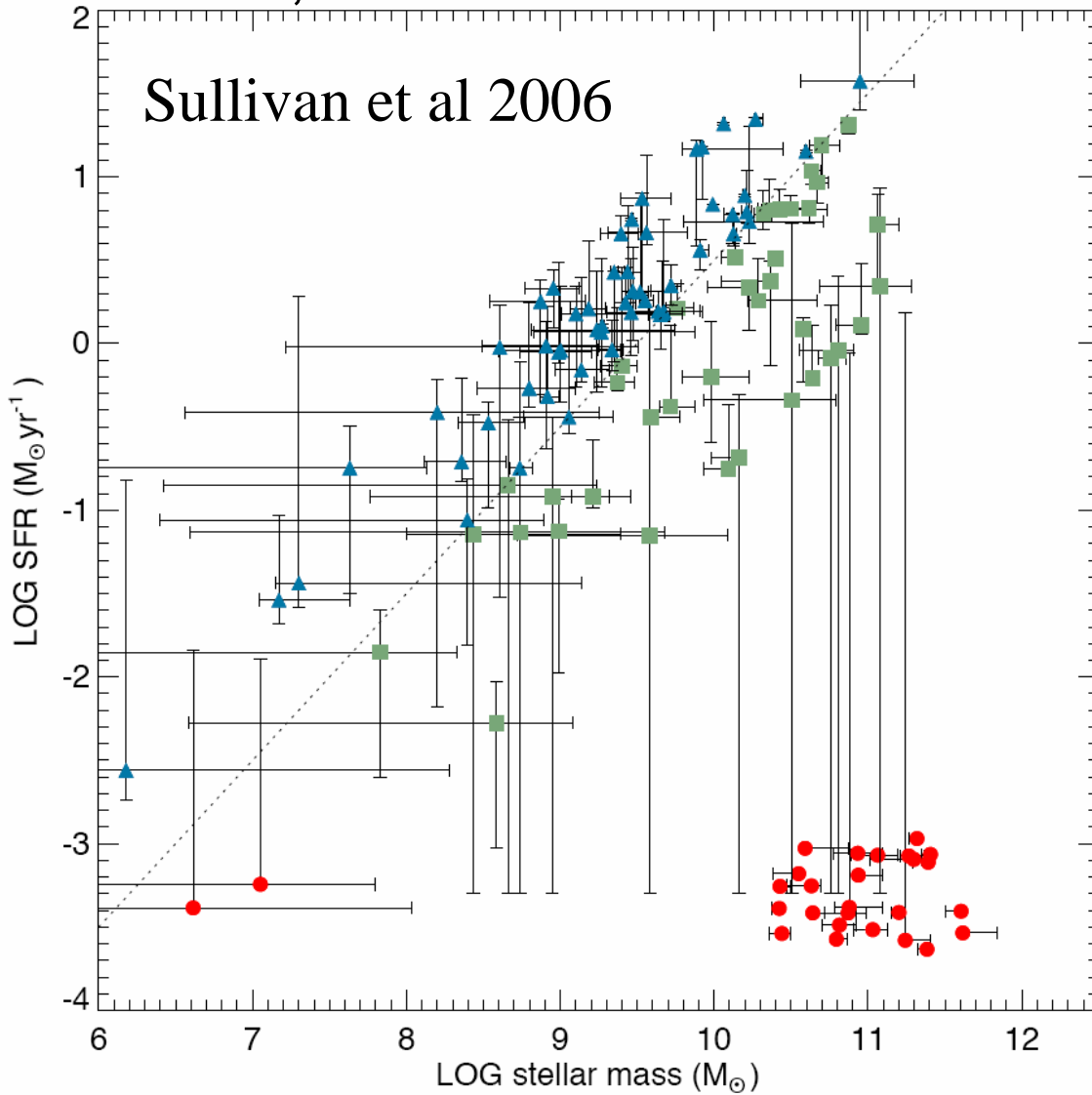
Type	N	M_{K^*} (mag)	α	n_* ($10^{-2} h^3 \text{ Mpc}^{-3}$)	j ($10^8 h L_\odot \text{ Mpc}^{-3}$)
All	3878	-23.39 ± 0.05	-1.09 ± 0.06	1.16 ± 0.10	7.67 ± 0.91
Late	2097	-22.98 ± 0.06	-0.87 ± 0.09	1.01 ± 0.13	4.06 ± 0.57
Early	1781	-23.53 ± 0.06	-0.92 ± 0.10	0.45 ± 0.06	3.08 ± 0.49

Local K-Light density*Mass Specific SFR=>2e-5 Ia/Mpc^3 yr

If only old populations, then 50/50 in ellipticals and spirals locally, any Ia's due to star-forming will make spirals more prevalent

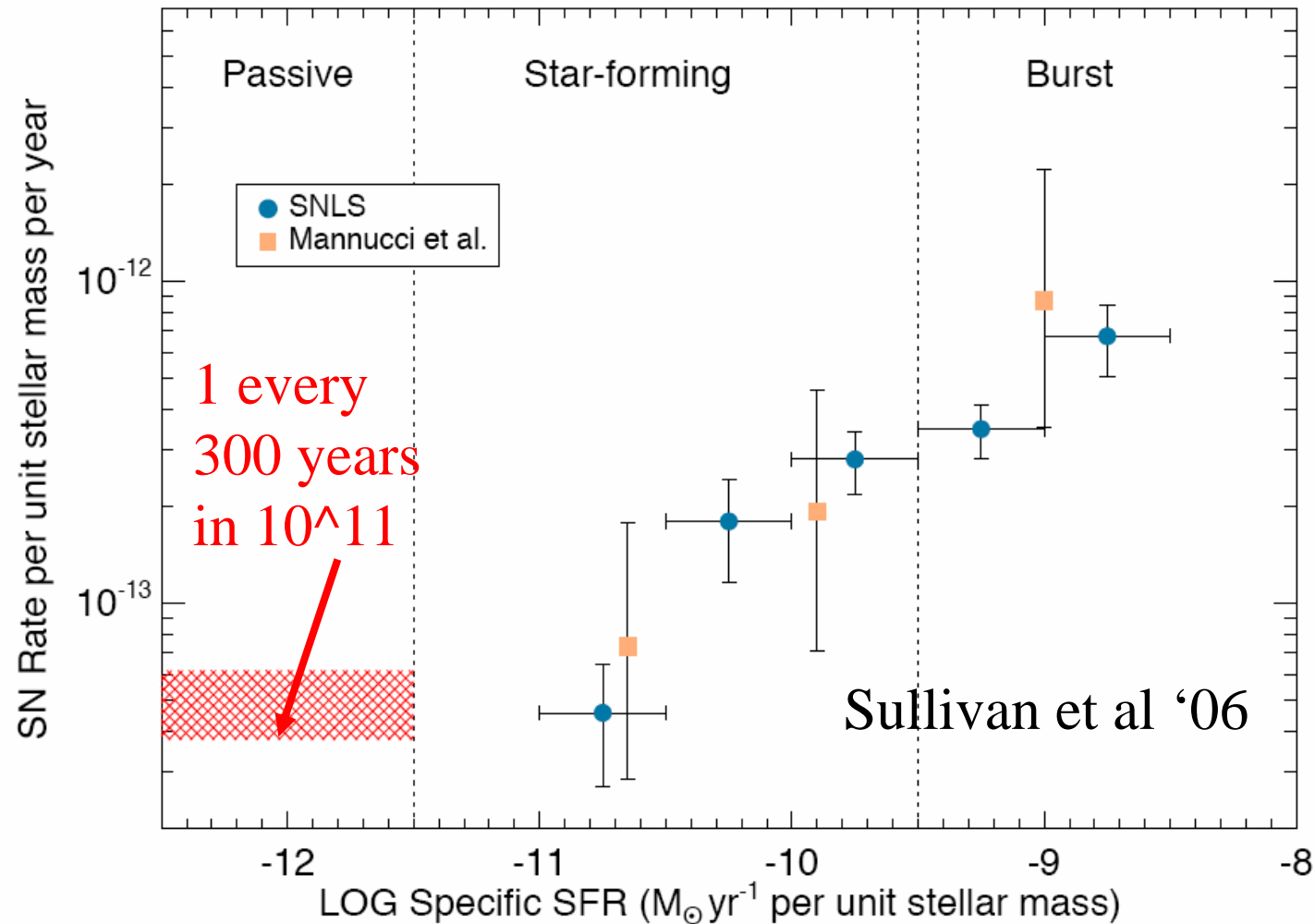
Canada-France-Hawaii Telescope SuperNova Legacy Survey

125 Ia SNe, $0.2 < z < 0.75$

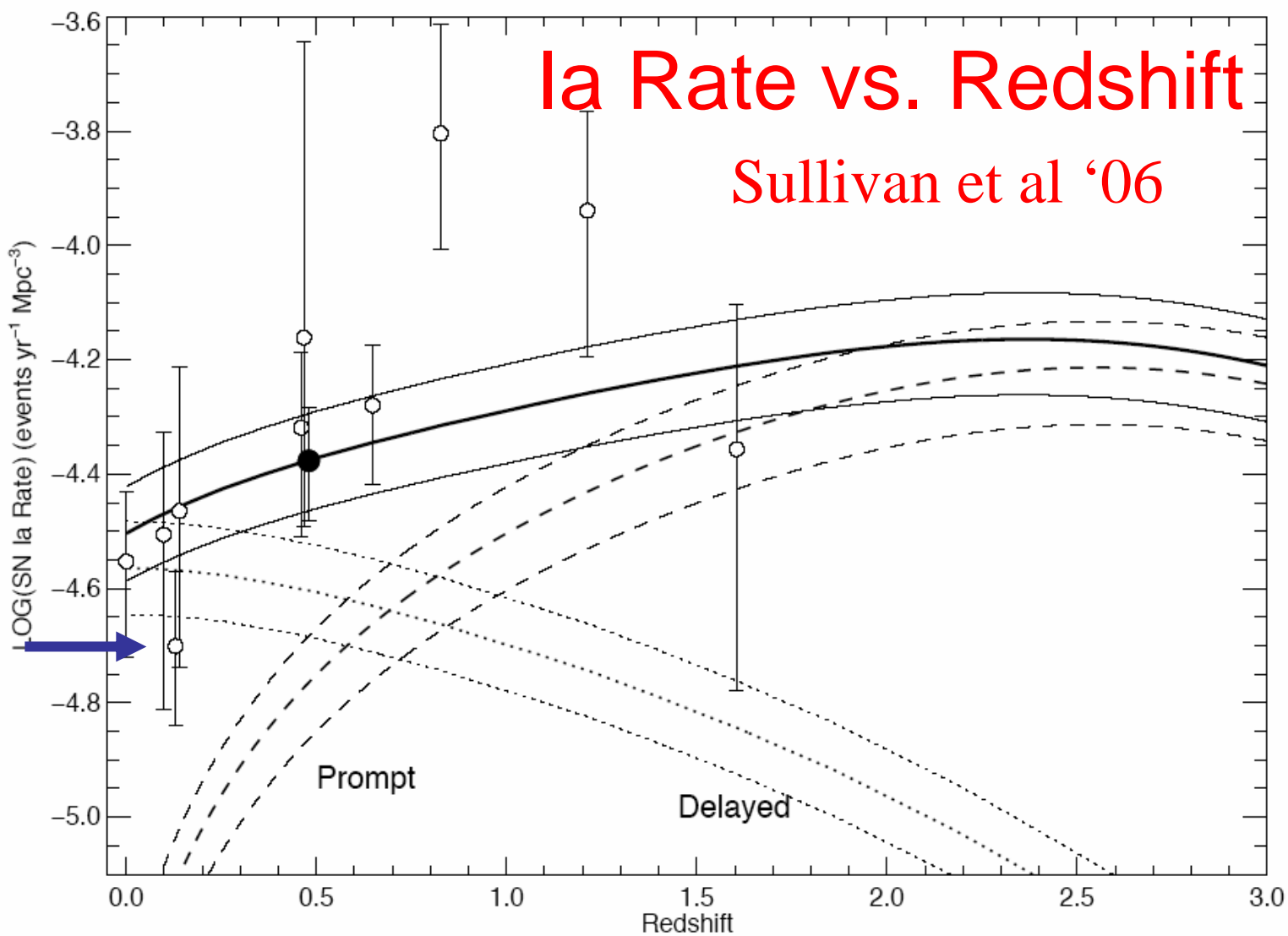


- Galaxies identified from the CFHT survey. All Ia's are spectroscopically confirmed
- For the clear counterparts (some are ambiguous), the galaxies were classified via colors as **vigorous star formers**, **star-forming**, and **passive**.
- When SNLS is done, this list should be ~ 500

Scalings with Star Formation Rate

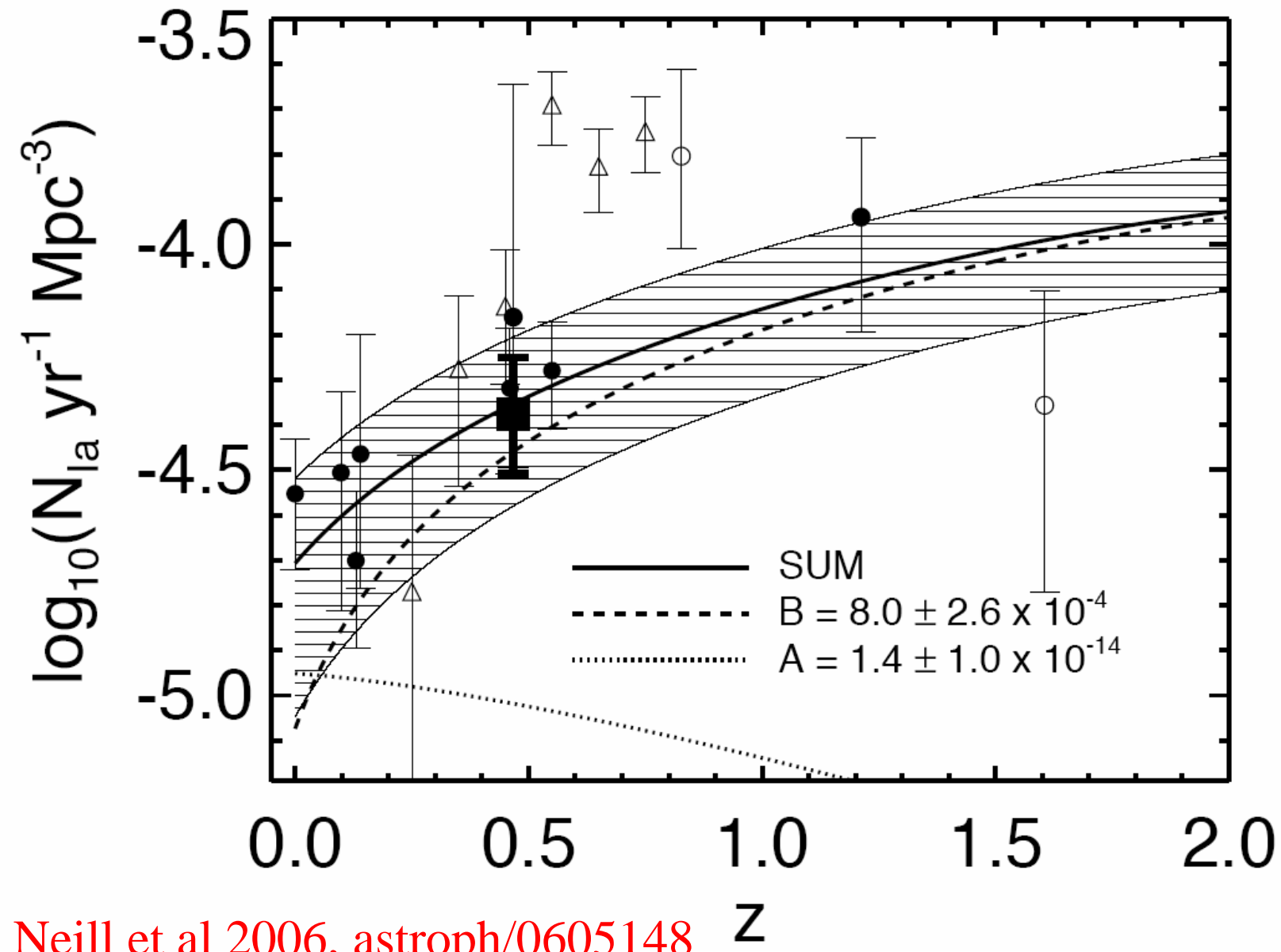


Confirmation of the mass specific rate of Mannucci et al for passive galaxies, and confirmation of the Ia rate linear dependence on

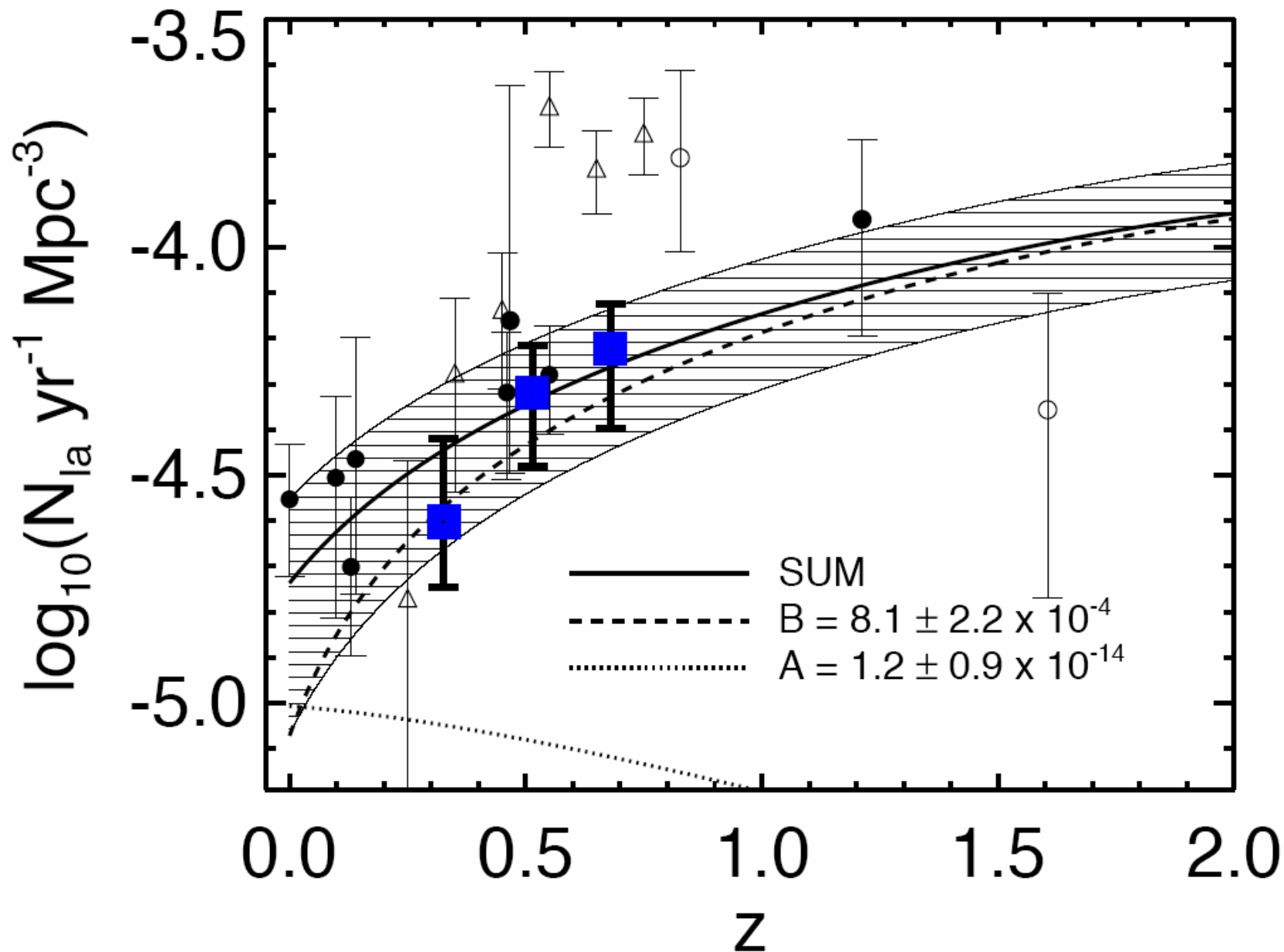


Their normalization with the SFR is 3 times smaller than Scannapieco and Bildsten '05, giving a different evolution with z . Should be resolved, but will take time. . . .they chose to go through their new Ia volume point at $z=0.47$ (Neill et al 2006).

CFHT Legacy Survey: Just Fit the Data!



Neill et al 2006, astro-ph/0605148

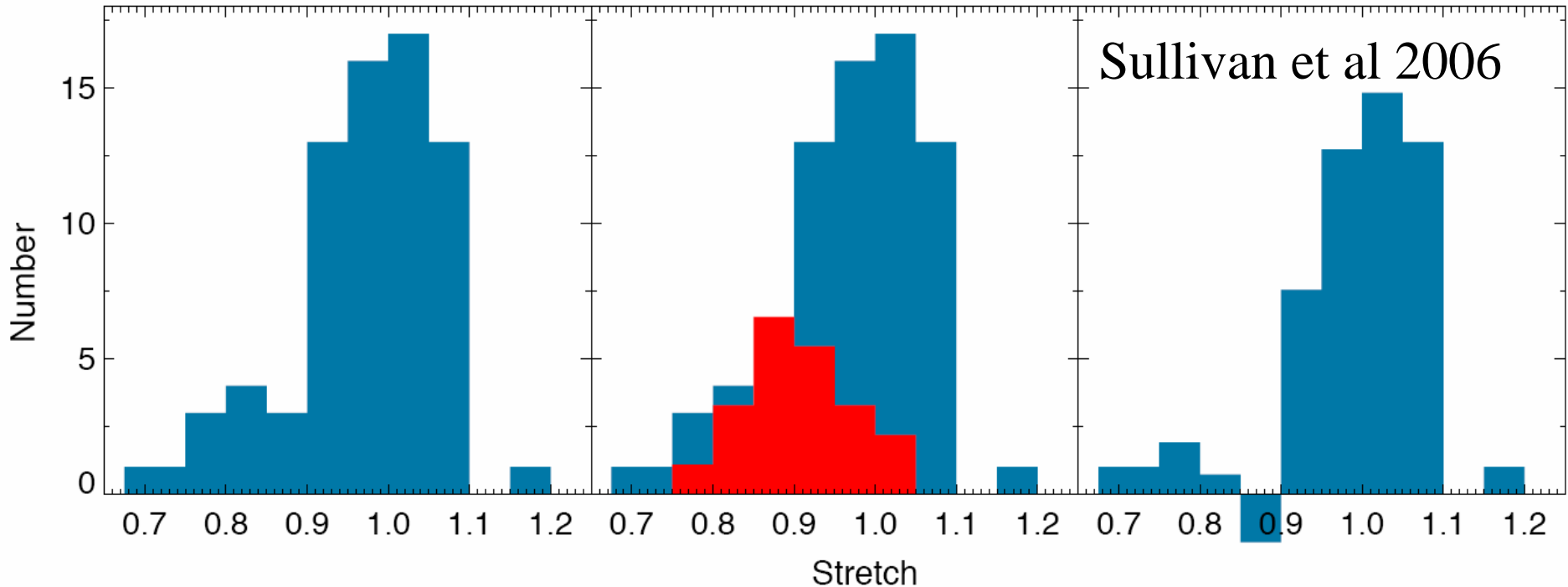


CFHT Supernovae Legacy Survey

(SNLS)
Red=Passive

Star Forming Galaxies

Star Forming-Passive



The number of faint (small stretch) Ia's in spirals is consistent with the old stellar population in the spiral galaxy.

The two populations are distinct!

Howell et al 2007 astroph-0701912

