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NEW EVOLUTIONARY MODELS OF HII GALAXIES

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INTRODUCTION

- **Are HII galaxies young systems?**

How the star formation takes place in HII galaxies?

We have used **three tools**:

1st. Chemical evolution code: (Ferrini et al.1992 , Mollá et al. 1996, Mollá & Díaz 2005)

t=0-13.2 Gyr, Δt=0.5 Myr

⇨ **age, metallicity, abundances**

2nd. Evolutionary synthesis code: (García –Vargas et al. 1995, Mollá & García-Vargas, 2000)

⇨ **S.E.D ionizing continuum**

3rd. Photoionization code: (CLOUDY, Ferland et al. 1991)

⇨ **Emission lines**

ATTENUATED BURST MODELS

- From t=0 to t=13.2 Gyr , Δt= 0.5 Myr
- M_{tot}= 100·10⁶M⊙
- R= 500 pc (Telles et al. 1997)

10 attenuated bursts every 1.3 Gyr. **Different initial efficiencies and attenuations have been taken. Attenuation modes:**

Type 0 $\Psi_n = \frac{\Psi_0}{n}$ $\Psi_n = \Psi_0 (nn)^{n-1}$ Type 1

n=number of the burst
nn= attenuation factor

Attenuation mode	nn	efficiencies		
0	-	64%	33%	10%
1	0.5	33%	10%	3%
1	0.8	33%	10%	3%
1	1.2	33%	10%	3%

Basic model

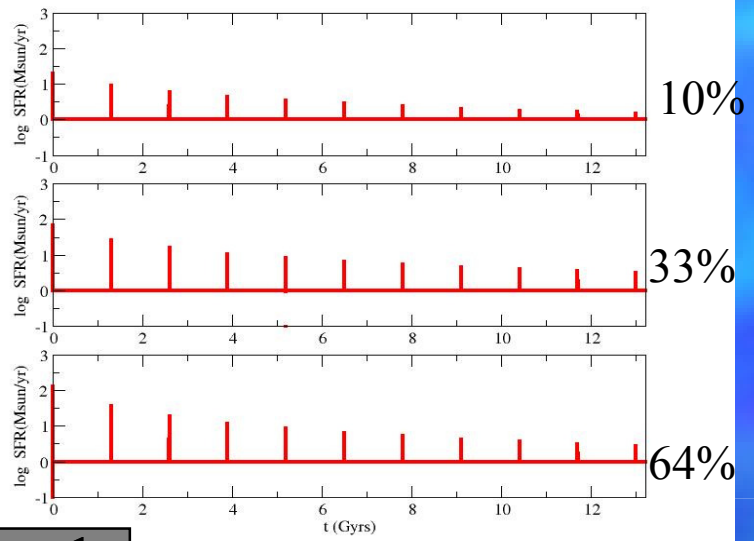
More attenuated than type 0

Less attenuated than type 0

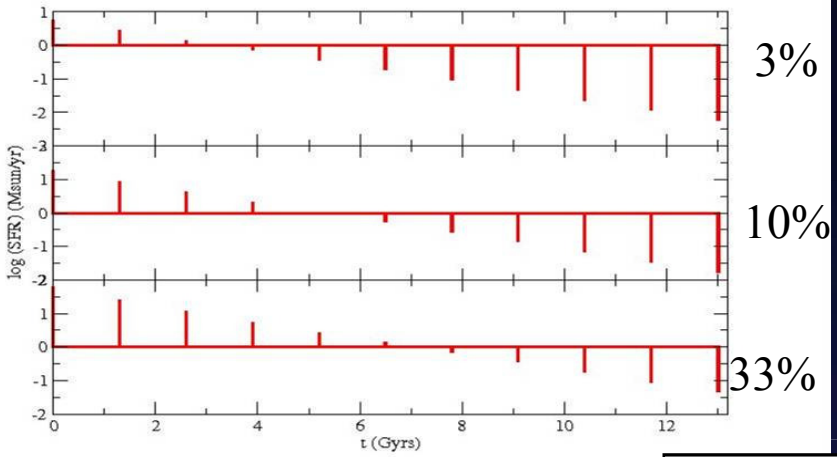
Increasing efficiency

Star formation rates

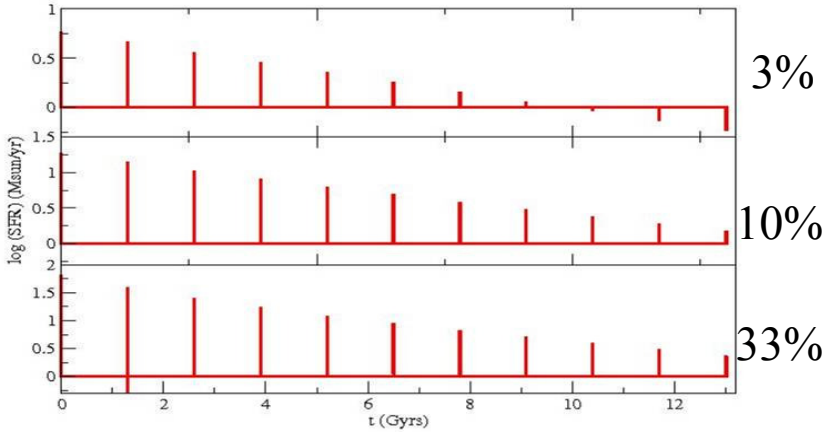
Type 0



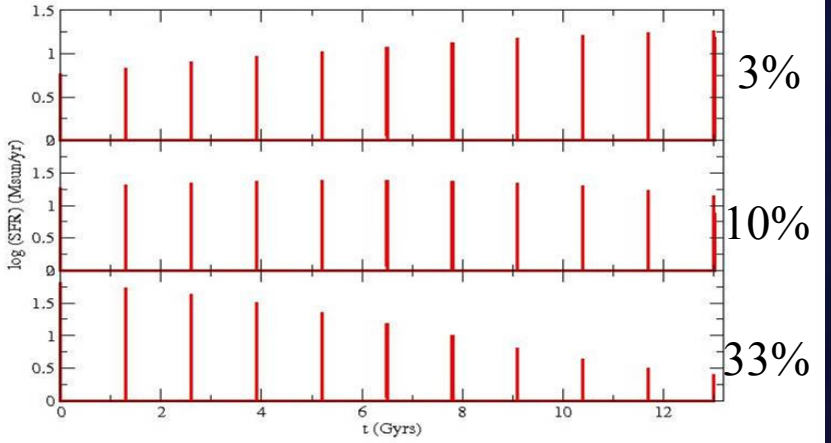
Type 1 nn=0.5



Type 1 nn=0.8



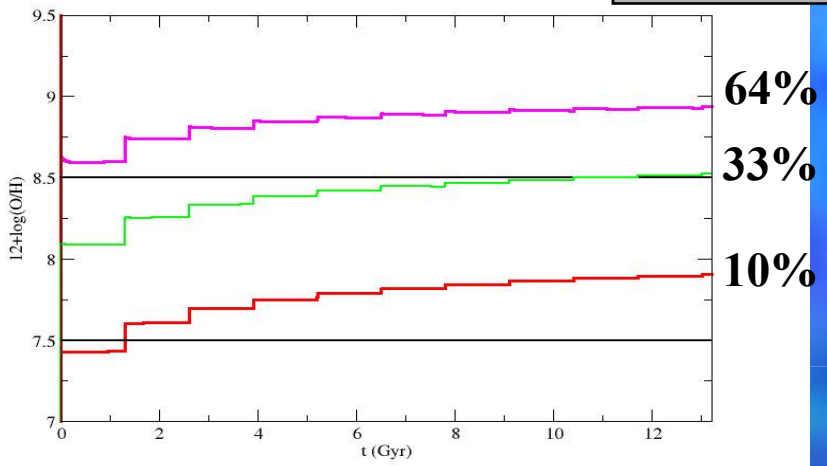
Type 1 nn=1.2



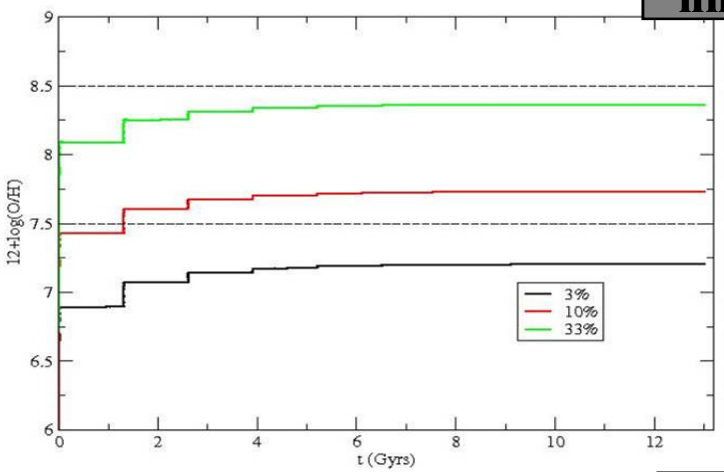
Oxygen abundance

HII galaxies: 7.5 < 12+log(O/H) < 8.5 (Hoyos & Díaz 2005, Terlevich et al. 1991)

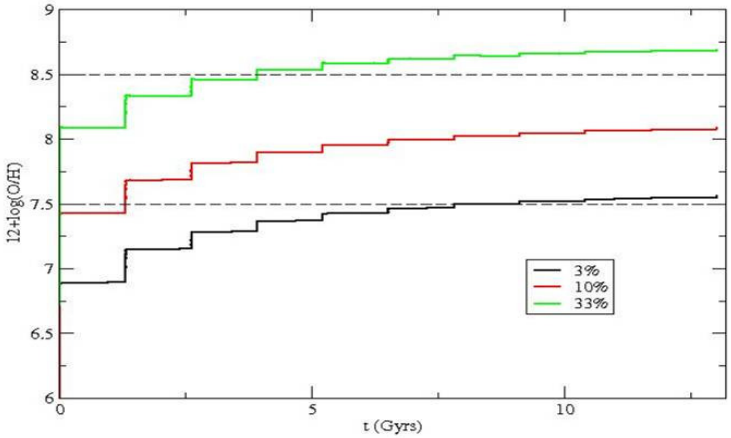
Type 0



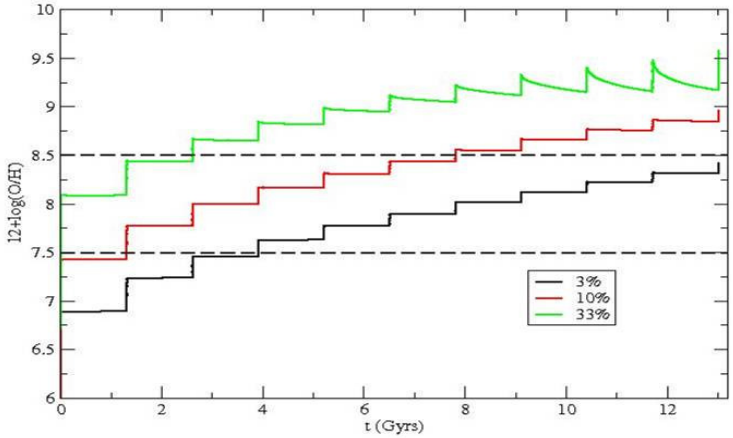
Type 1 nn=0.5



Type 1 nn=0.8



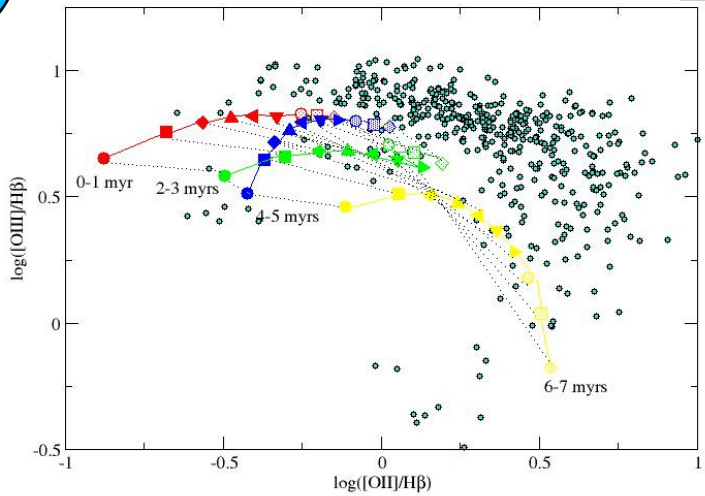
Type 1 nn=1.2



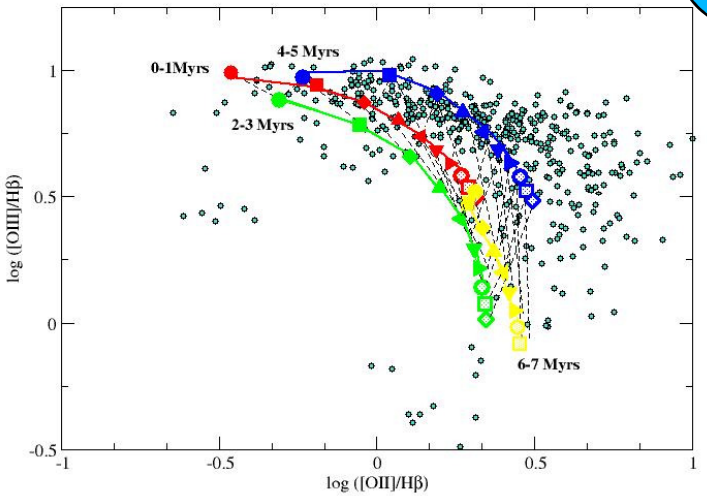
Ionized gas: diagnostic diagrams I

Type 0

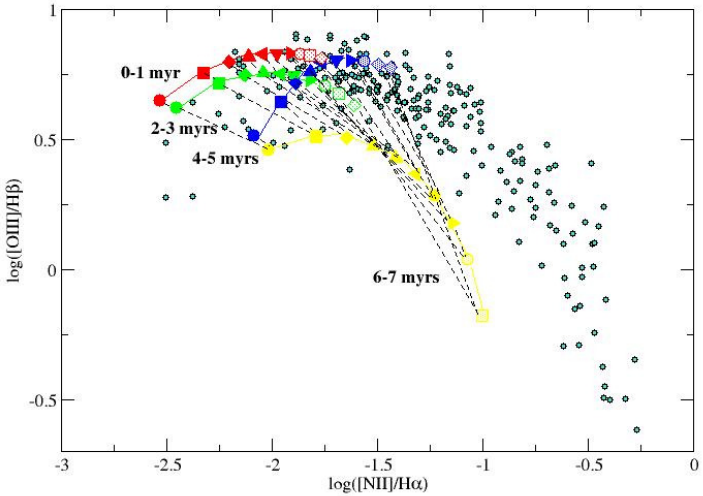
Є= 10%

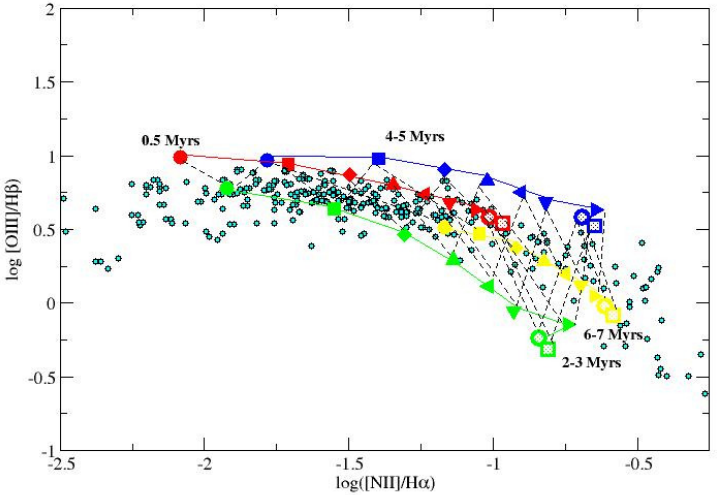


Є= 33%



Data compilation:
Hoyos & Díaz 2006

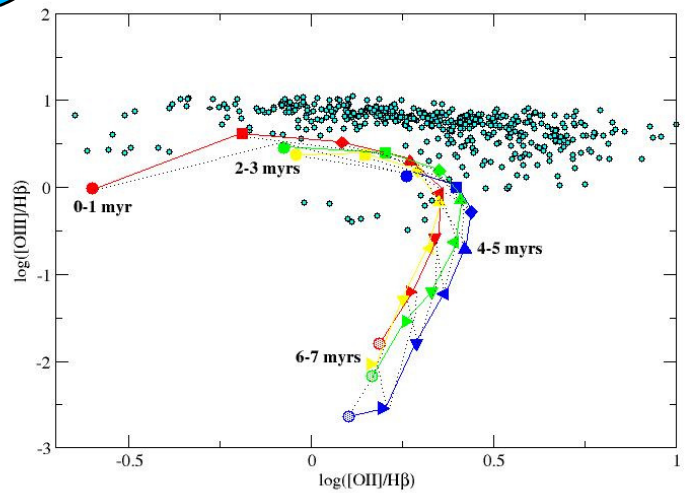


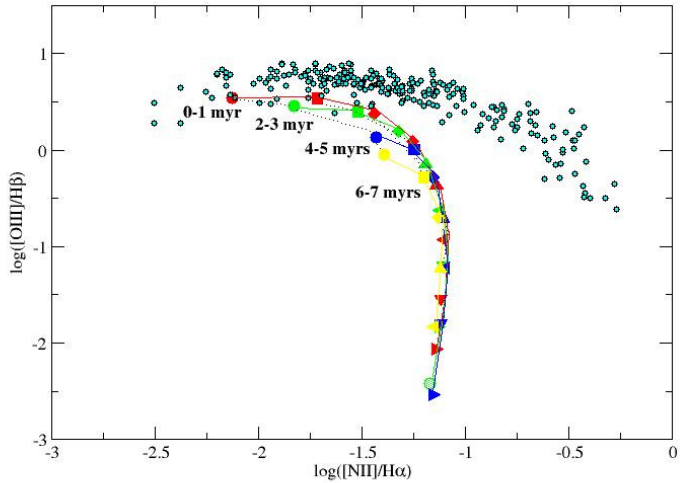


Diagnostic diagrams II

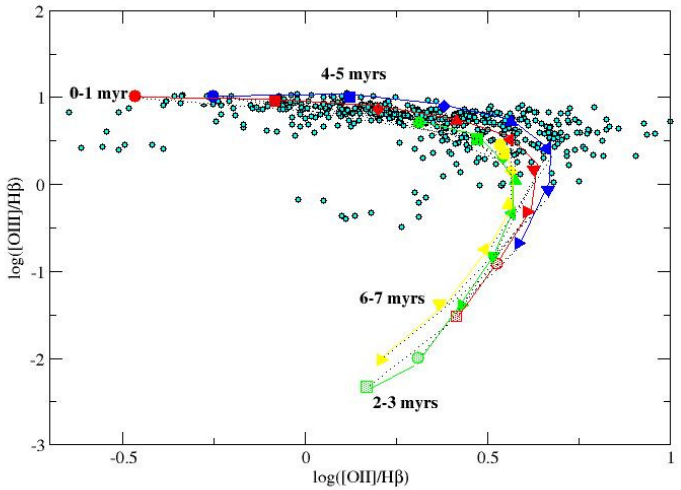
Type 1
nn=0.5 high attenuation

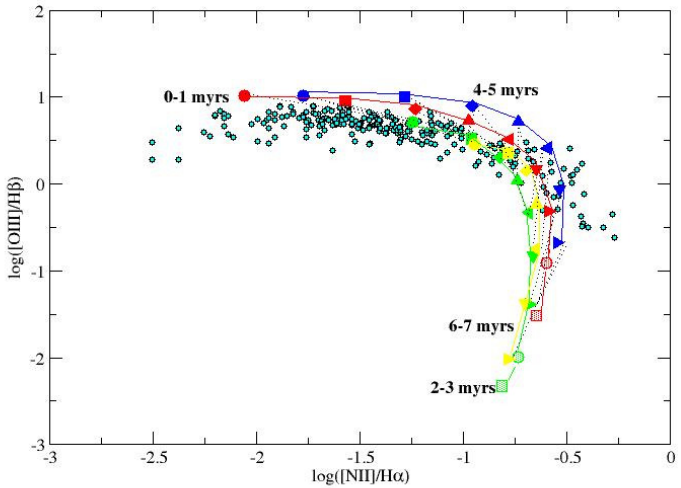
Є= 10%





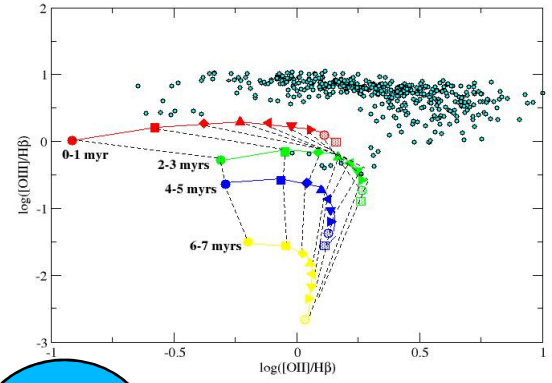
Є= 33%

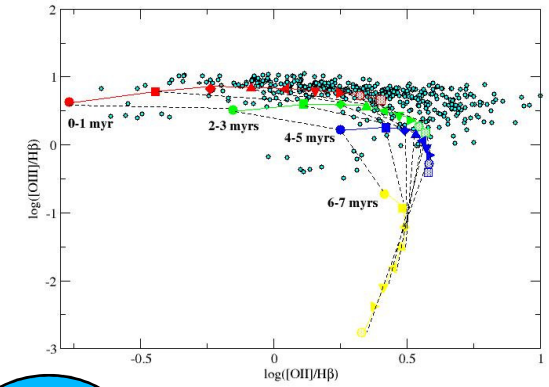


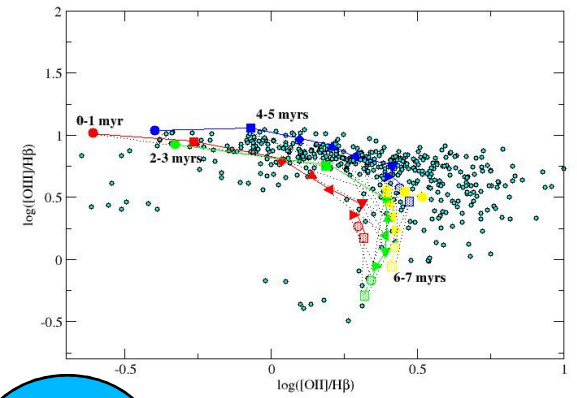


Diagnostic Diagrams III

Type 1
nn=0.8, low attenuation



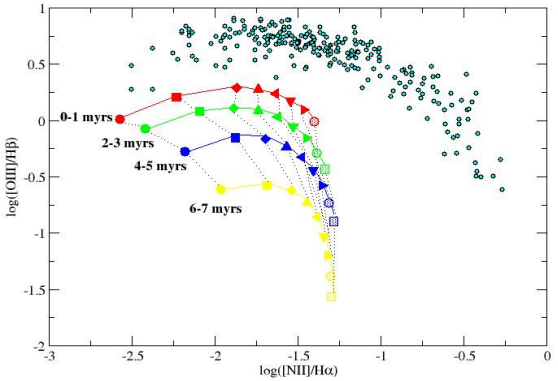


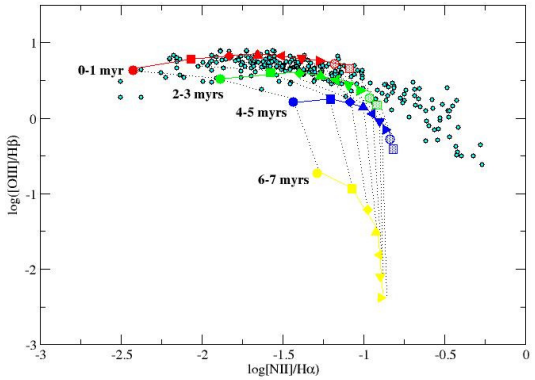


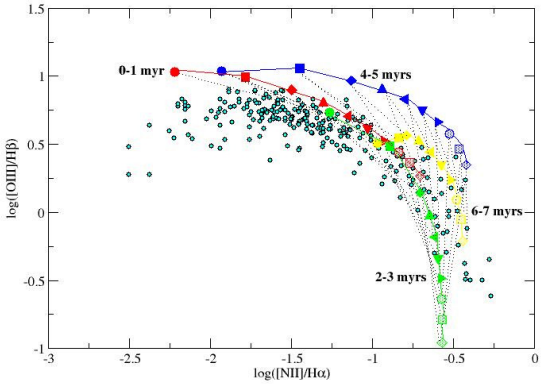
Є= 3%

Є= 10%

Є= 33%

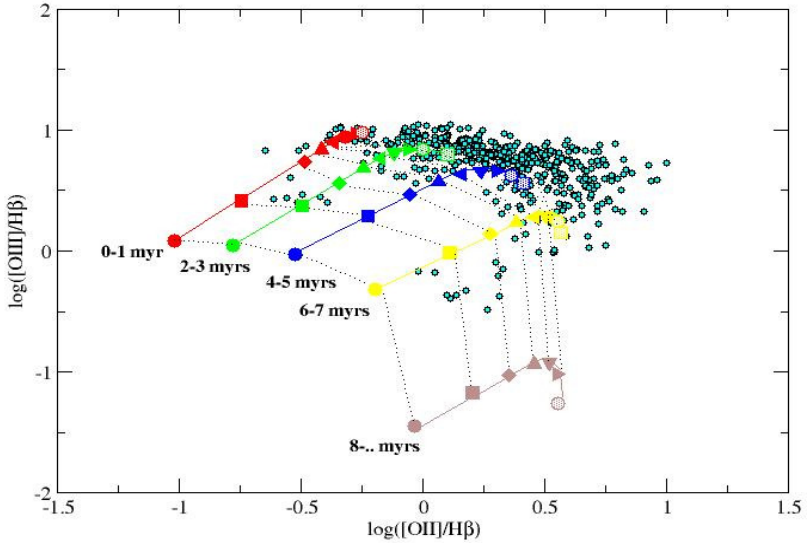


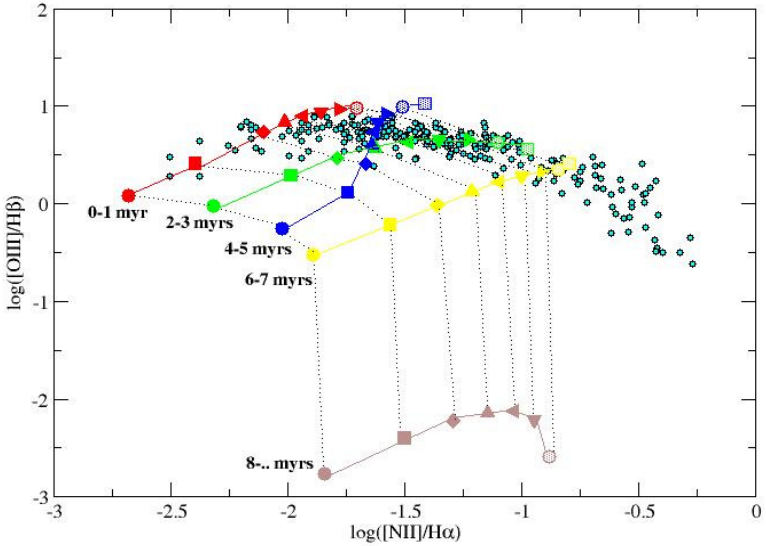




Diagnostic Diagrams IV

Type 1
nn=1.2, increasing s.f.r.



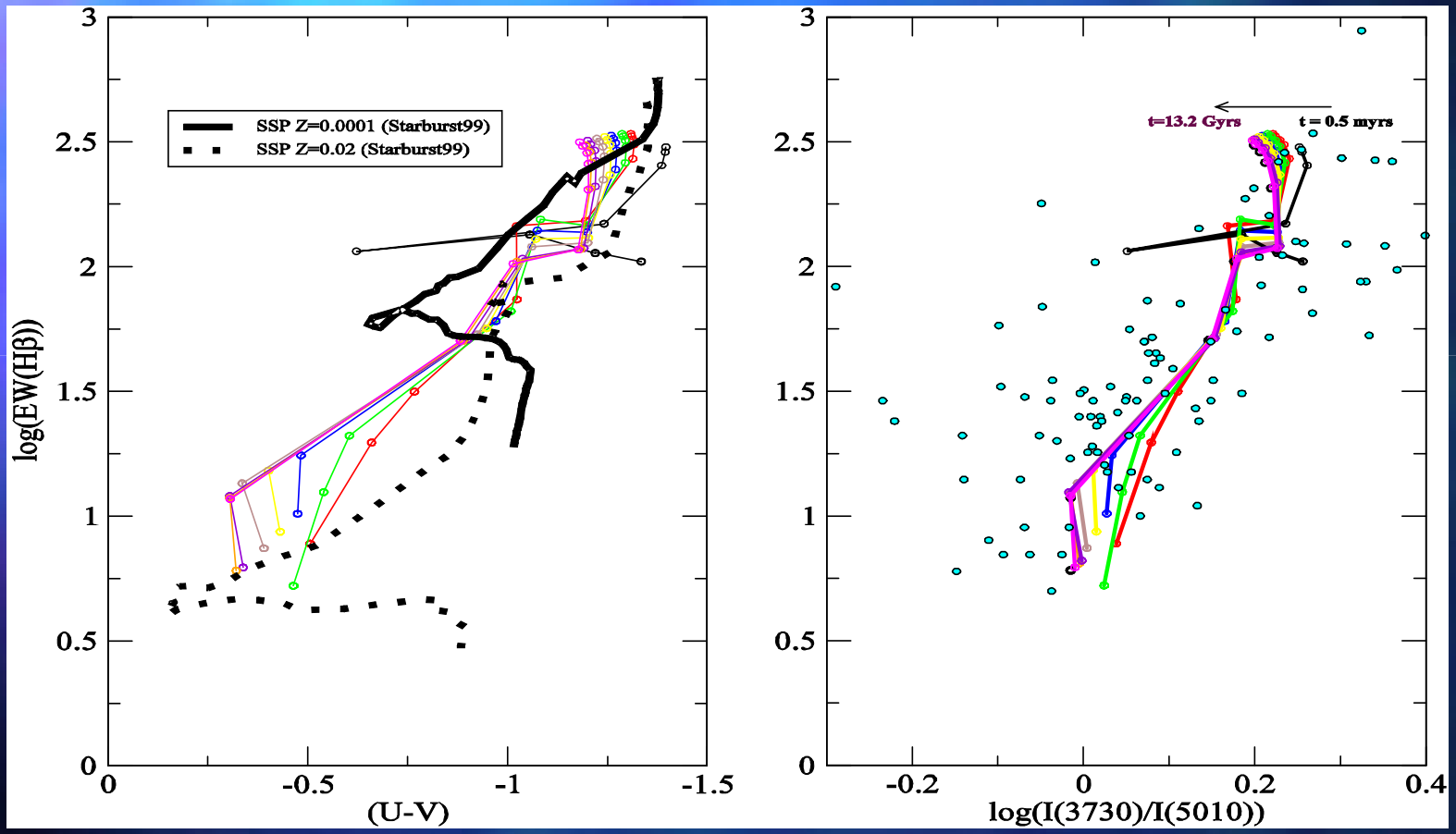


Є=3%

EW(Hβ) vs. colour

- Evolution of colour is reproduced with the contribution of the underlying population, not with a SSP.

$$EW(H\beta) = \frac{L(H\beta)}{L_{cont}(H\beta)}$$

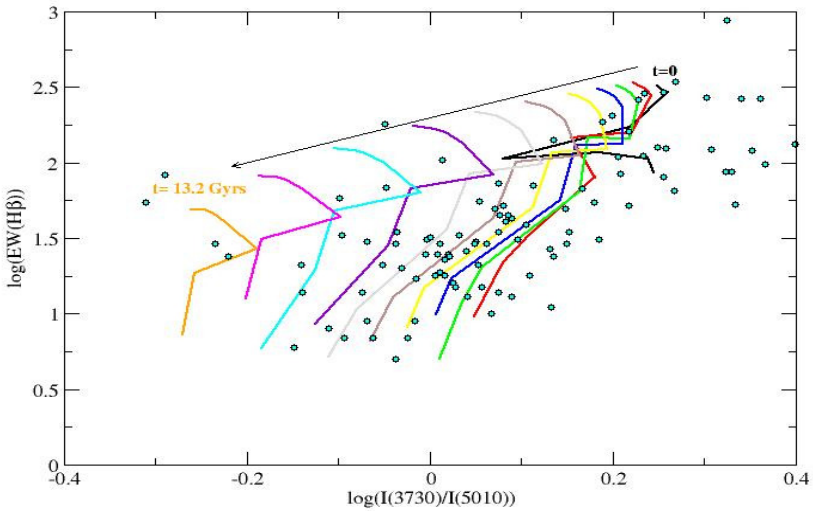


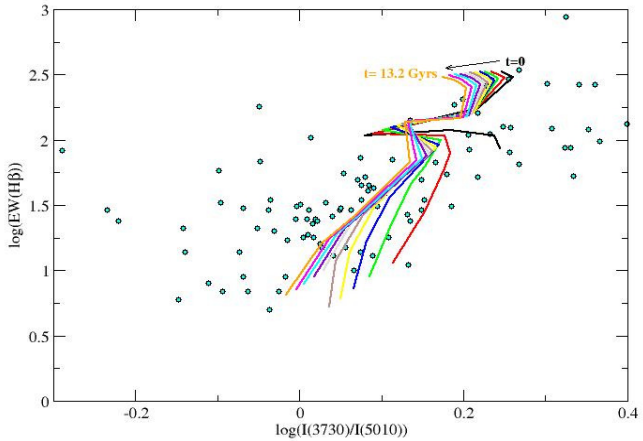
Type 0
33%

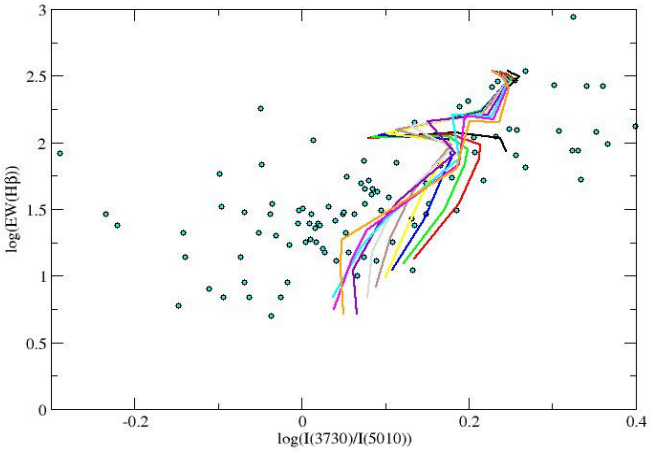
Observational data: Hoyos & Díaz 2006
Salzer et al. 95
Terlevich et al. 91

EW(Hβ) vs. colour

- With a high attenuation we can cover the whole range of data. The contribution of the continuum is higher than the blue colour of the burst .
- nn=0.5, ϵ =33%







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