Estallidos – Granada
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# Impact of an AGN on stellar population properties recovered with spectral synthesis

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## Outline

1) Context
2) Methodology
3) Results
4) Conclusions

## • spectral synthesis of active galaxies•

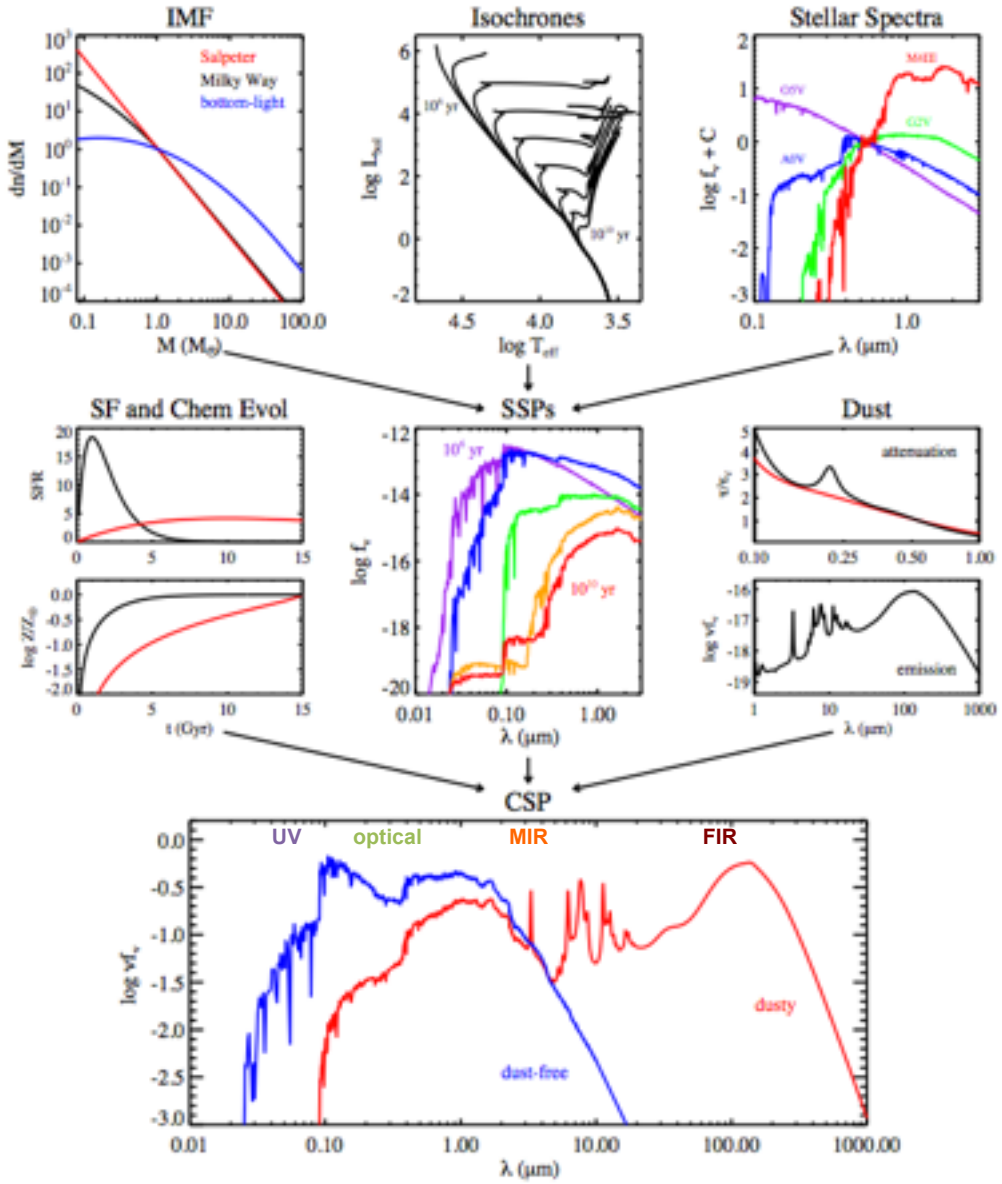

**Credit:** X-ray: NASA/CXC/Caltech/P.Ogle et al; Optical: NASA/STScI; IR: NASA/JPL-Caltech; Radio: NSF/NRAO/VLA

Do current astronomical techniques permit an unambiguous discrimination between the radiation emitted by stars and AGN?

## • spectral synthesis •

Whipple 1935; Baade 1944

**Evolutionary**
Tinsley 1968; Spinrad 1972

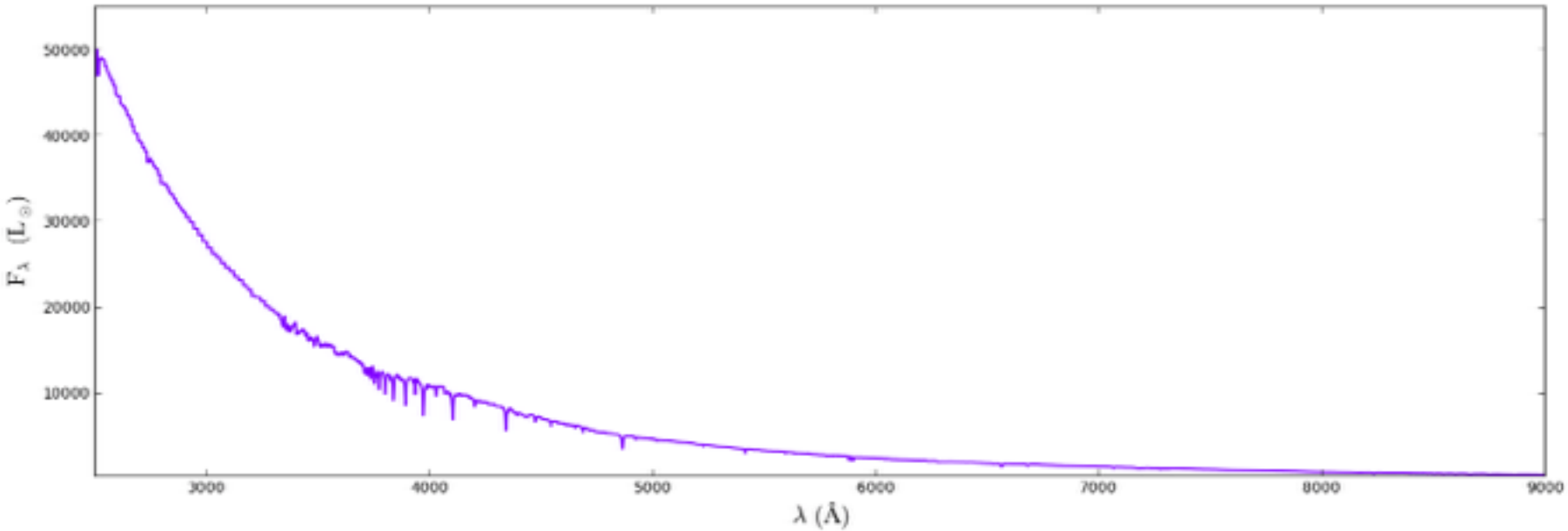


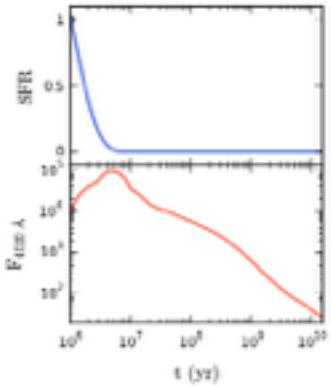

**Population Synthesis**
Morgan 1956, Wood 1966;
Faber 1972

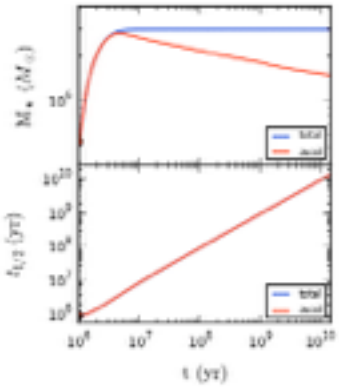
Conroy 2013

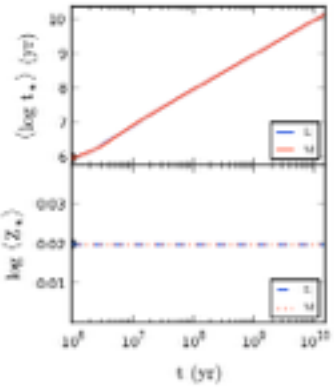
## • composite stellar populations with REBETIKO •

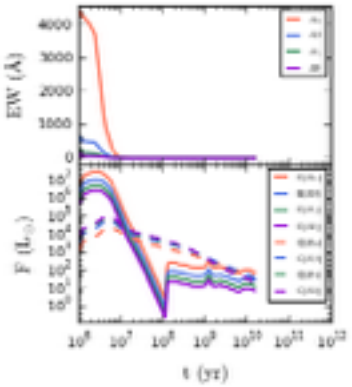
Gomes & Papaderos, in prep. Papaderos & Gomes in prep.

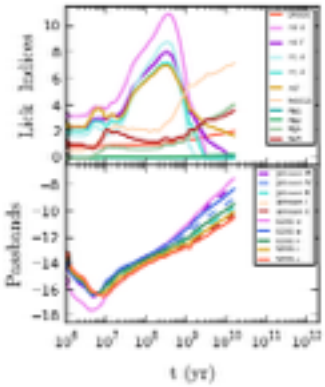


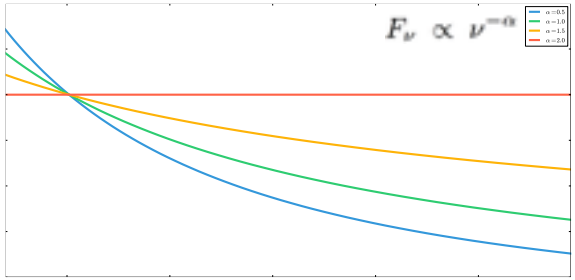



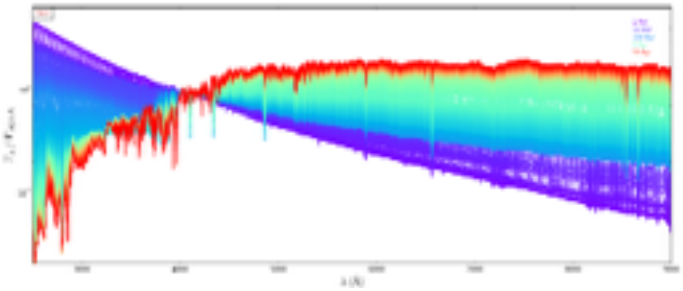
## • AGN + composite stellar populations with REBETIKO •

Cardoso, Gomes & Papaderos, in prep.

**toy AGN continuum model**
e.g. Koski 1978; Cid Fernandes 2004

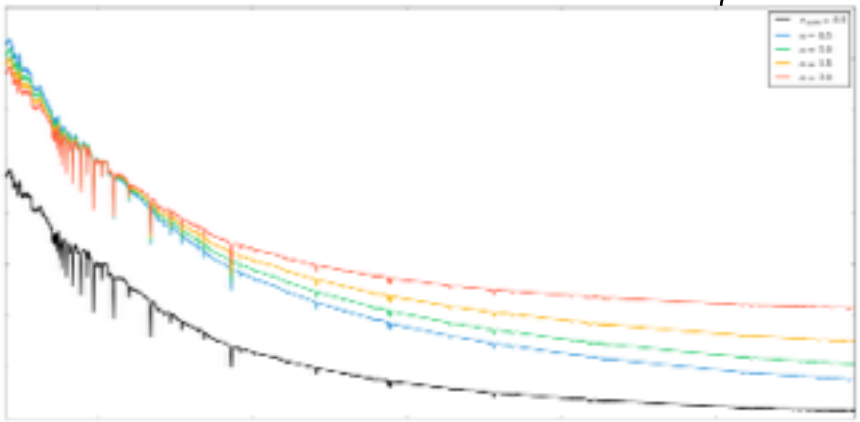



**composite stellar populations**
SSPs from Bruzual & Charlot 2003

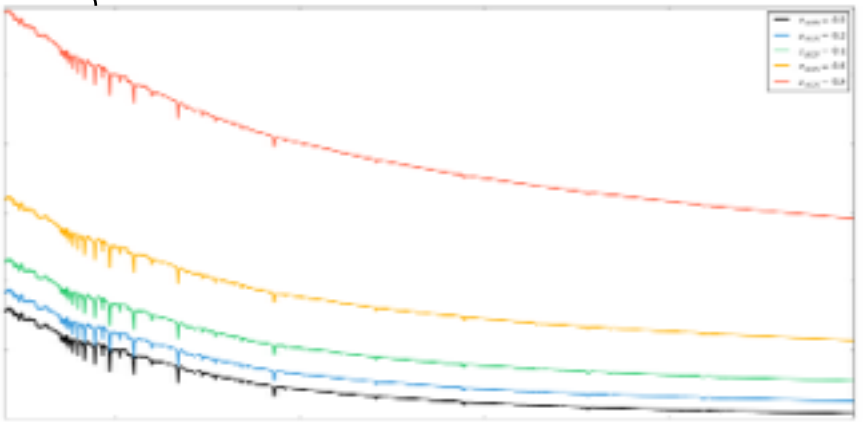


$$F_\lambda = x_{\rm AGN} \frac{F_{\rm AGN,\lambda}}{F_{\rm AGN,\lambda_0}} + x_\star \frac{F_{\star,\lambda}}{F_{\star,\lambda_0}}$$

**slope variations**

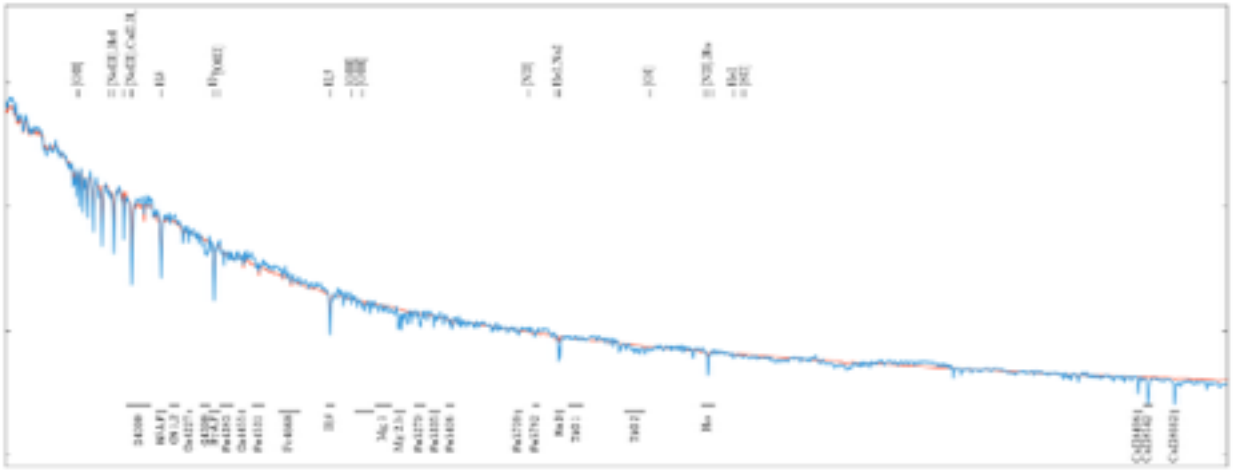


**fractional variations**



## • inversion approach with STARLIGHT •

Cid Fernandes et al. 2005

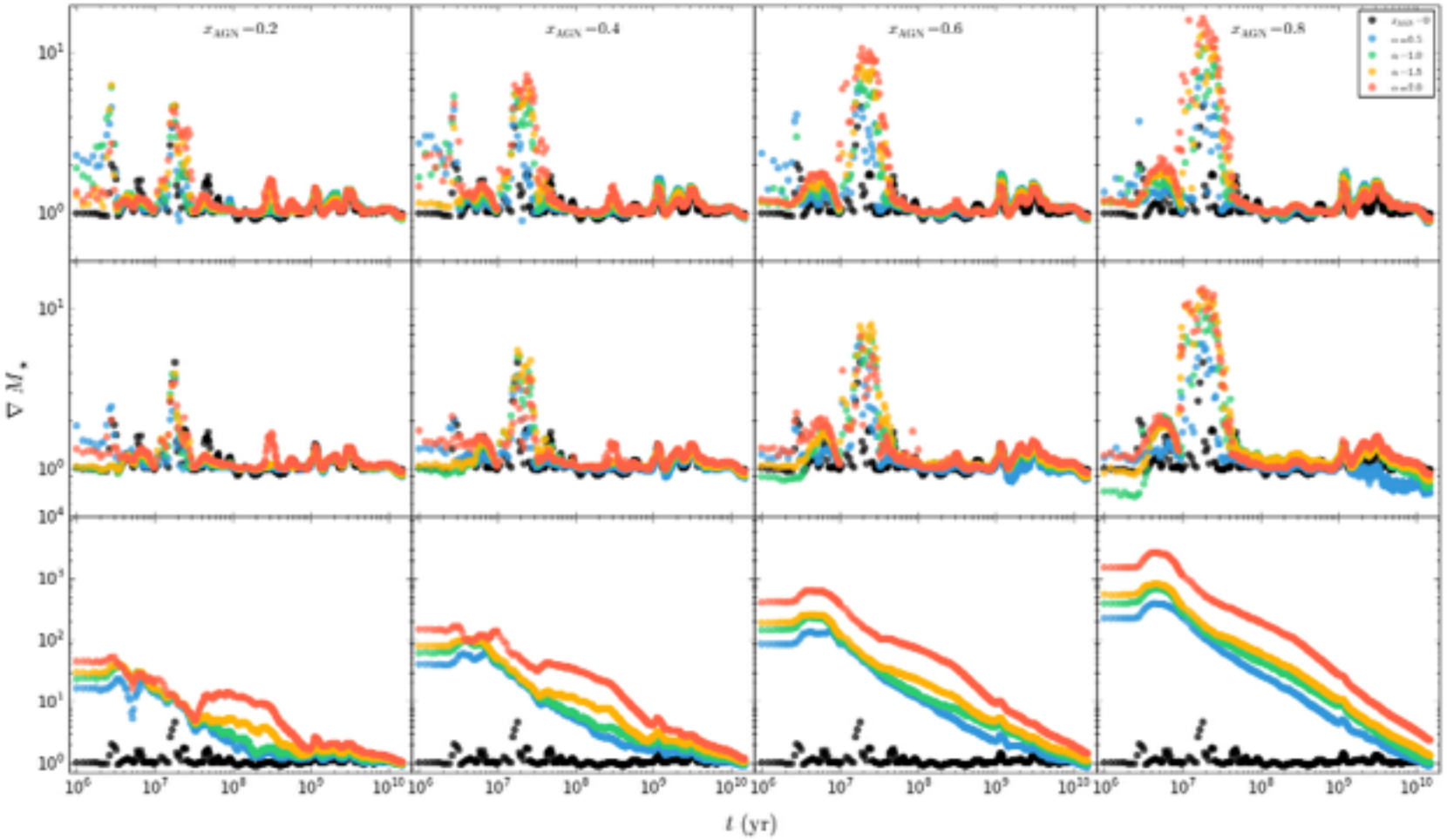


Scenarios regarding handling of a potential AGN component:

A) Inclusion of a power-law with the same slope as one adopted in REBETIKO;
B) Inclusion of multiple power-laws with all slopes adopted in REBETIKO;
C) Neglecting any power-law continuum.

## • spectral synthesis results •

total stellar mass ratio vs. age



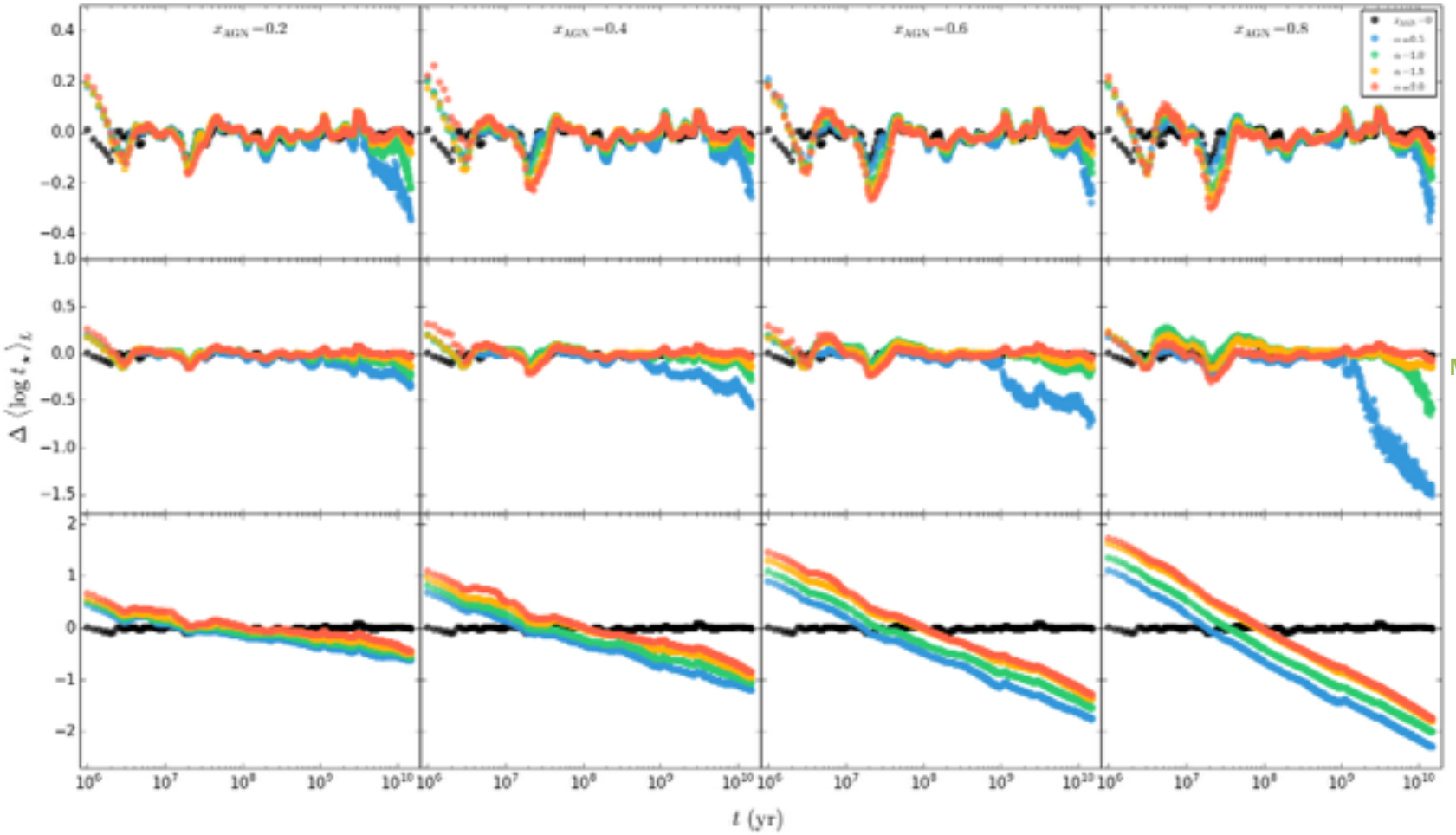

Precise PL

Multiple PLs

No PL

## • spectral synthesis results •

light-weighted mean stellar age vs. age



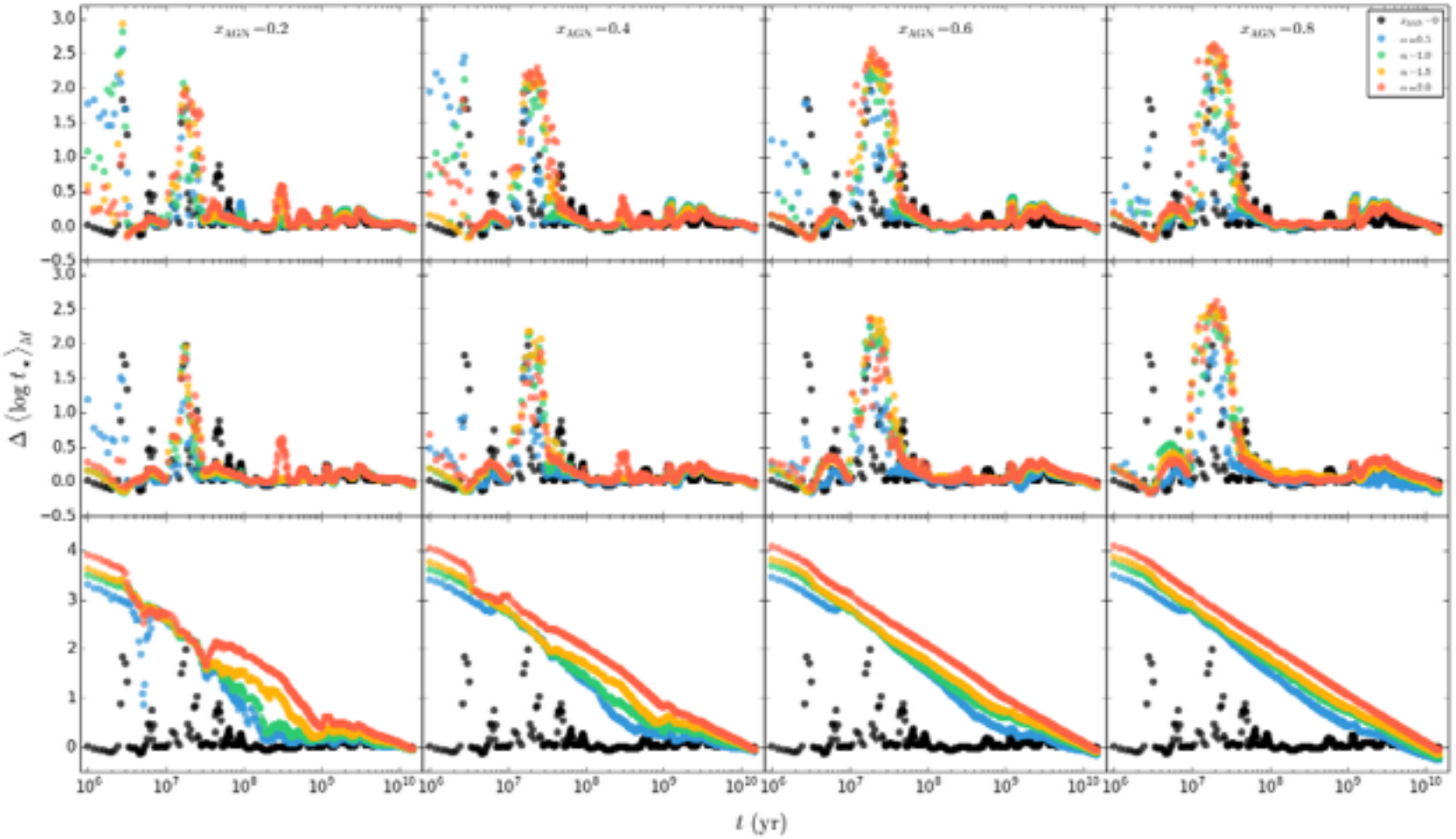

Precise PL

Multiple PLs

No PL

## • spectral synthesis results •

mass-weighted mean stellar age vs. age



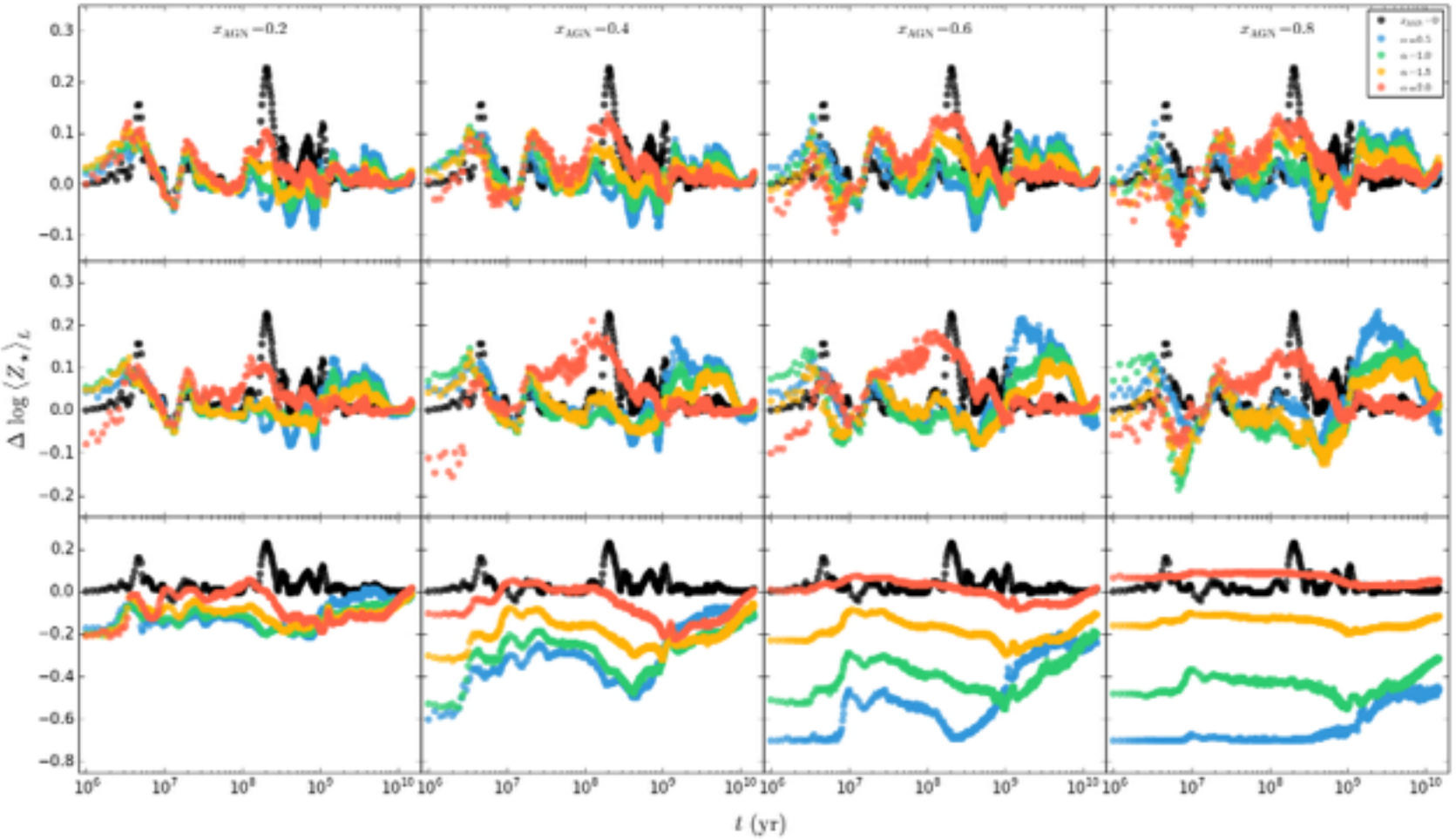

Precise PL

Multiple PLs

No PL

## • spectral synthesis results •

light-weighted mean stellar metallicity vs. age



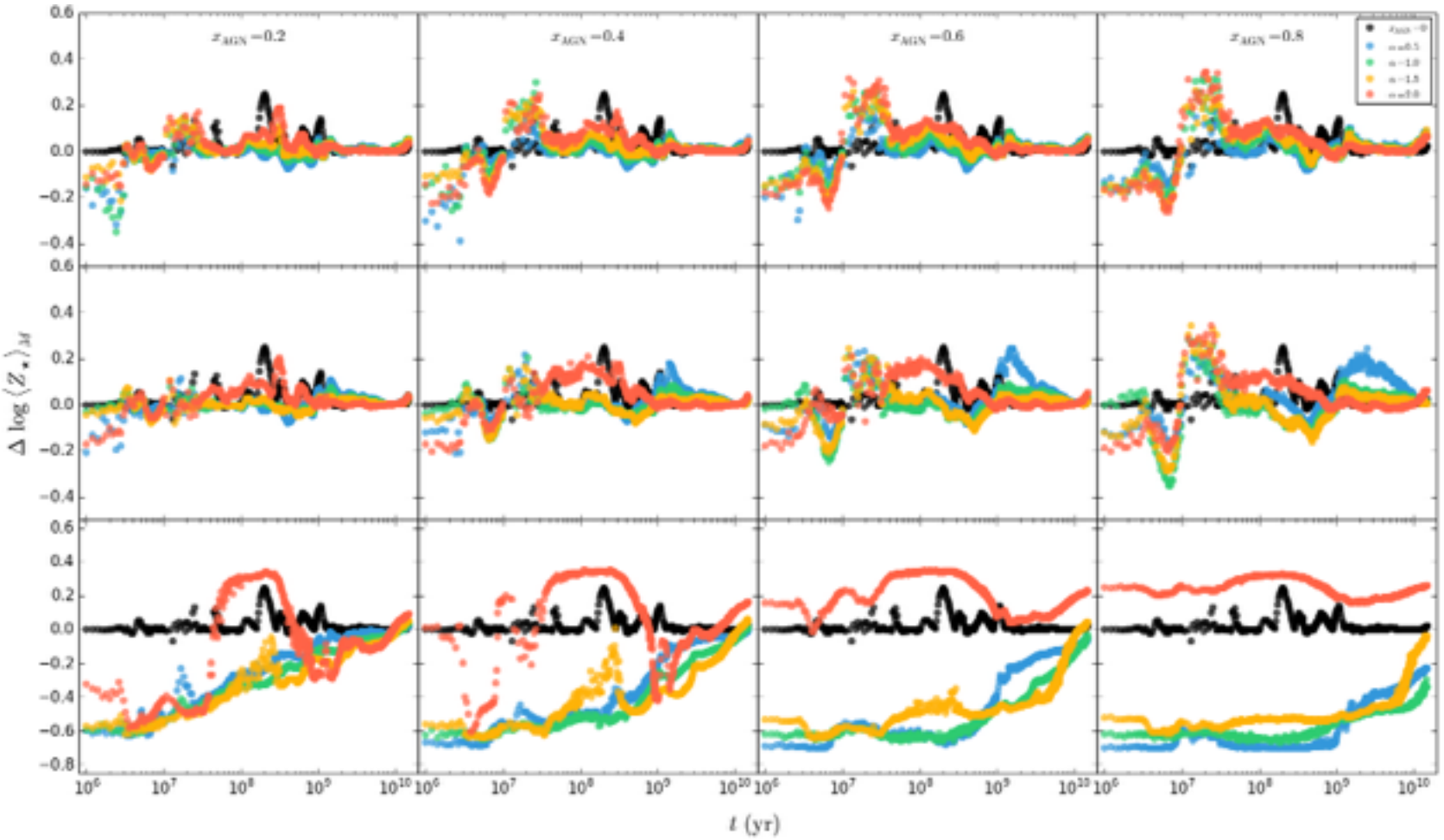

Precise PL

Multiple PLs

No PL

## • spectral synthesis results •

mass-weighted mean stellar metallicity vs. age




Precise PL

Multiple PLs

No PL

## • conclusions •

**Credit:** X-ray: NASA/CXC/Caltech/P.Ogle et al; Optical: NASA/STScI; IR: NASA/JPL-Caltech; Radio: NSF/NRAO/VLA

• **AGN light contamination should be properly accounted** in spectra synthesis codes **at the risk of** retrieving stellar properties of active galaxies plagued with **non-trivial biases**.

• **Thorough critical analysis is warranted** when interpreting synthesis results of galaxies **known** or **unknown** to harbor an **AGN**.

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## Acknowledgements