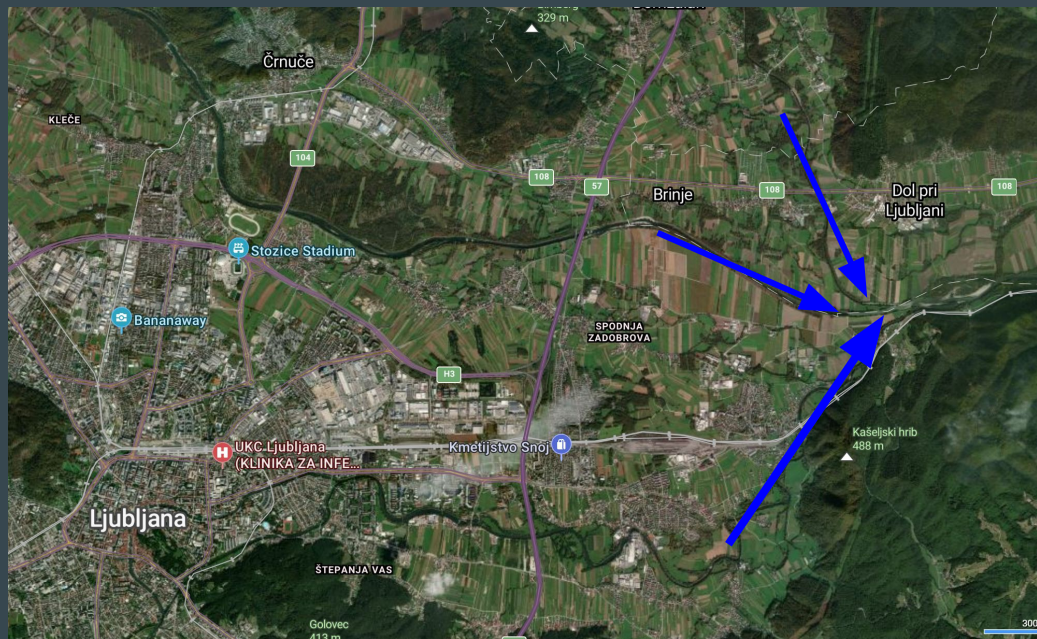# Universal Blacksmith

● ● ●

What metals reveal about galaxies' histories
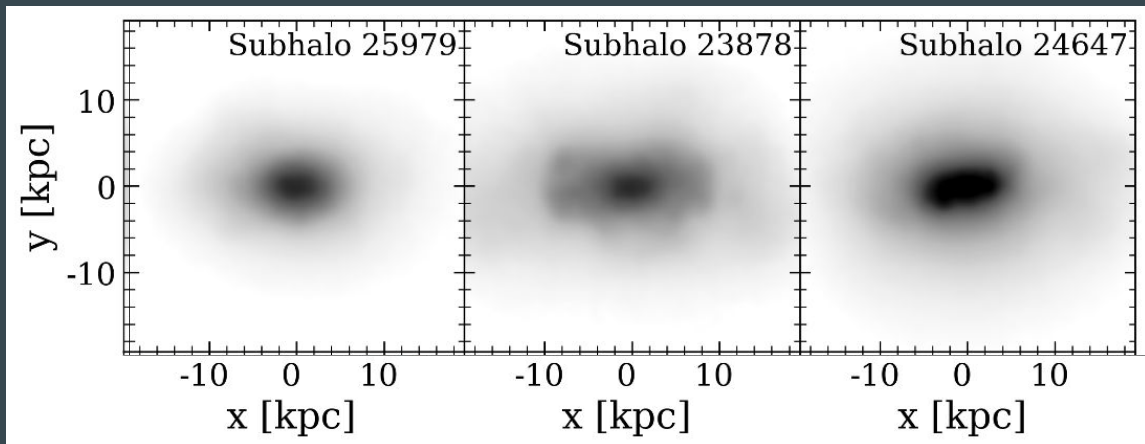
Lucas Kimmig

Dragons Team in Ljubljana

Dragons Team in Ljubljana
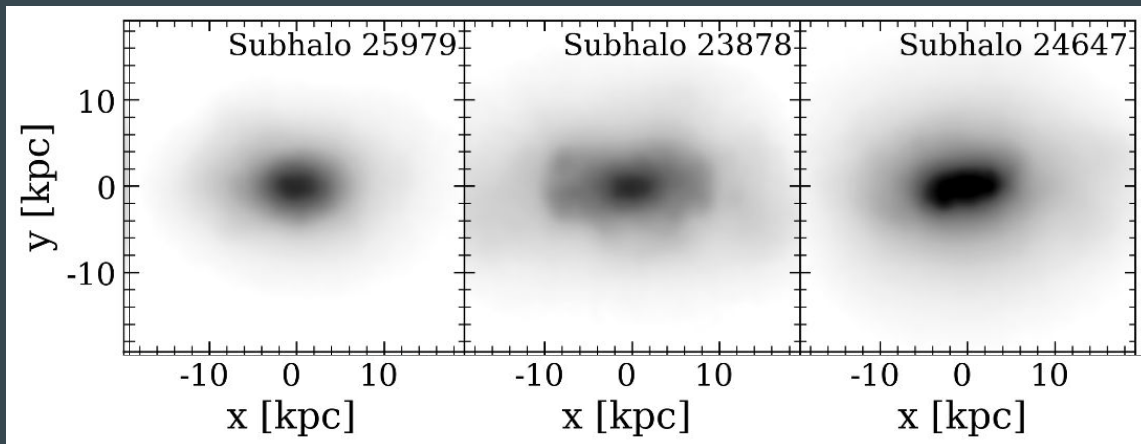
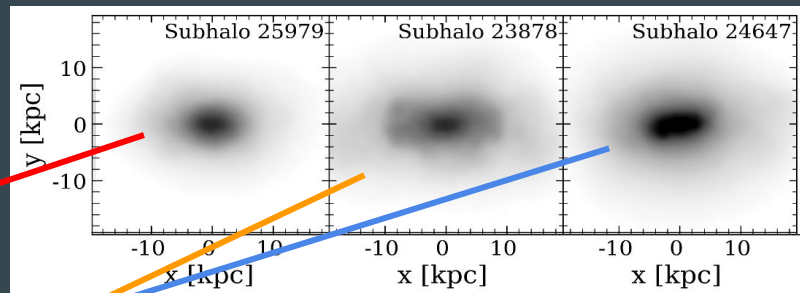# A Tale of Three Ellipticals

Three Ellipticals at z=0

	Subhalo 25979	Subhalo 23878	Subhalo 24647
$M_h \, [10^{11} M_\odot]$	3.14	5.48	4.4
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$r_{1/2, *} \, [kpc]$	2.27	2.97	2.3
[Z]	0.191	-0.0111	0.0662

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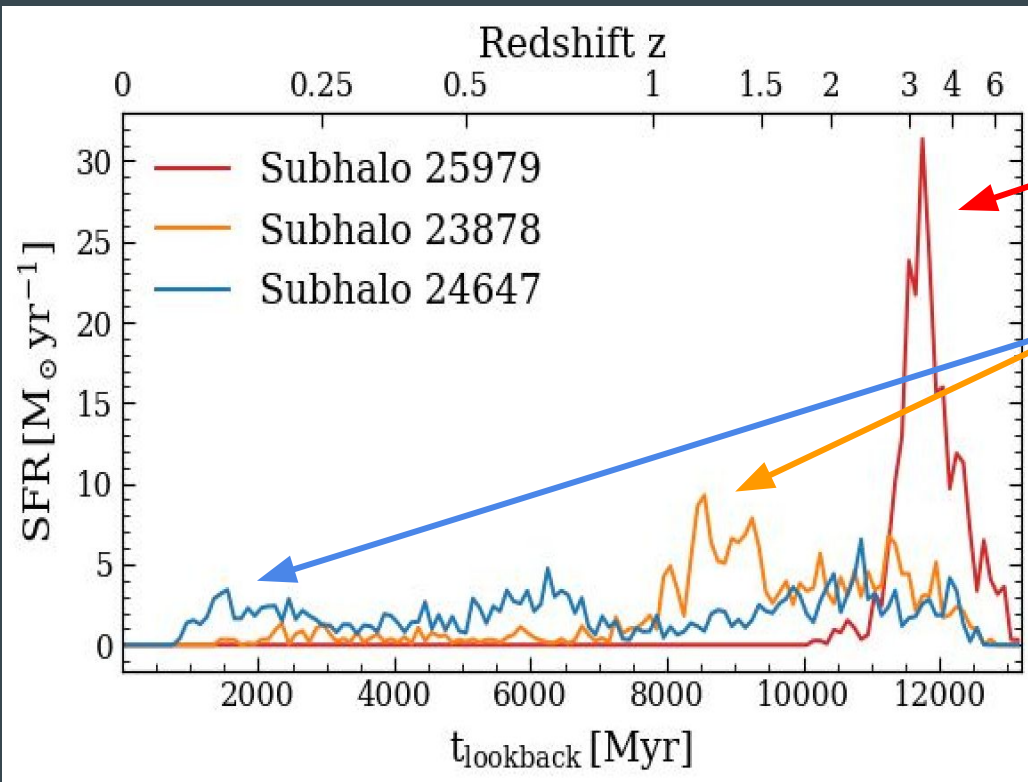
Three Ellipses at z=0

Three Ellipticals at z=0
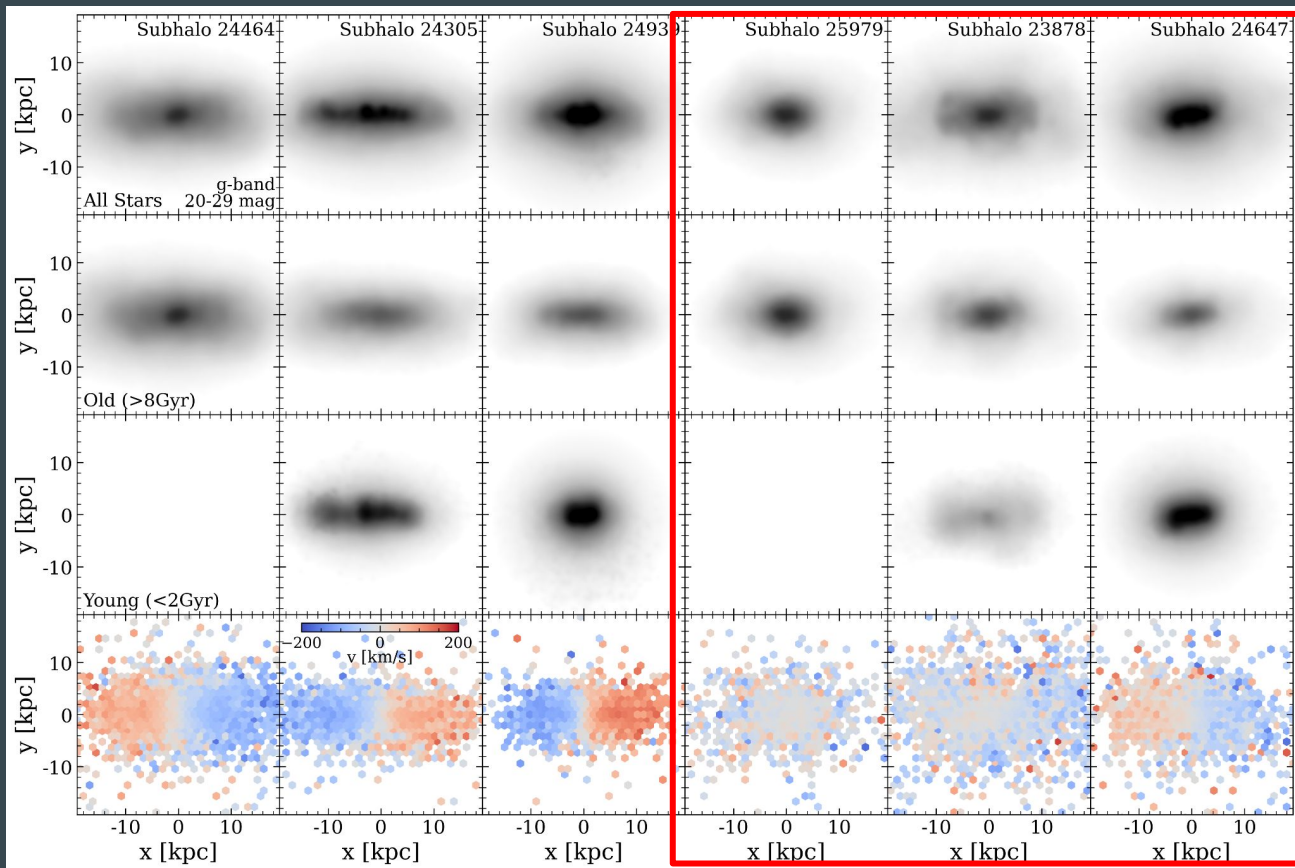
Kimmig et al., in prep
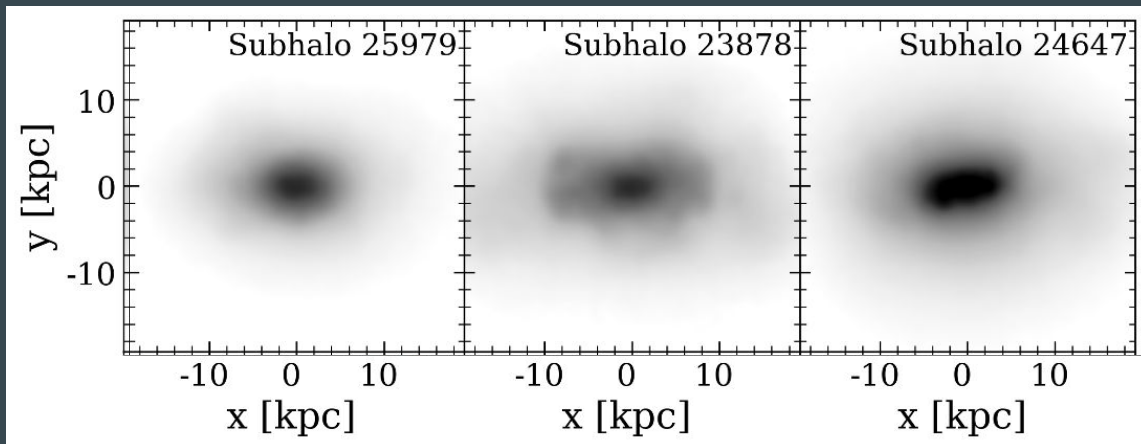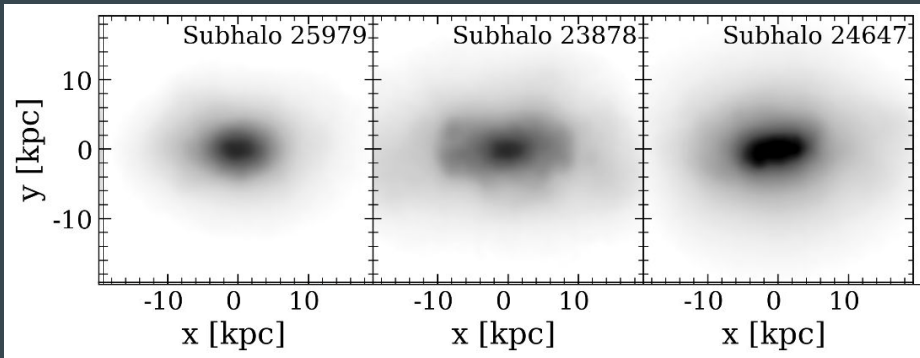
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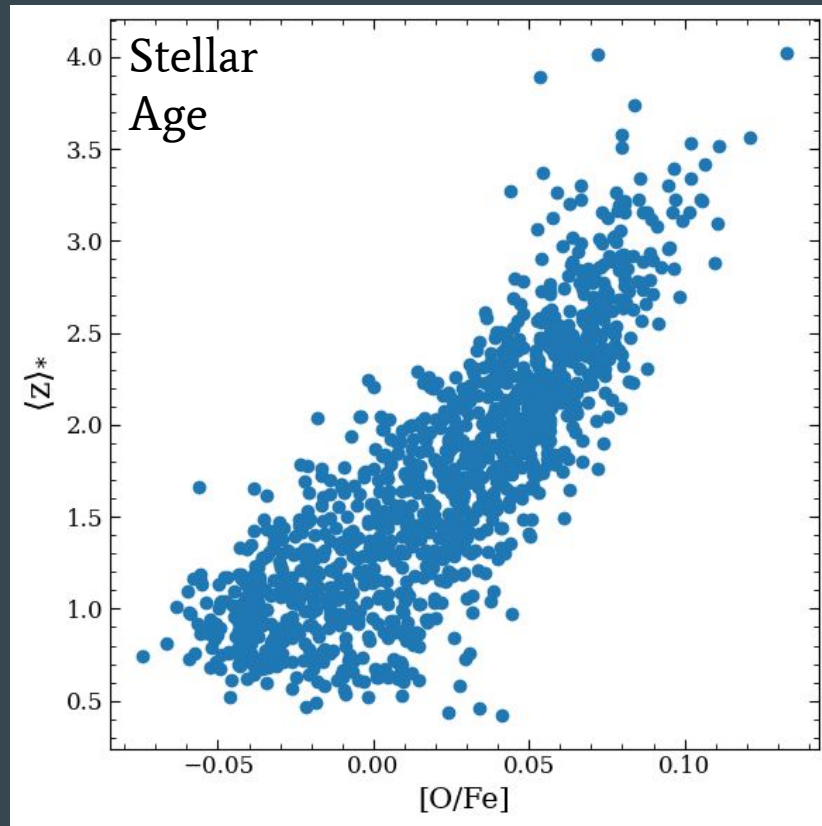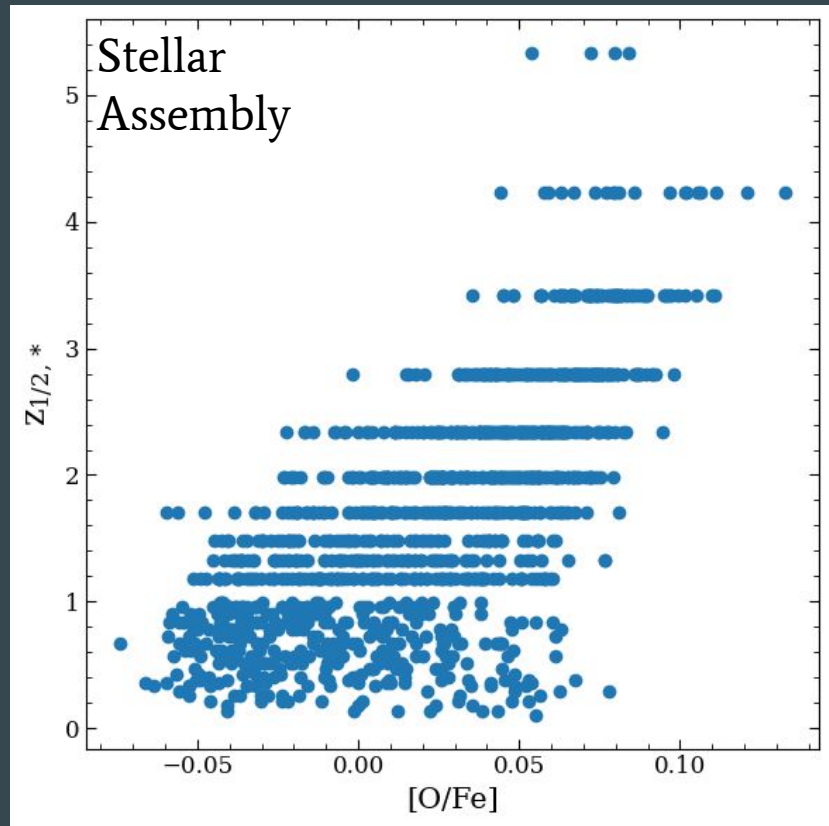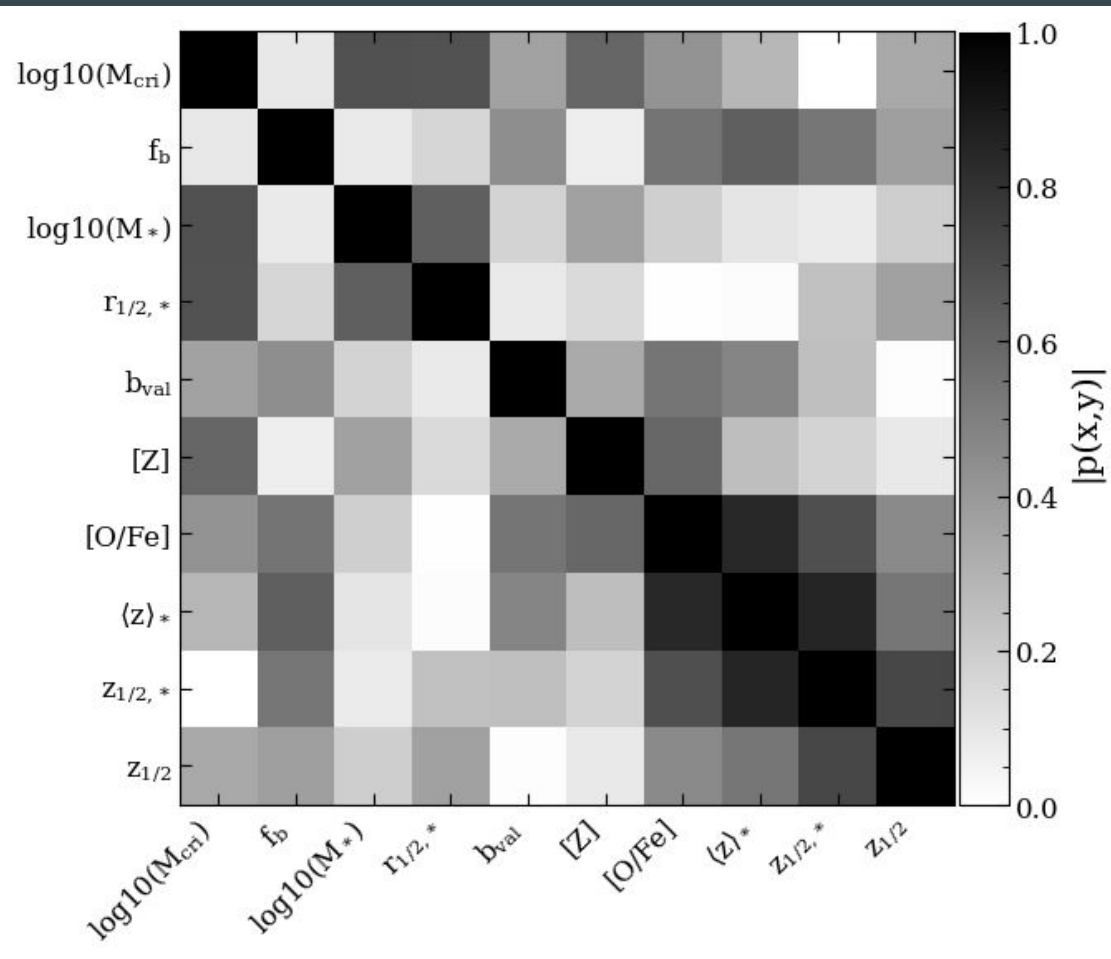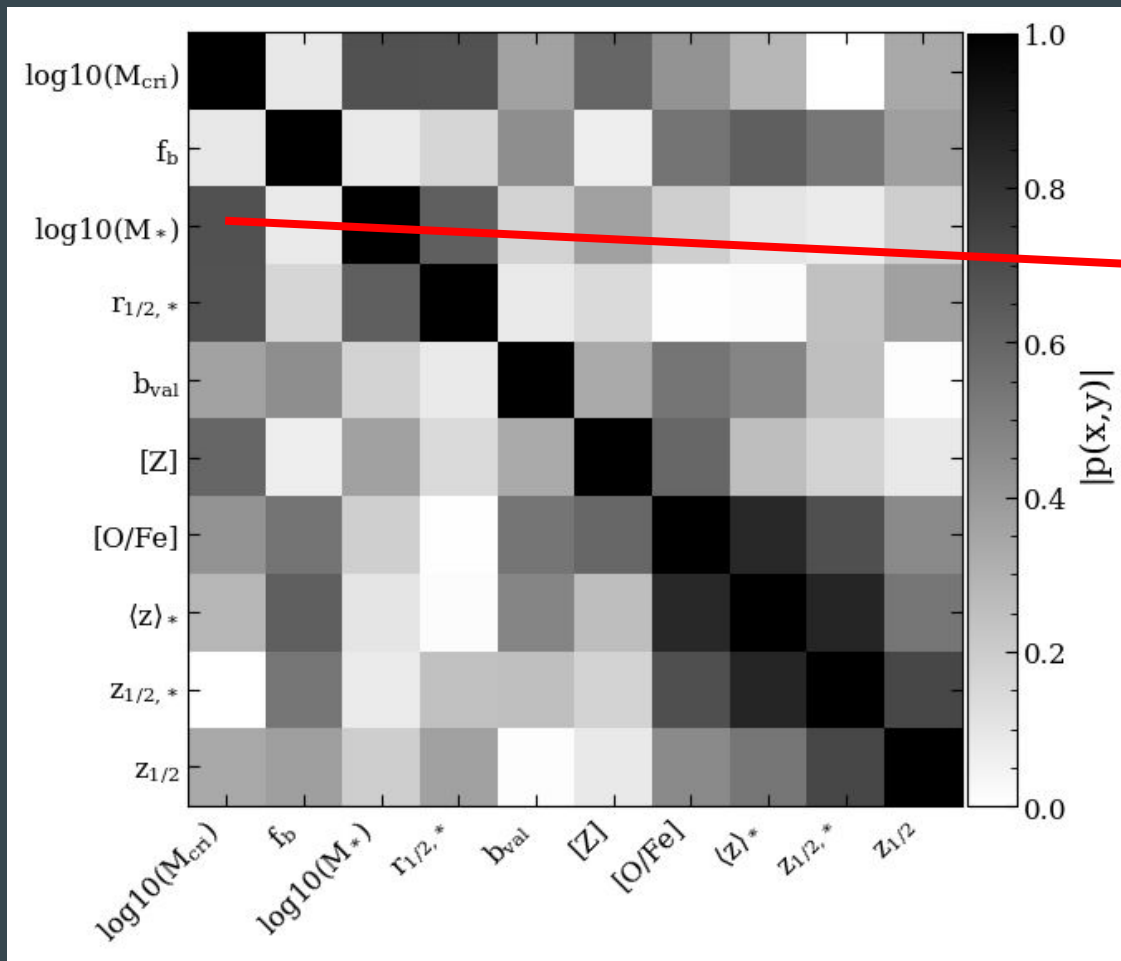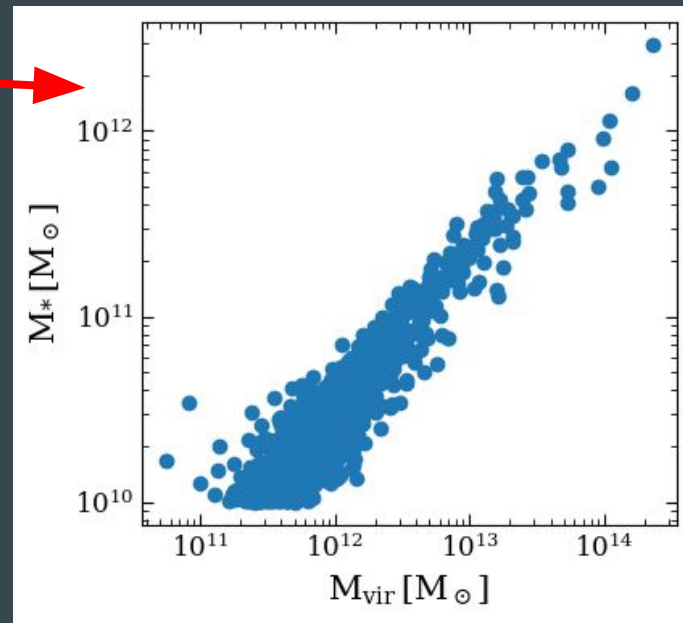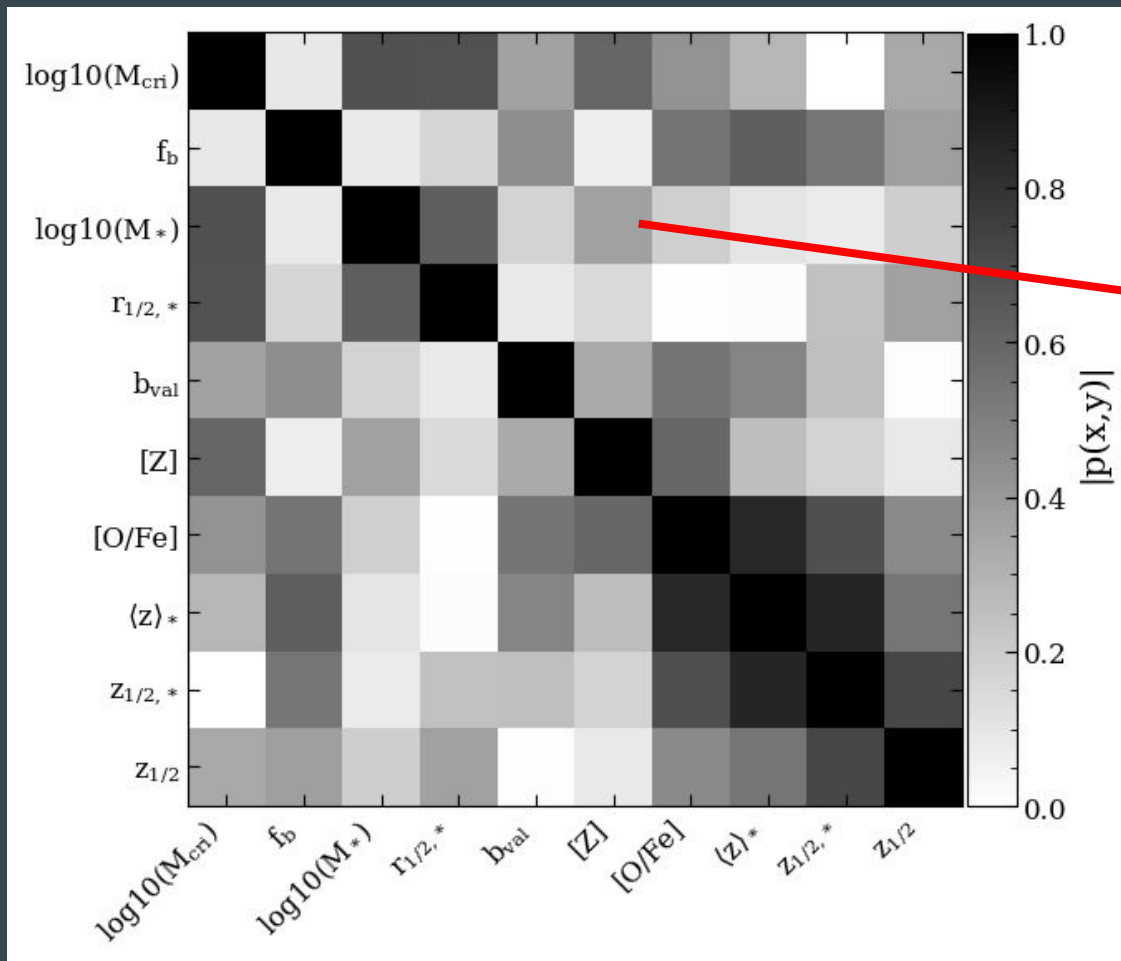
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Stellar Age

Three Ellipticals at z=0

Stellar Assembly

Stellar Age

How Good Is Alpha?

Kimmig et al., in prep

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Stellar Assembly
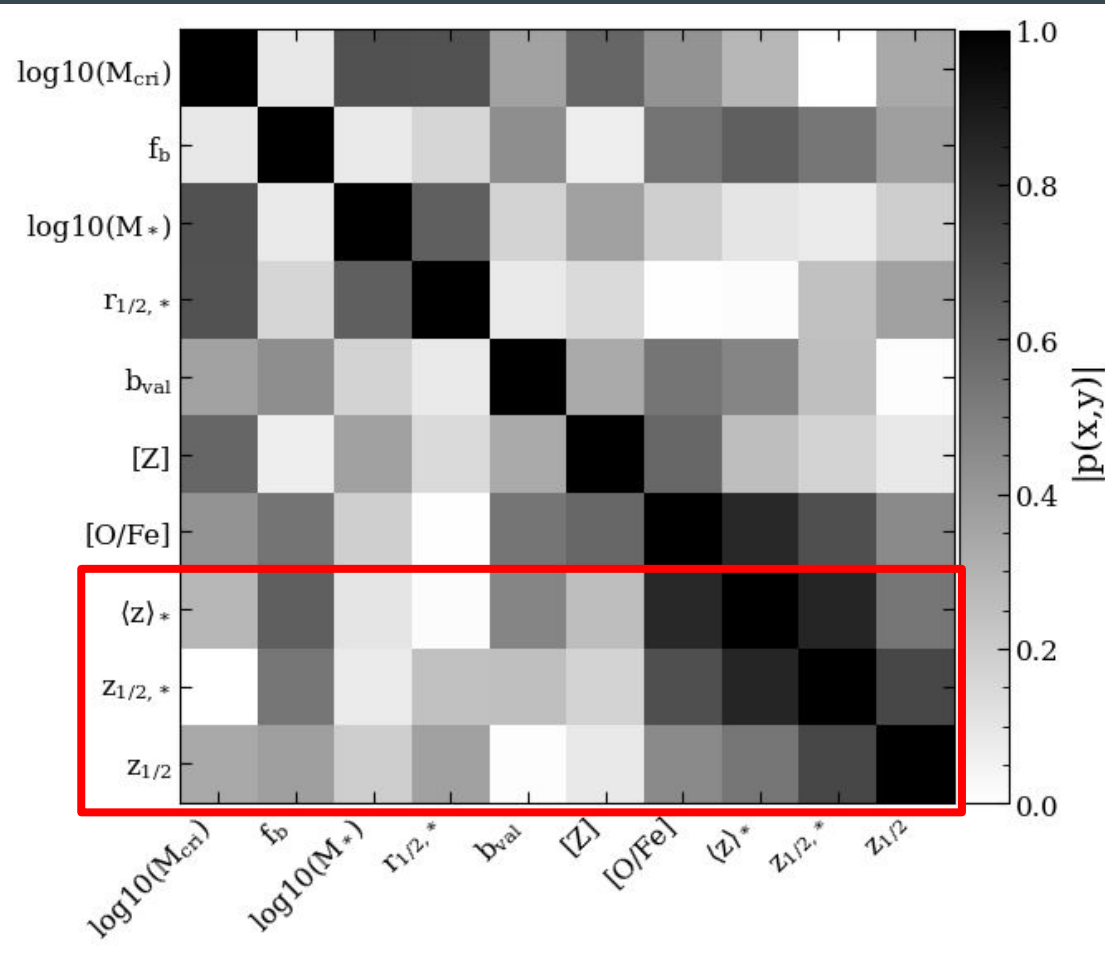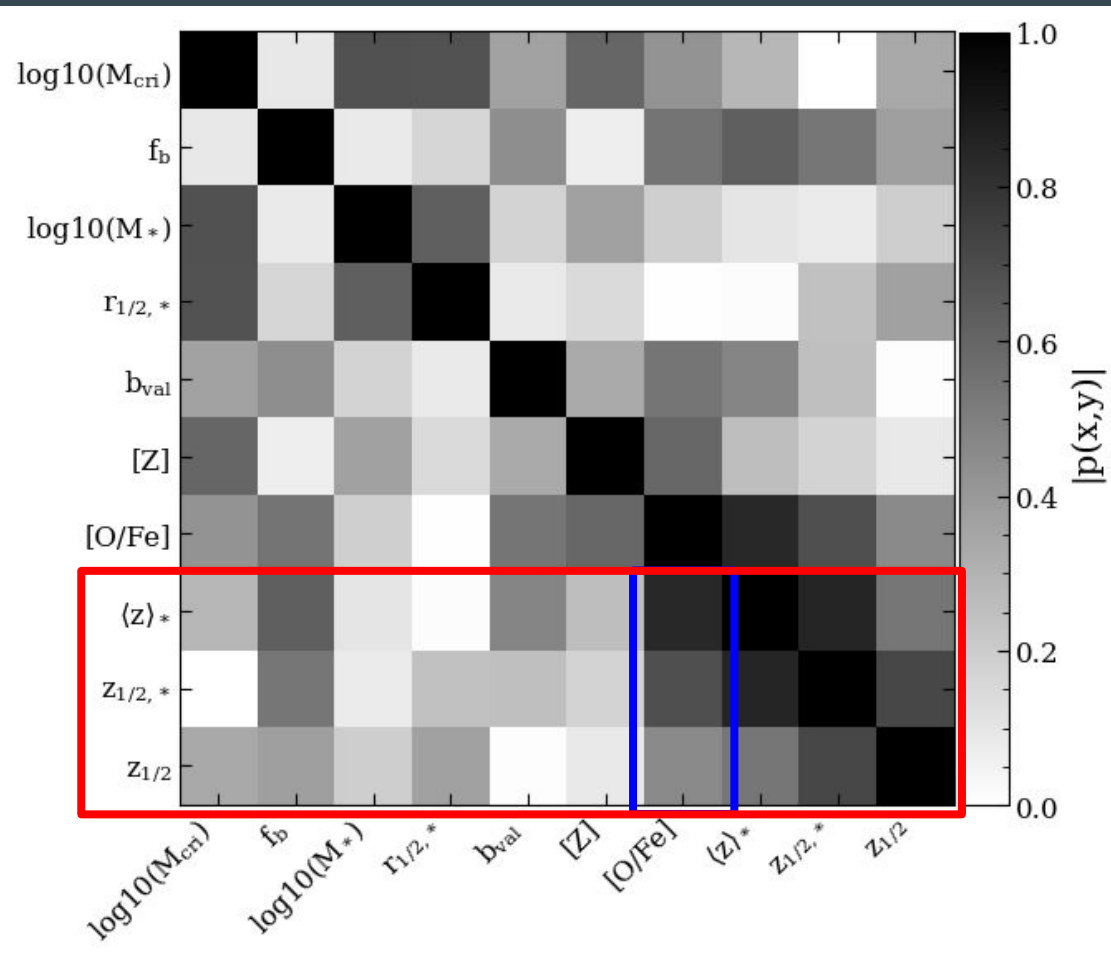
Kimmig et al., in prep
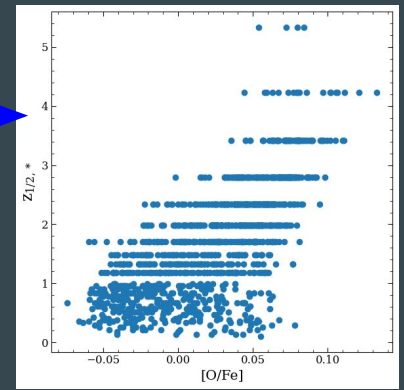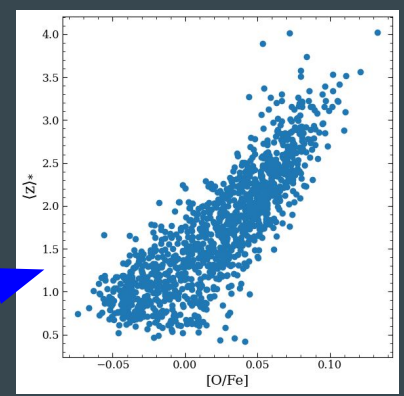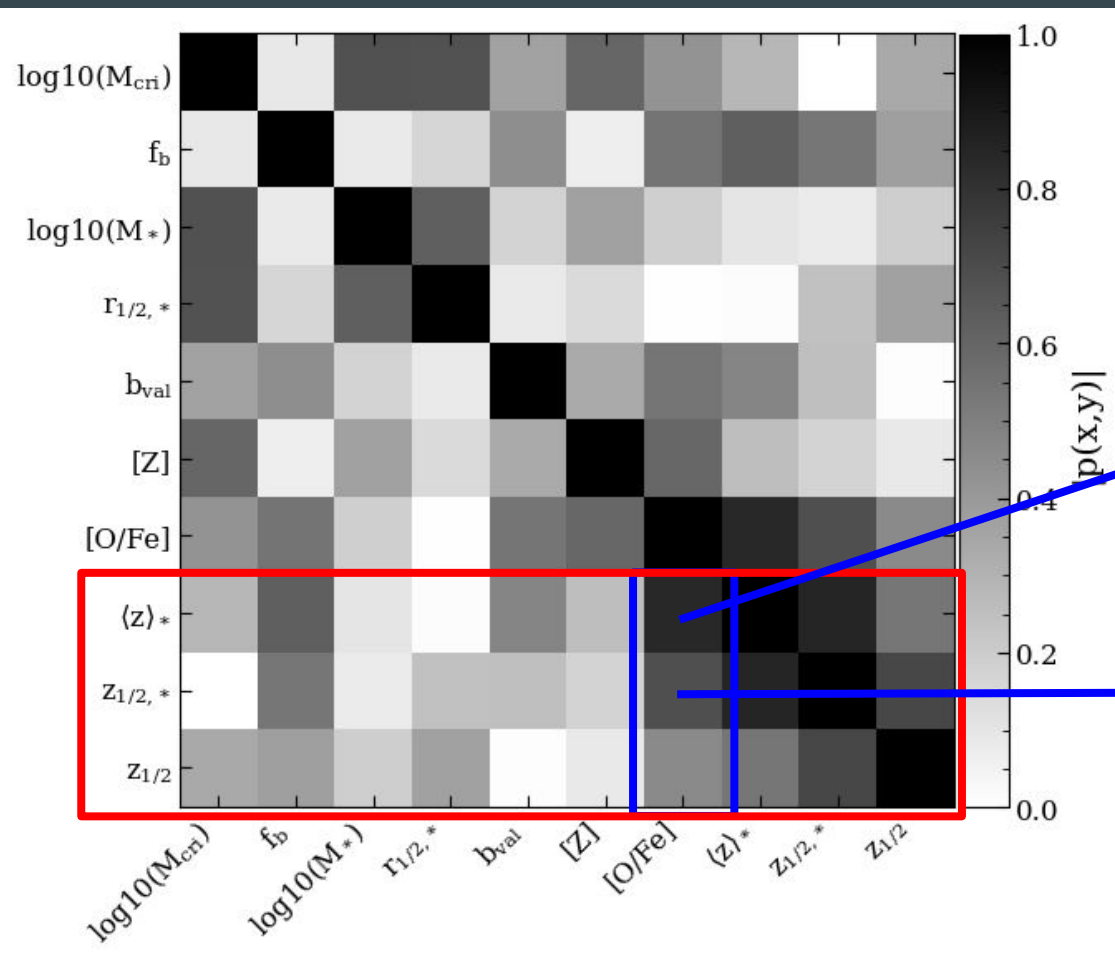
Alpha Elements Trace Age + Assembly

Alpha Elements Trace Age + Assembly

But Why?

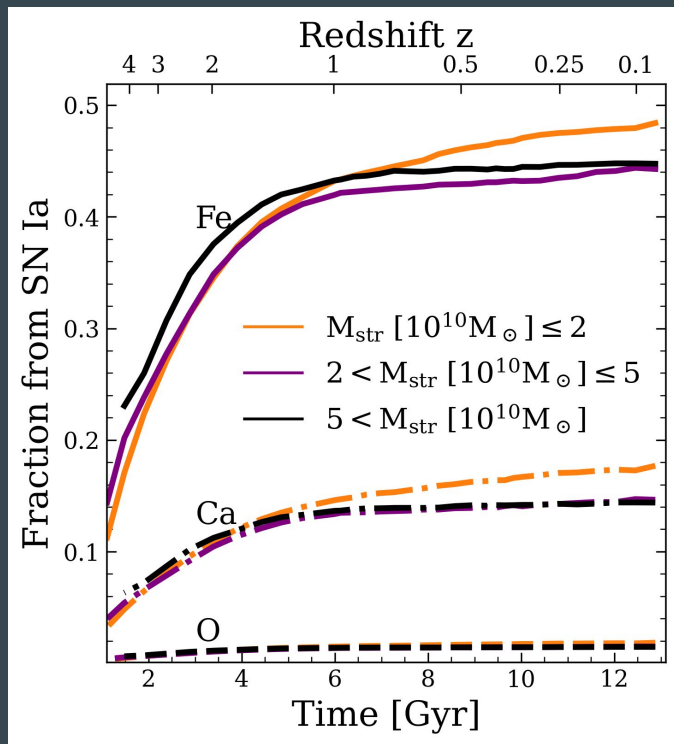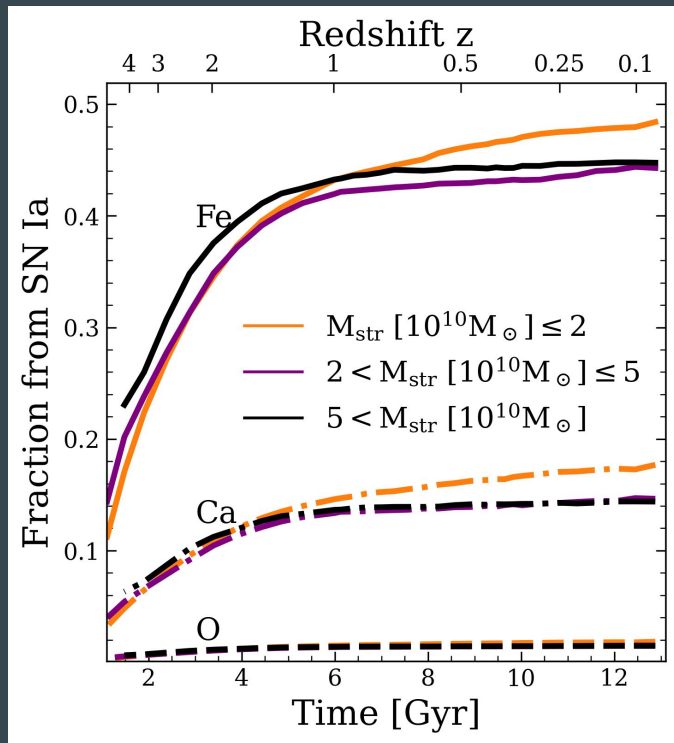# Global Enrichment Through Time:
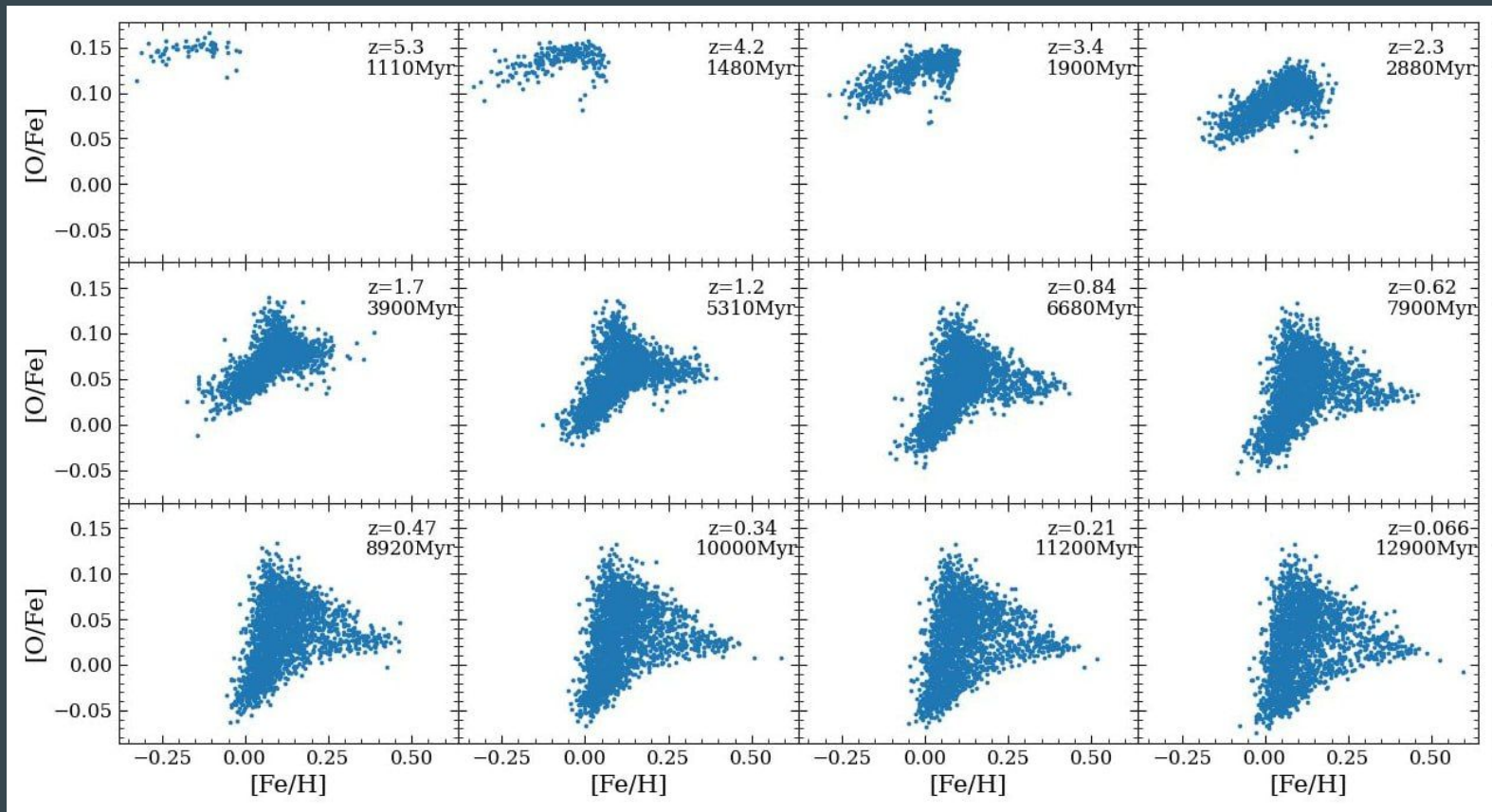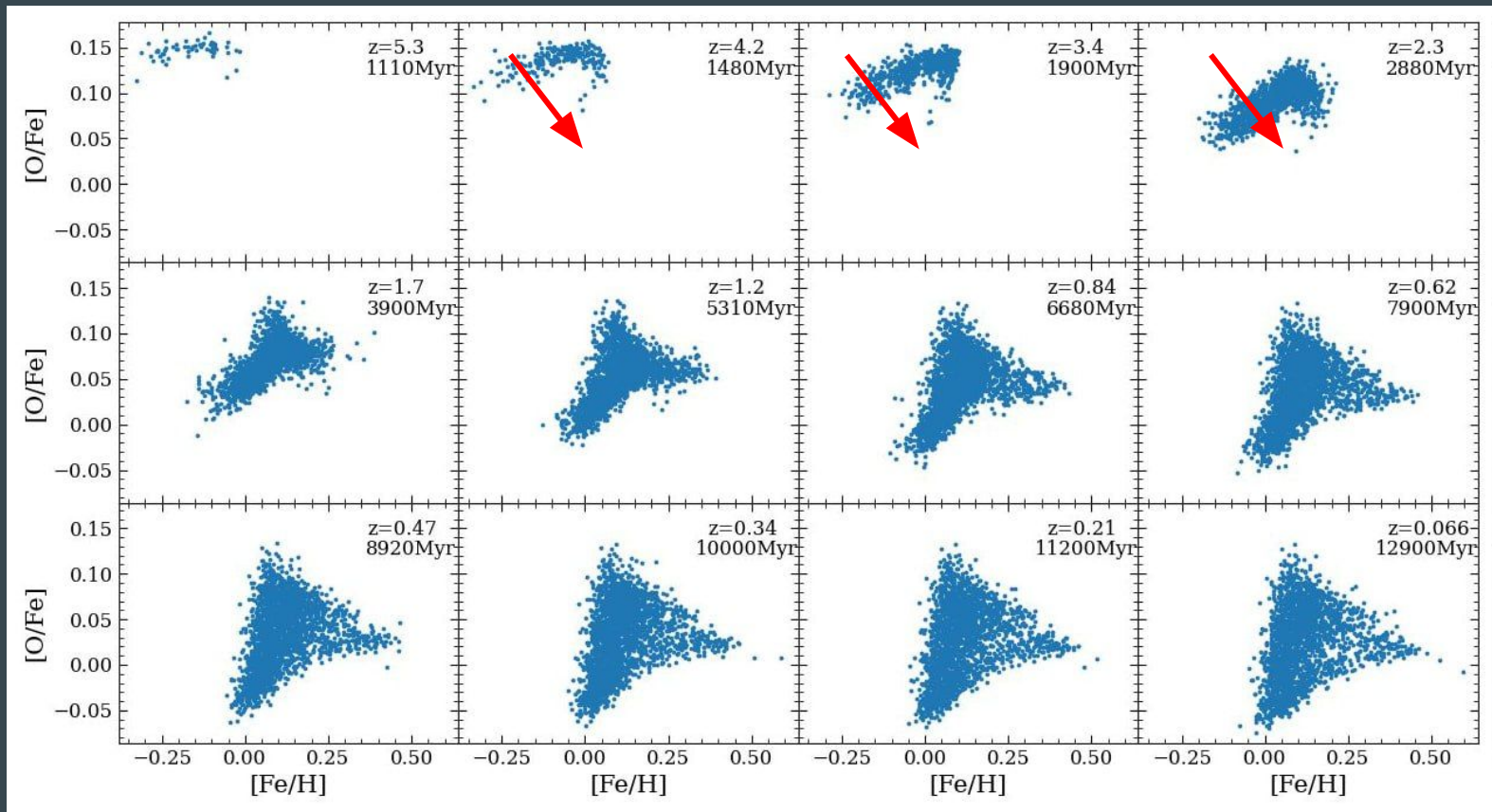
Global Enrichment Through Time:
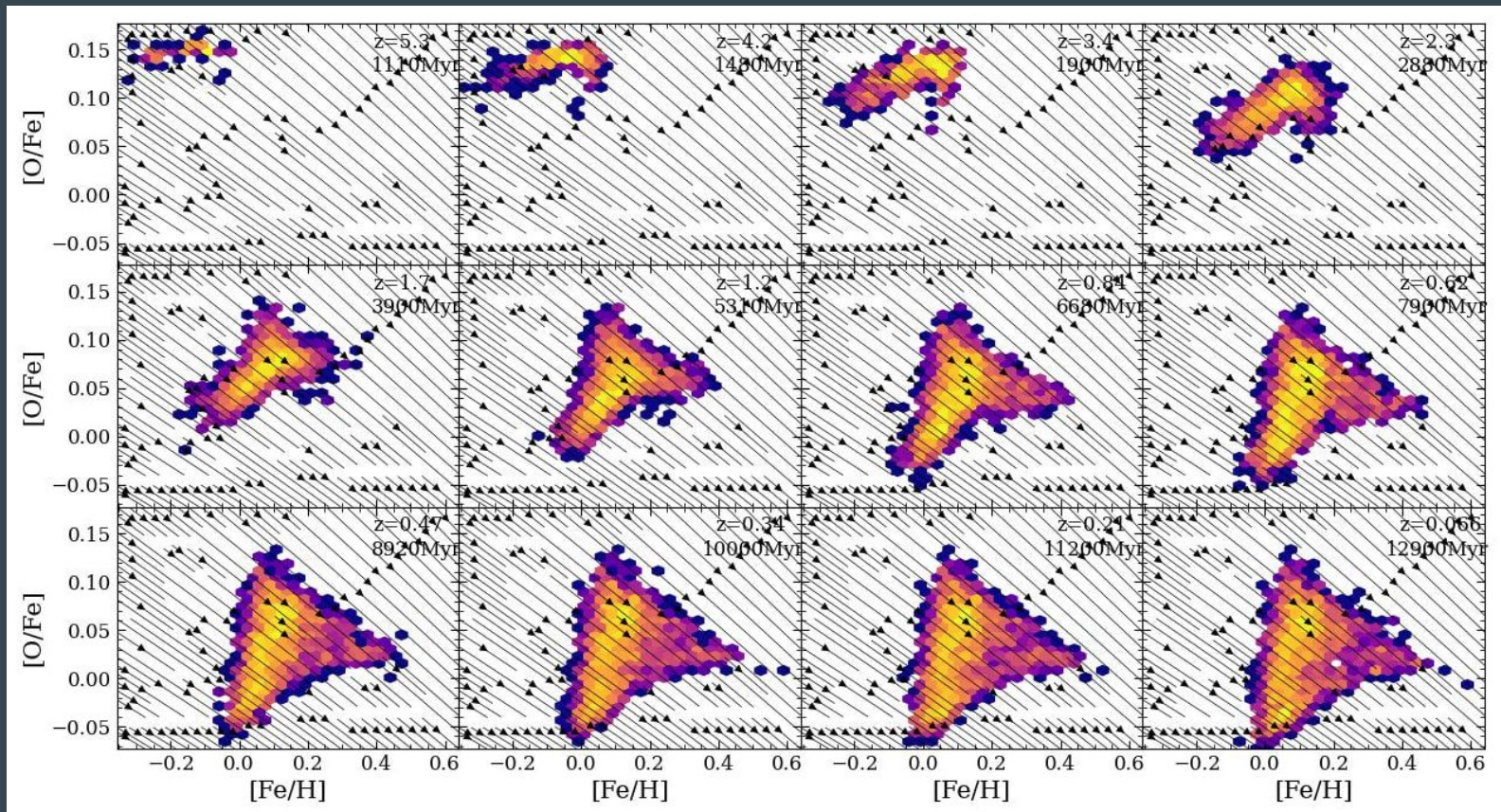
Global Enrichment Through Time:
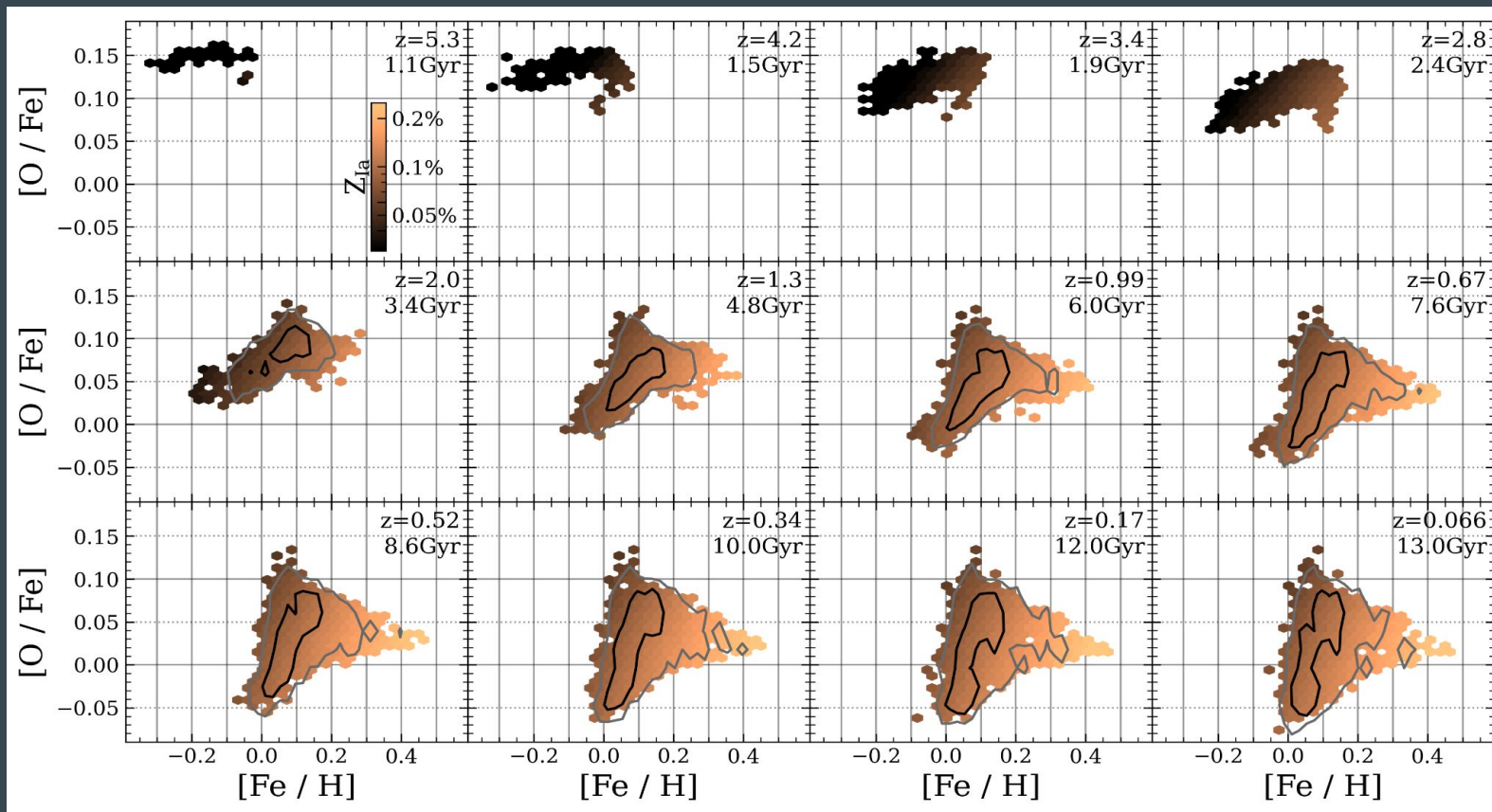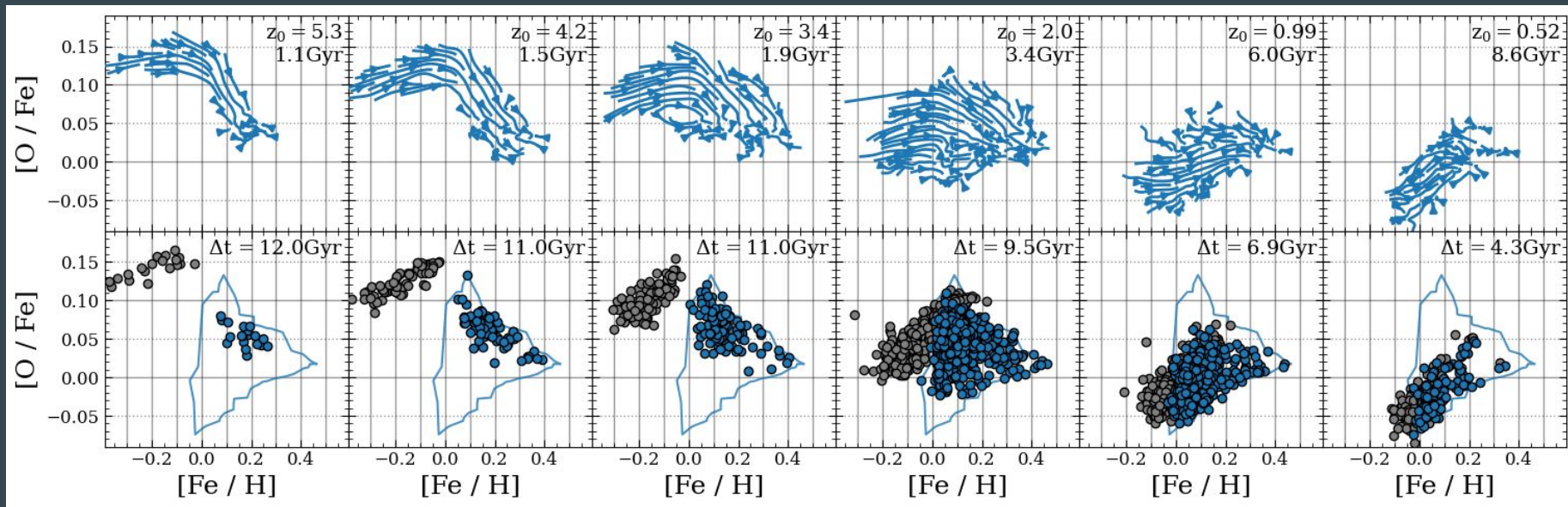

Kimmig et al., in prep
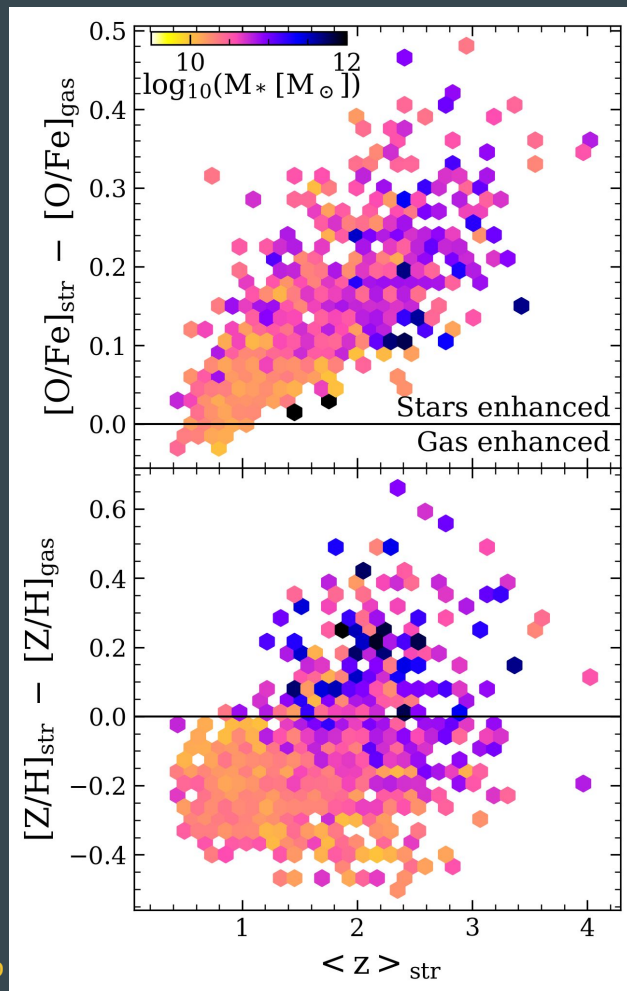
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Kimmig et al., in prep

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Kimmig et al., in prep

Evo
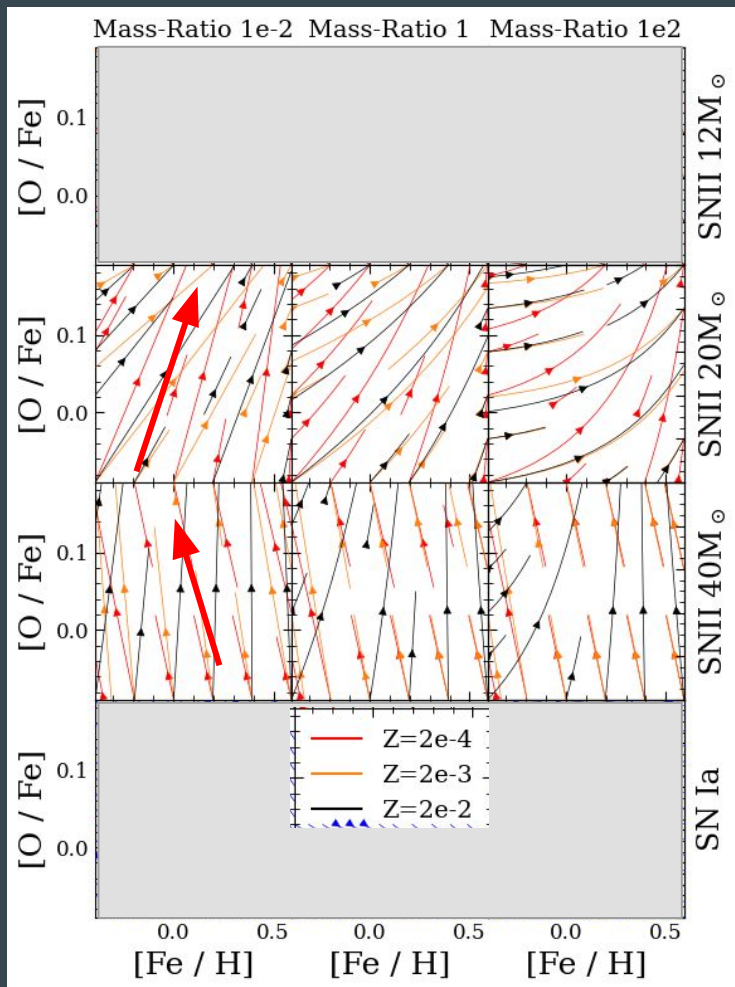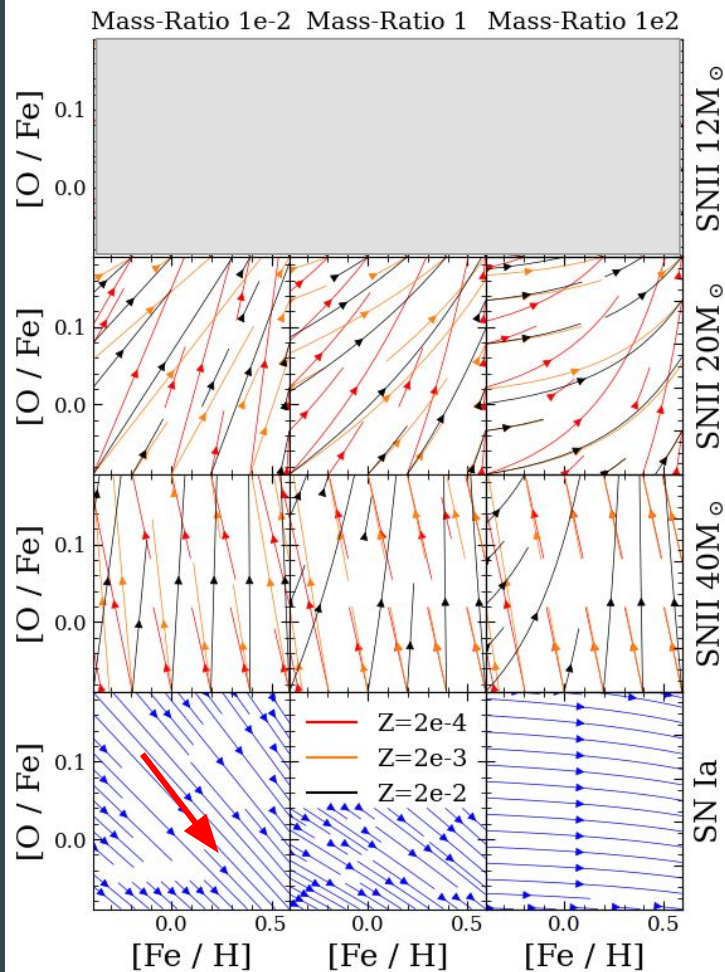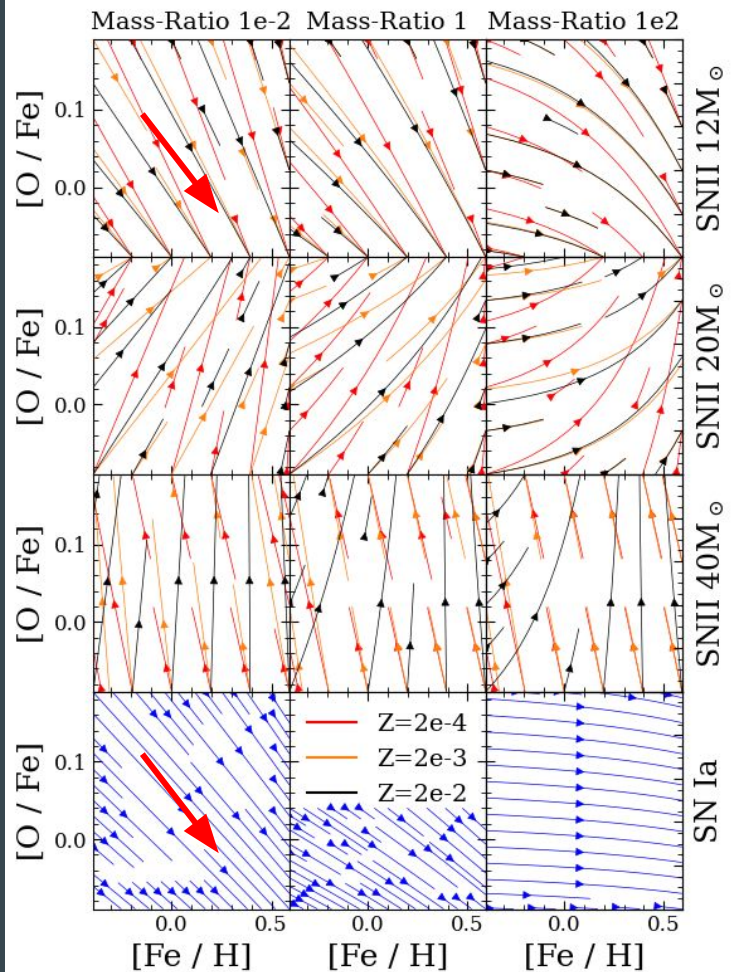
Kimmig et al., in prep

Consequences

Kimmig et al., in prep

Consequences

Kimmig et al., in prep

Comparing With Observations

Kimmig et al., in prep
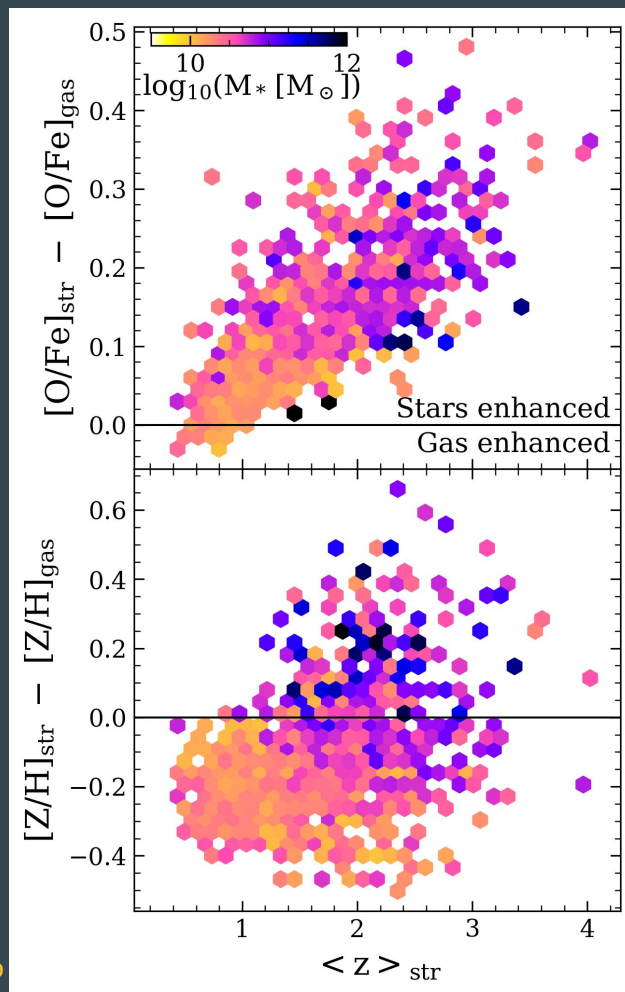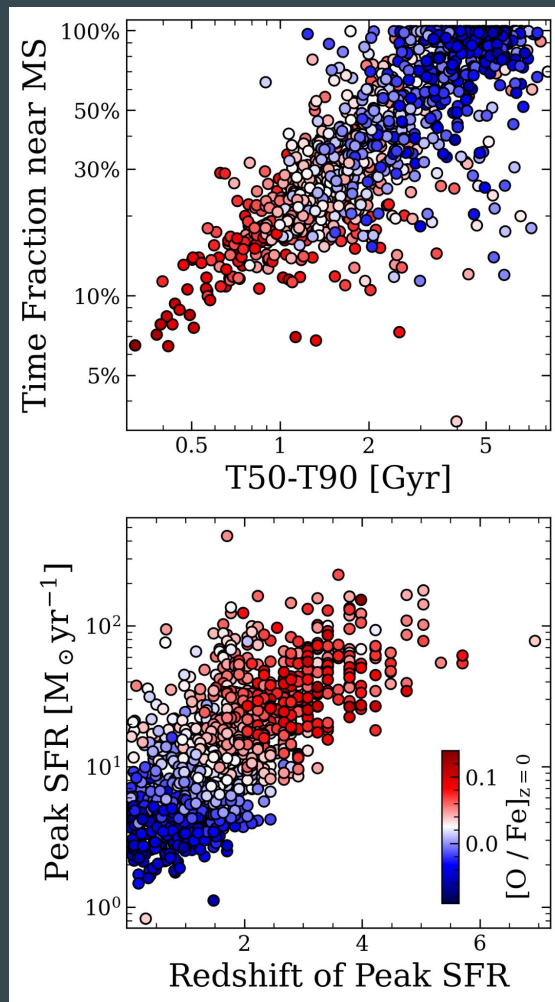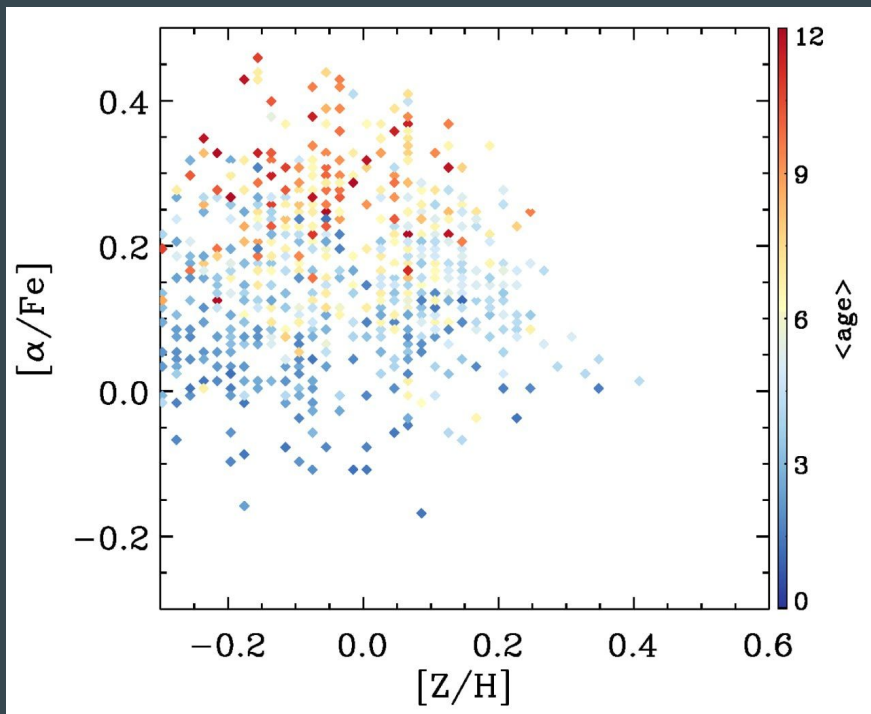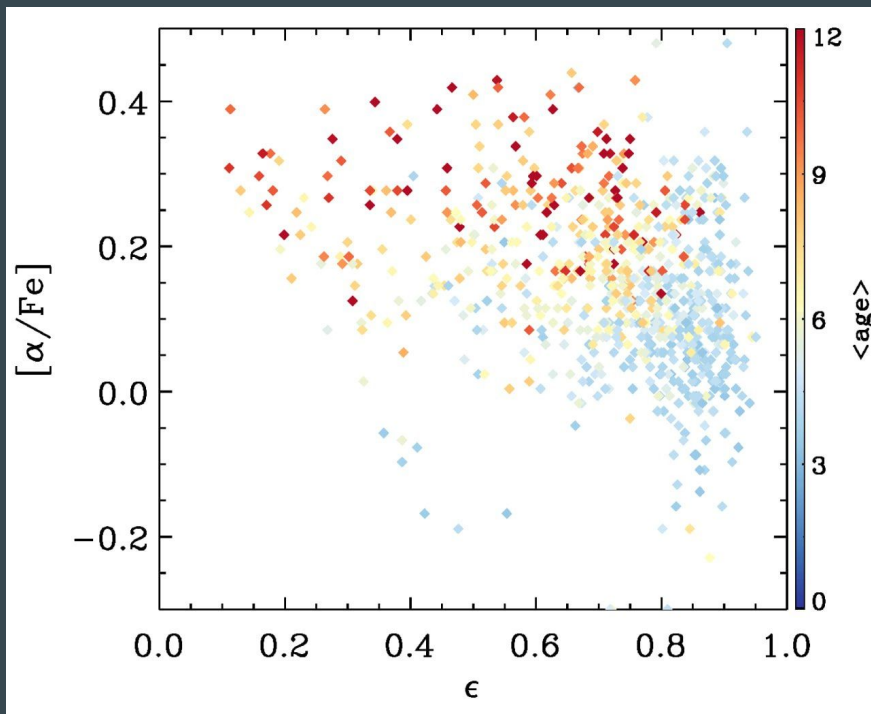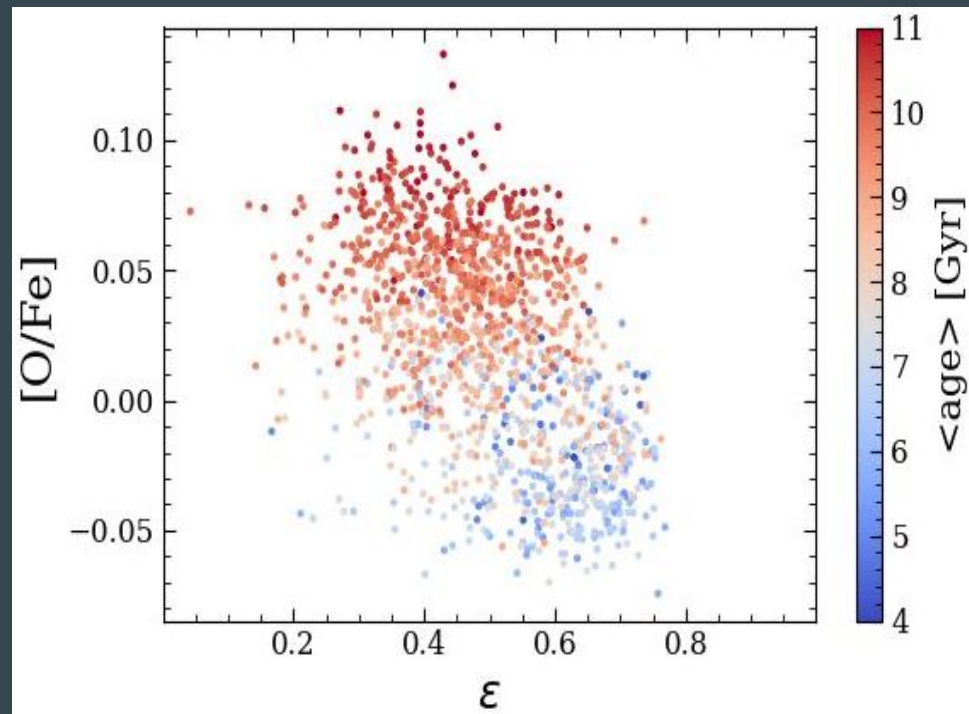
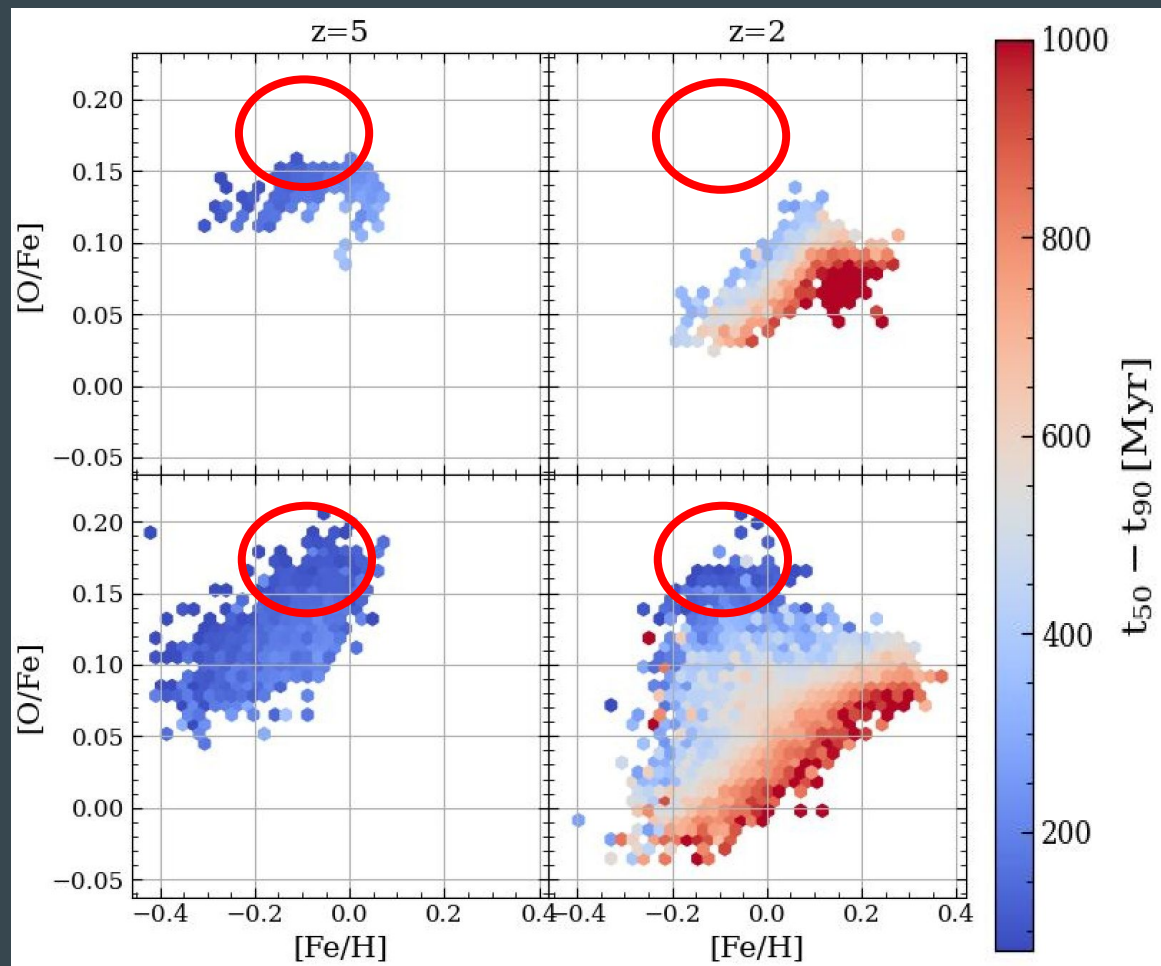# Comparing With Observations

SAMI (Scott+17)

Magneticum

Kimmig et al., in prep
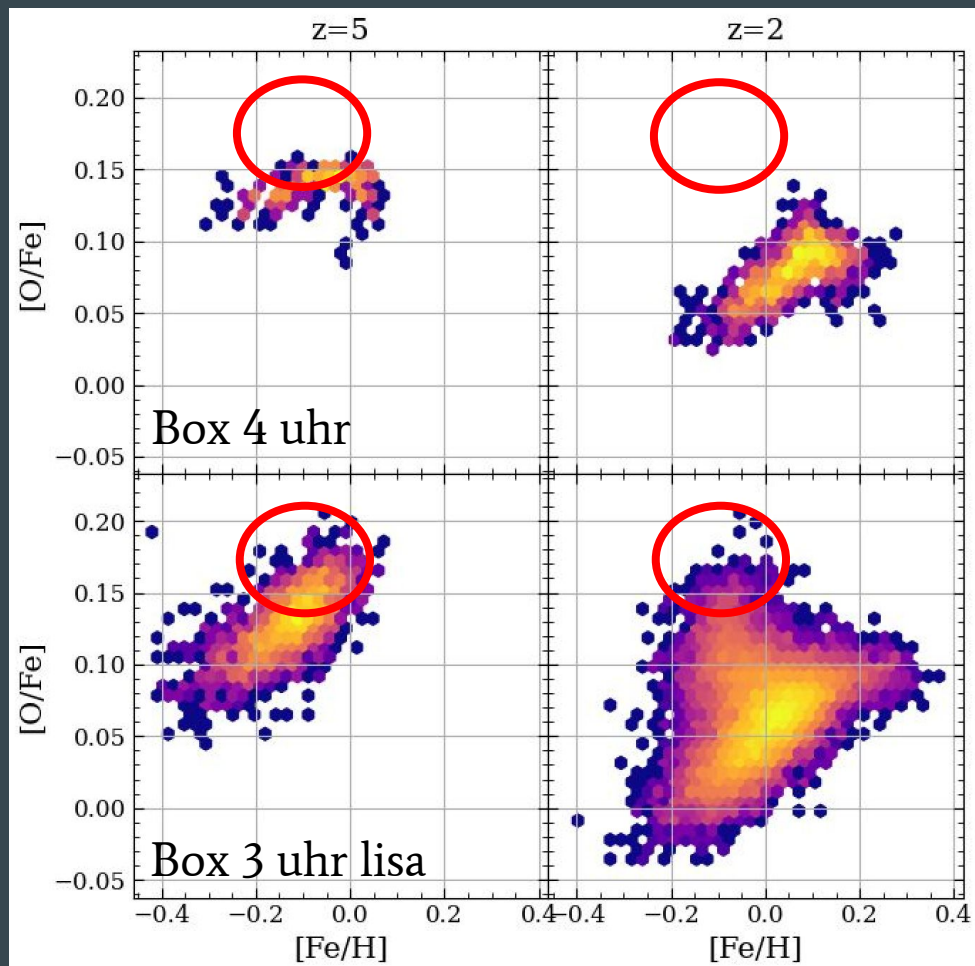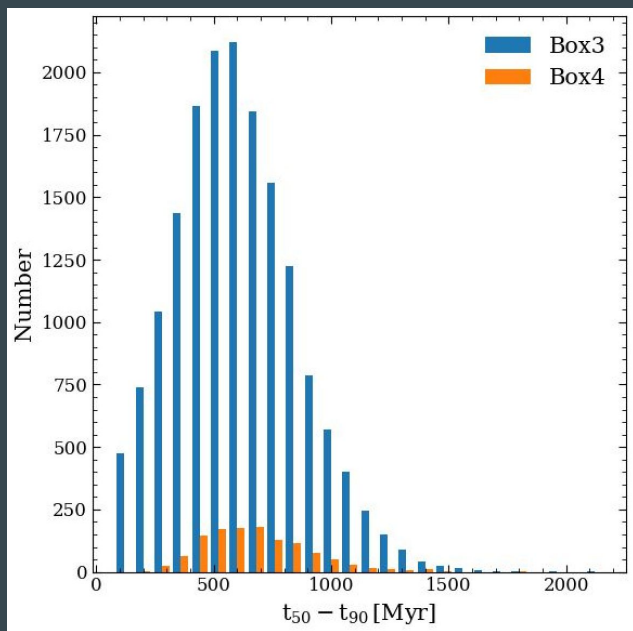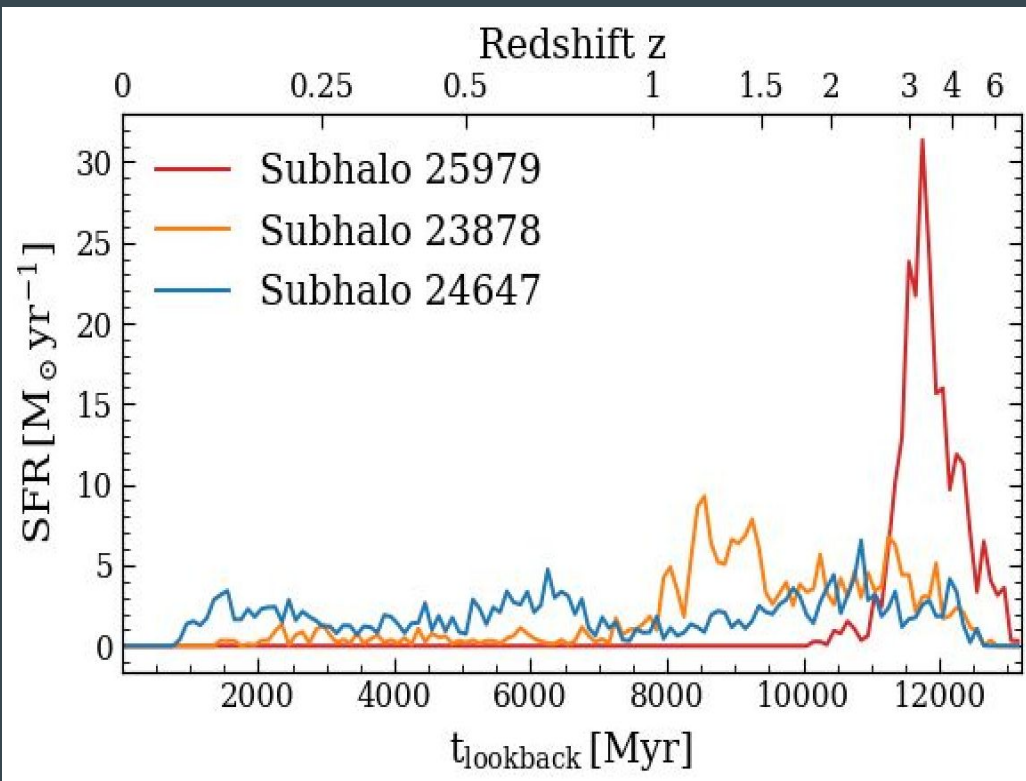
Comparing Boxes

Comparing Boxes

Three Ellipses at z=0
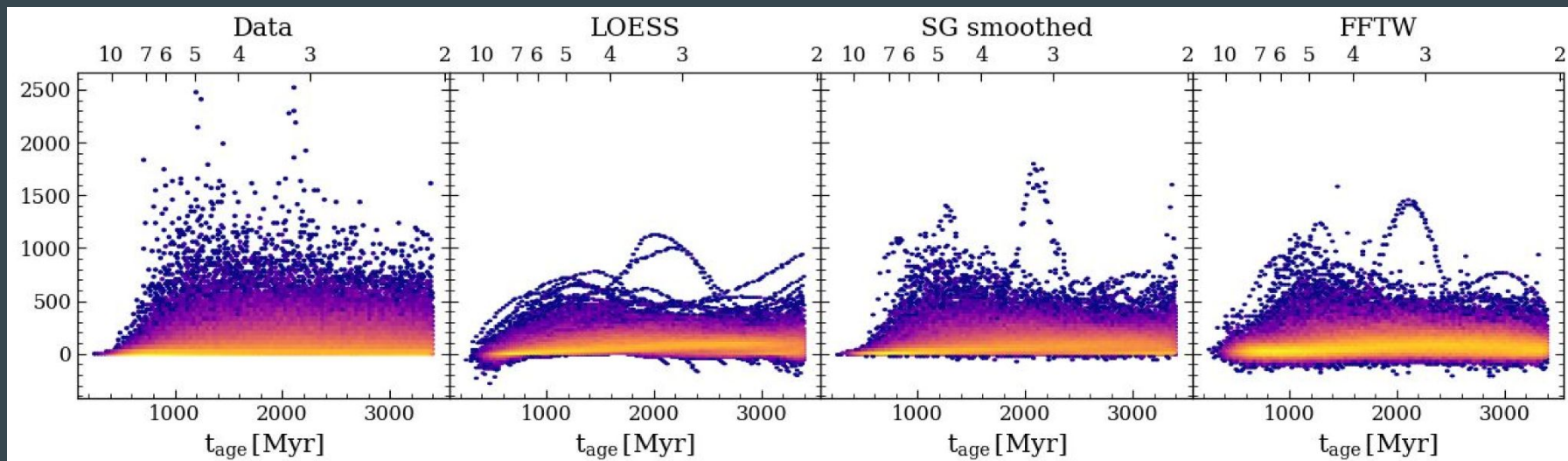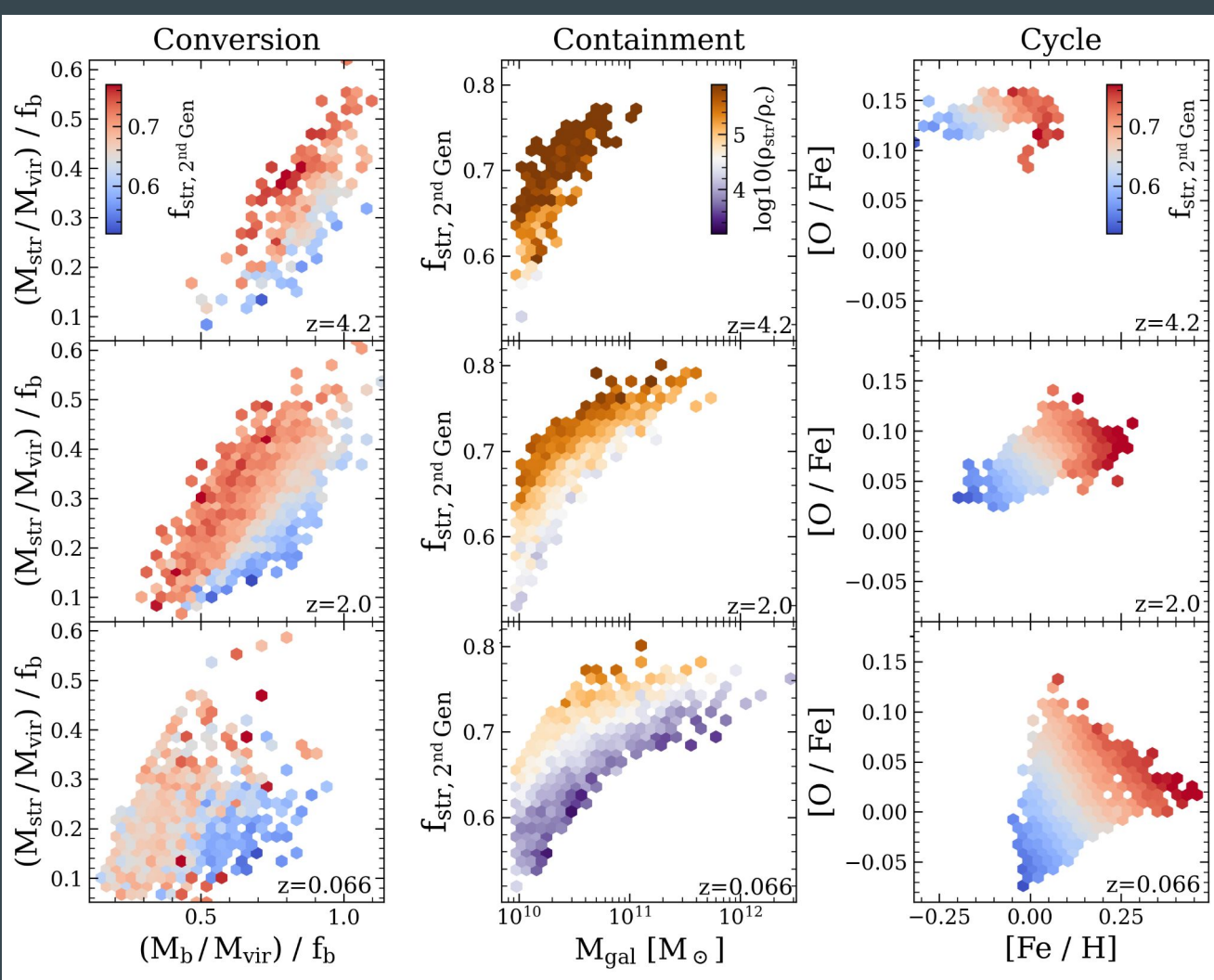
Summary:

- Metals → Evolutionary History
  - Where general properties fail
- Earlier Formation → Enhanced α, Shorter Burst (higher SFR)
  - But not necessarily more compact!
- More extended SF history → Lower α, Enhanced Fe/H
- But still need a greater spread in values

Next step: quantify SFH shape

SFH

Outlook

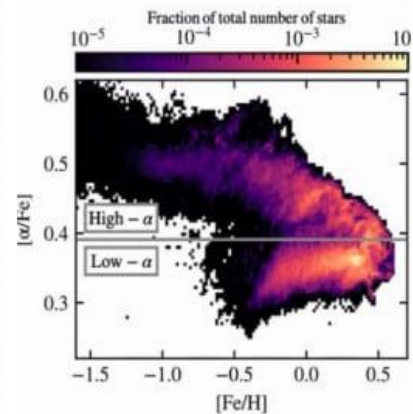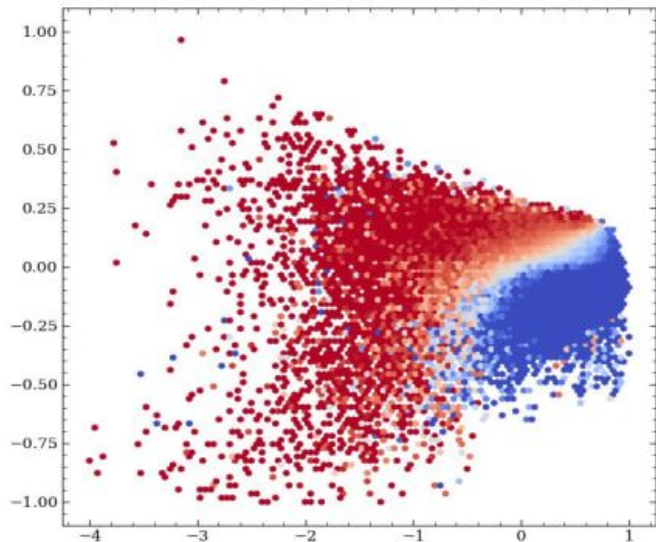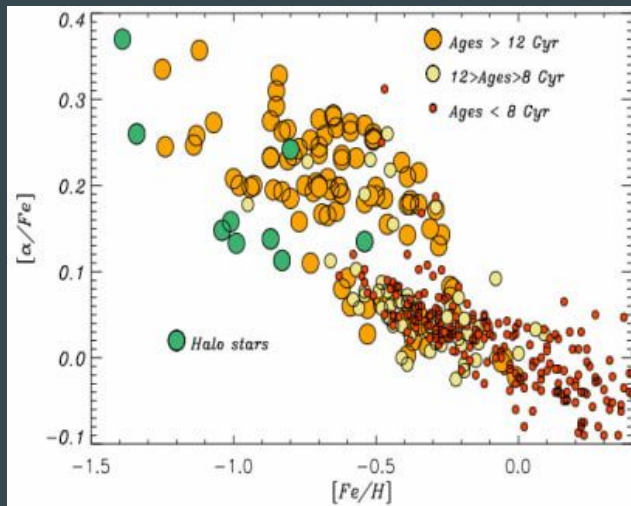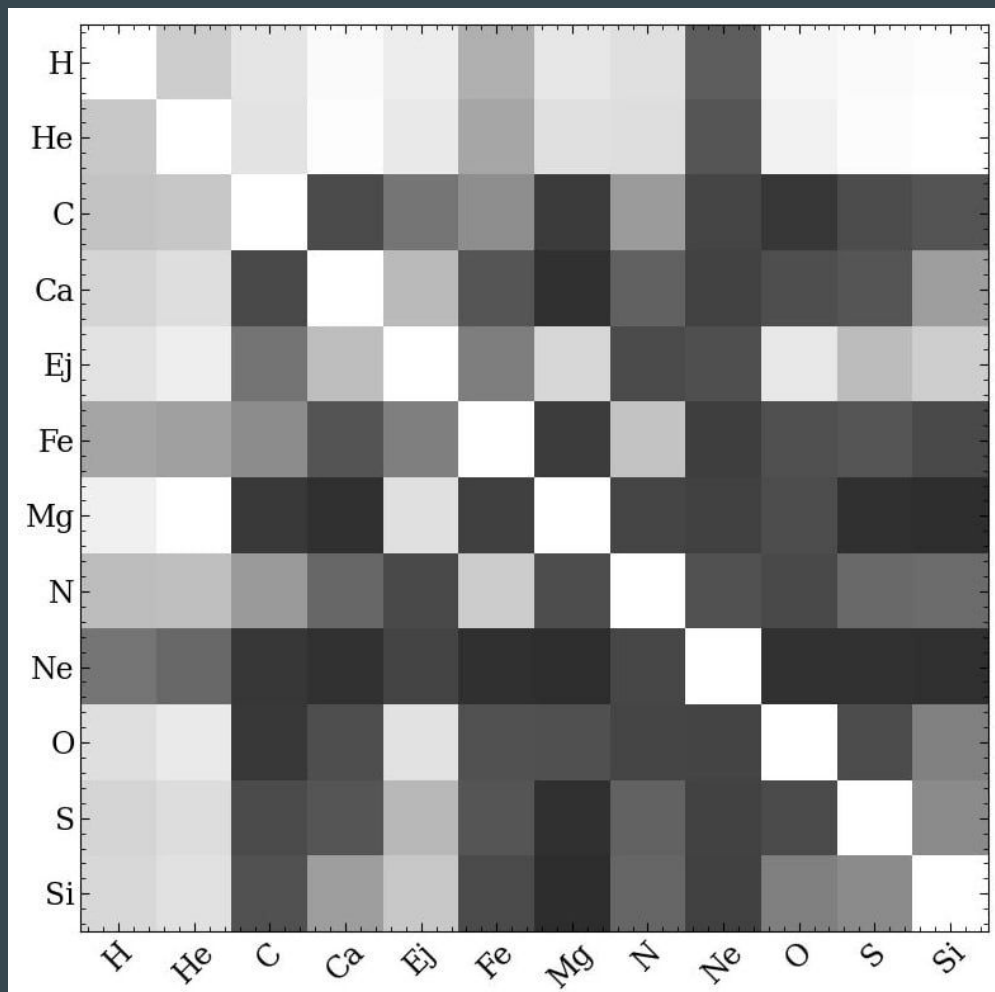# Comparison to MW

Correlations

Enrichment:

SN Ia: Decrease α

SN II:
Low-Z: Decrease
High-Z: Either/Or

SN II: Increase α