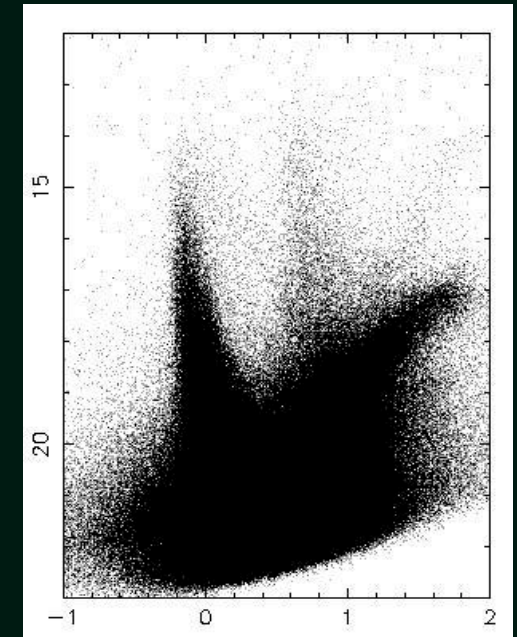
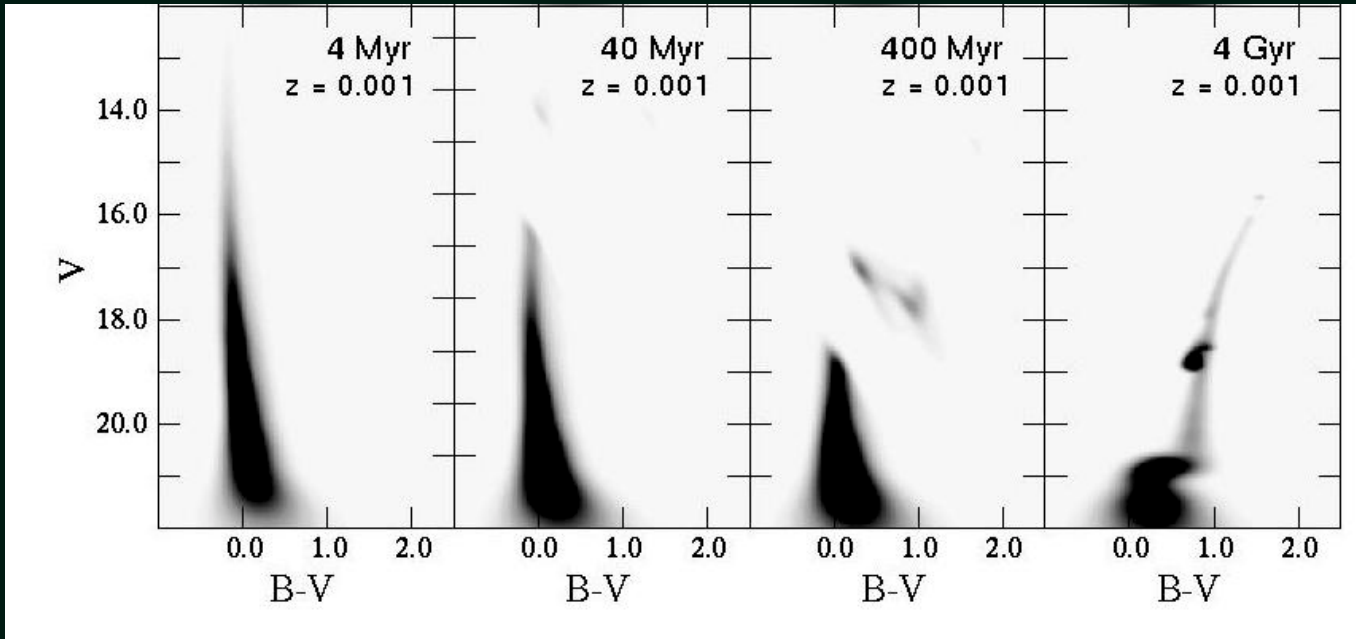




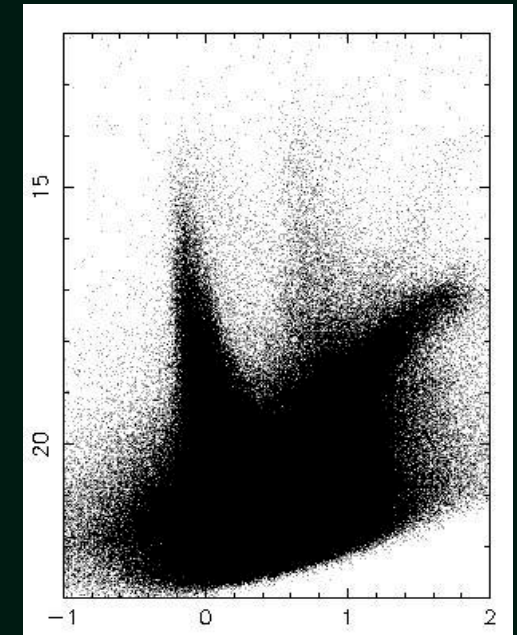
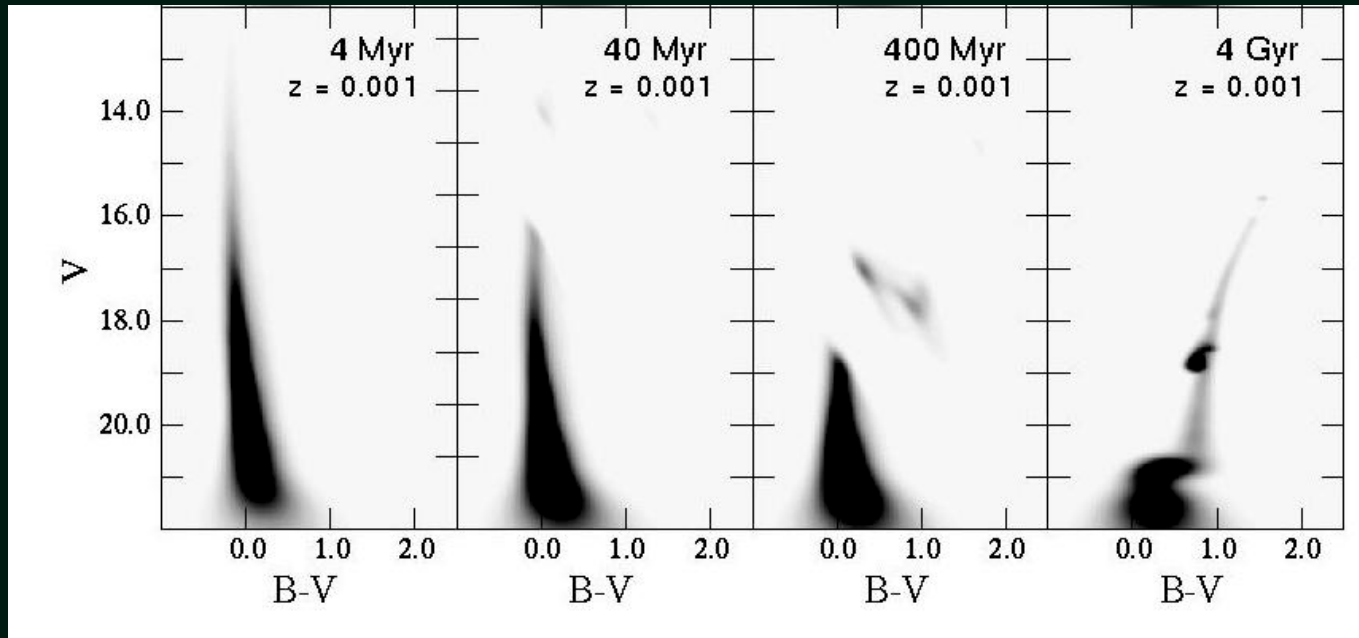
Galaxy Evolution in a Locally Dense Environment: The Small Magellanic Cloud

Does local environment play a role?
Can we quantify its effect?

in collaboration with Jason Harris



$A(\text{CMD1}) + B(\text{CMD2}) + C(\text{CMD3}) + \dots = \text{observed}$
 where A, B, C, \dots are the star formation history



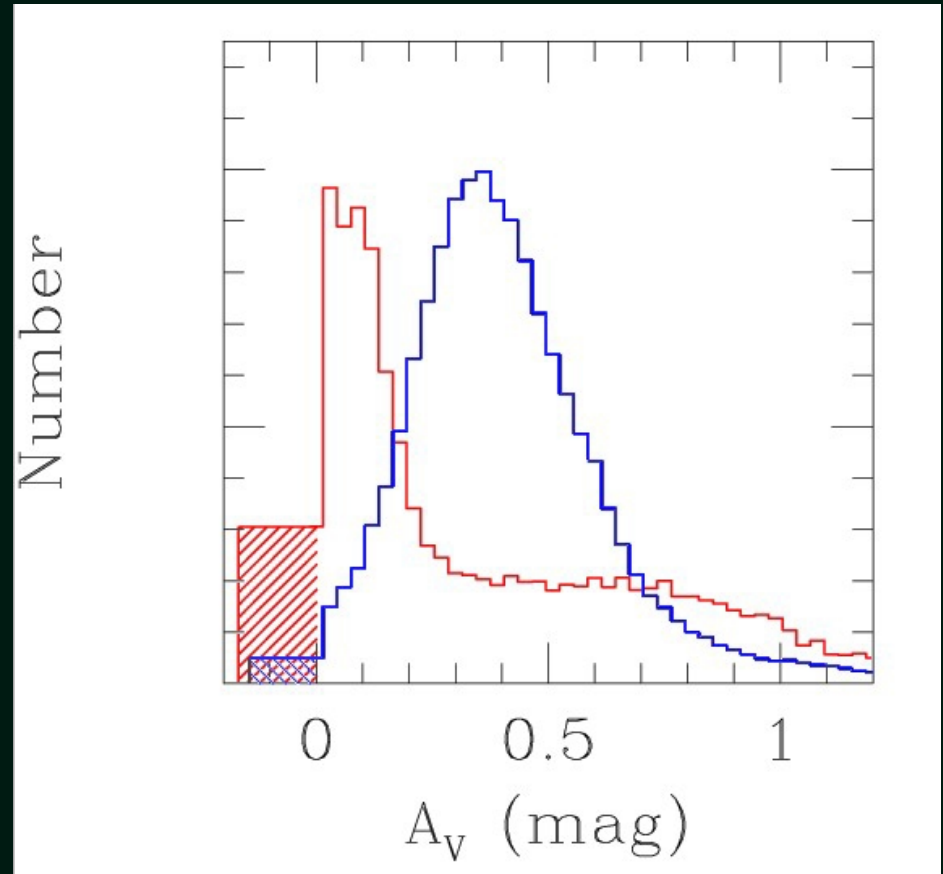
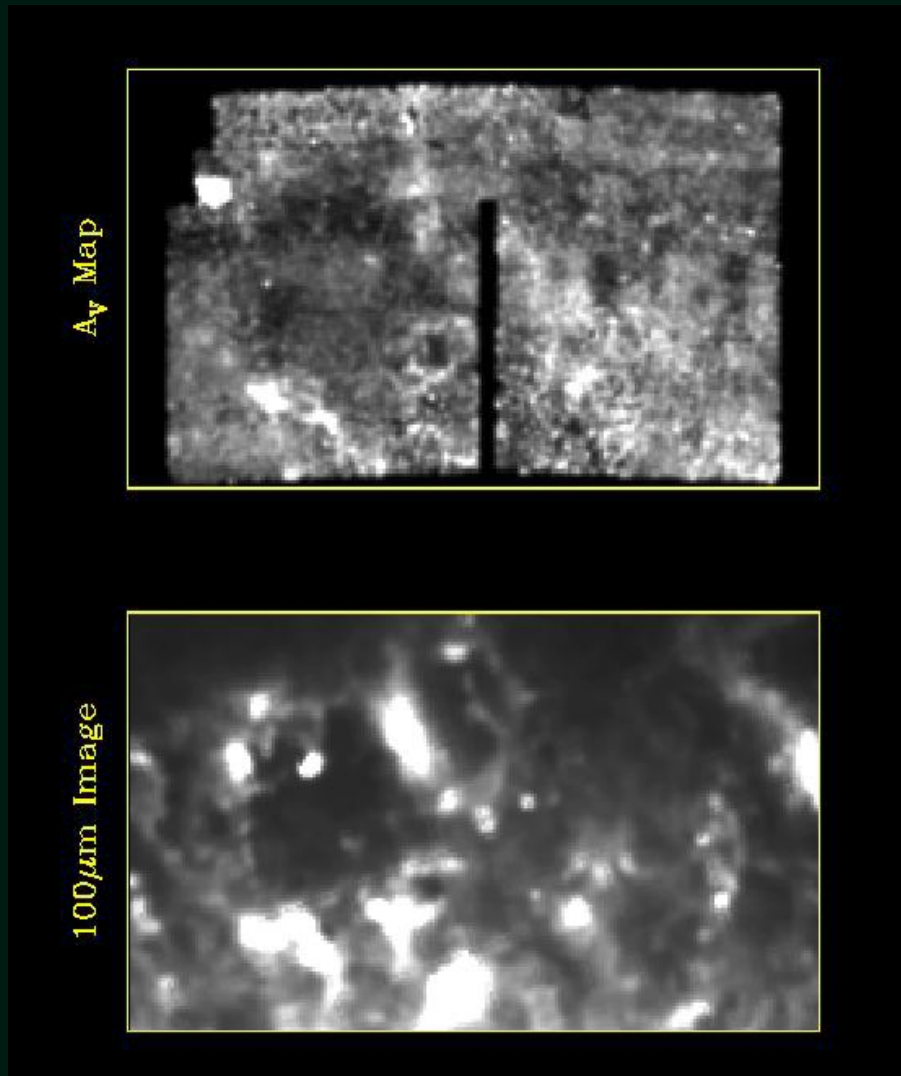
$$A(\text{CMD1}) + B(\text{CMD2}) + C(\text{CMD3}) + \dots = \text{observed}$$

where A, B, C, ... are the star formation history

photometric uncertainties, completeness, crowding, extinction, binarity, model libraries, line-of-sight depth, distance, dynamical mixing, foreground, IMF

Extinction is ...

spatially variable

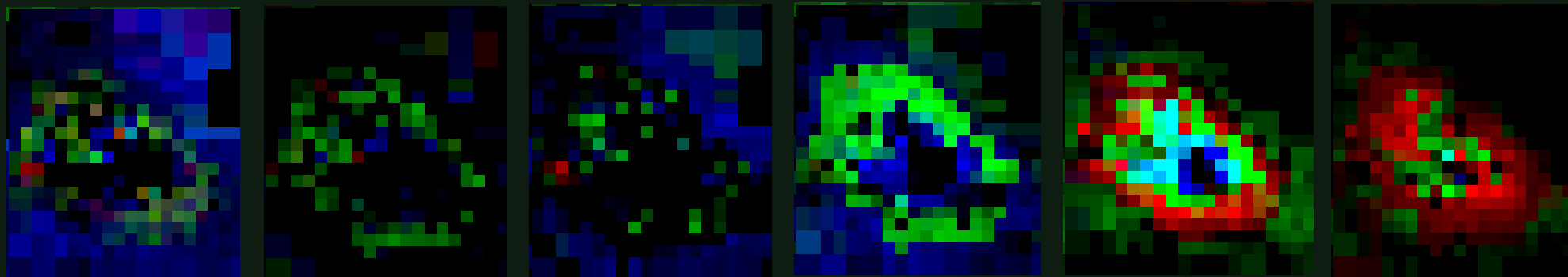


population dependent

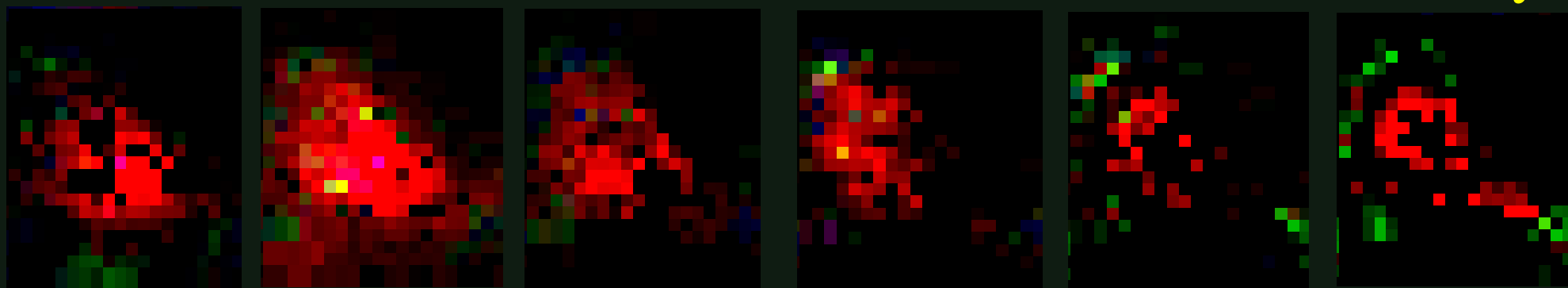
10 Gyr

--->

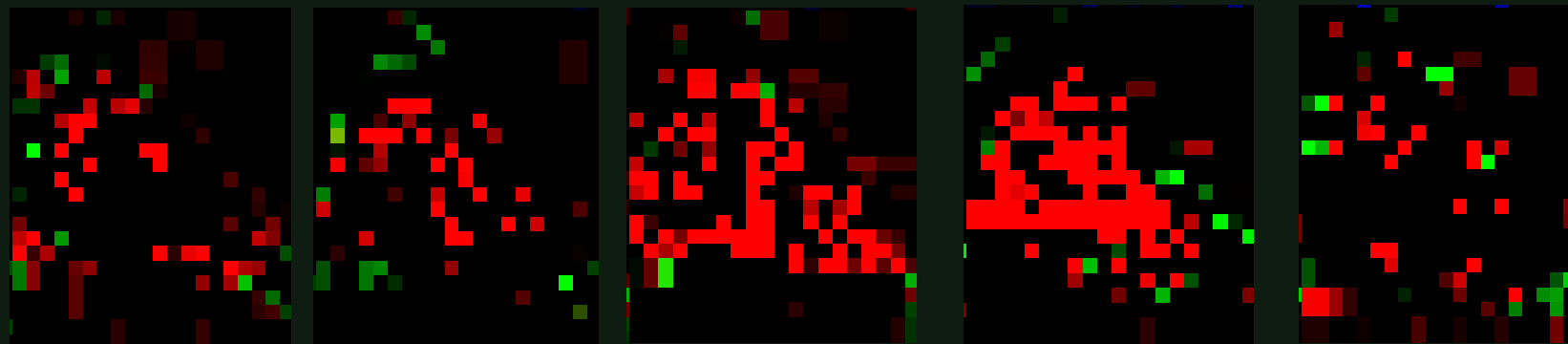
1 Gyr



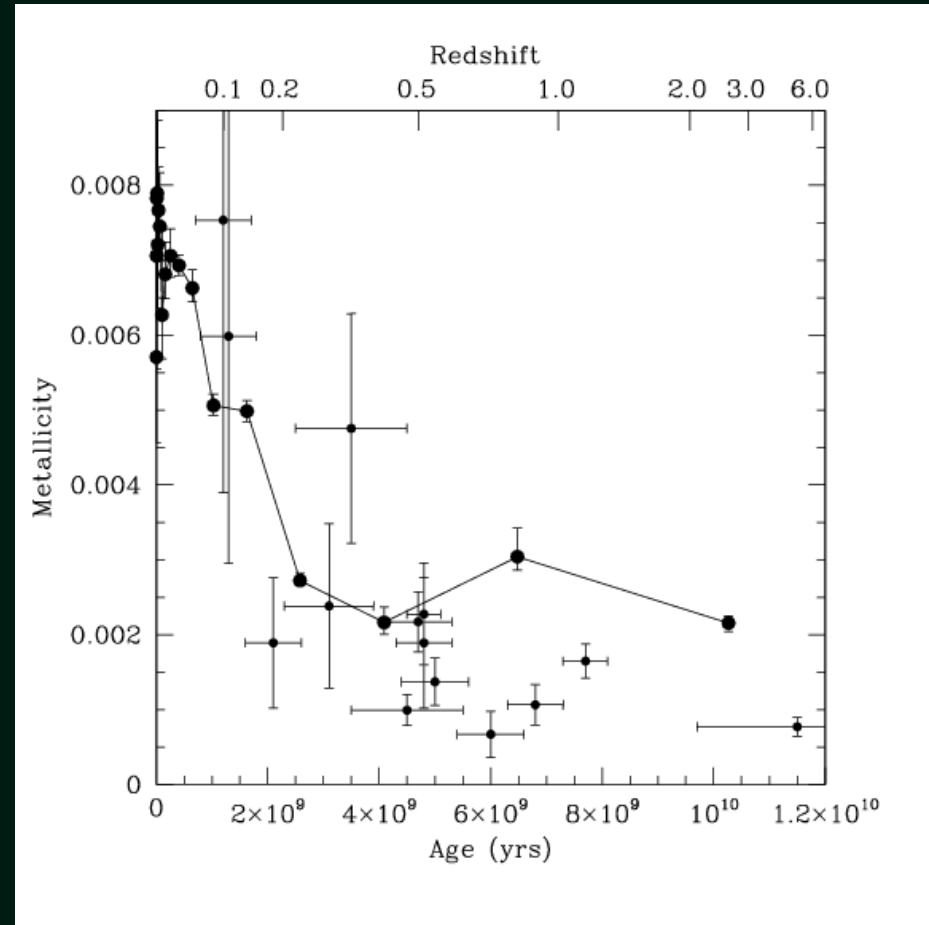
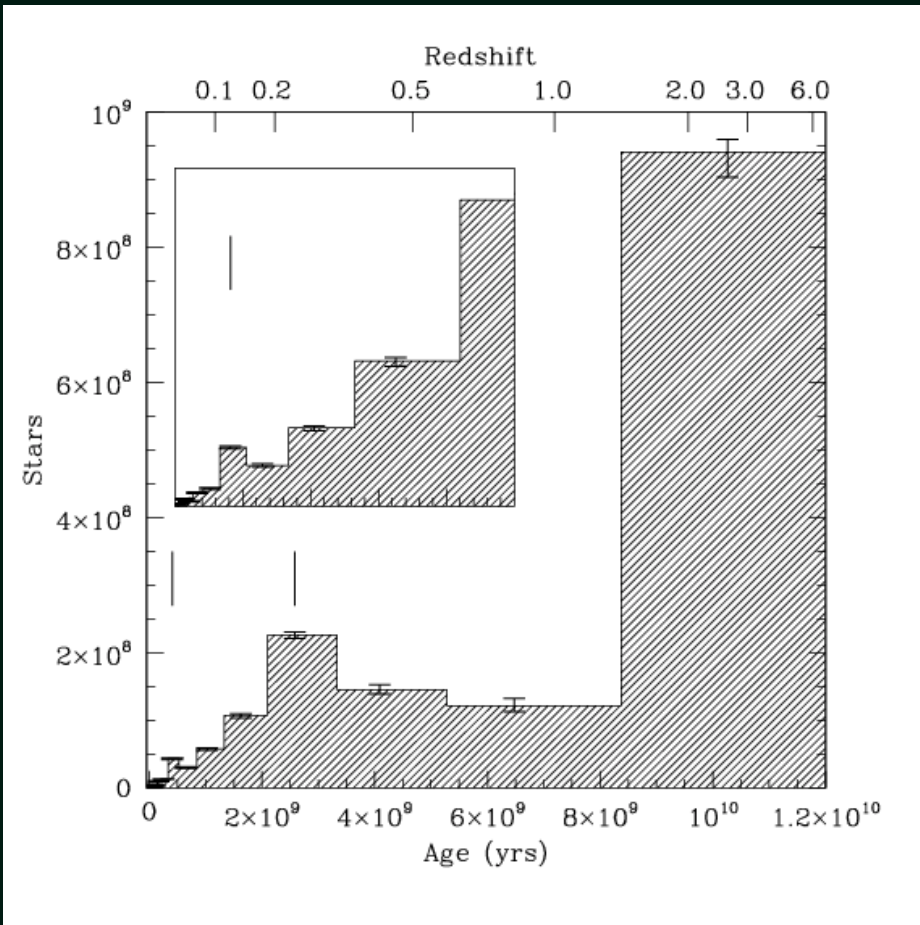
60 Myr



Now



The SMC star formation and...



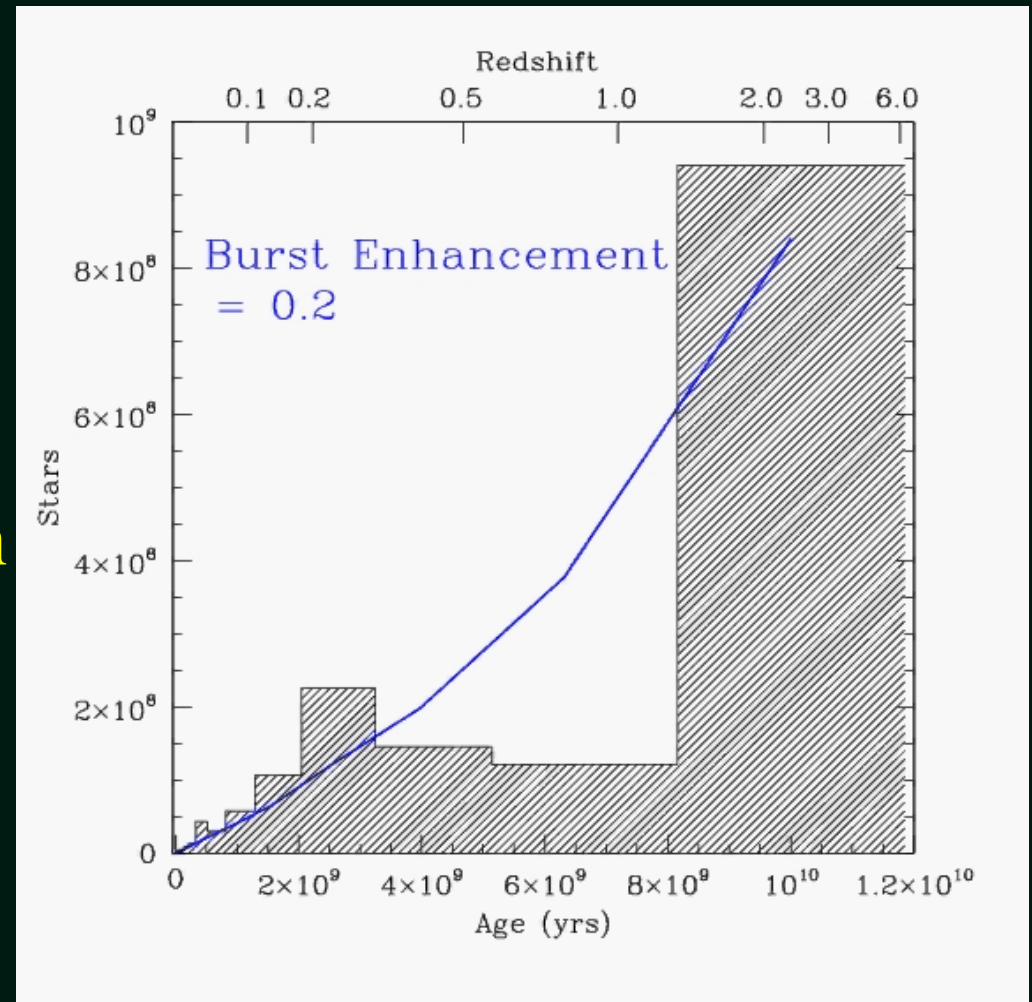
chemical enrichment history

Begin with simple model

closed-box, instantaneous
recycling

enhancement of SFR $\propto 1/r^n$
orbit given by proper motion
(Lin, Klemola, & Jones 1995)

must match stellar mass and
remaining gas

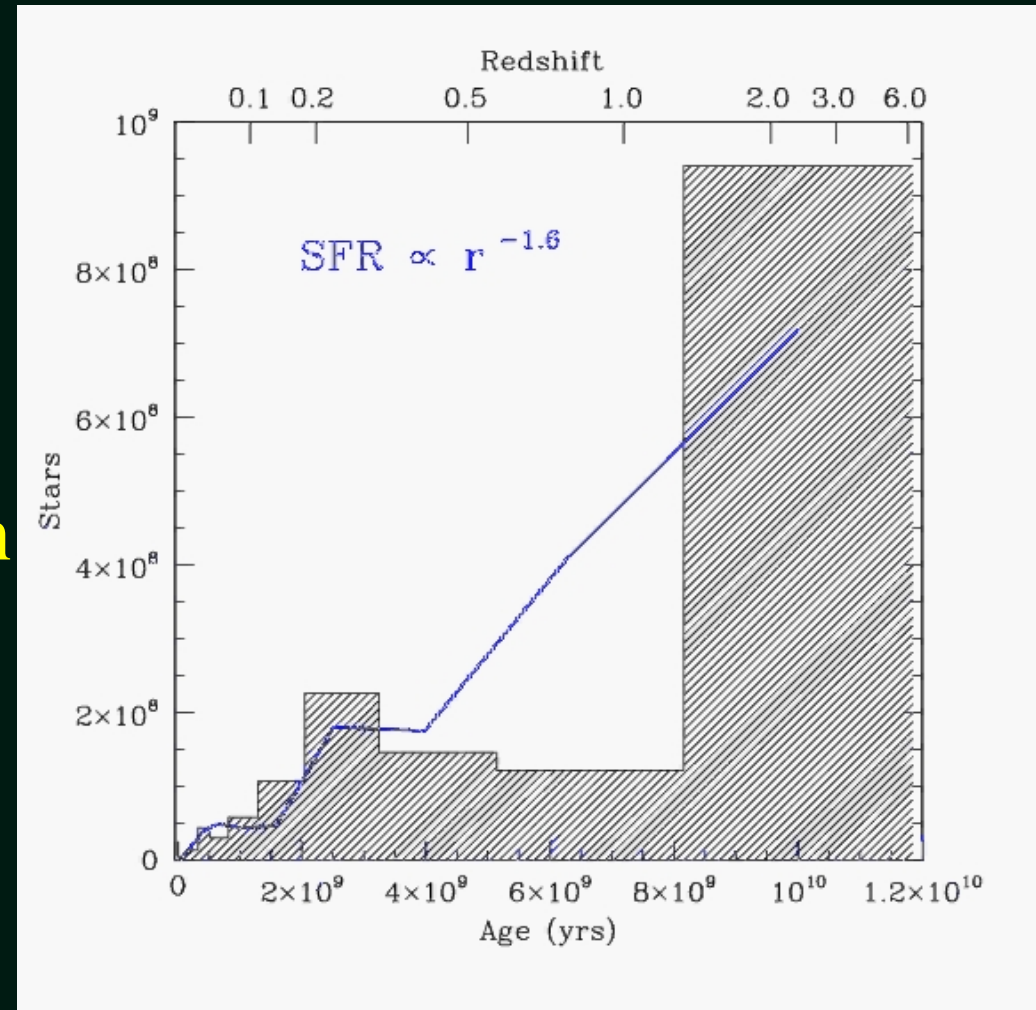


Begin with simple model

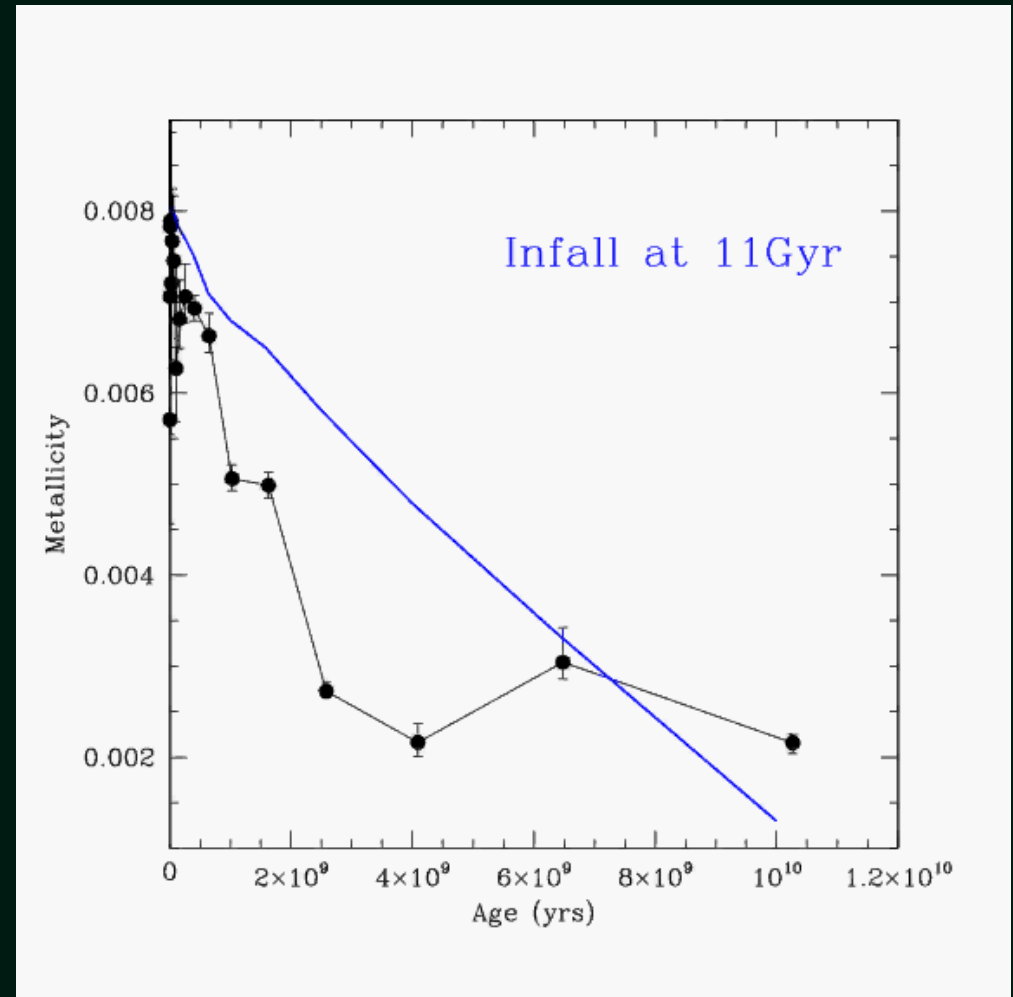
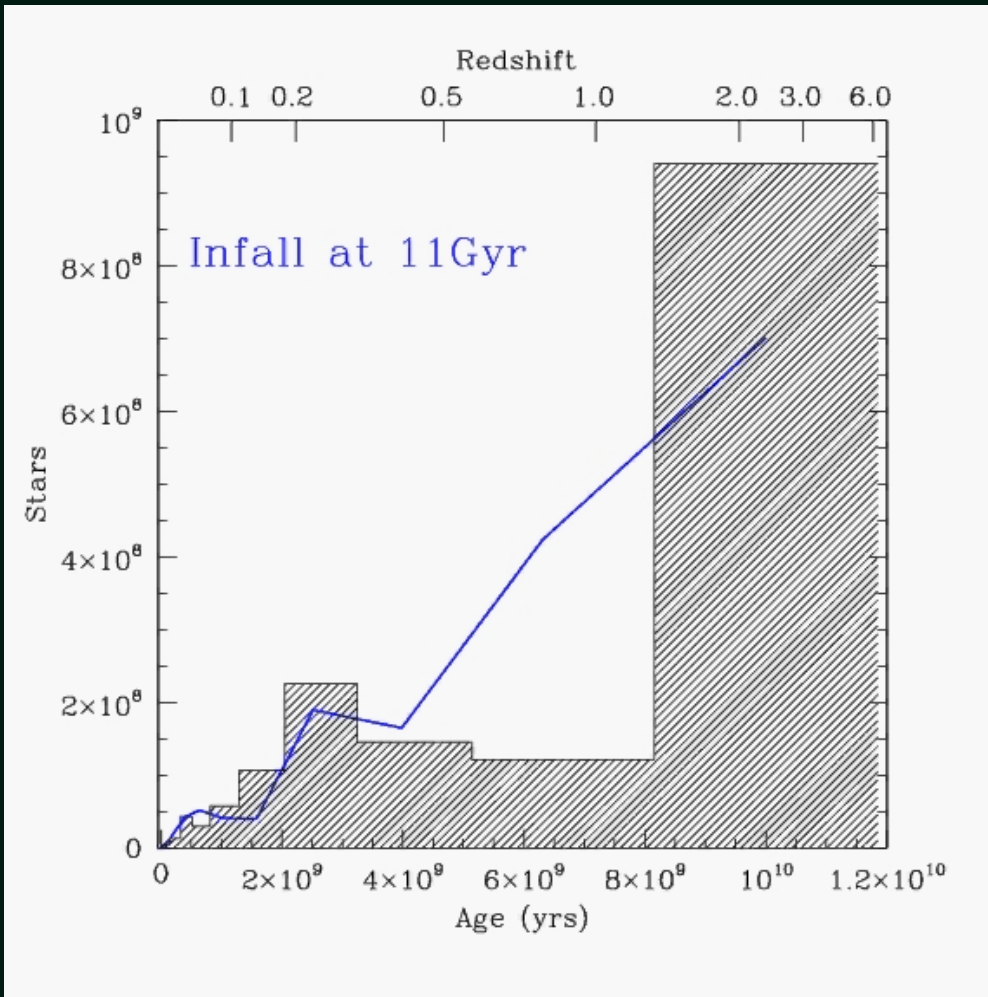
closed-box, instantaneous
recycling

enhancement of $SFR \propto 1/r^n$
orbit given by proper motion
(Lin, Klemola, & Jones 1995)

must match stellar mass and
remaining gas



The Case for Infall



Does adding an infall event help?

Best Fit Parameters

tidal exponent = 4.6 [2.8,7.0)

tidal enhancement amplitude = 1.2 [1.0,1.6]

time of infall \sim 4 Gyr

mass fraction \sim 0.4 - 0.5

fraction of stars from triggered mode 10-70%

\sim 5% of SMC stars formed in last Gyr



Conclusions:

Q: Does local environment affect galaxy evolution?

A: yes (SFH, morphology)

Q: Is the effect quantifiable?

A: yes (it is “impulsive”, it is dominant for SMC near pericenter, it can account for significant fraction of the total pop)

Q: Is the model transferable?

A: Unknown - depends on ability to scale and relative importance of other factors