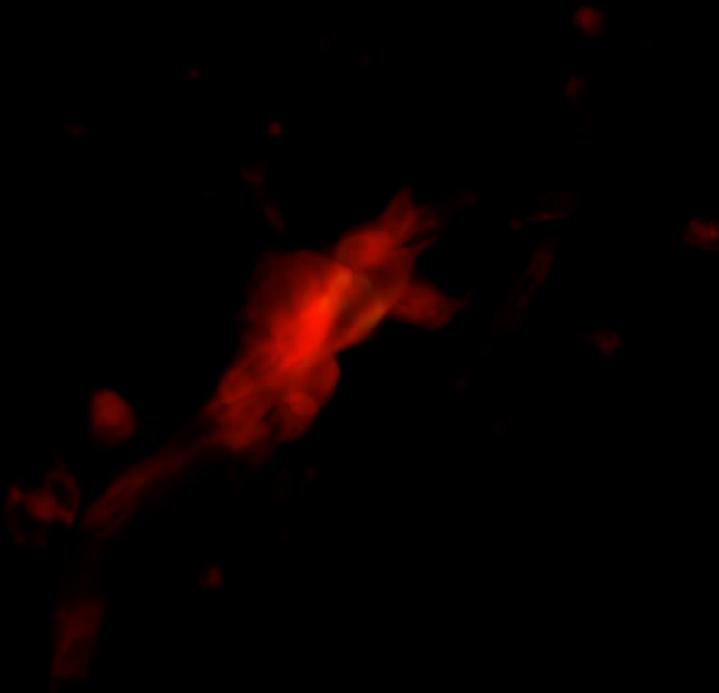


The Diversity of Metallicity Distributions of Local Group Dwarf Galaxies

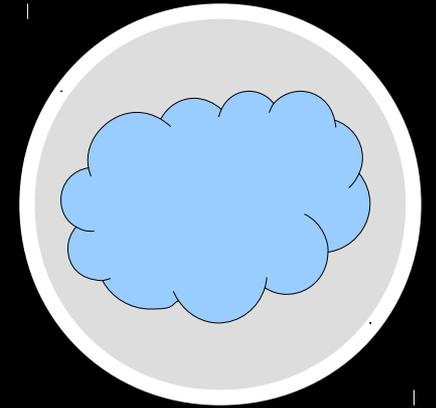
Evan Kirby
Caltech



credit: John Wise

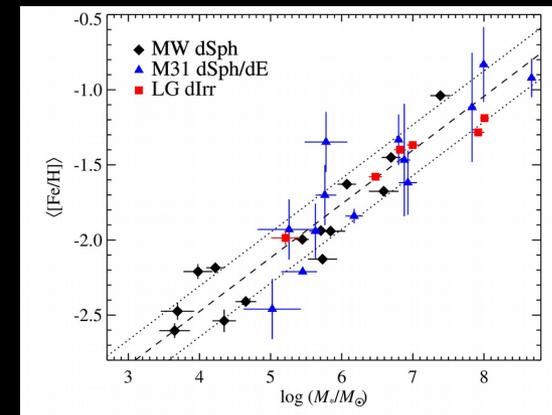
The Diversity of Metallicity Distributions

- dSph vs. dIrr



- Chemical evolution models

- The universal stellar mass–
stellar metallicity relation



Dwarf galaxies come in two main types.

dSph



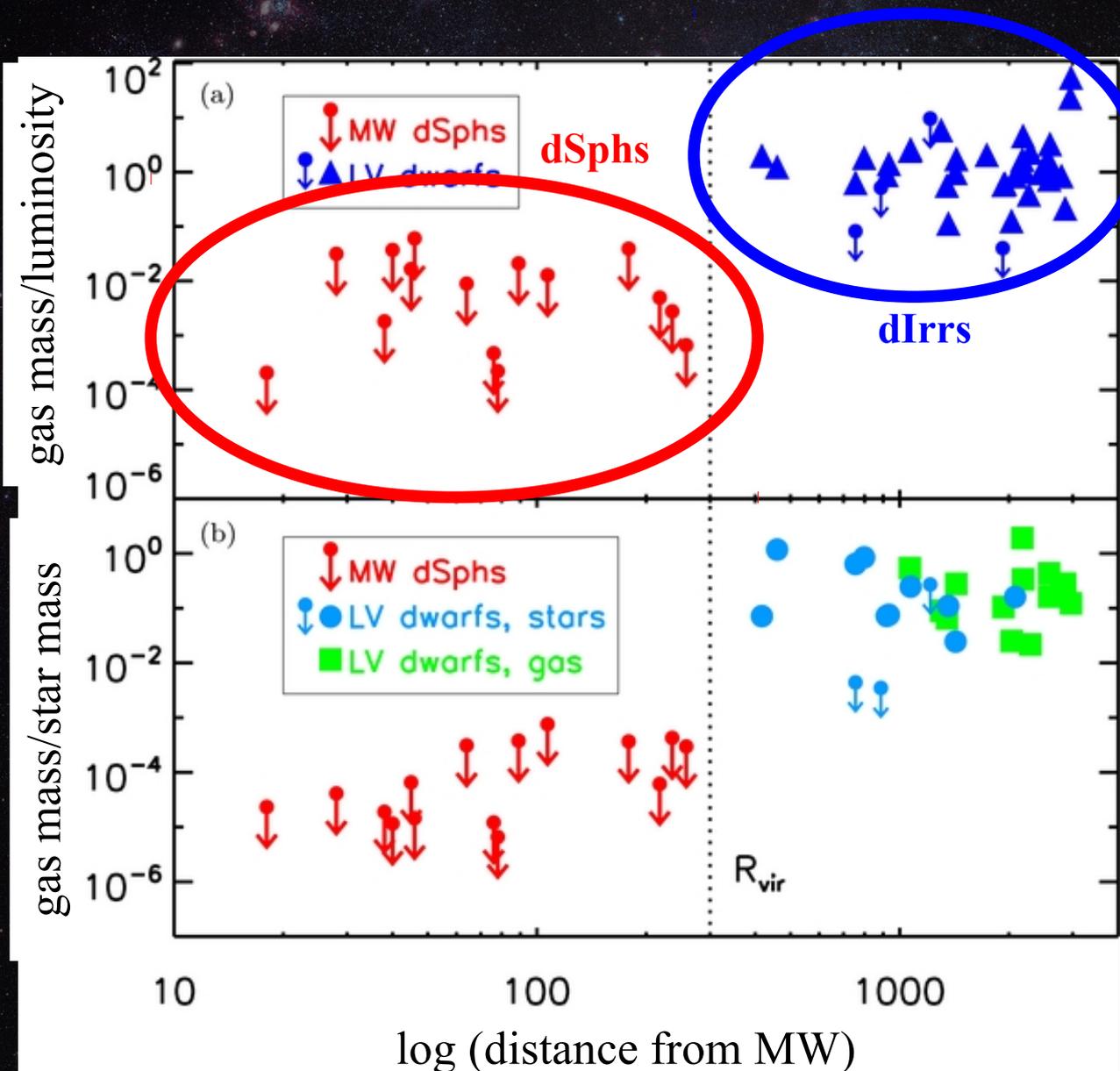
dIrr



dT



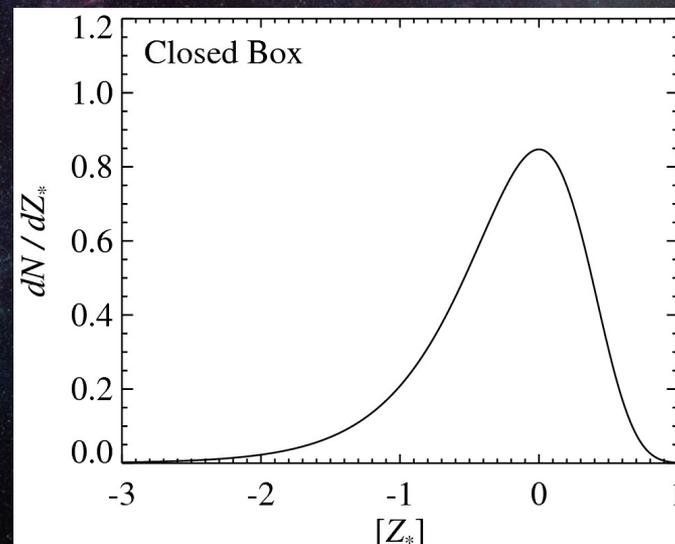
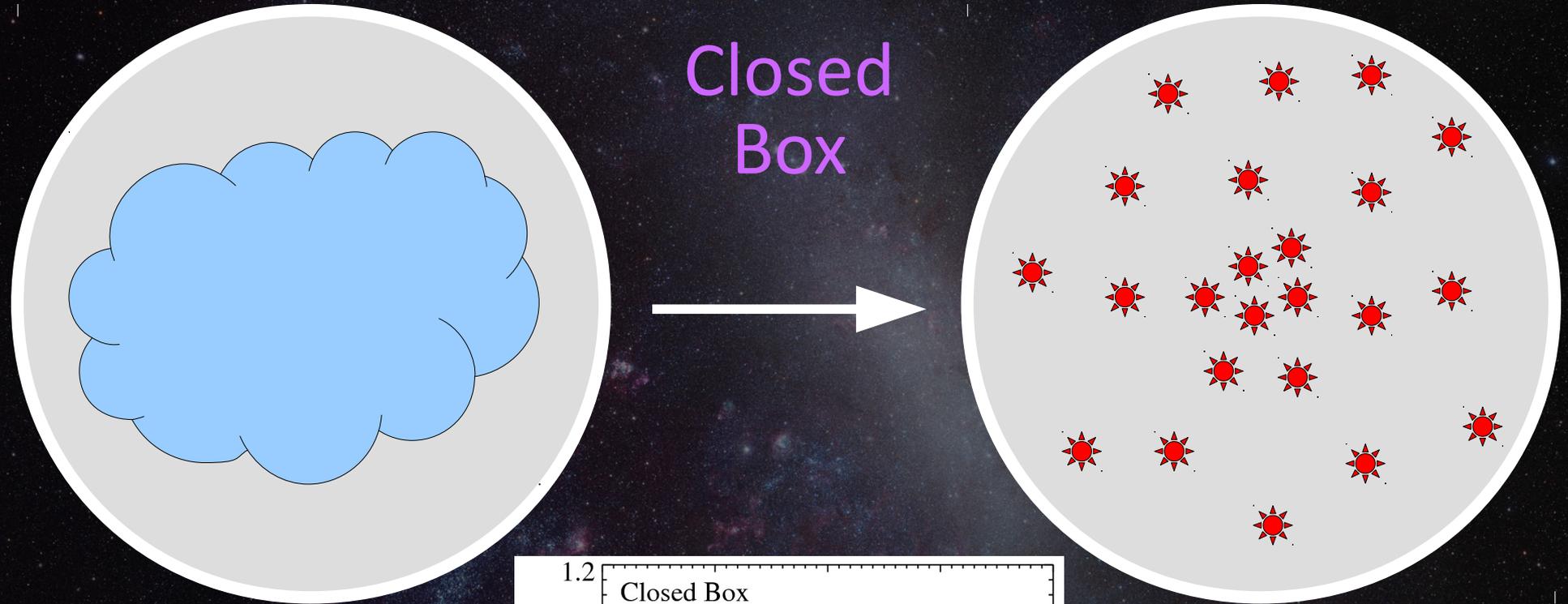
Environment dictates gas content.



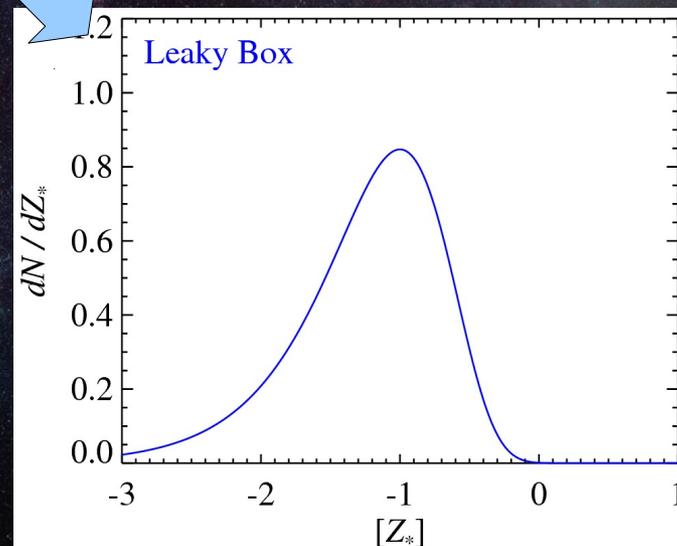
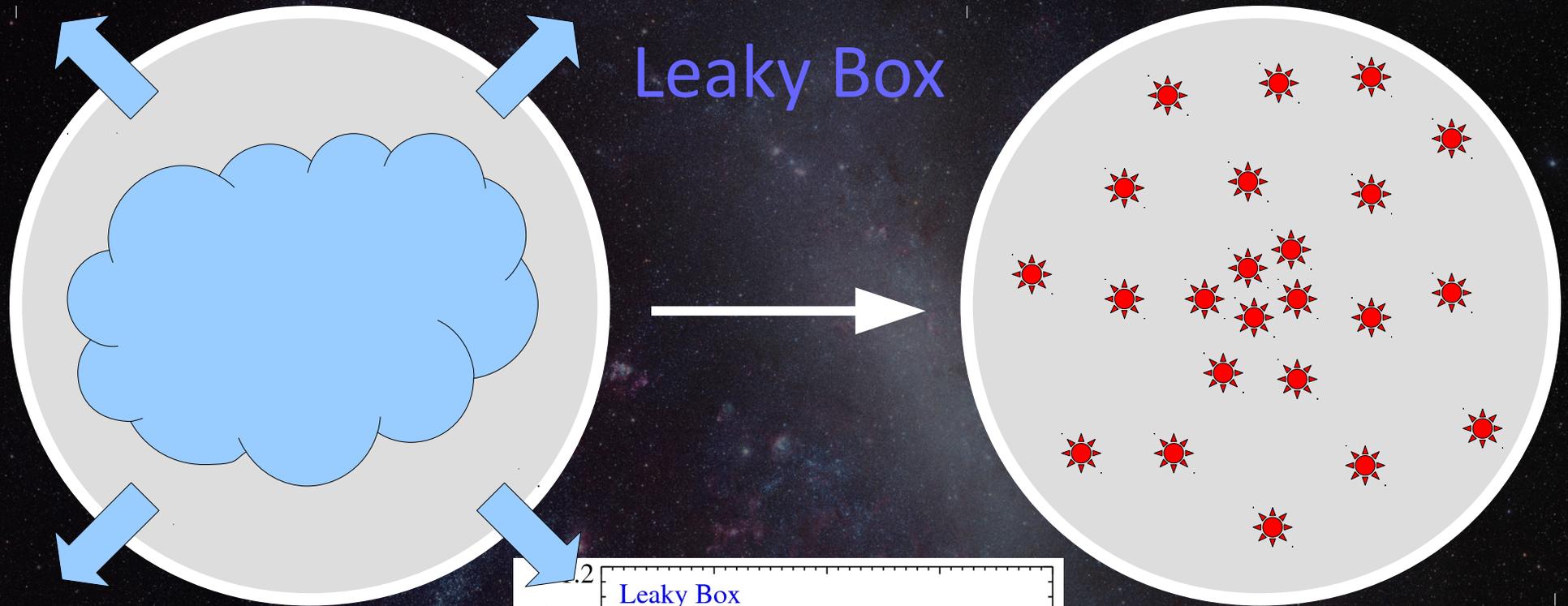
New distant dSph:
Eridanus II

(Li et al. 2017, ApJ, 838, 8)

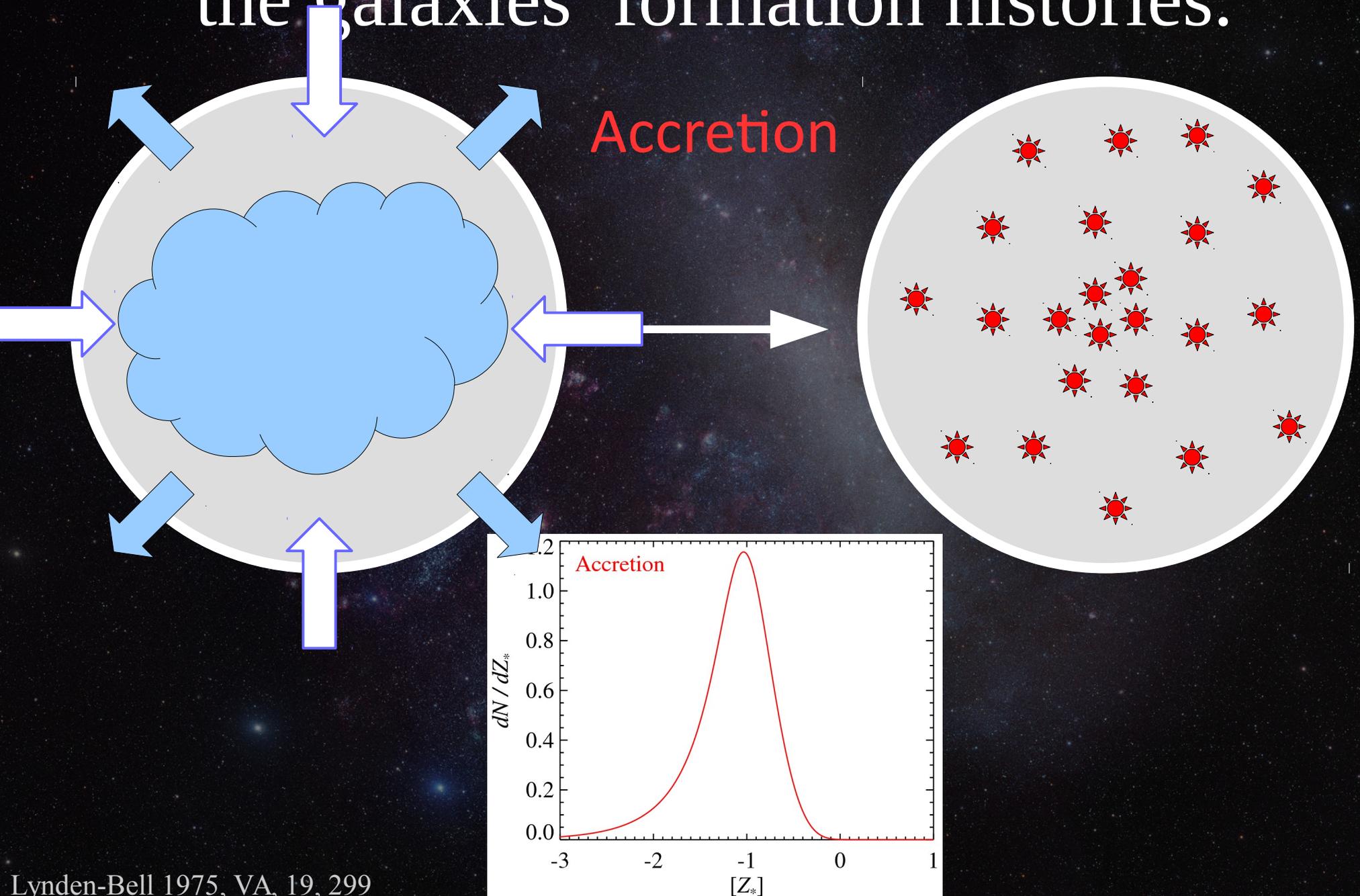
Metallicity distributions help to reveal the galaxies' formation histories.



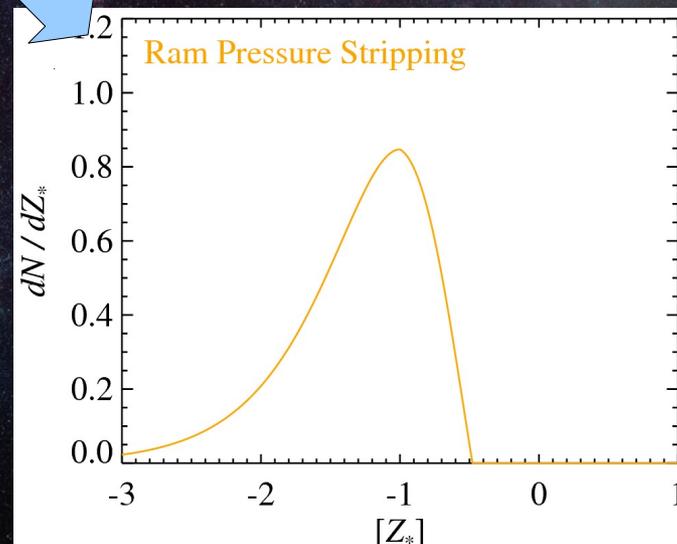
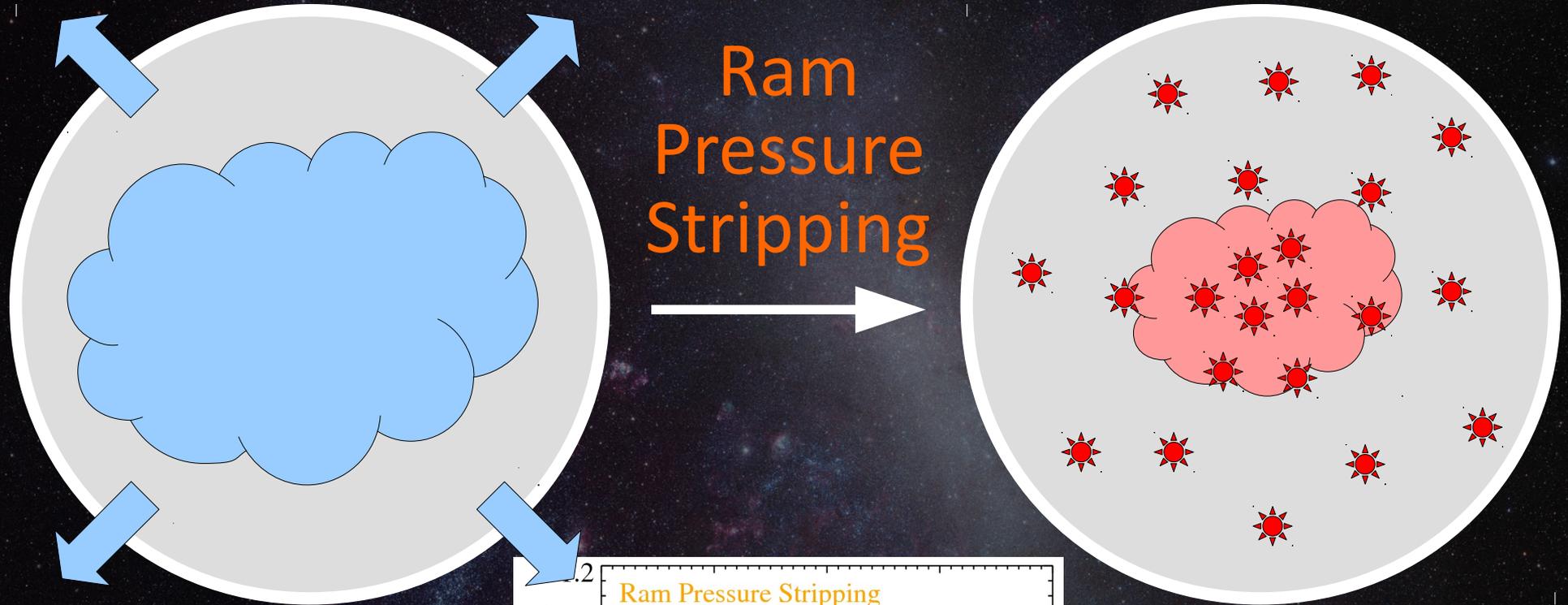
Metallicity distributions help to reveal the galaxies' formation histories.



Metallicity distributions help to reveal the galaxies' formation histories.

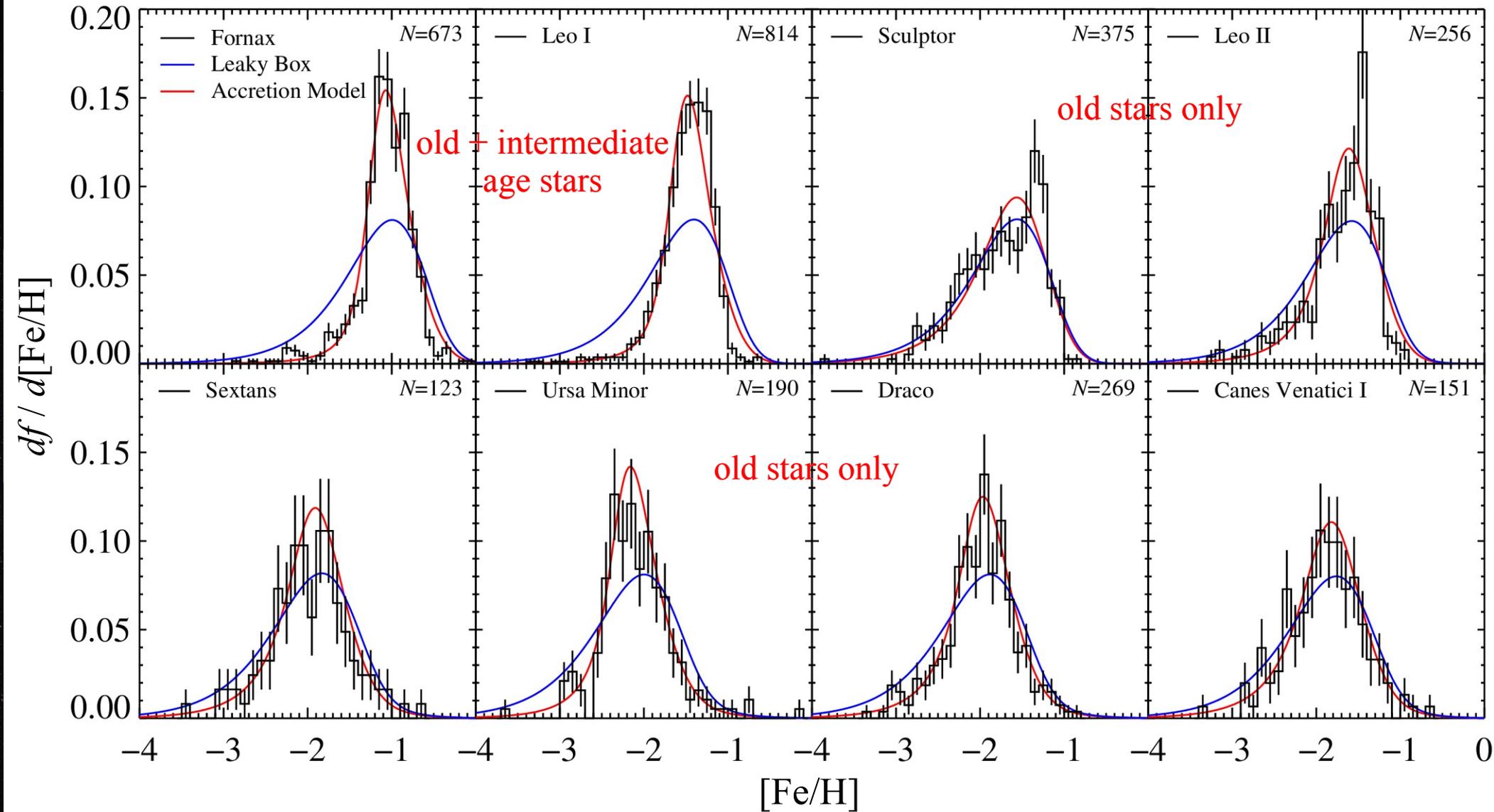


Metallicity distributions help to reveal the galaxies' formation histories.



The metallicity distributions of dwarf galaxies evolve with luminosity.

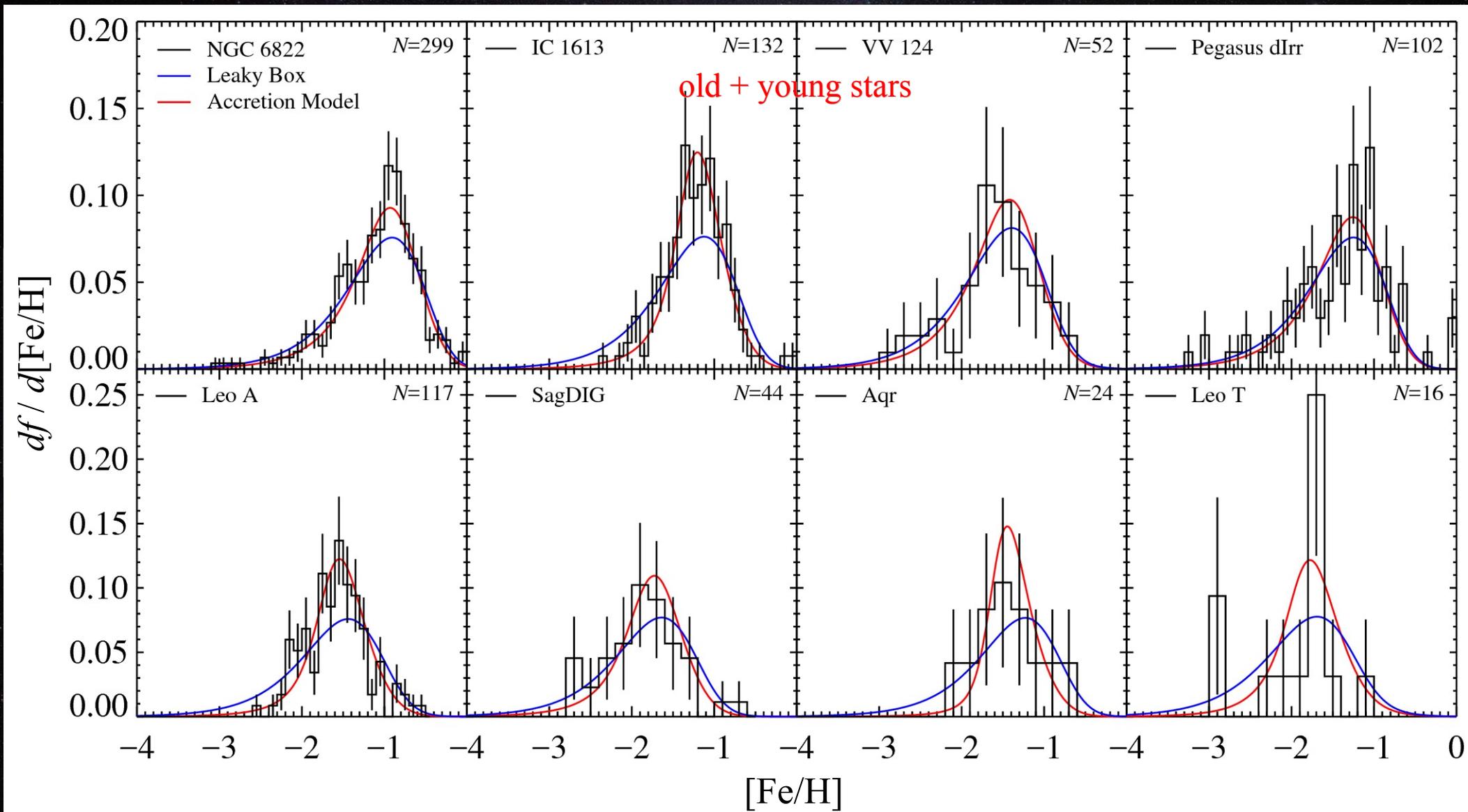
more stars ←



→ fewer stars

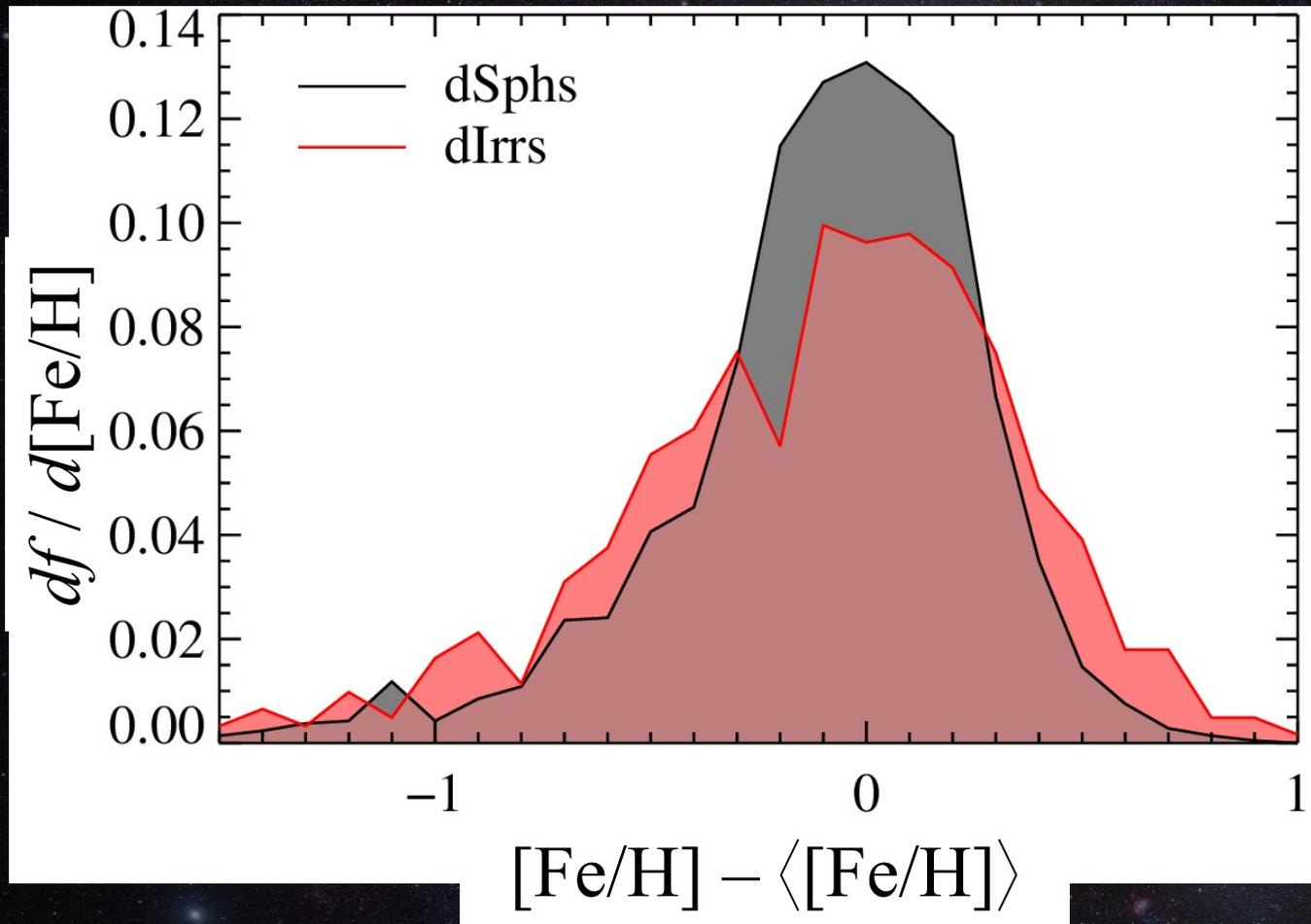
Isolated galaxies have differently shaped metallicity distributions.

more stars ←



→ fewer stars

Isolated galaxies have differently shaped metallicity distributions.



EK et al. 2013, ApJ, 779, 102

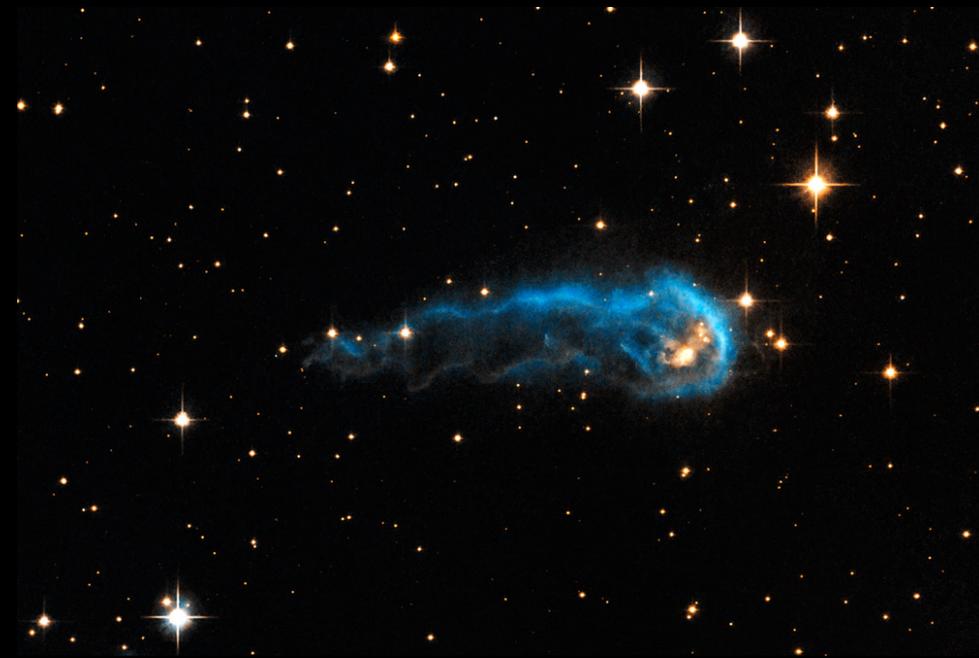


Ivanna Escala

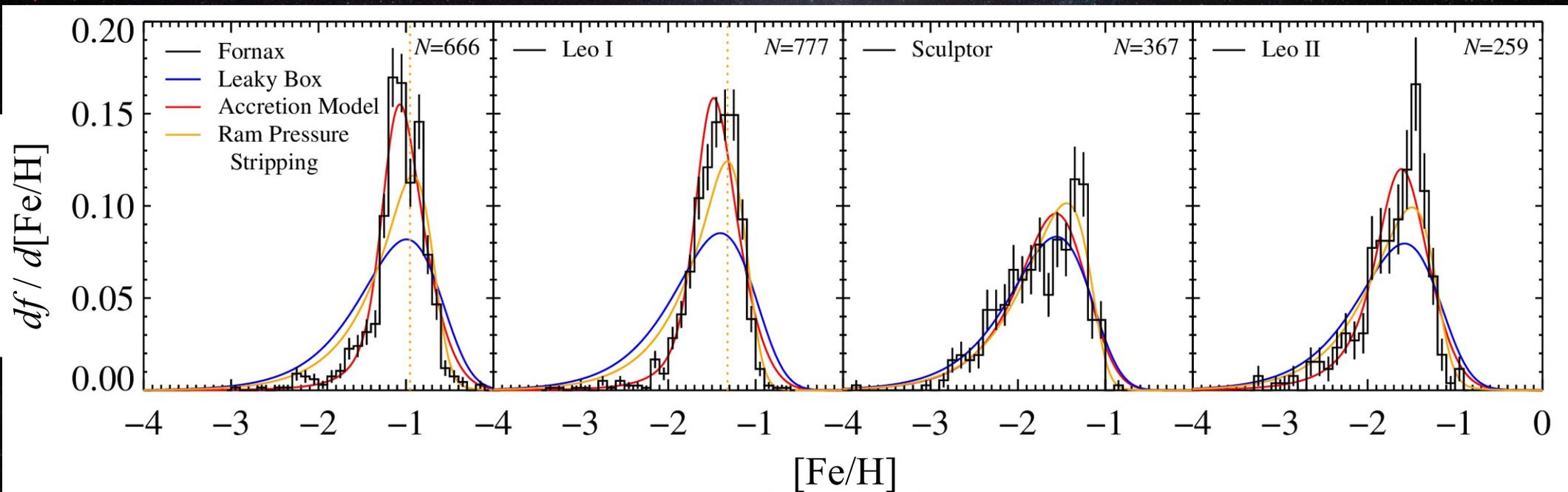
Satellite galaxies suffer ram pressure stripping.

NGC 4402

Cygnus OB association

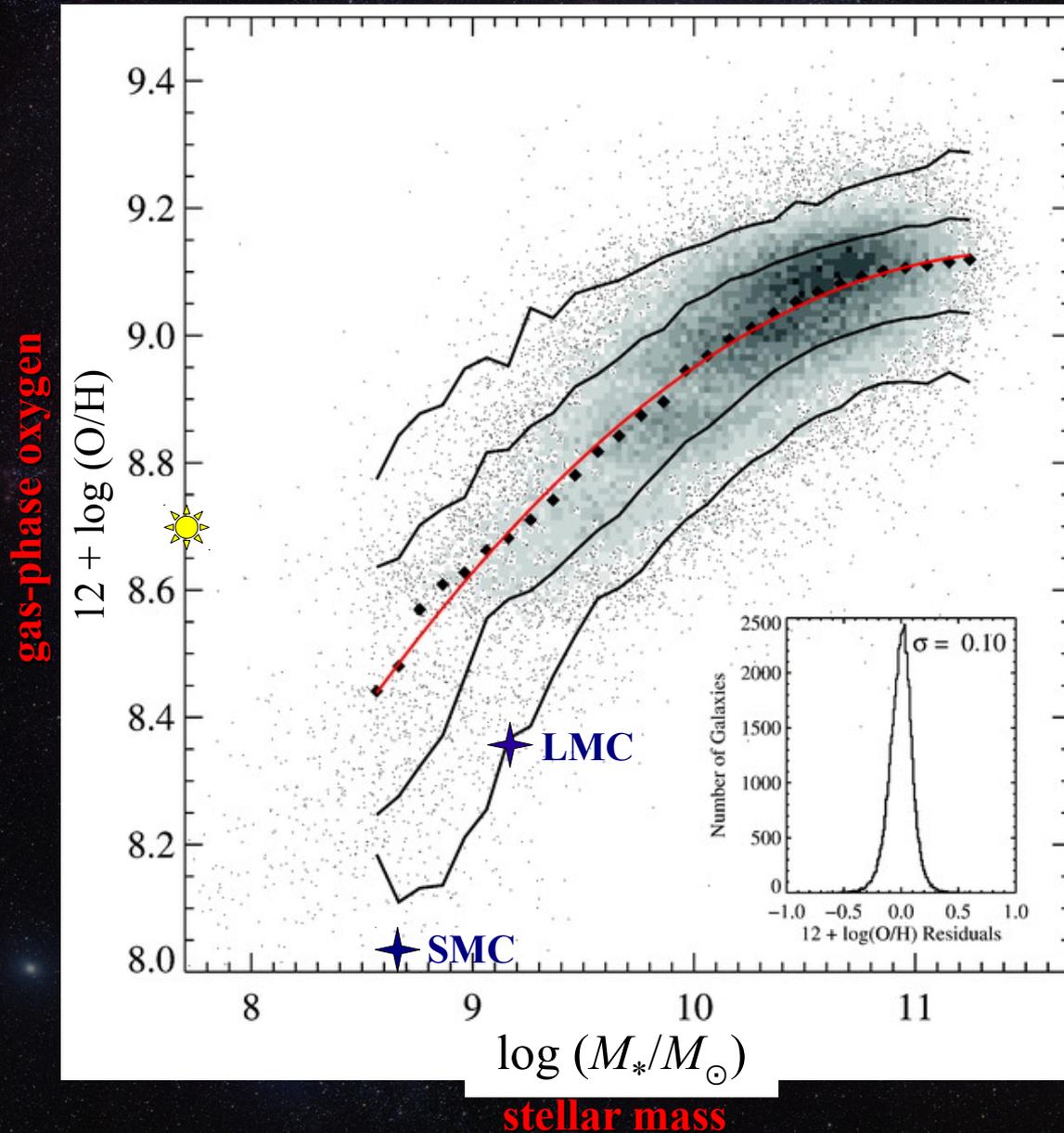


Ram pressure stripping explains some of the differences in metallicity distributions.



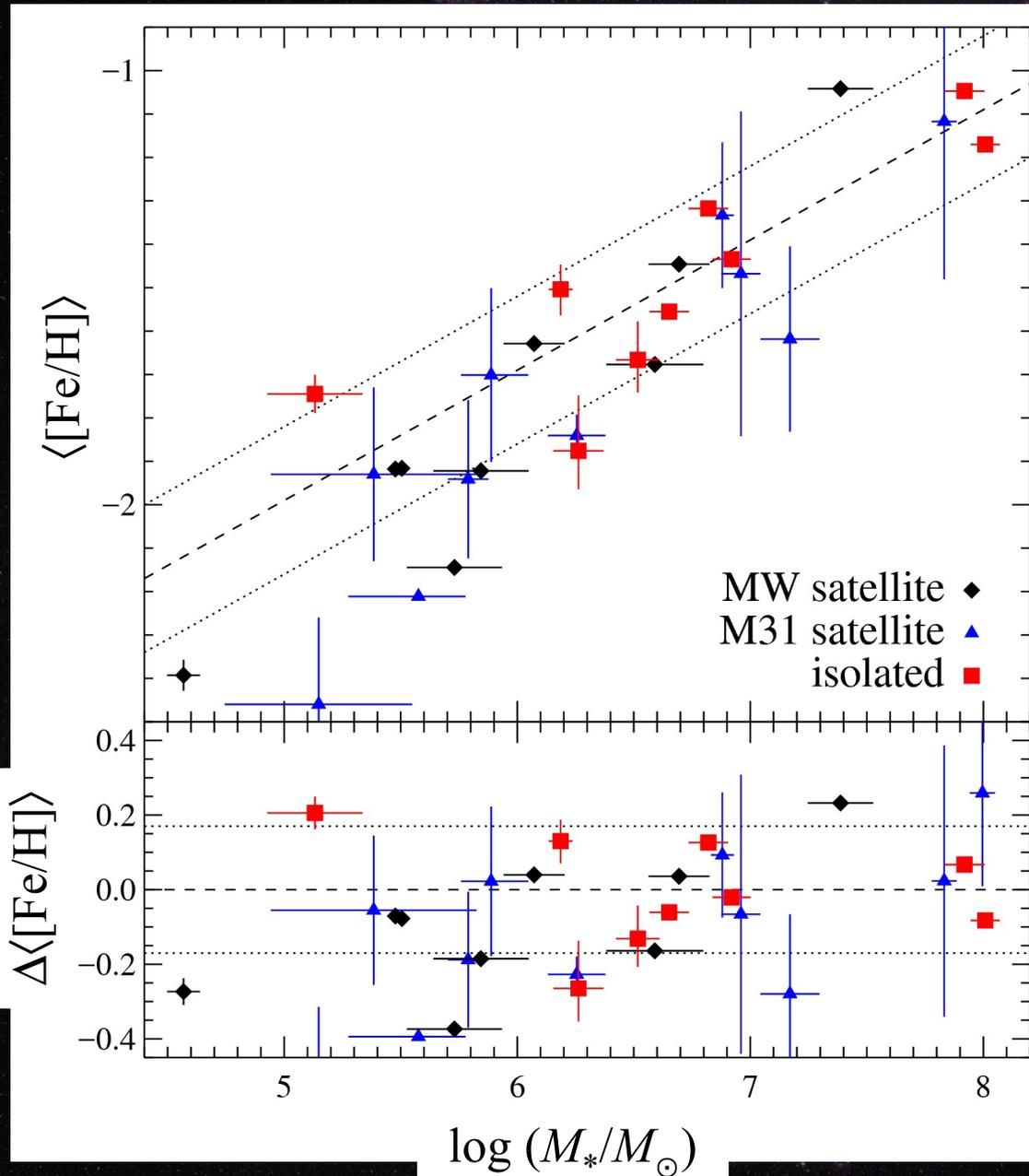
EK et al. 2013, ApJ, 779, 102

Galaxies obey a tight mass-metallicity relationship.

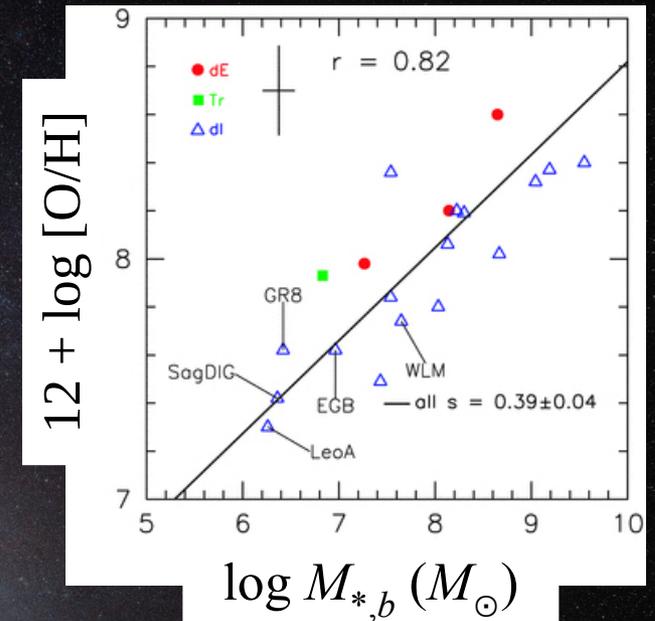


Tremonti et al. 2004, ApJ, 613, 898

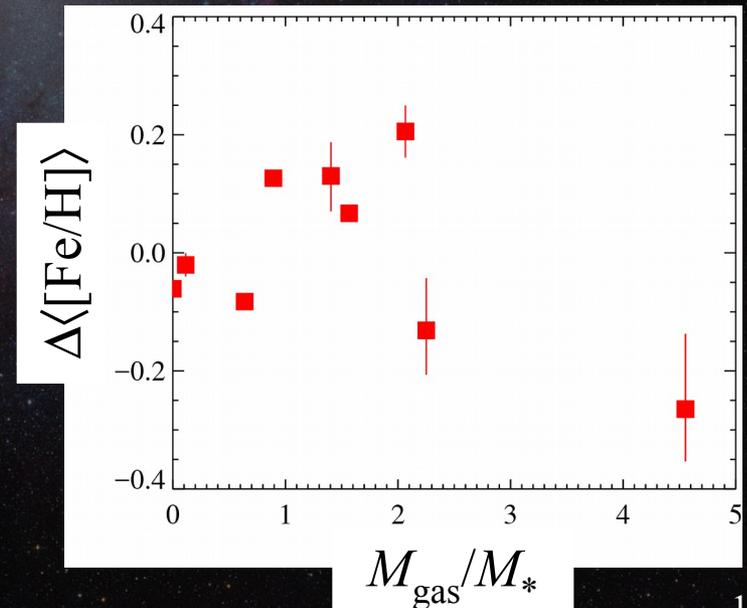
Residuals from the MZR do not correlate with gas fraction.



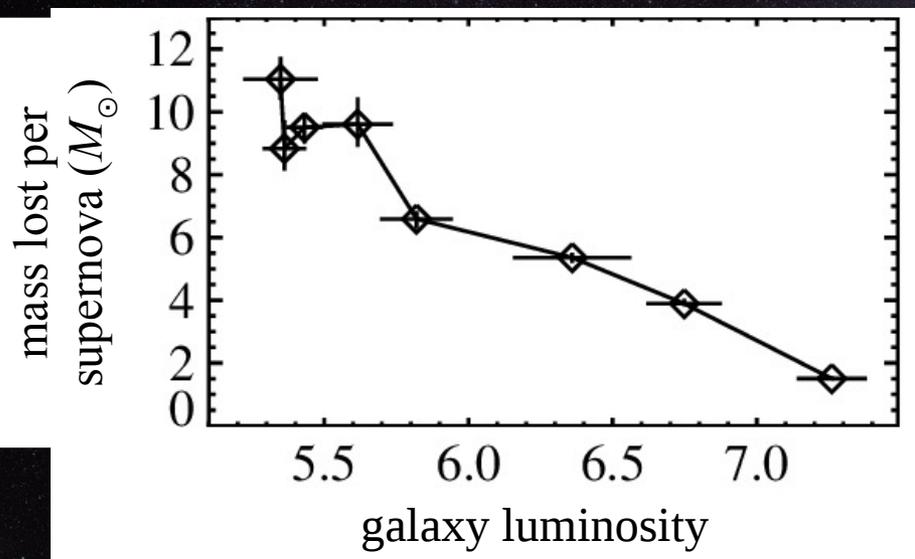
EK et al. 2017, ApJ, 834, 9



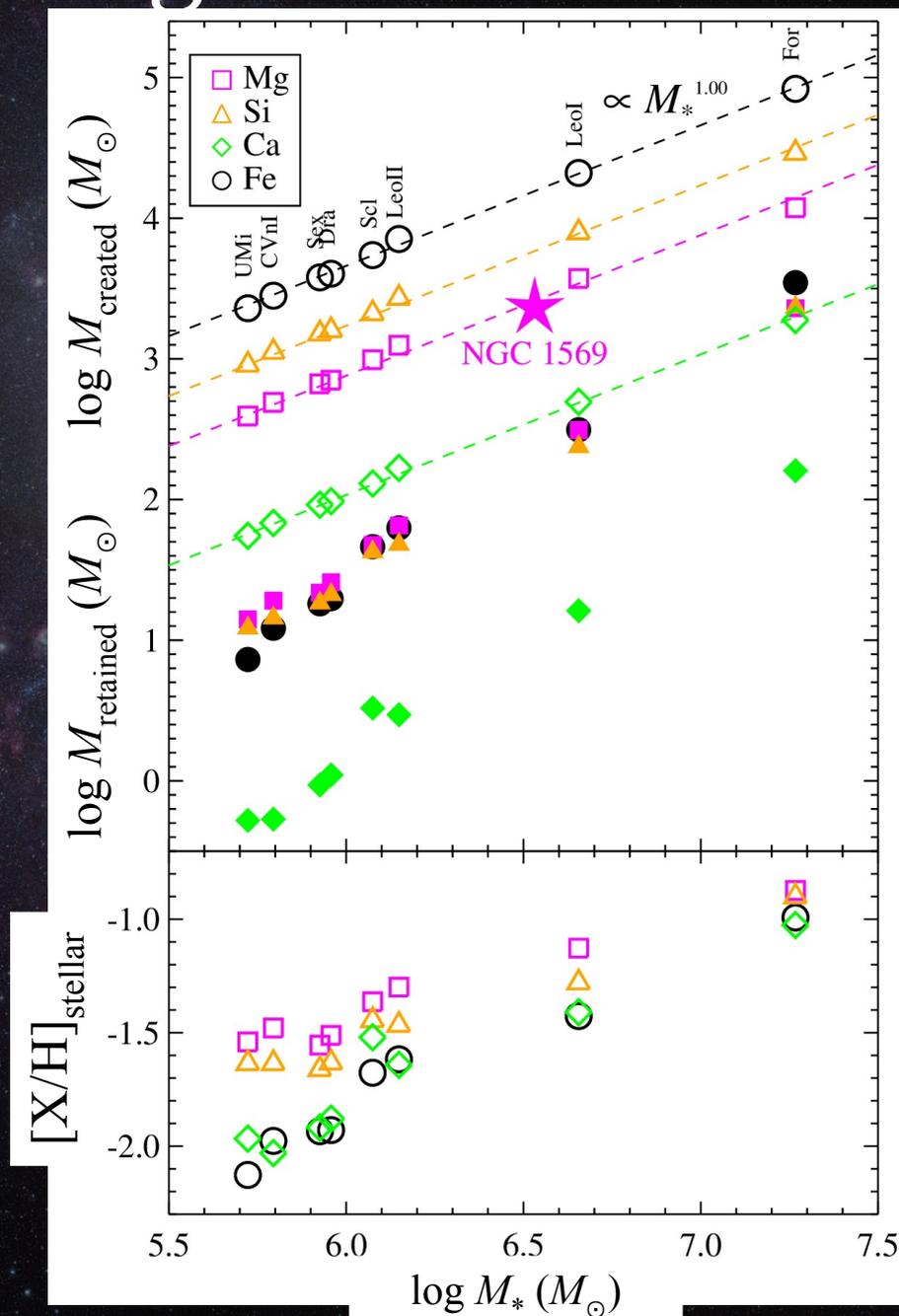
Woo et al. 2008, MNRAS, 390, 1453



The mass-metallicity relation is really a sequence of gas loss.

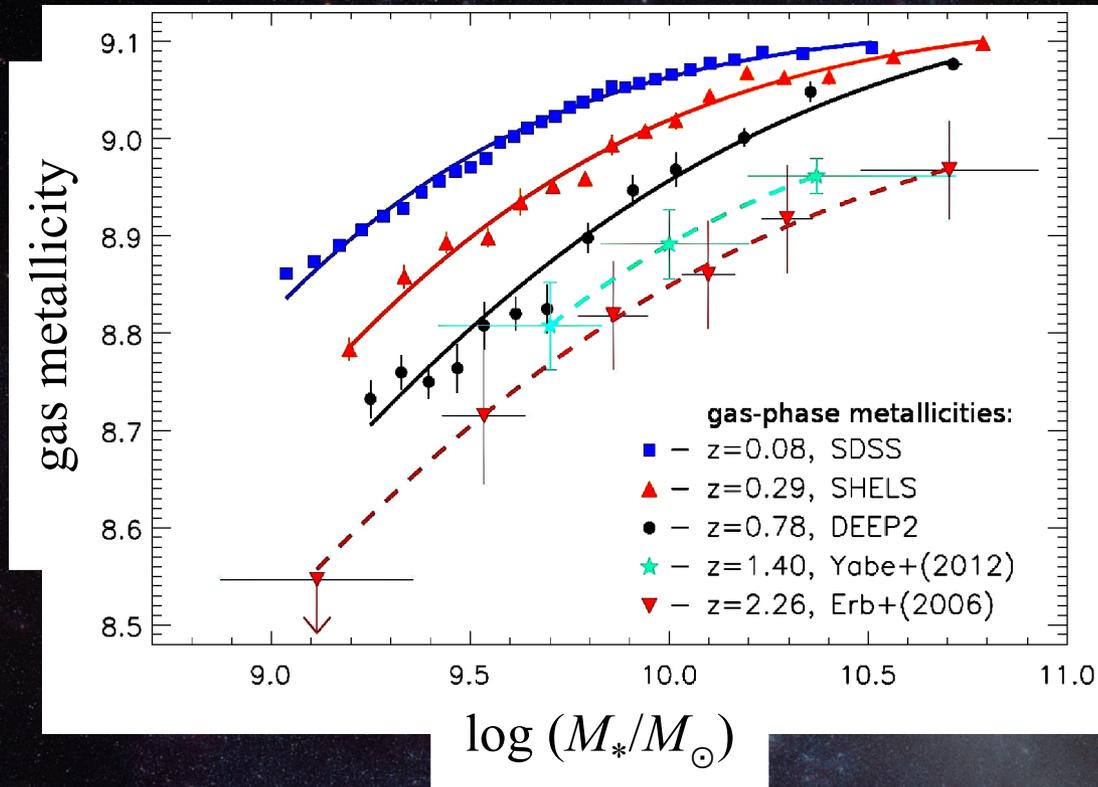


EK et al. 2011, ApJ, 727, 79

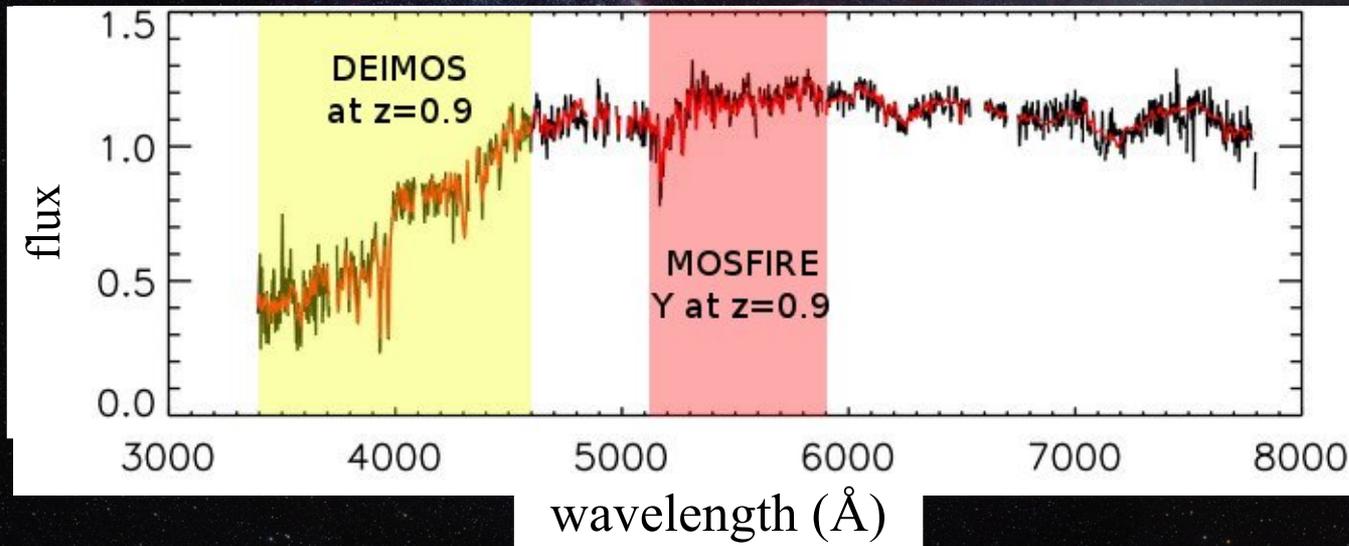


EK, Martin, & Finlator 2011, ApJL, 742, L25

The future of stellar metallicities is $z > 0$.



Zahid et al. 2013, ApJL, 771, L19



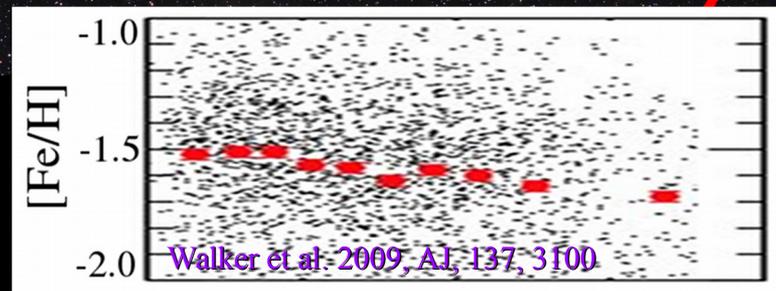
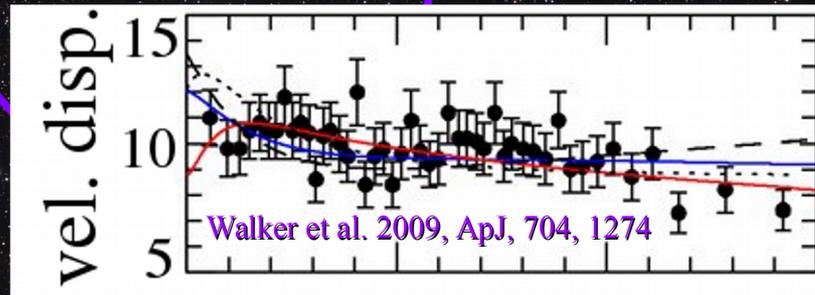
Nicha
Leethochawalit

I can't wait for Subaru PFS!

PFS
2400 fibers

FLAMES
130 fibers

DEIMOS
~120 slits



Conclusions

- The metallicity distributions of dwarf galaxies suggest a competition between **gas outflow and accretion**.
- The average metallicities of dwarf galaxies follow a **universal relation** with stellar mass ...
- ... even though the **metallicity distributions** depend on environment.

