



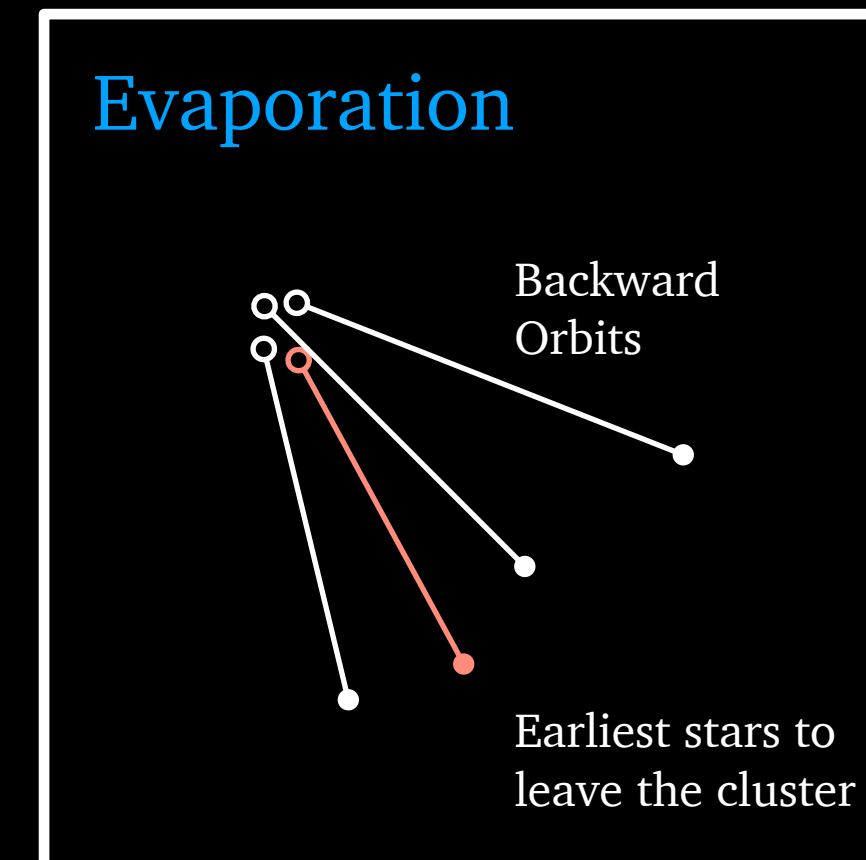
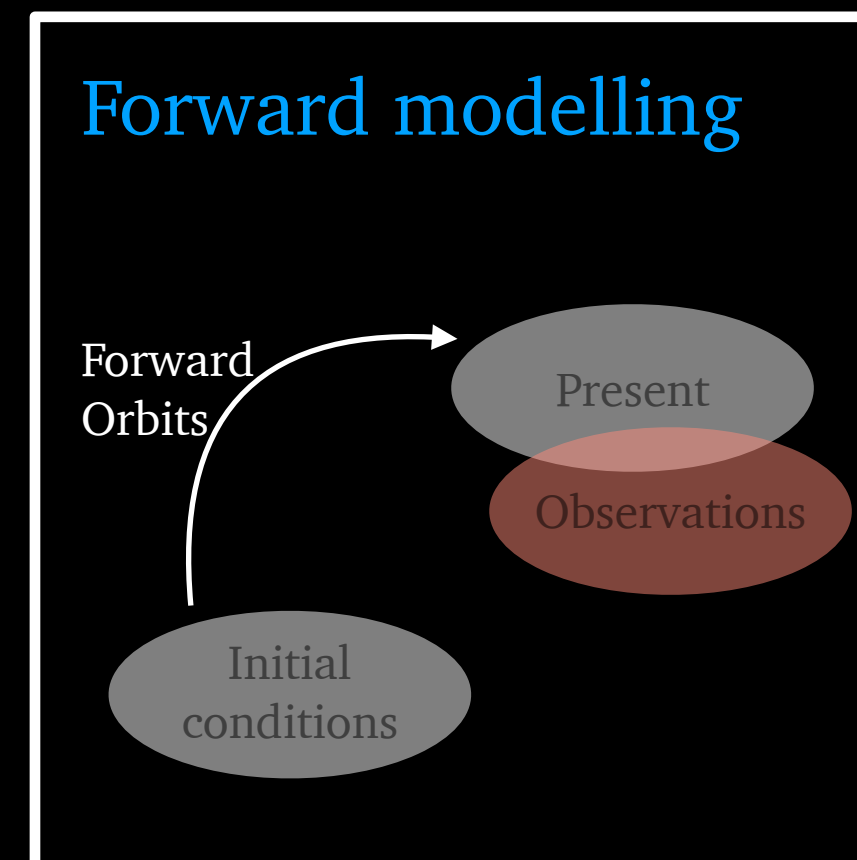
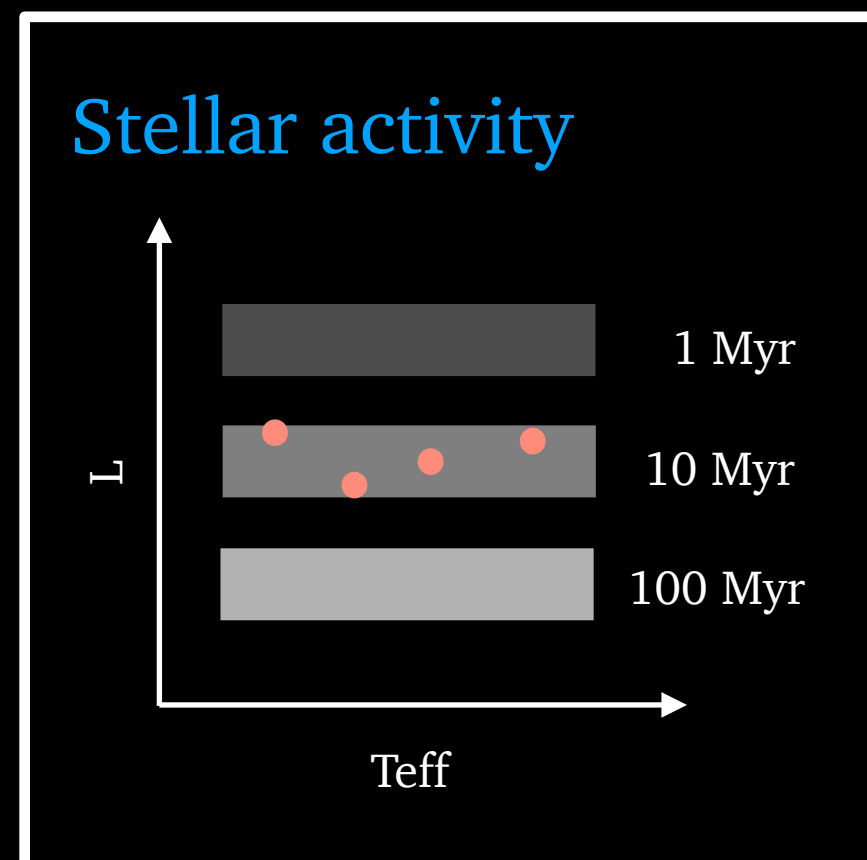
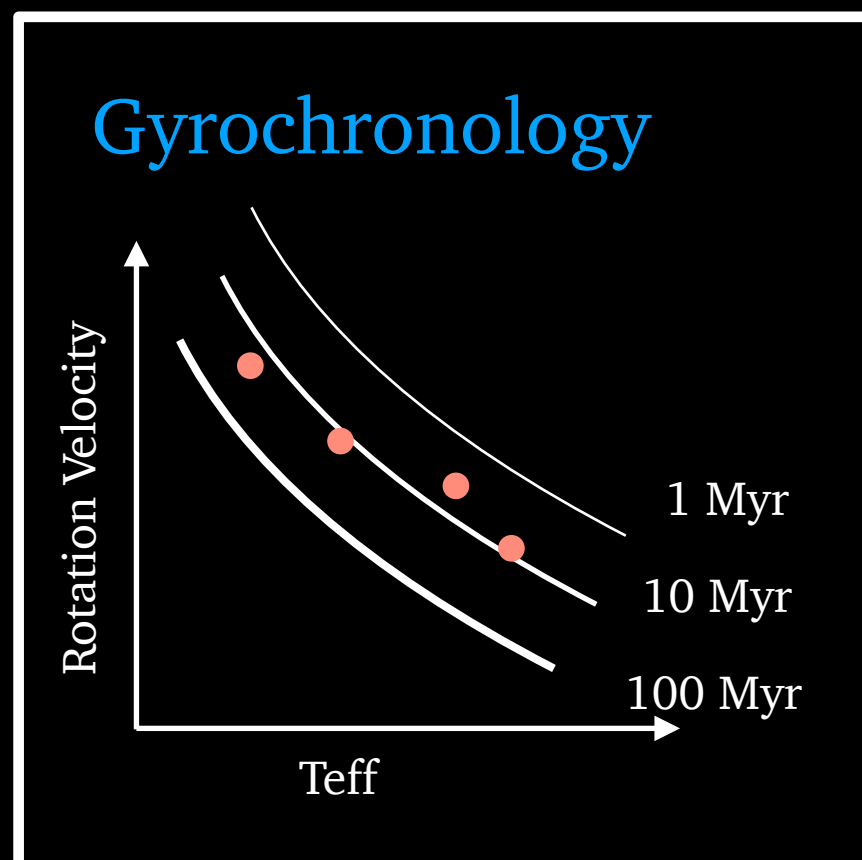
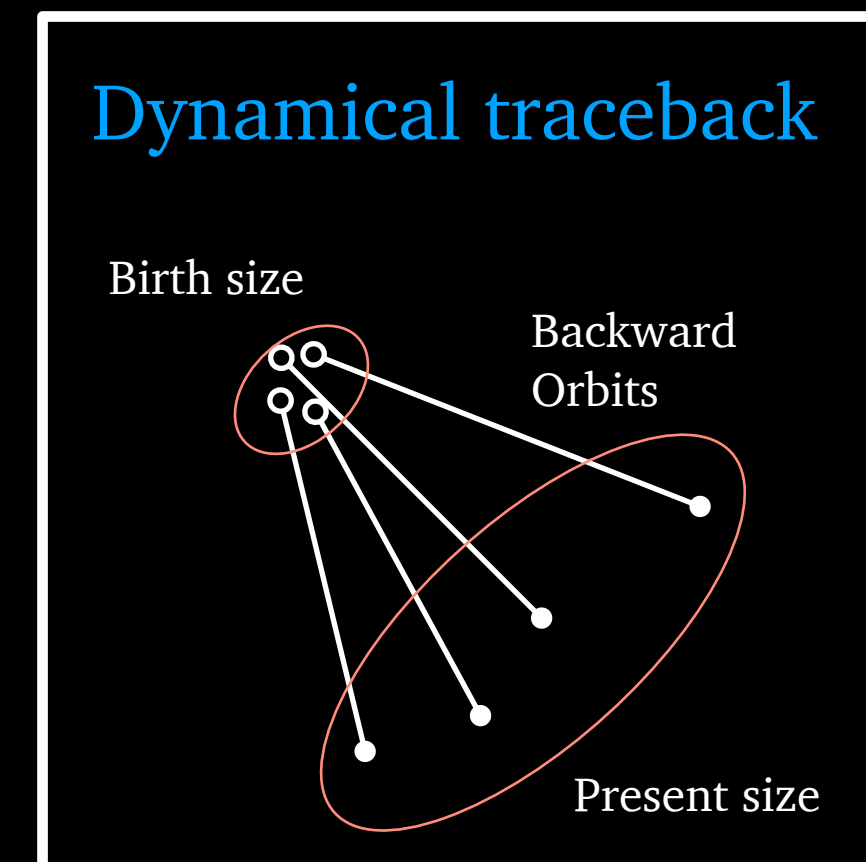
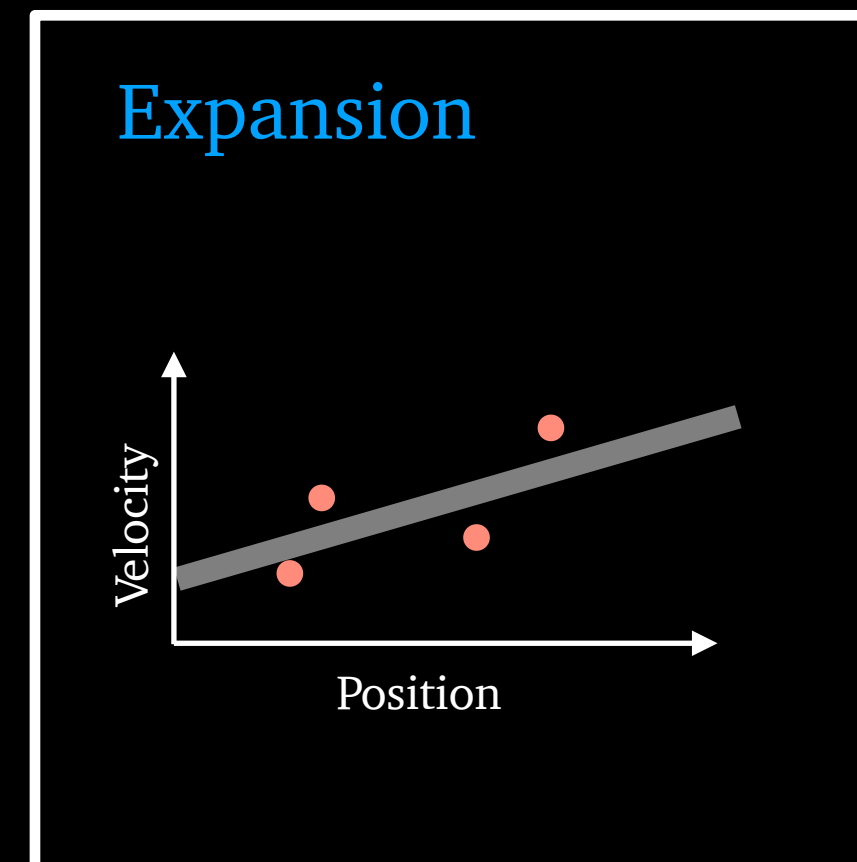
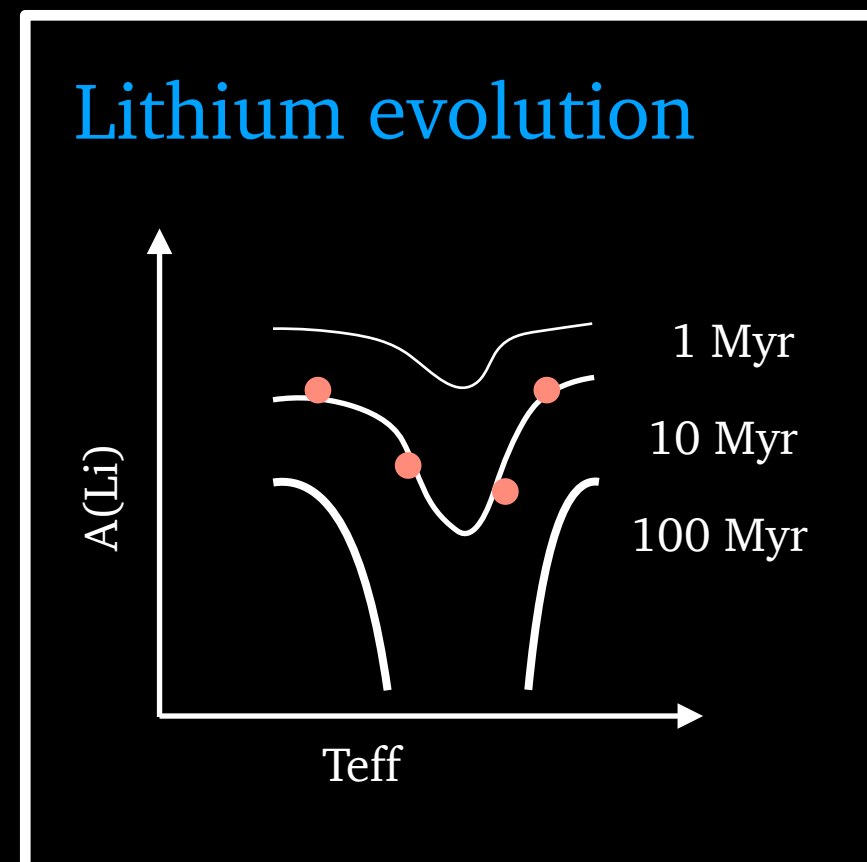
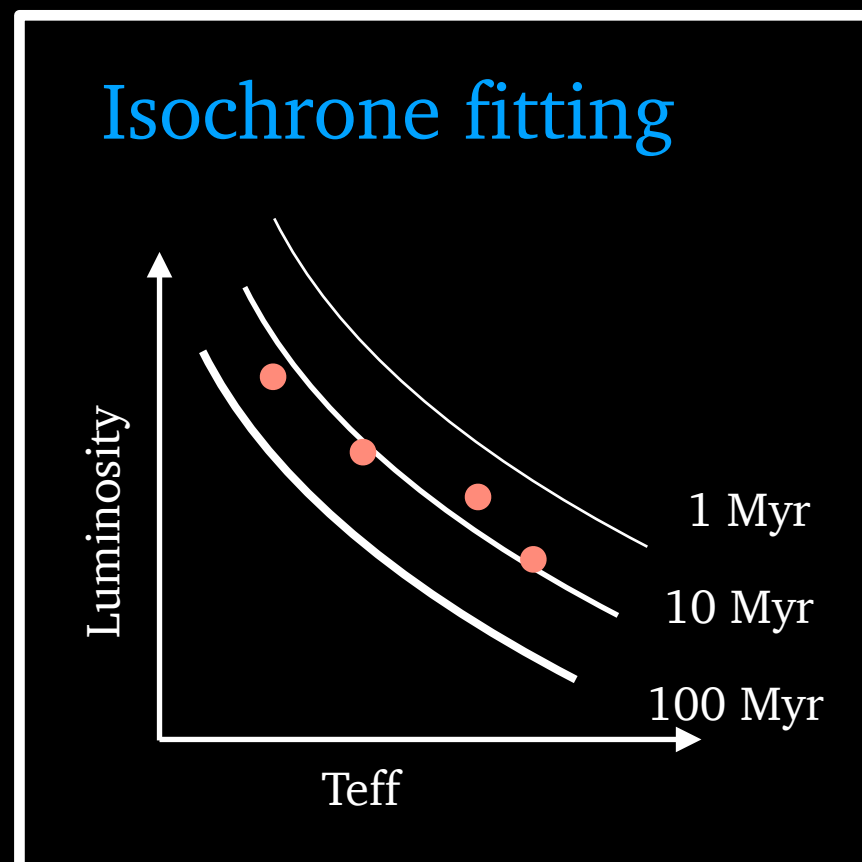
*La persistència de la memòria*, Salvador Dalí (1931)

# Synchronising stellar clocks

Núria Miret Roig

From star clusters to field populations – 20—23 Nov 2023

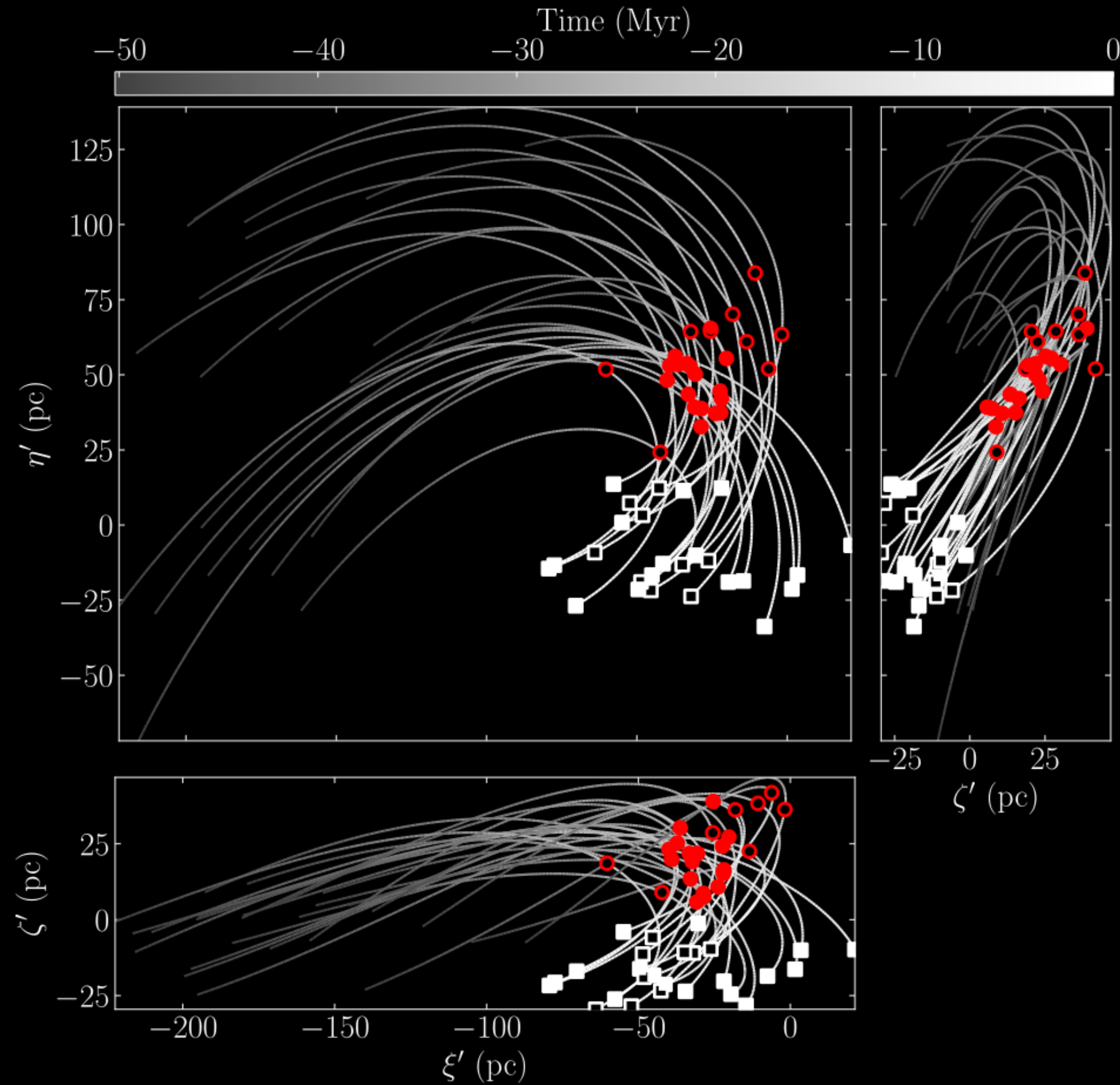
# Determining stellar ages



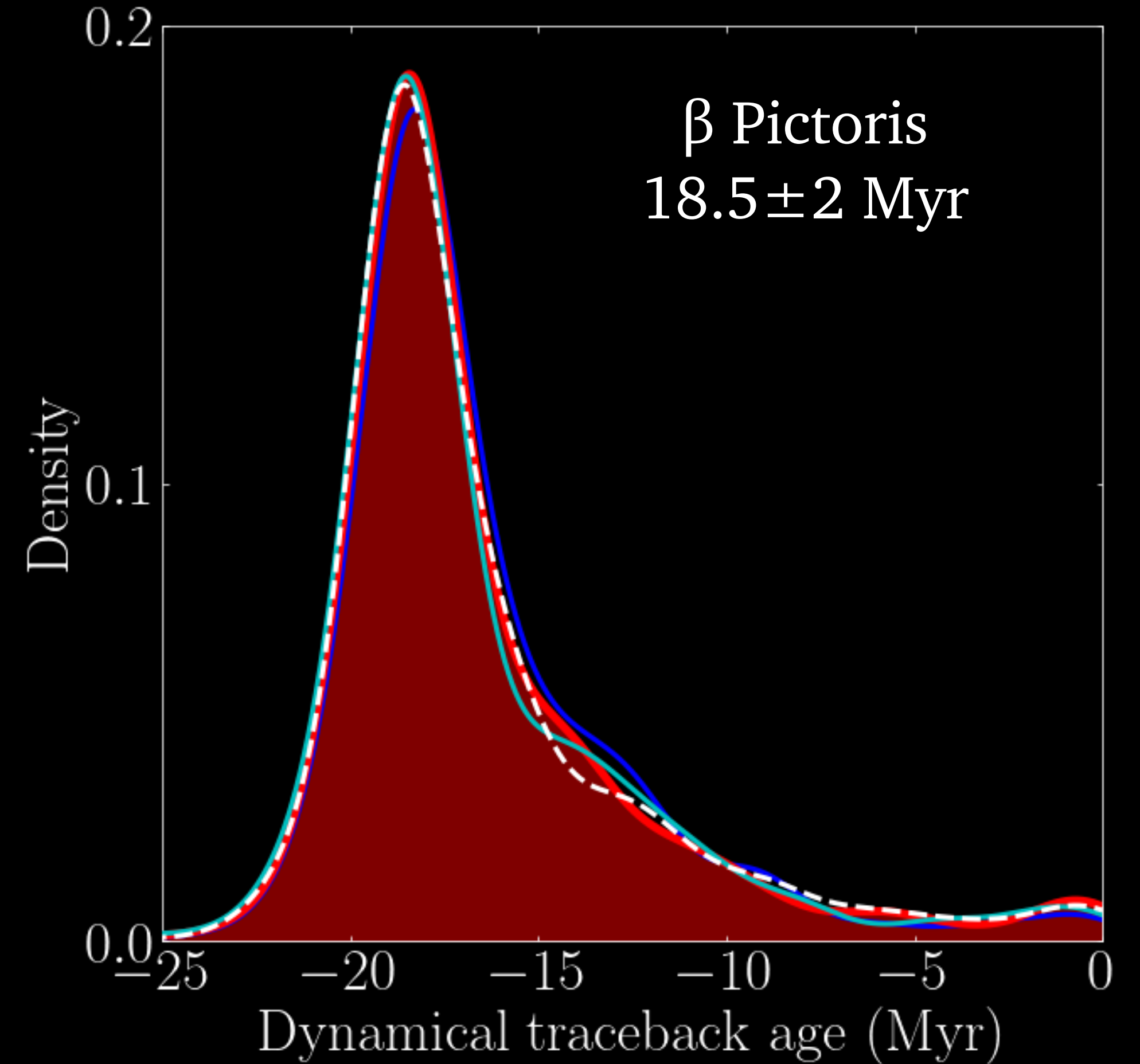
Evolution

Kinematics

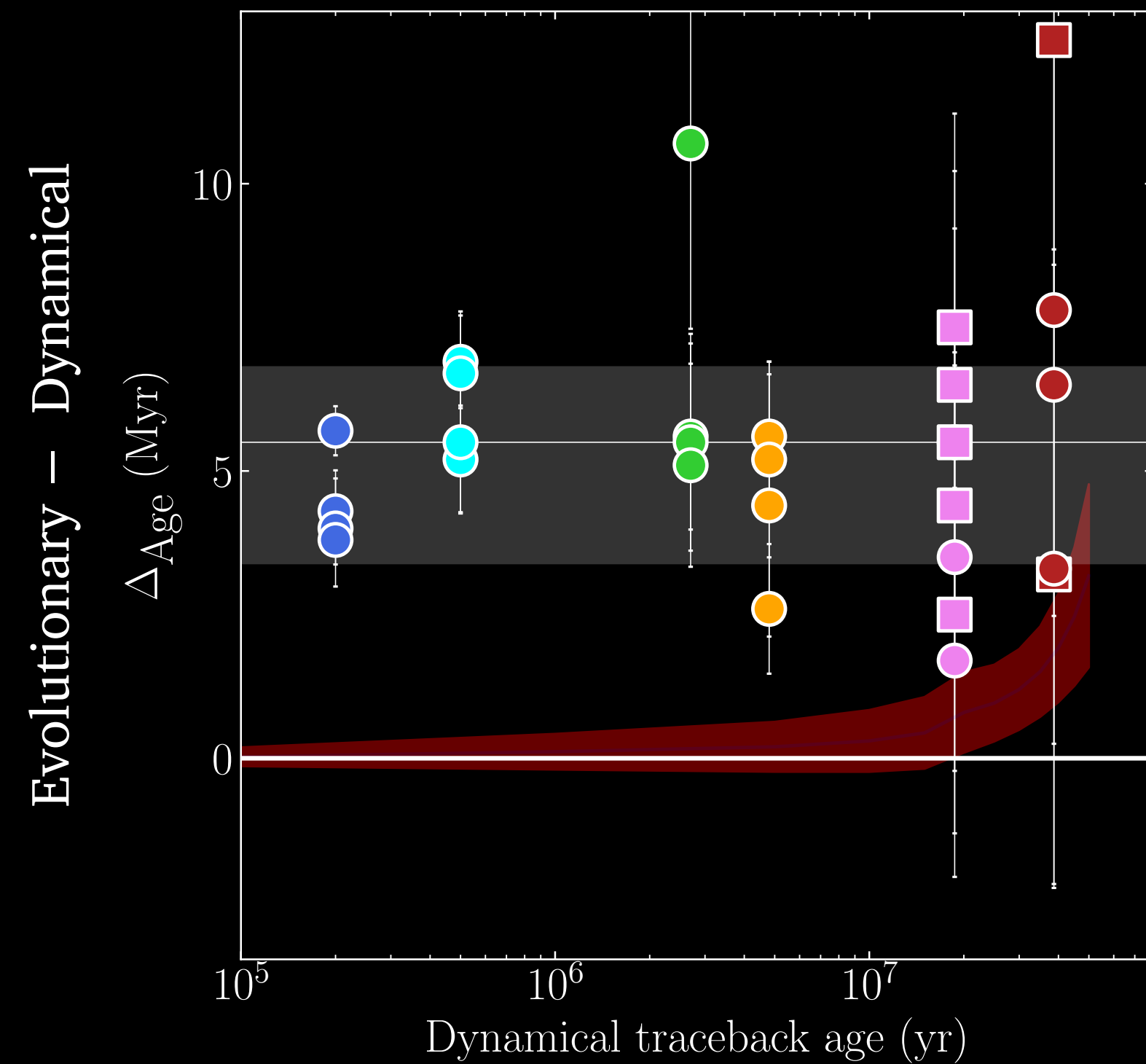
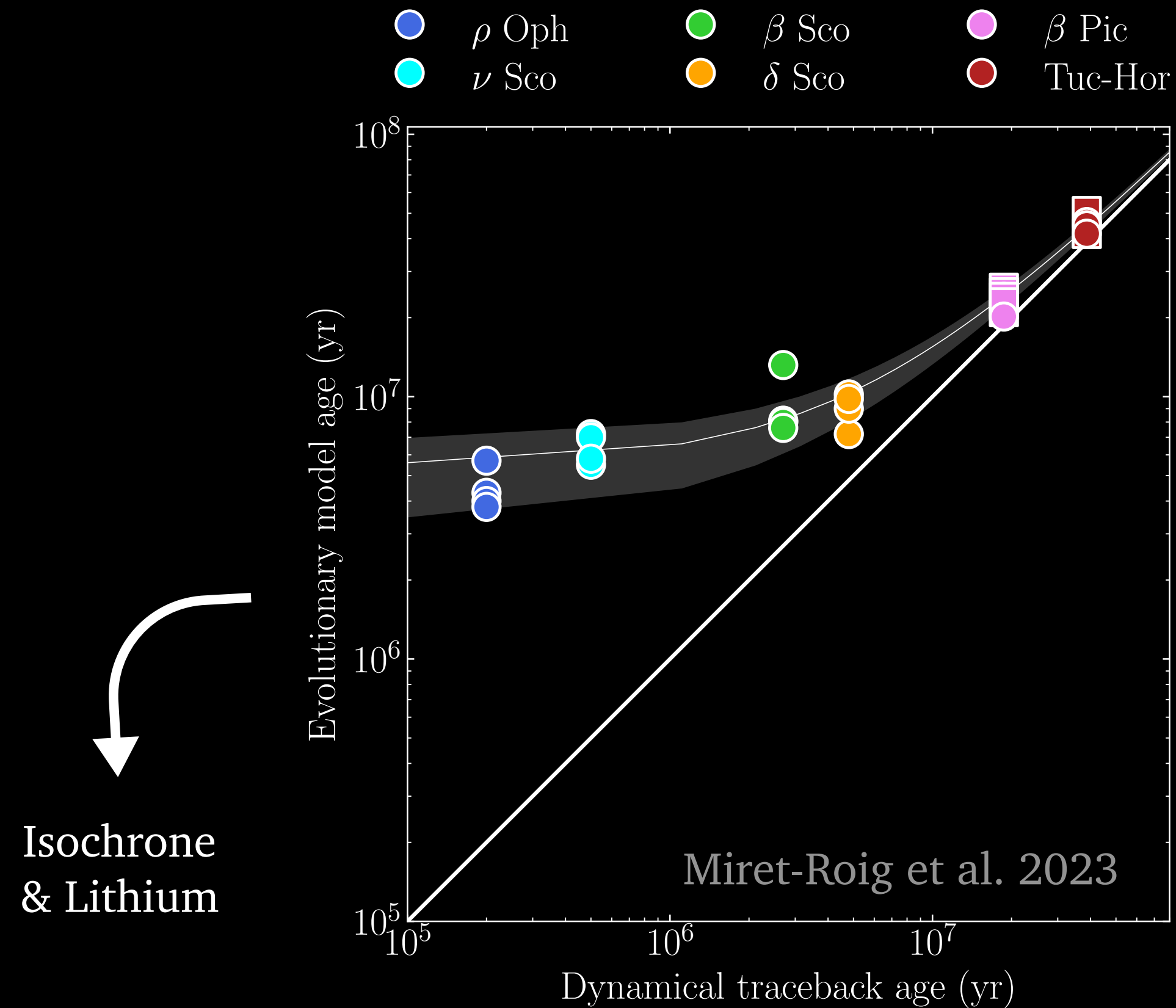
# Dynamical traceback ages



Miret-Roig et al. 2020

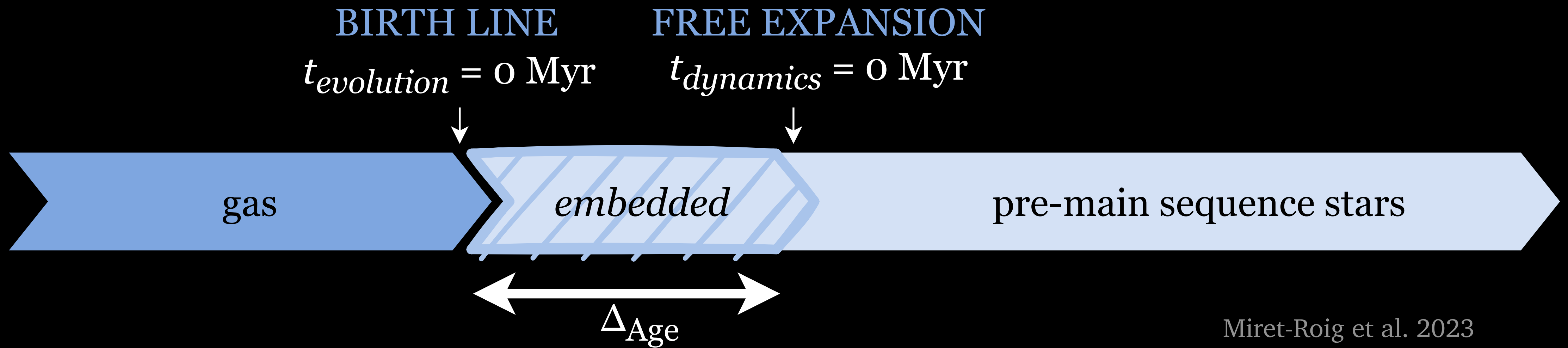


# Systematic offset ( $\Delta_{\text{Age}}$ )



Dynamical traceback ages are younger than ages from evolutionary models

# Synchronising stellar clocks



Miret-Roig et al. 2023

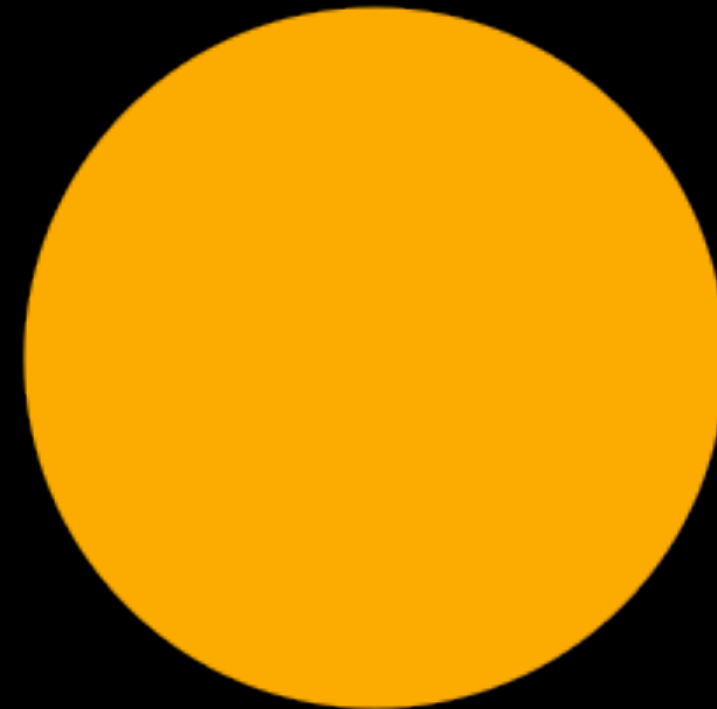
Published on  
Thursday 23.11

**The gas prevents the free expansion of stars until dispersed.**

Similar offset in extragalactic studies, see Chevance et al. 2020  
Similar offset in simulations, see Dobbs et al. 2022, Guszejnov et al. 2022, Jeffreson et al. 2023

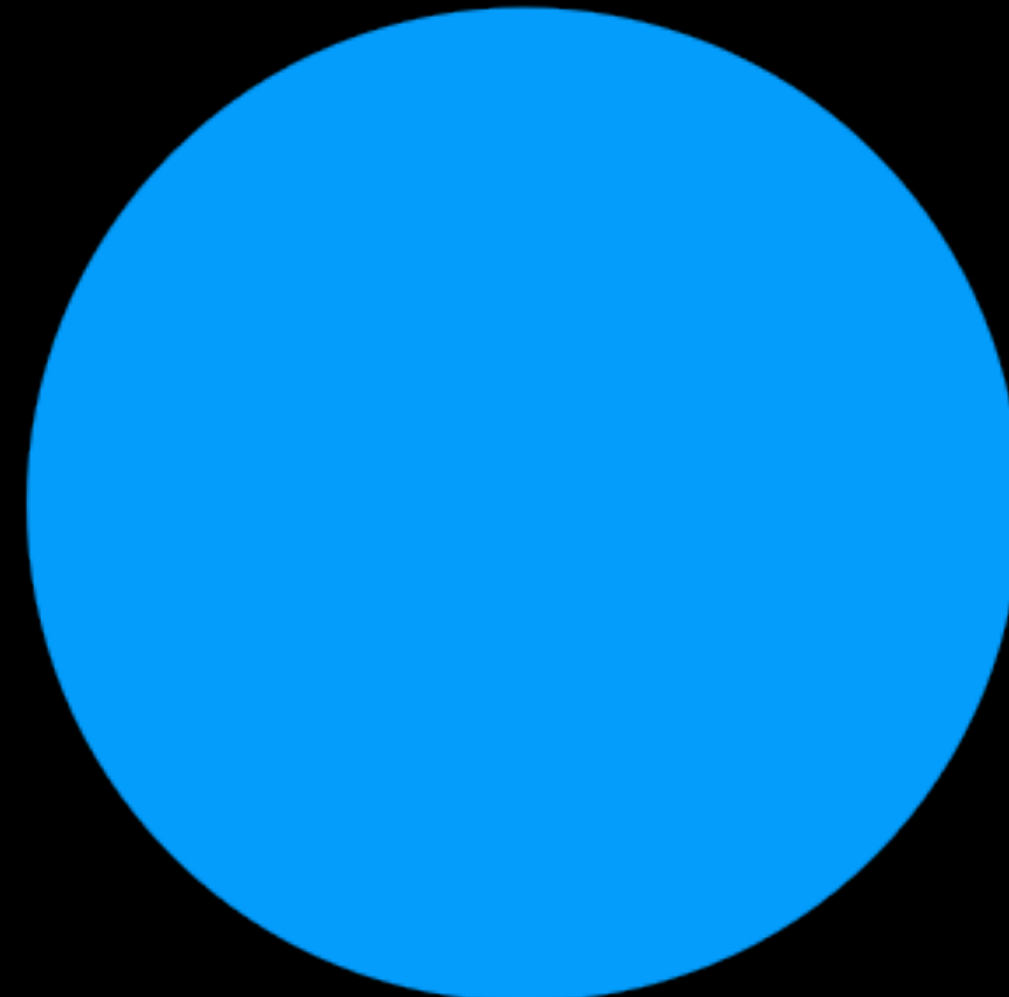
# Synchronising stellar clocks

How old are you?



The Sun

I accreted most of my gas  
23 Myr ago.



$\beta$  Pictoris

But I left my family  
19 Myr ago.

Miret-Roig et al. 2023

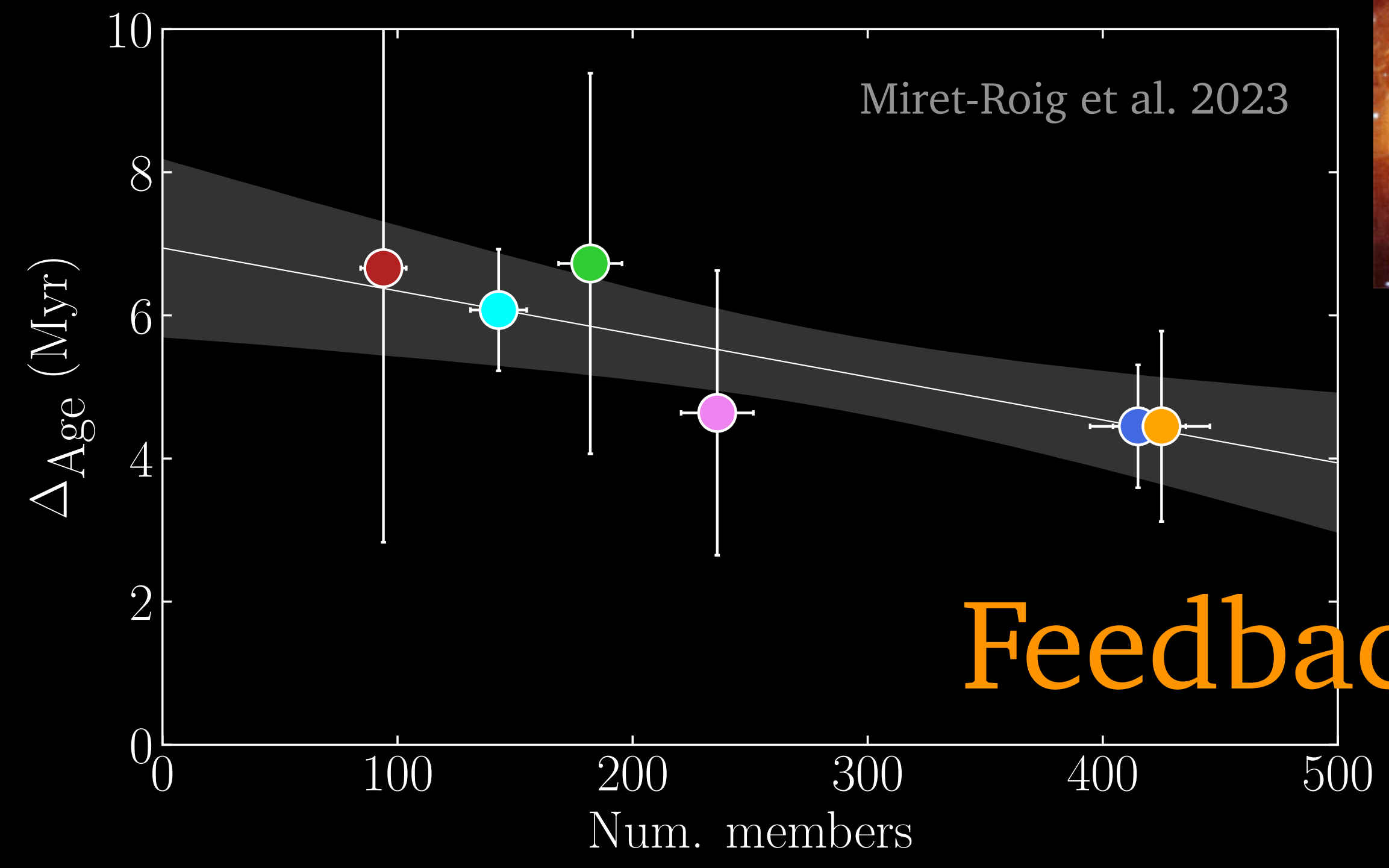
Published on  
Thursday 23.11



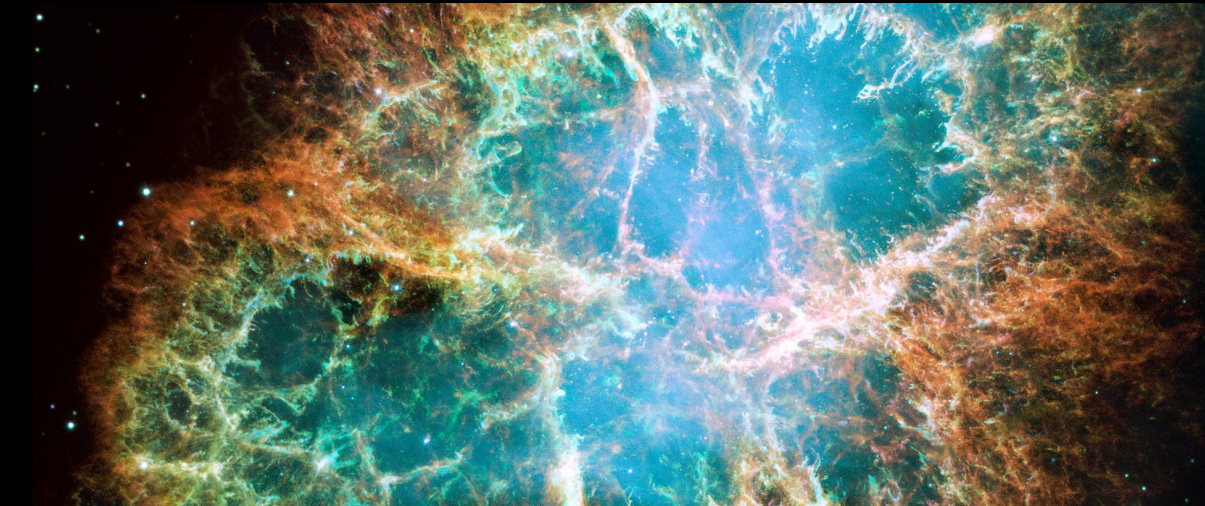
# $\Delta_{Age}$ and environment

- $\rho$  Oph
- $\beta$  Sco
- $\beta$  Pic
- $\nu$  Sco
- $\delta$  Sco
- Tuc-Hor

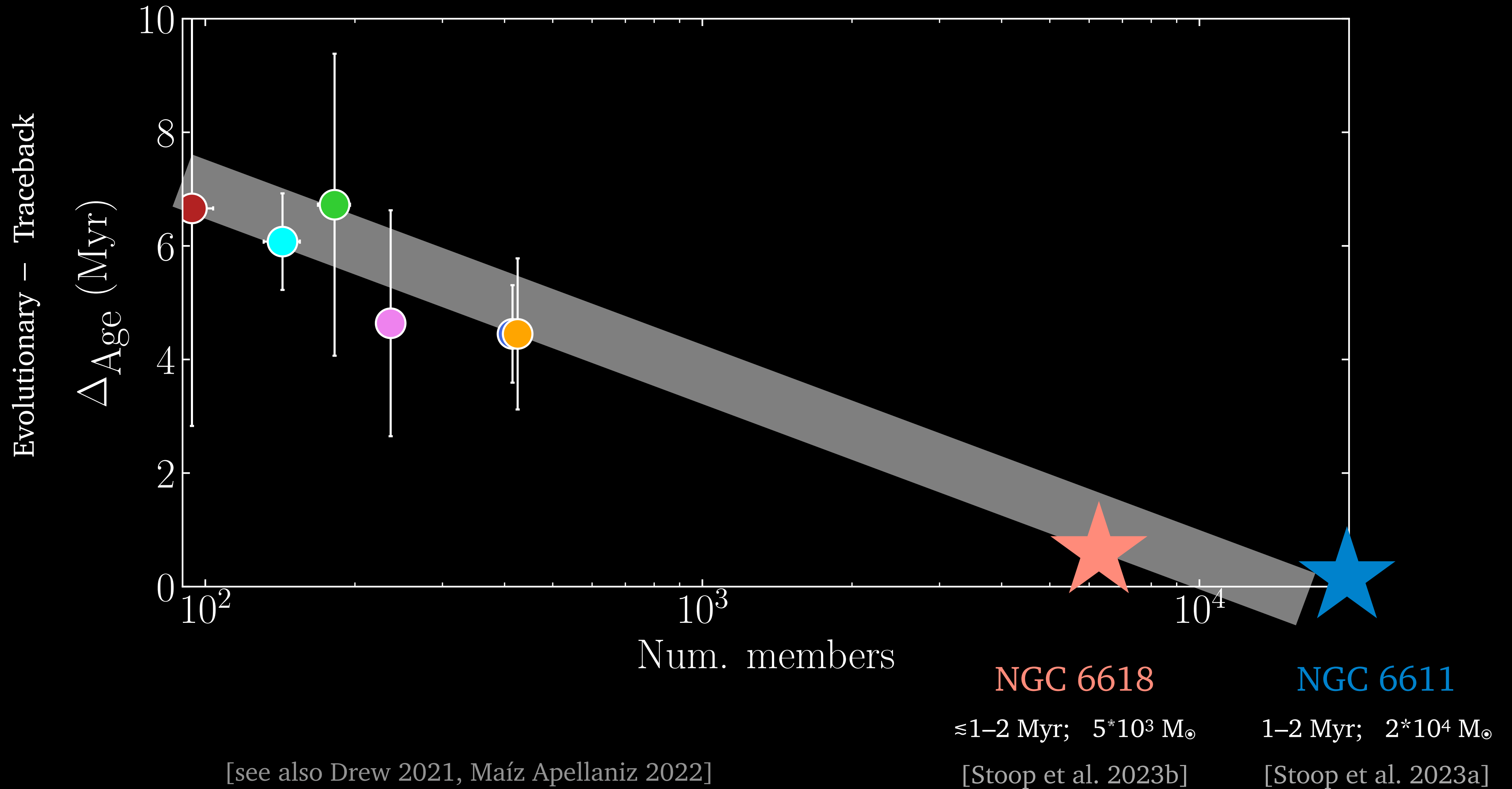
Evolutionary – Dynamical



## Feedback?

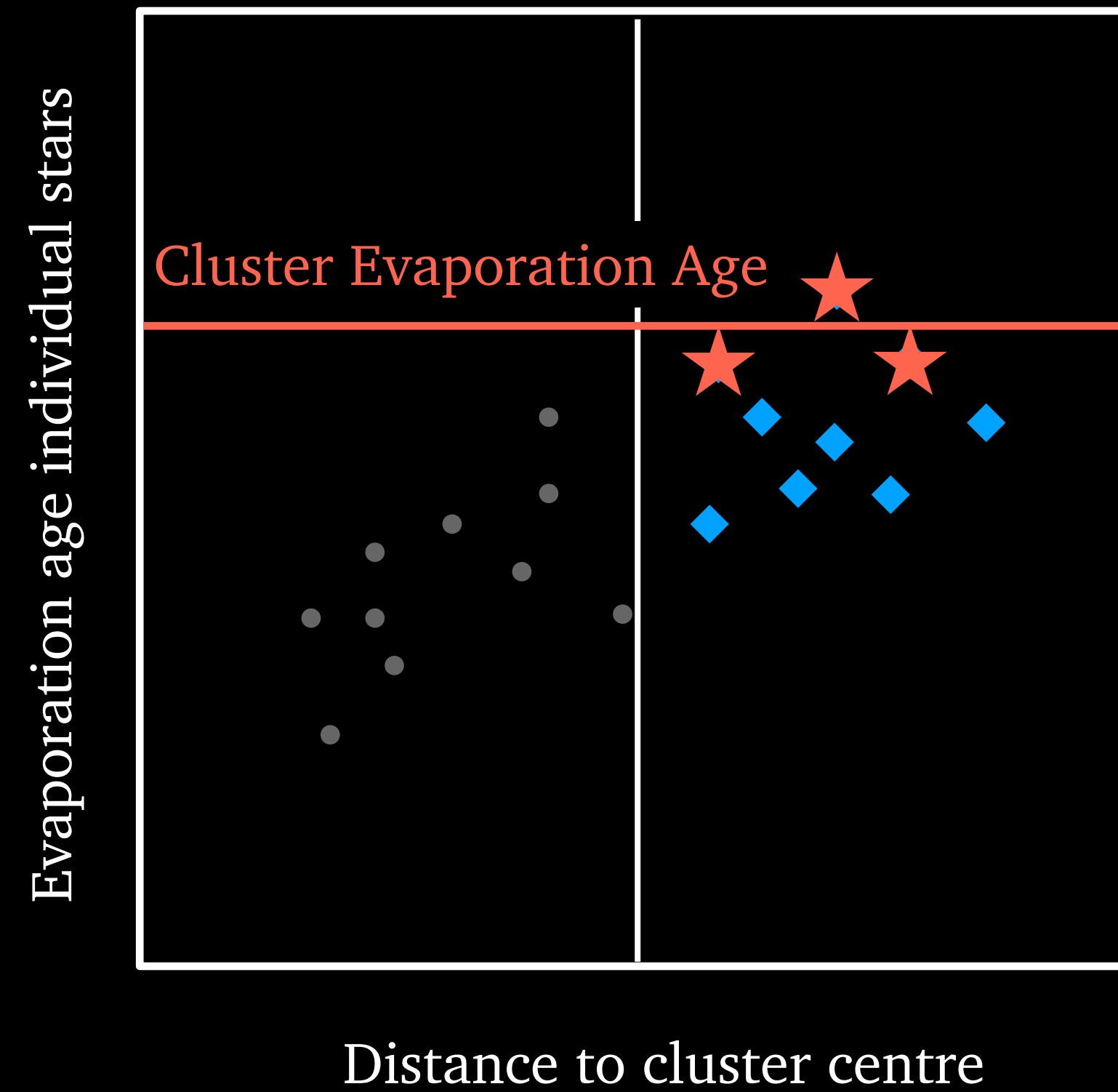
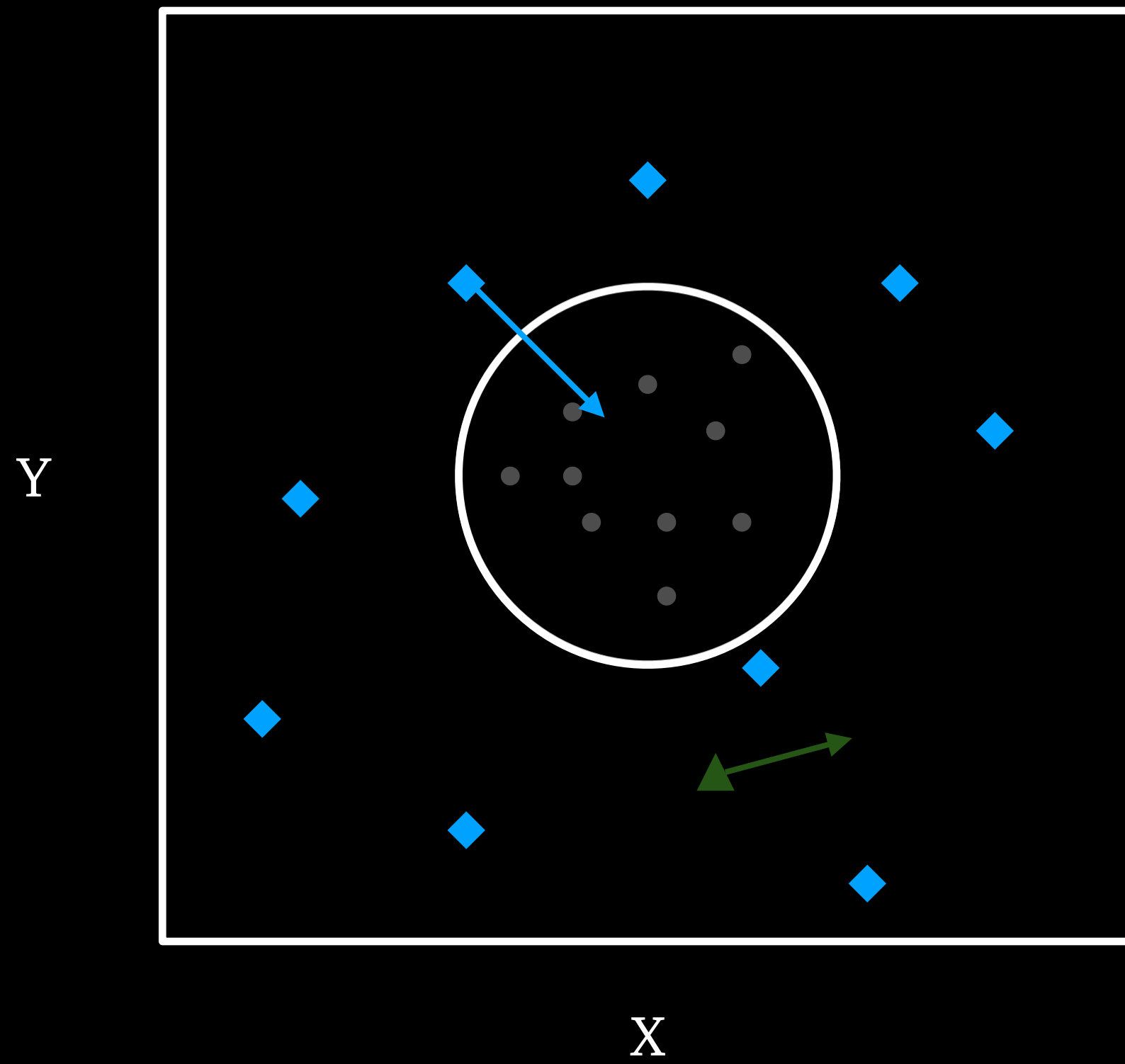


# $\Delta_{\text{Age}}$ and environment



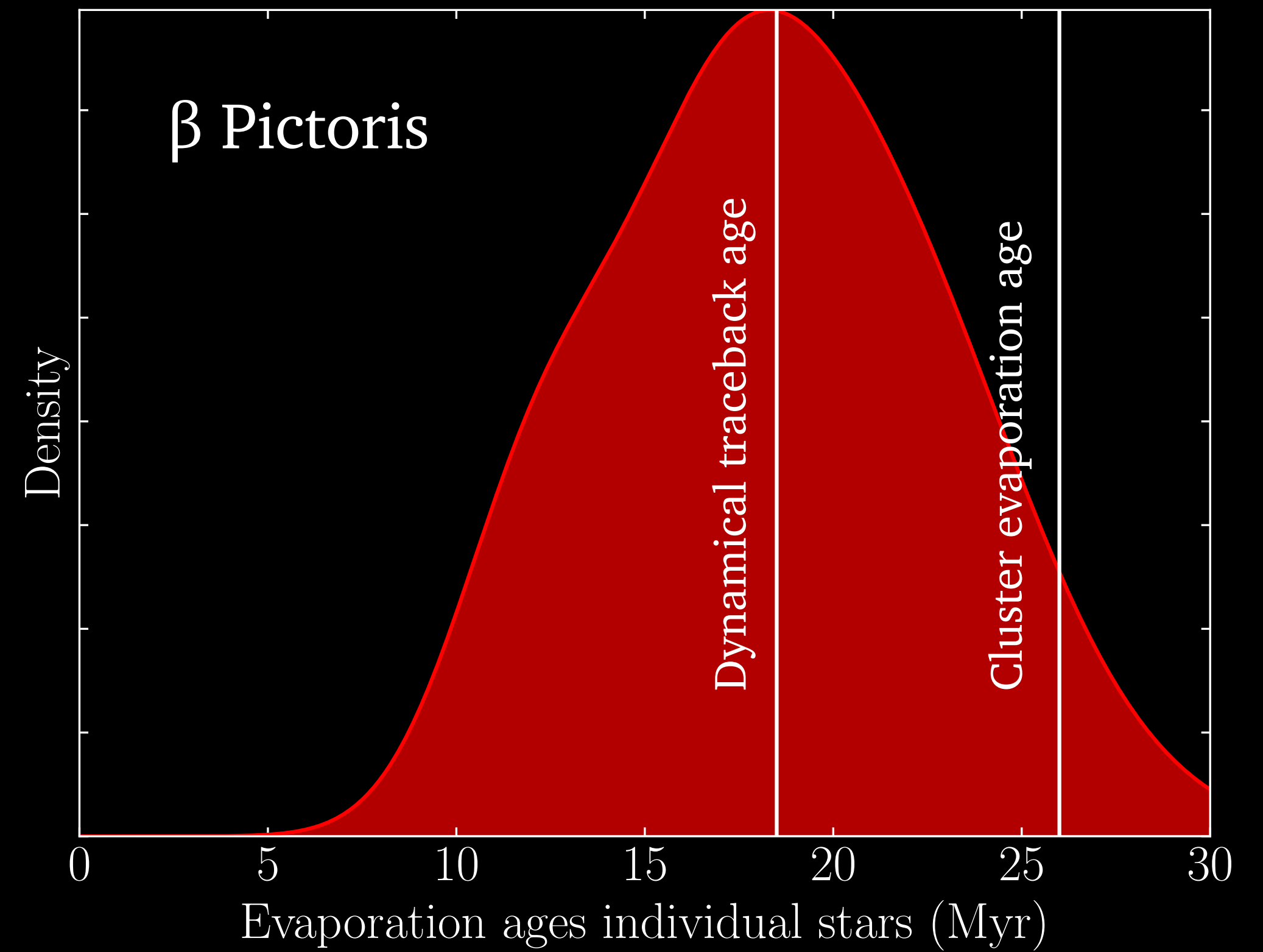
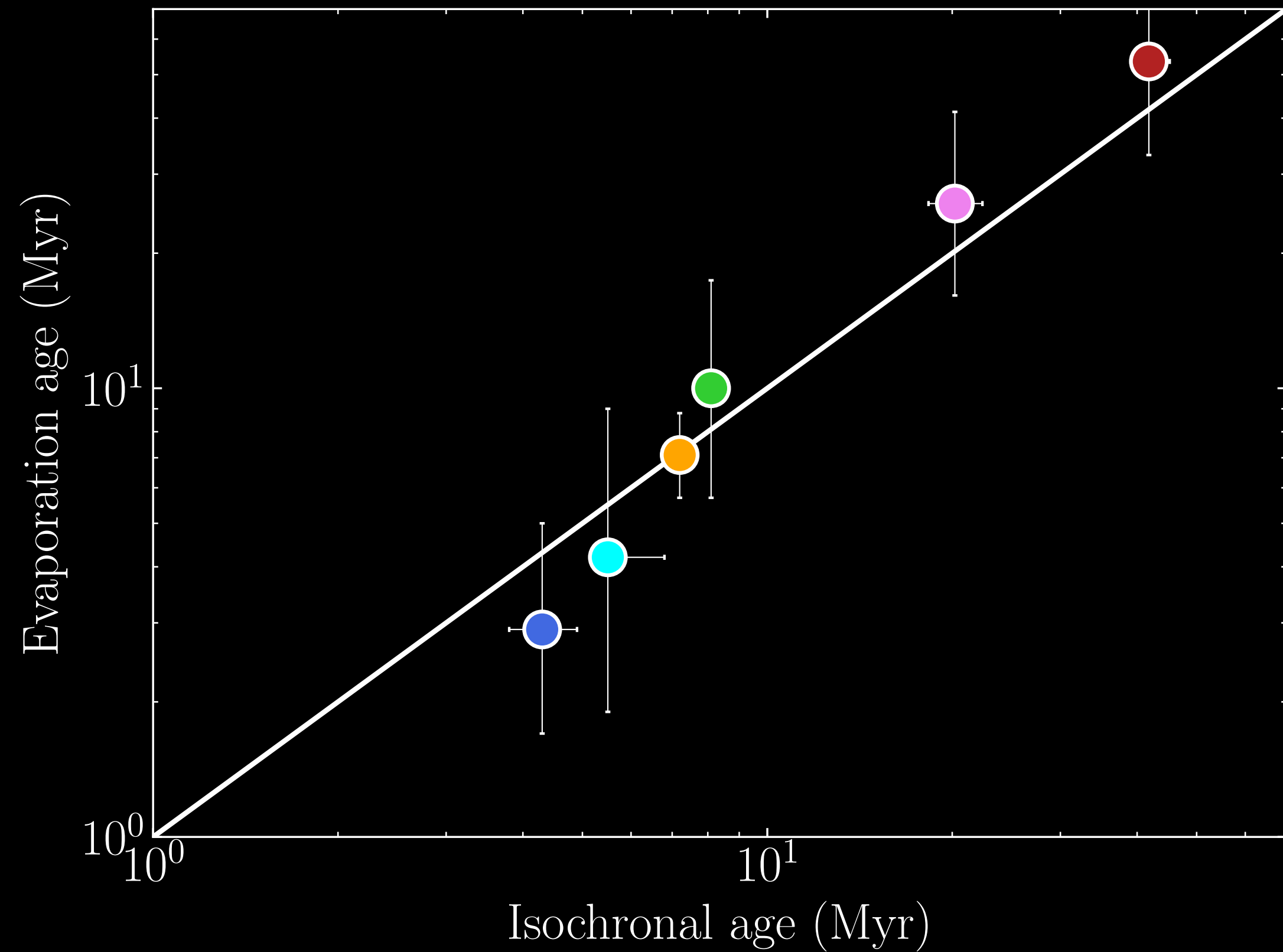


# Evaporation ages

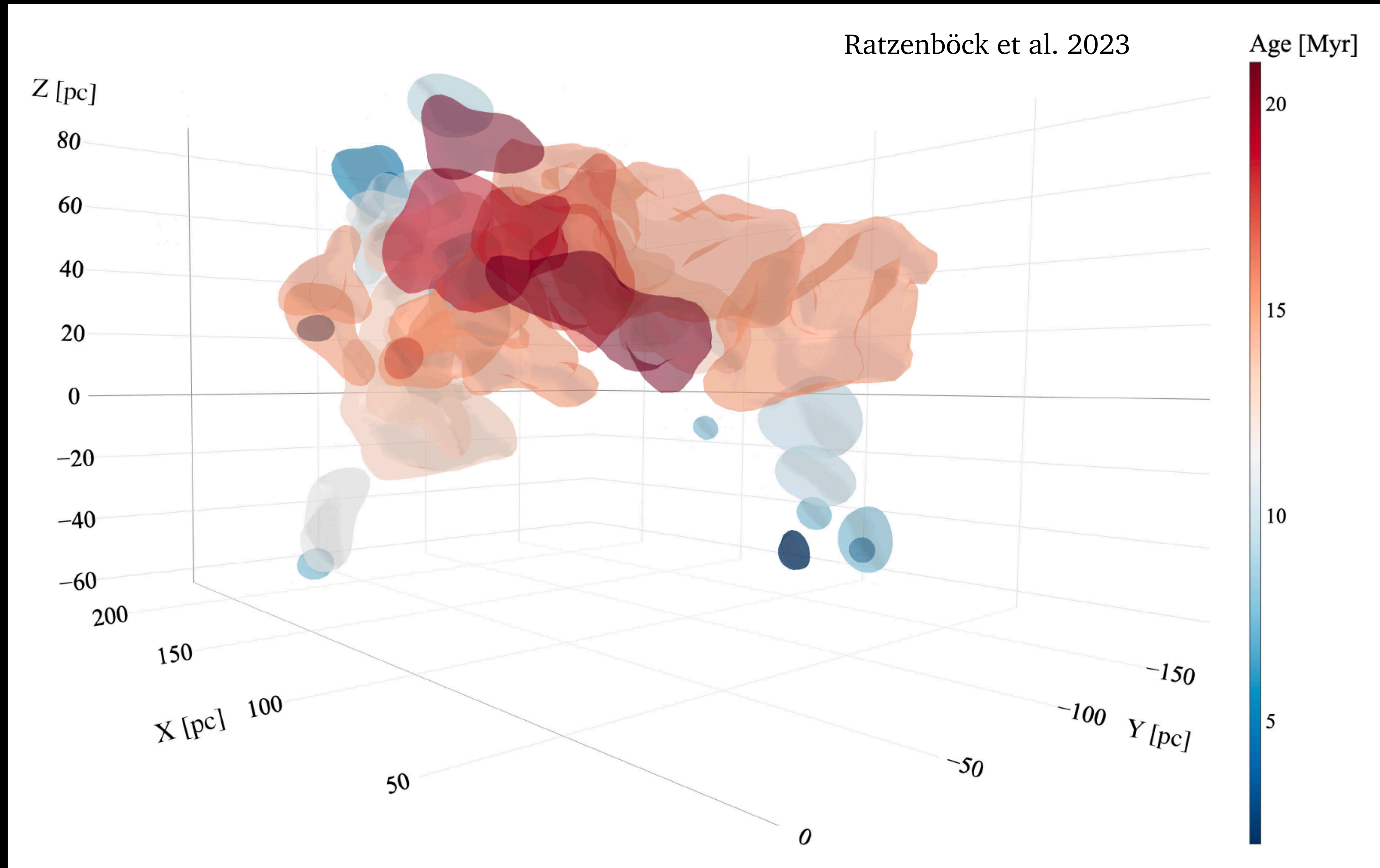


# Evaporation ages

- $\beta$  Pic
- $\beta$  Sco
- $\nu$  Sco
- Tuc-Hor
- $\delta$  Sco
- $\rho$  Oph



# New benchmark sample





*La persistència de la memòria*, Salvador Dalí (1931)

# Summary

Synchronising stellar clocks will shed light on the early stages of **cluster formation**, the timescale of the **gas-embedded phase**, and the **dispersion** of stars into the Galaxy.

