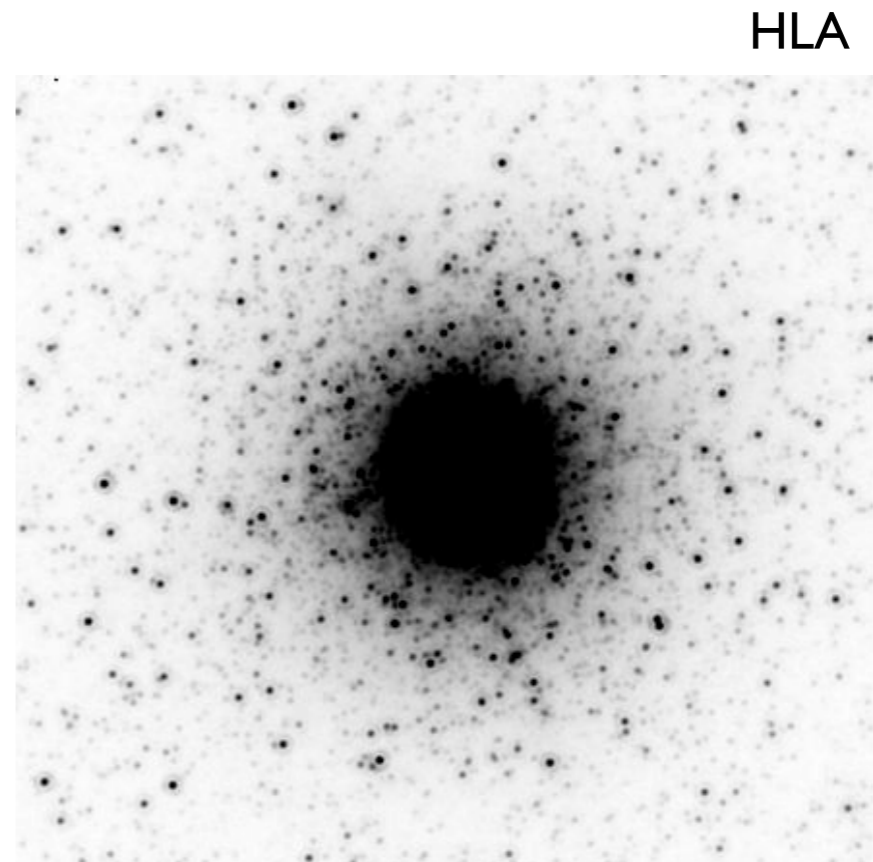
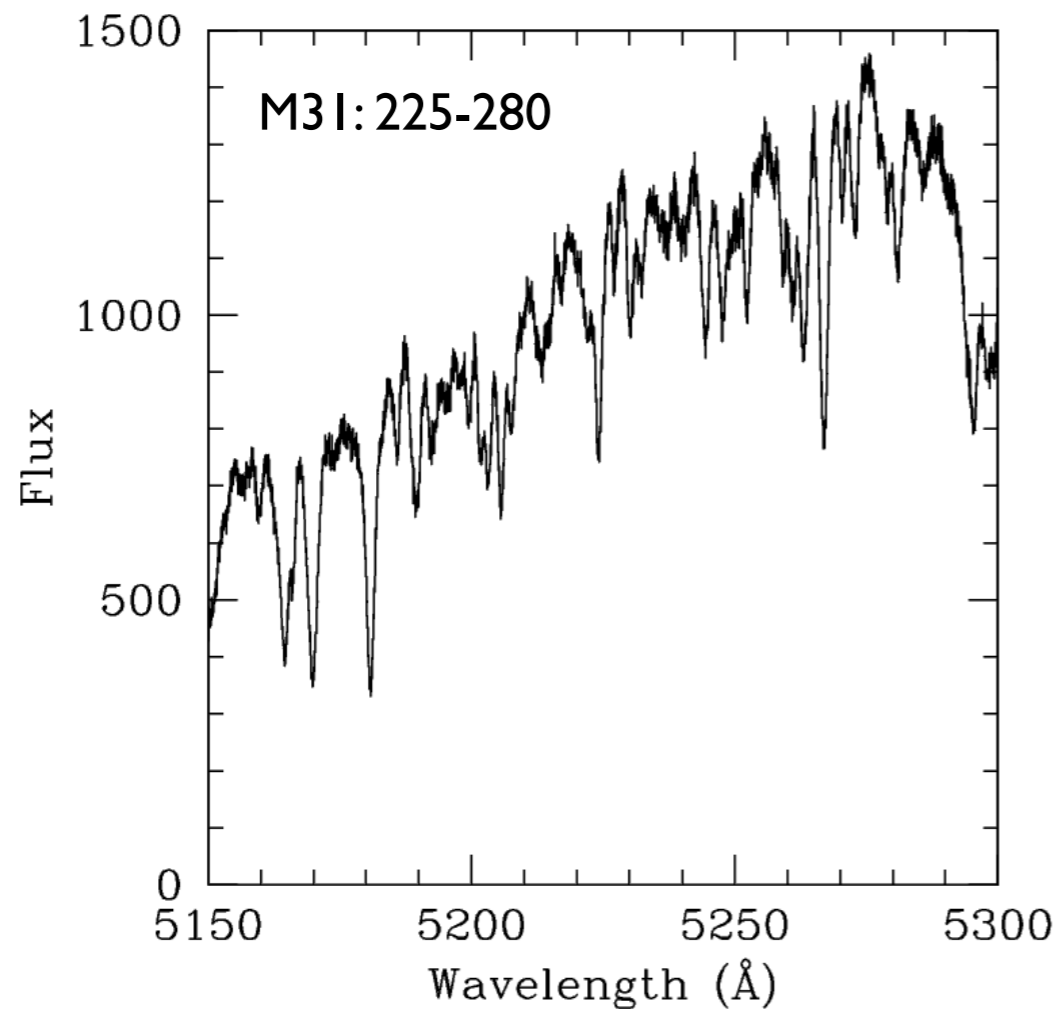


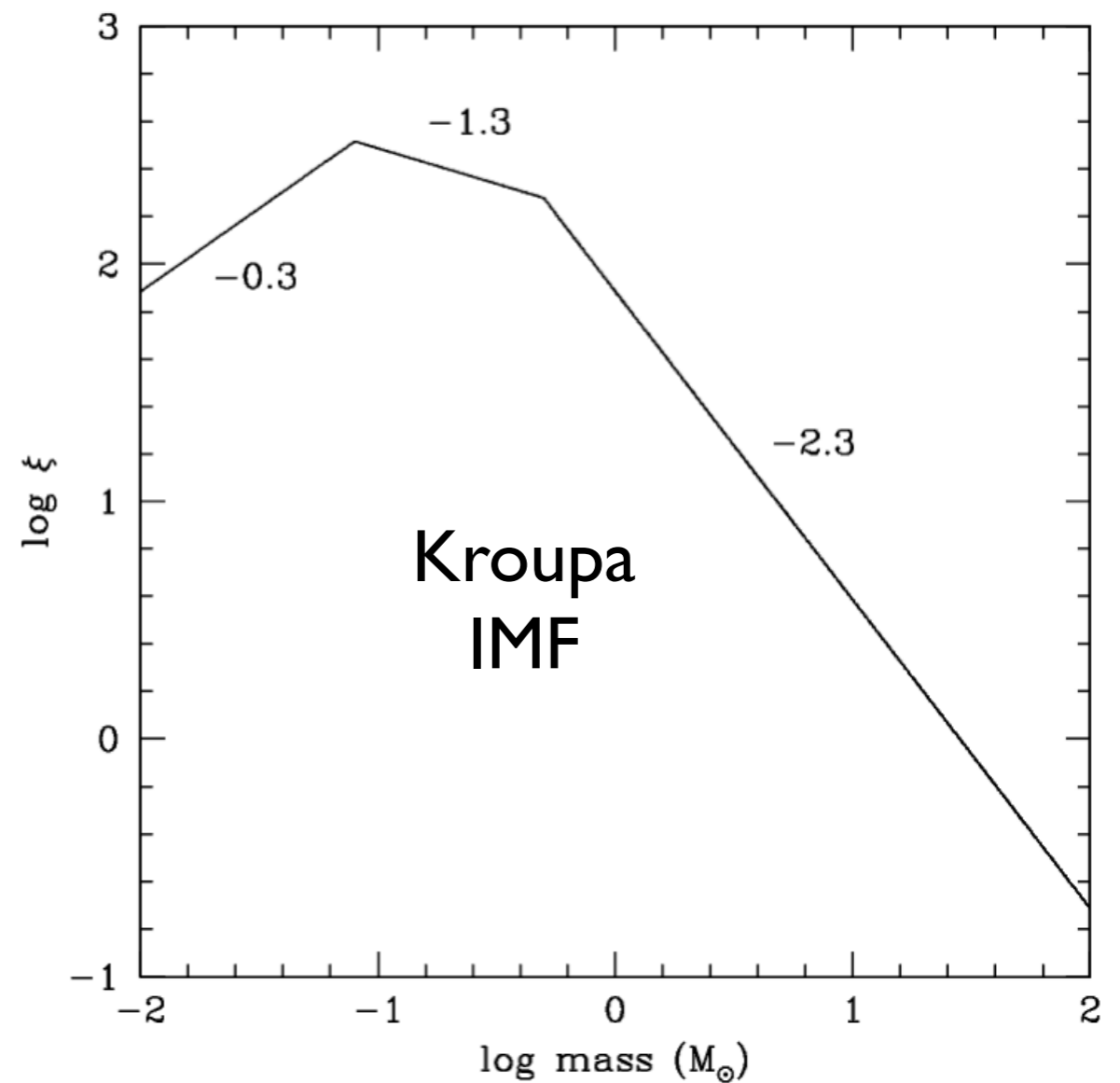
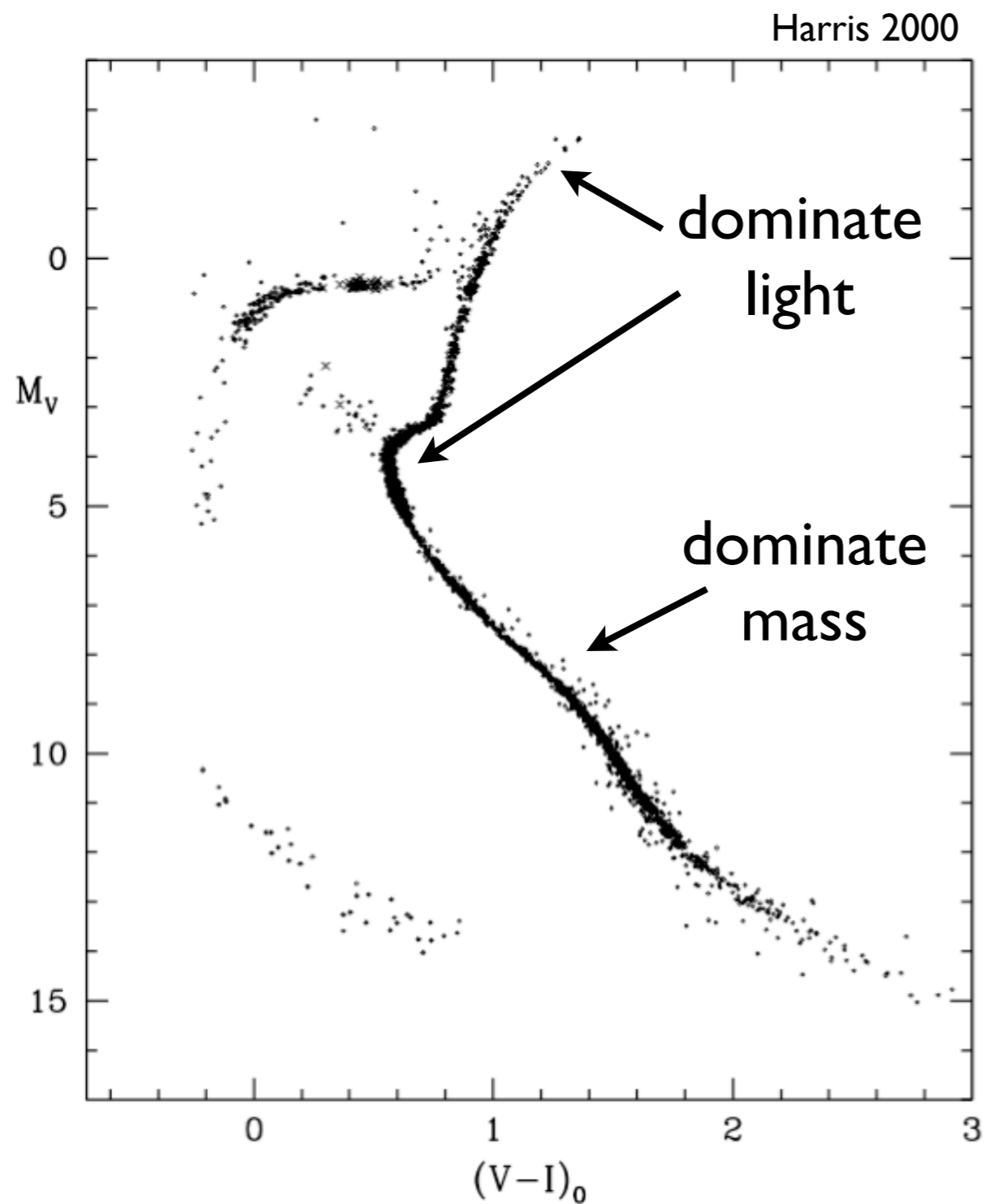
Mass-to-Light Ratios of Globular Clusters in M31 (and the Milky Way)

Jay Strader

(with Nelson Caldwell, Anil Seth, Matt Walker, Mario Mateo)

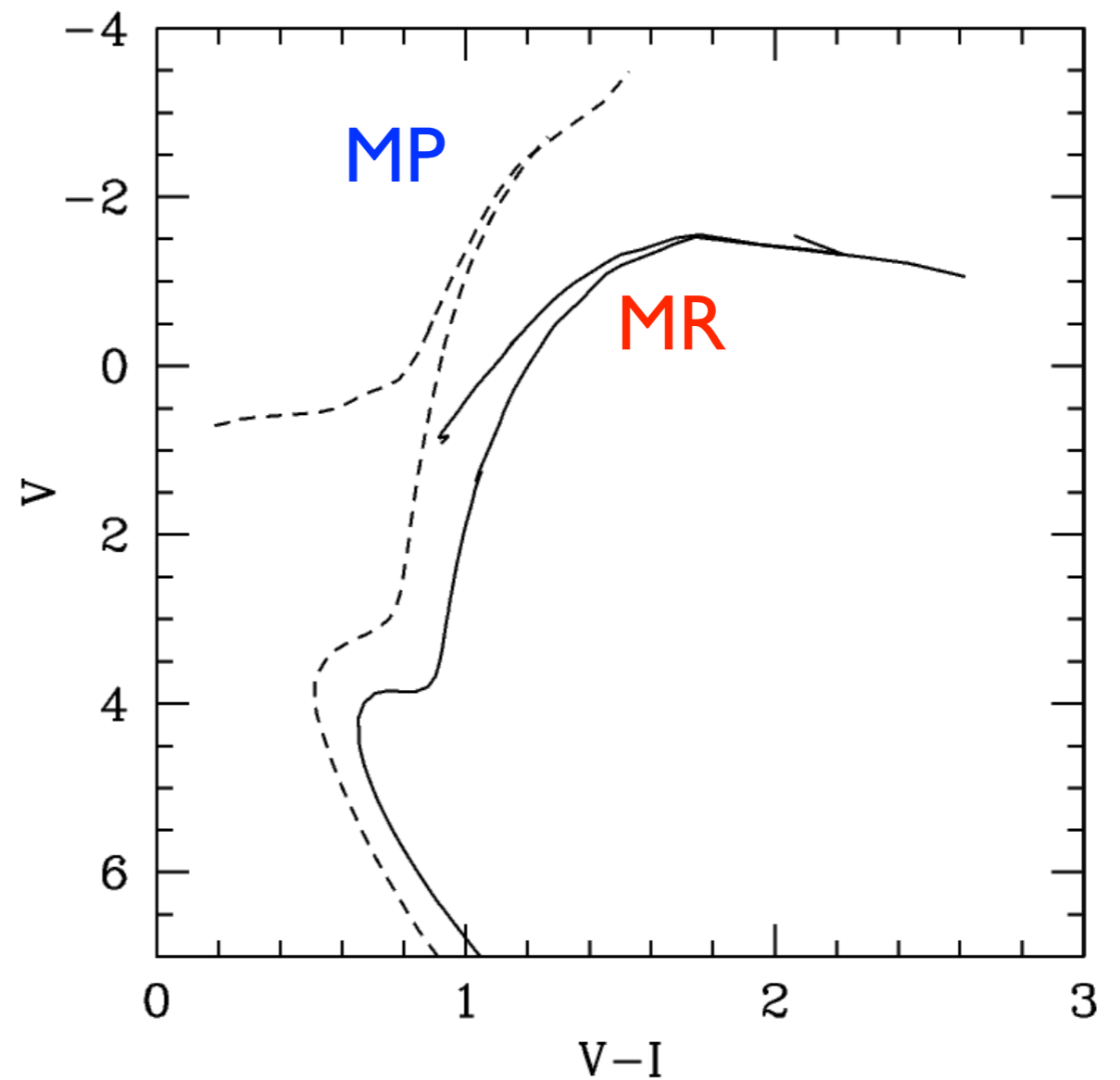
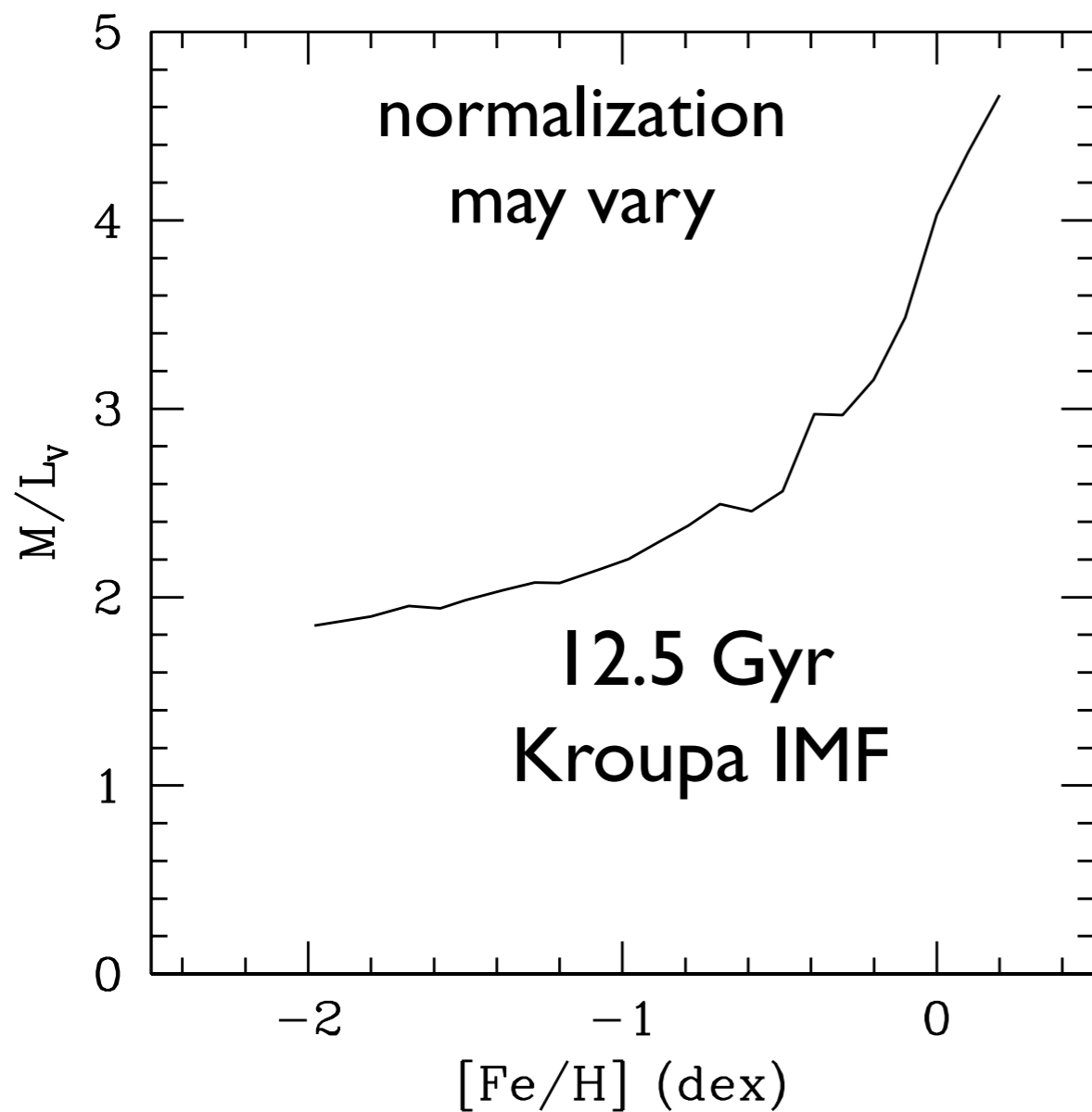


Why Measure M/L?



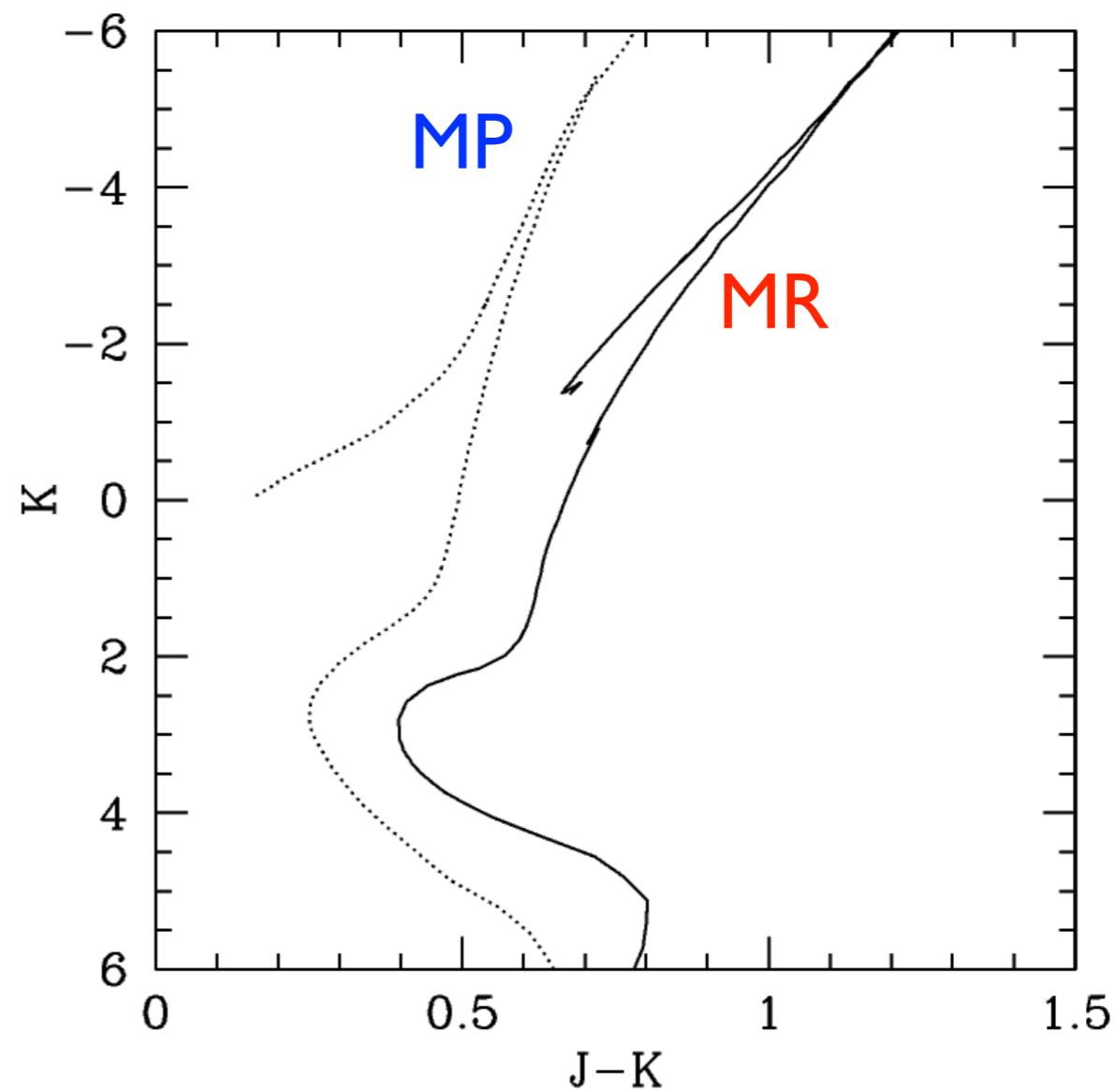
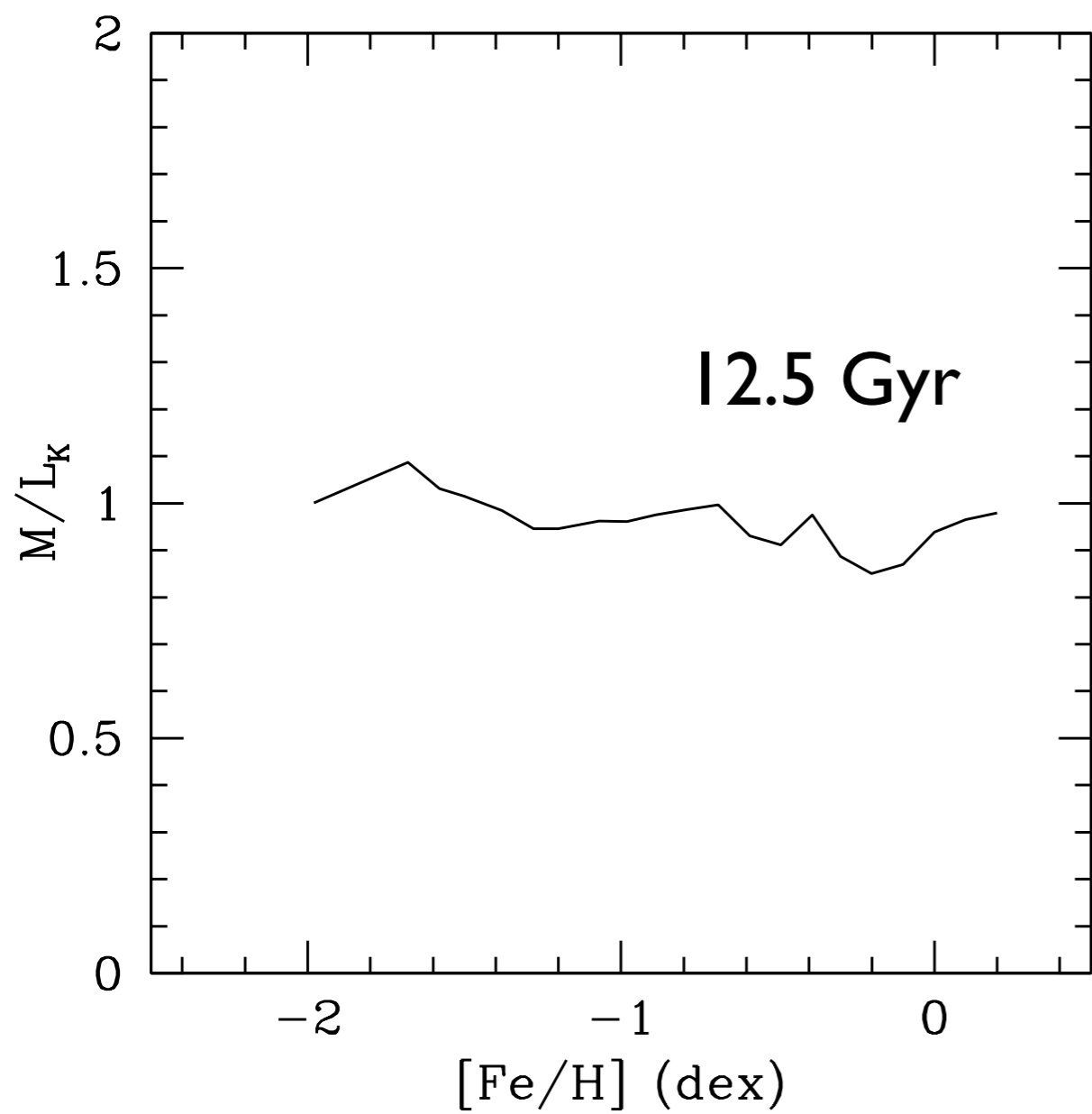
Mass-to-Light and $[Fe/H]$

(in the optical)



Mass-to-Light and $[\text{Fe}/\text{H}]$

(in the near-IR)

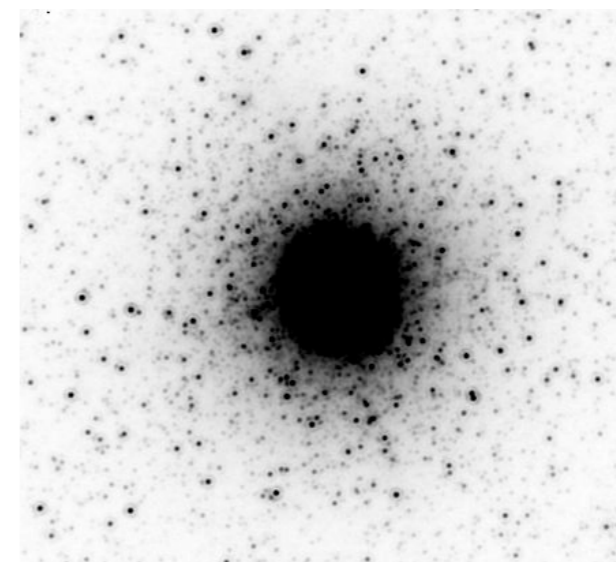
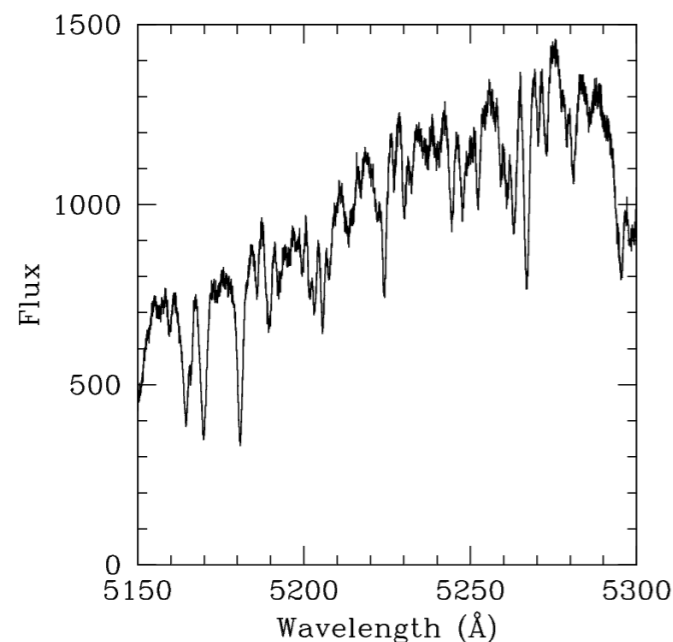


M3 I GCs: Calculating M/L

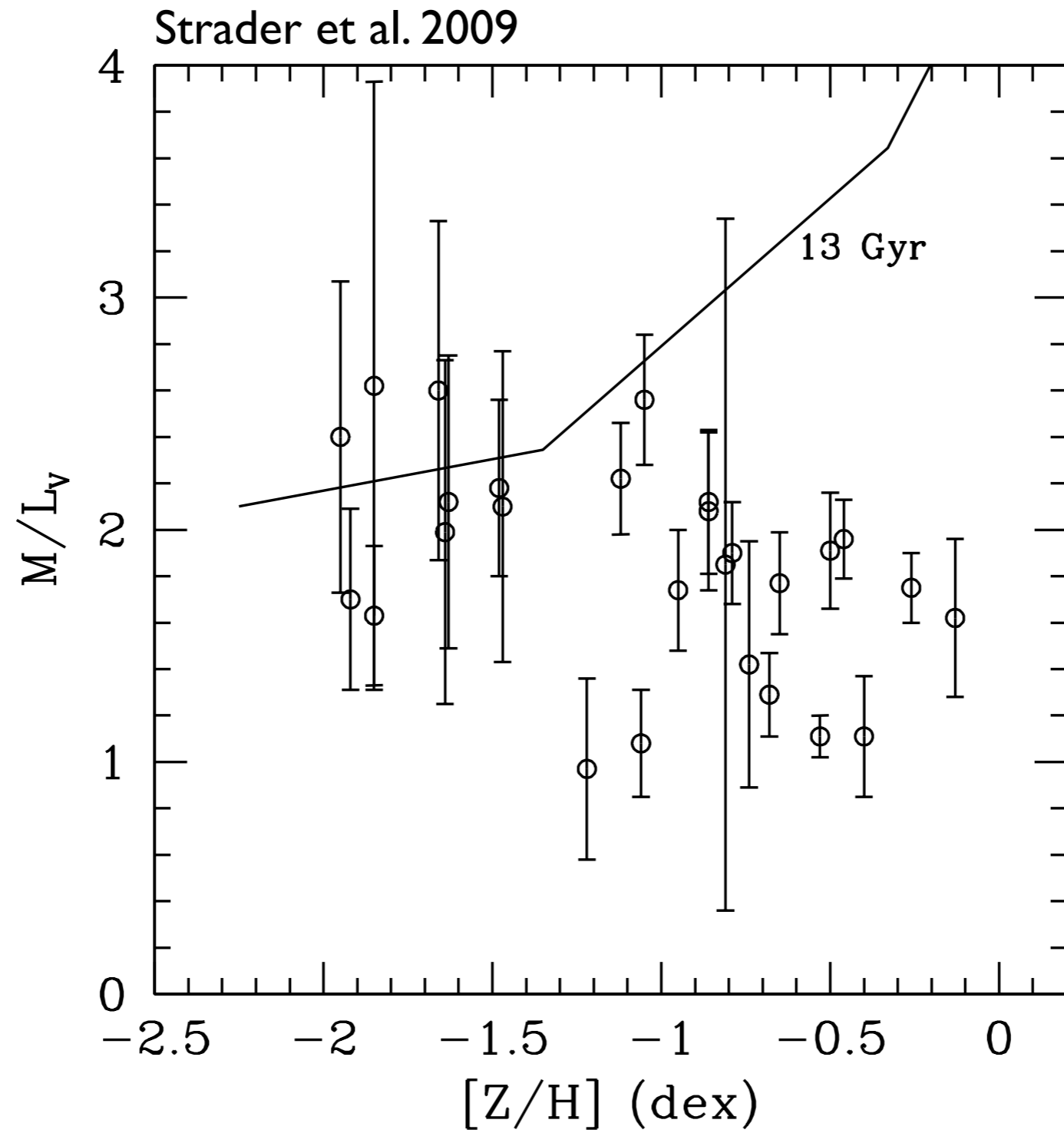
$$M_{\text{vir}} = \frac{7.5\sigma_{\infty}^2 r_{hm}}{G}$$

high-res spectra + cluster
structure

good imaging
(pref HST)

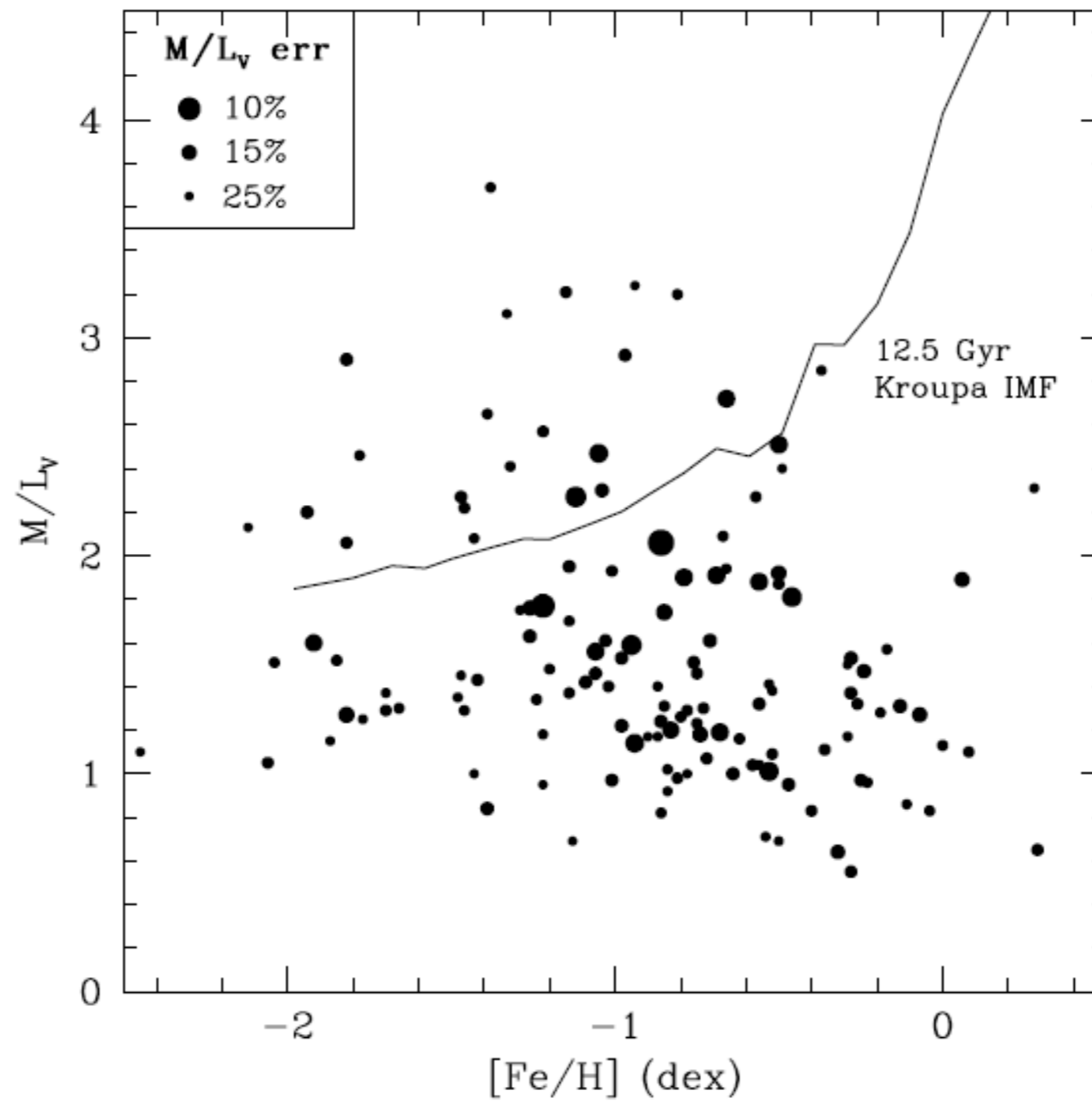


M/L of 27 M31 GCs

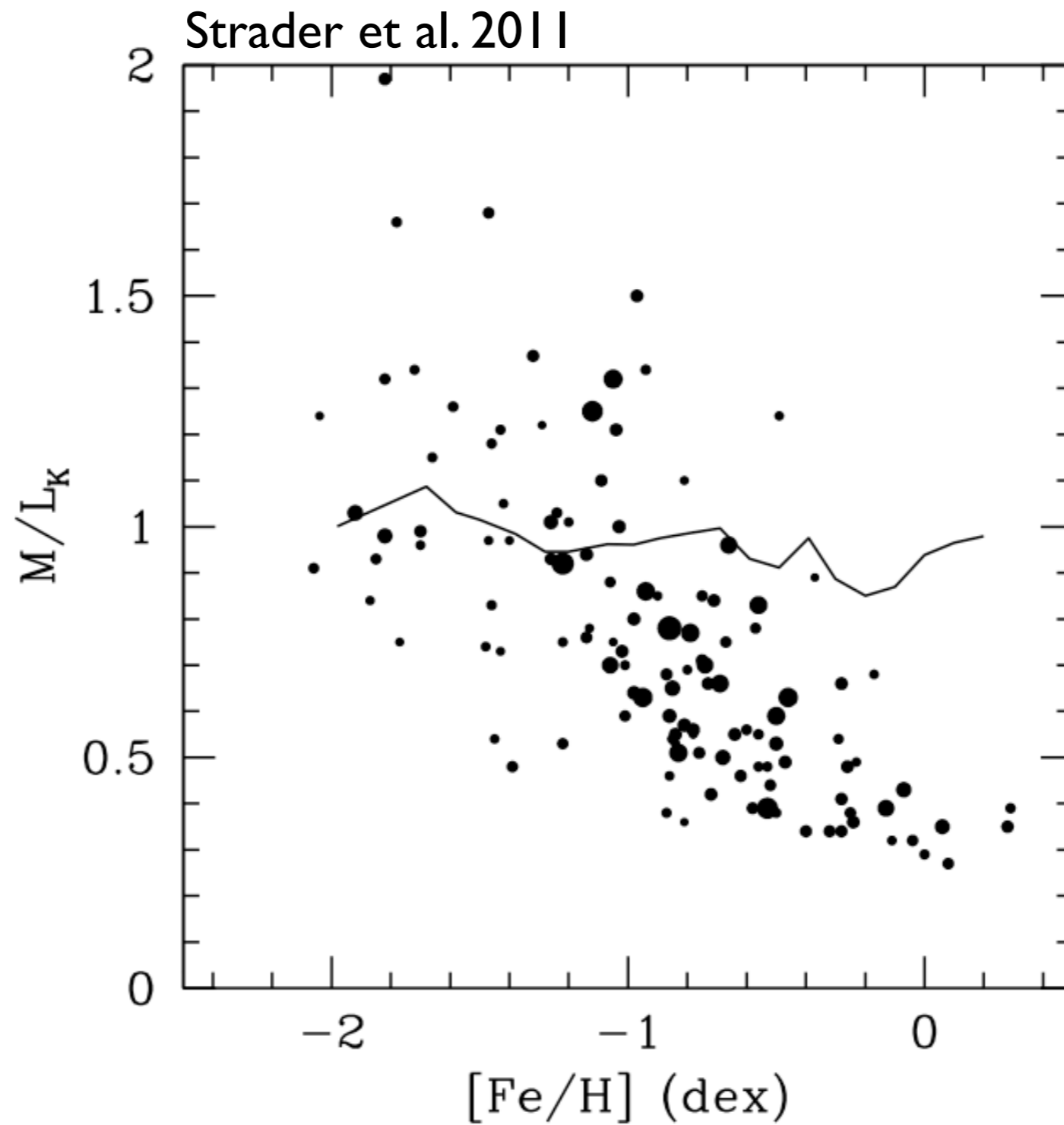


M/L of 131 M31 GCs

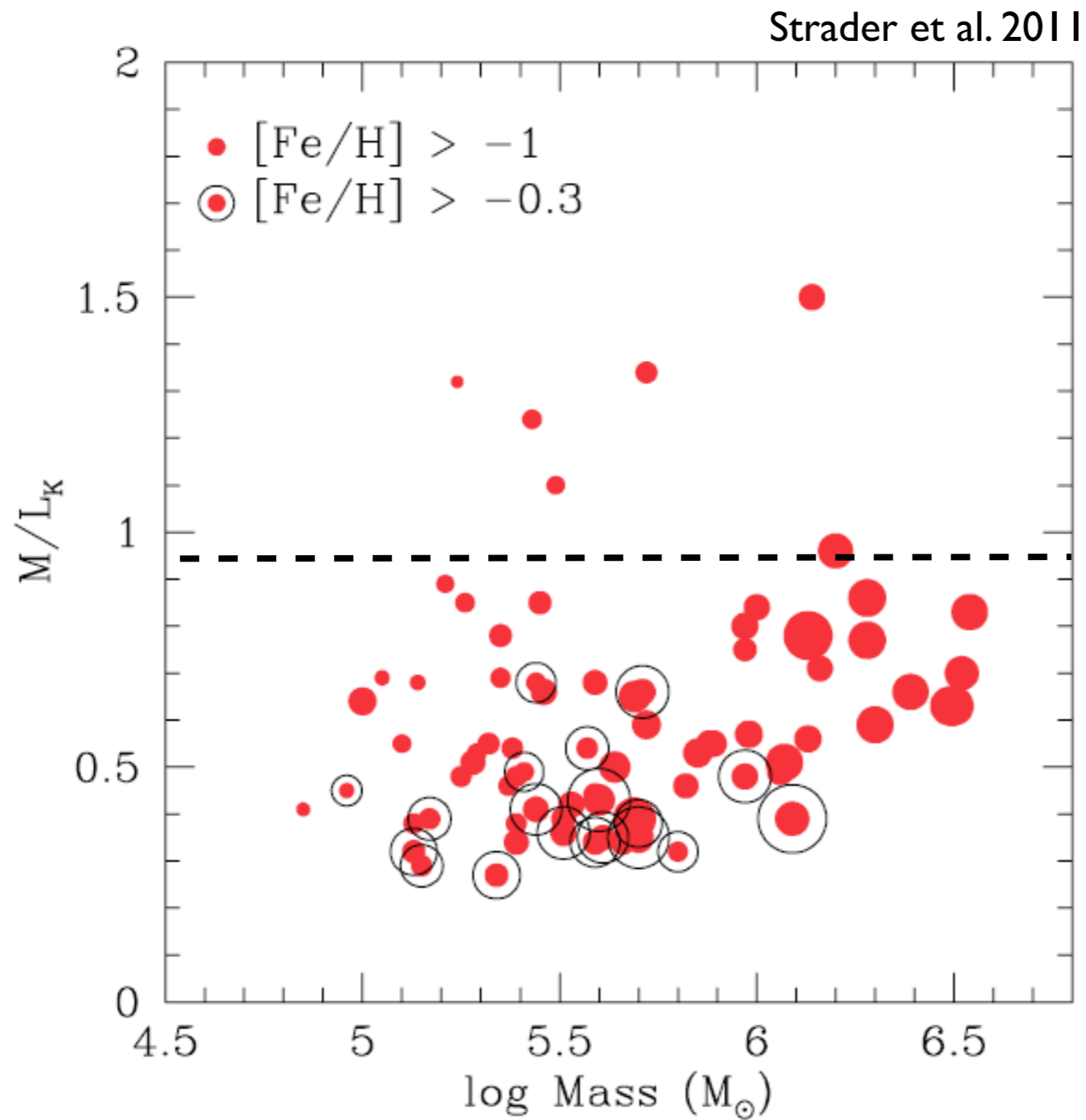
Strader et al. 2011



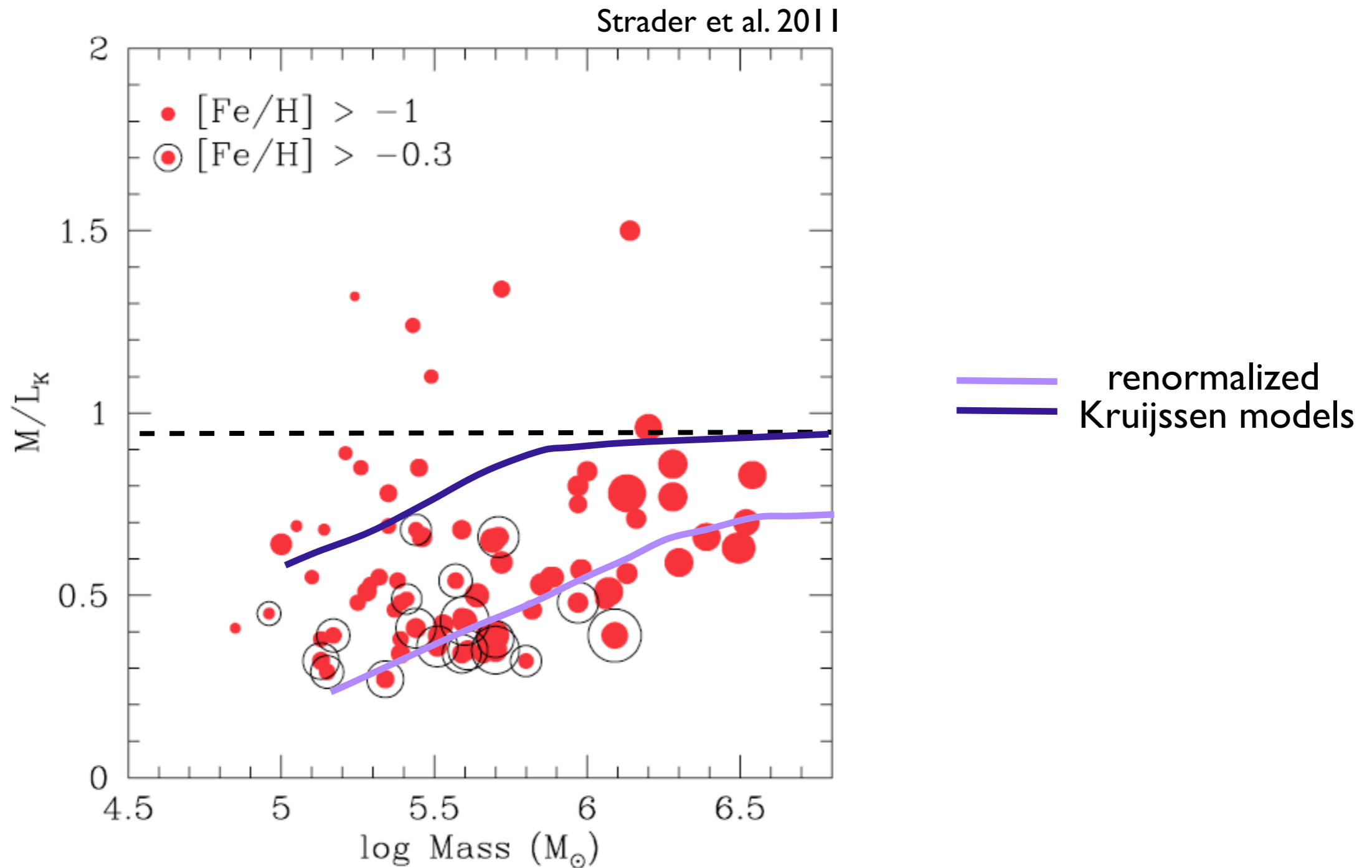
K-band M/L



M/L with Mass



M/L with Mass

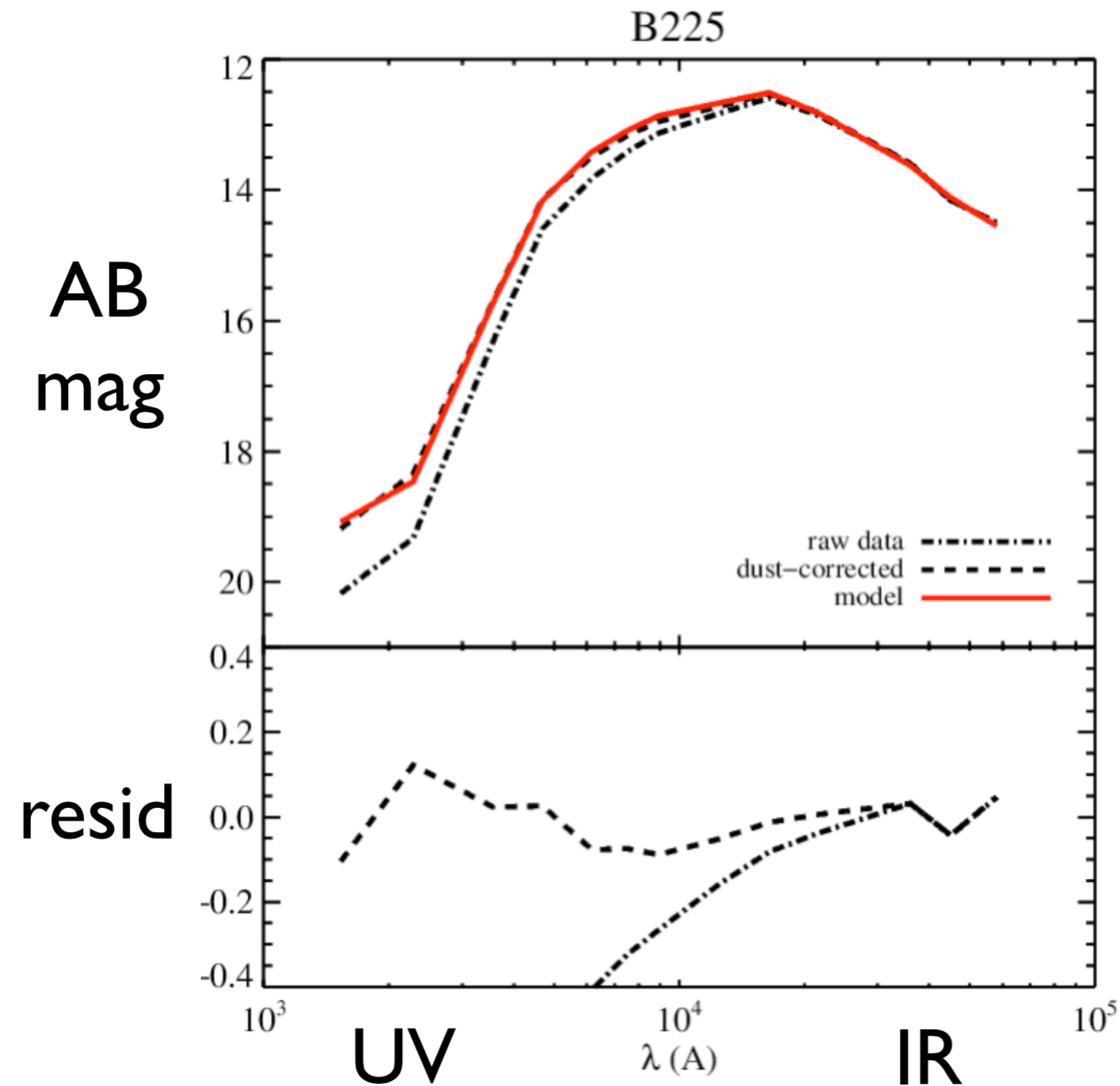


Ways to make M/L low

(i) Add stars with low M/L
(RGB/AGB)

(ii) Remove stars with high M/L
(low-mass dwarfs)

Bolometric Comparison

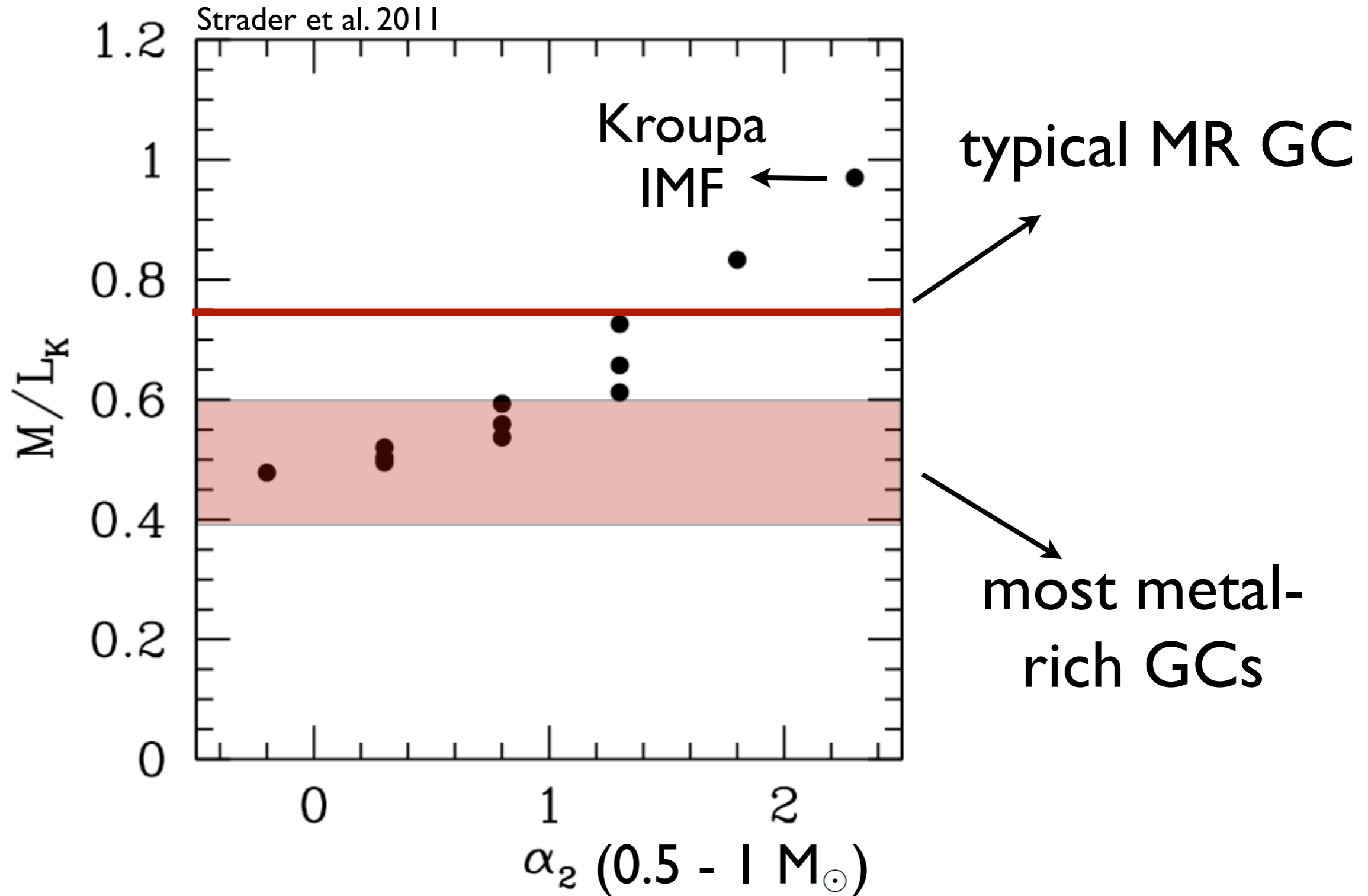


Flux matches!

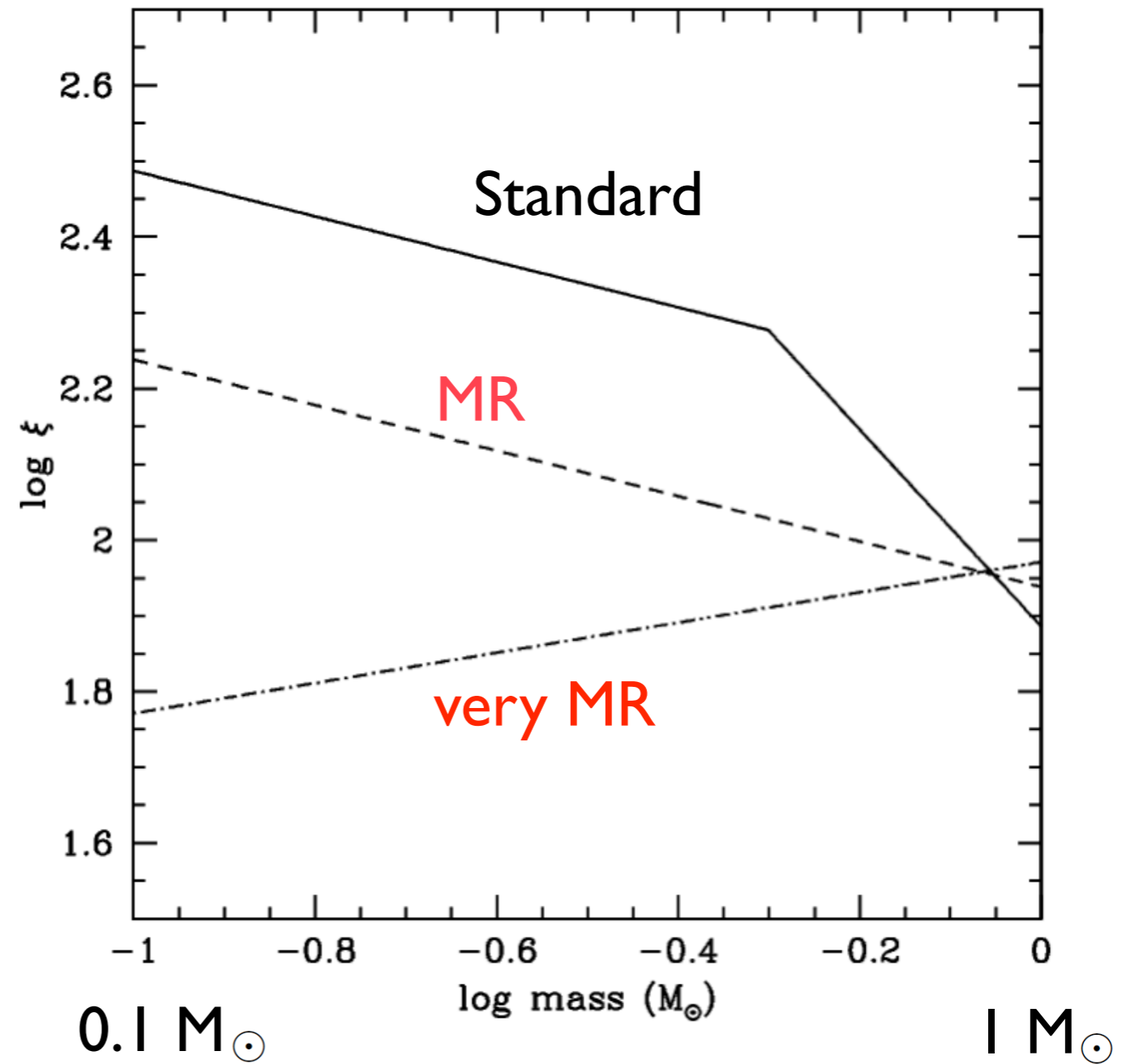
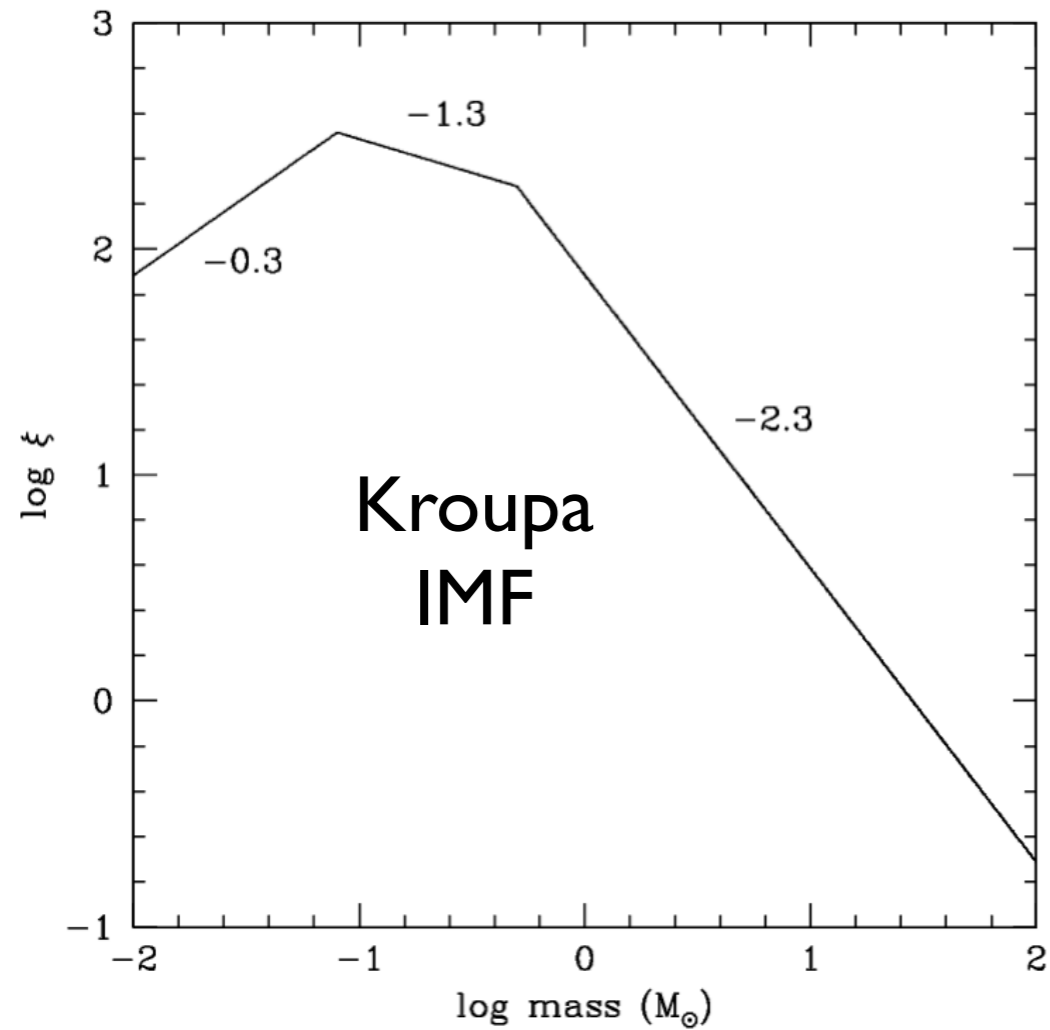


Models cannot lack many red giants.

Mass Function and M/L

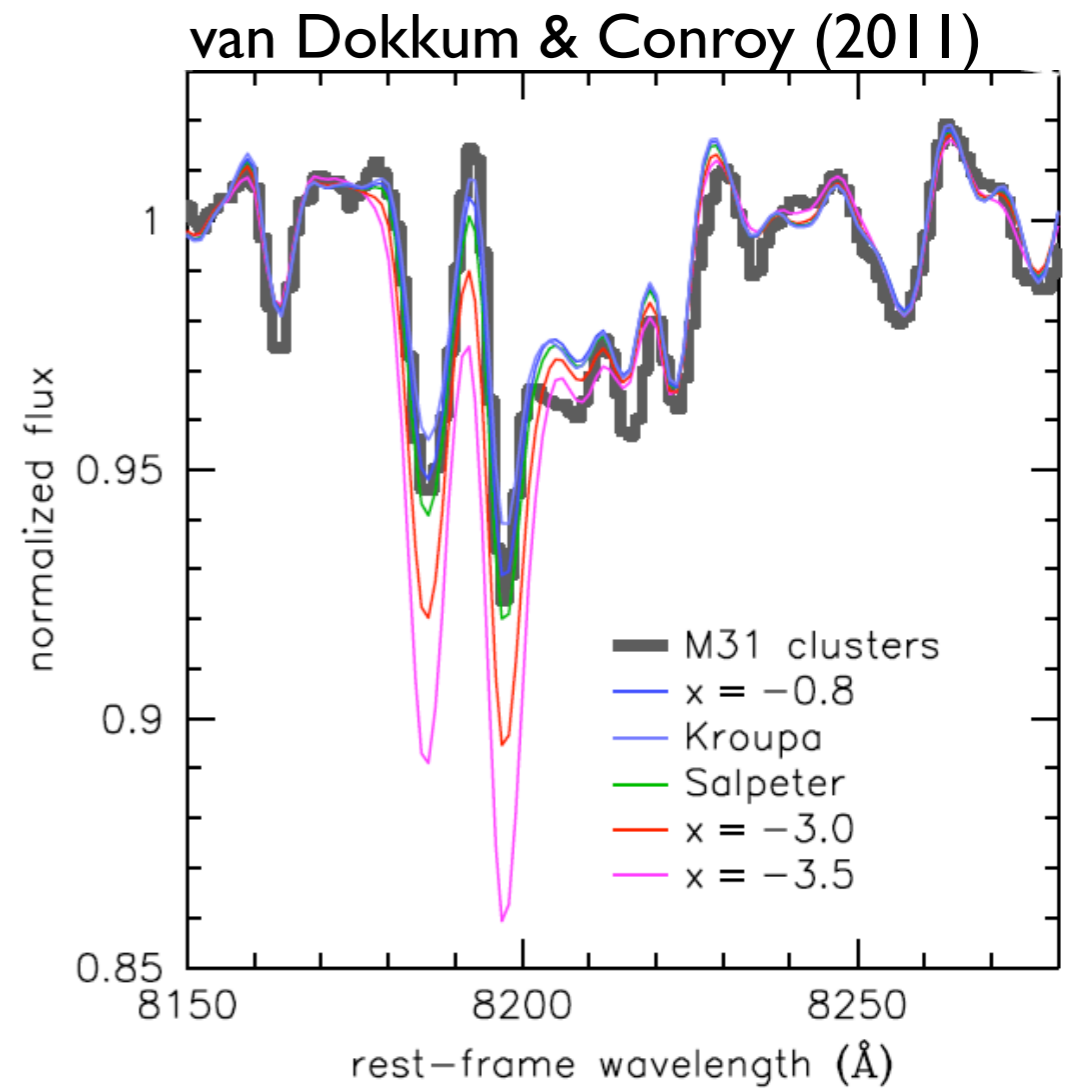
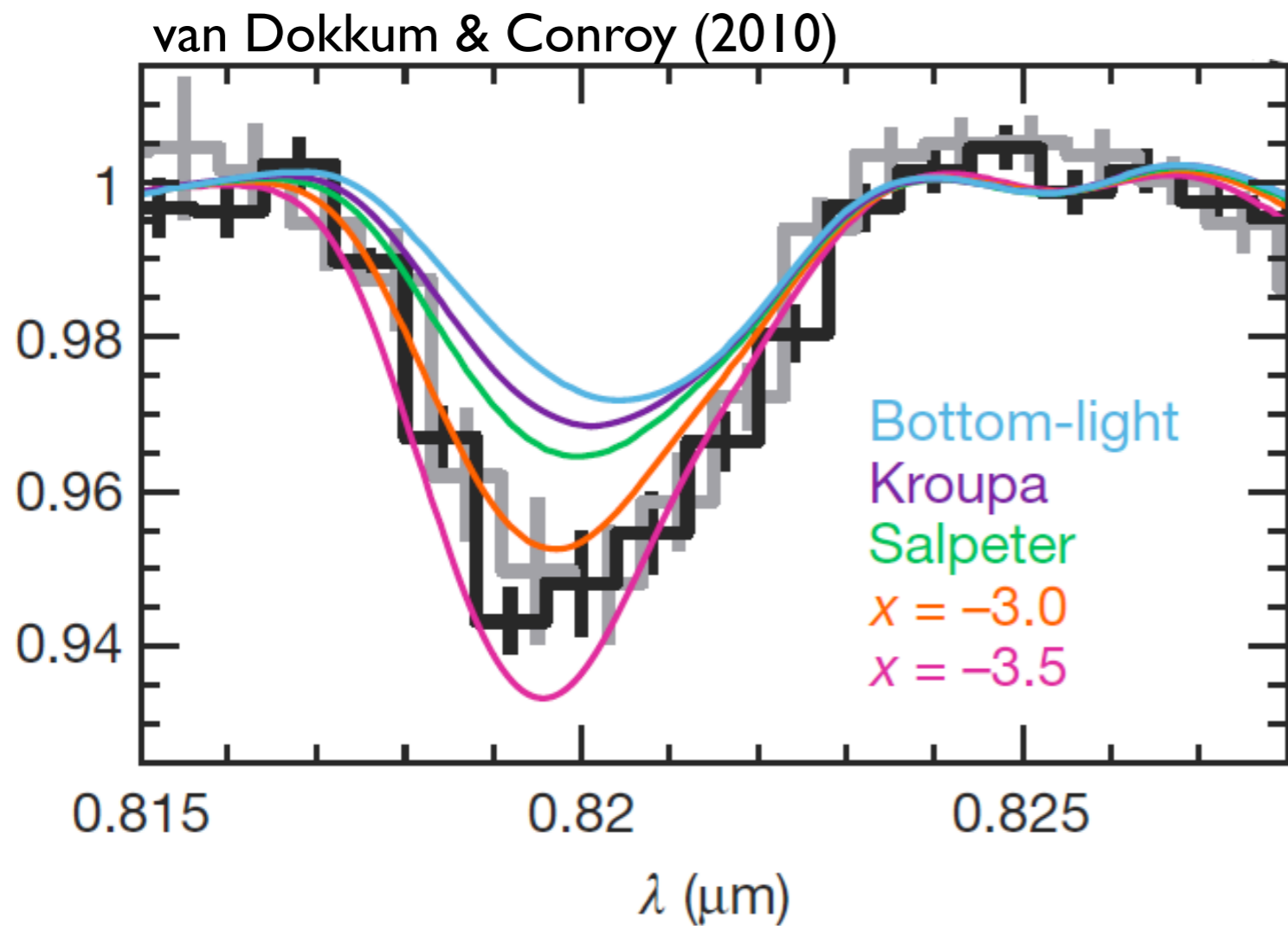


Inferred Mass Functions

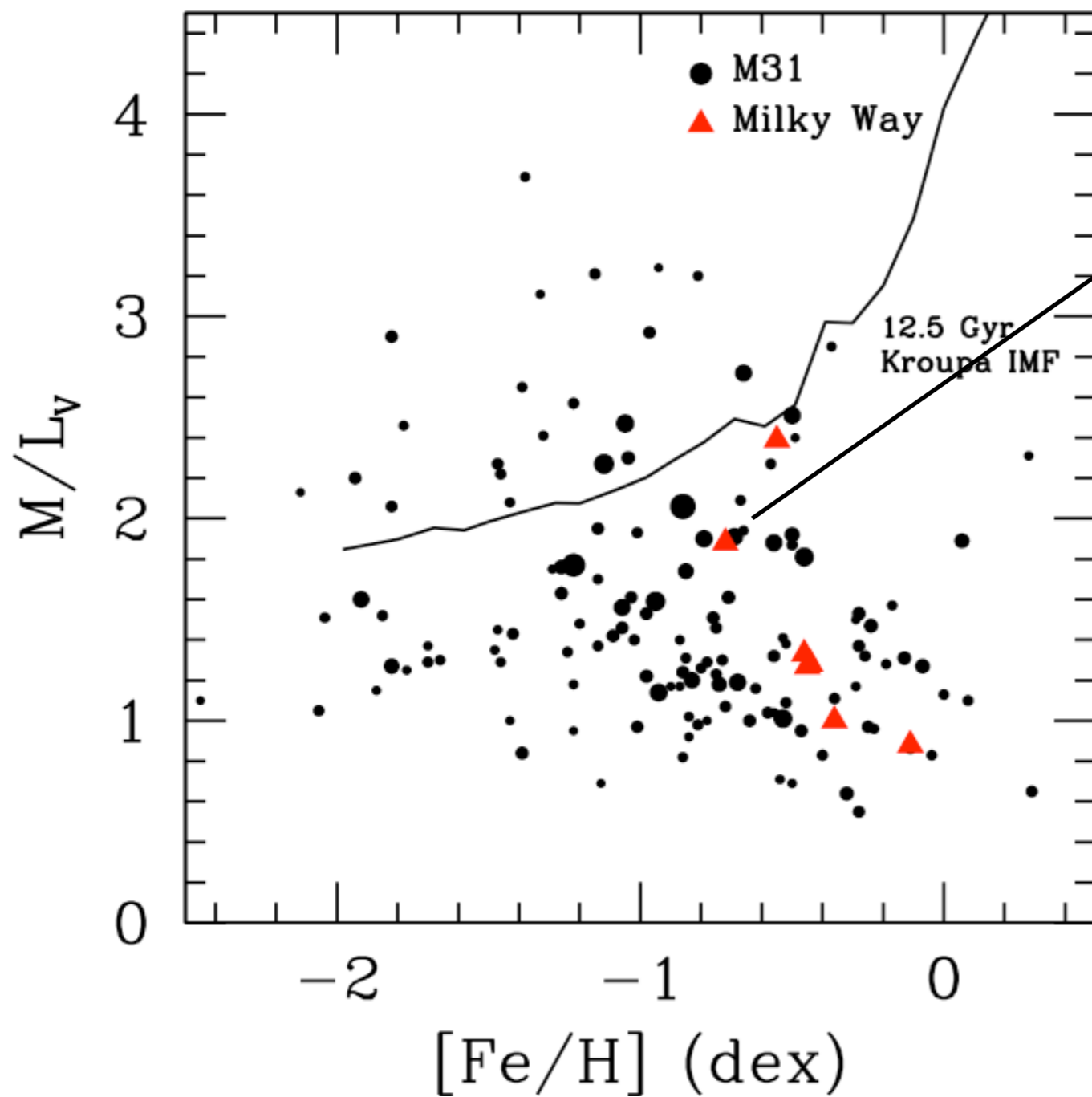


note: MF \neq IMF

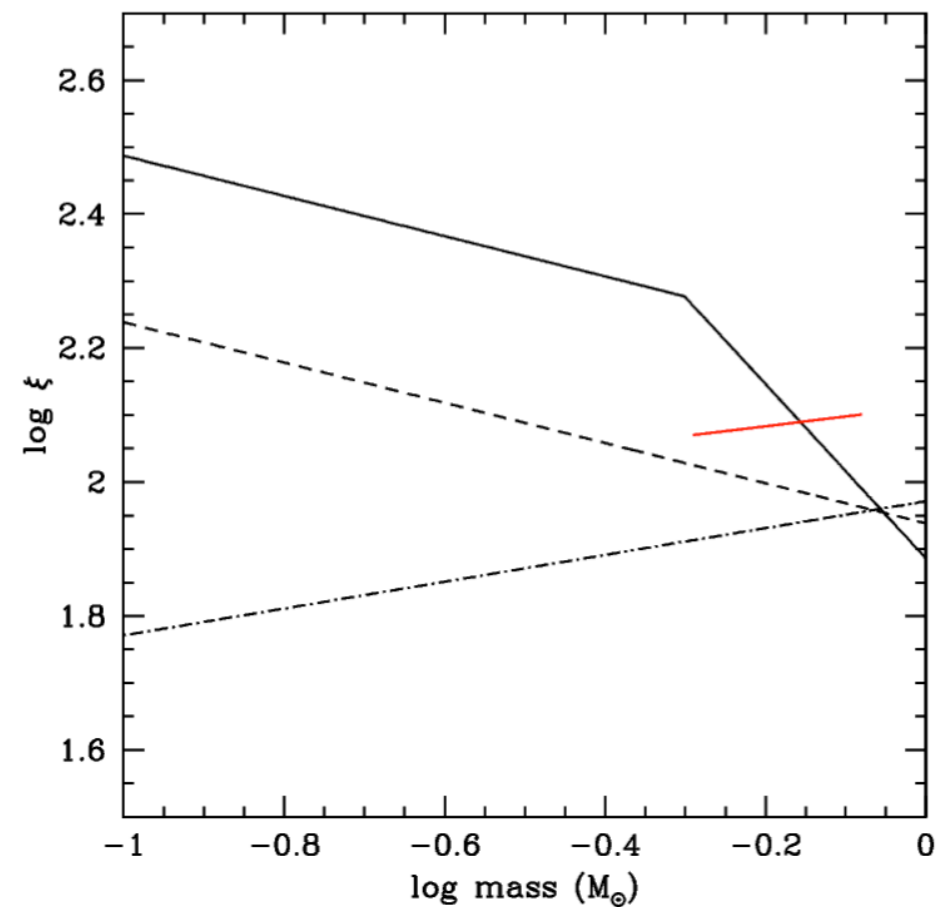
Other MF results



Galactic GCs



47 Tuc



Conclusions

Metal-rich globular clusters are unusually deficient in low-mass stars.

One explanation is a shallow IMF of the form:

$$dN/dM \propto M^{-0.8} - M^{-1.3}$$

Non-standard dynamical evolution is another possibility.

