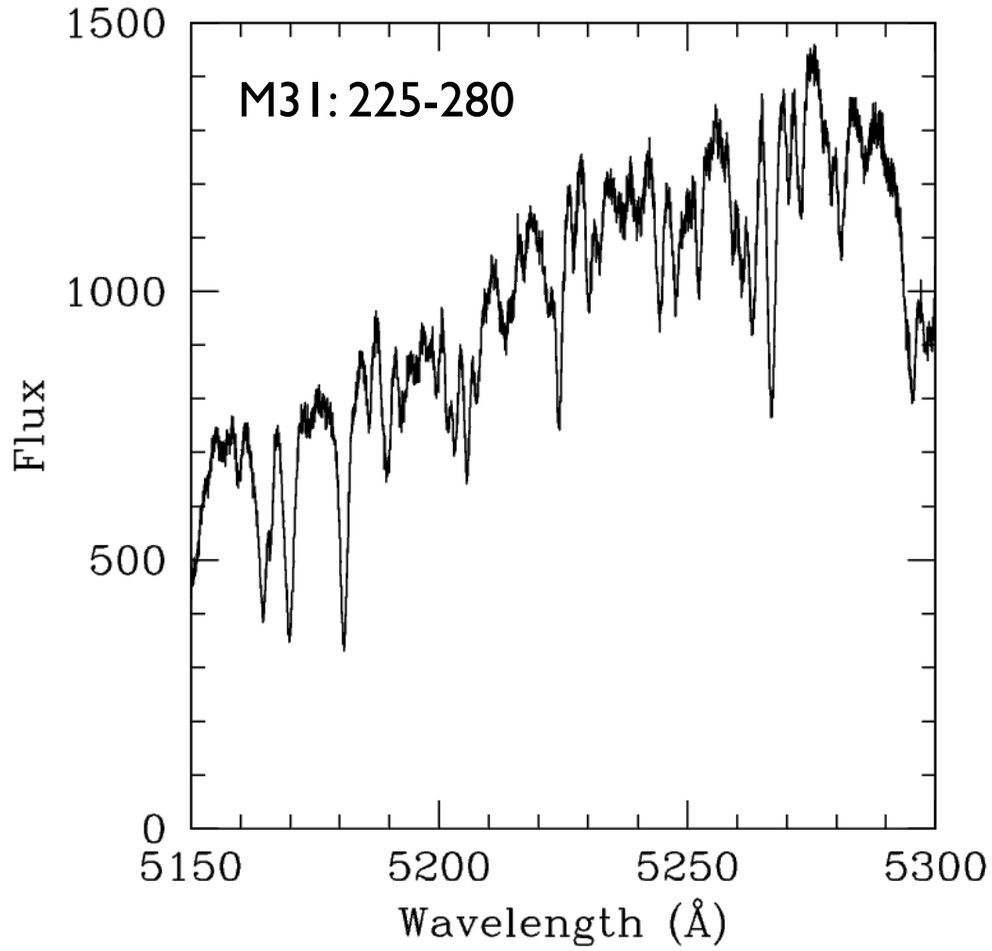
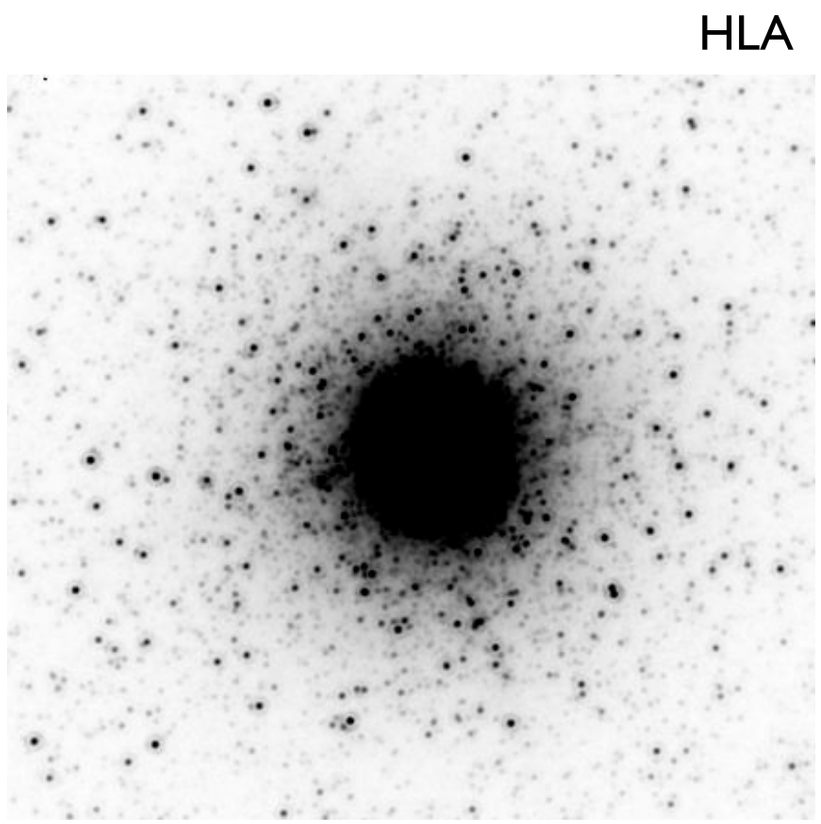
Mass-to-Light Ratios of Globular Clusters in M31 (and the Milky Way)

Jay Strader

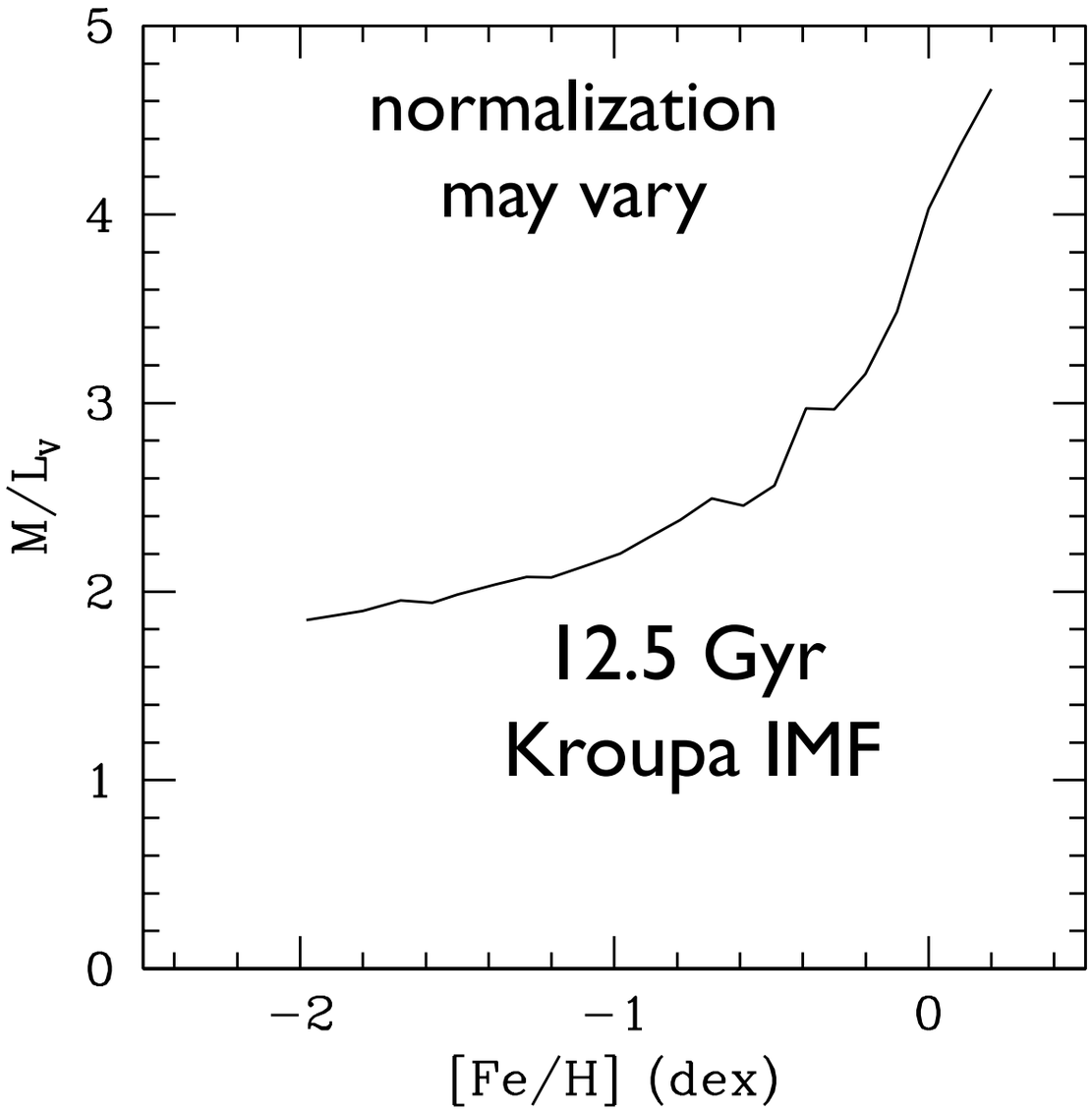
(with Nelson Caldwell, Anil Seth, Matt Walker, Mario Mateo)

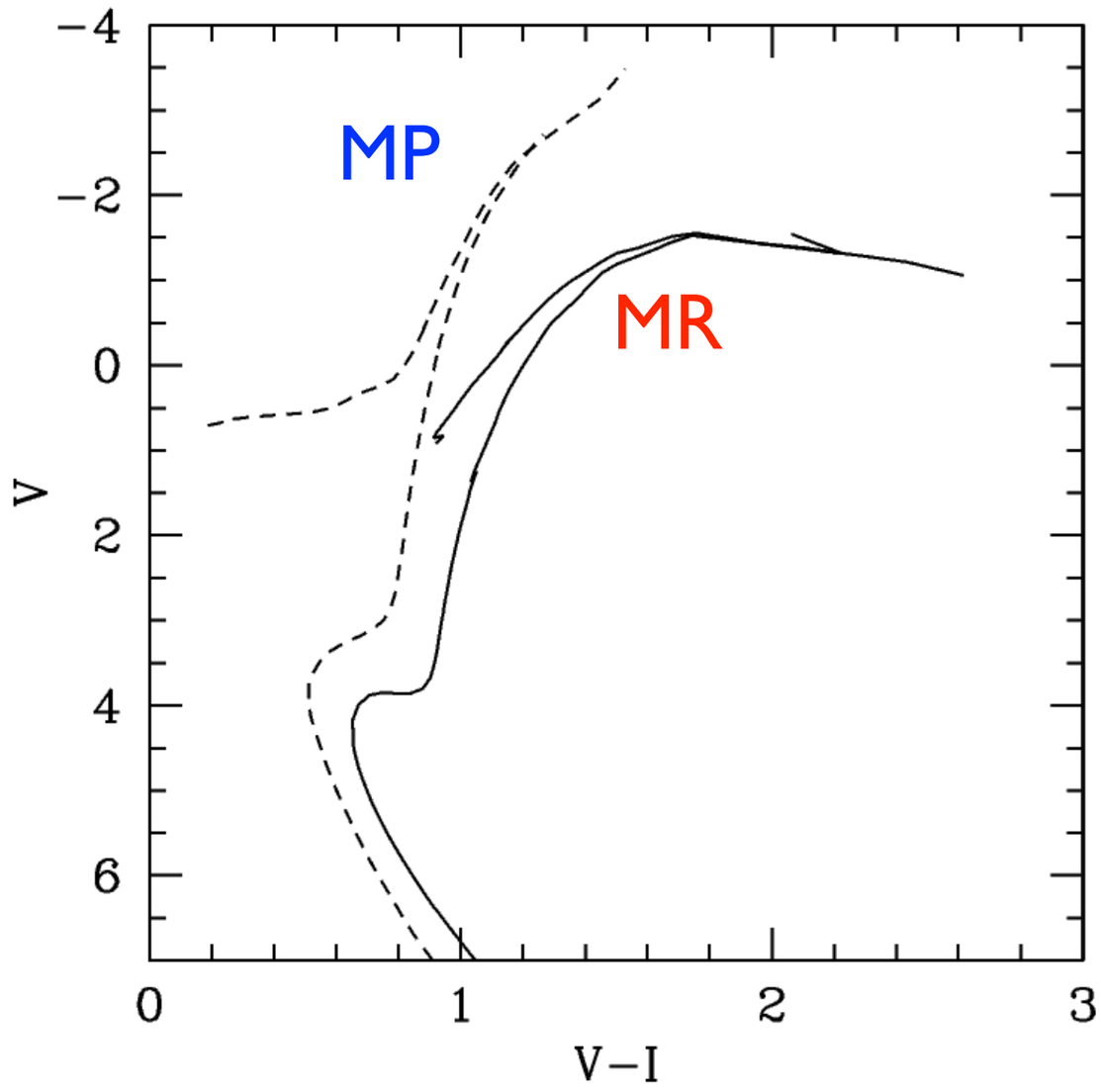




Mass-to-Light and [Fe/H]

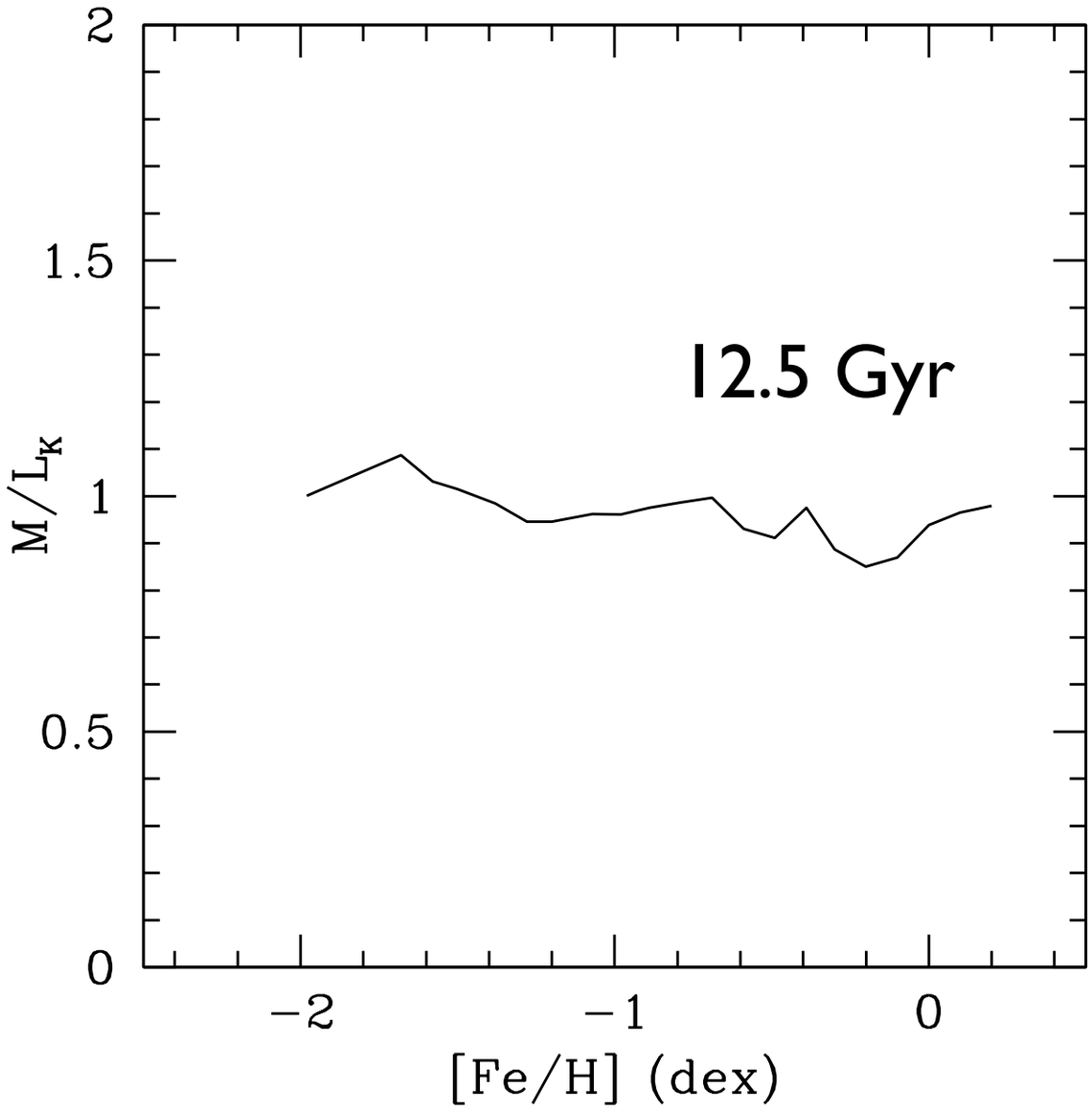
(in the optical)

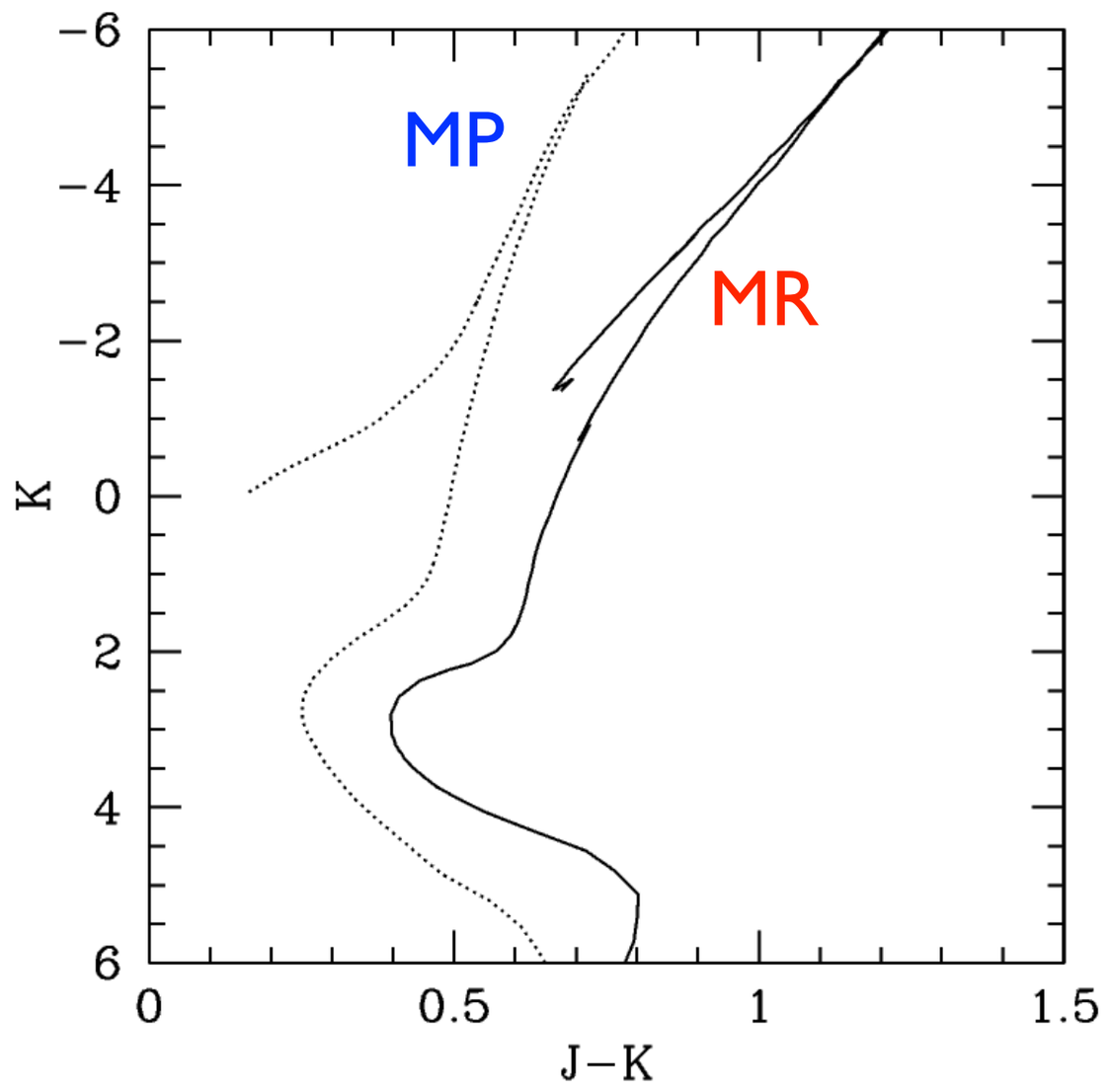




Mass-to-Light and [Fe/H]

(in the near-IR)

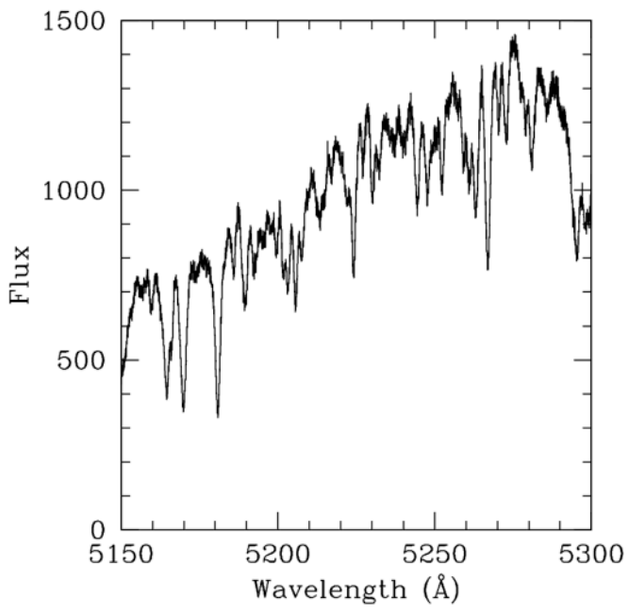




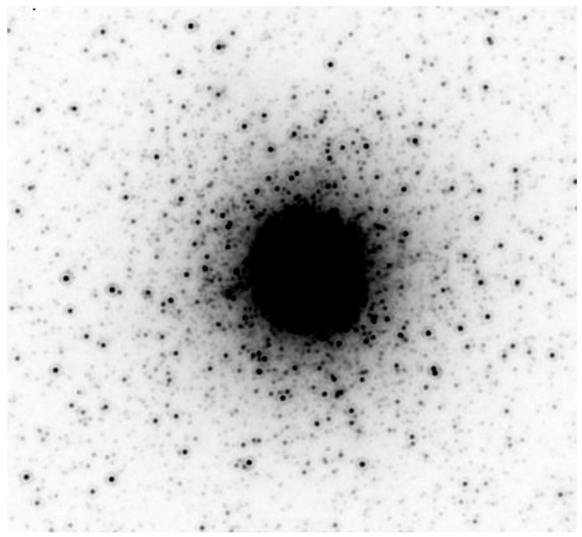
M31 GCs: Calculating M/L

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

high-res spectra + cluster structure

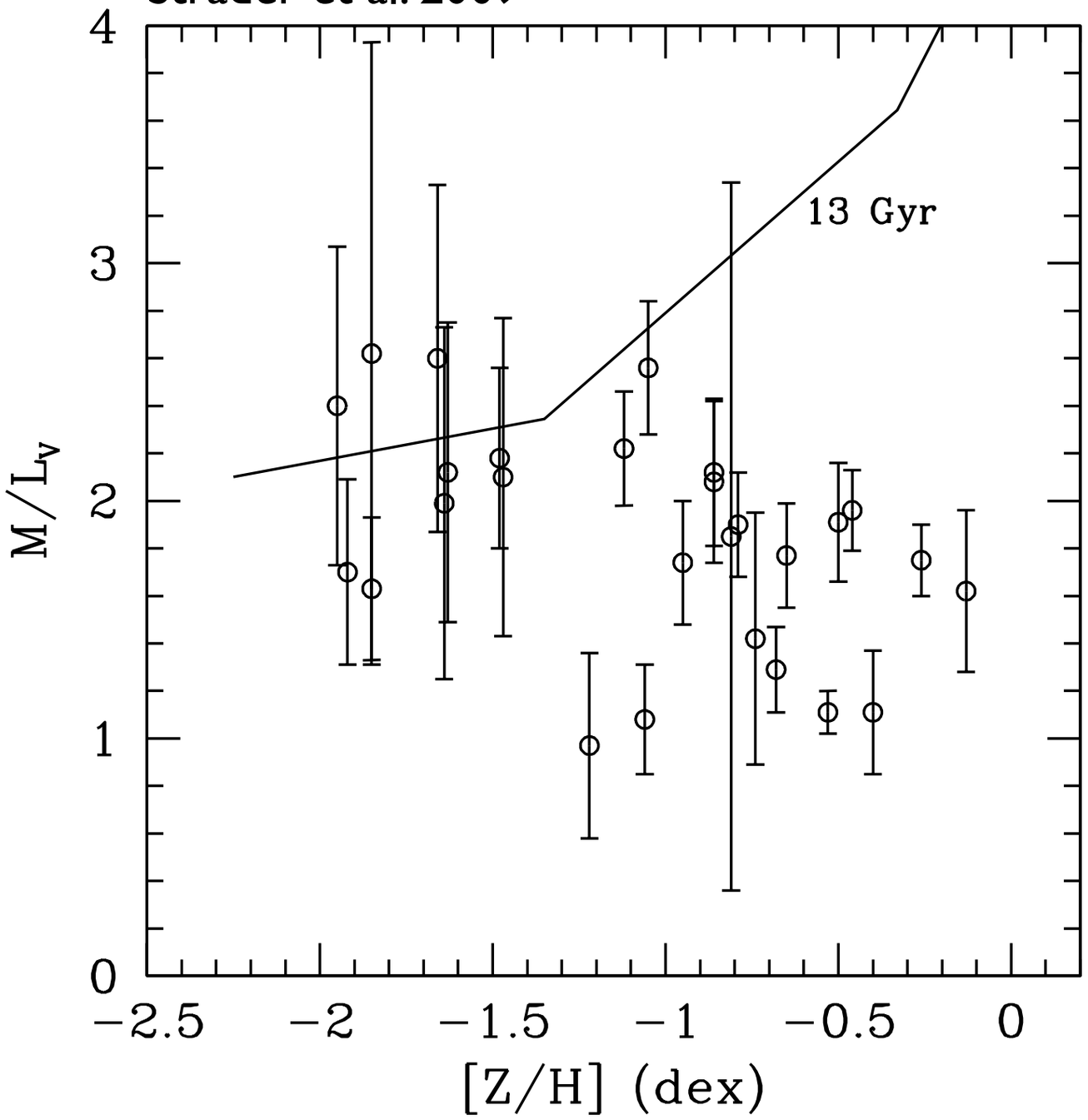


good imaging (pref HST)



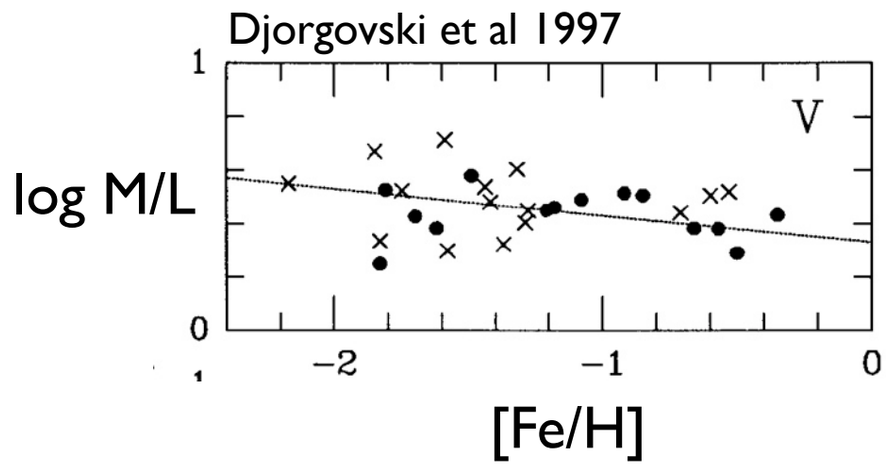
M/L of 27 M31 GCs

Strader et al. 2009



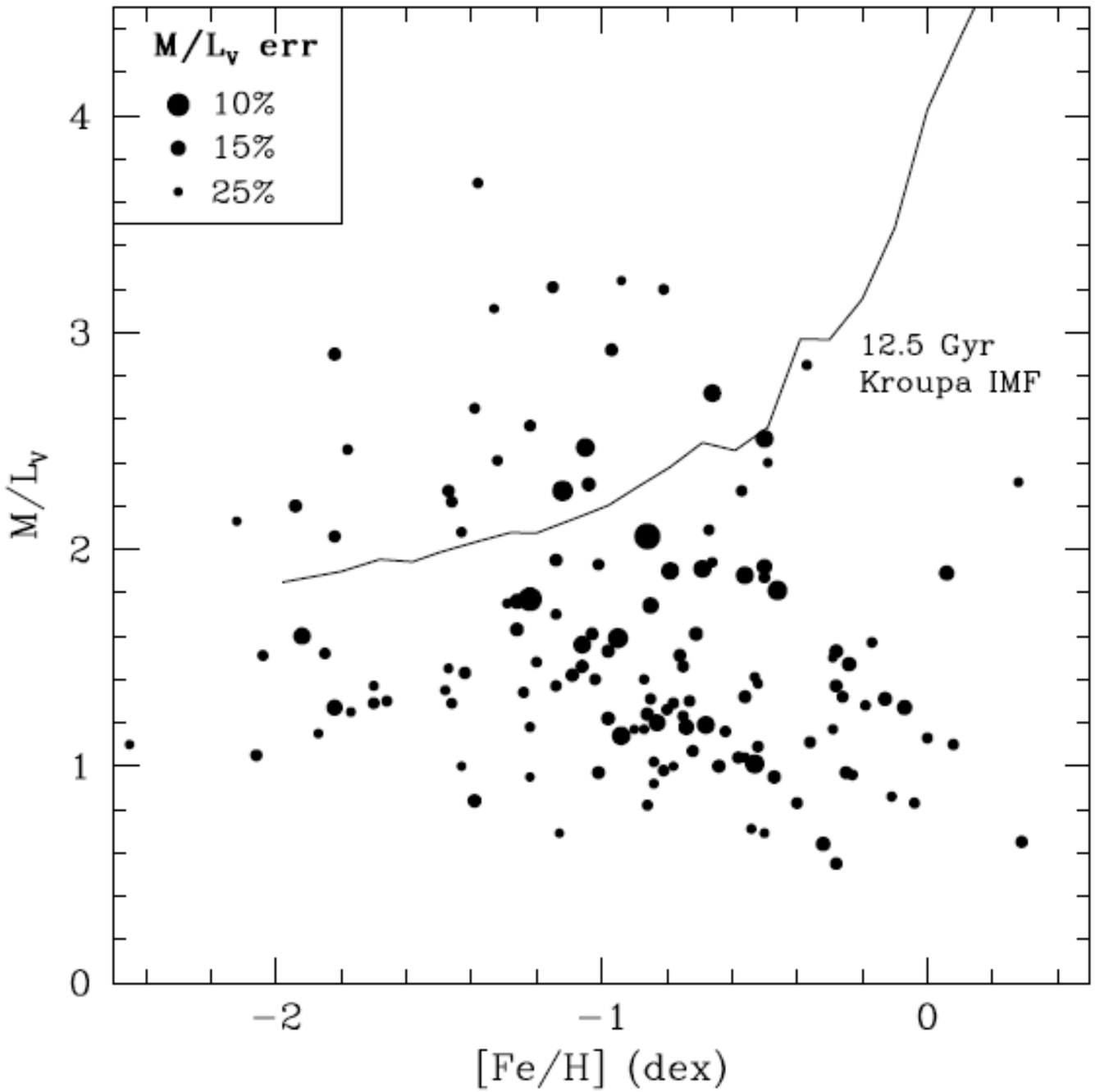
Mostly multi-order Keck/Lick spectra

Djorgovski et al 1997



M/L of 131 M31 GCs

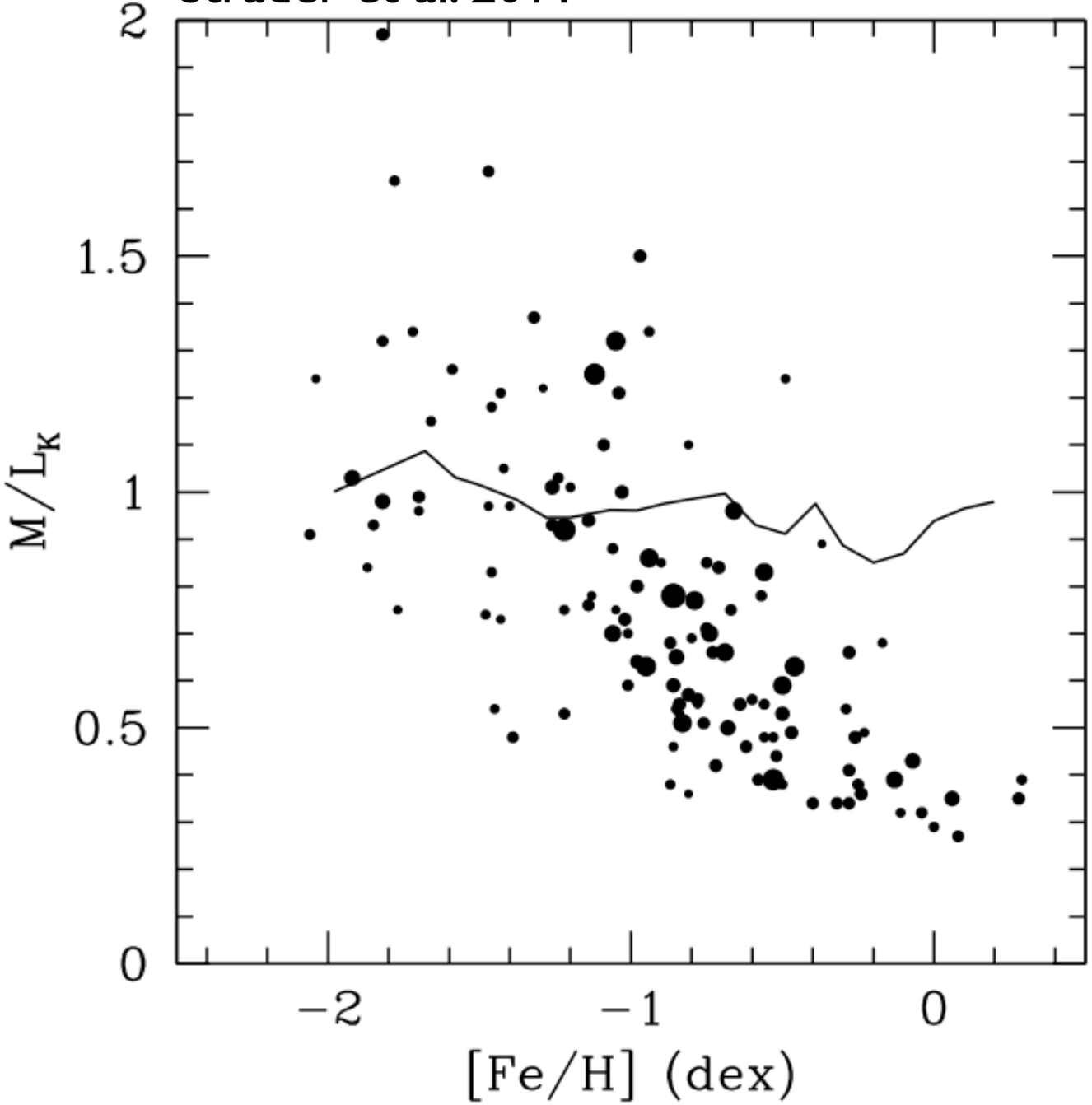
Strader et al. 2011



Mostly single-order MMT spectra

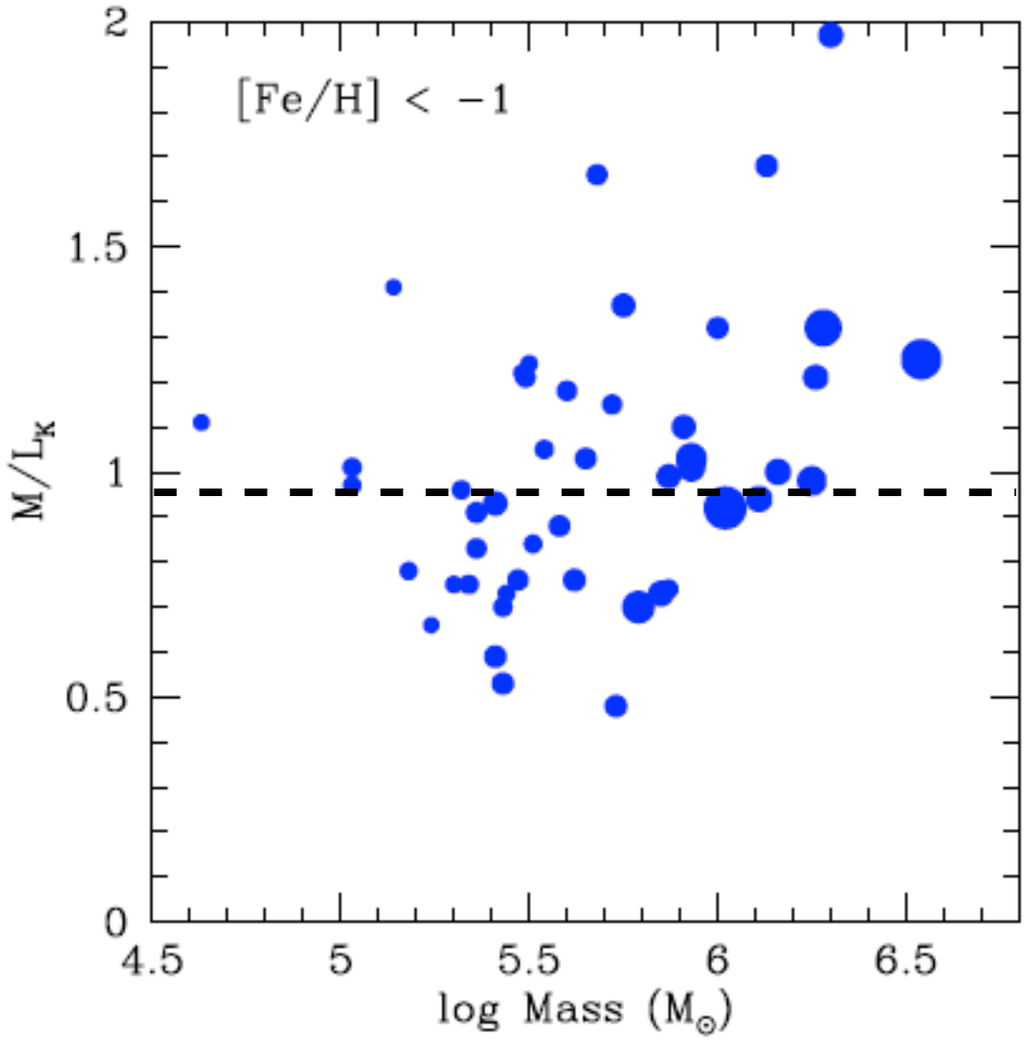
K-band M/L

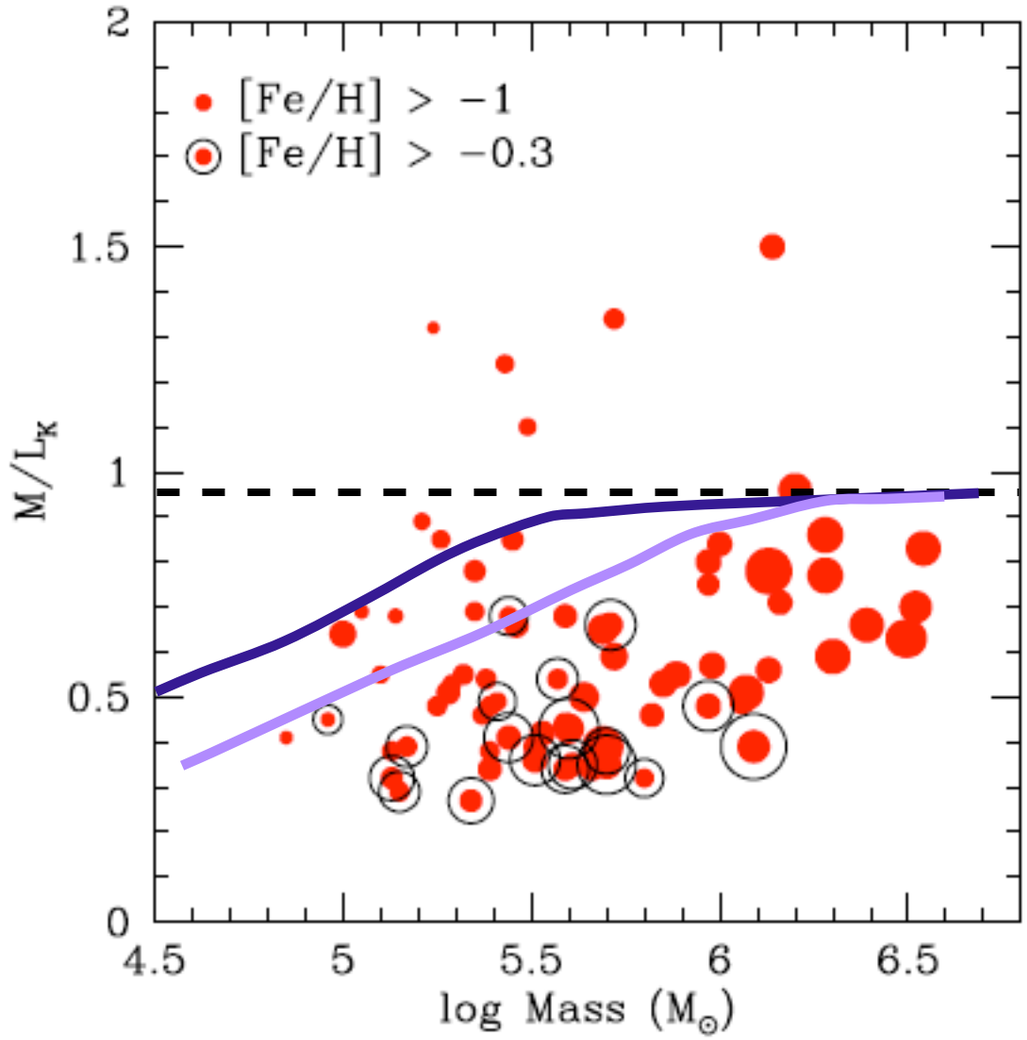
Strader et al. 2011



M/L with Mass

Strader et al. 2011





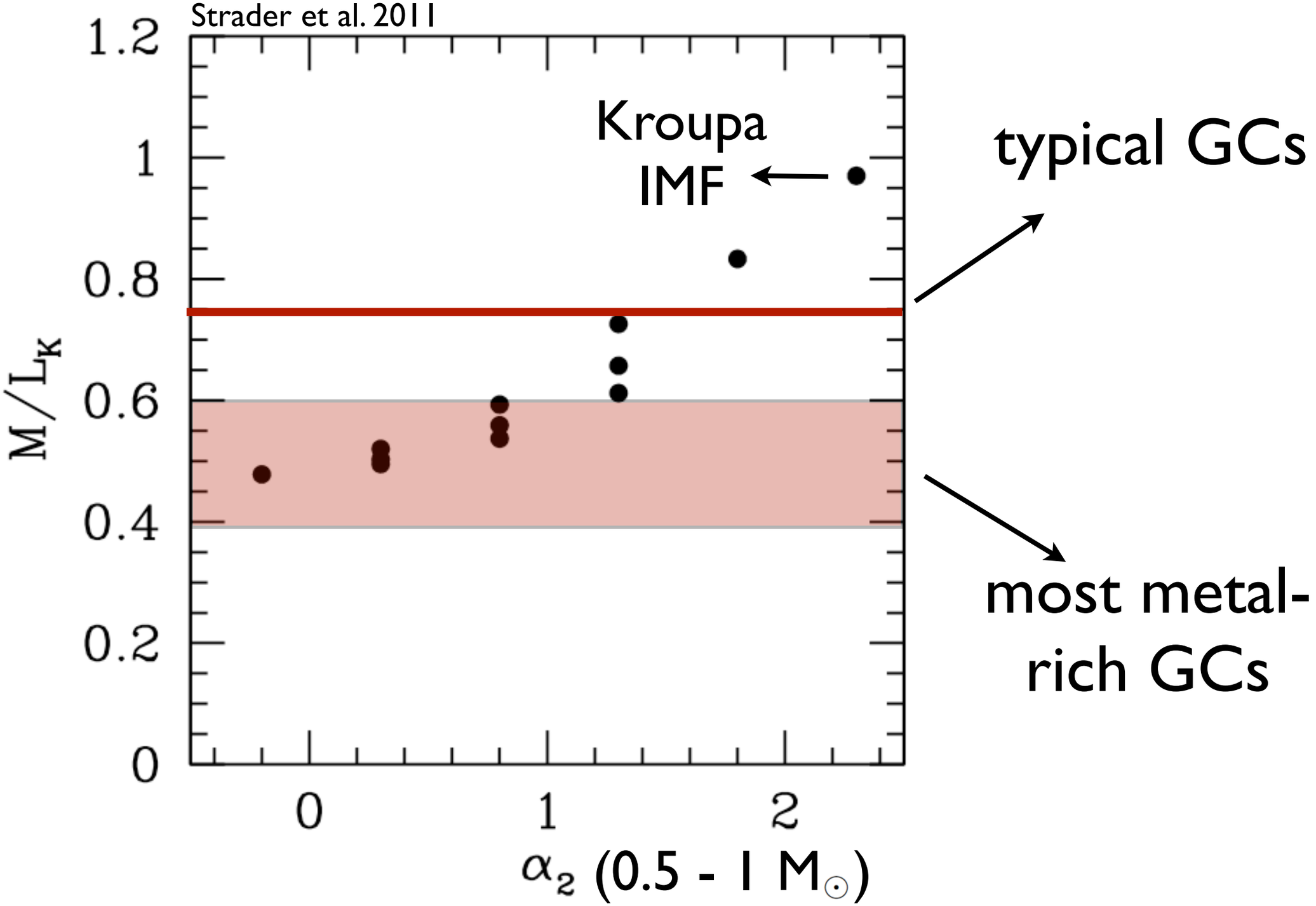
renormalized
Kruijssen models

Ways to make M/L low

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

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

Mass Function and M/L

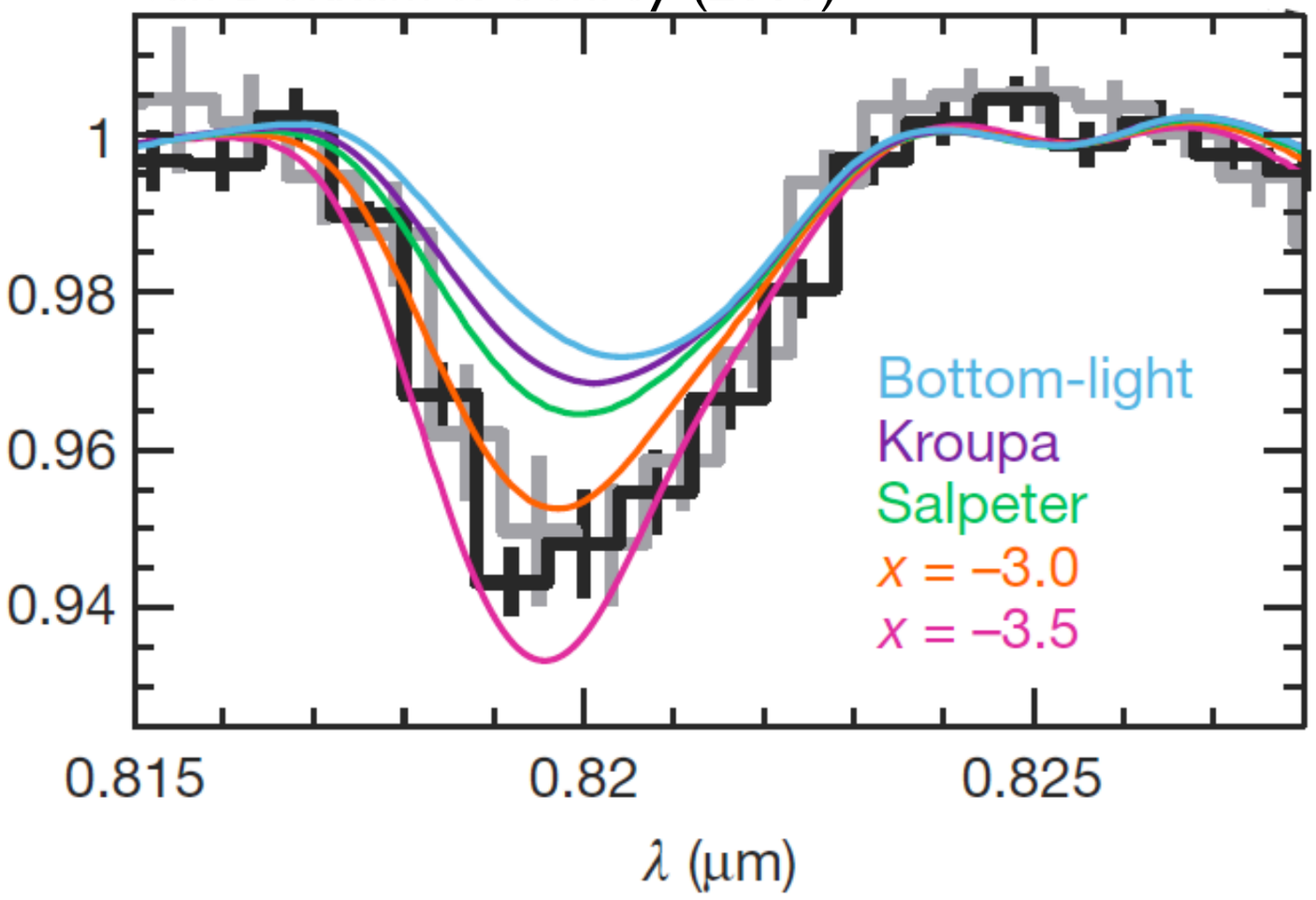


MF implications

For metal-rich M31 GCs, favors:

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

van Dokkum & Conroy (2010)



Galactic GCs