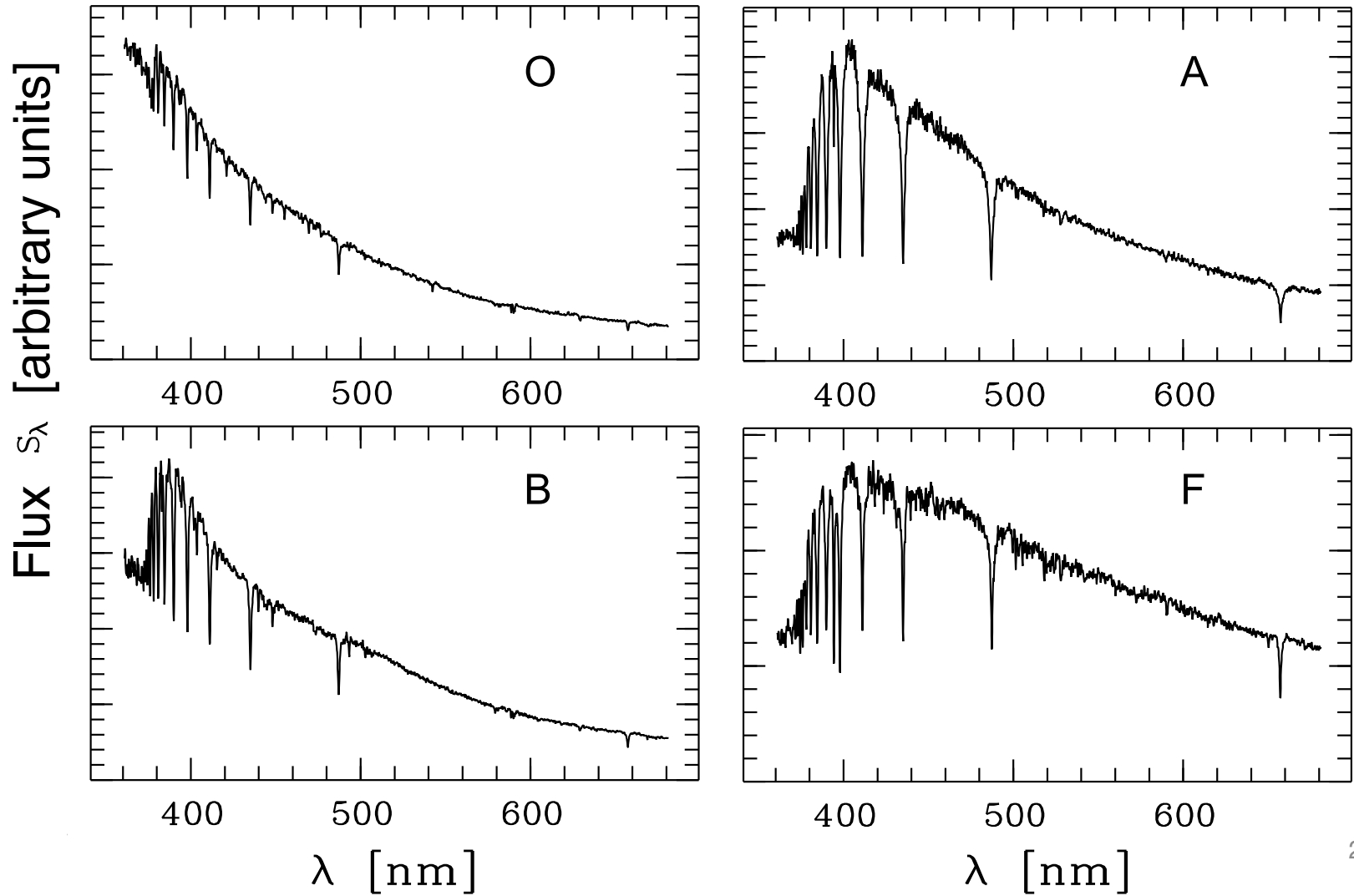Summer Semester 2018:

Master course Astrophysics II:
Galaxies and Cosmology

Lecture 7, 29 May 2018:
Stellar populations I
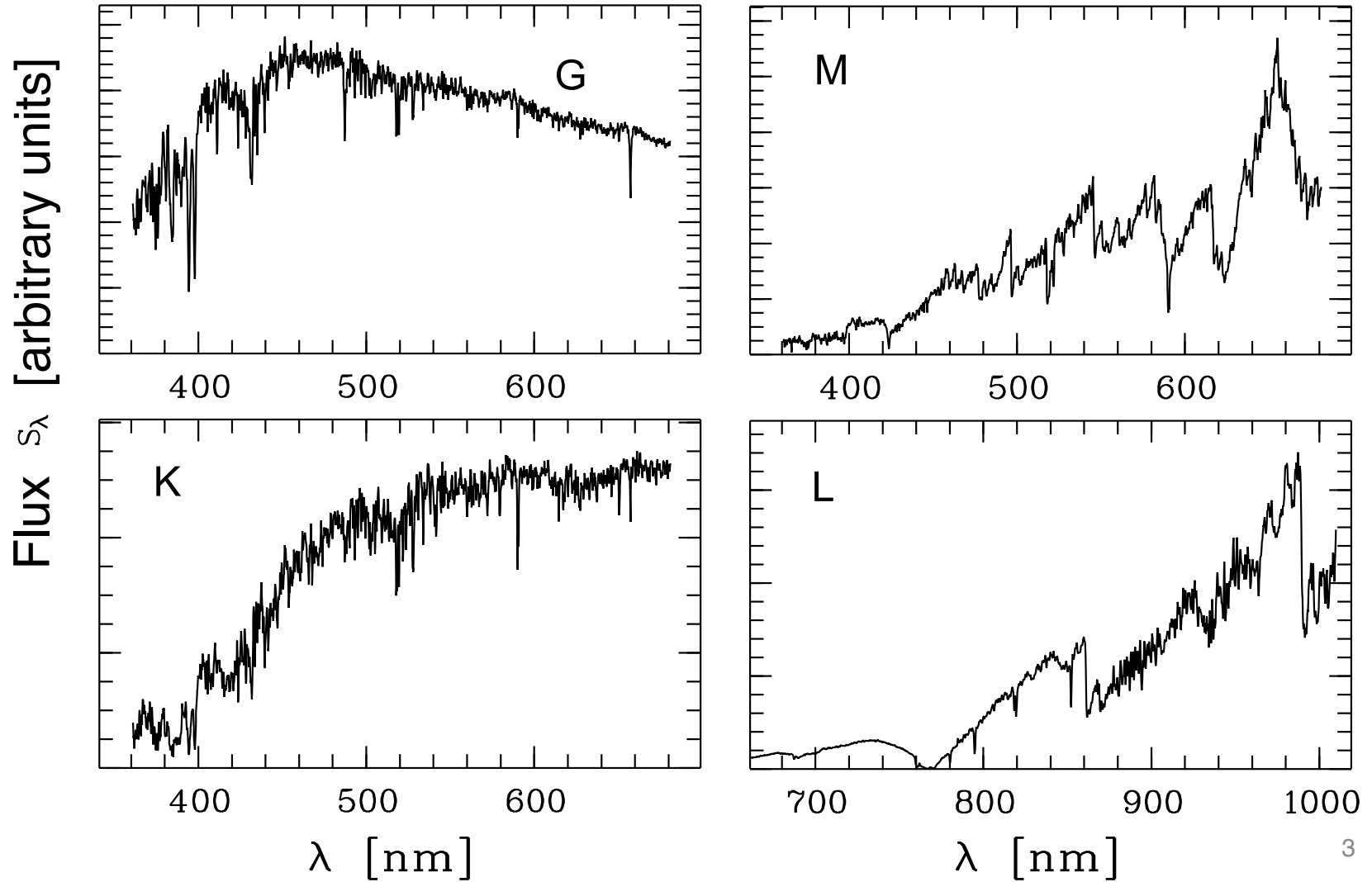
Responsible:
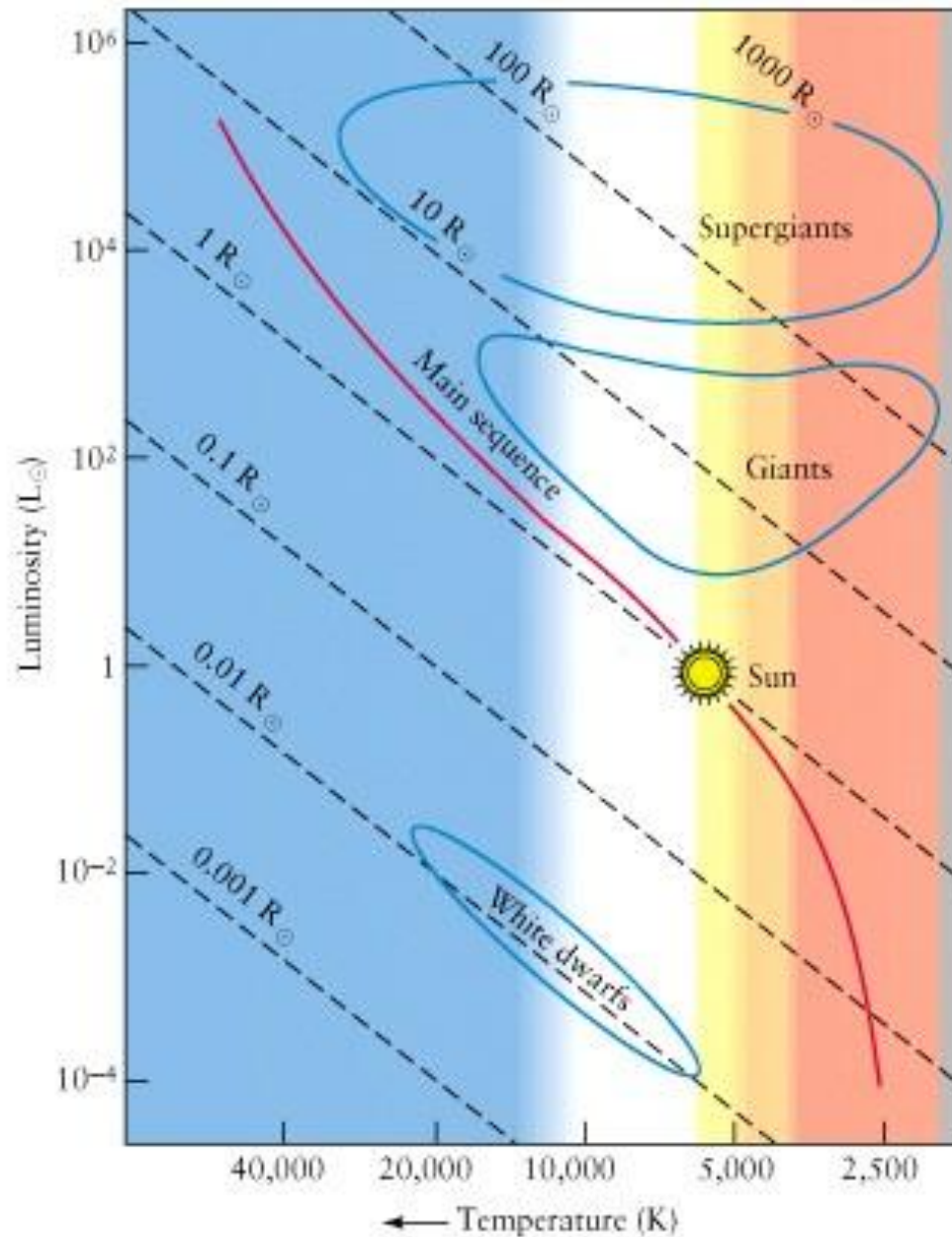Prof. Christoph Pfrommer,
Prof. Lutz Wisotzki
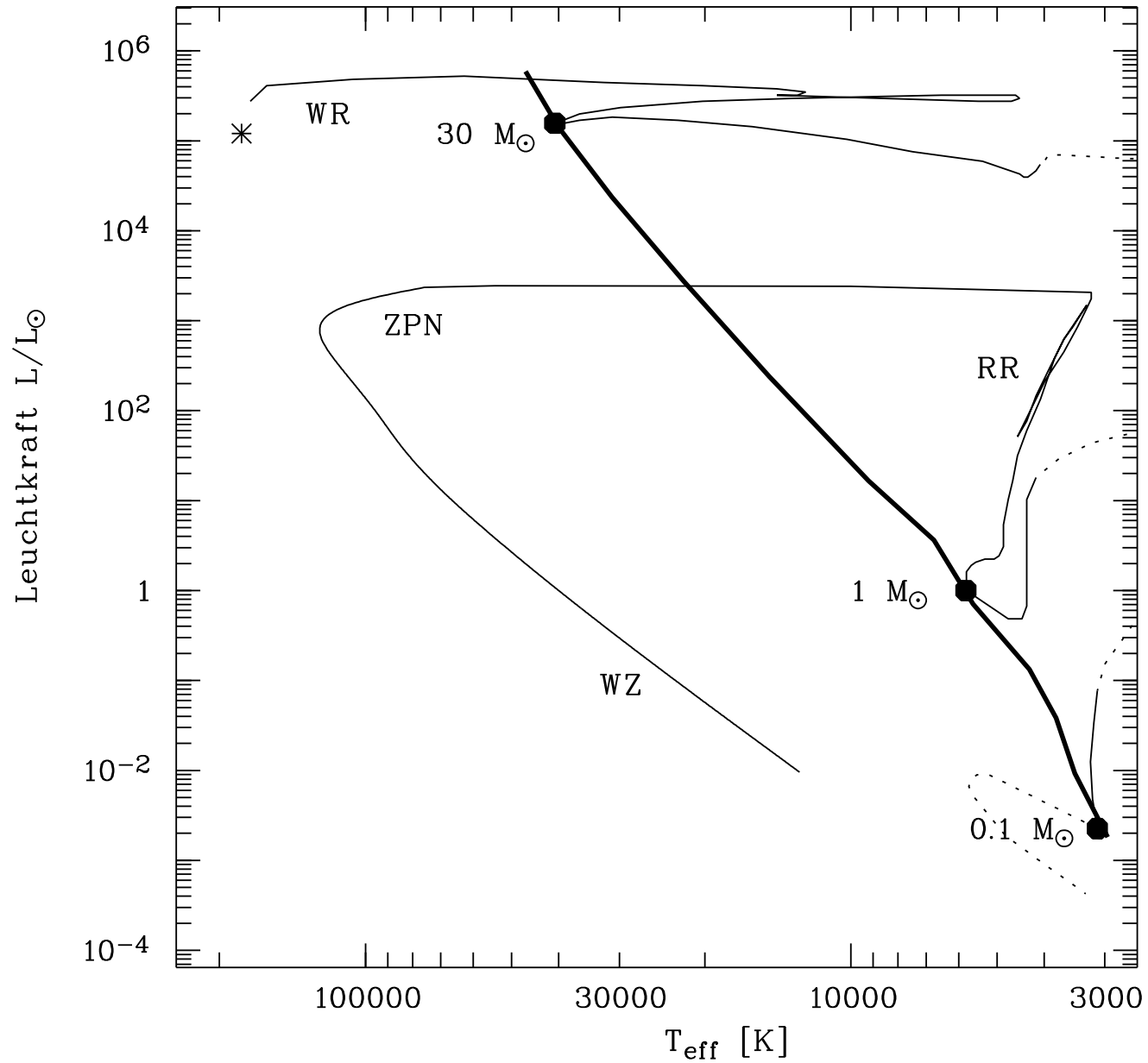
University of Potsdam

Example stellar spectra – 1

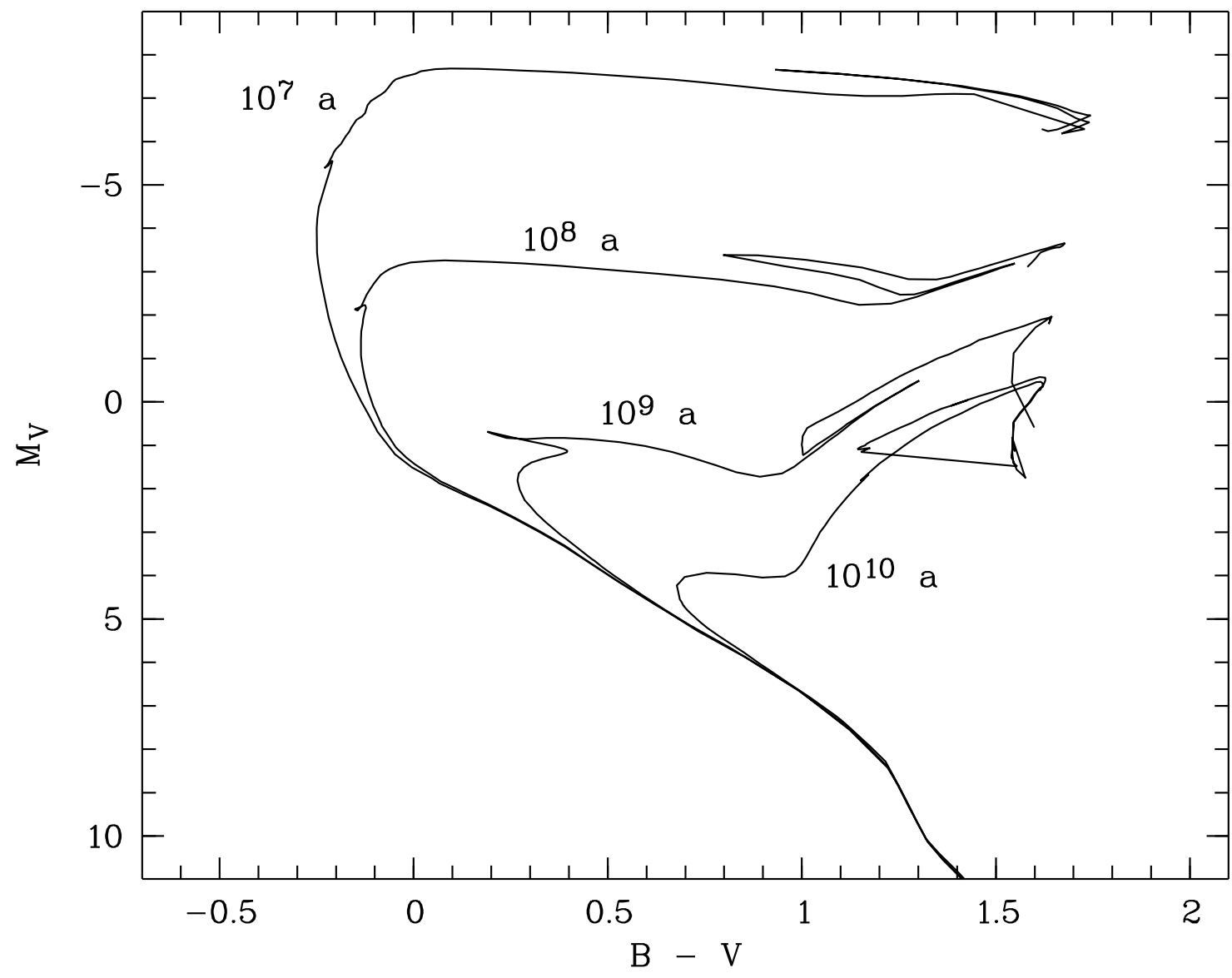# Example stellar spectra – 2

Hertzsprung Russel Diagram (HRD)
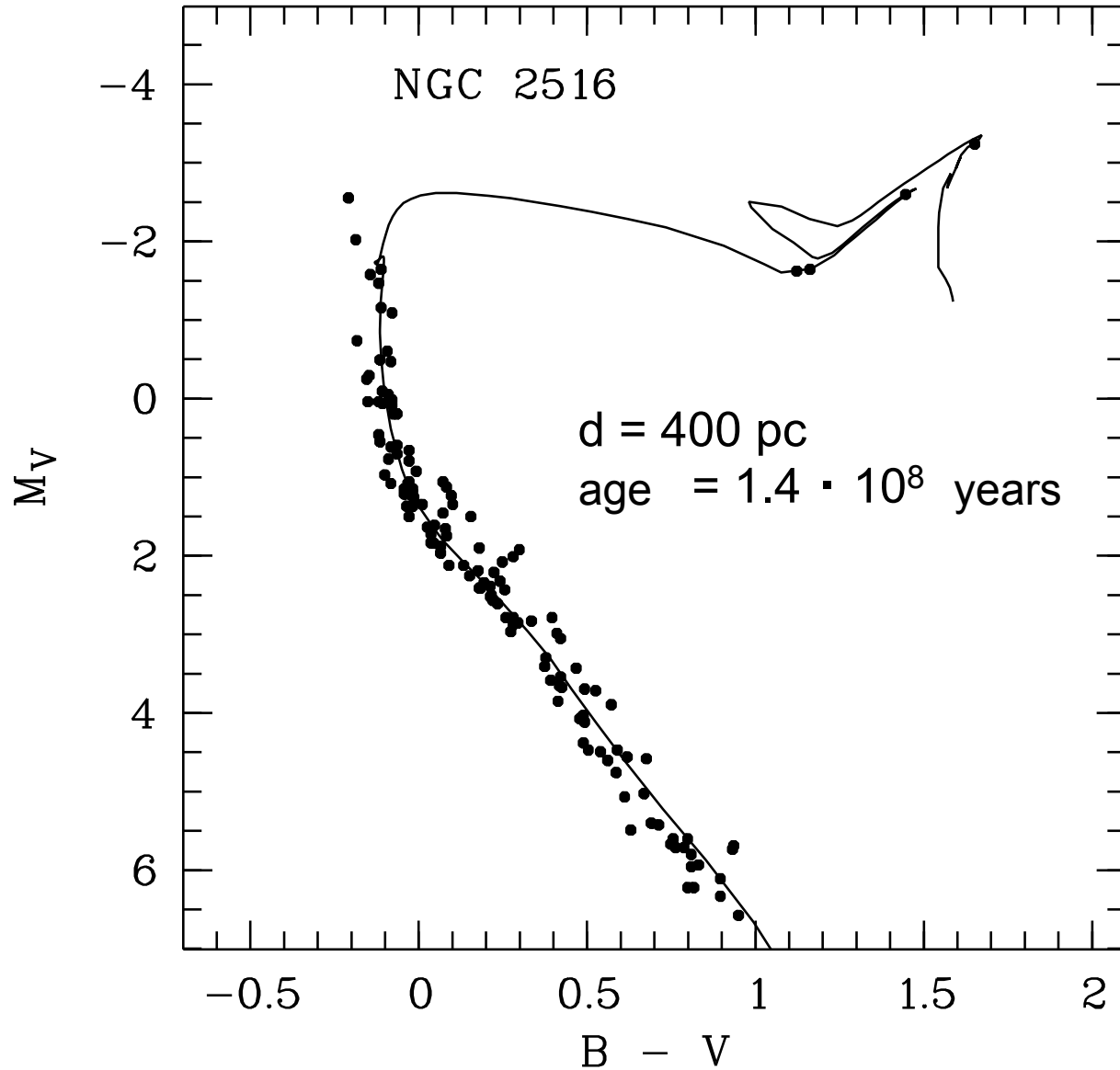
Stellar evolution in the HRD

Isochrones in the Colour-Magnitude Diagram

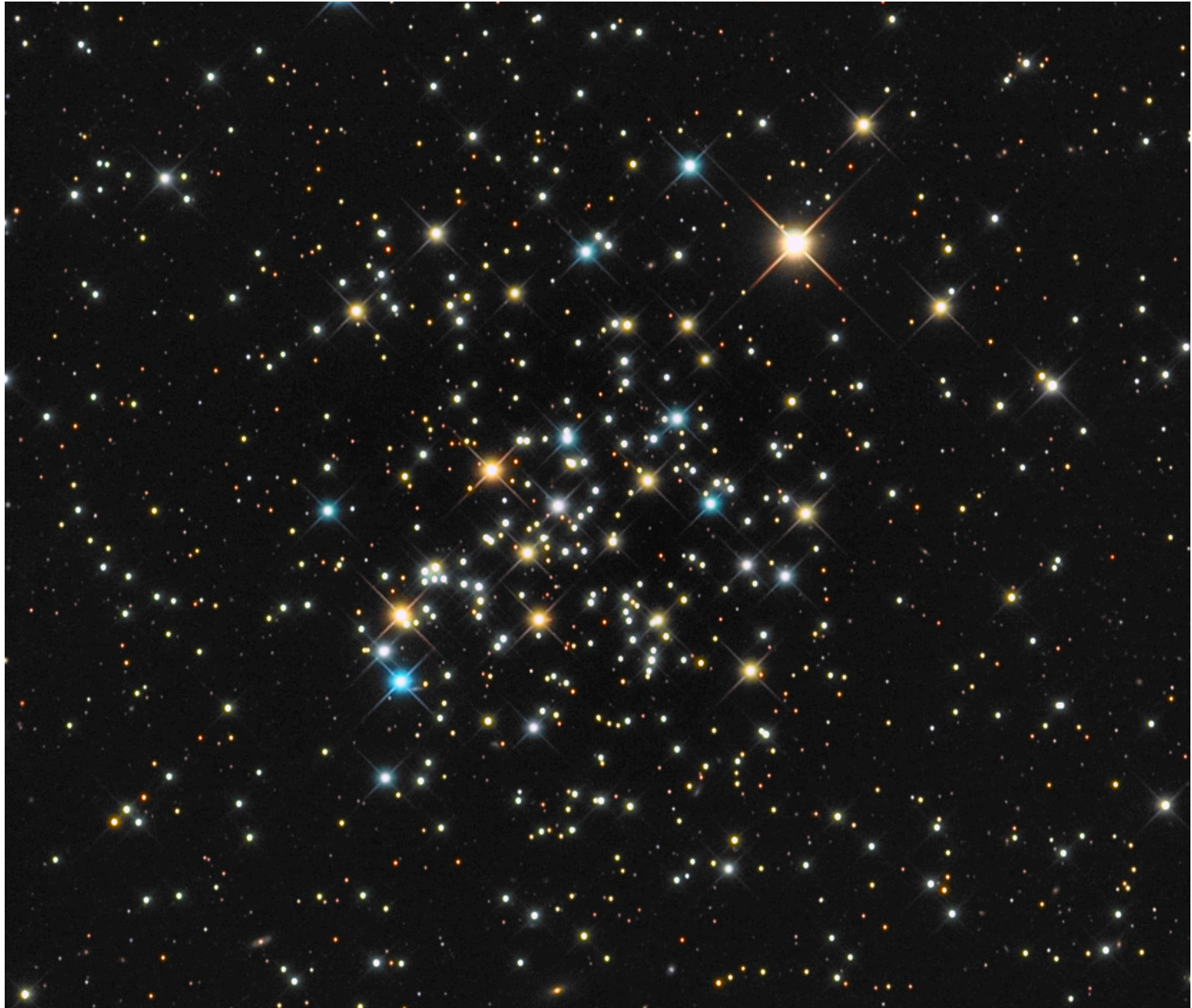# Open star cluster NGC 2516

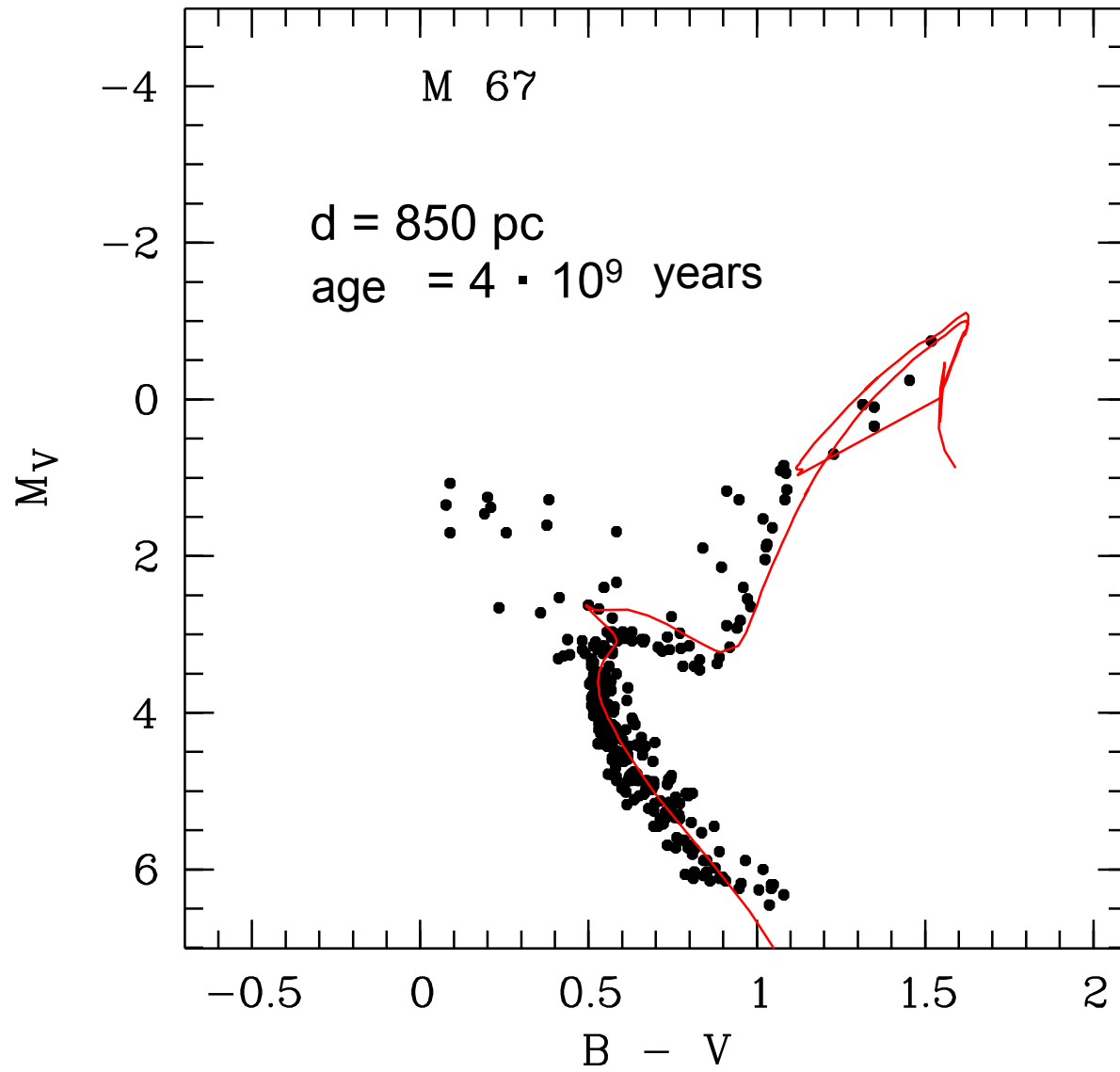# Young open cluster + isochrone

Open star cluster M 67

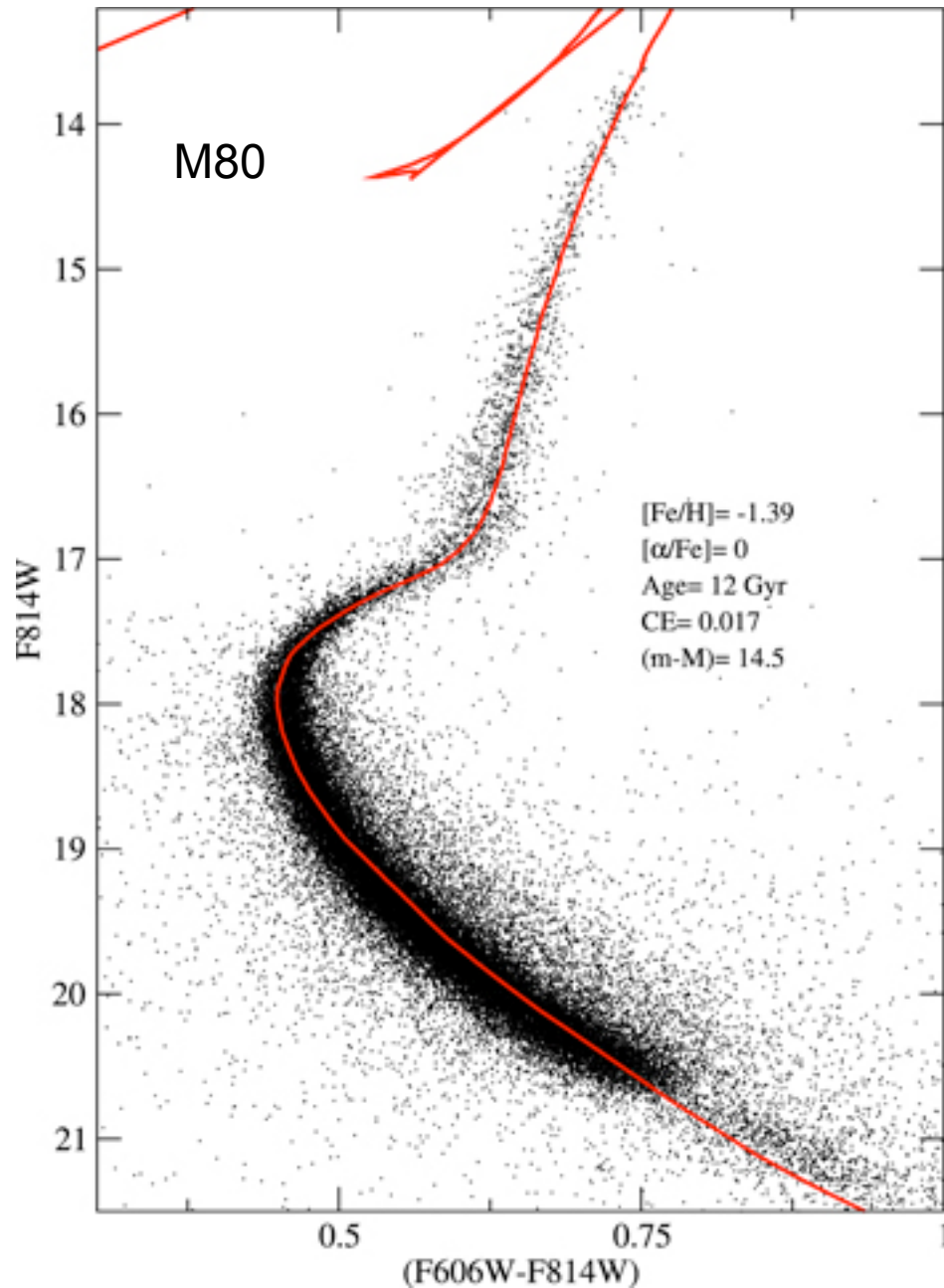# Old open cluster + isochrone

M 67

d = 850 pc
age   = $4 \cdot 10^9$ years

Globular cluster M 80

Old globular cluster + isochrone
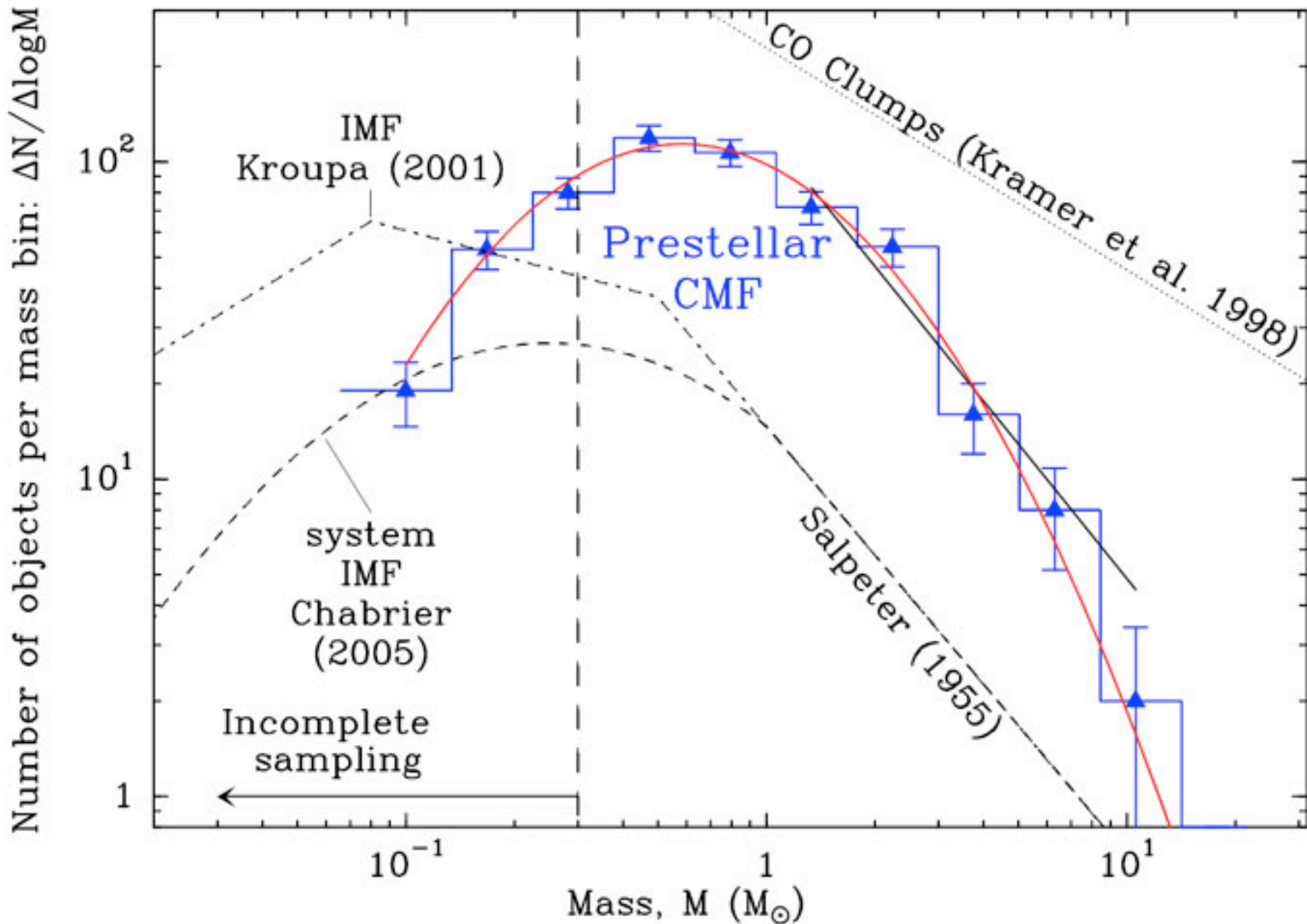

M80

[Fe/H]= -1.39
[α/Fe]= 0
Age= 12 Gyr
CE= 0.017
(m-M)= 14.5

Initial mass function from young open cluster

NGC3603

Figure: Mass function plot. Axes: Number of stars (y-axis, logarithmic 1 to 1000) vs Mass ($M_\odot$) (x-axis, 0.1 to 10.0). Annotations: $7" < R < 33"$, $\Gamma = -0.91 +- 0.08$, "Binary corrected MF + 30 % PMS binaries", PMS, MS.
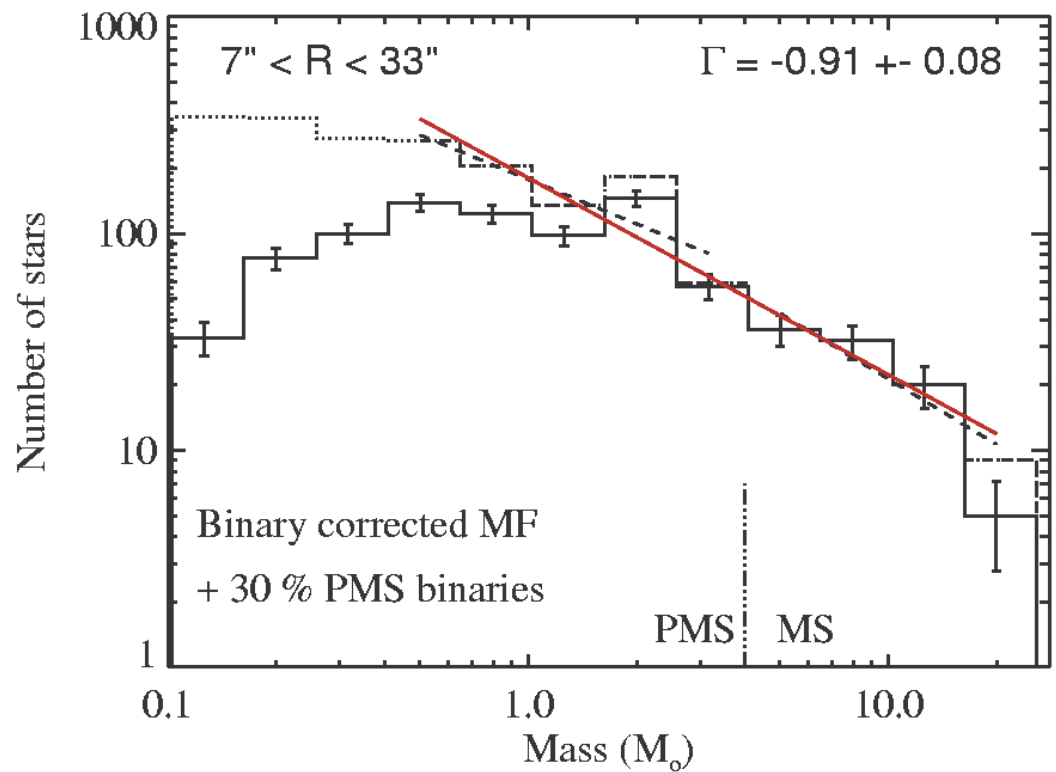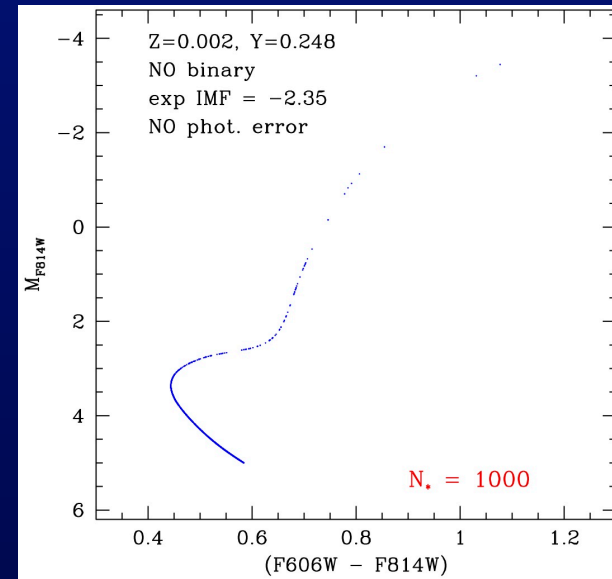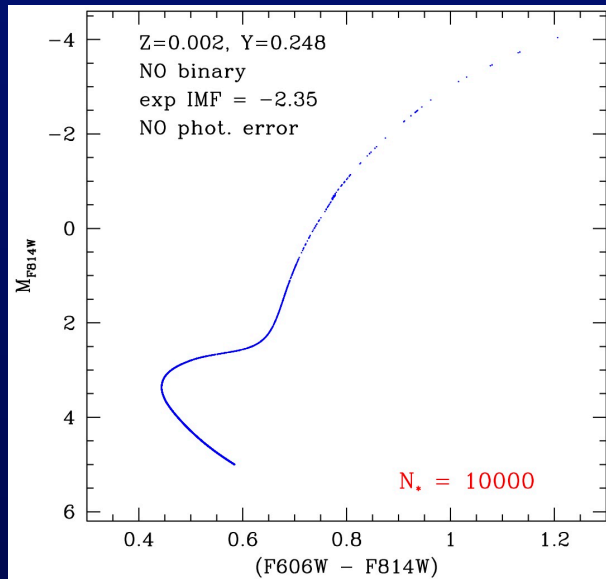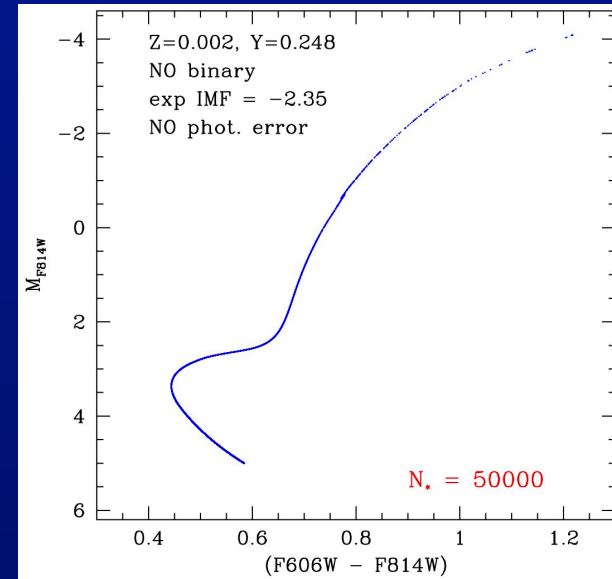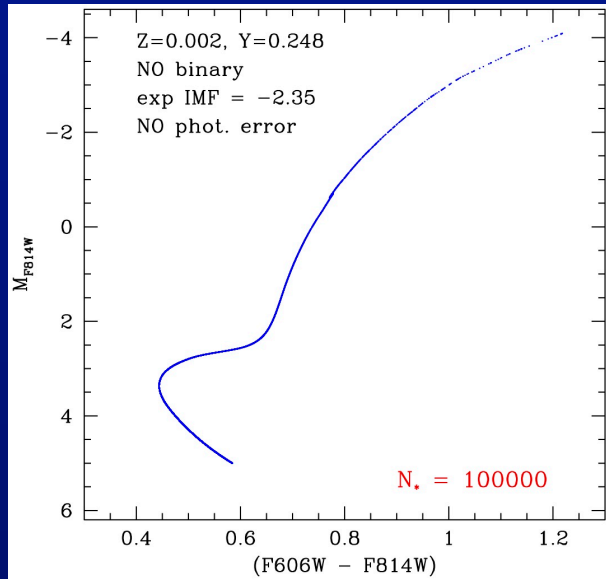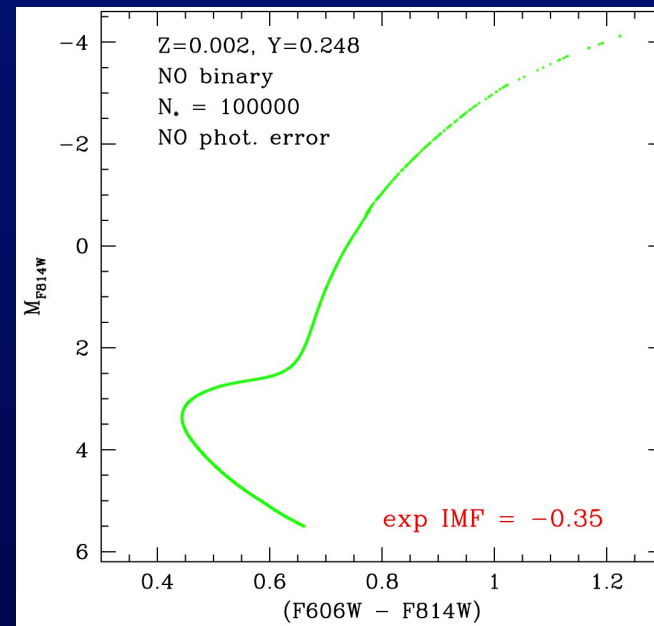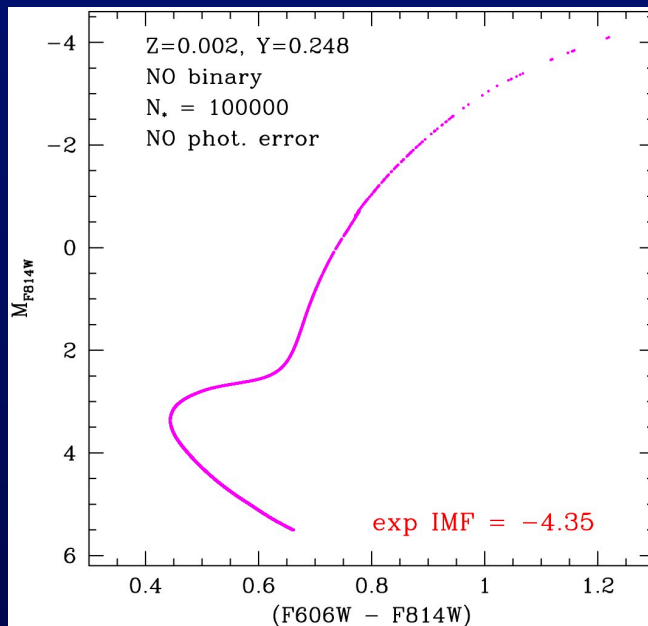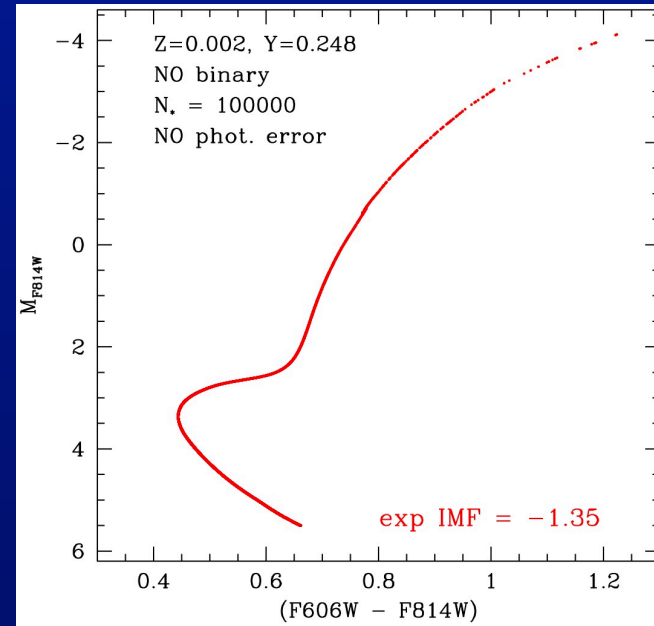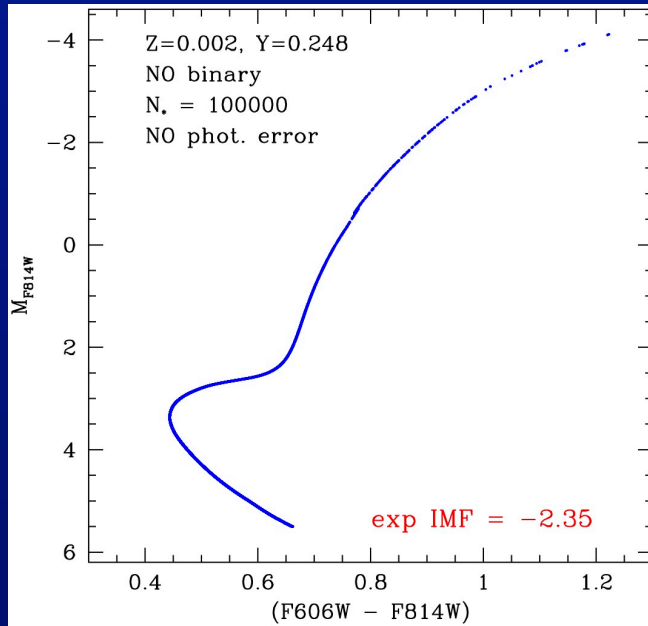
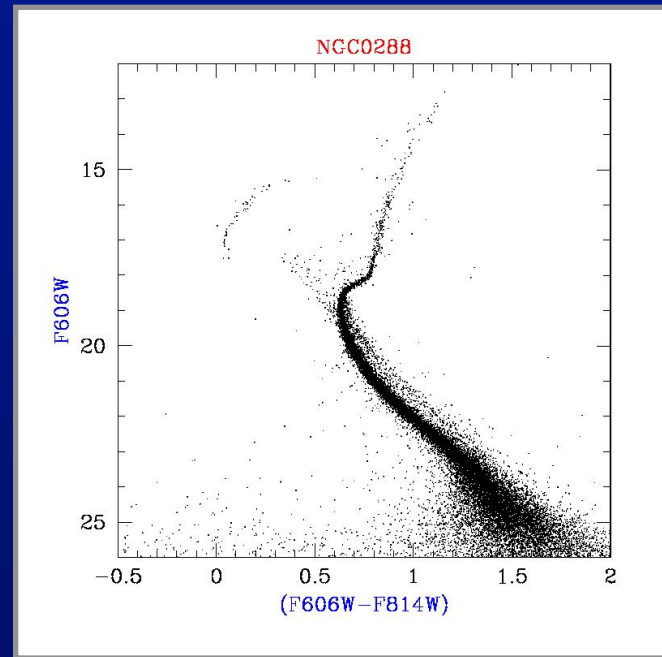# Mass function of pre-stellar cores

Reconstructions and parametrisations of the IMF
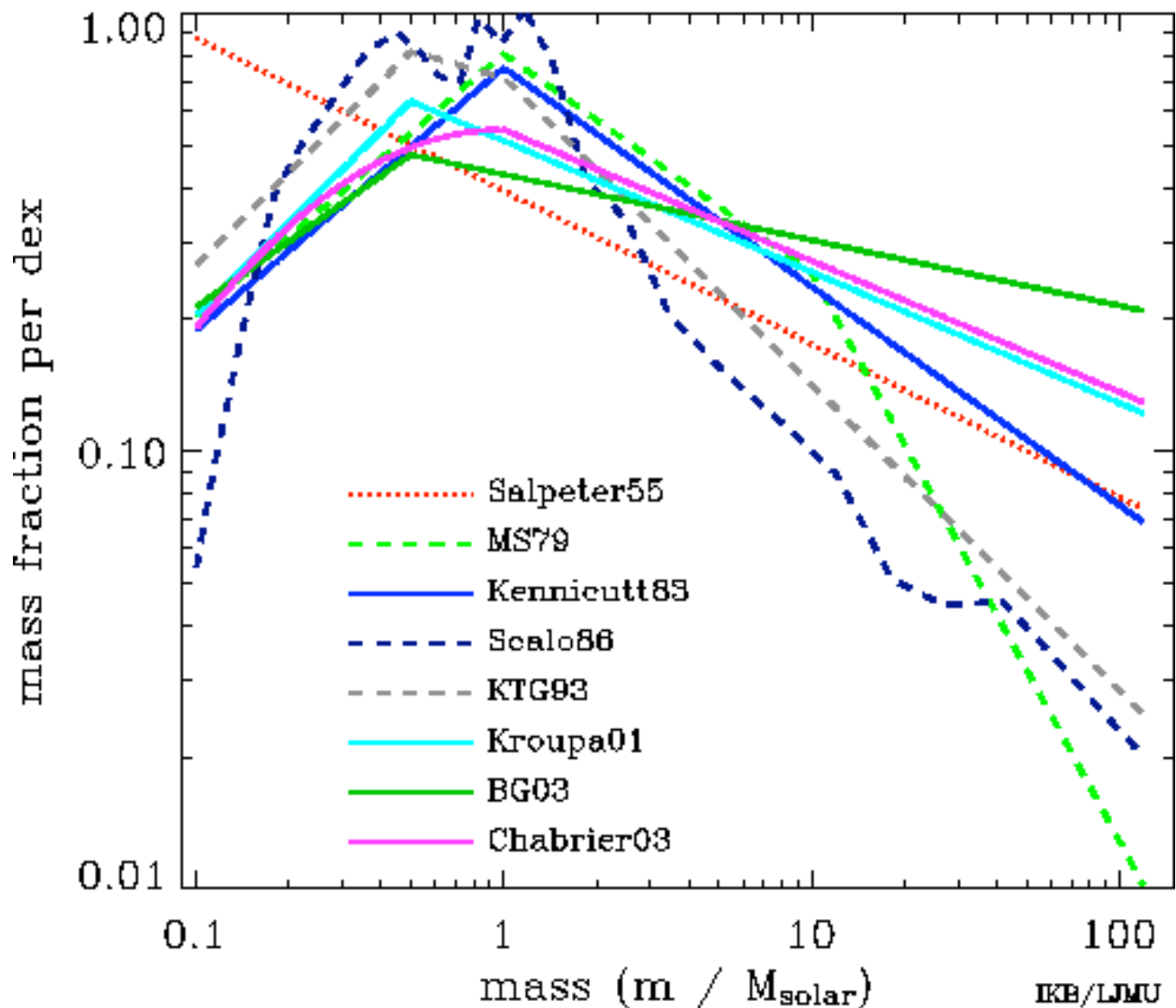
The effect of Statistical Sampling
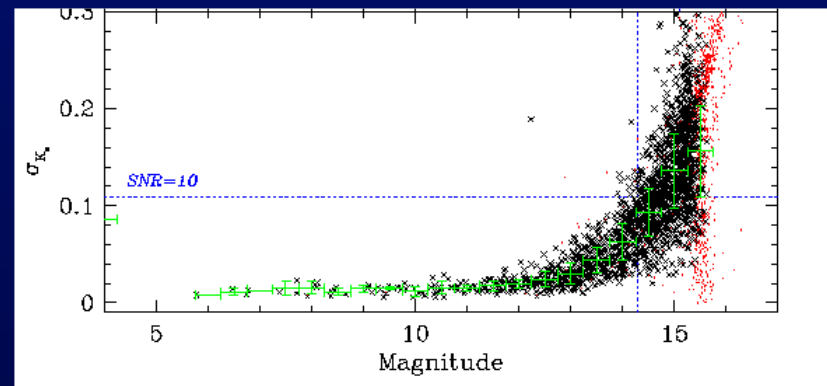

S. Cassisi

The effect of the Initial Mass Function

S. Cassisi

Theoretical CMD

Z=0.002, Y=0.248
NO binary
N$_*$ = 100000
NO phot. error

exp IMF = −2.35

Real CMD

NGC0288
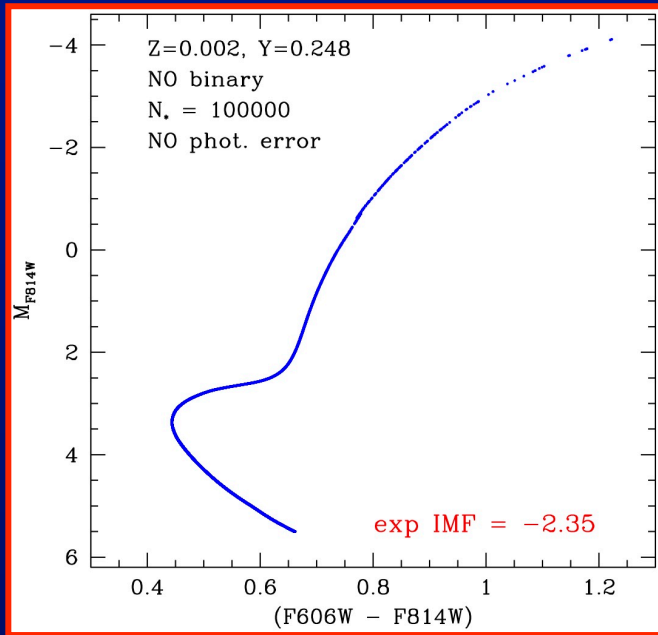
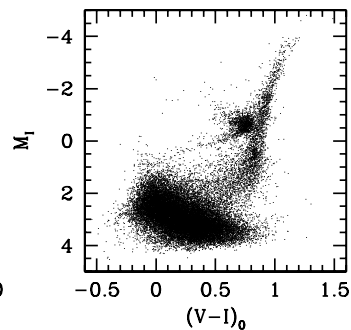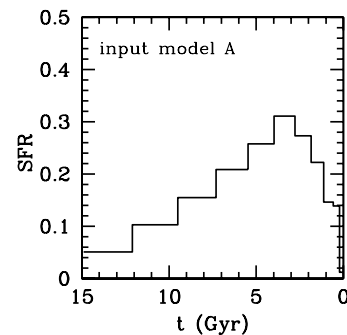**Photometric errors**
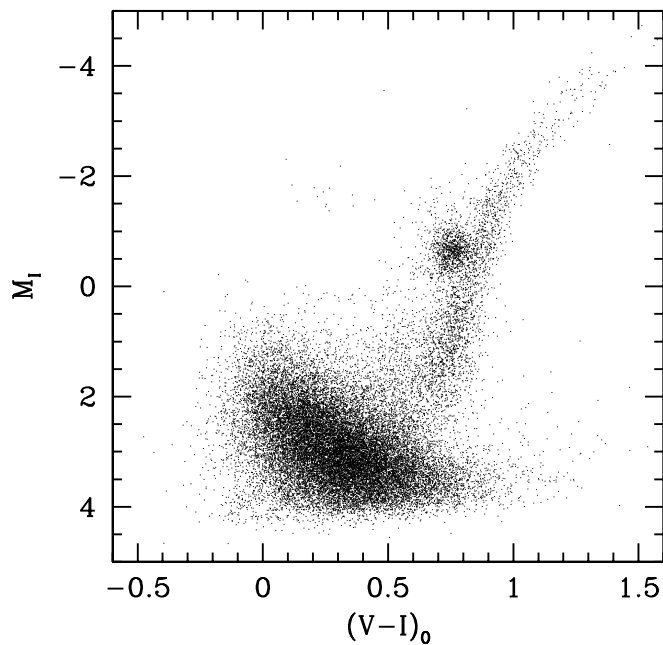
SNR=10

S. Cassisi

Age-Metallicity degeneracy in CMD

S. Cassisi
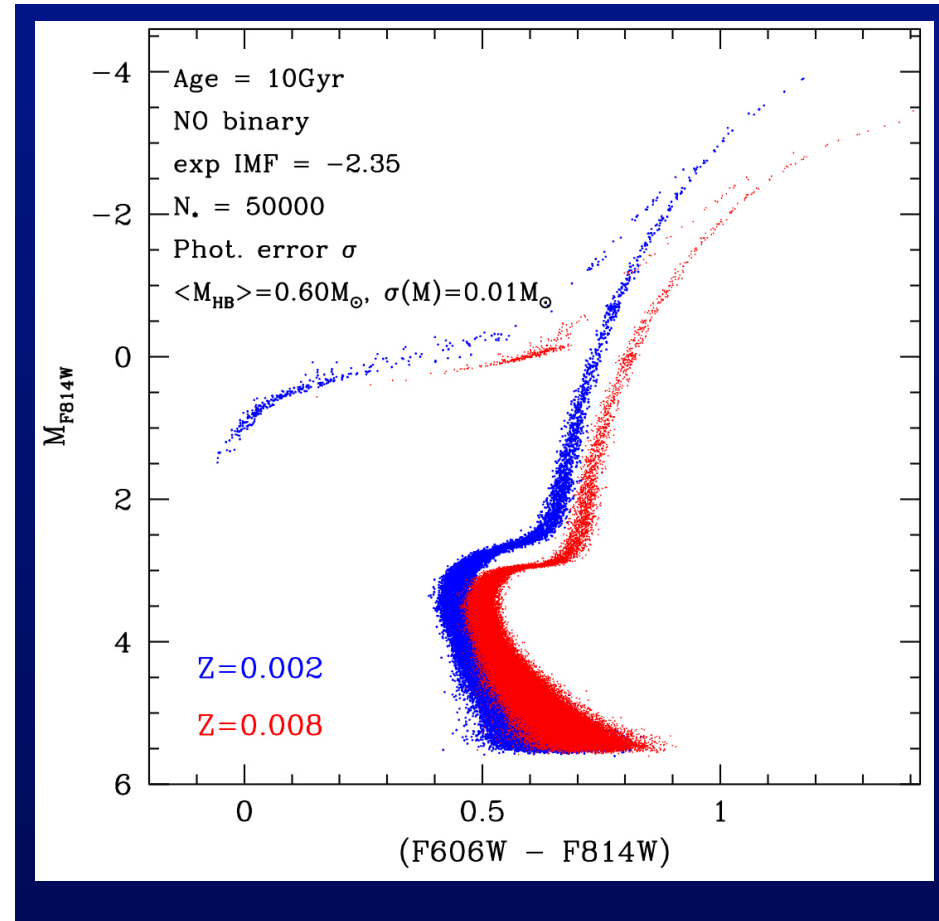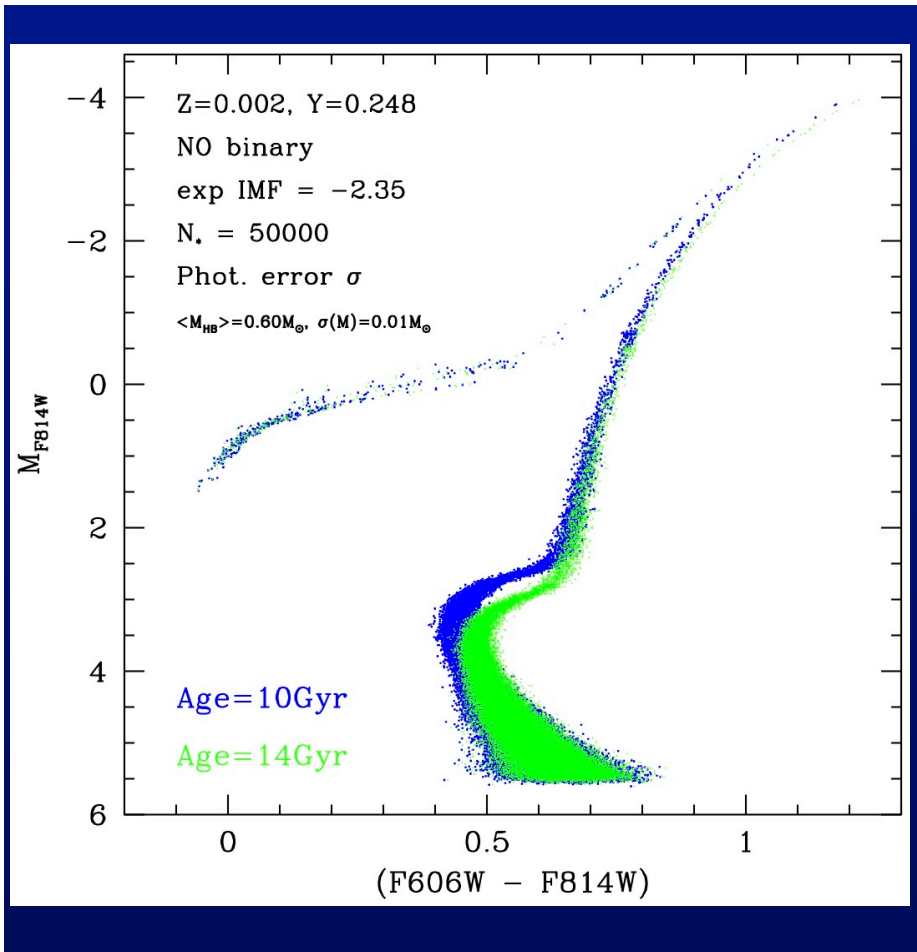
CMD of the Solar Neighbourhood + isochrones
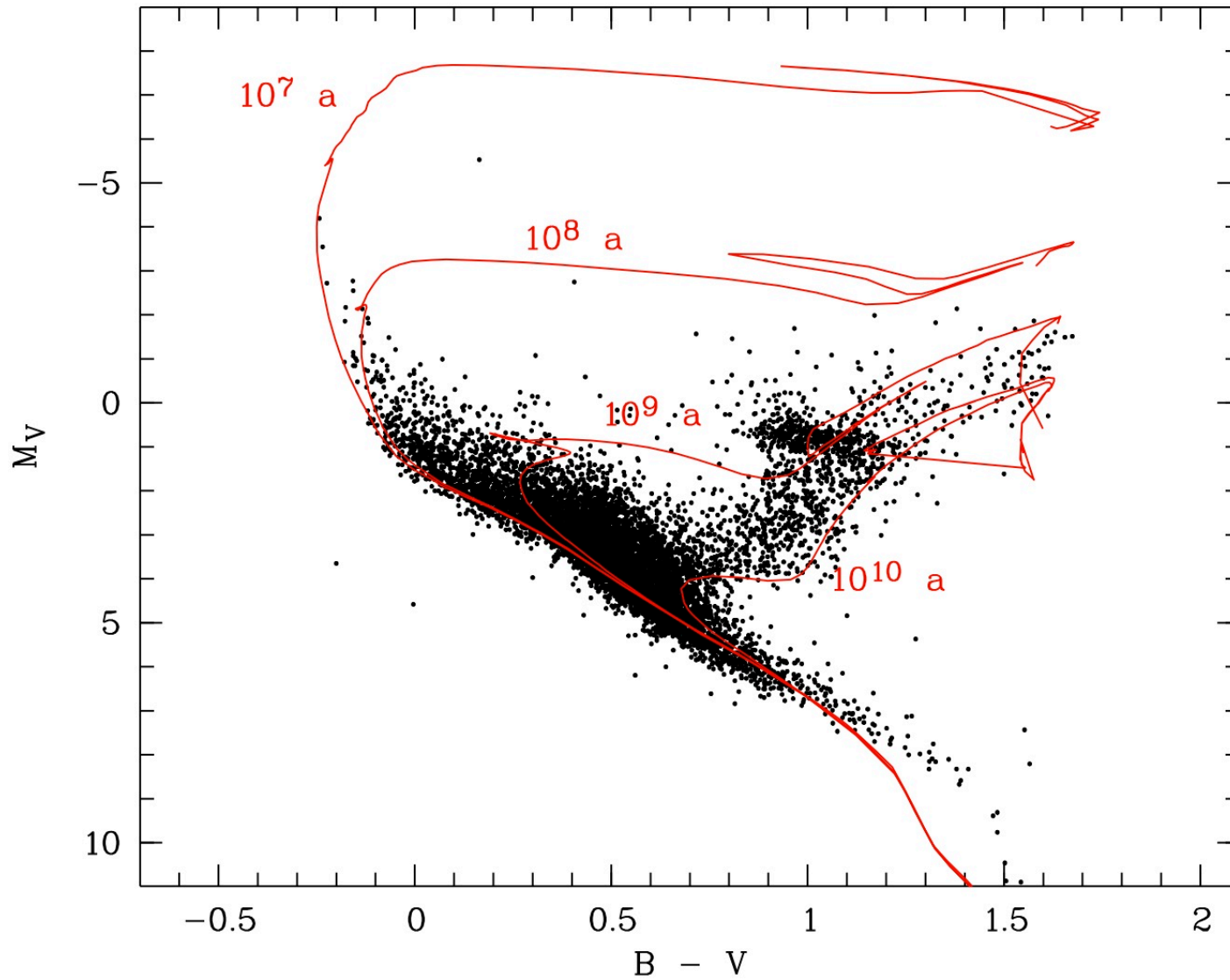
Dwarf galaxy Leo I: CMD & reconstructed star formation history
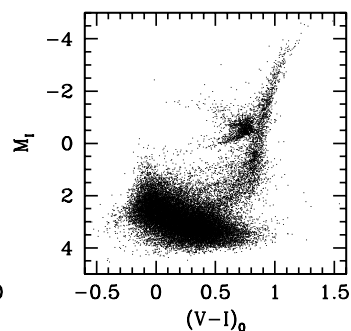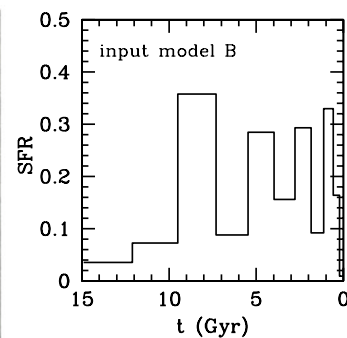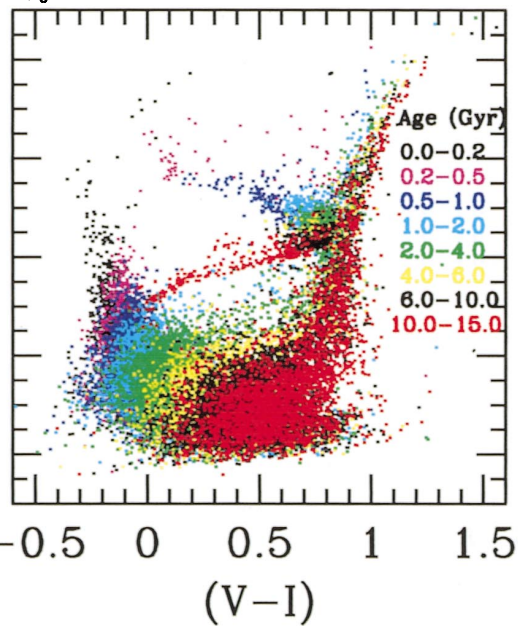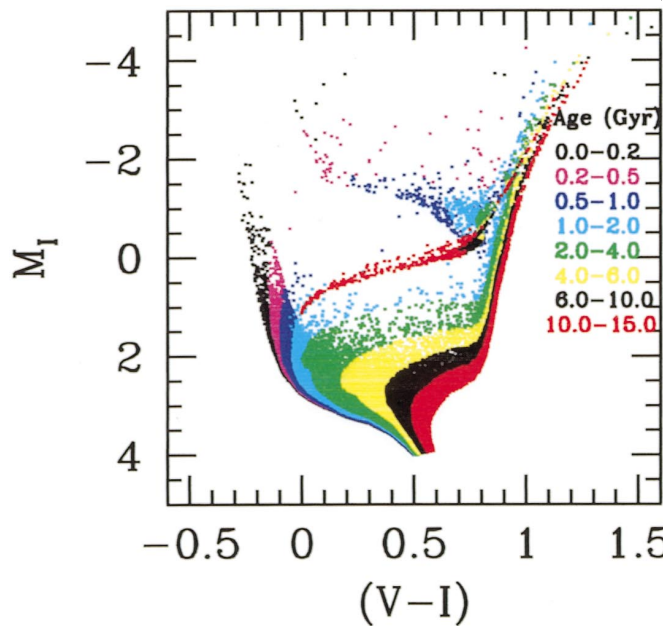
Source: Gallart et al. 1998