## Conclusions

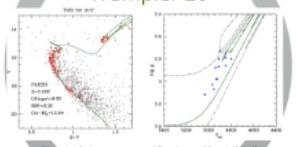
**Photometry**

- age
- distance
- metal-poor (approximate)
- average/differential reddening

**Spectroscopy**

- accurate membership
- Abundances
- Systemic velocity
- Membership

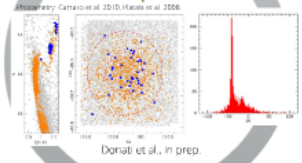
## Trumpler 20



Chemically homogeneous! See Laura Magrini's talk

## Trumpler 20

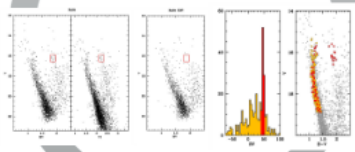
Photometry: Carraro et al. 2010; Hasse et al. 2006



Donati et al., in prep.

## The case of Be 81

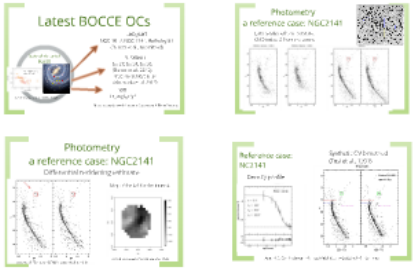
age 1 Gyr, E(B-V)=0.9, d=3 kpc



Open FSF Workshop - The Nature of Open Clusters

## The BOCCE project

Paolo Donati



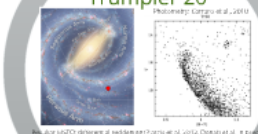

## Gaia ESO Survey

See Sofia Randich's talk

- Targets: 10^5 stars, 100 OCs
- with detailed chemical abundances


## Trumpler 20

Photometry: Carraro et al., 2010



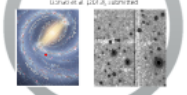
Analysis of UVOI distance at reddening (Pancino et al. 2010a; Donati et al., in prep.)

Estimate of MC core mass at the transition between overshooting and no overshooting (UVOI)

## The case of Be 81

age 1 Gyr, E(B-V)=0.9, d=3 kpc

Donati et al. 2014, submitted



Great-ESF Workshop - The World of Clusters

# The BOCCE project

Paolo Donati

http://www.bo.astro.it

# Bologna Open Cluster Chemical Evolution Project

Monica Tosi

Angela Bragaglia

- Michele Cignoni
- Giacomo Beccari
- Andrea V. Ahumada
- Eugenio Carretta
- Raffaele Gratton
- Grazina Tautvaisiene

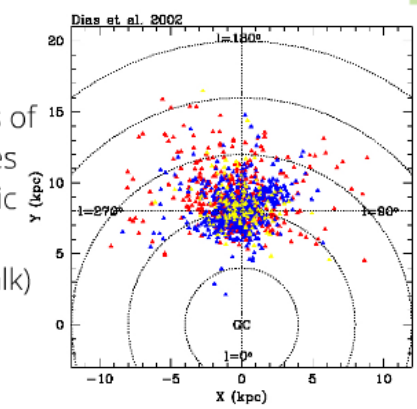
...and many others

# The aim of the project

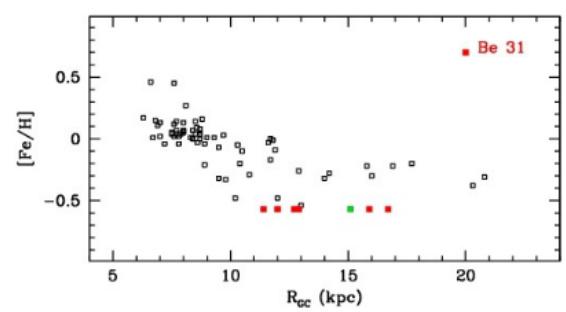
To study the chemical properties and evolution of the disc of the MW (Bragaglia & Tosi, 2006)

## Open Clusters

Good tracers of the properties of the Galactic disc (see A. Bragaglia's talk)




## Precision & Homogeneity

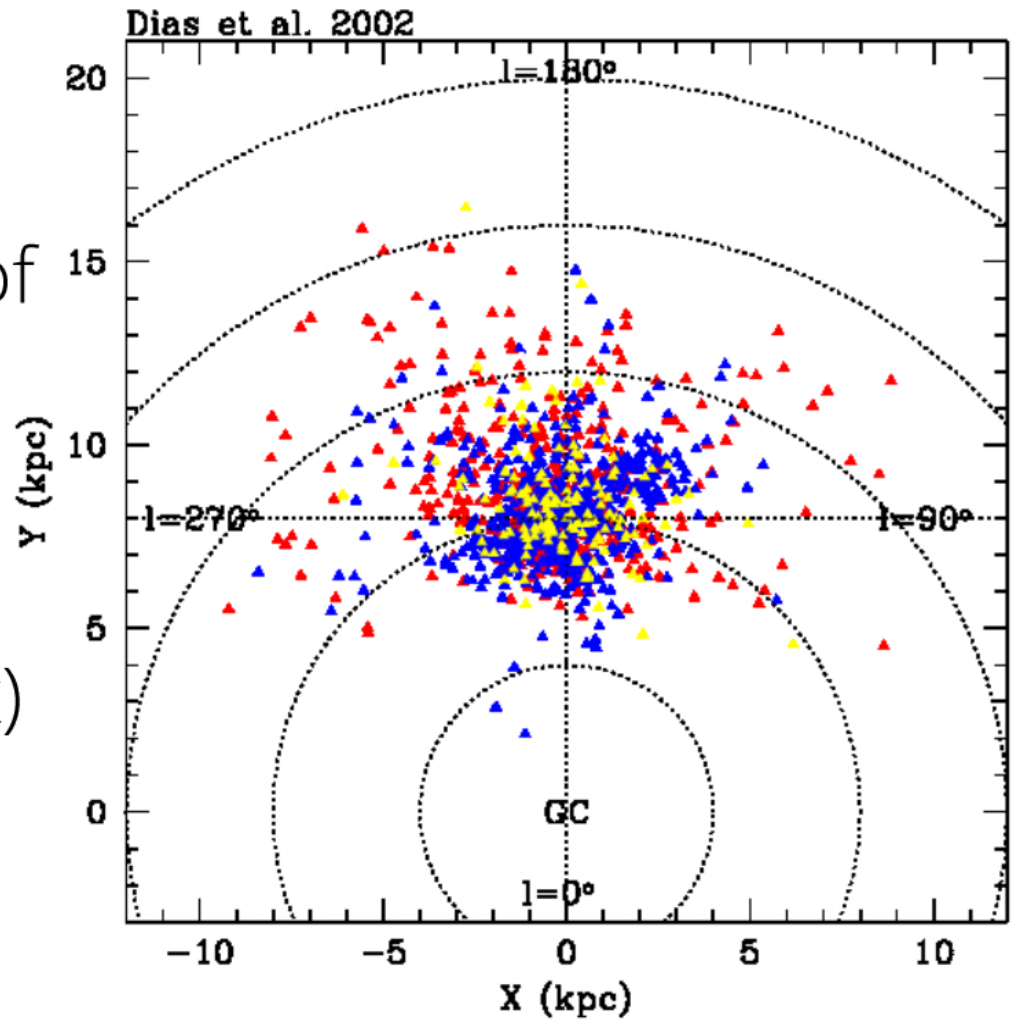



Literature:
4 kpc < d < 8kpc
2 Gyr < age < 8 Gyr

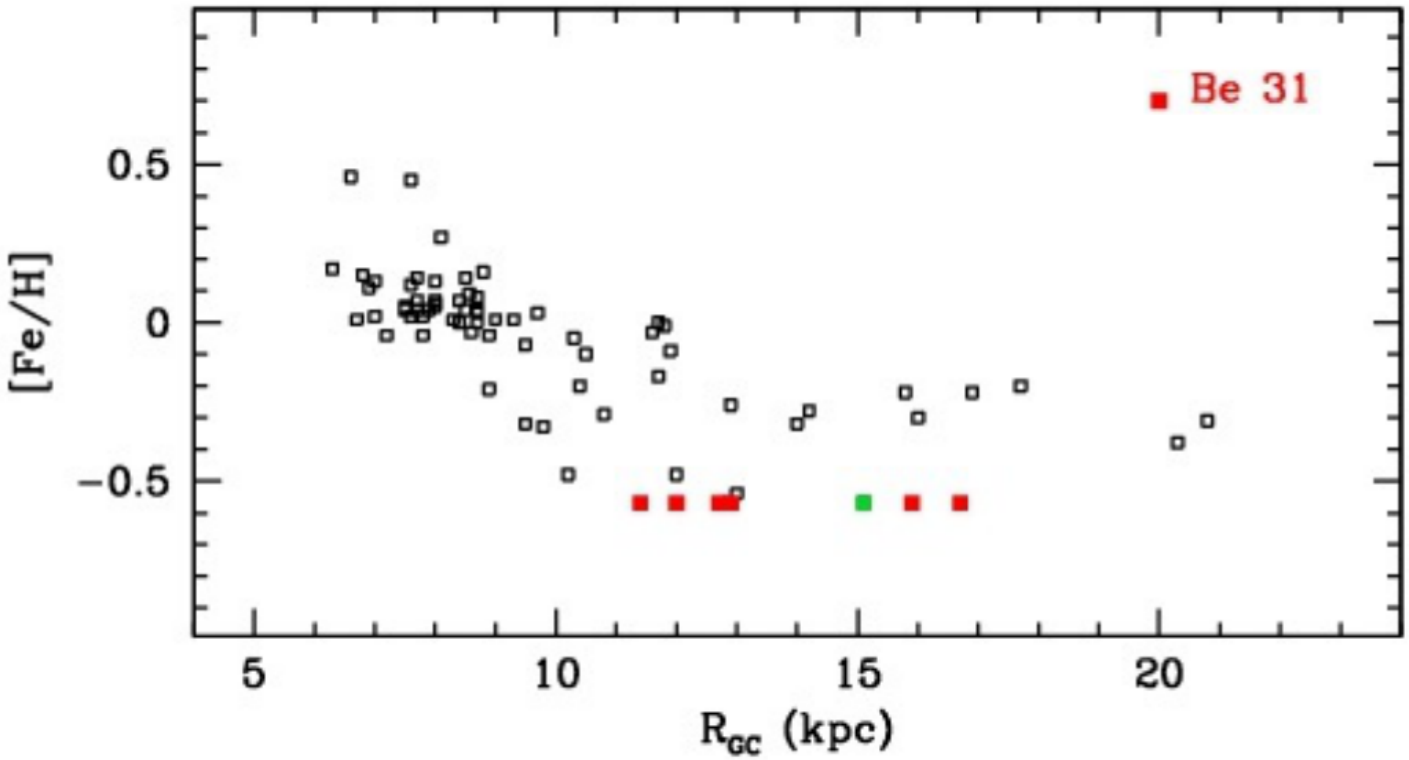
Bocce:
Rgc ~ 15 kpc
age ~ 2.4 Gyr

# Open Clusters

Good tracers of the properties of the Galactic disc (see A. Bragaglia's talk)



# Precision & Homogeneity




Literature:

4 kpc < d < 8kpc

2 Gyr < age < 8 Gyr

Bocce:

Rgc ~ 15 kpc

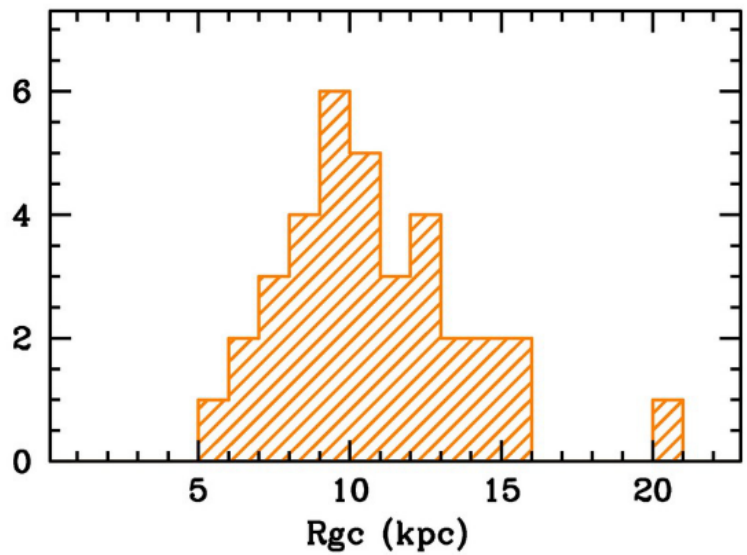
age ~ 2.4 Gyr

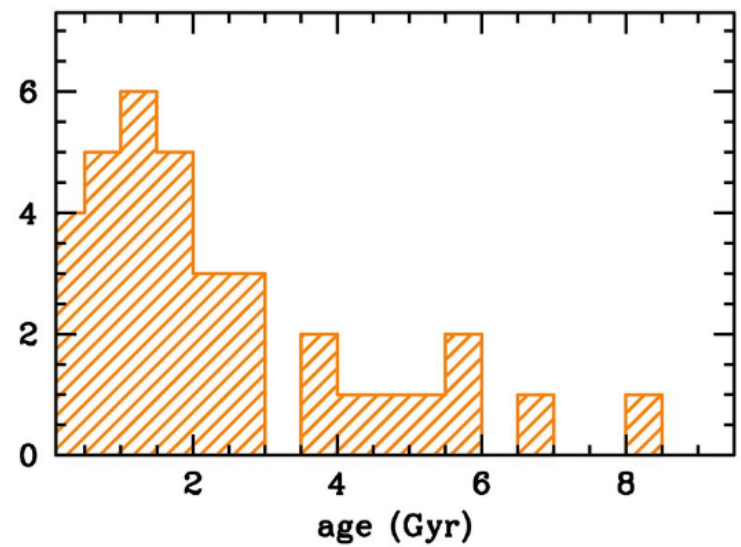
# Methodology

Accurate Photometry

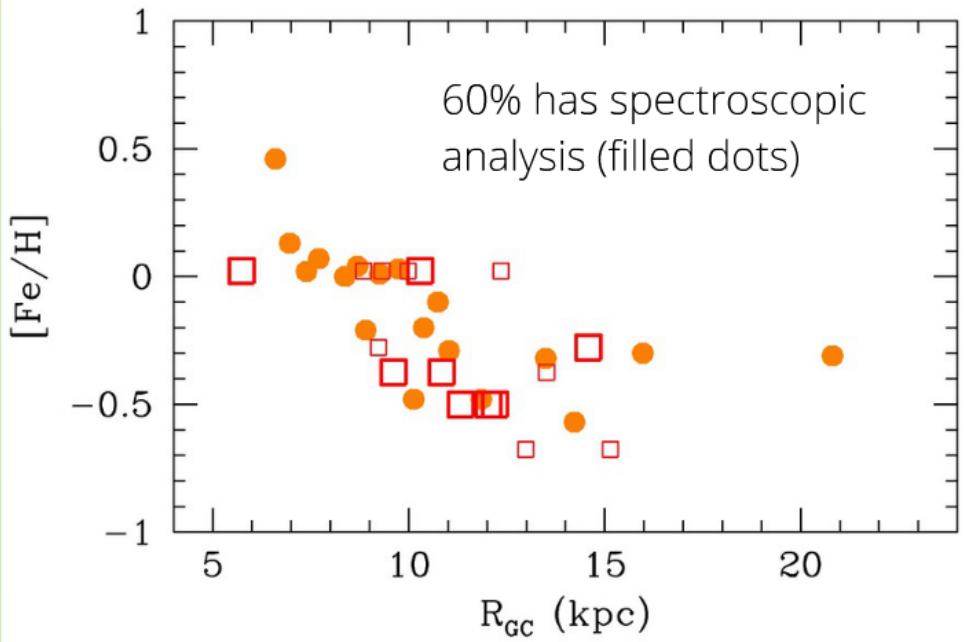
High resolution spectroscopy

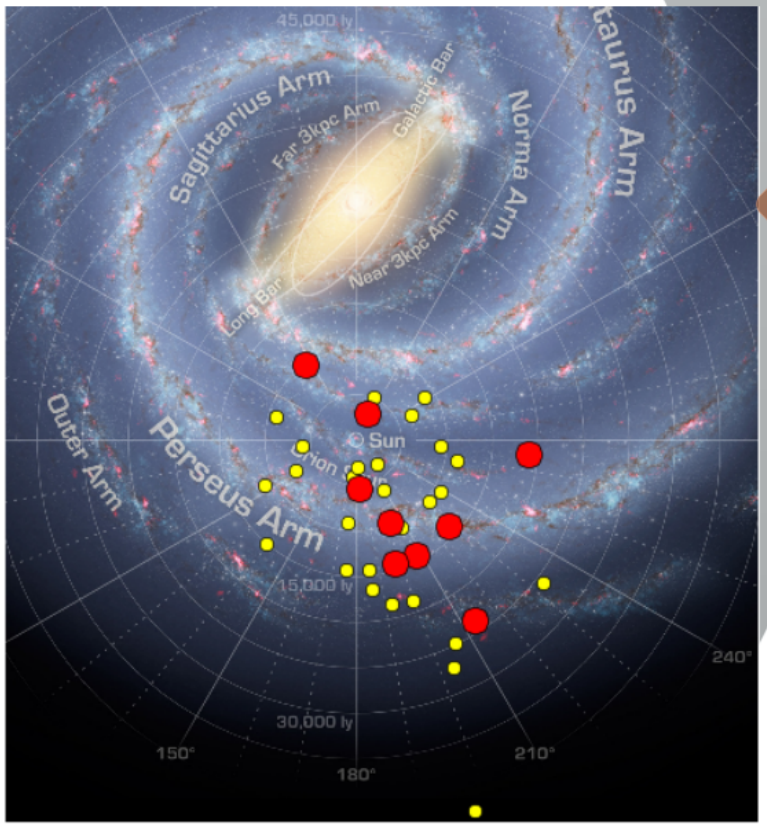
35 Open Clusters + 6 under study



# State of the art of BOCCE

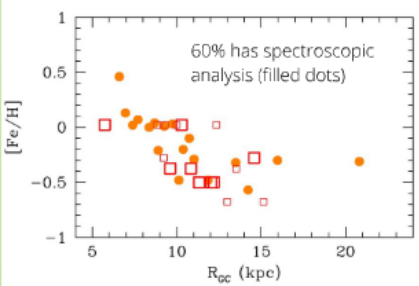


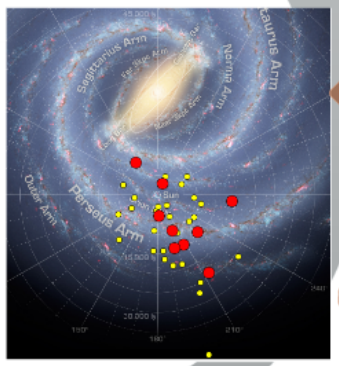




Metallicity gradient: see Tristan's talk

# Latest BOCCE OCs

State of the art of BOCCE




Metallicity gradient: see Tristan's talk

LBC@LBT
NGC 1817, NGC 2141, Berkeley 81
(Donati et al., submitted)

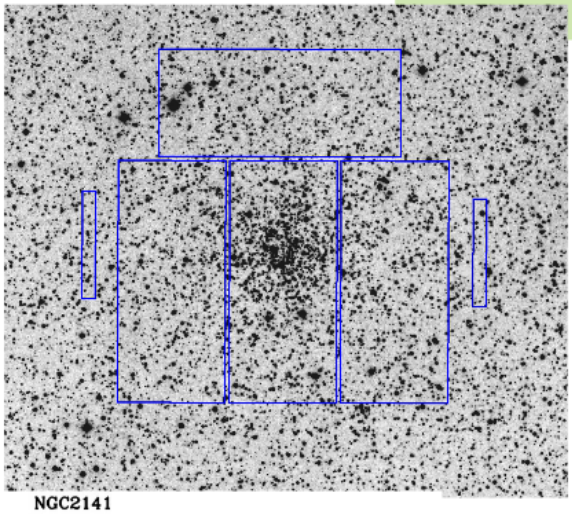
SUSI@NTT
Be 27, Be 34, Be 36,
(Donati et al., 2012)
NGC 2849, NGC 6134
(Ahumada et al. 2013)

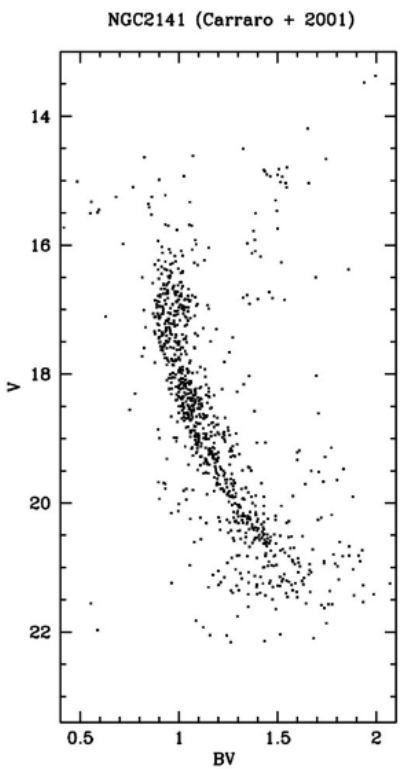
WFI
Trumpler 5*

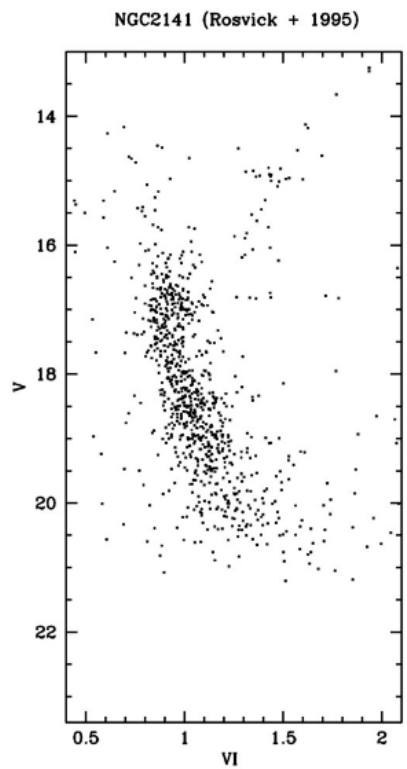
*In collaboration with Gabriele Cocozza and Elena Pancino

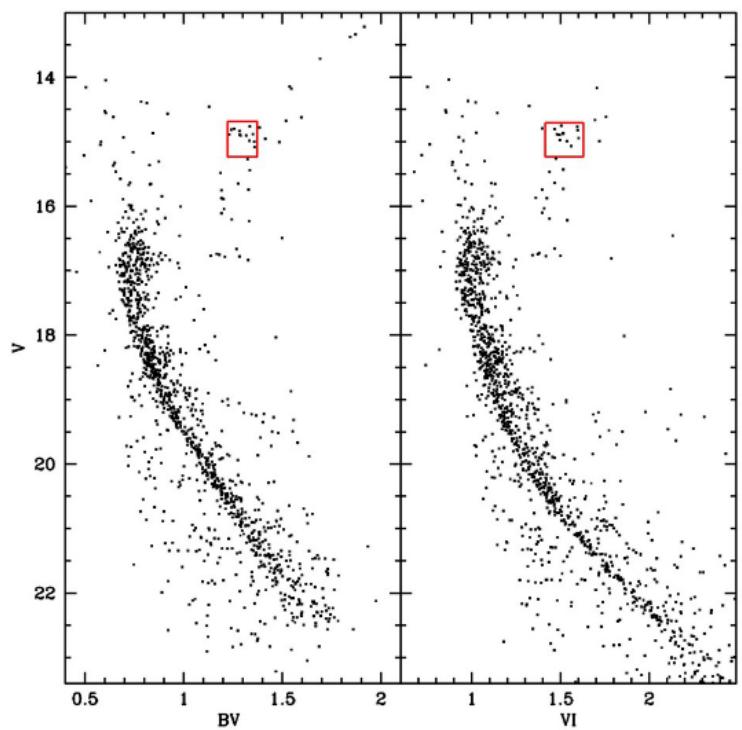
# Photometry
# a reference case: NGC2141

Data available from literature,
CMD inside 3' from the centre



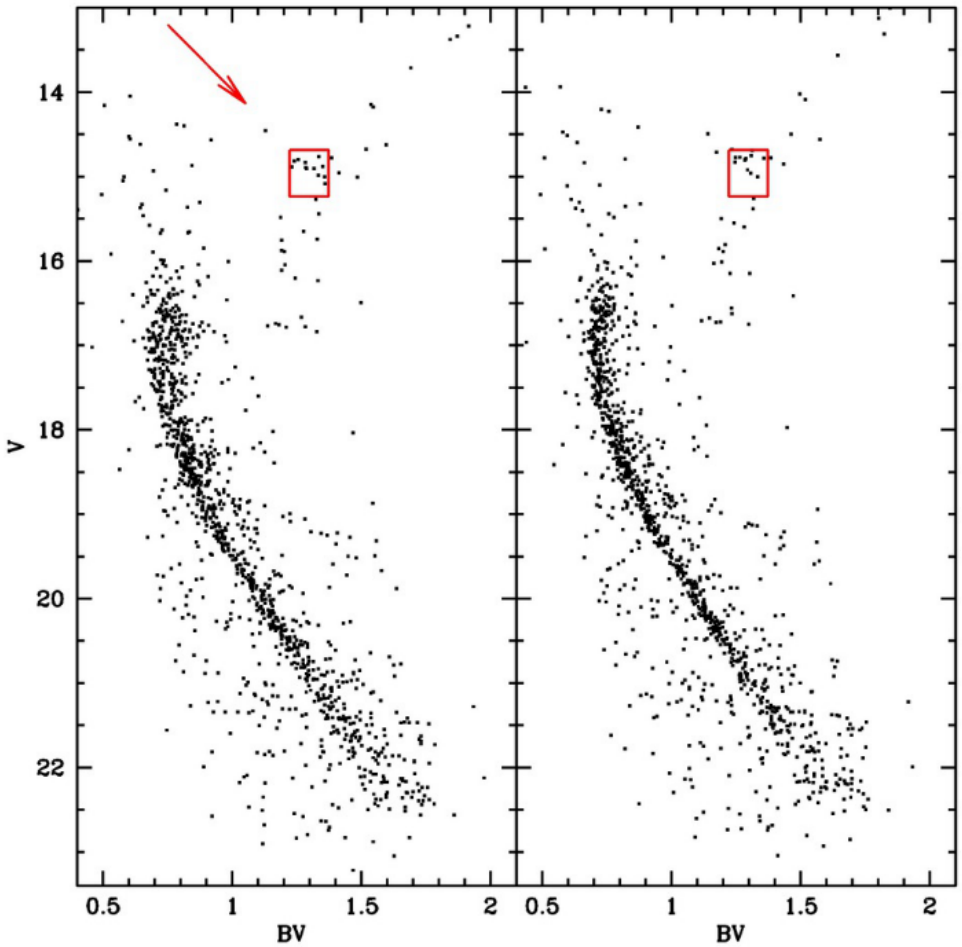



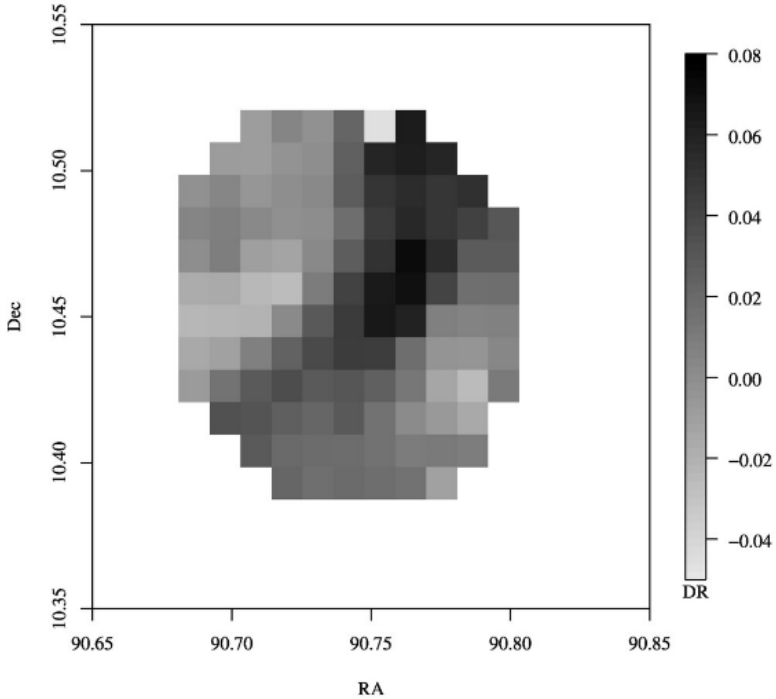
# Photometry
# a reference case: NGC2141

## Differential reddening estimate




Observed CMD and CMD corrected for DR

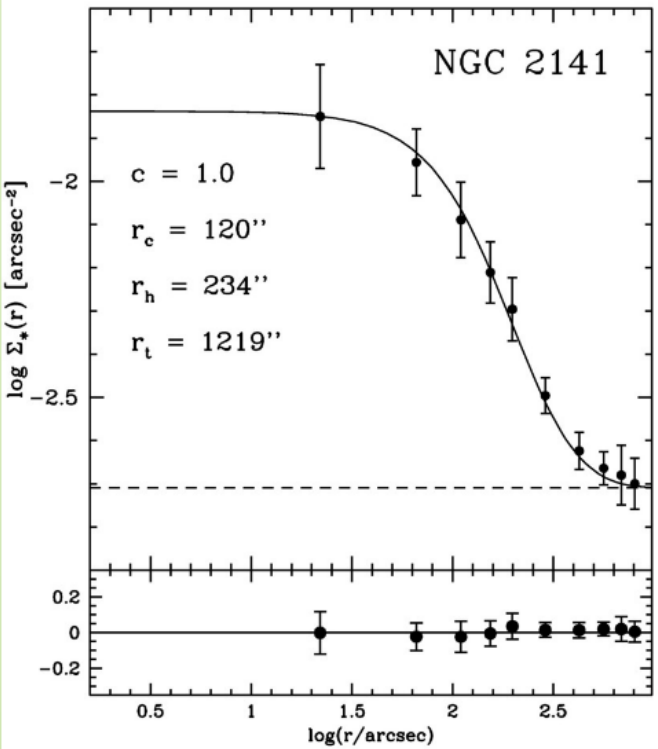
Map of the DR for the inner 4'



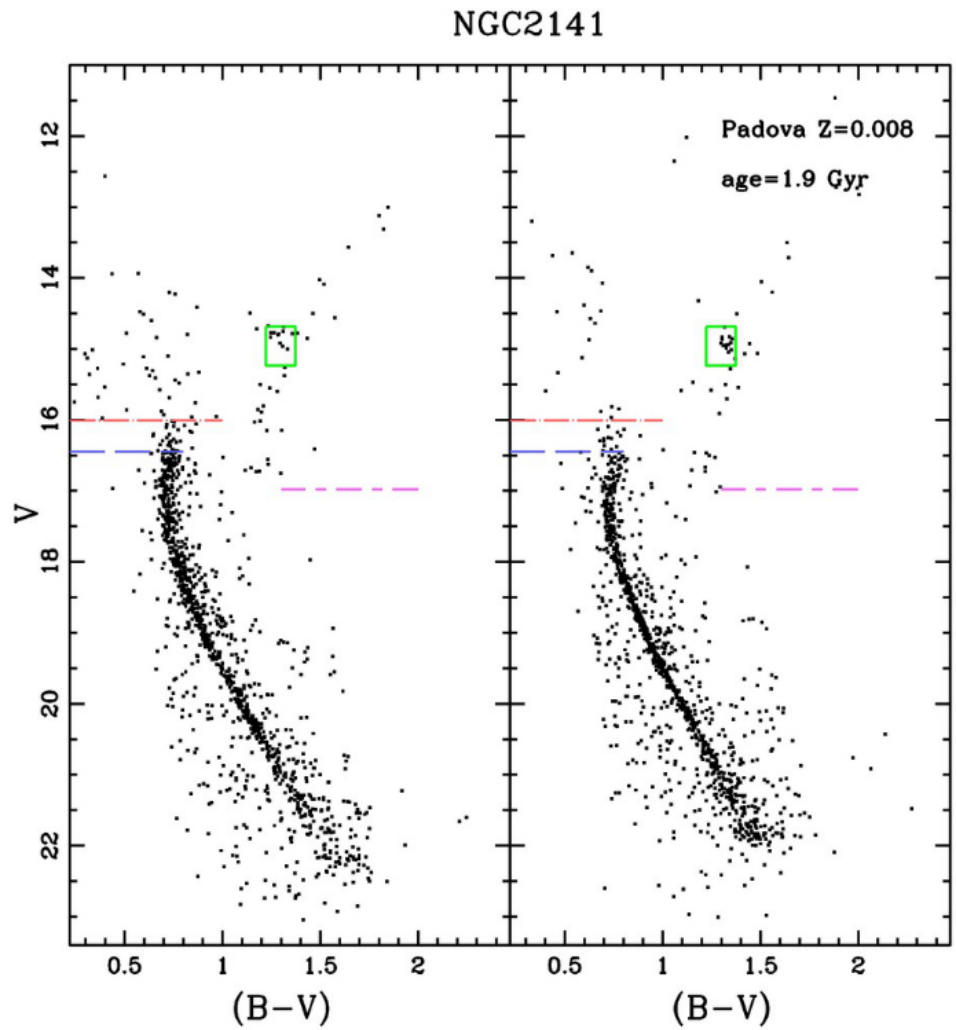

Method used adapted from Milone et al., 2012

# Reference case: NC2141

## Density profile




## Synthetic CMD method (Tosi et al., 1991)

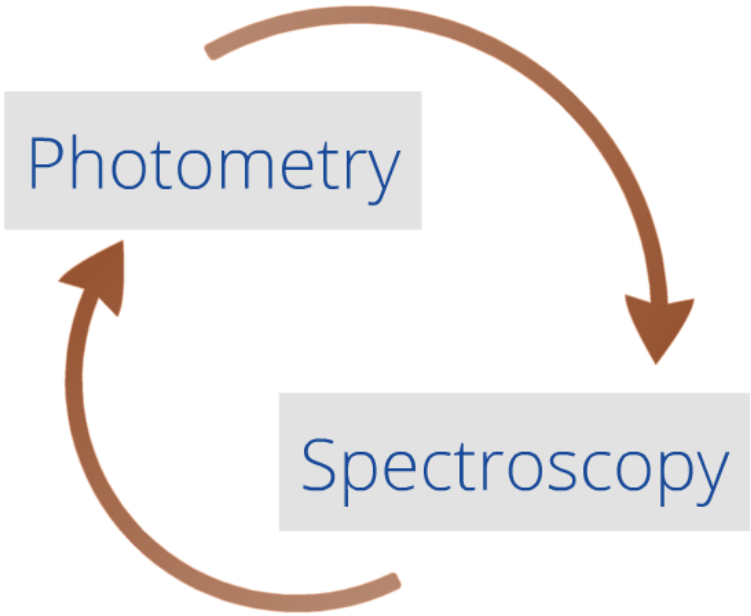



Age: ~1.9 Gyr  Distance: ~4.4 kpc Metallicity: Z=0.008 E(B-V): ~0.4 mag

# Gaia ESO Survey

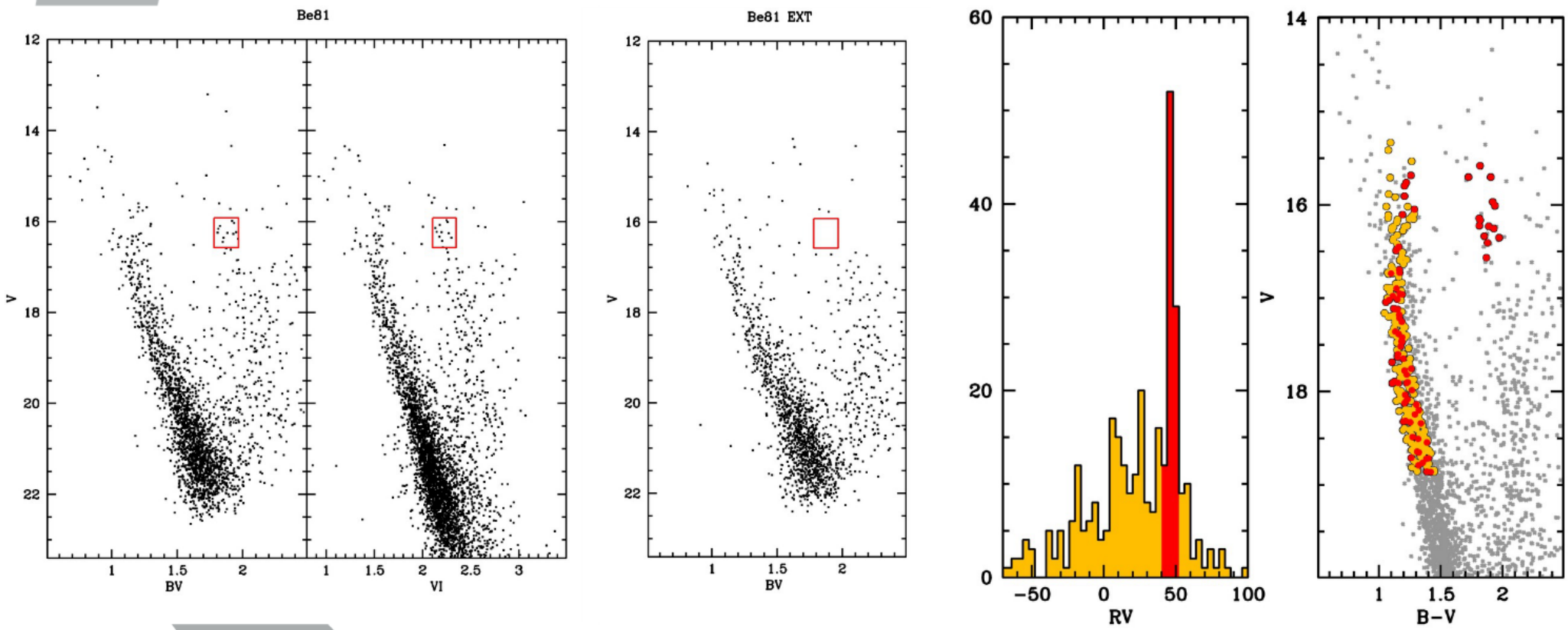
See Sofia Randich's talk

- Targets: 10^5 stars, 100 OCs
- Aim: detailed chemical abundances



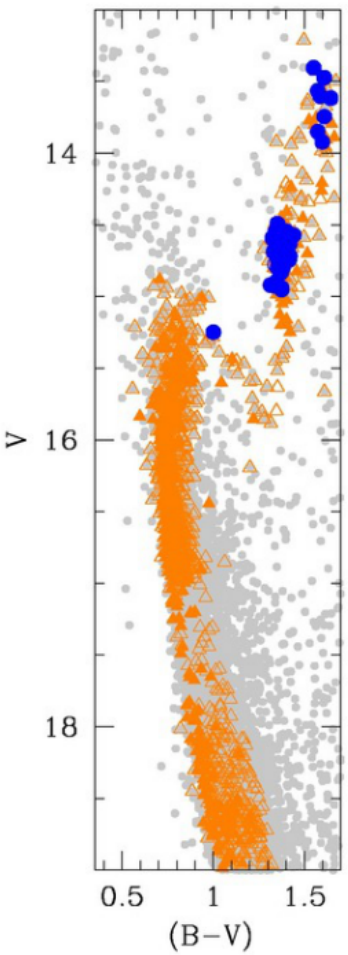
# The case of Be 81

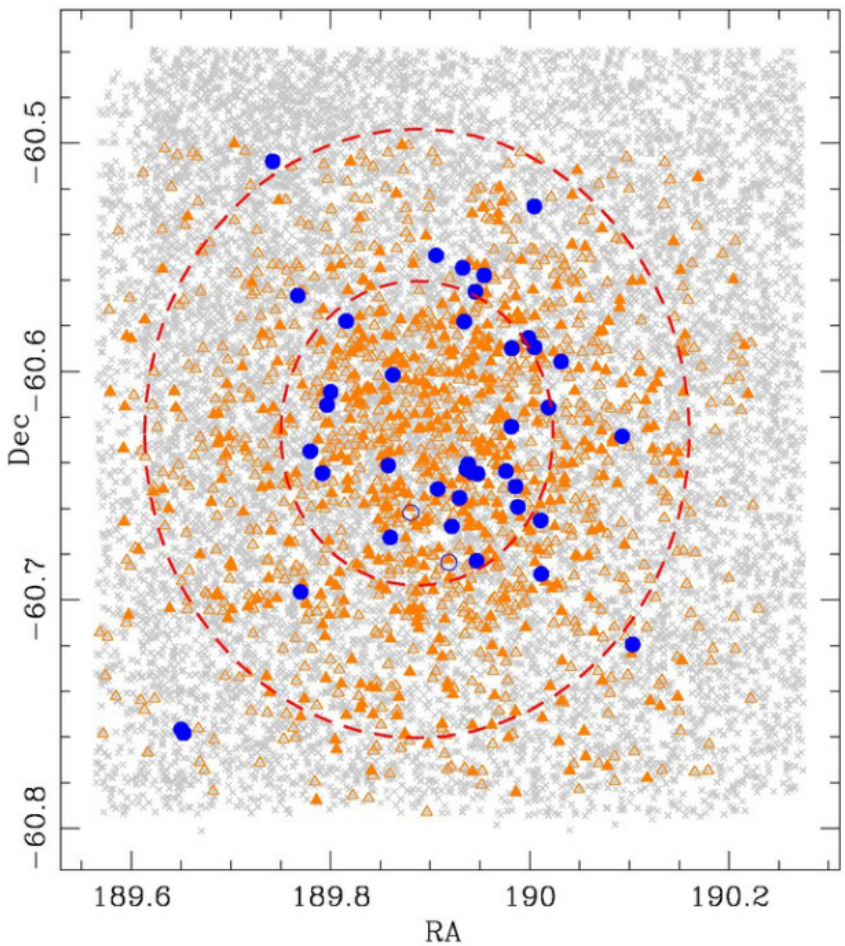
age 1 Gyr, E(B-V)=0.9, d=3 kpc

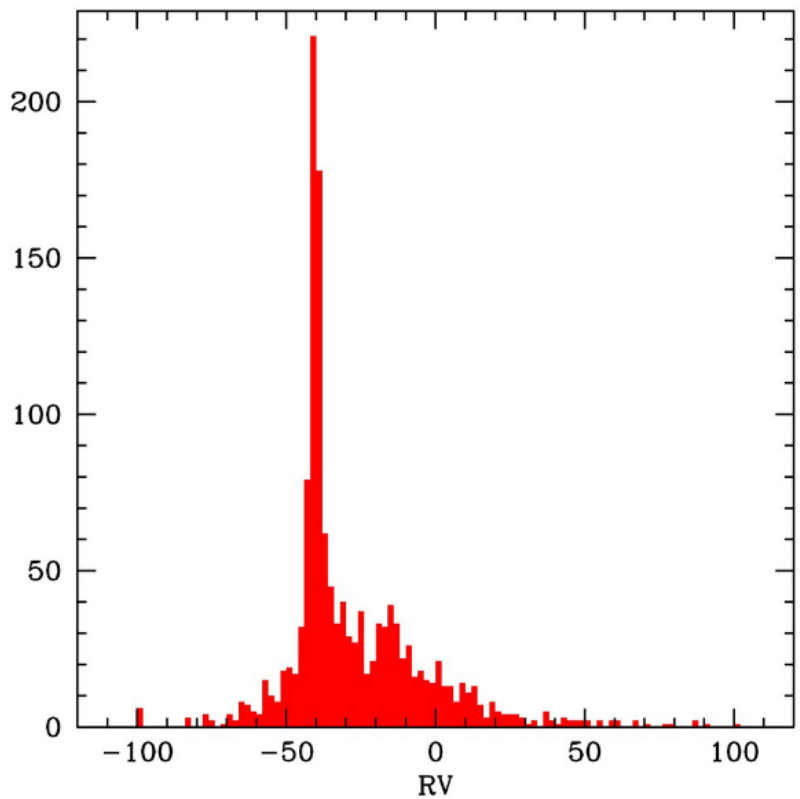


# Trumpler 20

Photometry: Carraro et al. 2010, Platais et al. 2008

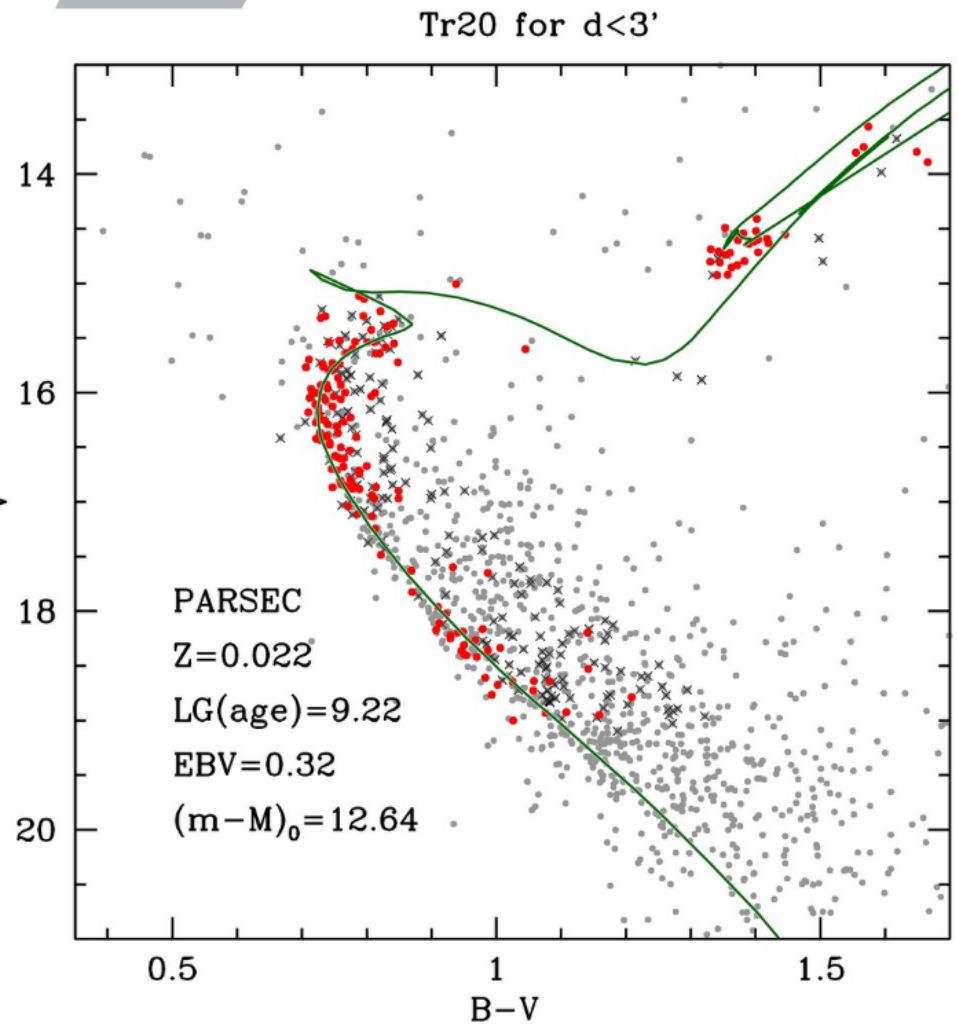


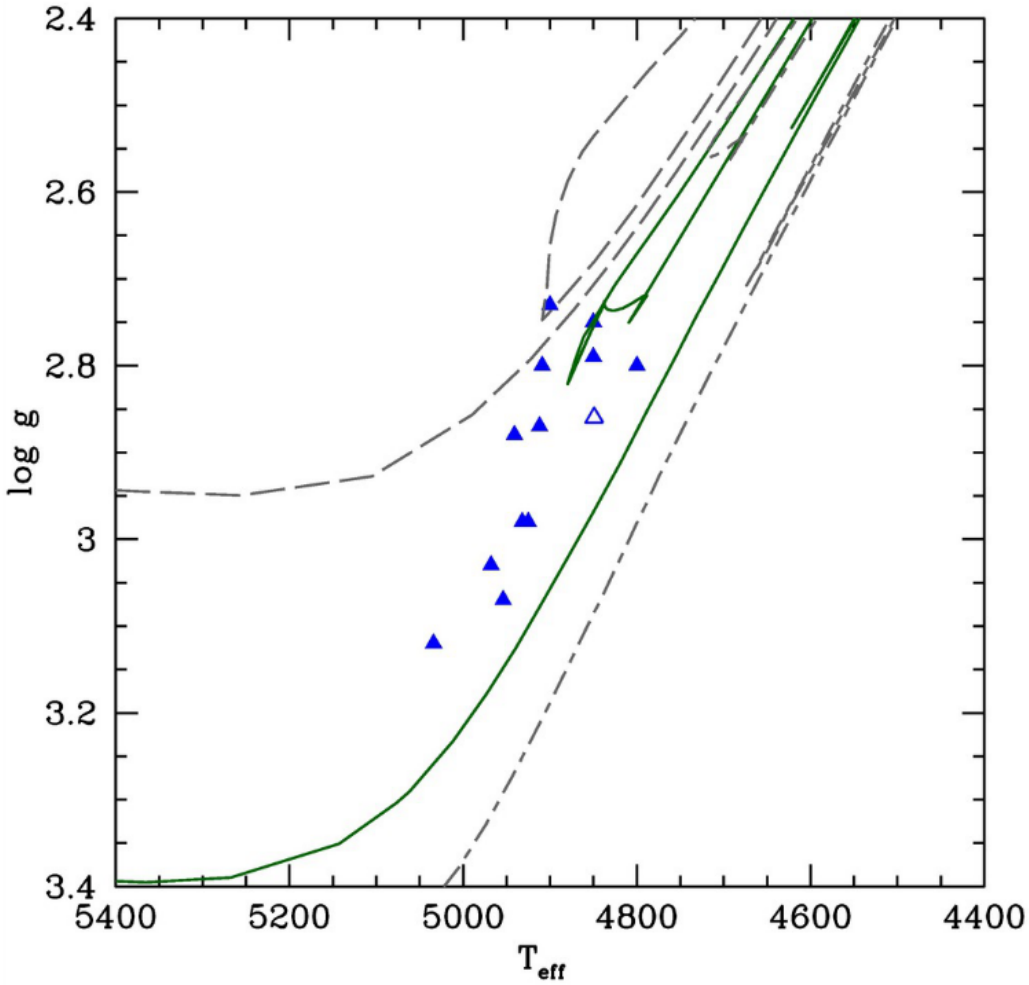




Donati et al., in prep.

# Trumpler 20




Chemically homogeneous! See Laura Magrini's talk.

# Conclusions

## Photometry

- age
- distance
- metallicity (approximate)
- average/differential reddening

## Spectroscopy

- Accurate metallicity
- Abundances
- Systemic velocity
- Membership