

# Star Clusters at IA and NAO Rozhen



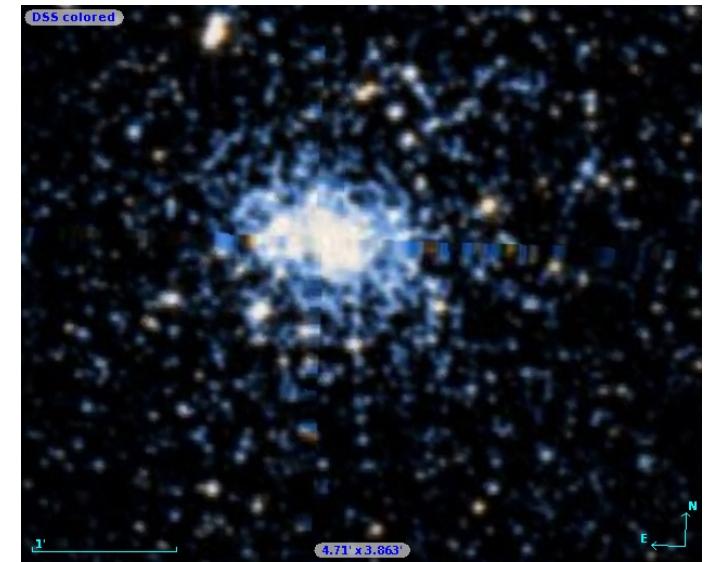
Grigor Nikolov

Institute of Astronomy and  
National Astronomical  
Observatory „Rozhen“

# LMC star clusters

## Star cluster profiles

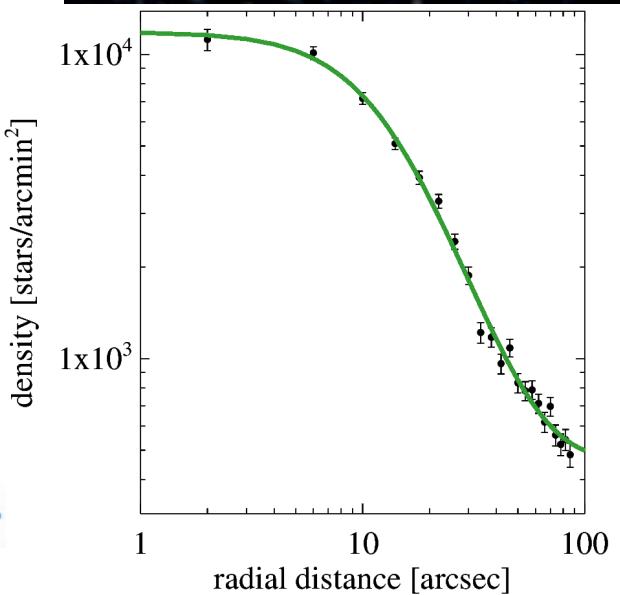
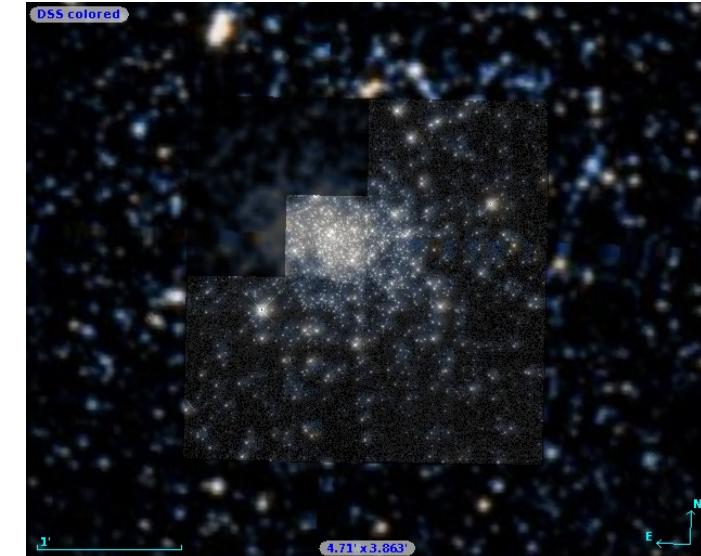
- LMC distance ~50 kpc
- 50% younger than 100 Myr
- Young populous
- Intermediate age clusters



# Methods I

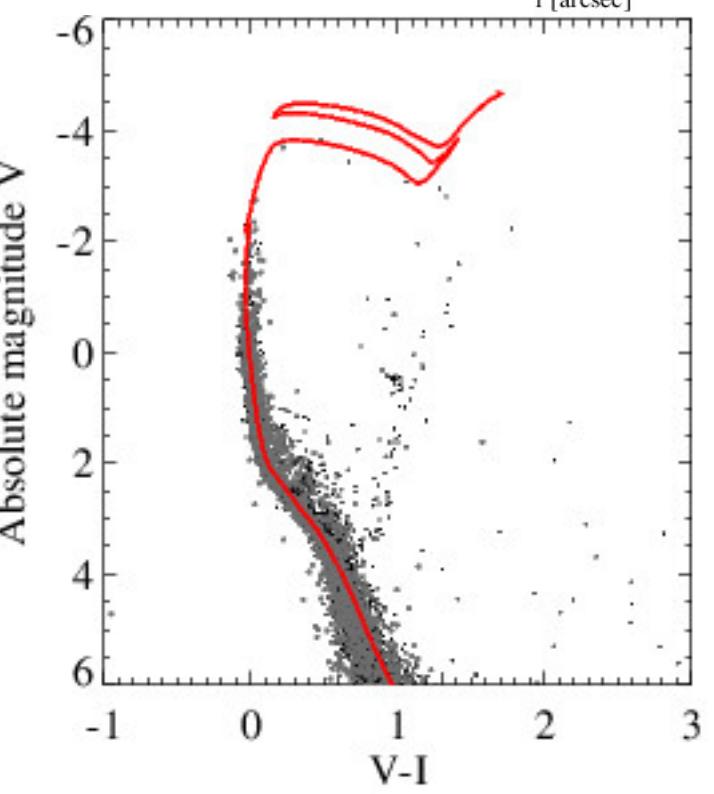
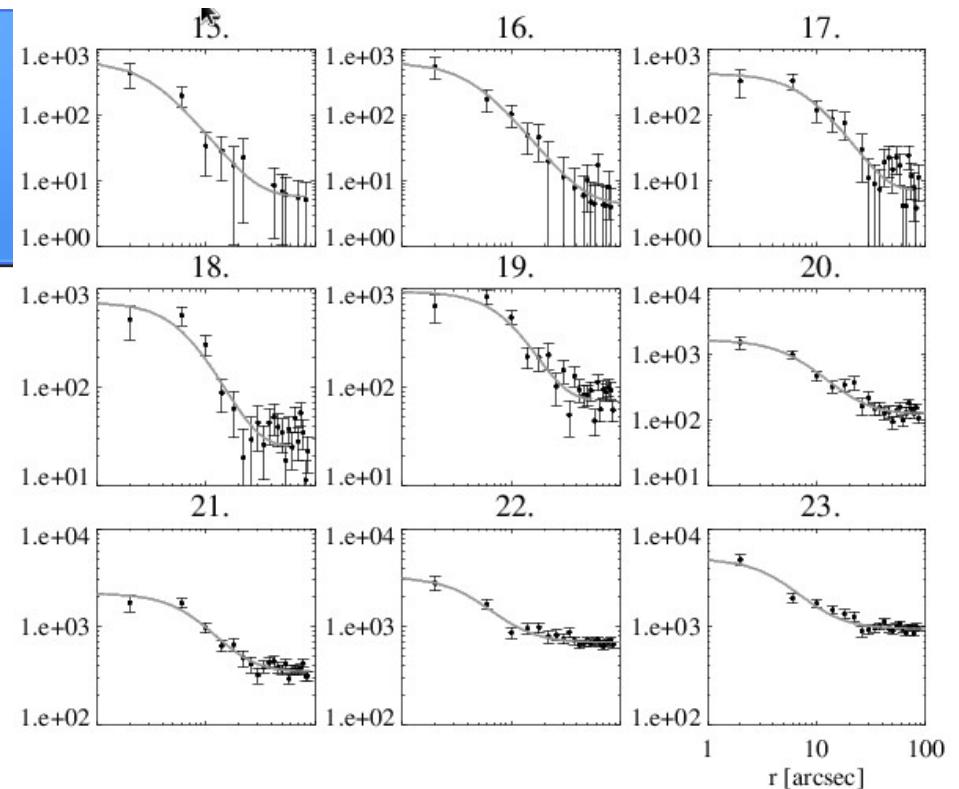
- HST/WFPC2 archival images
- PSF photometry (HSTphot)
- Radial number-density profiles
- Model fitting (King 1962)
- Structural parameters
- Stellar distribution

$$f(r) = f_0 \left( \frac{1}{\sqrt{1 + \left(\frac{r}{r_c}\right)^2}} - \frac{1}{\sqrt{1 + \left(\frac{r_t}{r_c}\right)^2}} \right)^2 + f_f$$

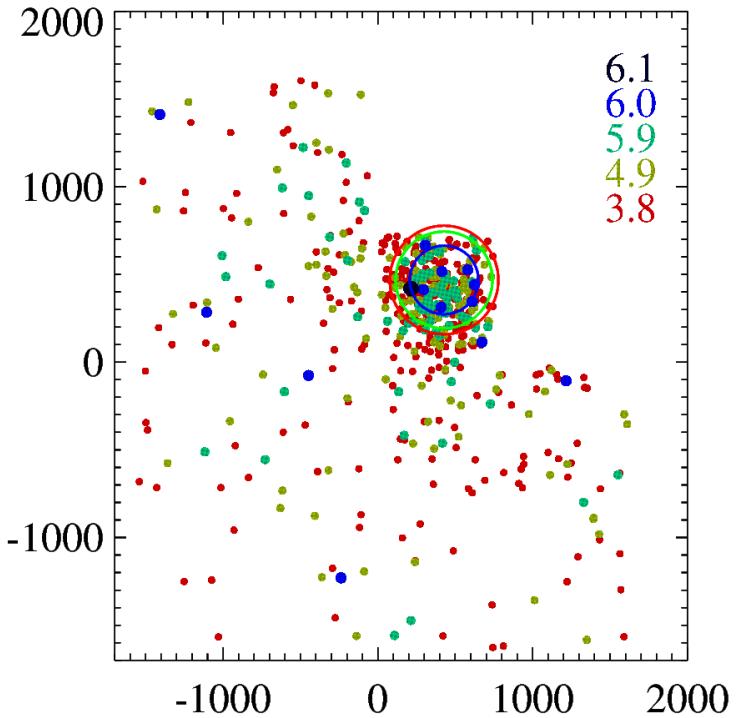


# Methods II

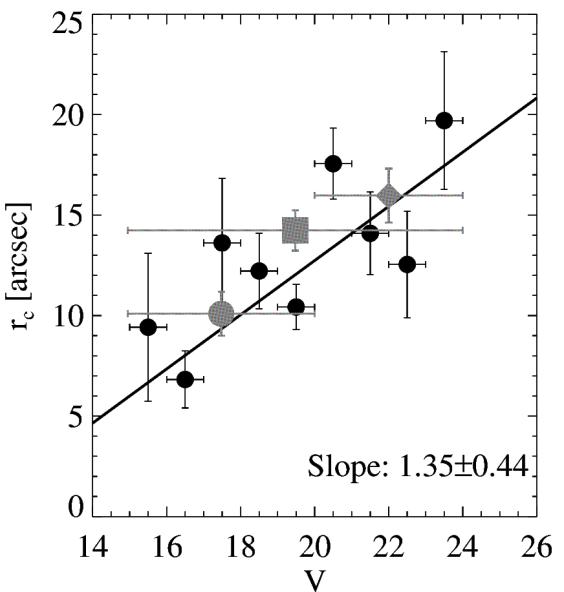
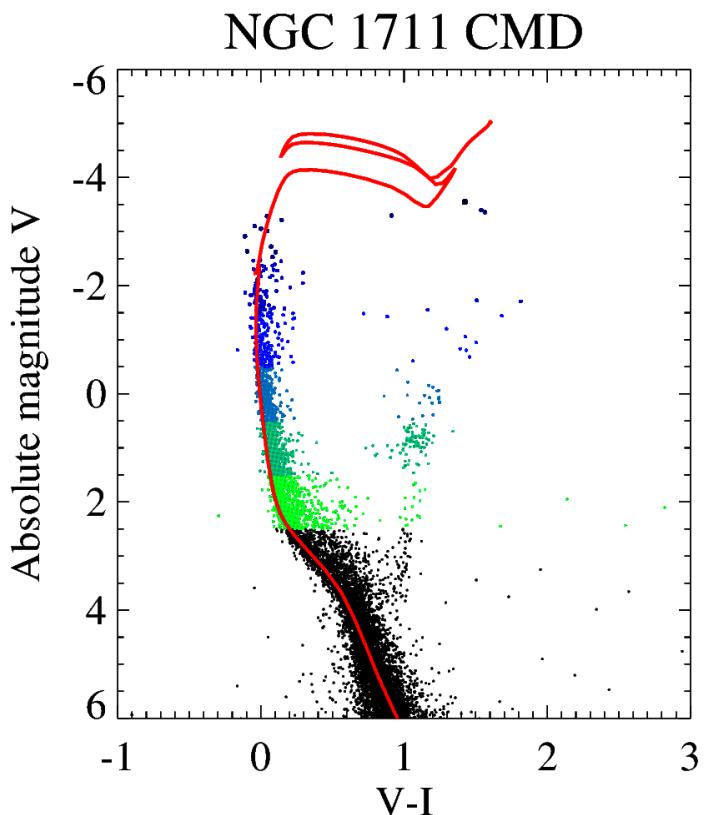
- Padova isochrones
- Best-fitting isochrone
- Mass-to-light relation
- Derive masses
- Distribution of mass groups



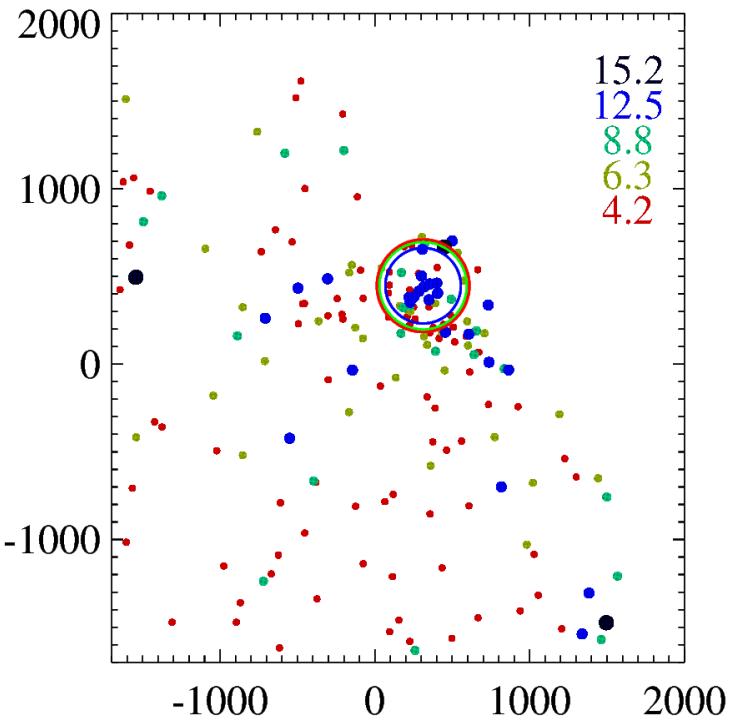
# Cluster NGC 1711



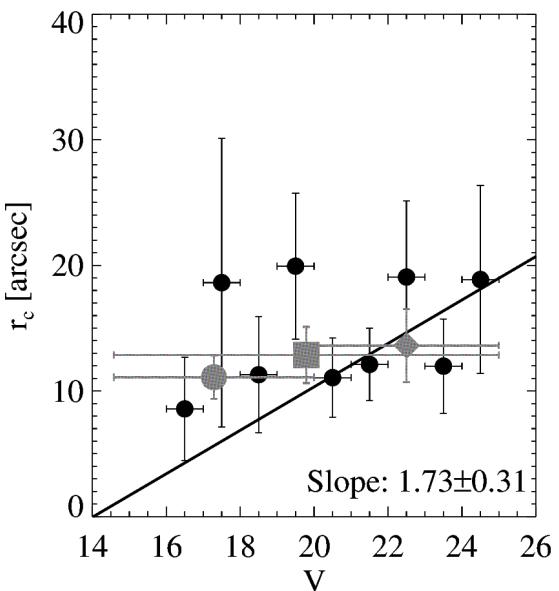
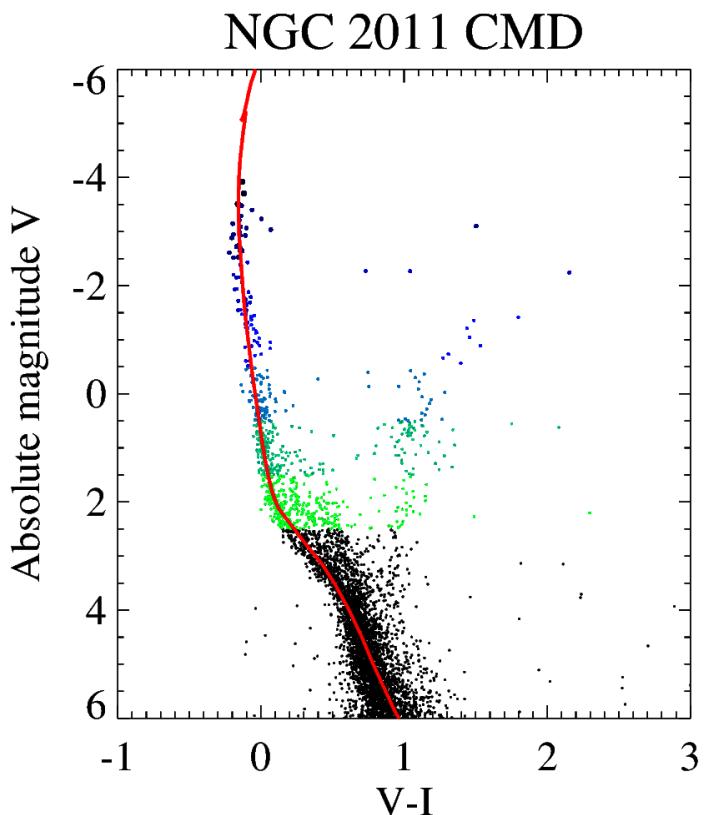
- Age 71 Myr
- $T_R = 125$  Myr



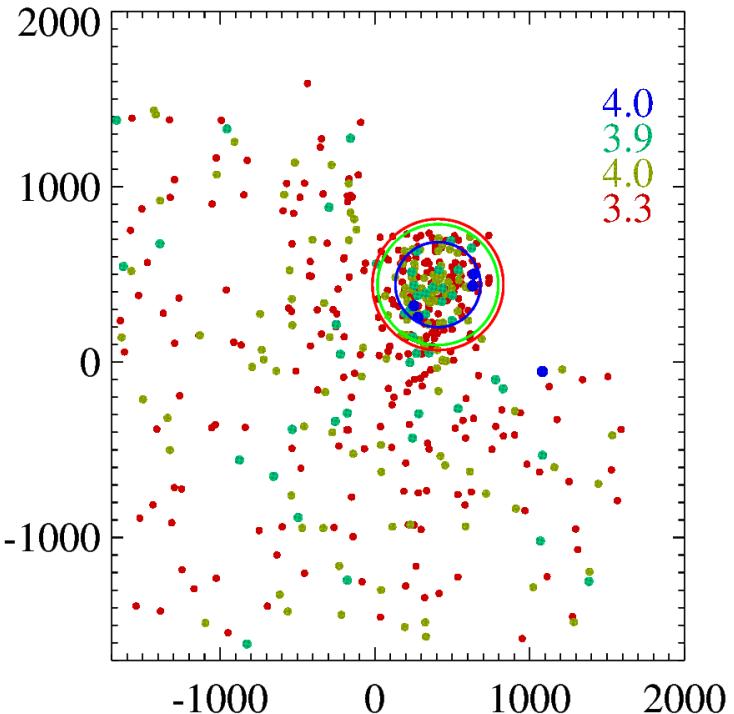
# Cluster NGC 2011



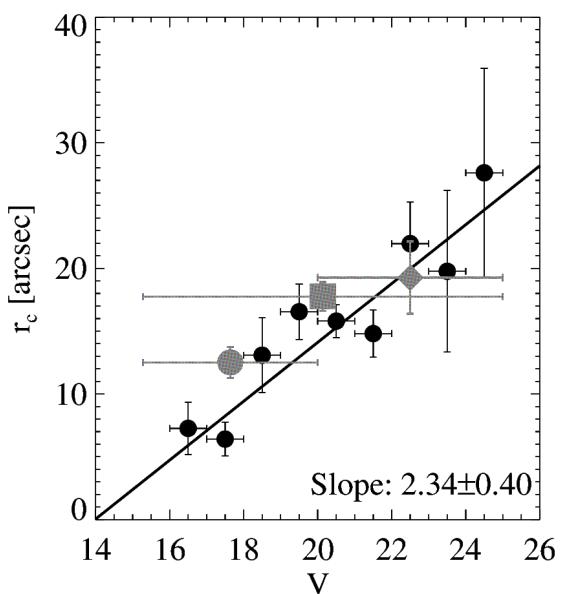
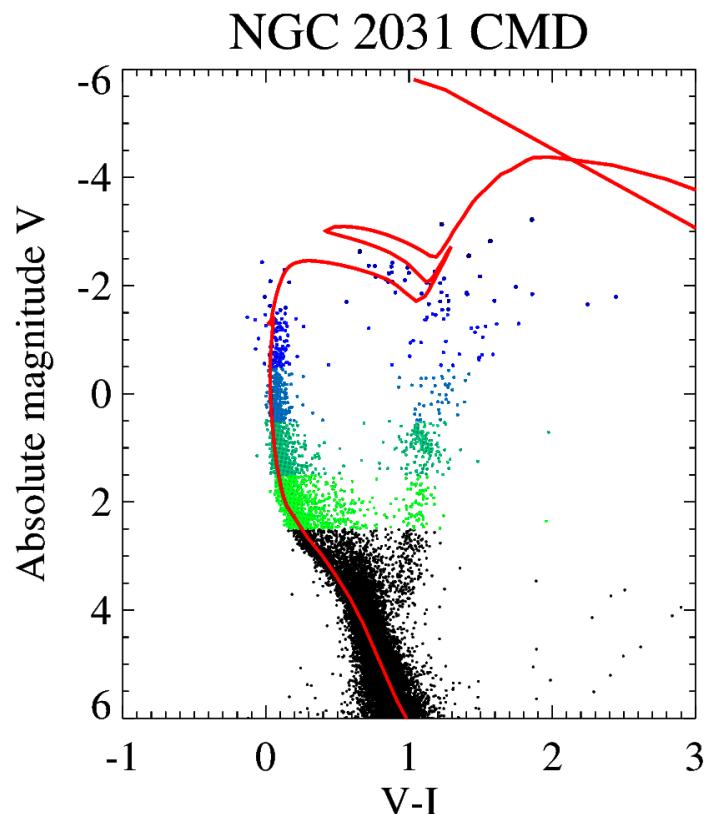
- Age 11 Myr
- $T_R = 91$  Myr



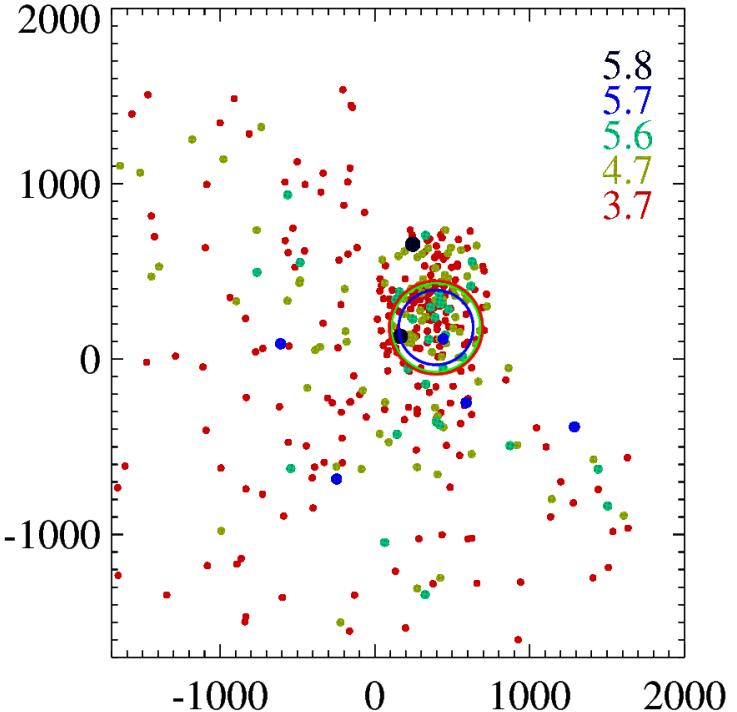
# Cluster NGC 2031



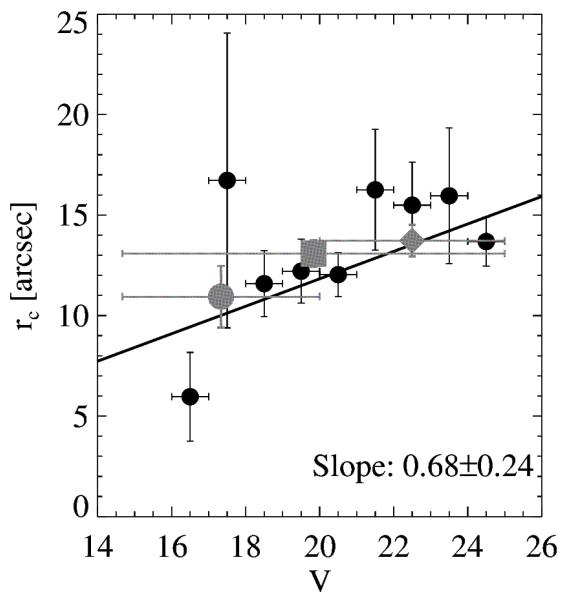
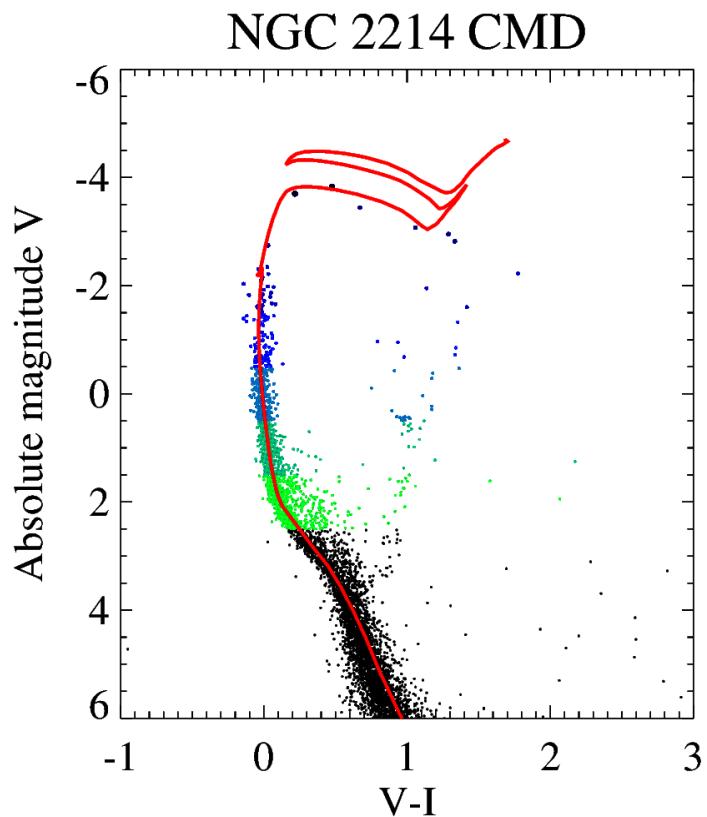
- Age 158 Myr
- $T_R = 228$  Myr



# Cluster NGC 2214

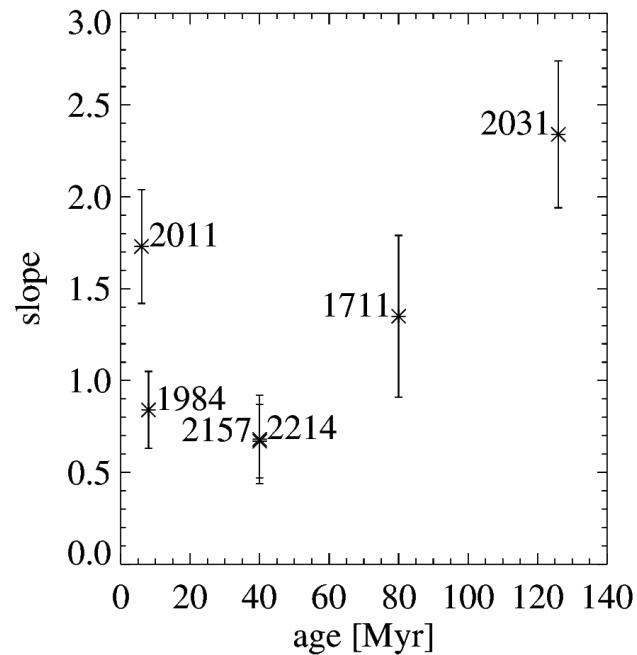
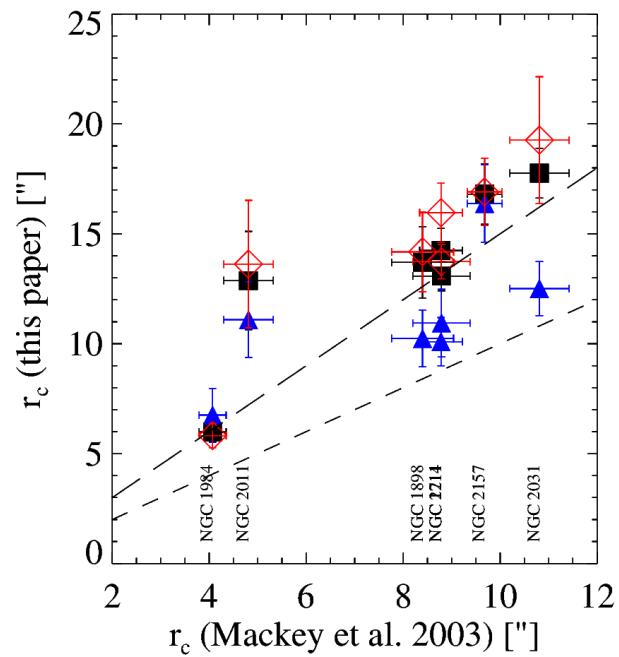


- Age 79 Myr
- $T_R = 88$  Myr



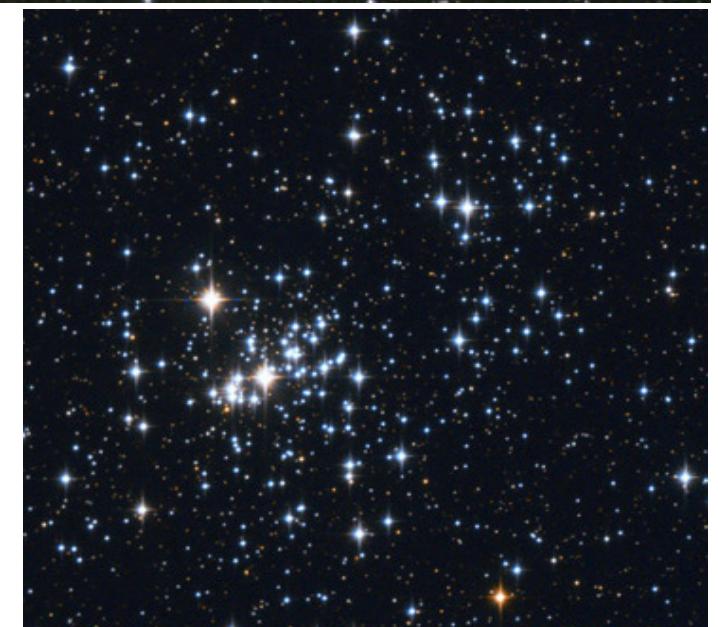
# Conclusions

- Brightness vs. density
- Young LMC clusters appear to be mass segregated.
- Primordial mass segregation vs. dynamical



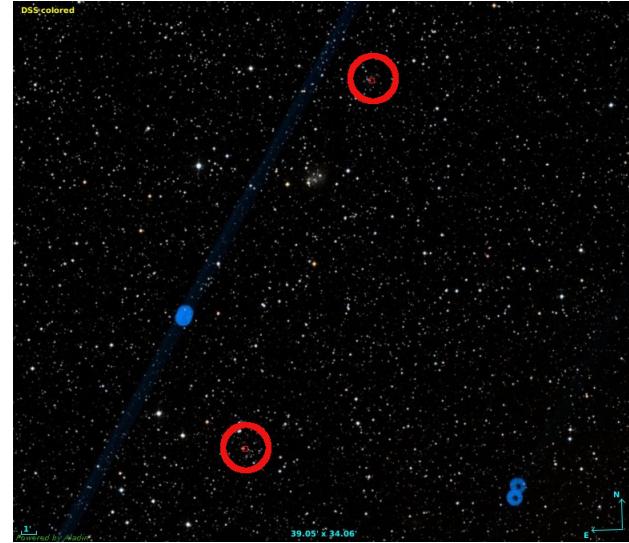
# Galactic open clusters

- Double clusters in MW
- Kronberger+ 2006 „Galactic Open Cluster Candidates“
- 2MASS and DSS

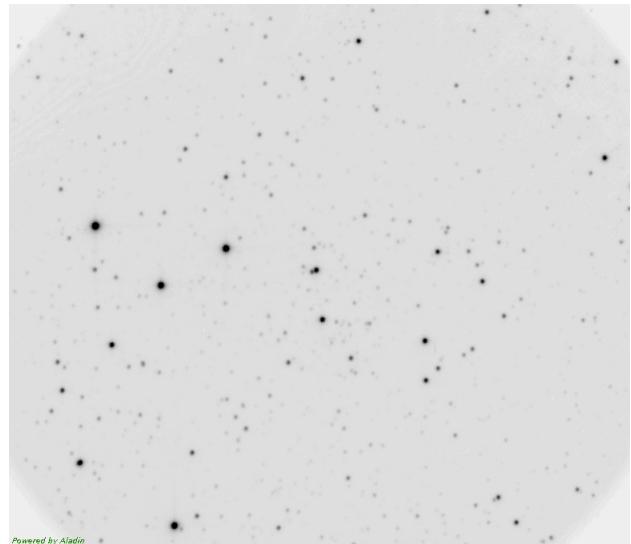
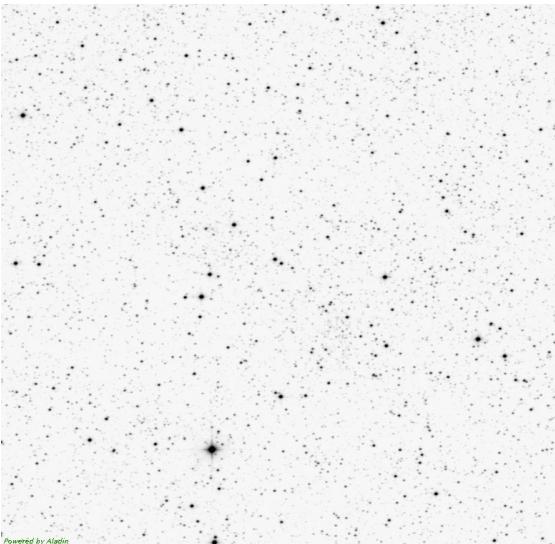


# Target selection

- Separation 2 and 25 arcmin
- Diameter > 6 arcmin
- 10 couples
- VRI imaging at NAO Rozhen



# NAO Rozhen observations



Schmidt 50/70cm

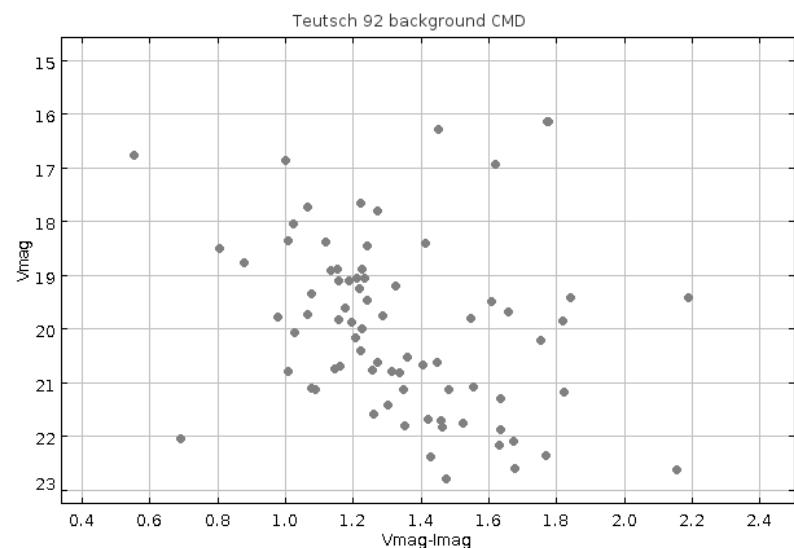
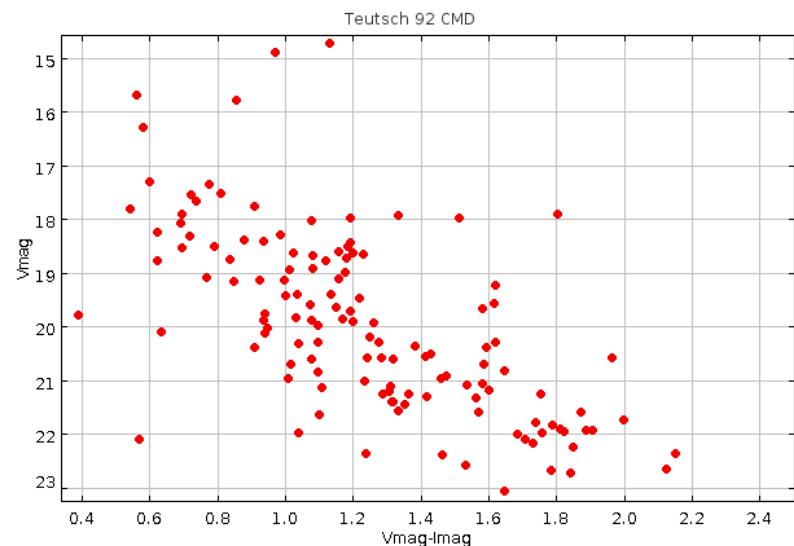
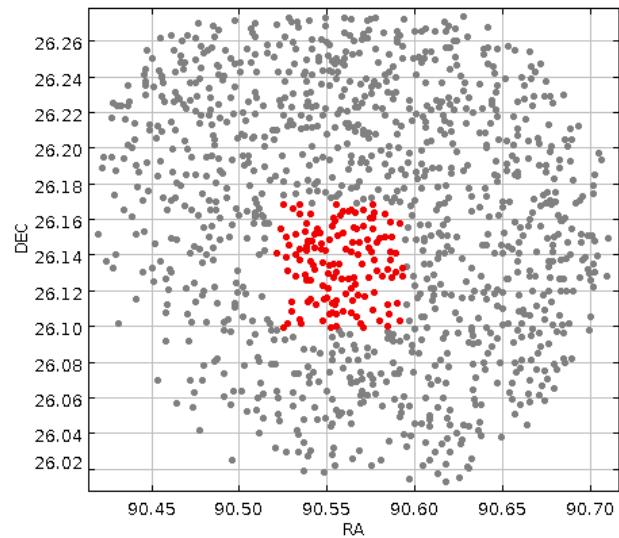
- FoV 1x1 deg
- 1 arcsec/px

2m FoReRo2 red

- Fov 15x15 arcmin
- 0.7 arcsec/px

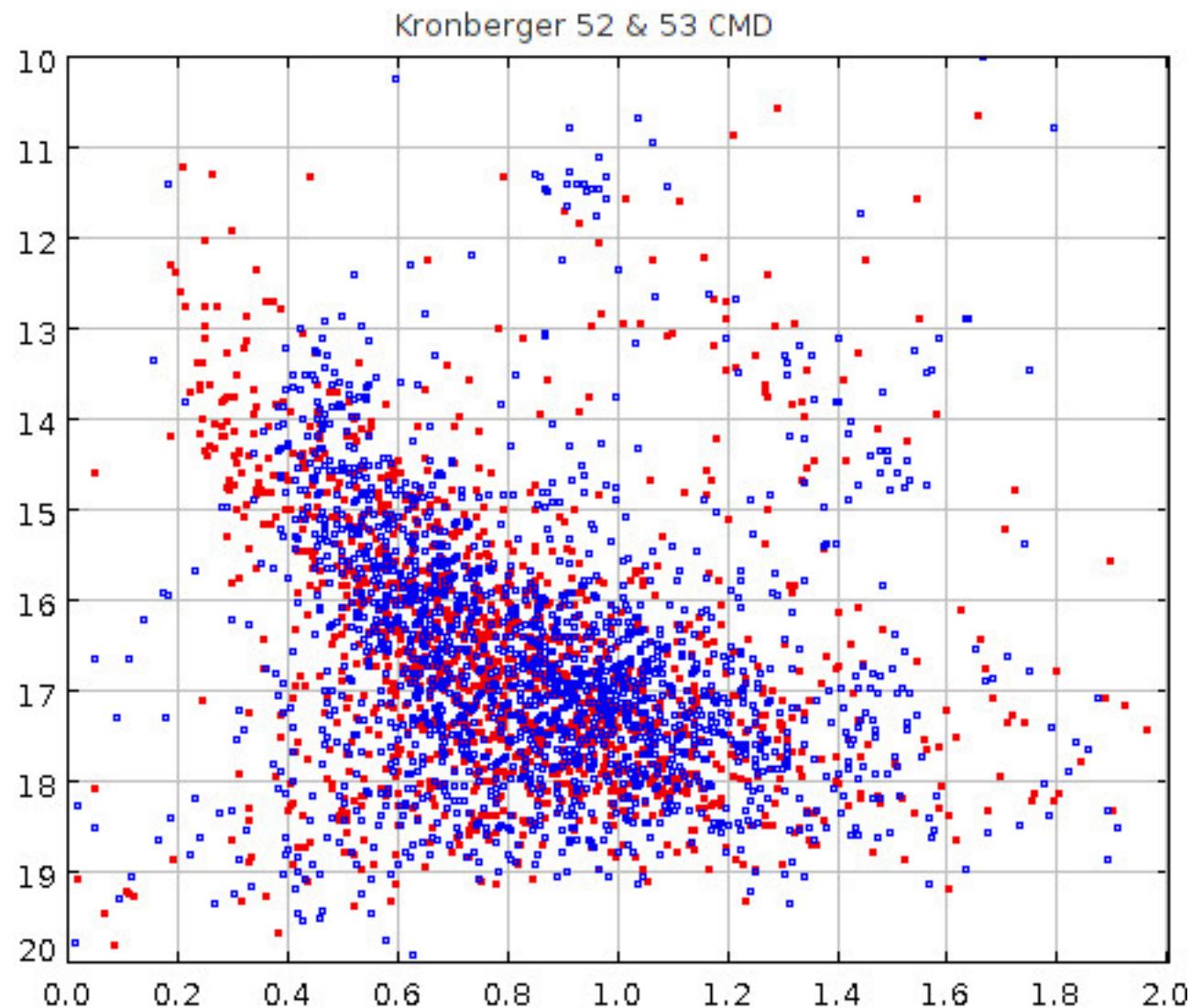
# Cluster confirmation

## Teutsch 92



# Cluster binarity

Kronberger  
52 & 53



Thank you !

# Acknowledgements

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Европейски съюз

**“Human Resources Development” Operational Programme  
ОПЕРАТИВНА ПРОГРАМА „РАЗВИТИЕ НА ЧОВЕШКИТЕ РЕСУРСИ”  
Инвестира във вашето бъдеще!**



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