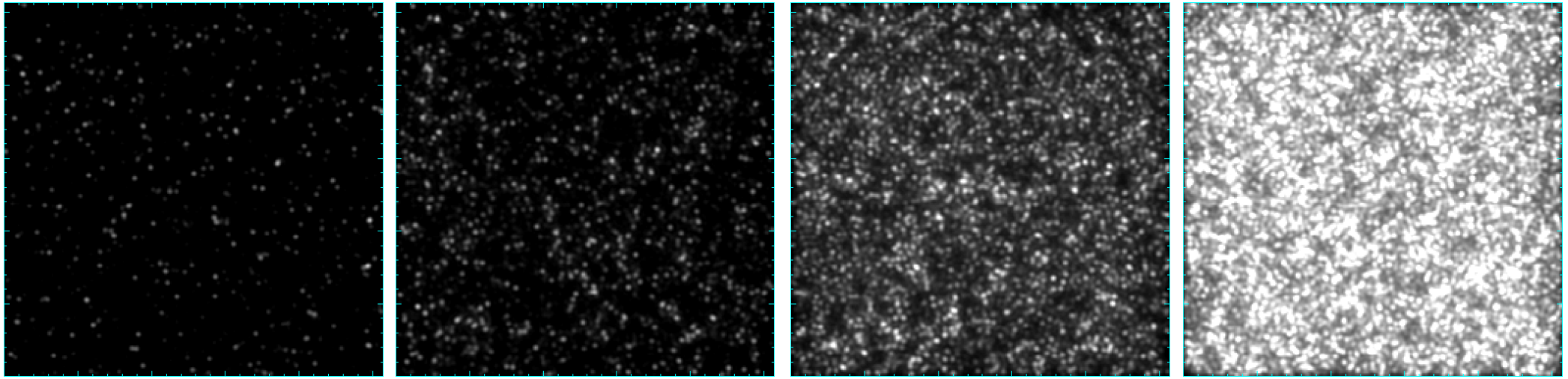
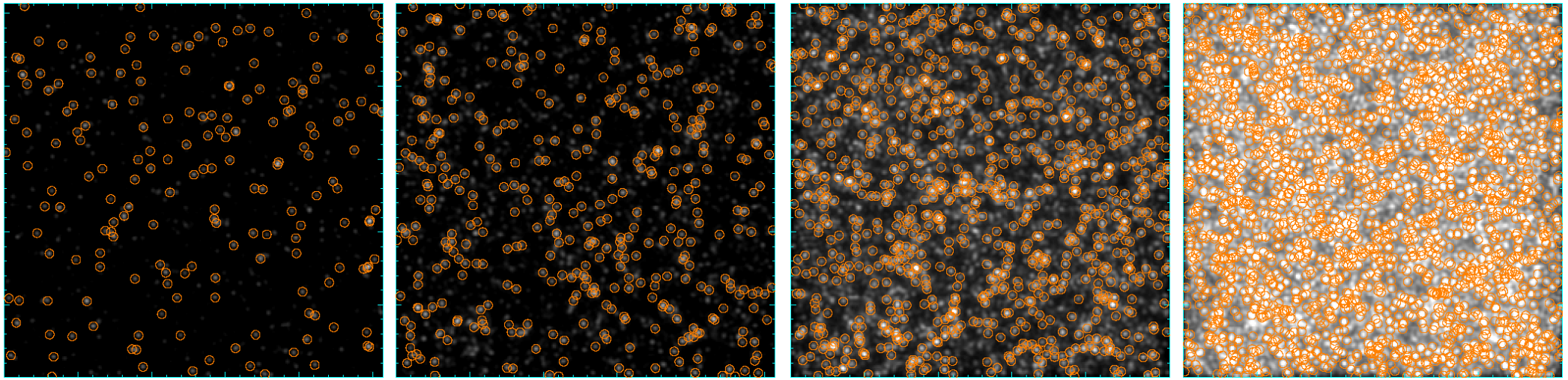
Resolved stellar populations



$\langle \mu_V \rangle$ = 21 20 19 18 mag/arcsec^2



Resolved stellar populations

Pipeline:

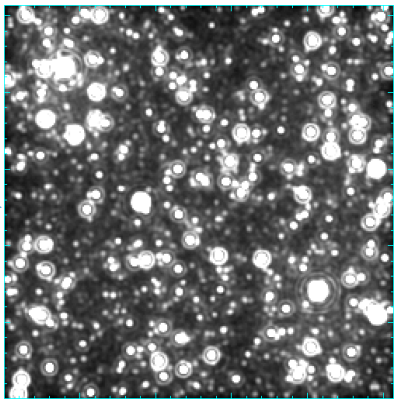
Stellar population

Yale-Yonsei isochrones (Yi et al. 2003)

end of SF 5 Gyr ago

Catalogue

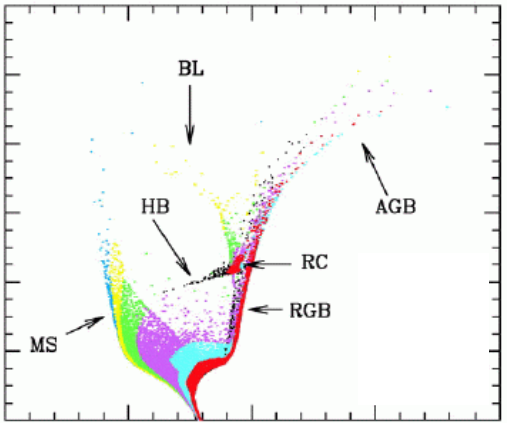
Observational parameters: telescope, PSF sims, etc.



Starfinder

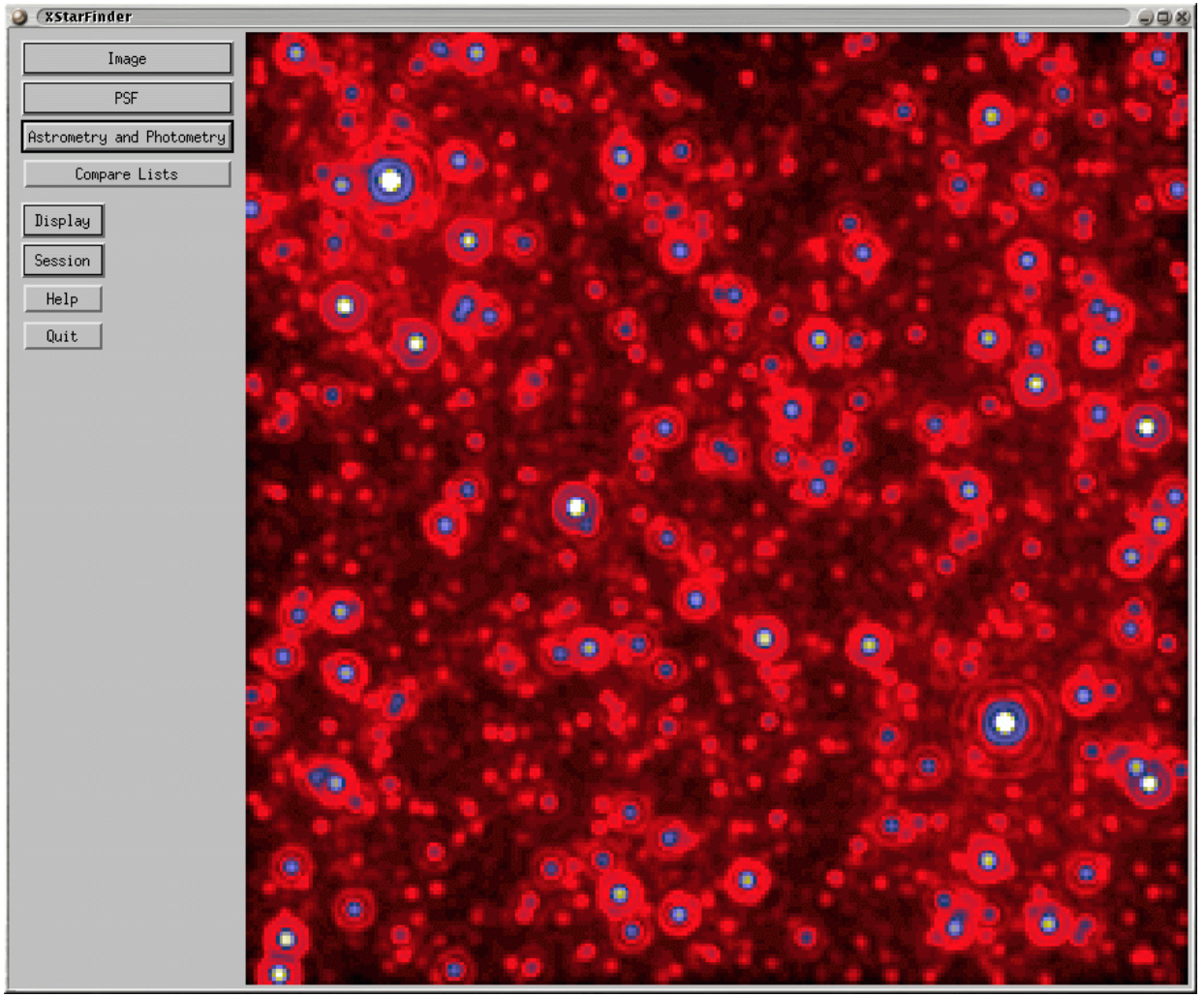
Catalogue

Measured CMD

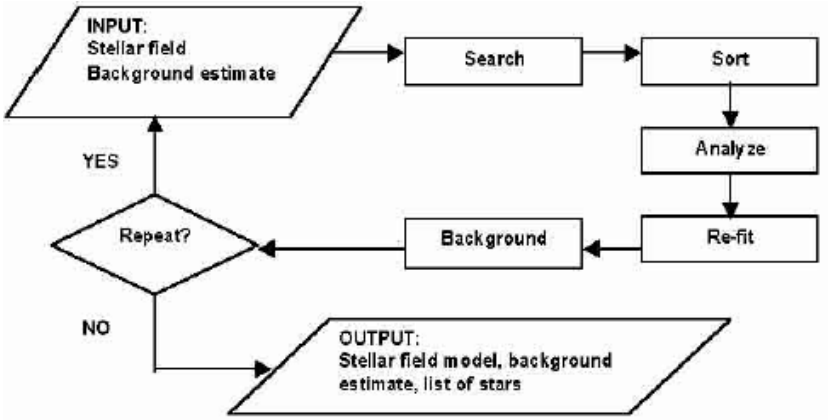


Resolved stellar populations

PSF photometry – StarFinder (Diolaiti et al. 2000):



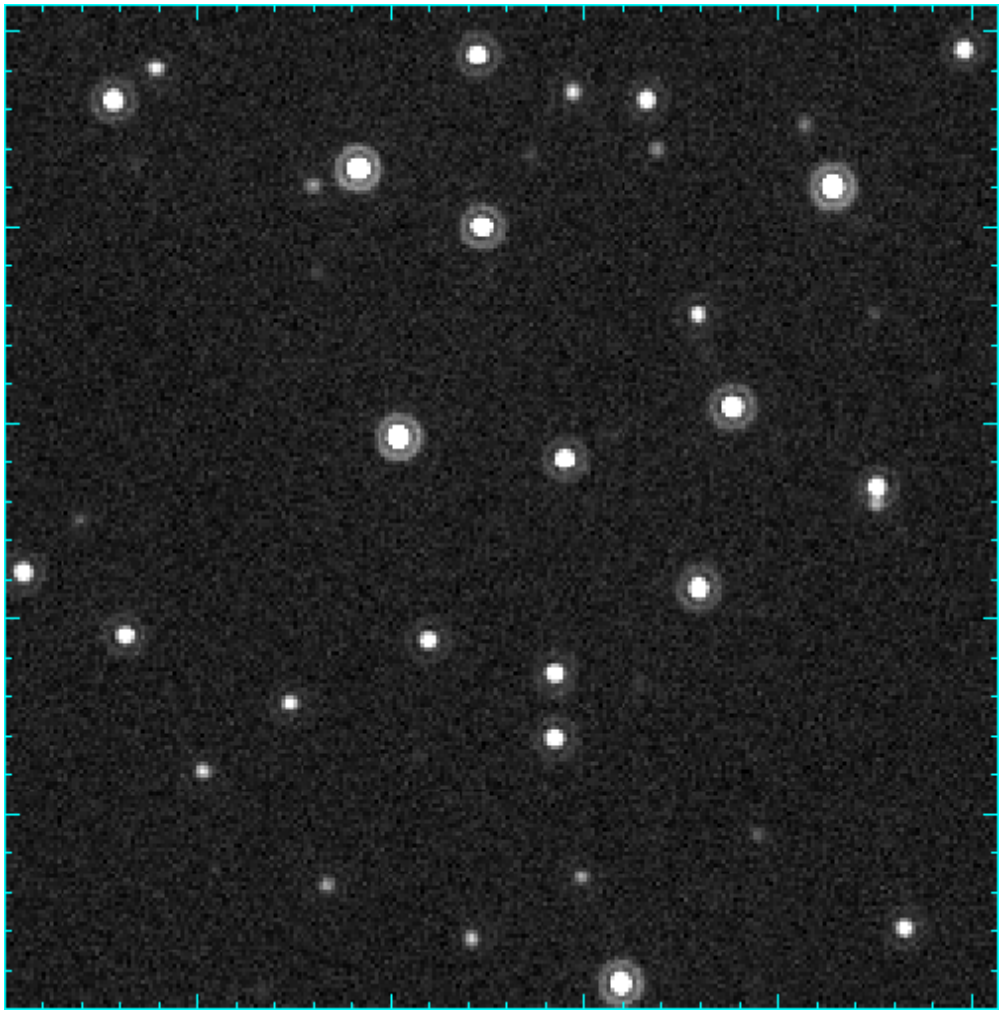
- Interactive
- Can determine PSF from image
- Iterative procedure:



- BUT: bugs/unexplained behaviour have slowed recent progress

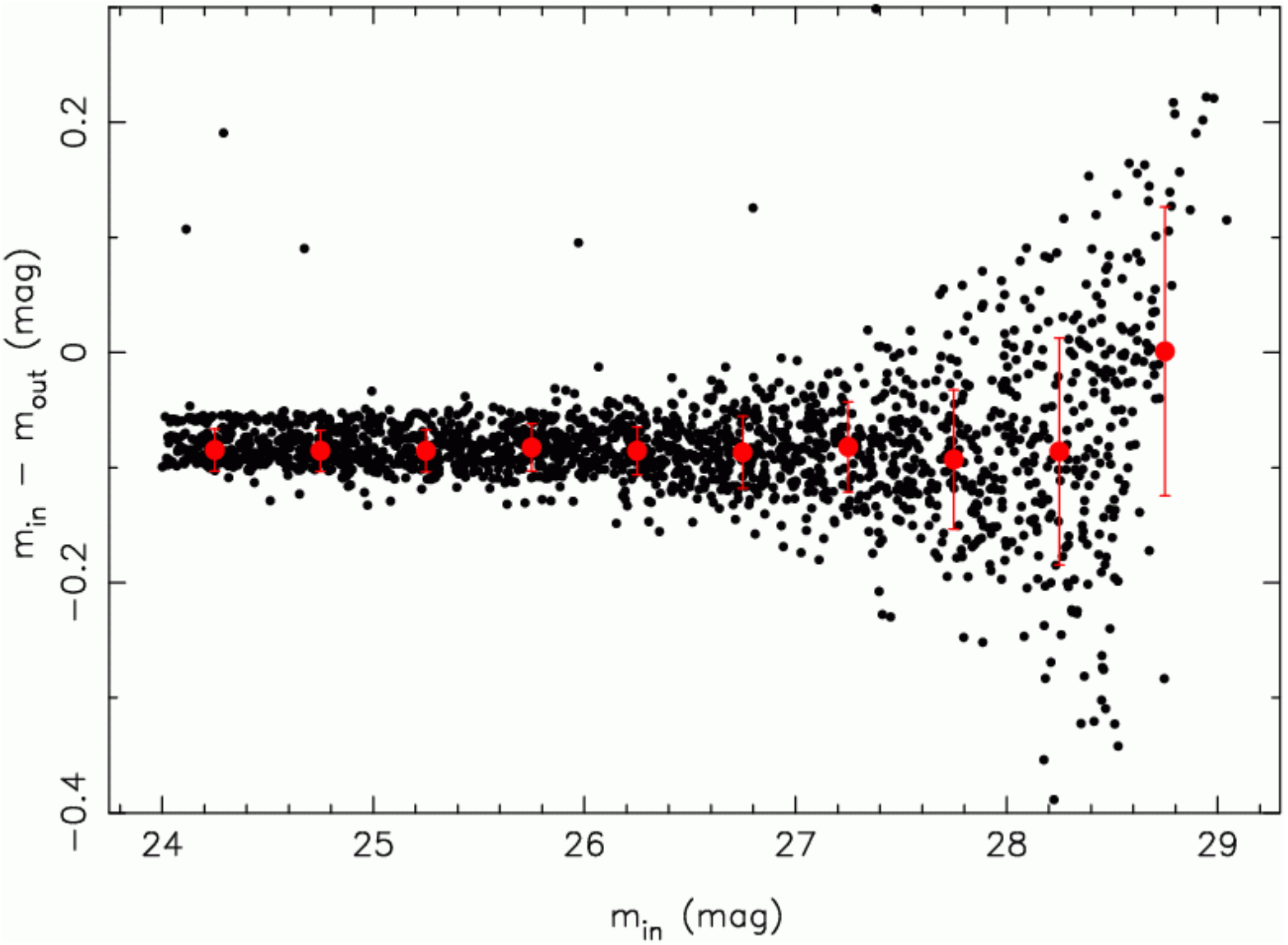
Resolved stellar populations

Photometry of uncrowded fields:

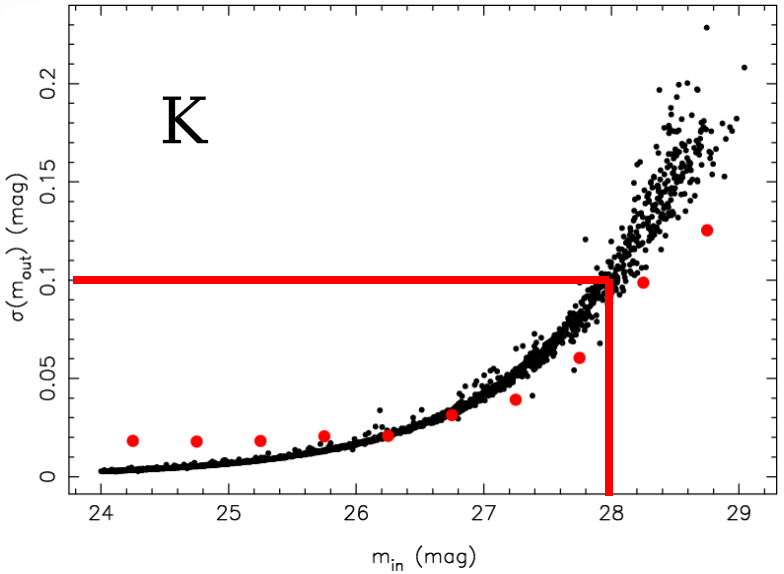


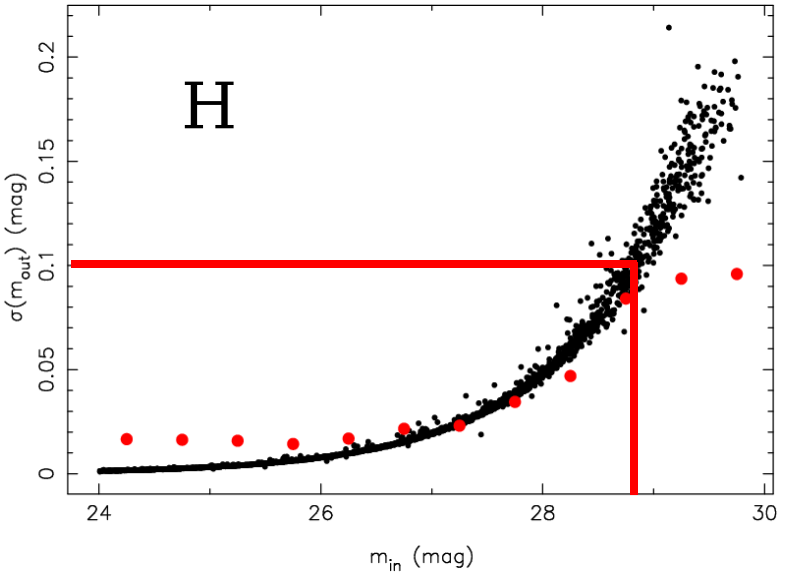
Resolved stellar populations

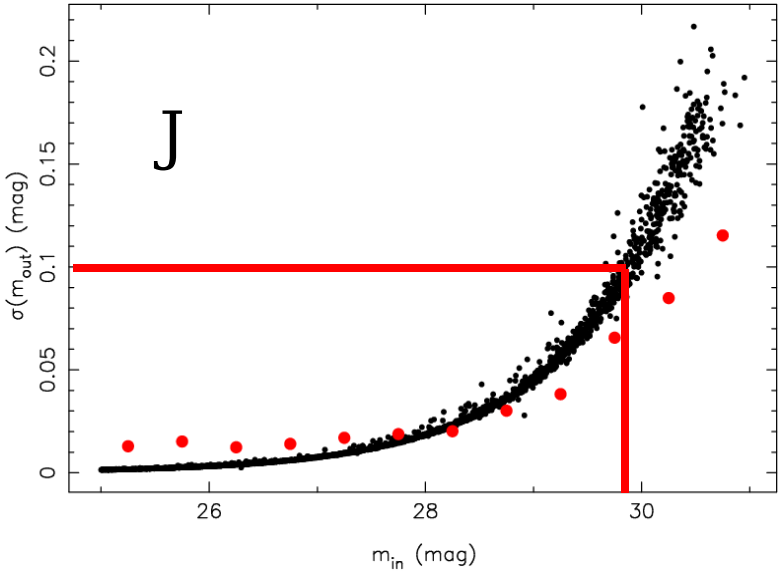
Photometry of uncrowded fields, 10h integration:

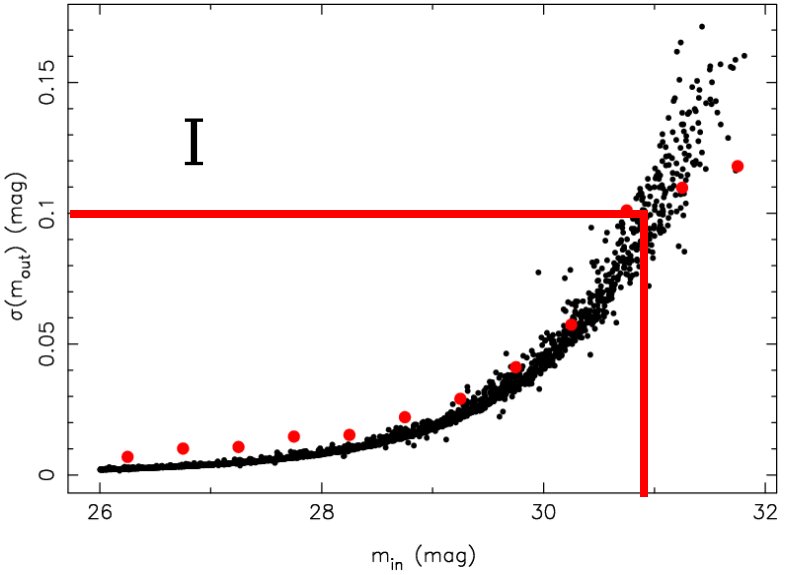


Resolved stellar populations

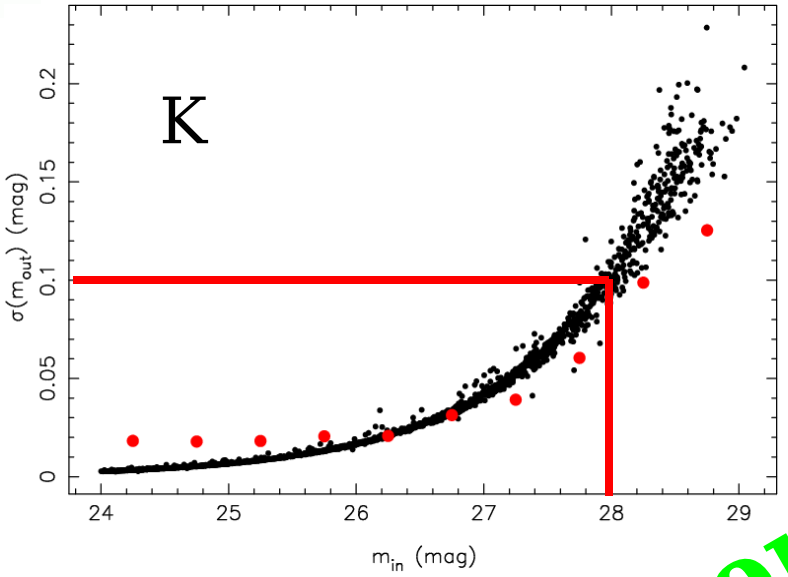


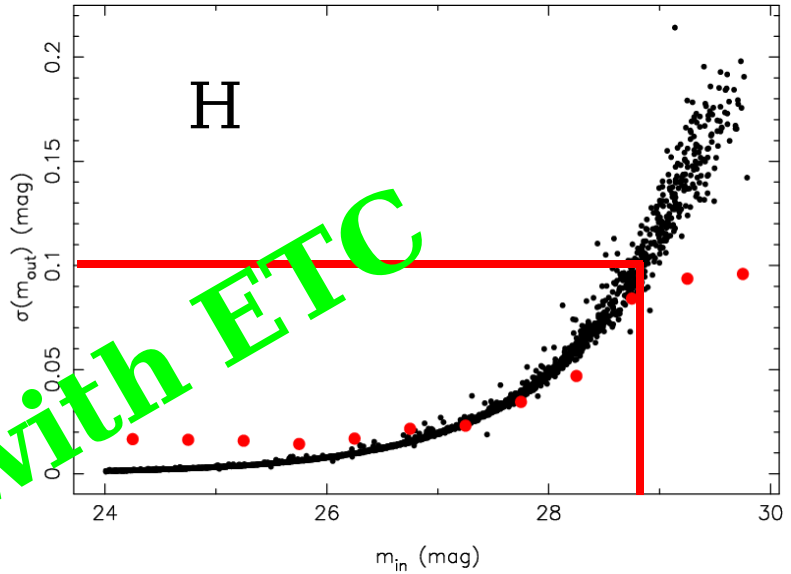


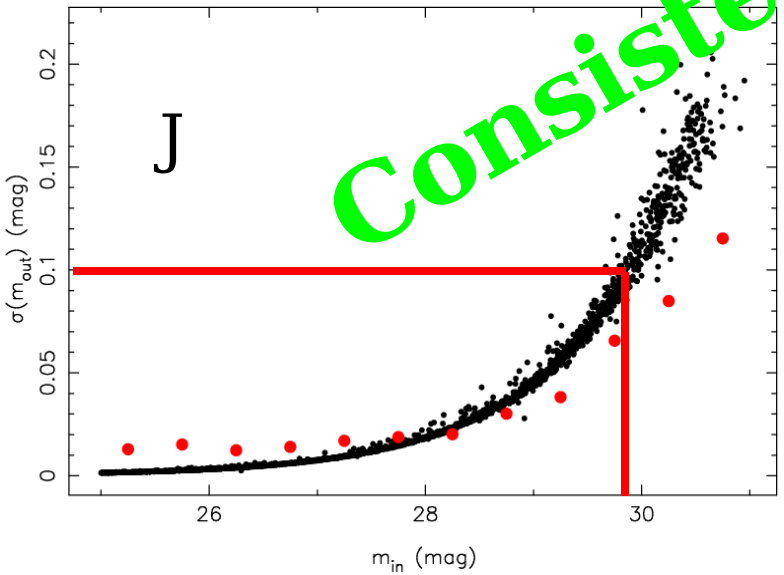


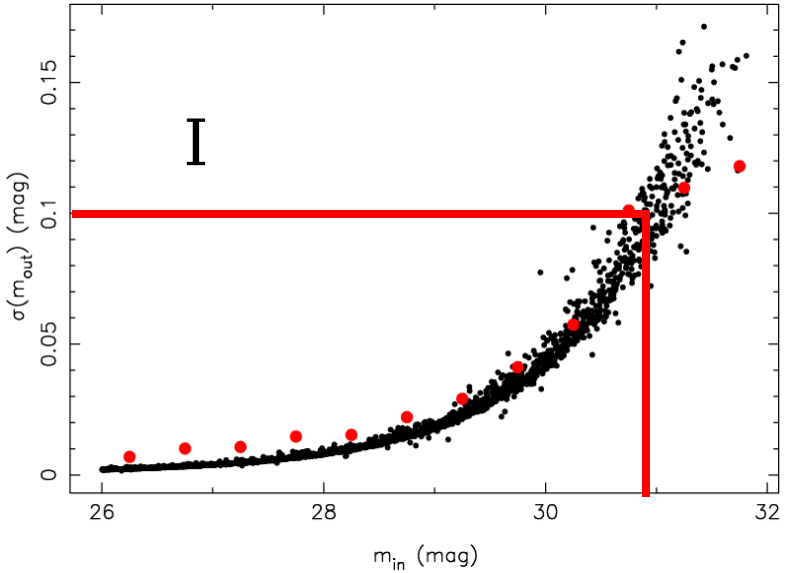


Resolved stellar populations









Consistent with ETC

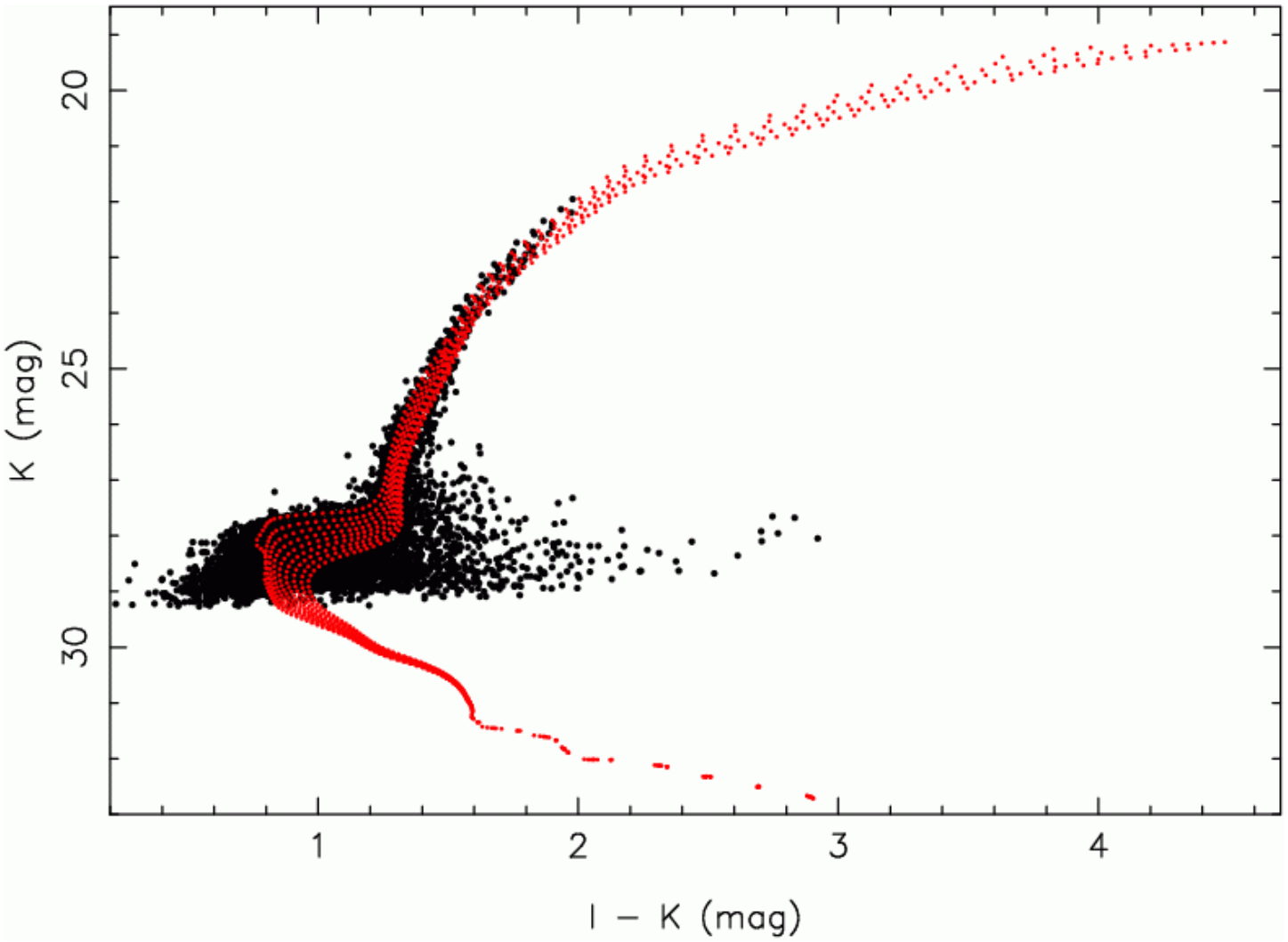
Resolved stellar populations

DM = 26 mag

$<\mu_V>$ = 22 mag/arcsec^2

t_{exp} = 100 h

FoV = 3.6 x 3.6
= 13 arcsec^2



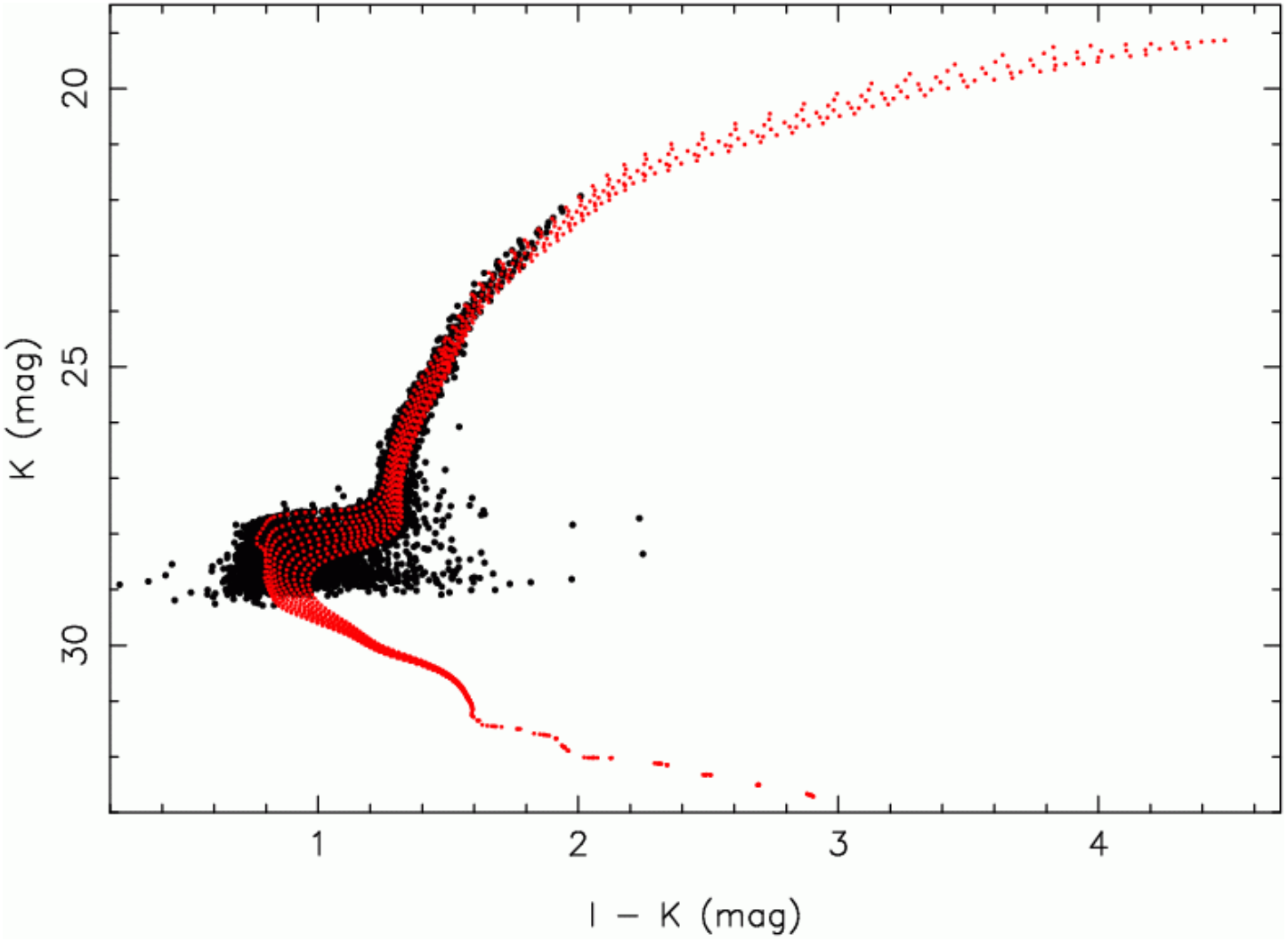
Resolved stellar populations

DM = 26 mag

$<\mu_V>$ = 24 mag/arcsec^2

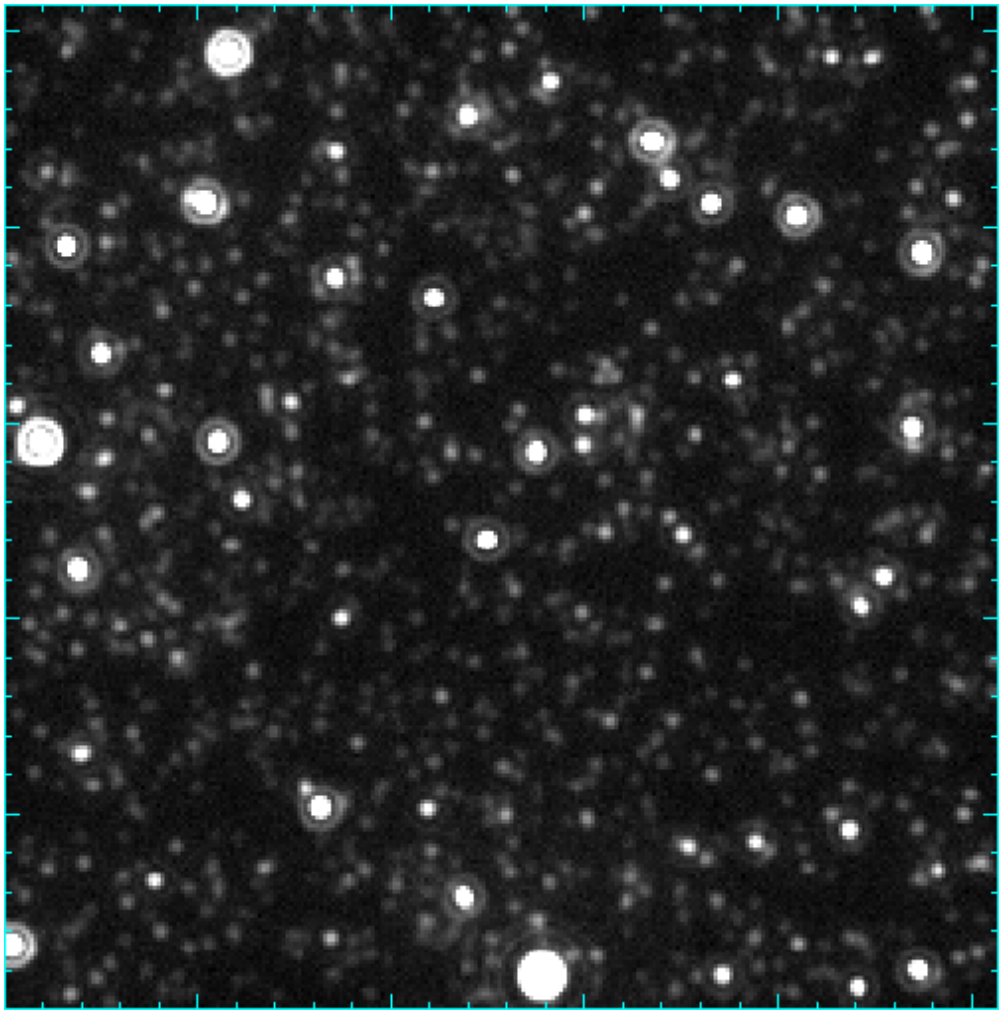
t_{exp} = 100 h

FoV = 9.1 x 9.1
= 82 arcsec^2



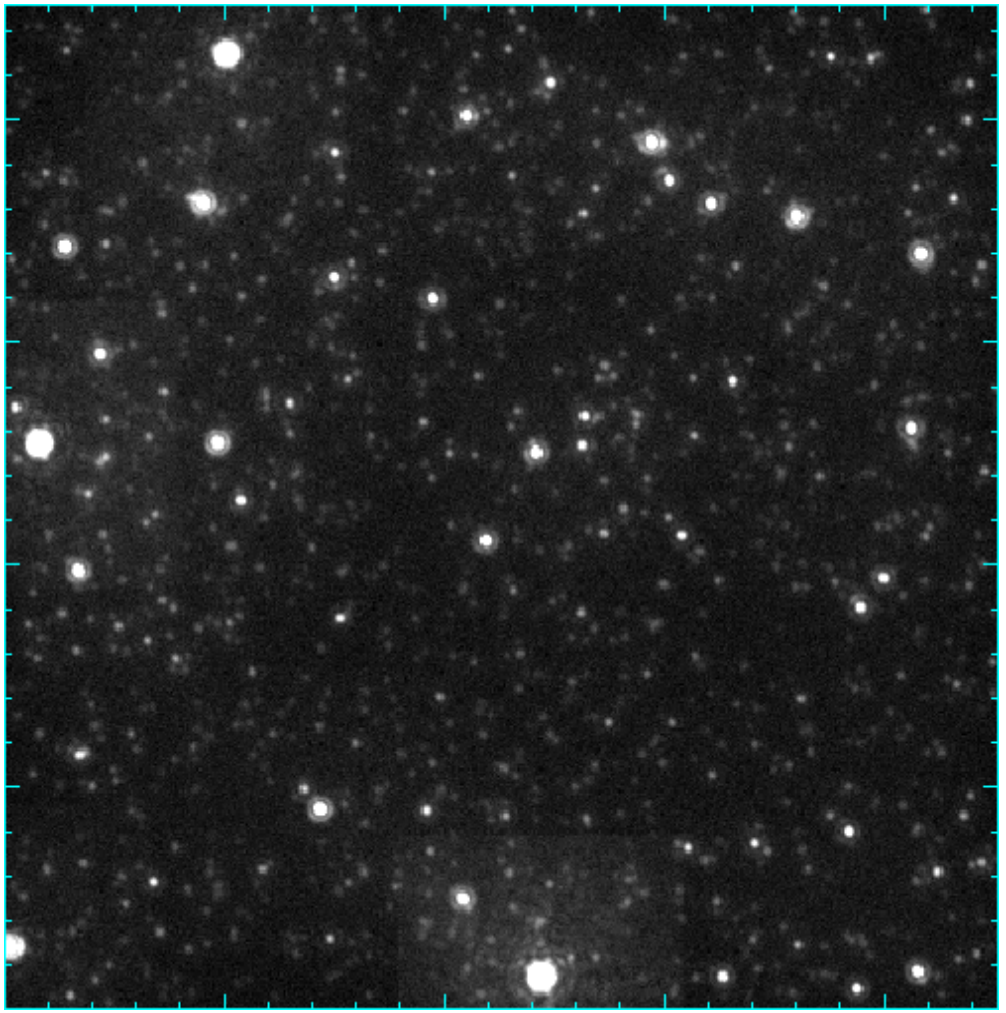
Resolved stellar populations

Original
K-band



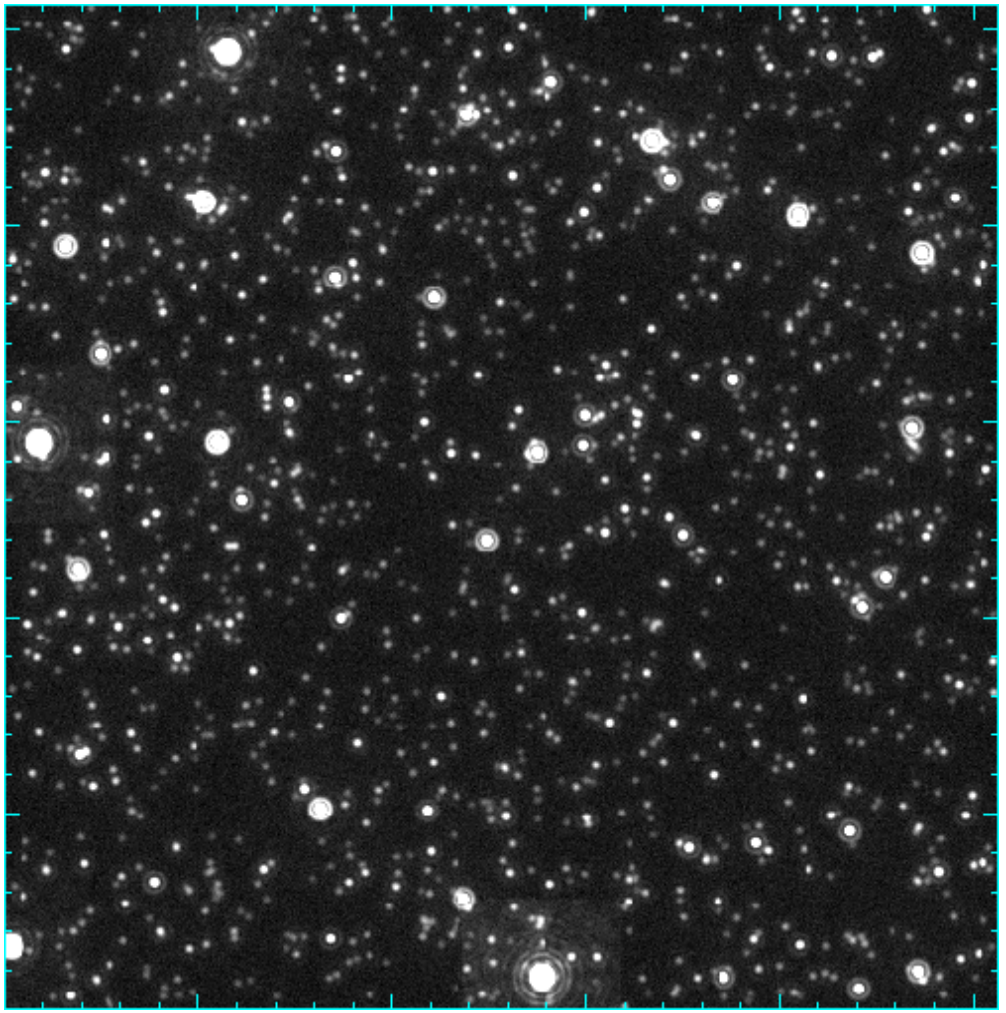
Resolved stellar populations

J-band PSF



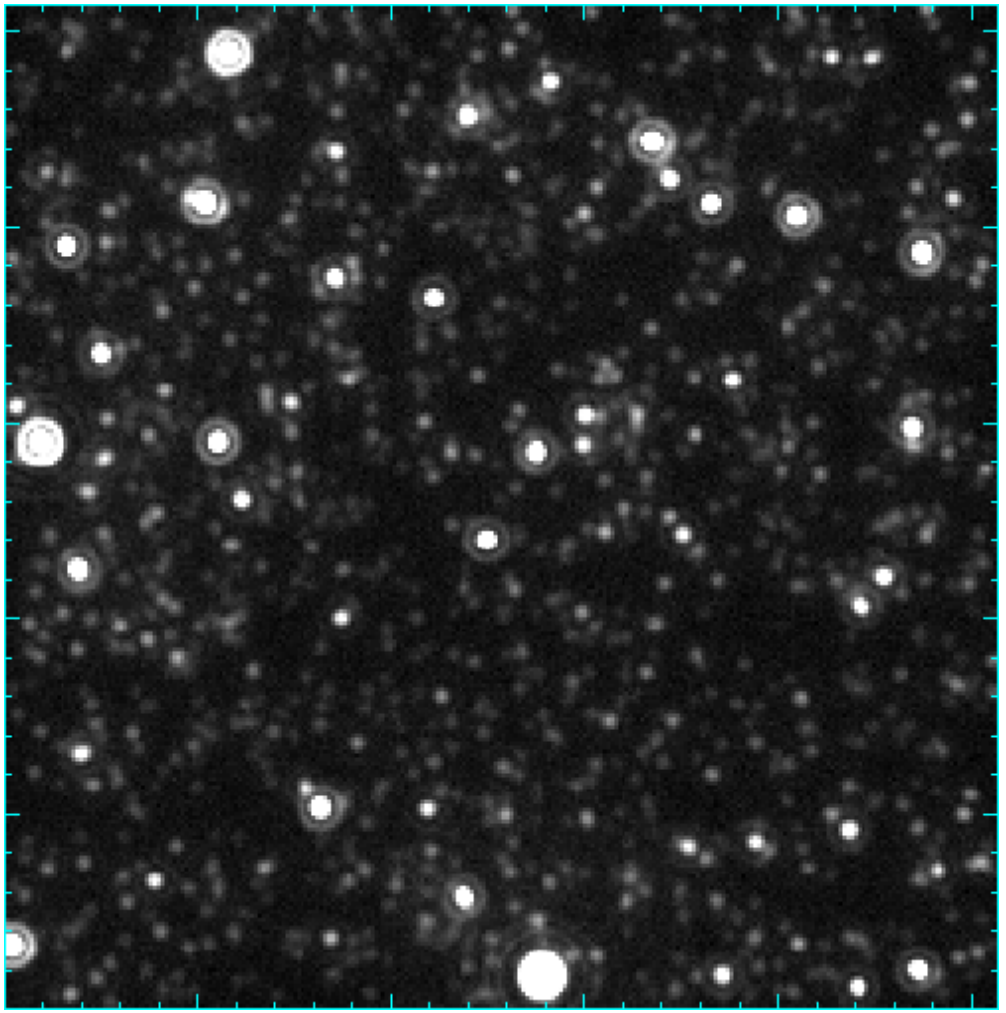
Resolved stellar populations

PSF scale / 2



Resolved stellar populations

Original
K-band



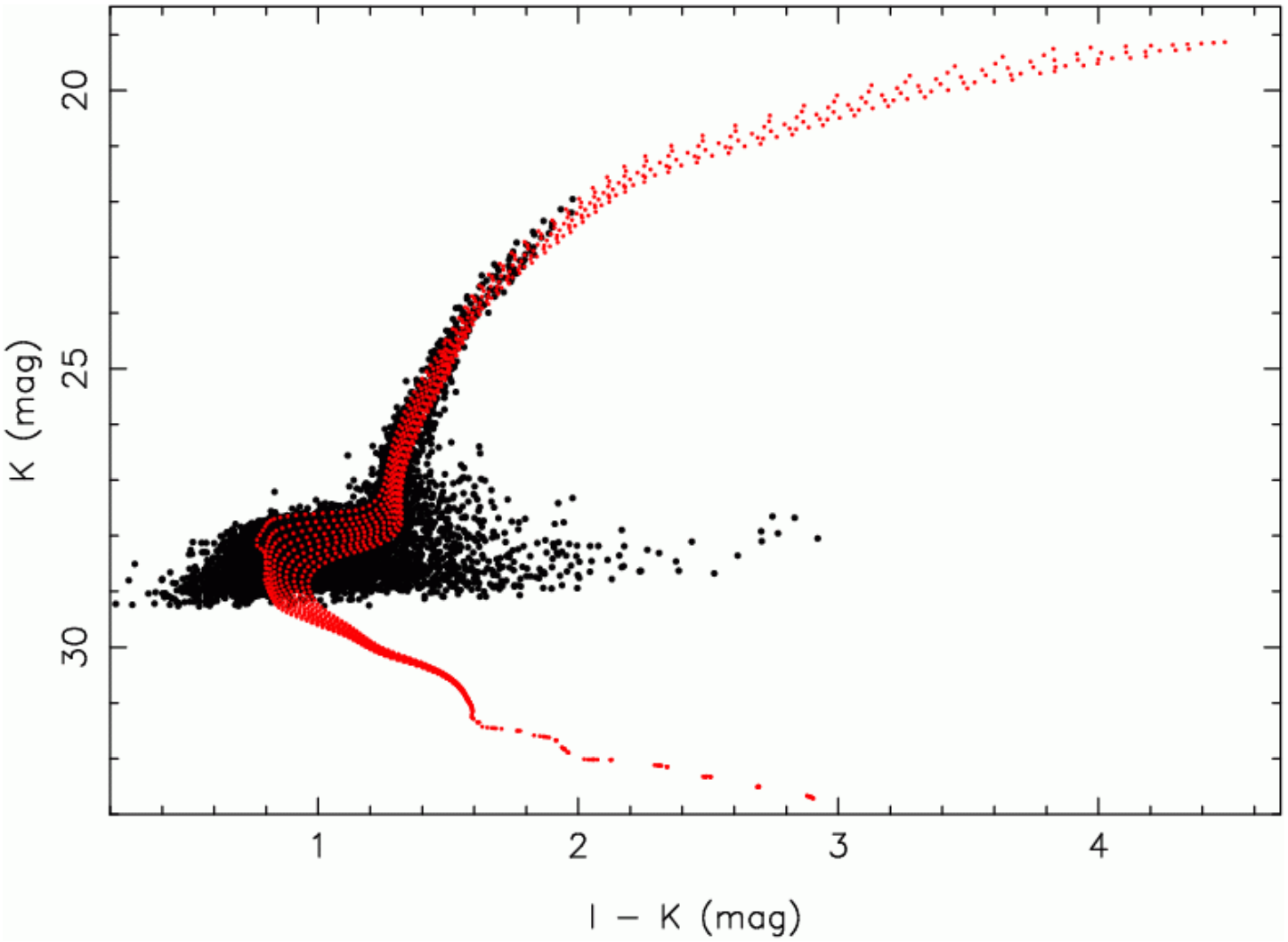
Resolved stellar populations

DM = 26 mag

$<\mu_V>$ = 22 mag/arcsec^2

t_{exp} = 100 h

FoV = 3.6 x 3.6
= 13 arcsec^2



Resolved stellar populations

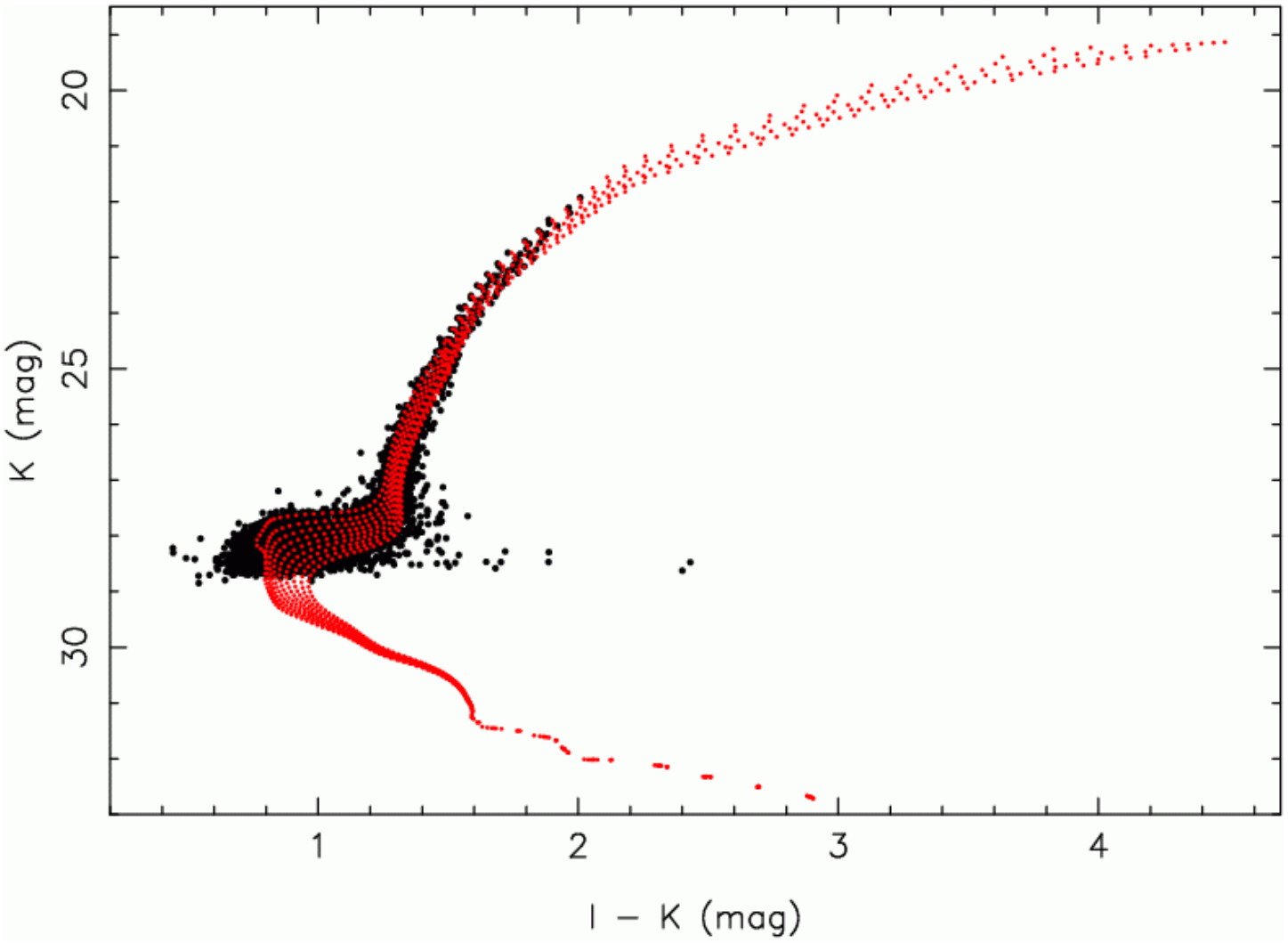
DM = 26 mag

$<\mu_V>$ = 22 mag/arcsec^2

t_{exp} = 100 h

FoV = 3.6 x 3.6
= 13 arcsec^2

PSF --> J-band PSF



Resolved stellar populations

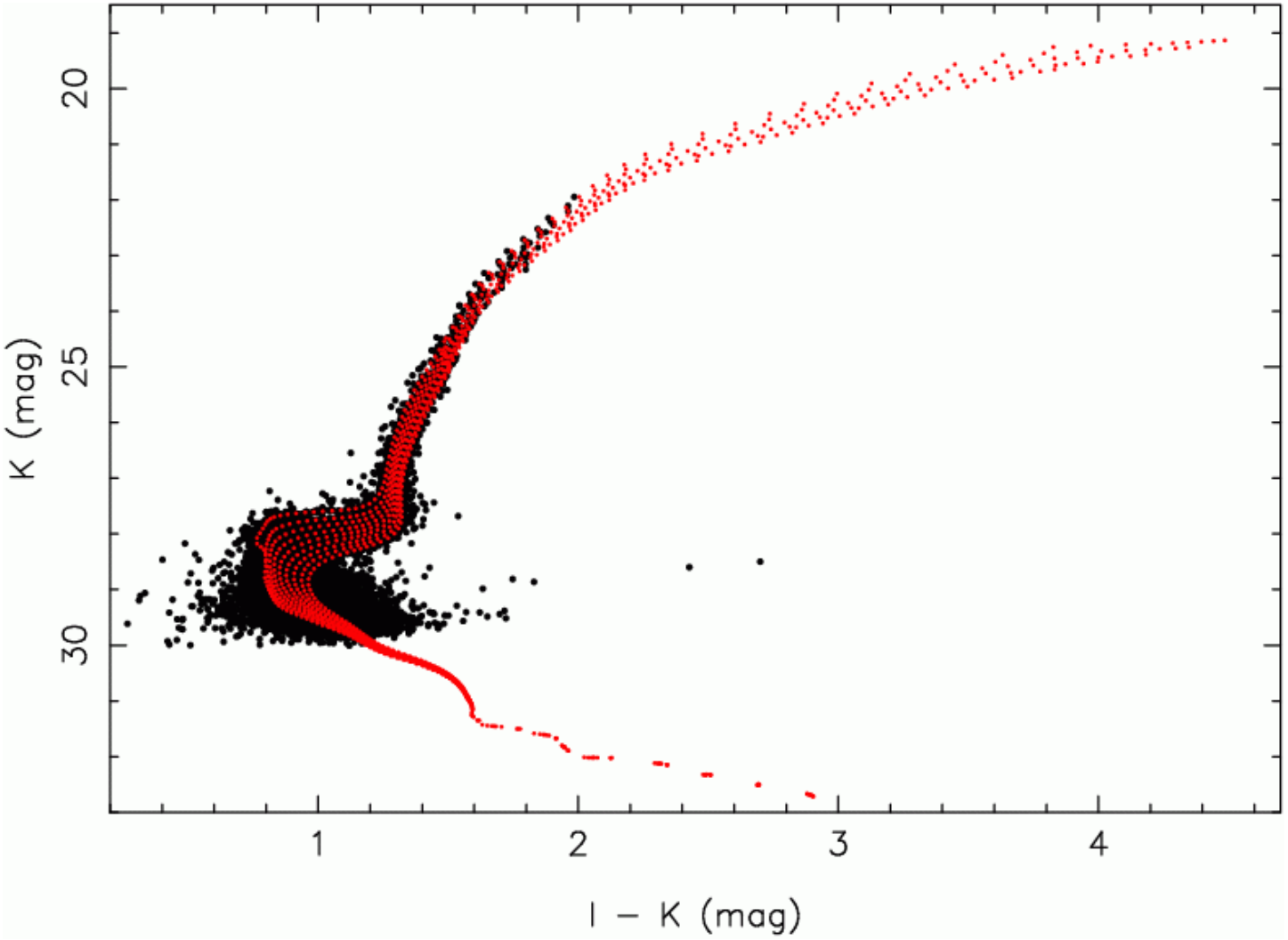
DM = 26 mag

$<\mu_V>$ = 22 mag/arcsec^2

t_{exp} = 100 h

FoV = 3.6 x 3.6
= 13 arcsec^2

PSF --> scale / 2



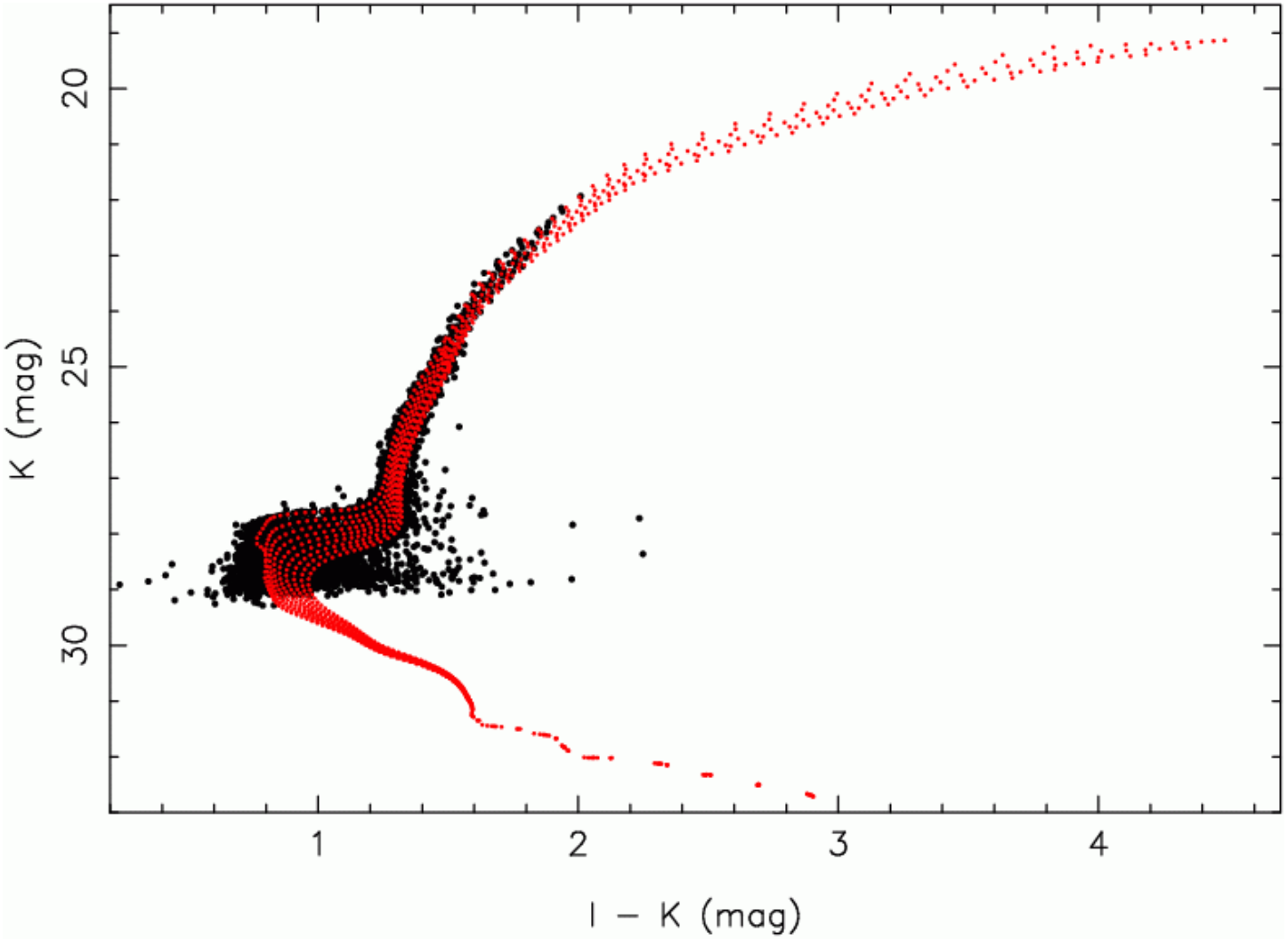
Resolved stellar populations

DM = 26 mag

$<\mu_V>$ = 24 mag/arcsec^2

t_{exp} = 100 h

FoV = 9.1 x 9.1
= 82 arcsec^2



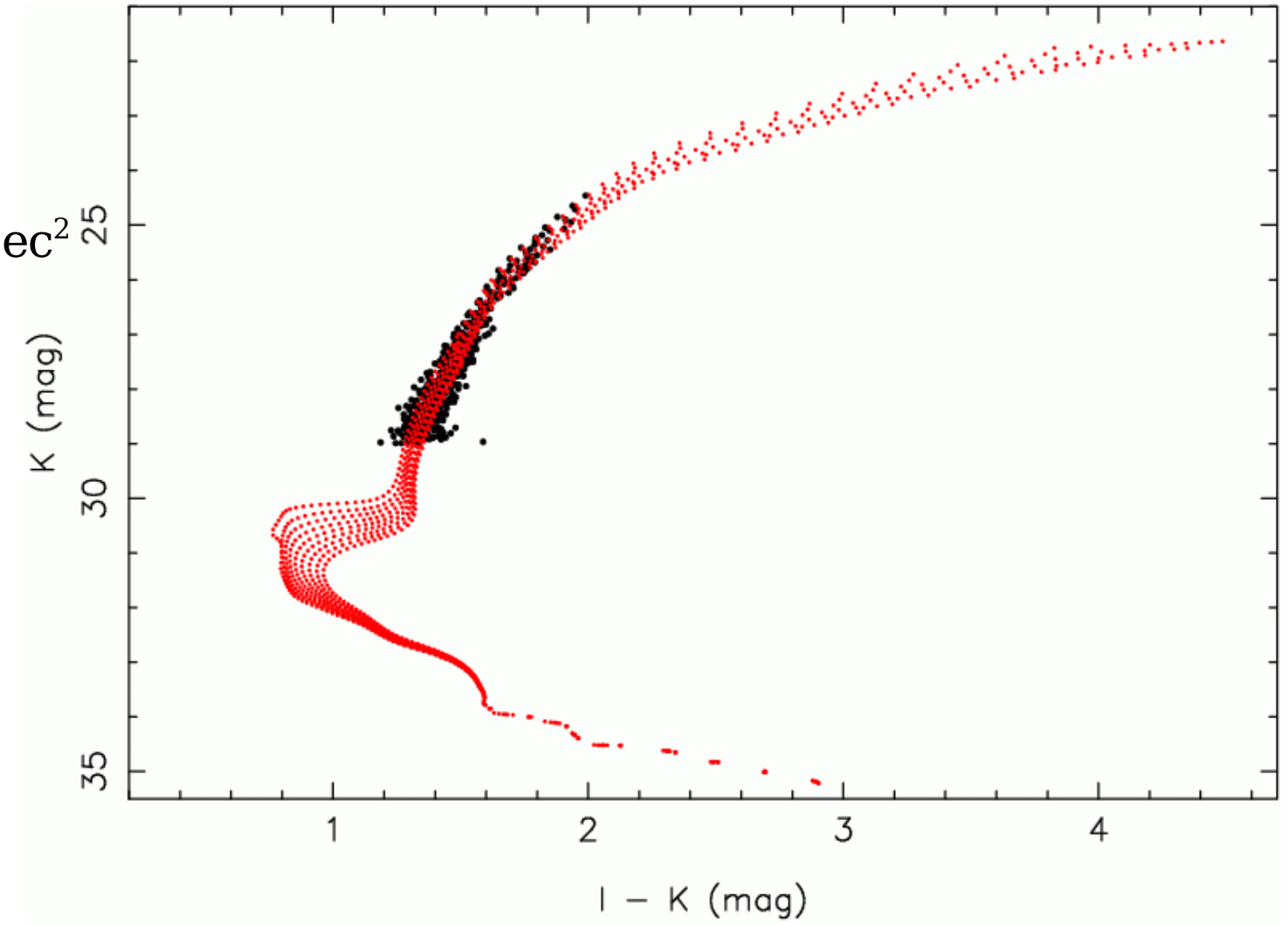
Resolved stellar populations

DM = 28.5 mag

$\langle \mu_V \rangle$ = 26.5 mag/arcsec^2

t_{exp} = 100 h

FoV = 9.1 x 9.1
= 82 arcsec^2



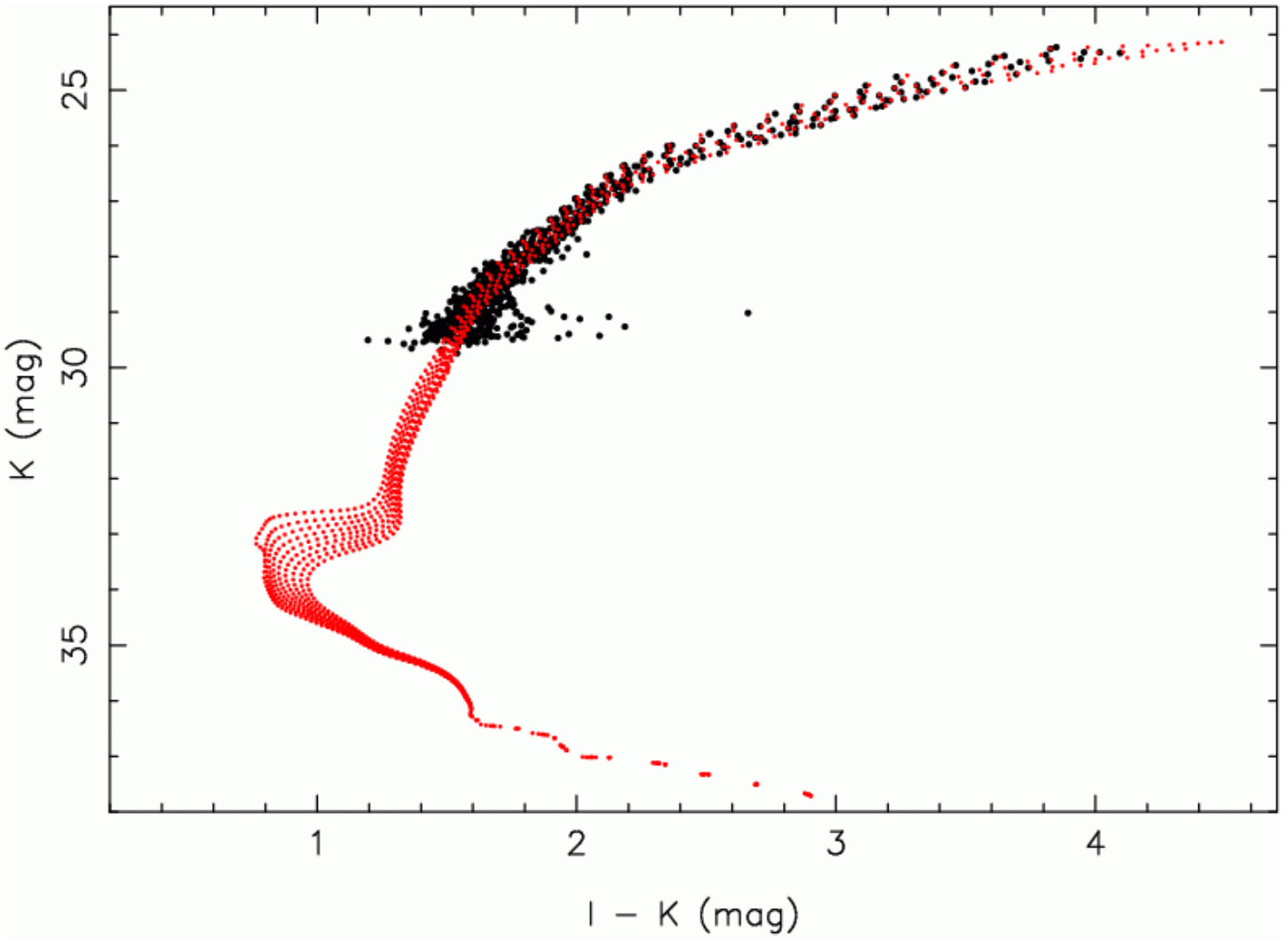
Resolved stellar populations

DM = 31 mag

$\langle \mu_V \rangle$ = 25 mag/arcsec^2

t_{exp} = 100 h

FoV = 3.6 x 3.6
= 13 arcsec^2



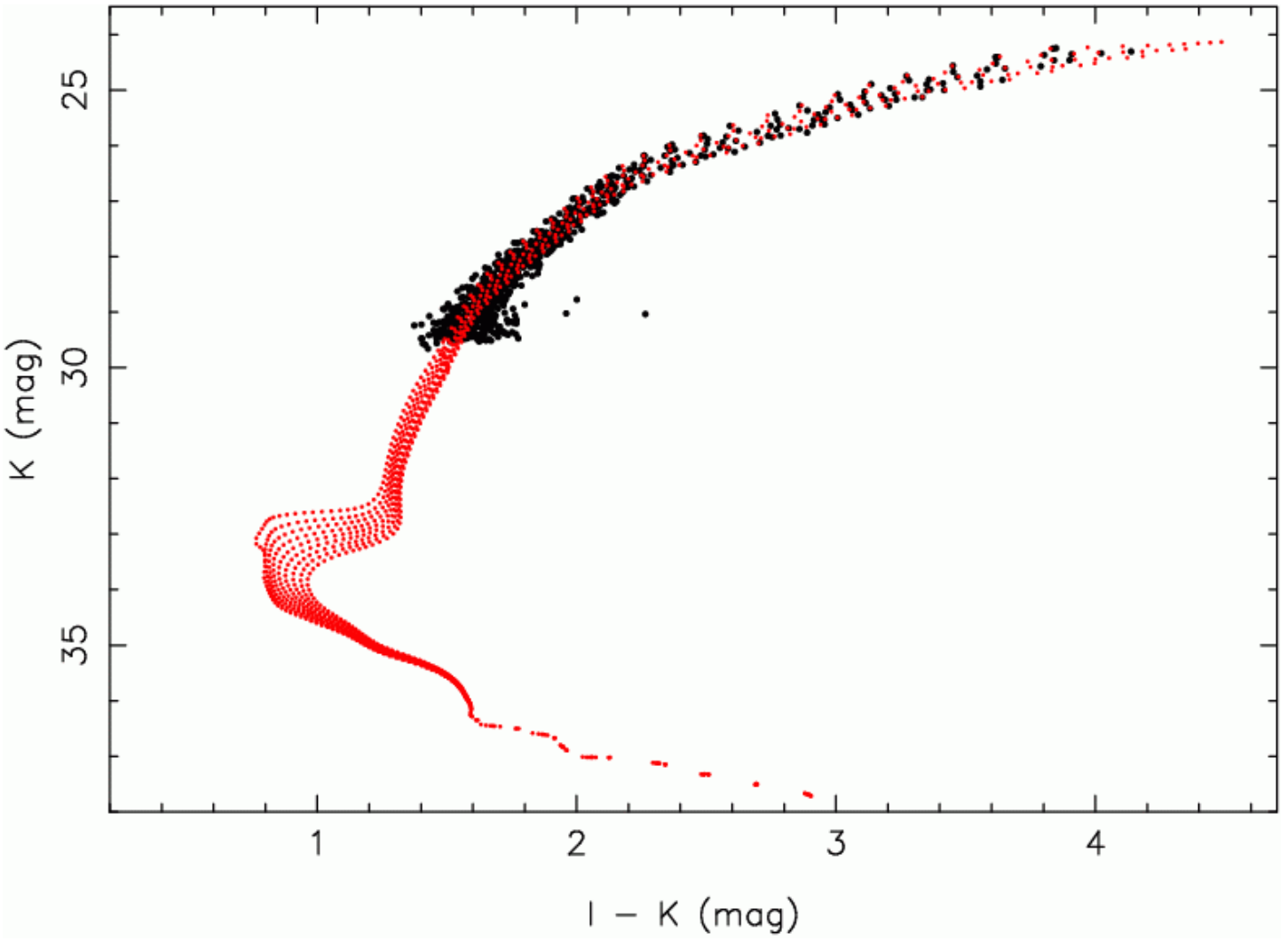
Resolved stellar populations

DM = 31 mag

$\langle \mu_V \rangle$ = 27 mag/arcsec^2

t_{exp} = 100 h

FoV = 9.1 x 9.1
= 82 arcsec^2



Summary

- MSTO should be possible to at least DM = 26 mag (Cen A).
- HB should be possible to at least DM = 28.5 mag (M83).
- Tip of RGB should be possible at DM = 31 mag (Virgo).

- RGB (and HB) is not so much affected by crowding but rather by increased background

  $\rightarrow$ photometric accuracy is improved by improving AO correction (or by going to lower surface density).

- MSTO is affected by confusion

  $\rightarrow$ photometric accuracy is improved by improving resolution, i.e. by going to shorter wavelengths (or by going to lower surface density).

Summary

- To make trade-off studies we need to define a science metric! e.g. time to get x stars with photometric accuracy y in CMD region z.

- Improvement of PSF photometry code?