

# New members of the Coma open star cluster



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ULMF Workshop

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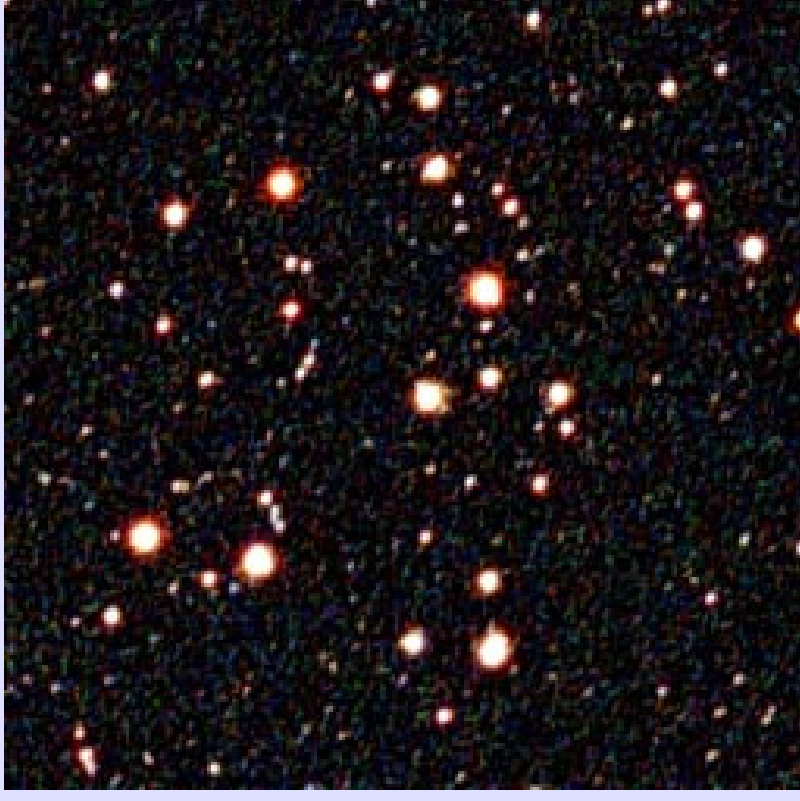
New members of the Coma open star cluster

# Introduction

- Coma open star cluster (Melotte 111)
- USNO B1.0 and 2MASS PSC surveys
- Proper motion and photometric selections
- Estimated membership probability
- Low mass members
- Further work

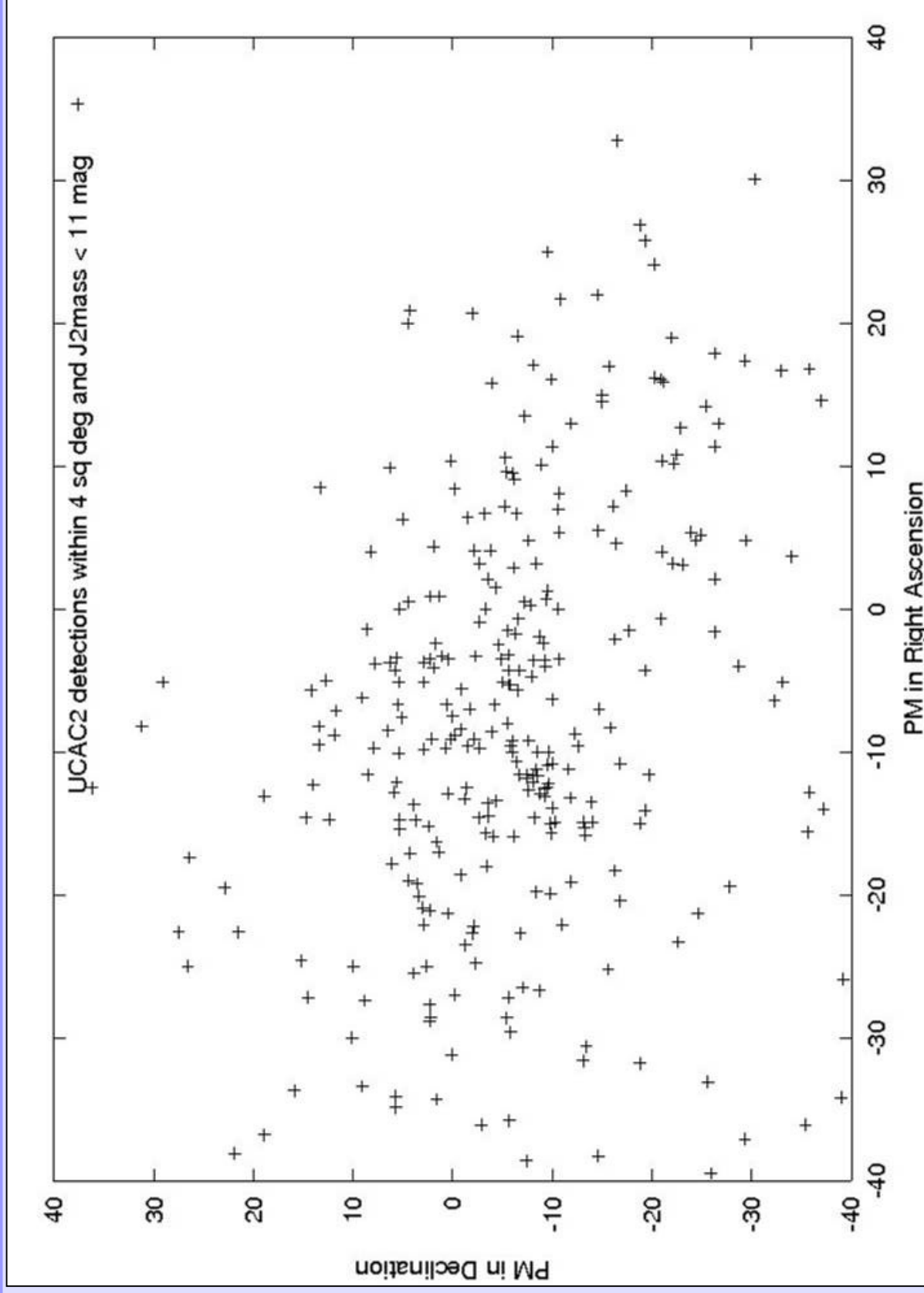
# Coma open star cluster

- 90 pc away (Hipparchos)
- $500 \pm 50$  Myrs old  
(Odenkirchen et al 1998)
- First studied in 1938
- Only 45 probable known members



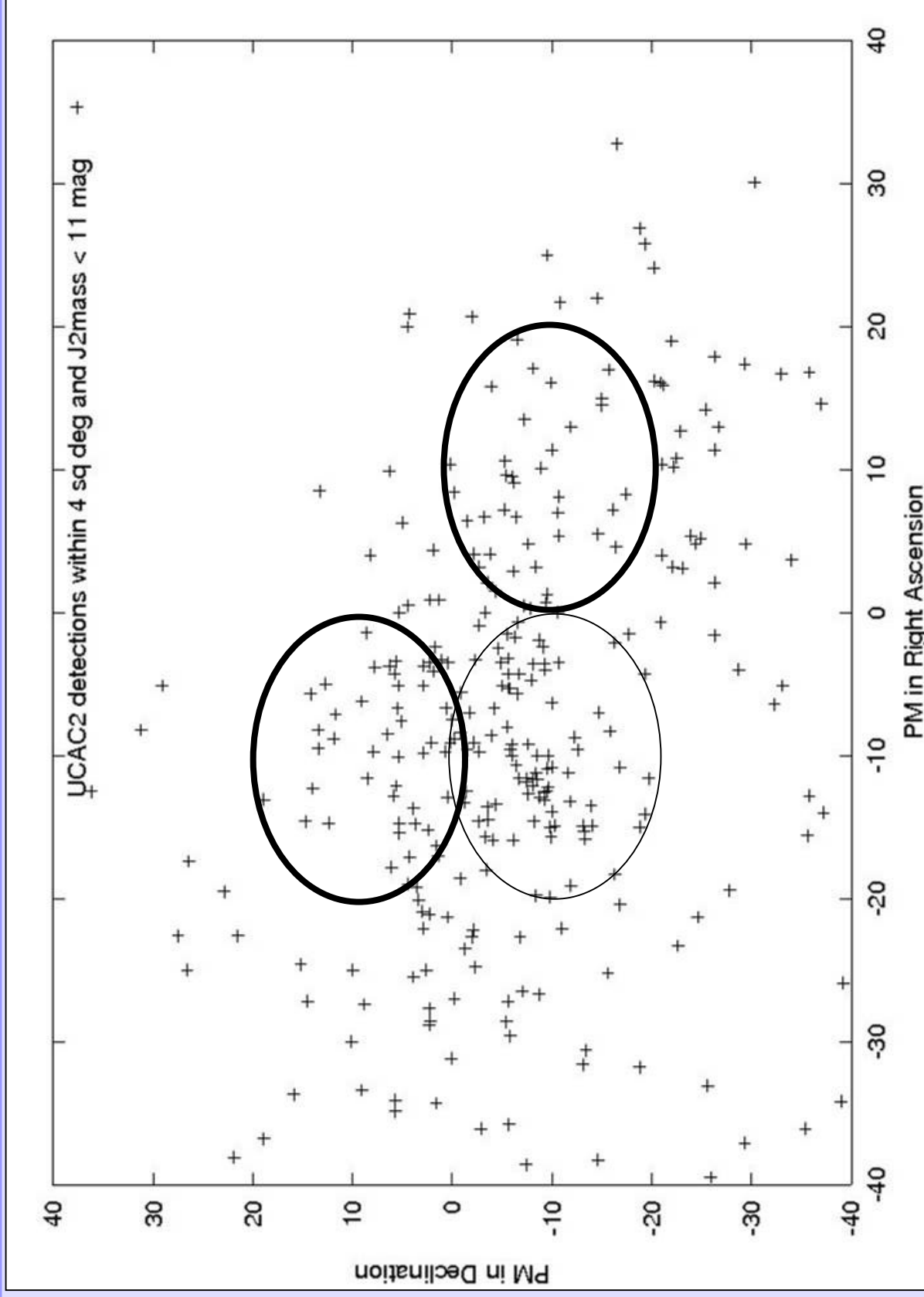
# Use proper motion?

- Small proper motion
- $\mu_{\alpha} = -11.21 \pm 0.26$  mas/yr
- $\mu_{\delta} = -9.16 \pm 0.15$  mas/yr
- Hipparchos measurements
- USNO B1.0 survey



# Star selection

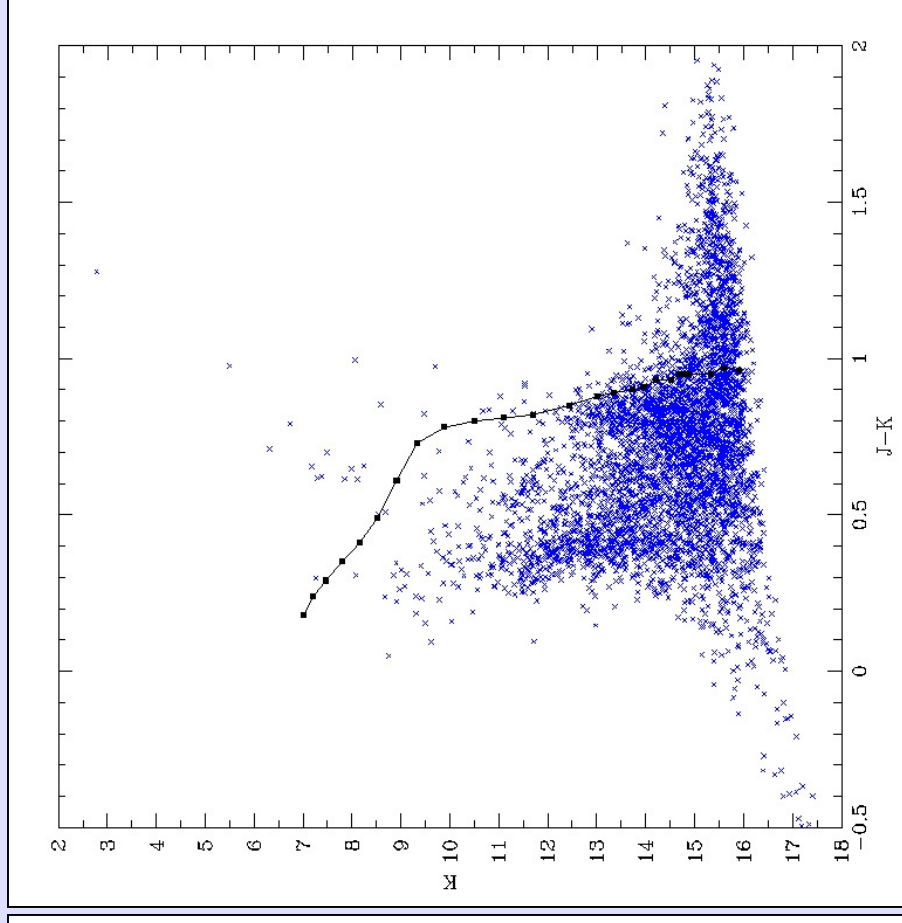
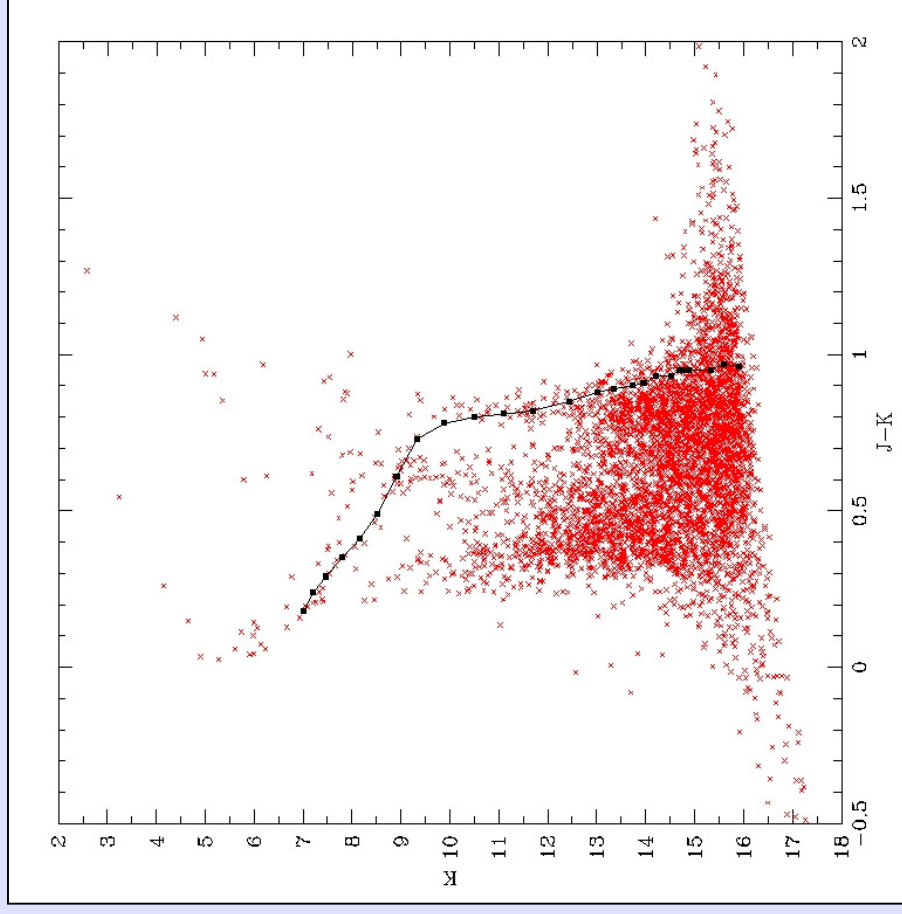
- Download 50 square degrees from USNO B1.0
- B1, B2, R1, R2, I2 magnitudes
- Accurate to 0.3 magnitudes
- Proper motions accurate to 2 mas/yr
- Proper motion selection  
 $(\mu_\alpha + 11.21)^2 + (\mu_\delta + 9.16)^2 < 100$
- Control Clusters

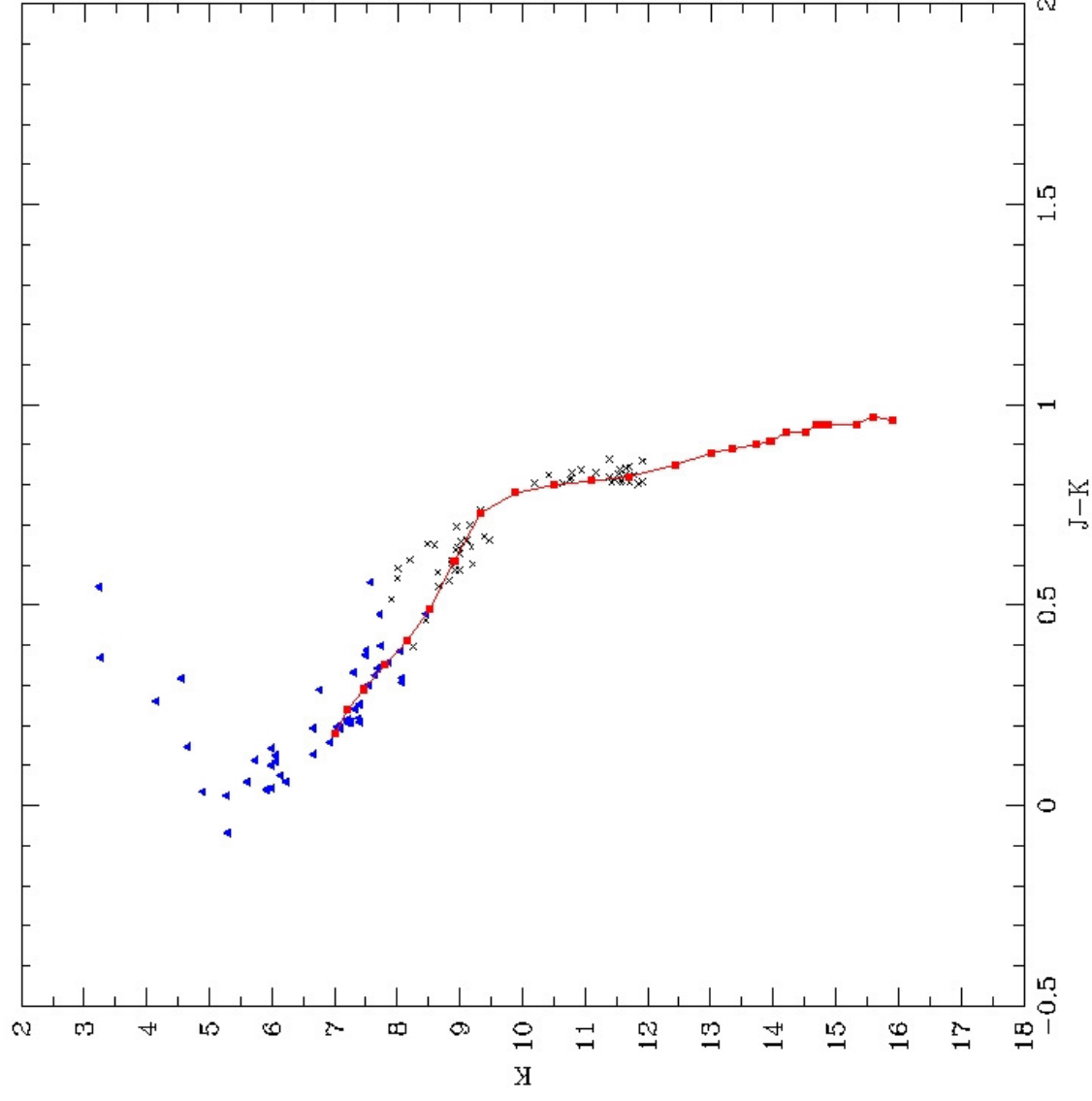


# Photometric selection

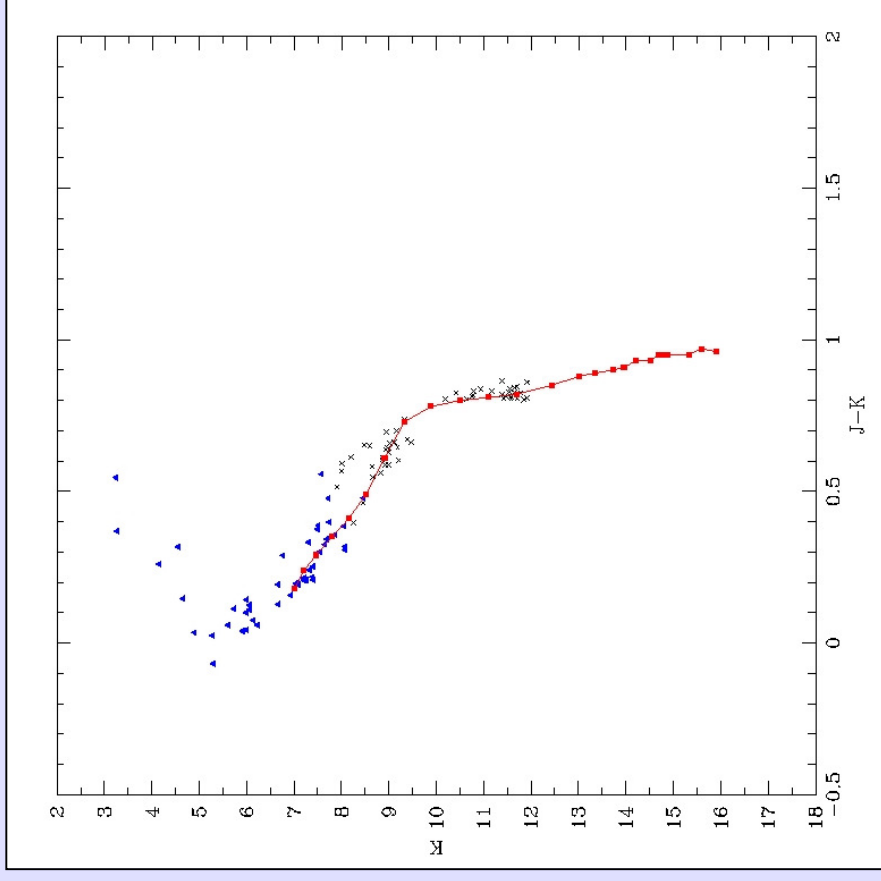
- Match data to 2MASS PSC
- $J=16.0$   $K=15.0$
- $K, J-K$  colour-magnitude diagram
- NEXTGEN models (Baraffe et al 1998)
- 0.3 magnitudes below and 1.5 magnitudes above the model, down to  $K=10$
- 0.05 magnitudes above and below model,  $12 > K > 10$
- **Found 53 new candidate members**





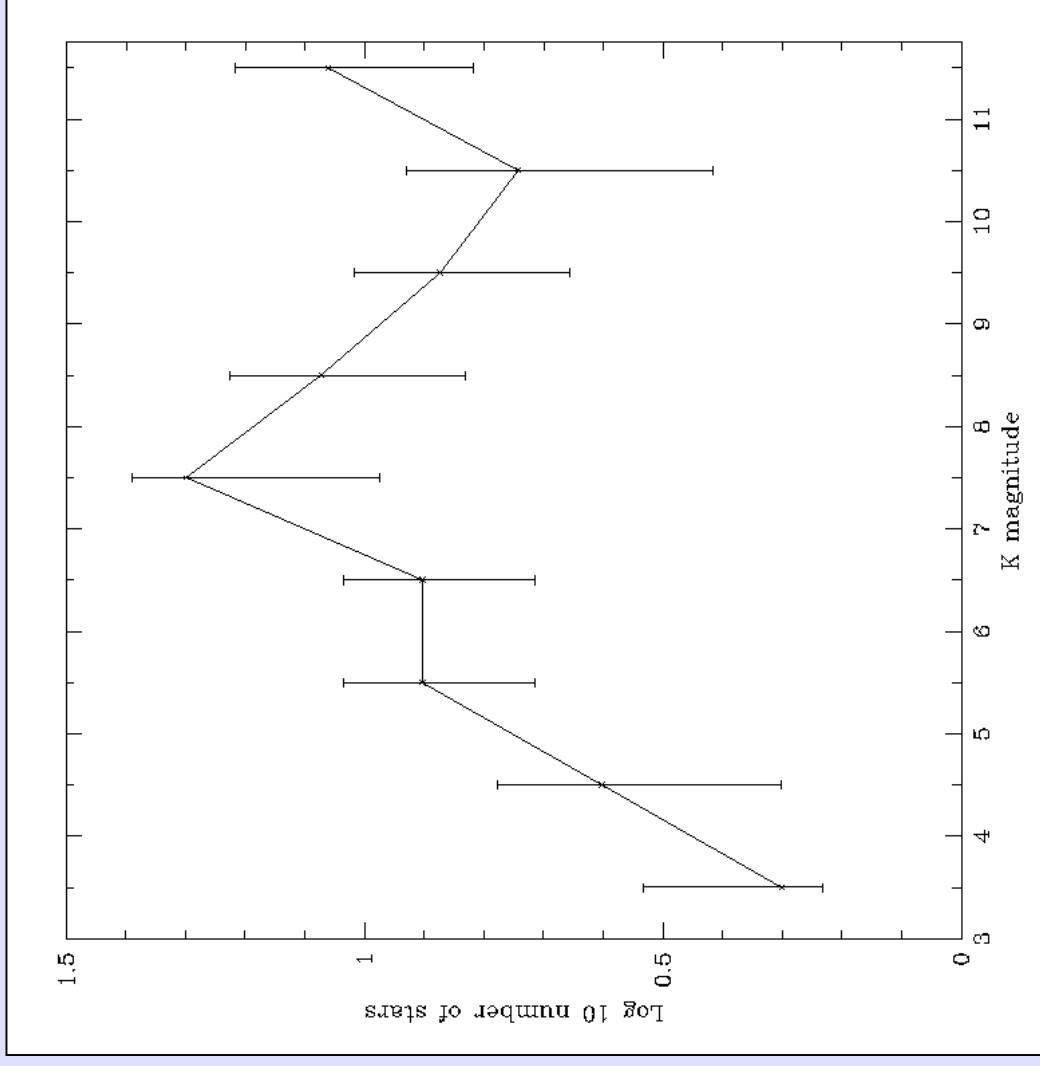


# Membership Probability



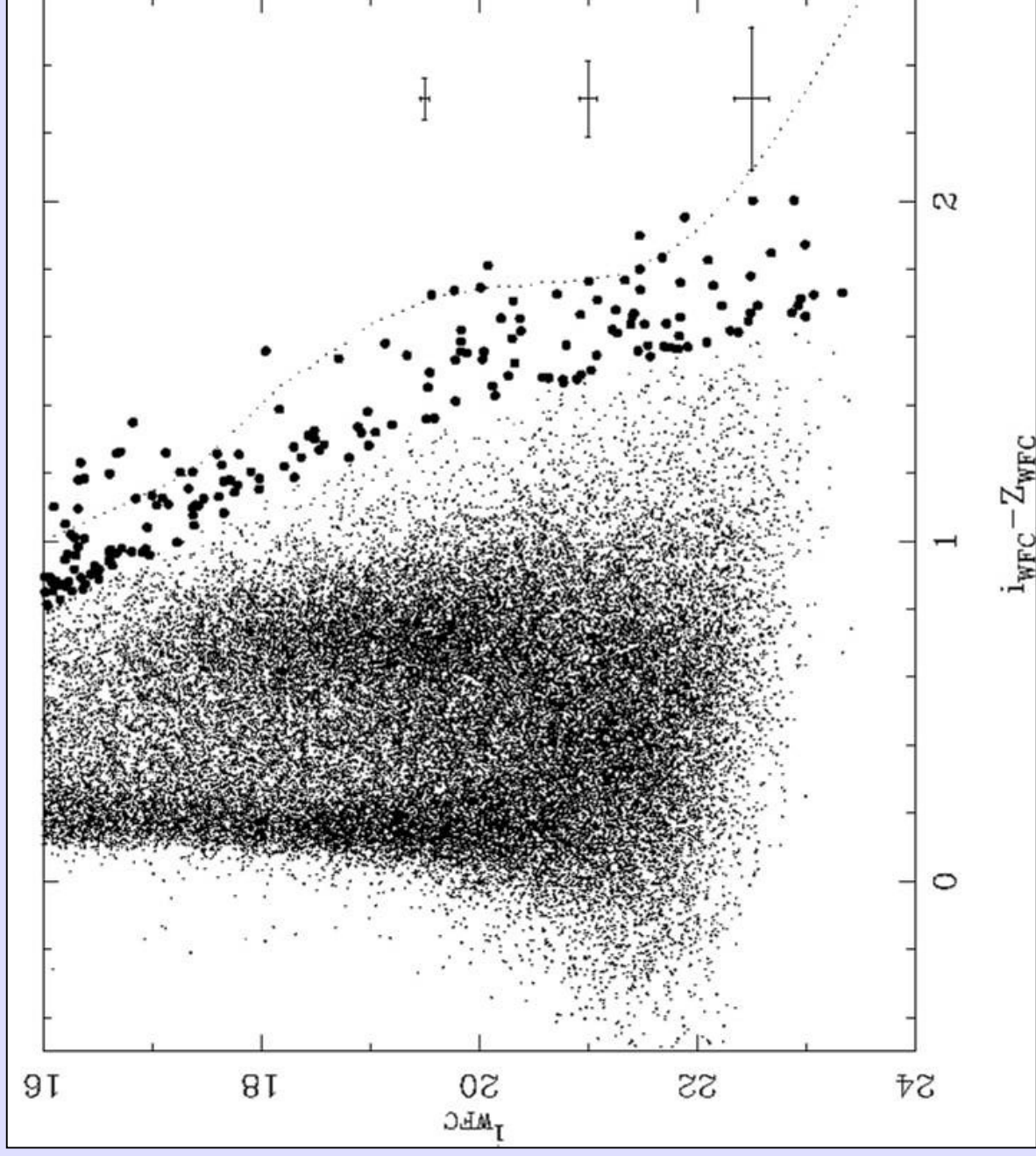
CMD section	No. of stars	Probability of membership
$0.2 < J-K \leq 0.4$	1	0.5
$0.4 < J-K \leq 0.6$	18	0.83
$0.6 < J-K \leq 0.8$	9	0.55
$10 < K \leq 11$	7	0.79
$11 < K \leq 12$	18	0.64

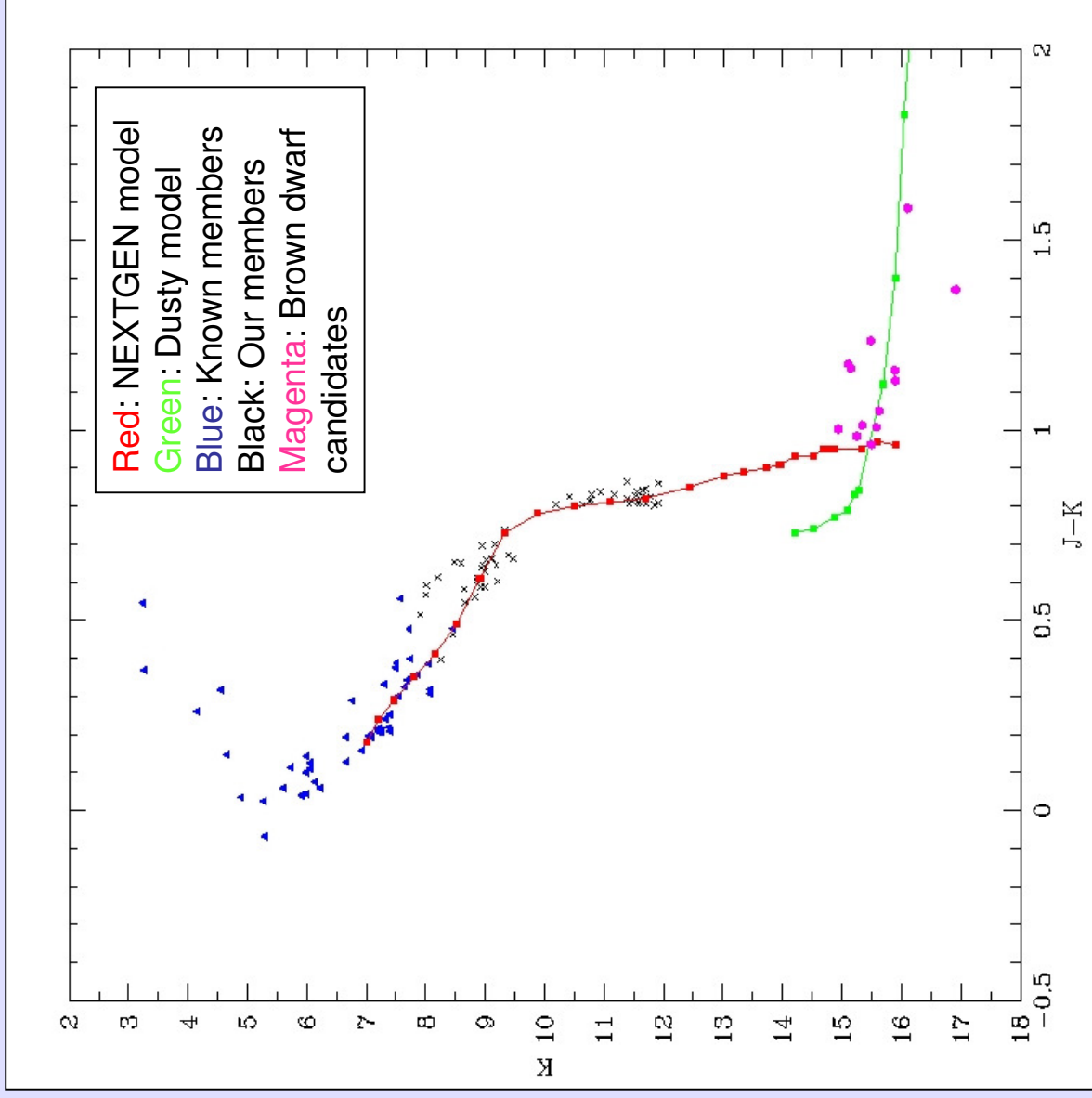
# Luminosity Function



# Low mass cluster members

- Previously  $1.05 M_{\odot}$
- $0.25 M_{\odot}$  our lowest candidate
- 15 degree I, Z survey
- 100 low mass candidates
- K and J magnitudes using UFTI on UKIRT
- **13** possible brown dwarfs





# Summary

- **53** possible new cluster members
- Selected via proper motion using USNO B1.0
- Photometric selection using 2MASS PSC
- Probability of membership calculated
- Stars down to  $0.25 M_{\odot}$  found
- 15 sq deg of cluster surveyed in I and Z
- **13** brown dwarf candidates
- Awaiting UKIDSS and SDSS for further study