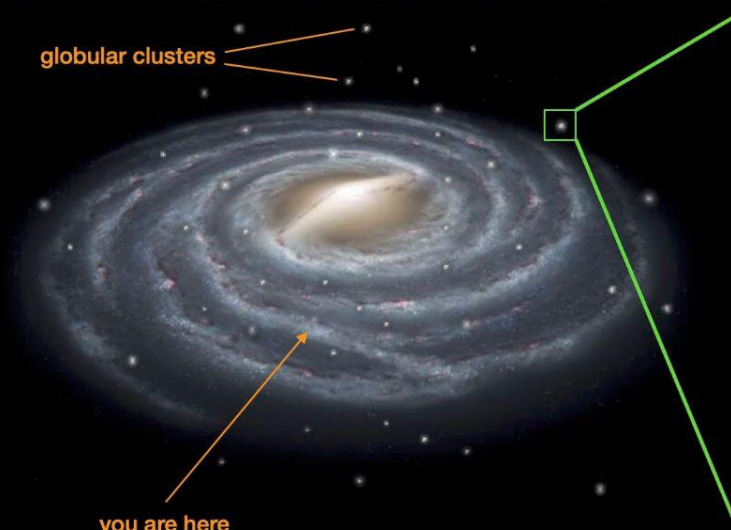

Mg-K anticorrelation in the extragalactic GC NGC 1786

INAF AI school, Napoli 14-17 April 2026

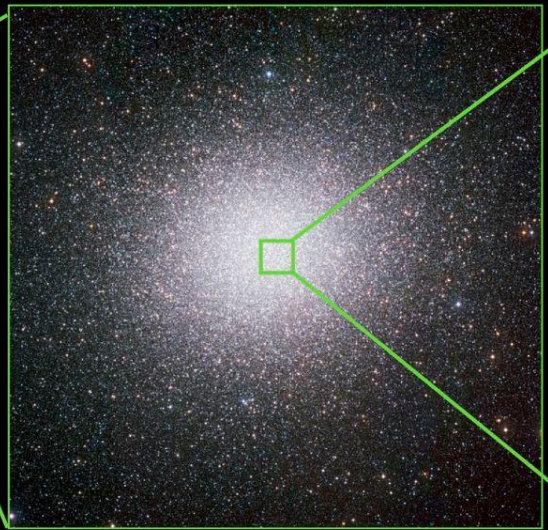
The Milky Way and its globular clusters

globular clusters

you are here

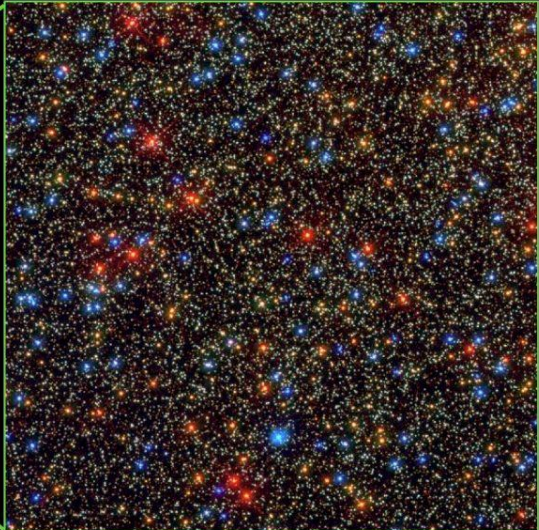


The globular cluster Omega Cen



credit: ESO/INAF-VST/OmegaCAM

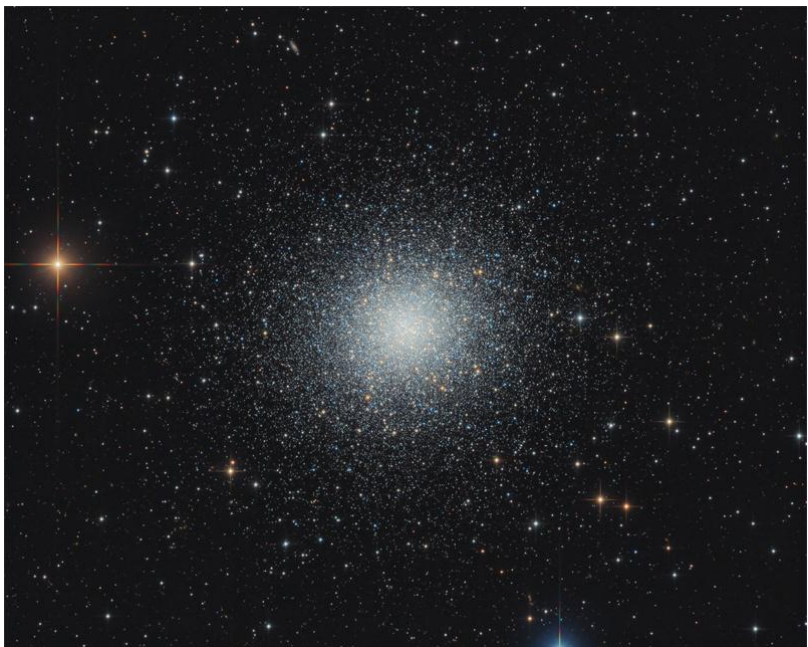
The central region of Omega Cen



credit: NASA, ESA, and the Hubble SM4 ERO Team



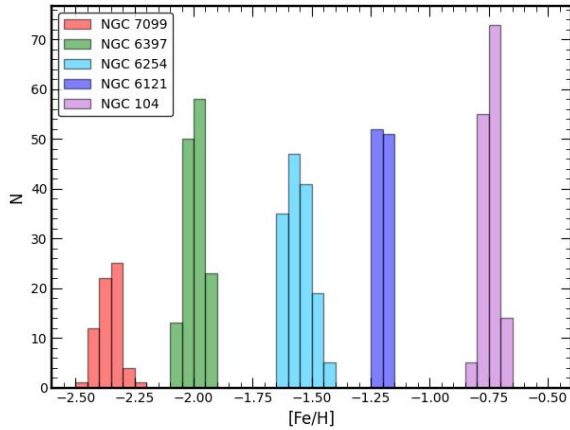
What is a GC?



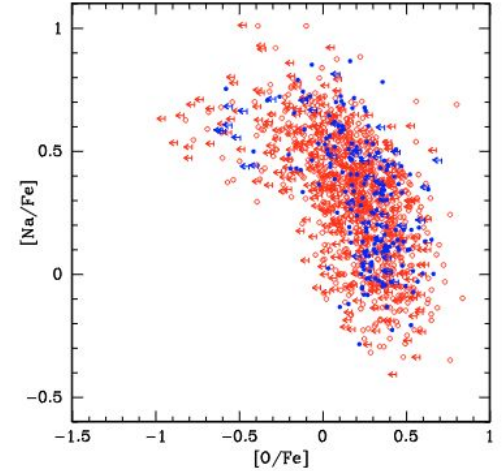
Credits: Bernhard Hubl

- A roundish object located in the Halo, Thick Disk or in the Bulge
- It contains up to 10^6 stars held together by gravity
- It can reach tens of pc in diameter
- It has a typical mass of $\sim 10^5 M_{\odot}$
- It is usually old (> 10 Gyr)
- There are ~ 170 of them in our Galaxy

What is a GC?



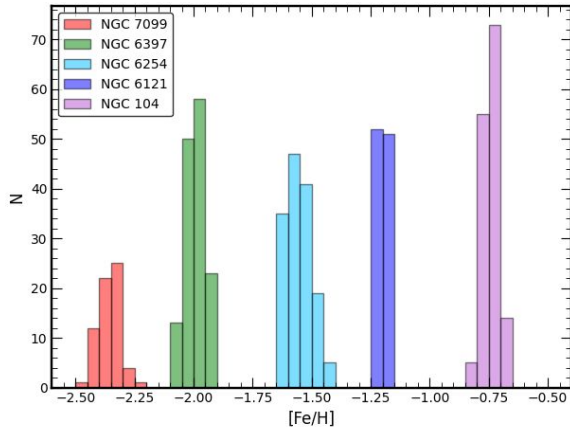
- Homogeneous in age
- Homogeneous in $[\text{Fe}/\text{H}]$
- Variations in light elements (O, Na, Mg, Al, Si, K)



From Carretta et al. 2009

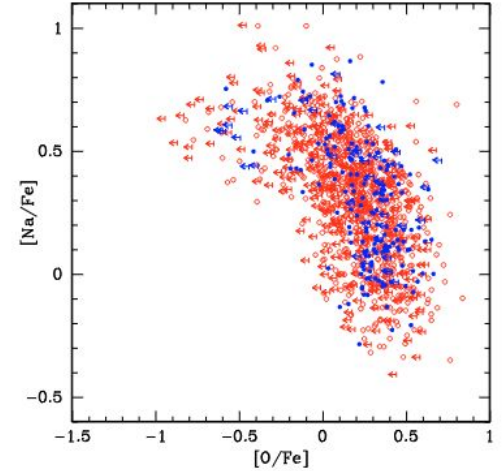
Carretta et al. 2009

What is a GC?



From Carretta et al. 2009

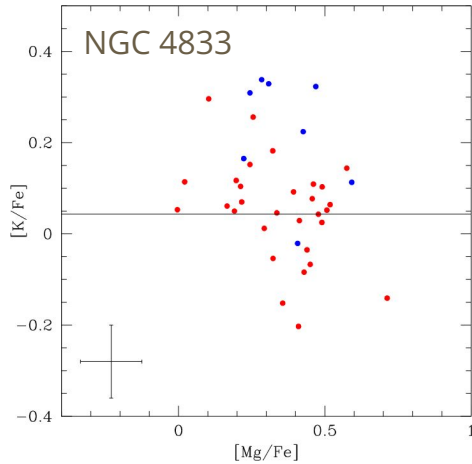
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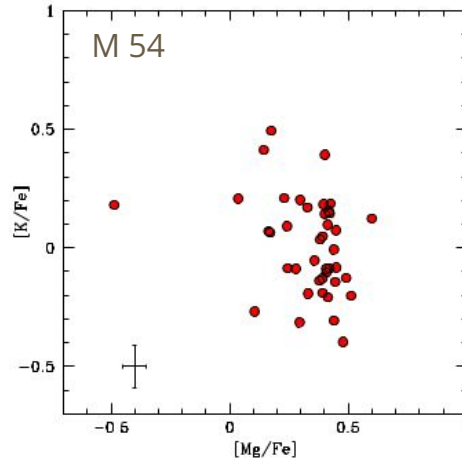
Carretta et al. 2009

- No variation in Fe \rightarrow NO SNe ejecta
- Variations in light elements \rightarrow low velocity ejecta retained

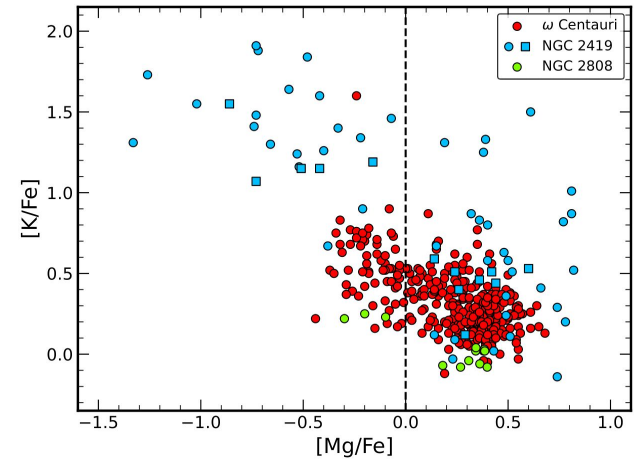
What is a GC?



Carretta et al. 2021



Carretta et al. 2022

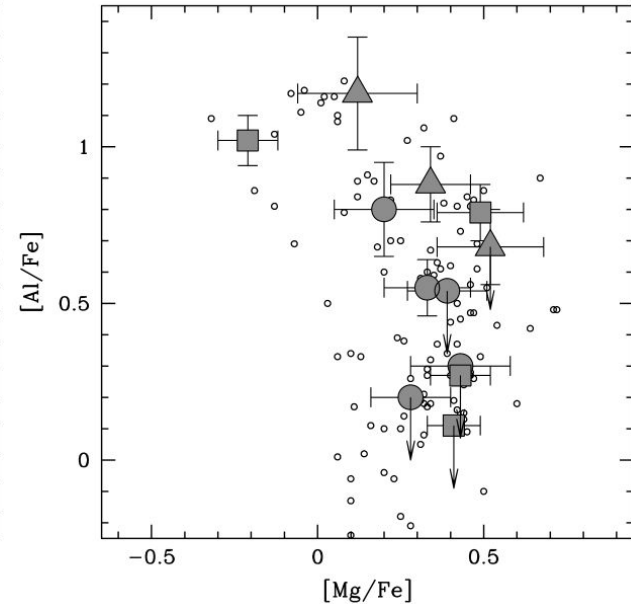
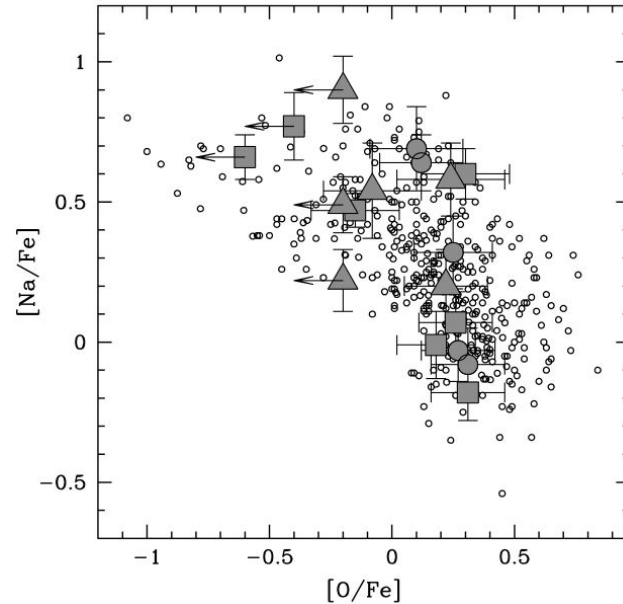


Alvarez Garay et al. 2022

Mg-K anticorrelation observed only in a handful of GCs.

NGC 1786 in the LMC

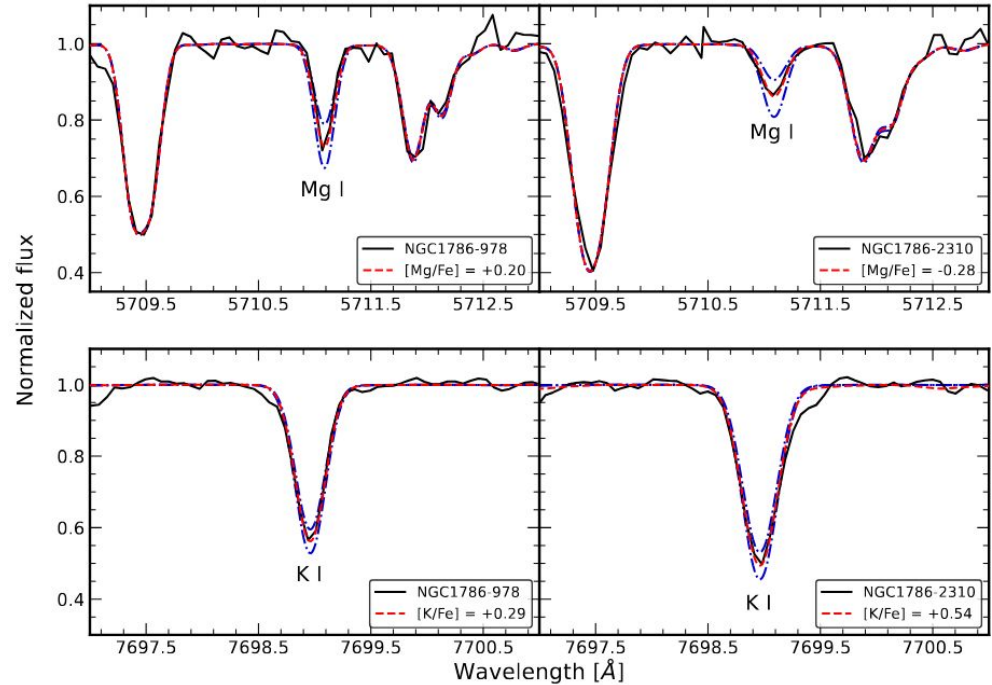
NGC 1786 is a metal-poor globular cluster ($[Fe/H] = -1.70$ dex), located in the LMC.



Mucciarelli et al. 2009

NGC 1786 in the LMC

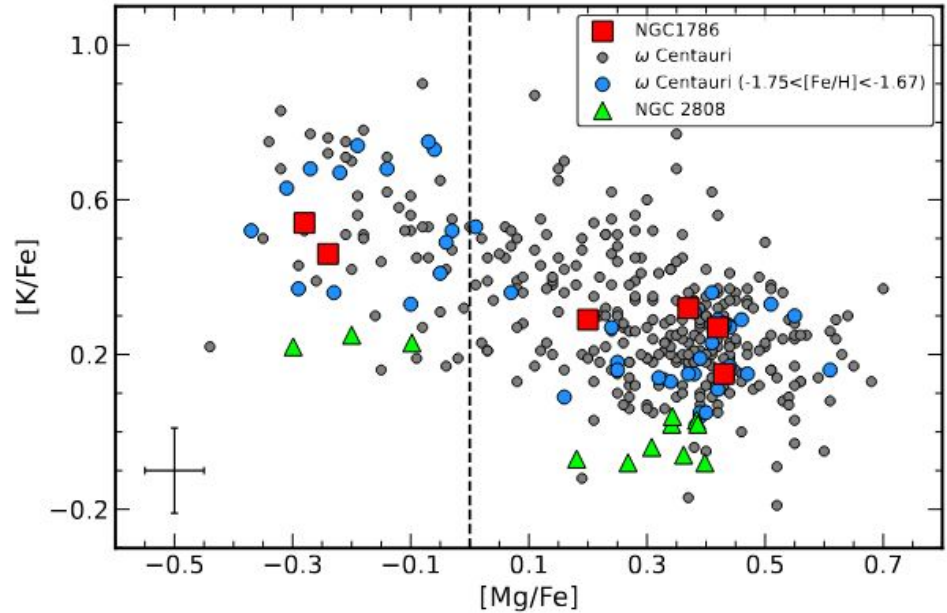
We analyzed 6 stars,
observed with the
MIKE@Magellan Telescope
($R = 28000$)



Alvarez Garay et al. 2025

NGC 1786 in the LMC

A clear Mg-K is evident in this cluster.
The extreme chemical anomalies are independent from the GC environment.



Alvarez Garay et al. 2025

NGC 1786 in the LMC

Possible responsables for the observed chemical anticorrelations

- Asymptotic Giant Branch stars
- Supermassive stars
- Fast rotating massive stars
- Interacting binaries
- Novae events

