Stellar Stream Between The Clusters NGC 5024 and NGC 5053

Abstract

We created a density map of the clusters NGC 5024 and 5053 by using an isochrone of their colour-magnitude diagrams. We obtained a moderate view of the streams, but improvement is possible.

Introduction

When groups of stars merge and their gravitational interaction is sufficiently strong, it is possible that stars will be pulled out of the cluster resulting in a flow of stars going from one cluster to the other. These stars form a bridge between the clusters. We want to confirm the existence of two bridges suggested by Chun et al.[1] between the globular clusters NGC 5024 and NGC 5053.

Figure 1: An overview of the observed system. Source: [2]

Methods

We obtained our data with the Wide Field Camera of the Isaac Newton Telescope in the r and g band. After the data reduction, we made colour-magnitude diagrams of the clusters and the bridge to get a turn-off point. WIth an isochrone mad from these diagrams, we identified the bridge member stars. Finally, we plotted the position of the stars belonging to the clusters and the bridge in an overdensity feature map.

Results

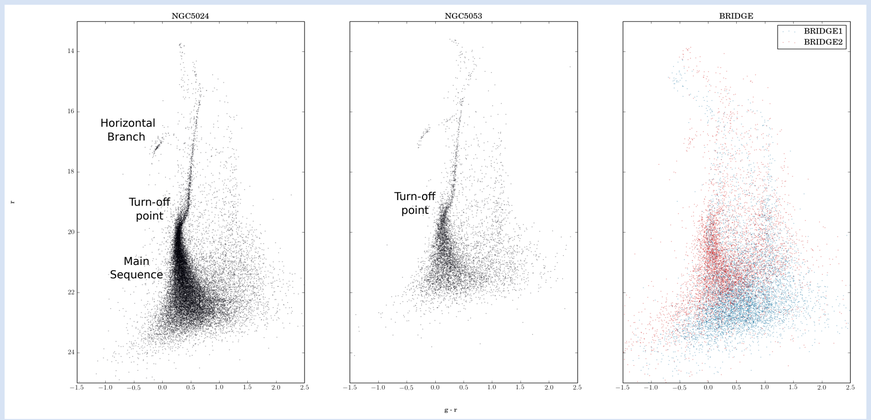


Figure 2: The colour-magnitude diagrams of the clusters and the bridge.

The obtained colour-magnitude diagrams show an evident turn-off point for NGC 5053 and NGC 5024 at a g-r colour of ~0.2 and ~0.3 respectively. This characteristic is also visible in the bridge.

After subtracting the average background from the clusters and using the turn-off point to create an isochrone, we identified the stars that belong to the bridge. The bridge members are plotted in a density map in Fig. 3.
The bridge should be visible as two streams between the clusters[1] , with a hole in between them. This is moderately visible in our image.

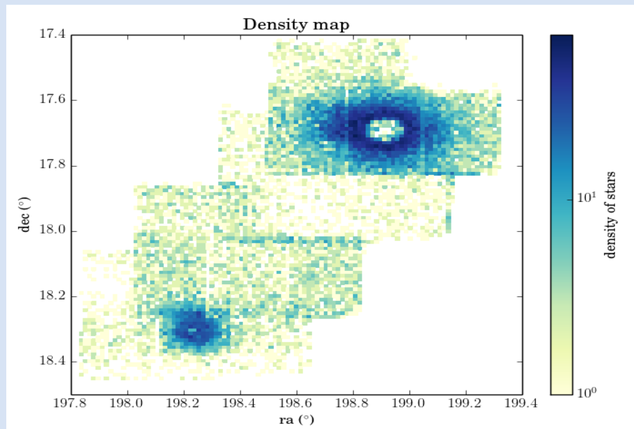


Figure 3: The overdensity feature map of the system.

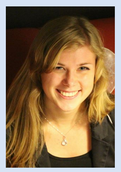
Conclusion

We did get deeper data than the Chun et al. research group: we observed stars as faint as 24 magnitude.
The features in the colour-magnitude diagram of the bridge indicate that there presumably is a bridge between the clusters.
The streams and the hole in between them are visible in our density map, but they are not clearly present.
A better result could be retrieved by using a better method for distinguishing bridge member stars from the background.

References

[1] Chun et al. (2010), A wide-field photometric survey for extratidal tails around five metal-poor globular clusters in the Galactic halo, The Astronomical Journal 139.
[2] Franke, Bob 25 april 2014, Focal Pointe Observatory. Retrieved from: http://bf-astro.com/m53fsq/m53.htm

Authors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