Lucia Pizarro
Professor Brian Hill
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An open cluster in the constellation Scutum, The Wild Duck Cluster

Reasons for Choice

I chose this object because I was interested in studying a visual representation of a few thousand stars that are loosely gravitationally bound. While reading the textbook, I found it hard to wrap my head around that description, and I wanted to investigate it further. Additionally, I was intrigued by the smaller number of stars in the open cluster because I thought it would be a more manageable way to study a cluster. The irregular groupings in the open star cluster (as opposed to the more symmetrical ones in the globular cluster) also appealed to me. Finally, there's something inspiring about looking at stars that are relatively new to space rather than older stars. M11 is interesting because it has a few thousand stars, meaning that while it is classified as a large open cluster, it could also be counted as a small globular cluster.

Description of Object

The Wild Duck Cluster, or Messier 11, gets its name because the brightest stars in the cluster form a V-shape. It is an open star cluster that is 6,200 light years from Earth that is thought to have formed between 250 and 316 million years ago. In comparison, the Pleiades cluster is about 444 light years away. The Wild Duck Cluster is also part of M11, the most distant category that can be seen by the naked eye, where it's 2,900 stars form a triangular patch of light. The cluster is located in the constellation Scutum, which slightly resembles a tent, and it has an apparent magnitude of 6.3. The Wild Duck Cluster is best viewed when it's high in the Southern sky: before sunrise in the spring, late night in early summer, and mid-evening in late summer and early fall. Thus, we picked a good time to view and photograph the cluster.

Image Capture Procedure

We used sloan g, r, and i bands.The Sloan g and r bands were imaged with 45-second subexposures, and the i band was imaged with 60-second subexposures. There were 10 subexposures in each band for a total of 30 exposures.

Image Processing Procedure

The Sloan g, r, and i bands were mapped to B, G, and R. The image processing sequence involved five steps. First, we calibrated the images using darks, flats, and bias frames. Then, we aligned the calibrated images. Thirdly, we integrated the aligned images into a single image of each color. Next, we stretched the contrast in the images. Finally, we combined the three images into a single RGB image.

Results

Full Image

A higher-resolution versions of this image is posted at:

https://brianhill.github.io/astronomy/projects/WildDuckCluster.html

Cropped Image to Show Detail near Cluster

Closing Comments

This open cluster looks surprisingly like a globular cluster. However, despite its size, the Wild Duck Cluster is classified as an open cluster because of its age. Estimated to have formed about 300 million years ago, this open cluster is way younger than the average globular cluster which was about ten billion years old.

The target did satisfy my original reasons for choosing it. I was excited that I got to look at a relatively newer star formation. It was cool to learn about the image processing software, and I'm glad we were able to get good quality images. The irregular groupings in the cluster are quite visible, and I think this process did help me learn more about what open clusters are and how they work. It was exciting to apply concepts in the textbook to real star gazing. Thank you for the opportunity to complete this project. I really appreciate your help, and I think it turned out quite well.