Determining Mass and Tidal Disruption in NGC7089 Using the Gaia Space Telescope

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Abstract
Globular clusters contain some of the oldest stars in our galaxy. They are also some of the brightest objects in the galaxy. This project will focus on a single globular cluster, NGC 7089, to determine its properties. Throughout this project we have used data from the Gaia Space Telescope, which measures the locations and motions of Milky Way stars. The project will attempt to identify stars that used to belong to NGC 7089 but have been pulled away by the tidal gravitational forces of the Milky Way. Past attempts to study the cluster have been done using data from other telescopes, so the Gaia data will provide a new, independent way to study the cluster.

Methodology
- The goal was to remove stars that were not useful to the goal of the project or had values inconsistent with the cluster.
- The first cut applied were selecting stars with a magnitude less than G of 18.5, as these are better measured stars.
- There was also a cut on parallax, distance, to remove stars that were not going to be measured. Stars that were greater than 0.2 mas, 5 kpc, so that stars too close to earth wouldn’t be a distraction
- After the error graph, we cut in terms of magnitude where later the color magnitude diagram (CMD), shown below, where stars that were not going to be measured. Stars that were greater than 0.2 mas, 5 kpc, so that stars too close to earth wouldn’t be a distraction

Results
- In regards to the mass, we used the radial velocity dispersion to help convert proper motions from mas/yr to km/sec

Conclusion
- There are different ways to measure the mass of the cluster, but with this technique we are able to measure it but without precision this data is not reliable
- In comparison, this data is able to measure extratidal stars of the cluster consistently, which would warrant a future investigation

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Reference
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