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Using SAOImage DS9 and Hubble Space Telescope Data to Identify Globular Clusters in IC 219

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Background

Globular clusters are tightly bound spherical clusters of stars located within the halo of elliptical and spiral galaxies. They are among the oldest stars found in a galaxy, and their presence and abundance in a galaxy's halo offer insight on the age, composition, and formation of the galaxy.¹ I used a Hubble Space Telescope (HST) image and SAOImage DS9, a powerful imaging tool used to analyze astronomical data, to identify the size and locate the position of globular cluster (GC) candidates in IC 219.

Objective

- Create a comprehensive list of globular clusters surrounding IC 219 to be used for further research.

Methods

- Spherical, “fuzzy-edged” objects were observed in DS9, approximately 3-7 pixels in apparent size.
- GC candidates were centered in a 20x20 box aperture (see Figures 1 & 2)
- All candidates were saved as individual regions in a collective list (.reg file)
 - Descriptors: WCS in degrees, position in RA/Dec, size in arcsec

Data

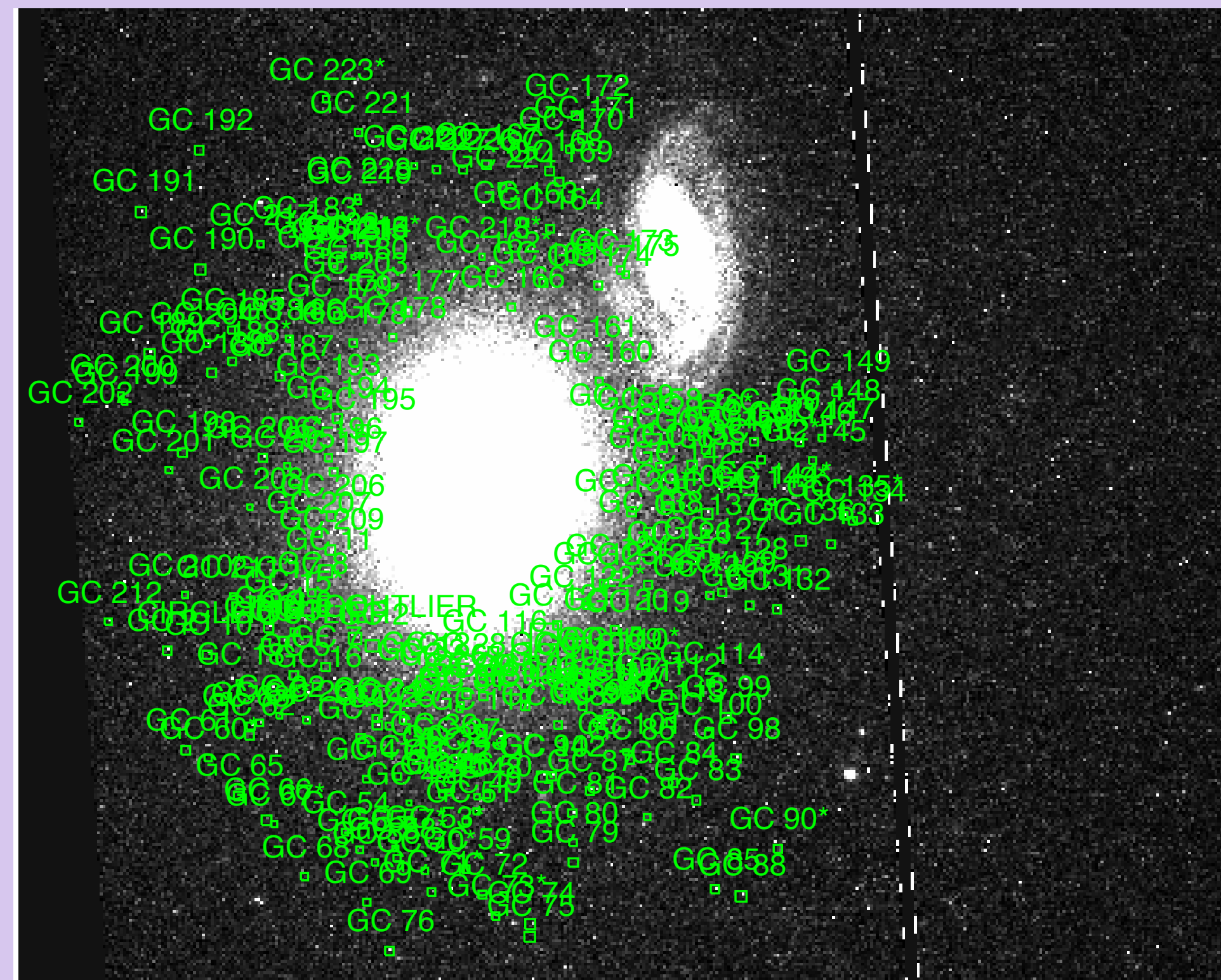


Figure 1: HST image converted to a .fits file in DS9; GC candidate apertures marked as green boxes

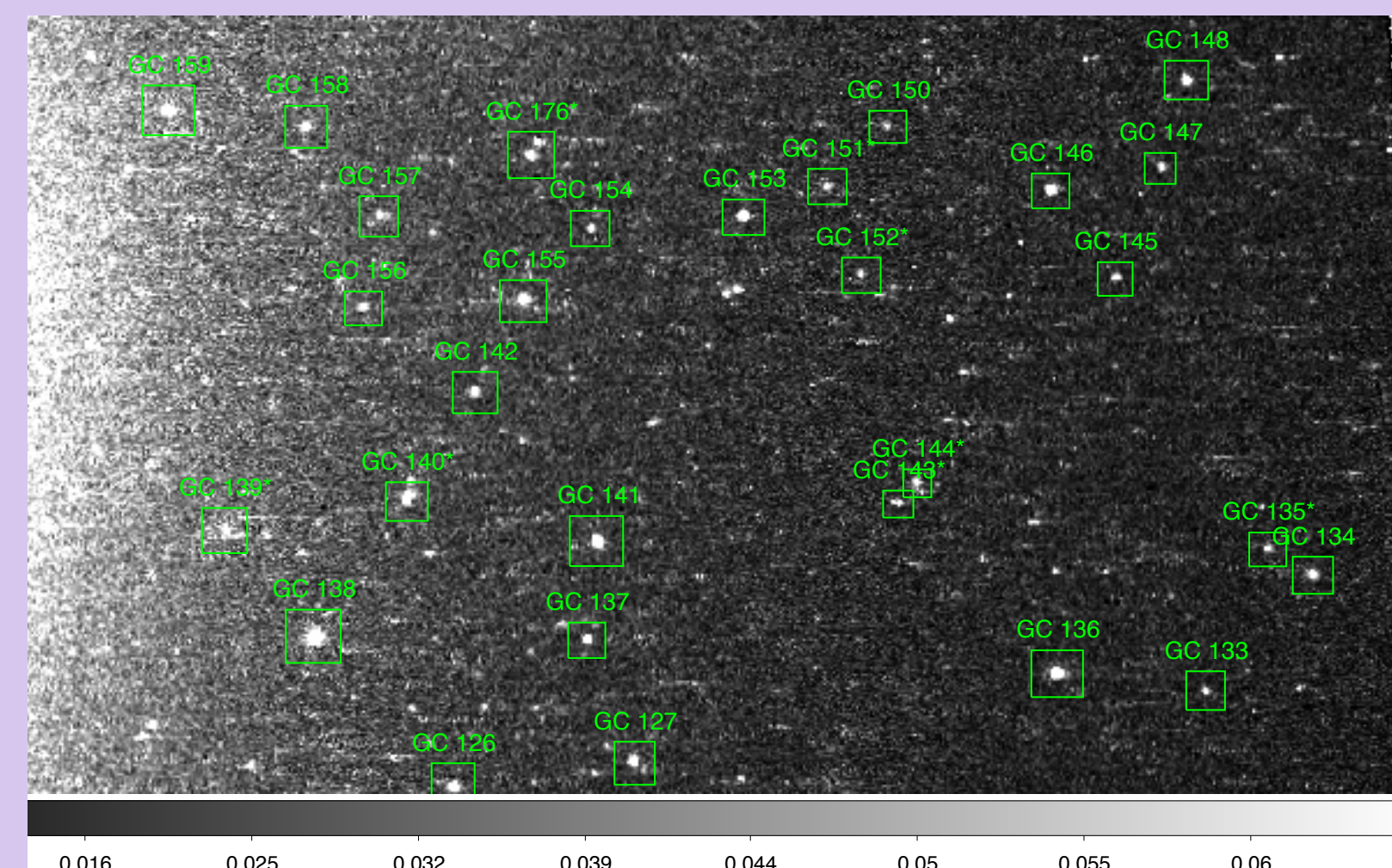


Figure 2: Globular cluster candidates located on the right side of IC 219

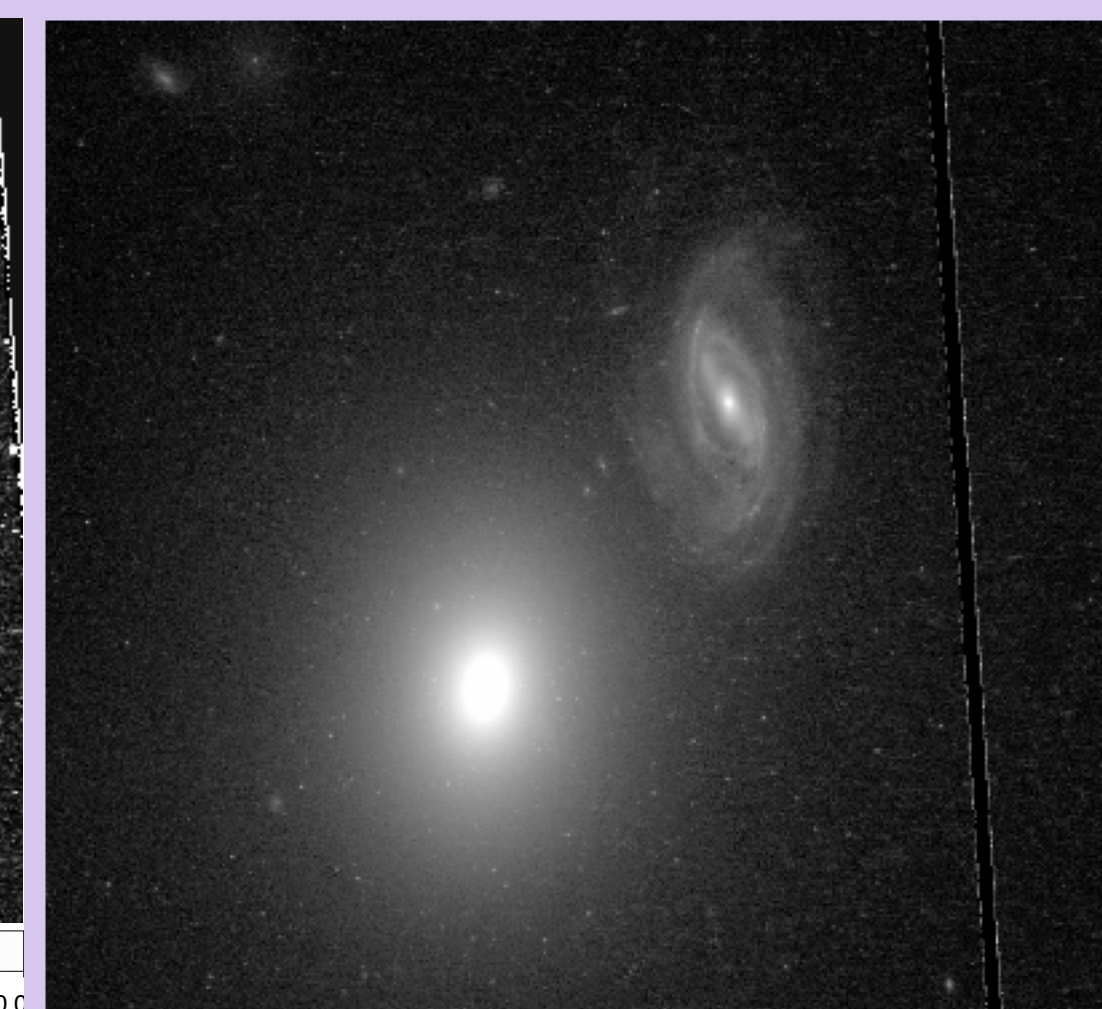


Figure 3: HST image of IC 219 (left) and PGC 8816 (right)

Results

- 216 globular cluster candidates were catalogued

Further Applications

- The HST data candidate list found in DS9 will be used to locate the candidates in MUSE cube data
 - Spectra of candidates will be obtained
 - GC Candidates will be confirmed or omitted through this process
- Globular cluster metallicity and age will be discovered through spectra

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References

¹Pasachoff, J. M., & Filippenko, A. V. (2019). *The cosmos: Astronomy in the new millennium* (5th ed.). Cambridge: Cambridge University Press. (p. 343-345)