MEMBERSHIP ANALYSIS OF GLOBULAR CLUSTER M92 WITH APOGEE (APACHE POINT OBSERVATORY GALACTIC EVOLUTION EXPERIMENT) DATA

TEMI OLATINWO-SPELMAN COLLEGE

VA-NC ALLIANCE

LEADERSHIP ALLIANCE NATIONAL SYMPOSIUM
GLOBULAR CLUSTERS: WHAT ARE THEY

• Exactly what they sound like: Close-Stars!
  • To be more precise they are gravitationally bound group of stars
  • They appear to be a bundle of stars in the night sky
  • Furthermore, they tend to possess similar chemistry so you can imagine the stars within a cluster as stellar siblings!
Like siblings, stars in globular clusters were born in very similar environments. When they’re grouped based on their resemblances you can gain insight into their home lives.

- I.e. their parents - the interstellar medium at the time of their birth, and their grandparents - the stars that have died and shed their chemicals into the interstellar medium.
GALACTIC ESTRANGEMENT

• Similarly to how you may move out of your hometown and never text your family or former friends again, Stars may be pulled out of their original orbits by a process known as Tidal Disruption.

• But just like you can’t completely cast off your origins these stars can’t completely eradicate the characteristic accent of their Podunk hometown.
  • They share the same signature characteristics, like how Luke Hemsworth shares his more famous brothers square jaw and blue eyes.
• By examining the chemical compositions of these stars we can also determine whether they’re related in the first place!
  • Some stars can get in the way of the family pictures, like Kimmy Gibbler from Full House
• We looked at traits such as the amount of iron and hydrogen in a star and compared those to other stars within the general area
  • Stars which abundances fell within accepted values were determined to be part of the cluster
• We also examined radial velocity: the speed at which a star is moving towards or away from the sun
INVESTIGATION

Right Ascension vs Declination (No Cuts)
CONCLUSION (WHY NOT LEAVE THEM BE?)

• As we all know the modern nucleic familial structure is a fundamental unit of capitalist society.

• The metaphor is falling apart a bit here- or is it working all too well? Get woke.

• Anyway, back to stars- Globular Clusters are a fundamental unit of galactic formation
IF THE NSA WON'T GIVE ME PRIVACY DON'T EXPECT ME TO EXTEND SUCH MERCY TO STARS

• By learning more about Star Clusters we can gain valuable insight into the processes which formed our Galaxy

• This goes double for old star clusters, such as those in the Galactic Halo
  • Clusters like, M-92 for example

• However this only works if we know which stars are in clusters
  • Hence the detectiving.
ACKNOWLEDGMENTS

- Me: You’re doing great, sweetie
- Nitya Kallivayalil
- Shane Davis
- Zaniyah Dock

- Funding for the Sloan Digital Sky Survey IV has been provided by the Alfred P. Sloan Foundation, the U.S. Department of Energy Office of Science, and the Participating Institutions. SDSS-IV acknowledges support and resources from the Center for High-Performance Computing at the University of Utah. The SDSS web site is www.sdss.org.

- SDSS-IV is managed by the Astrophysical Research Consortium for the Participating Institutions of the SDSS Collaboration including the Brazilian Participation Group, the Carnegie Institution for Science, Carnegie Mellon University, the Chilean Participation Group, the French Participation Group, Harvard-Smithsonian Center for Astrophysics, Instituto de Astrofísica de Canarias, The Johns Hopkins University, Kavli Institute for the Physics and Mathematics of the Universe (IPMU) / University of Tokyo, Lawrence Berkeley National Laboratory, Leibniz Institut für Astrophysik Potsdam (AIP), Max-Planck-Institut für Astronomie (MPIA Heidelberg), Max-Planck-Institut für Astrophysik (MPA Garching), Max-Planck-Institut für Extraterrestrische Physik (MPE), National Astronomical Observatory of China, New Mexico State University, New York University, University of Notre Dame, Observatario Nacional / MCTI, The Ohio State University, Pennsylvania State University, Shanghai Astronomical Observatory, United Kingdom Participation Group, Universidad Nacional Autónoma de Mexico, University of Arizona, University of Colorado Boulder, University of Oxford, University of Portsmouth, University of Utah, University of Virginia, University of Washington, University of Wisconsin, Vanderbilt University, and Yale University.

- This work was supported by the NSF CAREER award 1455260