

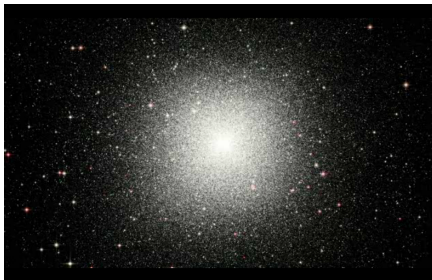




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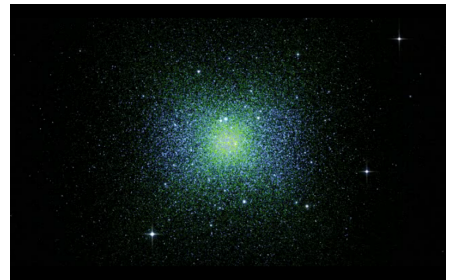
Episode 80: The riddle of the missing stars	Visual notes
<p>00:00 [Narrator] 1. Dense gatherings of stars like these are some of the most puzzling inhabitants of the Universe.</p> <p>Now, new Hubble observations reveal that they are even more mysterious than previously thought.</p>	
<p>00:19 2. Intro</p>	
<p>00:39 [Narrator] 3. Globular clusters are large balls of stars that orbit galaxies, including our own.</p> <p>Objects like these were once thought to consist of a single group of stars that had all formed together. However, the Milky Way's globular clusters seem to be far more complex.</p>	

01:04

[Narrator]

4. Many clusters orbiting the Milky Way are made up of at least two distinct groups of stars.

Around half the stars are a single generation of normal stars that were thought to form first, and the other half form a second generation that are more polluted with certain chemical elements produced by the earlier stars.



01:30

[Narrator]

5. But, when astronomers first measured the proportion of second generation stars in the Milky Way's clusters they were baffled — there are many more of these younger stars than anyone expected to find.

And so, astronomers began to speculate.

A leading explanation was that these clusters had once contained a huge number of first generation stars, but that a significant fraction of these older stars was then ejected from the cluster, leaving roughly equal numbers of stars from each generation.

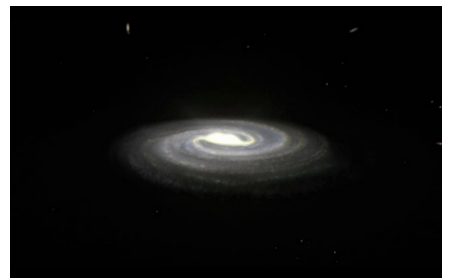


02:19

[Narrator]

6. This explanation makes sense for globular clusters in the Milky Way, where the ejected stars could easily hide among the many similar stars in our galaxy's vast halo.

But new Hubble observations have now looked at globular clusters in a much smaller galaxy — and what they found calls this idea into question.

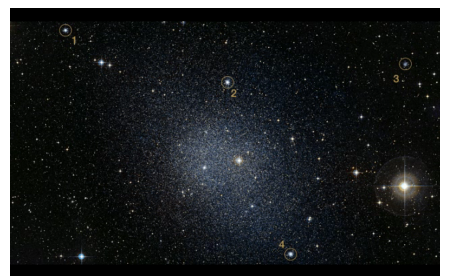


02:51

[Narrator]

7. These four globular clusters in the nearby Fornax galaxy have now been shown to be very similar in composition to those in our galaxy, so the same theory should explain how they formed.

Based on the number of younger stars in these clusters,



they should have been up to ten times more massive in the past before kicking out huge numbers of the older, unpolluted stars to shrink to their current size.

But, unlike the Milky Way, the galaxy that hosts these clusters just doesn't contain enough of the stars needed for this to have been possible.

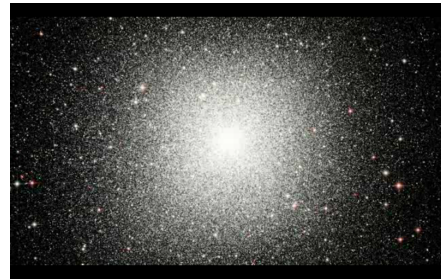
There is nowhere for them to hide! They are simply not there.

03:41

[Narrator]

8. This finding means that a leading theory on how these mixed-generation clusters formed, which should only find them nestled among large numbers of old stars, just cannot be correct.

Astronomers will have to think once more about how these mysterious objects, both in the Milky Way and further afield, came to exist.



Ends 04:40