

# Briefing

**To:** Captain Howard  
**From:** Astrophysics Group  
**CC:** Ships Computer  
**Date:** 12/06/02  
**Re:** Second Conclusions from Further Astrophysical Observations

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## Summary

**URGENT:** A pair of probably artificial satellites, in a low orbit, is passing over us. This suggests that intelligent life is present on or near Ziggy.

Planet Ziggy seems to be located in the outer regions of an elliptical galaxy, or perhaps in a globular cluster orbiting such a galaxy. We are not, therefore, in the Milky Way any more. We lie around 10 kpc from the centre of this galaxy.

We have not been able to detect any spiral galaxies elsewhere in the sky. Instead, all we detect are spherical systems which are probably elliptical galaxies. This suggests that we are no longer in our own universe.

## Artificial Satellites

A pair of blue dots is moving very rapidly across the sky. They are moving far faster than the Moon, indicating that they are probably closer than it. If they were further away, they would have to be moving at quite extraordinary speeds. They cannot be stars: even the closest, fastest stars would take years to move across the sky like this. Even other planets would usually take weeks. We therefore strongly suspect that they are small moons or satellites orbiting low above Ziggy.

They seem to be doing circles around their common centre-of-gravity. If they are as close as we think, they would be too small for their gravity to achieve this. There must therefore be some other force holding the two objects together – perhaps a tether between them. This strongly suggests that these objects are artificial.

## **The Milk Stain**

No milky-way is seen. We conclude that we are not, therefore, in the disk of a galaxy. Instead, a vast collection of faint stars covers around 25% of the sky. We are calling it the Milk Stain. This could be an elliptical galaxy or a globular cluster.

Several pulsing stars were seen in the Milk stain. Their rapid period suggests that they are RR Lyrae stars, similar to those we saw last year. As these new stars are 100,000,000 times fainter, they must be  $\sqrt{100,000,000}=10,000$  times further away (from the inverse square law). The centre of the milk stain is thus roughly 10 kpc distant.

This distance implies that it is much larger than a globular cluster. We therefore suggest that it is an elliptical galaxy. We could either be in the outer regions, or in a globular cluster orbiting it. If the latter is true, the centre of the globular must lie on the other side of Ziggy, where we cannot see it.

## **Fuzzballs**

As you know, if you point a telescope anywhere in the sky on Earth, you see galaxies: both disk galaxies and elliptical galaxies.

Ziggy appears different. We see no disk galaxies anywhere. Instead, we see round objects that could be small elliptical galaxies or globular clusters. Their spectra support this interpretation.

If they were globular clusters, orbiting around the Milk Stain, they should mostly be seen near the Milk Stain. This is not observed: they are seen in roughly equal numbers all over the sky. We suggest therefore that most, if not all of them, are elliptical galaxies.

The lack of spiral galaxies suggests that we are not in our own universe any more.