Francis Filament: a large scale structure that is big, big, big bang trouble. Is it really so large?

John Hartnett

'From a galaxy far, far away comes a stunning new discovery' so begins the article of science reporter Rosslyn Beeby of the *Canberra Times* (Australia), Thursday, 8 January 2004. The article continues with some sensational claims:

> 'Existing theories about the formation of the universe have been challenged by a sensational new discovery—the existence of an enormous string of galaxies 300 million light-years long and 10,800 million light-years from Earth.
>
> 'ANU astronomer Dr Paul Francis led an international research team which discovered the galaxies … Their discovery defies accepted theories of how the universe evolved. Current theories cannot explain how such an enormous galaxy string could have formed at such an early stage in the evolution of the universe.
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> 'Scientists claim the universe was formed during the Big Bang—a cosmic explosion that hurled matter in all directions—about 13.7 billion years ago.
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> '"There simply hasn't been enough time since the Big Bang to form structures this colossal," Dr Francis said. "In three billion years matter should be able to move 10 million light years at most—you can't make something that's 300 million light years long in the time that's given … It's impossible."'

This newly discovered string of 37 galaxies has been named the Francis Filament, after Dr Francis who led the research. Computer modelling of the early universe cannot explain how such a structure could form so soon after the big bang. There appears to be two main problems:

1) The size of the filament structure indicates the galaxies formed much faster than the maximum expected rate, and
2) such galaxies are not expected to have formed so early after the big bang.

The rule of the paradigm

Dr Francis says:

> '… there's something badly wrong with the accepted Big Bang theory … or the universe is much older than we think it is. We think there might be something in the idea that galaxies may be able to form at a faster rate than previously thought.'

But the problem is far deeper. When speaking on why they were refused time, at the US Southern Observatory telescope in Chile, Dr Francis says: 'They knocked us back because they thought the observations were technically impossible because the galaxies were too faint.' The estimated distance of 10,800 million light-years, is based on the assumption of the Hubble law calculation of redshift, which was reported to be $z = 2.38$.[1] They also noted that the density of the objects is about 4 times greater than similar collections of objects with similar redshifts. However, these figures for density and size of the region of space (300 million light-years) depend on the acceptance of the model itself. They chose a L-dominated flat universe with a Hubble parameter $H_0 = 65$ km s^{-1} Mpc^{-1}, fractional matter density (normal and dark) with respect to closure density WM = 0.3 and fractional dark energy density WW = 0.7.

Analternativeperspectiveonredshift

The redshift calculated distance places the filament at the edge of the visible universe, where it is very difficult to see anything. Now consider for a minute that the observed galaxies are faint because they do not give off much light. That is they are not so far distant but are very dim or have a low surface brightness. Suspecting that the structure may be much closer I emailed Halton Arp my opinion and he agreed with me saying:

> 'The gigantic feature recently hyped by the Australians is, as you suspect, undoubtedly much closer and smaller than its redshift distance would imply. The so called "Francis Filament" is mentioned on p. 122 of my new "Catalogue of discordant Redshift Associations" (Apeiron, Montreal).'[2]

Arp has amassed a large amount of observational evidence indicating the association of high redshift quasars with low redshift galaxies, as well as the association of clusters of galaxies that have evolved from the ejected quasi-stellar objects. [3–6]

On p. 122 of his book,[7] Arp shows a map of the sky around an irregular spiral (SBc/Ir) galaxy (NGC 7107 with $z \sim 0.007$), which has two very high redshift quasars $z = 3.06$ and $z = 3.25$ apparently ejected from it. The Francis Filament is located about 30 arcminutes North of NGC 7107, which is within the normal distance range that high redshift objects are observed to be located from an ejecting galaxy.

Ejected material and X-ray emitting gases are commonly found in nebulae associated with high redshift sources. The shapes of these materials often indicate they were ejected from a parent galaxy. It is interesting to note that such blobs of matter that are commonly associated with the host galaxy have been observed in this area.[8]

Arp goes on to say: 'An amazing coicidence—there is a cluster of galaxies and quasars around $z = 2.39$ in another area of the sky.'

So looking at Arp's paper[9] we see a very similar story with four bright blue radio galaxies and eight quasars and active galactic nuclei (AGN) with redshifts between $1.84 \le z \le 2.397$. One disrupted blue galaxies has five AGNs of $2.389 \le z \le 2.397$ within 2 arcmins. One of the AGNs is within a few arcseconds. And mixed within this region are 18 Lyα emitters (galaxies) of similar redshift. So it basically is a similar story. It is a large collection of galaxies at an apparent redshift distance of 2.3. Or is it?

If we apply Arp's interpretation to the redshift data the redshift is telling us something about the ejection phenomena and not a distance measure at all. Instead, the collection of galaxies is much closer—though because they are dim—they may be relatively distant even out to say 100 Mpc, the region of the extent of the Local (Virgo) Supercluster. But even that only gives a cosmological redshift of z ~ 0.007, of the parent NGC 7017. If the filament is not so distant, then it is also not so large—everything changes.

Significant issue for the big bang

The American Physical Society email bulletin service also reported this issue:

> 'Large scale structures in the early universe are also larger than expected. Like the presence of *surprisingly early mature galaxies at a redshift of about 2* … another result at the AAS meeting suggests that the *standard cosmological model*—or at least that part of it *devoted to galaxy formation—is in need of revision*' [emphasis added]… .

This was apparently a top story from the NASA web site.[10] Unfortunately the included link doesn't work (or didn't on 27 January 2004). From the above excerpt, it seems they now are admitting, at least, the model doesn't correctly describe the formation of galaxies. Stephen Hawking in his 2002 book *The Theory of Everything*[11] admitted the same thing there, that is, they don't yet know how galaxies and stars formed. The big bang cosmology, does not appear to have much going for it, a better title may have been 'open speculation on the origin and fate of a materialistic universe'.

I suggest a creationist universe as described in the Bible is a much better beginning point to understanding the universe, starting about 6,000 years ago.

References

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