THE STRUCTURE OF THE VISIBLE UNIVERSE

By Arnold G. Gulko

In issue # 62 of Infinite Energy magazine (2005) in an article entitled "Two Competing Cosmological Theories" (pages 31-39) this writer established that the Big Bang theory did not fit the facts whereas his 25 year old Universe Cycle theory did. At the start of that article the respective theories were summarized, and at the end of the article it was pointed out that the characteristics of the gamma-ray bursts now being received correlated remarkably well with the overall structure of the universe. To briefly summarize the Universe Cycle theory, the cosmos initially contained an infinite space filled with widely spaced apart supermassive black holes, and our visible universe came into being when these holes exploded in gamma-ray bursts of enormous power. As stated in the 2005 article the cosmos started with a uniform distribution of matter which:

> ". . . existed in black holes of galactic mass left over from previous universes. These holes exploded, one at a time, starting in our region of space, and the zone in which these explosions occurred expanded outwardly to form all the objects we now see."

Taking a broad view, the formation of galaxies, one at a time, is consistent with the existence of a universe constituted by widely spaced galaxies containing millions or billions of suns with few particles in the vast space between the galaxies. In contrast, a single big bang is inconsistent with everything we know about explosions. A single big bang is also inconsistent with the expanding universe we see in which the objects in intermediately remote space are accelerating away from us instead of being slowed by the gravity of the universe. While the prior article contains many reasons why the Universe Cycle theory is more consistent with the facts than the Big Bang theory, this paper is particularly concerned with the extent to which the overall structure of the universe logically correlates with the explosion of supermassive black holes evidenced by the peculiar characteristics of the gamma-ray bursts we are now receiving.

Starting at page 37, the prior article presented a section entitled "THE STRUCTURE OF THE VISIBLE UNIVERSE", and it was stated:

> "In the Universe Cycle theory our visible universe is the result of the evolution of objects formed by gamma-ray bursts taking place over the eons in an expanding zone. If this be so, then the resulting structure of the visible universe should be closely connected with the character of the gamma-ray bursts we are now receiving. Let us test this projection starting with the character of the bursts as they are being received, which presents a tri-modal distribution when the number of bursts are graphed against their duration. . . . "
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> "The highest peak on the graph is provided by bursts of very short duration, less than about 2 seconds, which form a first highest peak in the graph. After the first peak we have a second highest peak of bursts of intermediate duration, namely: more than 3 and up to 25 seconds. The smallest number of bursts are those longer than 25 seconds which presents a third peak of little height at a duration of about 80 to 95 seconds."
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> "The shortest bursts are faint, suggesting they are very distant. On average the longest burst have about the same energy content as the bursts of intermediate duration. This suggest the bursts of intermediate duration are closer than the longer ones."

In line with the above background various aspects of what we observe in space were presented to demonstrate that the large scale structure of the visible universe correlated with the tri-modal character of the bursts as noted above. These correlations were based on the following simple logic:

> "The more massive the black hole, the longer the greater mass of that hole will take to explode, and the more particles will be formed by the explosion. The more particles, the more massive the object which is formed."

The many correlations with the overall structure of the visible universe which were presented in the prior article are summarized below.

1. There is a direct correlation between the very large number of very short bursts and the very large number of globular clusters which are the galaxies of minimum mass.

2. There is a direct correlation between the very faint character of the very short bursts and the presence of large number of very small young galaxies in the most remote space we have been able to find visible objects.

3. Since these very small young galaxies can be expected to mature into globular clusters, there is a direct correlation between the greater age of some of the globular clusters surrounding our own and other nearby full-sized galaxies and the concentration of these objects in extremely remote space which suggests they were formed before our Milky Way galaxy was formed.

4. There is a direct correlation between the separate formation of the globular clusters independent of the formation of the larger galaxies with which they are now associated and the independent orbits of these clusters around those galaxies. As summarized in the article:

   > "When one attempts to connect the character of the bursts with the astronomical facts, one must explain how the bursts require the globular clusters to be older than their associated galaxies, how the bursts require the clusters to be far more numerous than their associated galaxies, and how these bursts require the clusters to be in independent orbit around the galaxies. All of these connections have been achieved."

5. There is a direct correlation between the smaller number of bursts of intermediate duration in comparison with the greater number of bursts of short duration and the smaller number of galaxies of intermediate size and mass compared with the number of galaxies of cluster mass (the dwarf galaxies are less numerous than the globular clusters).

6. Since the energy received in the bursts of intermediate duration is about the same as the energy received in the bursts of greatest duration, there is a direct correlation between the products of the bursts of intermediate duration and their presence in intermediately remote space closer to us than the more massive products formed from the bursts of greatest duration.

7. There is a direct correlation between the number of bursts of intermediate duration (which is much larger than the bursts of greatest duration) and the fact that the dwarf galaxies are considerably more numerous than the full sized galaxies. As summarized in the article:

   > "So we have three groups of bursts. The highest peak of very short, faint bursts logically formed the globular clusters which are the oldest, least massive, and most numerous galactic objects in space. These very short bursts are concentrated in extremely remote space as established by the dimness of these burst. The second highest peak of bursts of intermediate duration logically formed the dwarf galaxies. which are of intermediate mass and number. The great energy content of these bursts, despite their intermediate duration, suggest they take place at a distance closer to us than the longer bursts. The third smallest peak of bursts of greatest duration logically formed the normal galaxies, again conforming the number and mass of the normal galaxies with the duration and number of the bursts which formed them. This three-way correspondence between the character of the bursts and the mass and number of the galaxies of various type provides a formidable connection between the character of the bursts of various durations and the galaxy content of the visible universe."

   The article continued by suggesting that since "the bursts form the quasars after they had expanded to where they became visible, there must also be a relationship between the location of the bursts and the location of the gamma-emitting quasars."

8. There is a direct correlation between the very large number of tiny galaxies suggested by the large number of bursts of shortest duration and the existence in extremely remote space of large numbers of tiny young galaxies which should emit high energy radiation because they are young, round and densely packed with suns, and the fact that they disappear when viewed through an ultraviolet light filter.

9. There is a direct correlation between the intermediate cosmological distance suggested by the bursts of intermediate and greatest lengths and the fact that the visible quasars are concentrated at intermediately remote distances instead of in extremely remote space, as was once the prevailing wisdom.

   The visible quasars are concentrated into two groups, one about 3 billion light- years away containing more quasars than the other, and the other about 6 billion light- years away. If the quasars in each group intrinsically possessed about the same brightness, then the more remote group should be four times dimmer. In fact these two widely separated groups have, on average, about the same brightness.

10. There is a direct correlation between the larger concentration of visible quasars closer to us (at a distance of roughly 3 billion light-years) and the larger group of bursts of intermediate duration.

11. There is a direct correlation between the smaller concentration of visible quasars farther from us (at a distance of roughly 6 billion light-years) and the least numerous bursts of greatest duration.

12. There is a direct correlation between the greater emission to be expected from a quasar having the mass of a full-sized galaxy and the fact that the quasars in the more remote concentration have roughly the same average brightness as those half their distance away (3 instead of 6 billion light-years) even though the greater distance suggests only one-fourth the brightness.

    Astrophysics has attributed gamma-ray bursts to the supernova of an especially large sun (a hypernova) despite the finding that the shortest bursts have "relatively more high-energy gamma rays than long bursts do." So in reaching their conclusion they ignore the logic which suggests if the supernova of an especially large sun is to emit a large amount of gamma radiation while the smaller supernovas do not, that the larger the exploding sun, the longer the supernova and the larger the proportion of gamma radiation. It is not wise to ignore facts simply because their reasonable suggestion is opposite to one's preconceived notions.

13. There is a direct correlation between the shortest bursts which form fewer particles and the fact that there is a reduced interaction with the released gamma radiation which can be expected to reduce the energy level passing through the particles.

14. Moreover, when the shortest burst result in the fewest interaction with emitted gamma radiation, then there is a direct correlation between the shortest bursts which form the least massive galaxies, and the incredibly large solar density which has been found to exist in those least massive galaxies. As stated in the prior article:

    > "So the shortest bursts not only provide a gamma-explosion having the highest proportion of high energy photons, but the particulate mass produced by those shortest bursts will have the highest density because they expand the least."

With the foregoing review of the prior article's description of the relationship between the detailed characteristics of the gamma-ray bursts and the large scale structure of the visible universe, we can look to see whether still further significant correlations can be found.

The essence of the prior correlations is that the process of galaxy formation takes place in three groups extending outwardly from a central region, albeit the process is erratic so that the finding of a large cluster of full sized mature galaxies in extremely remote space is inconsistent with the Big Bang theory, but consistent with the Universe Cycle theory. Nonetheless, the process should concentrate on the formation of three different types of galaxies at different times. The graphical analysis of the bursts suggests the remote universe should emphasize the formation of the smallest galaxies, and the intermediately remote universe should emphasize the formation of the two groups of larger and more massive galaxies (the full-sized ones like our own) and the dwarf galaxies which are intermediate in size and mass. These dwarf and full-sized galaxies are to start with visible quasars in intermediately remote space which expand to form the mature galaxies around us.

In line with the above broad description of the galaxy formation process, we find two concentrations of visible quasars, the larger concentration being about 3 billion light-years away, and the smaller concentration being about 6 billion light- years away. Since the brightness of the quasars in both concentration as we see them have much the same brightness, logic requires the more remote concentration contain the more massive quasars which form the full-sized galaxies, while the closer remote concentration contain the less massive quasars which form the dwarf galaxies.

If the formation of three expanding groups of differently sized galaxies is correct, then it demands remote space, beyond about 6 billion light-years from us, contain few dwarf and full-sized galaxies, and this is the fact. Moreover, if the above is correct, then it demands that the proportion of dwarf galaxies be higher near us than it is more than 3 billion light-years from us because in that more distant region most of the full-sized galaxies have already been formed while many of the dwarf galaxies have not yet been formed. Correspondingly, in our region of space the ratioi of dwarf galaxies to full-sized galaxies should be greater than it is in the regionof space 4 to 6 billion light-years away.

These last two conclusions are predictions since this writer does not know the fact. However, it should be a simple matter to review the proportion of full-sized galaxies and dwarf galaxies in pictures which have already been taken and which focus upon the objects which exist at the distances under consideration.