

THE OSCILLATING UNIVERSE (Every 100 Billion Years God Stutters)

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The present rate of expansion of the universe implies that the creation (the most recent "Big Bang") took place sometime between 15 and 20 billion years ago, and this sort of age is confirmed by independent techniques for dating the oldest stars.

In our daily experience, the laws that govern our world are adequately described by Newton's mechanics. However, in discussing the origin of the universe, one must expand physics to include quantum mechanics and relativity.

First, if the speed of the bodies involved approaches the speed of light, then the motions are distorted from the Newtonian prediction because of the effects of special relativity. The velocity of light, c , acts as an absolute upper limit on the speed of all material systems. For this reason the mechanics of rapidly moving bodies possess some strange features. For example, the energy, E , and mass, M_0 , (measured at rest) of a body moving at speed, v , relative to some observer are related as follows:

$$E = M_0 c^2 / [(1 - v^2/c^2)]^{1/2}$$

As v approaches c , the energy of the body becomes large without limit, which implies that an infinite amount of energy must be supplied to the body to accelerate it to the speed of light. When $v=0$, the body is at rest, and $E=mc^2$.

Secondly, if the gravitational field becomes intense, then not only must one expand the idea of Newton's law of gravity, but also Newton's mechanics. According to the general theory of relativity, gravity is a manifestation of a spacetime distortion akin to the curvature of a surface, such as a sphere. Moving in this fourth-dimensional topological space, all bodies in the universe return to their point of origin.

Thus, the universe might be pictured similar to, say, the Klein bottle, as show in Figure 1:

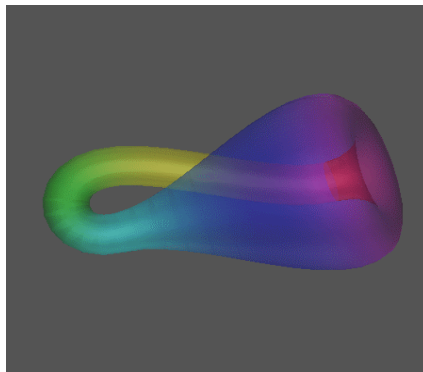


Figure 1

The place where the Klein bottle intersects itself is arbitrary, and there are no points on the curve of intersection that are on two different parts of the surface at once, i.e., on both the narrow neck and the main body. The part of the main body where the hole is, is supposed to continue across it uninterrupted: The hole is there for the convenience of the model. When followed with the eye, the surface on the outside is seen to connect to the inside of the neck, and thus all parts of the surface. Starting at the top rim we can go, bugwise, down the outside, or down into the neck, and so to the inside. So, the bottle has no "inside" and "outside." Like the Moebius strip, it has only one side. But, unlike the Moebius strip, it has no edges.

Thus, we can begin to "visualize" Universal Space. Pick any arbitrary point, A, for the point of creation (the Big Bang). The expansion of the universe is gradually slowing. The gravity of all the galaxies and other cosmic material acts as a restraint. But remember, the bodies are not travelling in a straight line (Euclidean Space), but rather in a curved line --four dimensional topological space, where the fourth dimension is time. [It's kinda hard to accept that the shortest distance between two points is not a straight line, isn't it?! But then, it's not what we don't know that hurts us as much as what we do know that ain't so!]

Thus, we see that the universe falls back in on itself at an accelerating rate, where eventually $v=c$, which implies that an INFINITE ENERGY SOURCE (=God) must be supplied to all bodies in the universe.

After a finite length of time, say, 100 billion years, the galaxies are smashed together and any given volume of space shrinks catastrophically in a "big crunch" -- the big bang in reverse. The outcome of this awesome implosion would be another big bang, as depicted in Figure 2:

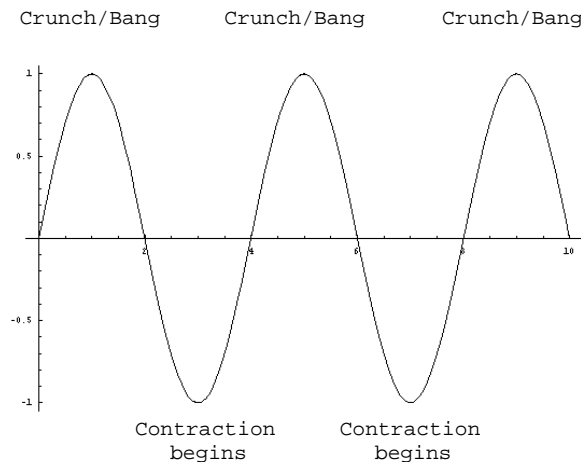


Figure 2

So each Big Bang represents a new "Beginning", and every 100 billion years, God stutters, "Let there be light."