

**Subject:** Science

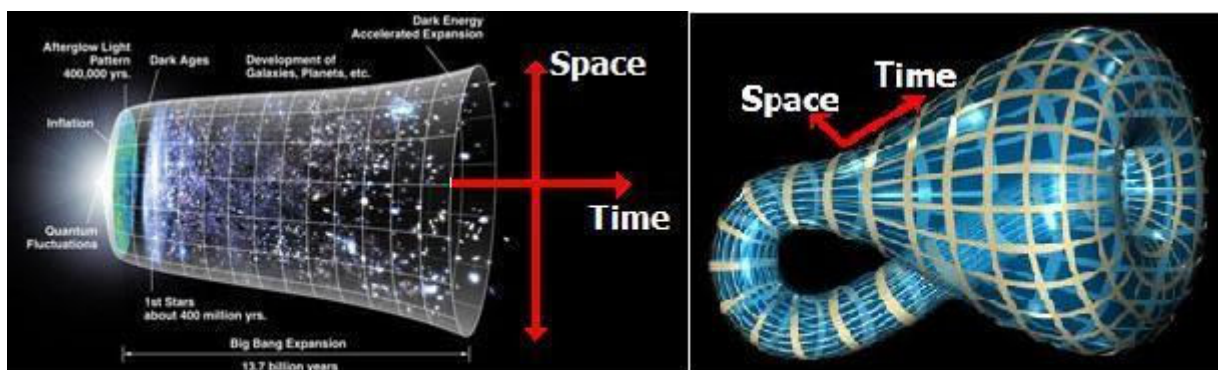
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## A Different Universe

Doç. Dr. Haluk Berkmen

There are important questions that need to be answered in the Present Model of the Universe. Two of these questions were stated in the previous article **02-Problems of the Big Bang**. The present model starts with an initial Quantum Fluctuation, but is unable to explain why that fluctuation had such tremendous energy to expend in an extremely short time to such an extremely large space. The present valid model claims that after this "Inflationary" phase, which lasted much much less than a second, the universe stopped expanding and reached it's almost present dimension.

A further problem of the BB model is the question of "inside-outside". The present model claims that space and time started with the big bang, but refuses to admit that there should be a medium in which the first Quantum fluctuation happened. That medium should exist prior to the Big Bang.



**Present Big Bang Model**

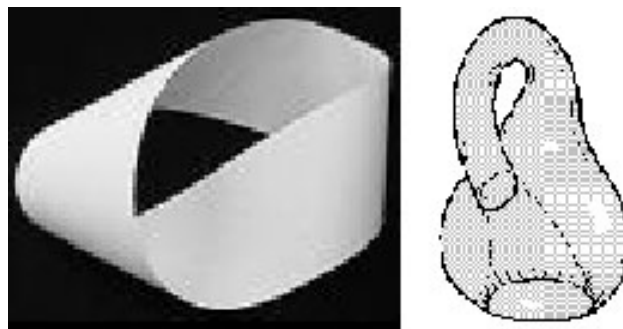
**Berkmen Model**

Above left we see the space-time evolution of the present accepted universe. Time is linear and any cross-section of the tube represents the size of the universe. According to the theory of General Relativity (GR) the space-time manifold should be inherently curved. A linear time axis is not in accordance with the theory of GR. If we accept the initial Quantum Fluctuation as an initial point

singularity, all physical laws break down and GR becomes useless at the very beginning of the universe.

These problems do not appear in a different model, which I propose and name the Berkmen Model (BM). In this model the universe does not start from an initial Quantum fluctuation. Furthermore the problem of "inside-outside" is also resolved. Consider a 4-dimensional manifold as shown on the right hand side of the above picture. Both space and time are curved and the equations of GR are valid at all points. Any cross-section of that manifold represents the size of the universe. The form of that 4-dimensional manifold is like a **Klein Bottle**.

In 1882, Felix Klein (1840-1925) imagined a bottle which came to be known after his name. The Klein bottle contains itself. Its inside is its outside. It is the generalization of the Möbius loop. Below we see the Möbius loop on the left and the Klein bottle on the right.



It is not possible to tell for sure which side is their inside and which side is their outside. A symbol on their surface can be slid around and it will appear at the same point on the reverse side. The Möbius loop is a 2-dimensional strip that can exist in 3-dimensions. Similarly the Klein bottle can only exist in 4-dimensions, because in 3-dimensions it has to pass through itself. This does not happen in 4-dimensions. Therefore the Klein bottle is a one-sided object. This is why we will always think that we exist "inside" the universe.

If our universe is a 4-dimensional manifold, then the problem of "inside-outside" and the question of "background" is resolved. The Klein bottle is a self-contained 4-dimensional object that does not need a background. The apparent expansion of the universe is also resolved because the Klein bottle is not a cylindrical object, but expands and contracts without going through a singularity. The **space-time coordinates** (shown in red) are curved and the universe expands as time goes by. Thus there is no need to postulate a "dark matter" or "dark energy". The present expansion will reverse and the universe will seem to contract in the distant future.

The fact that the Klein bottle passes through itself, tells us that it is a **Fractal Manifold**. Because Fractals are created by iterating a given equation over and over again, a form of feedback based on recursion. The fractal aspect of the universe is scale invariant and applies at all levels and all sizes of our universe,

including the universe itself. This basic aspect of our universe has been discussed and demonstrated in this site as a Power Point (voice) presentation.