

Subject: Science

Article: 9

The Lattice Field

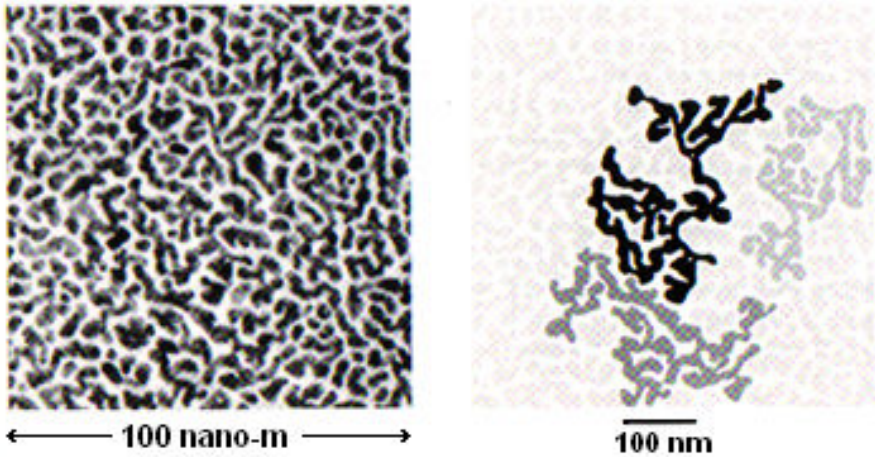
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The macroscopic structure of the proposed model of the universe accepts that there has been a contraction phase during which many heavy particles were created. These particles were unstable and had to decay to lighter ones. This decay process ended when the two nucleons (the neutron and the proton) and two leptons (the electron and the neutrino) were formed. But due to the spontaneous symmetry breaking particles were formed together with their antiparticles (Tachyons). Thus two universes came into existence, our universe and the Tachyon universe, which became separated by their speed. Their boundary is the constant speed of light and all electromagnetic radiation –the visible light being only a small portion of this spectrum- is constrained to move on that boundary.

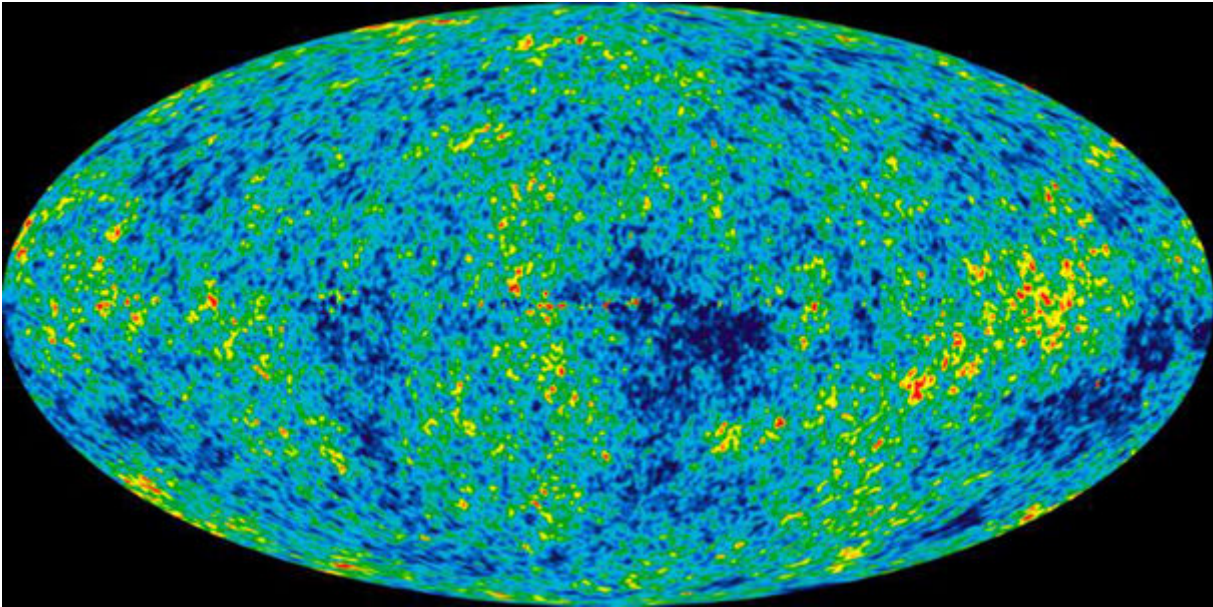
The T-waves proposed here form a 4-dimensional space-time manifold encompassing both universes. This manifold is like an infinite and recursive 4-dimensional fractal lattice field. The portion of this field that formed material particles interacts with its Tachyon counterpart and each one makes the other one vibrate chaotically. The vibrations have a very high frequency and are out of phase. These vibrations are what we call “quantum fluctuations” and are shown in **05-The Coupled Universes**. In Quantum Field Theory the field undergoes Quantum Fluctuations, but no one knows why those fluctuations occur. In this model the Quantum Fluctuations have a reason and occur naturally.

Chaos is the consequence of the fast expansion of the universe, which is still going on. The formation of unstable heavy particles during the early phase is the main reason for some regions becoming denser than other regions. Another reason is the shape of the potential energy that creates these heavy particles. The small irregularities in the energy distribution became the main reason for the

fractal structure of our universe. Fractals are self similar irregular formations that can be found at arbitrarily small scales. A physical example that can be seen in our scale is the formation of gold clusters. Gold clusters can be obtained in colloidal form. Their size is generally less than one micrometer. Below we see a group of gold clusters. Although no cluster is exactly the copy of another one; they are all self similar. The self similarity applies at all scales as can be seen on the picture at the right. The Cosmic Microwave Background Radiation mentioned in article 2 has also a similar fractal structure as shown below. It is a fact that the chaotic self similarity applies at all scales.



Gold clusters

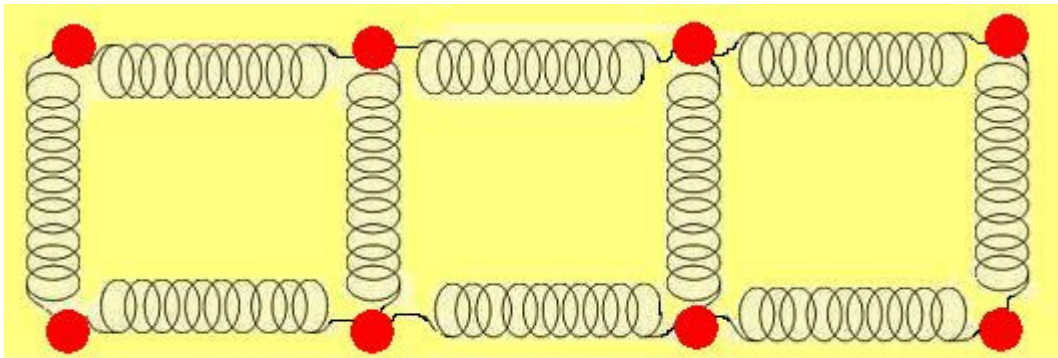


Cosmic Microwave Background Radiation

The background lattice field is made out of chaotically vibrating infinitesimal small points. Their amplitude is in the range of the Planck length L , which is:

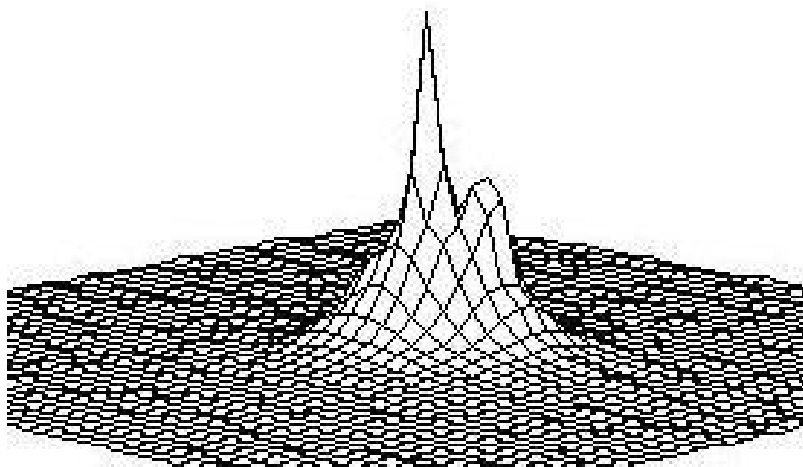
$$L = (\hbar G/c^3)^{1/2} = 1.62 \times 10^{-33} \text{ cm.}$$

We can visualize these infinitesimally small points as being connected by springs that have a very weak spring constant, as shown below. Each spring is a T-wave and the field can be called the 4-dimensional **T-Field**.



Weakly coupled lattice field points

This lattice is a scalar field, meaning that a certain number can be assigned to every point in the field. Examples of scalar fields are the temperature distribution throughout space and the pressure distribution in fluids. Scalar fields provide the mechanism for the rapid inflation of the universe. According to the General theory of Gravitation, the energy of the scalar field must have caused the universe to expand rather rapidly. The expansion slowed down when the scalar field reached its minimum, that is when the four elementary particles (n , p , e , ν) became abundant in the universe. These particles are local density formations within the **T-field**, similar to the oasis found in deserts. Below we see a visual representation of the formation of particles in this 4-dimensional T-field.



The T-Field