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Primordial Black Holes And How Strings Get Created Into Matter In The Early Universe

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Abstract.

The C-Neutralino is the major particle that drives the beginning of our universe. It decays into other particles including protons and electrons. Primordial Black Holes are also important in the development of our universe. They connect astrophysical constraints on sources of cosmic rays. Primordial Black Holes play a role in element abundance and the spectrum of the CMB. They are particle and matter creators. Primordial Black Holes can be a source of any species of particles in our space-time. In the end, they can shed new light on problems in Cosmology. Primordial Black Holes are the solution to inhomogeneous primordial structures in the early universe. C-Neutralinos are the particle that contributes to creation and also contribute to dark matter in our universe. It is the major source of dark matter in our universe. In the early universe, the cosmological principle did not exist. The inhomogeneous universe we see today evolved after about 1 billion years after the creation of our universe.

Keywords C-Neutralino, String Creation, and Primordial Black Holes.

Modern Cosmology is going through significant changes in our beliefs about the early Universe. Discoveries by the James Webb telescope have changed our views of the beginnings of time. Researchers found a Black Hole dating from the early Universe in January of this year. This paper will explore the development of the early Universe. It will discuss the supermassive particle that was important in creating the Universe. It will discuss the Primordial Black Hole and its importance in galaxy development. Finally, the paper will discuss string and matter development in the early Universe. The C-Neutralino is the primary particle that drives the beginning of our Universe. It decays into other particles, including protons and electrons. Primordial Black Holes are also crucial in the development of our Universe. They connect astrophysical constraints on sources of cosmic rays. Primordial Black Holes play a role in element abundance and the spectrum of the CMB. They are particle and matter creators. Primordial Black Holes can be the creator of any species of particles in our space-time. In the end, they can shed new light on problems in Cosmology. Primordial Black Holes are the solution to inhomogeneous primordial structures in the early Universe. C-neutralinos are the particles that contribute to creation and dark matter in our Universe. It is the primary source of dark matter in our Universe. In the early Universe, the cosmological principle did not exist. The inhomogeneous Universe we see today evolved about 1 billion years after the creation of our Universe [1].

To search for the conditions needed to create matter, we must start before the beginning of time. Of course, there was zero matter present at this time. Without the presence of matter, space is neutral. That means that its constituents equal zero. That also means that space is passive, and its resistances equal zero. Space has the potential to inflate, but only if its contents can exert the necessary internal pressure to overcome any resistance by the space container to expand. The primordial contents of space being neutral must exist as a neutral point, which equals zero. So then, from a mathematical viewpoint, we

$$0 = (+1) + (-1) = \text{point} \tag{1}$$

Neutral Constituents of space must exist as equal complements of (+) and (-) qualities. These complements are neutral entities and are the primary singularity of creation and the hidden fabric of our Universe. These complements must be pervasive and exist as an ocean of individual points of unities throughout space, each with the potential to inflate. This neutral point is defined as C-Neutralino. This C-Neutralino has mass and no charge. The C-Neutralino is an elementary particle in supersymmetry. This particle is electrically neutral and unstable in an R-parity. The C-Neutralino only interacts with weak vector bosons. So, this particle is difficult to produce at Hadron colliders. The C-Neutralino has a mass of around 3 TeV/ c^2. This particle decays through neutral Z bosons to lighter neutralino. However, the C-neutralino continues to decay into many other particles. During the collisions and inactions of these particles. A proton and an electron are created. It does have a magnetic dipole moment. The exact property of the C-Neutralino is more like the higgino. It is also phenomenologically similar to a neutrino. Two or more things equal to the same thing are equal. These single C-Neutralino occupy no space and exert no pressure upon their potential container. It does not contain, nor does it create heat by itself. At this point, before the creation of matter, before the inflation of space, everything equals zero. It has a form that needs to be a hollow sphere with no content, beginning, or end, and it equals zero. Before the beginning, there was no time, timeline, or spacetime. Creation's clock, as a measure of the internal between a beginning, its becoming, maturation, decline, and finally, its end, must be counted by the number of revolutions between its start and end. Every entity, once begun, marks its allotted time until its end. For the C-Neutralino to undergo expansion, it must go through division. It must go through the separation of its complements [2]. Like meiosis and mitosis in biological cellular division. The first element, hydrogen, is created by separating a C-Neutralino into complementary particles. The C-Neutralino has a positive up spin and a negative down spin. When they separate, spacetime begins. This spacetime expands in both directions so that it is always the present time in which we experience. Once hydrogen becomes H2, the remainder of the elements of the periodic table have the potential to be created by fusion, fission, and nucleosynthesis of itself. The heavy elements are created in supernova explosions and when two or more neutron stars have inaction with each other. Spacetime and the creation of matter have had their beginnings this time. Zero has become inflated or localized. That means that the Universe has resistance properties upon which to stand. The Universe now contains mass and space. The C-Neutralino now has momentum, so it has the energy to keep its complements separate and in harmony. The Primordial Black hole is where the answer lies. Scientists have plenty of data to answer these questions. They need to understand the form and function of a Primordial Black hole. The problem with cosmology today lies in the misinterpretation of the available data. A Primordial Black hole can create matter, unlike a black hole that forms after a large star collapses and takes in matter. A Primordial Black hole event horizon keeps everything from falling back into the Black hole. A primordial Black hole ejects material into each Universe. Material inside the primordial Black hole crosses the event horizon and enters each new Universe. The supermassive Primordial Black hole can let matter and light escape. The supermassive Primordial Black hole has mass, charge, and angular momentum properties. Our Universe was created from a supermassive Primordial Black hole. Light-speed collisions between neighboring concentrations of c-neutralinos result in cosmic pressure and forces that lead to sparks flying as a chisel against a grinding wheel. Visually, it is a pinwheel firework of cosmic proportions, moving along a trajectory at the speed of light while rotating on an axis at an equally breaking neck speed of cosmic proportions. The Supermassive Primordial Black hole is hollowed, as is a zero. It is because two other voids of c-neutralinos move while others are stationary. These c-neutralinos have differences in entropy, and they collide with each other at speeds greater than light. Cosmically high temperatures combine extreme pressures and maximum forces, which act like a closed jar of different densities. This type of construct produces cosmic vessels able to contain and withstand the temperature and pressures needed to break the strong bond between the c-neutralinos paired (+1) + (-1) components. While in this rotating cosmic cauldron, each ionized pair of components undergoes spaghettification into a spectrum of open strings. This cleaving of individual c-neutralino produces hydrogen atoms after cooling and string closure. While most of the matter is pushed away as hydrogen is formed. This hydrogen jumpstarted the stars of the many galaxies in the night sky. However, some hydrogen remains for varying lengths of revolutionary time within the chaotic zone of this pressure cooker. Here, maximum heat and extreme pressure augmented by nuclear chain reactions are sufficient to fuse the hydrogen into heavier atoms. This process sequentially issues forth a varying combination of electrons, protons, and neutrons (including some c-neutralinos) to create measured proportions of the rest of the matter in our Universe. This essential matter is necessary for creating the Universe, which is sequentially flung away from the Primordial Black hole. The ashes of a cosmic fire are reborn as a galactic universe. Once outside of this cosmic cauldron of copulation, this intimate activity takes place. The producers of creation begin to cool down while germinating through specific affinities and concreting all the elemental forms within our Universe and all the electromagnetic frequencies as a spectrum of photons. All evolutions and transformations undergone by hydrogen are influenced by the number of revolutions of space/time spent within the super fiery corona of spaghettified c-neutralinos and crushed hydrogen. With the repeated kneading of the lighter elemental forms within the corona of c-neutralinos, which then pair with free protons within the nuclei of forming atoms during cooling and recombination. This matter is then shot away from the region of the Primordial Black hole. Heavier atoms like lead and gold are born near the tip of the spear, where the greatest fusion pressures are achieved within the forward eyewall of the storm. A high amount of force persists within both lateral eyewalls. A lesser amount of force follows in the posterior eyewall. Oscillating vibratory shivering is compressed toward the center of the spinning orb and is forced to exit the system along the trajectory path of the Primordial Black hole coupling. Quasars and similar observed cosmic phenomena can be explained this way. A primordial abyss must be the starting point in our developments that give rise to the creation of matter, making up the Universe we see today. Space per se is space, or infinite space, that would eventually prove inadequate in explaining the partnership between space, time, and matter since the term space demands a complement to define its limit just as contents demanded by a container. Whereas the primordial abyss can stand alone. So then, one can say that before the creation of matter, the primordial abyss required no correspondence to give the ultimate rise to the formation of space since an abyss serves as a prerequisite to a space that limits must define as in the space that separates two entities. So then, this abyss must be neutral. The abyss is nonactive and has mass but no charge, walls, or momentum. It offers no resistance, contains no space, and is infinite and non-detectable. Also, it contains no heat and no light. Through cyclic progressive transformations, this abysmal void, with an innate desire to be filled, can only have a specific affinity for one quality: a c-neutralino having mass and no net charge. This c-neutralino has no heat or light, offers no resistance, and is infinite and non-detectable. However, the c-neutralino has a capacity for movement and momentum. Its form and character as a particle with the potential to give rise to matter can only begin as a point. What follows in form from this point through transformative expansion is a hollowed zero having no content, no beginning, and no end. So, with an infinite capacity of c-neutralinos to become more of themselves without being created by another, the void becomes fulfilled with self-created c-neutralinos. Spinning, vibratory movement becomes mandatory because of their differences in potential entropy and the need for each c-neutralino to occupy its place. Patterns of spinning, vibrating c-neutralinos flow within the abyss as the temperature rises. With increasing rage, collisions occur between the c-neutralinos in reaction to the crowding of one upon another's space [2][3][4]. Temperatures continue to rise in this environment away from absolute zero. Nevertheless, this rise in temperatures does not occur uniformly. With differences in potential at and above zero degrees Kelvin, spinning spheres of vibrating c-neutralinos collide into otherwise stationary masses of other c-neutralinos of opposing degrees at light speed. These c-neutralinos also spin at the speed of light, creating huge force when collating. This scenario produces cosmic changes in temperature over time. This situation led to temperatures of over a billion degrees. Under such conditions, zeros are separated into their complementary pairs. The c-neutralinos have been transformed into hydrogen. So, then atoms have been created in the Universe. As spacetime continues, large clouds of hydrogen as plasma are flung away from the corona through many different forces. In contrast, other hydrogen and c-neutralino atoms remain within the Primordial Black hole corona. The scorching temperatures and pressures are restrained and contained within a double interface of c-neutralino, properly encapsulating the Primordial Black hole and restraining the outer event horizon. At the same time, atoms are fused within this constraint into all the elements within the Universe. A spectrum of vibrational waves results from this torrid activity and are forced toward the central core of the system and forcefully issued forth in both directions along the system's trajectory. Then, there are massive collisions between clouds of c-neutralinos. They are moving at a speed close to the speed of light, and the c-neutralinos get compressed into a disc shape. Each of these c-neutralinos expands and splits into open and closed strings. Then, all the matter leaves the Primordial Black hole and begins to become stars. All of this expelled matter continues to form our galaxy as it is today. Everything we see in the night sky starts from the interaction of c-neutralinos. Which in turn helps to develop matter in the form of hydrogen. Finally, the c-neutralinos catalyze expanding and spiting open and closed strings. These point particles, called c-neutralinos, can create strings of any dimension. A string is a one-dimensional extended entity. If the strings are open, they form a segment with two endpoints. Closed strings form a loop like a circle. Strings are tiny: they are about 10^35 meters. They are so small that today's particle accelerator cannot find them. Strings vibrate like a harmonic oscillator; these different states are different types of particles. A closed string is topologically equal to a circle. An open string is topologically equal to a line segment. D-branes are important for open strings. As open strings travel through spacetime, they have endpoints that lie on D-branes. So then, open strings require boundary conditions. Primordial Black Holes formed all the galaxies in our Universe. Primordial Black Holes have existed since the beginning of the Universe we see today. Primordial Black Holes can have initial masses greater than a thousand solar masses. They are non-baryonic, which makes them dark matter candidates. They formed very early in our Universe during the inflationary era. Primordial Black Holes are formed by the collapse of over-dense regions in the inflationary era [5][6][7][8]. The fluctuations in the early Universe were an important ingredient for the foundation of these Primordial Black Holes. In the early Universe, domain walls are formed during phase transitions with large energy densities. Primordial Black Holes explain the absence of magnetic monopoles in our Universe. Magnetic monopoles existed in the early Universe. They interacted with the Primordial Black Holes and were absorbed, so we do not see them today. Primordial Black Holes should have evaporated by now, but there is a fourth spatial dimension. It affects how gravity slows down this evaporation. When considering a four-dimensional spacetime, the energy stored in this dimension creates a stationary wave that brings a significant rest mass to an object. This effect can create an infinite number of these Primordial Black Holes. So then, Primordial Black Holes resulted from the collapse of energy and ionized matter in the very early Universe. Primordial black holes were important in developing strings and matter in the early Universe. These new stable massive particles started in the early Universe in their simplest form as a gas. The C-Neutralinos begin the process in the early Universe. However, other massive particles become important as well. These particles have a large mass and are in equilibrium at very high temperatures. Their cross-sections are large enough to bring about the condition of equilibrium. These massive, stable particles exist today in our Universe as dark matter. These particles dominate the total density and form the dark matter in our Universe. A pattern of particle symmetry breaking can determine these massive particles. This pattern then leads to phase transitions in the very early Universe. Primordial Black Holes can form from this first-order phase transition. These phase transitions then go through a bubble nucleation. The second phase transitions lead to the development of topological defects. These kinds of defects include walls, springs, and magnetic monopoles. Primordial black holes can form in a non-homogenous expanding universe. During the radiation era of our Universe, the cosmological principle is not true. If Primordial Black holes created the galaxies we see today, we should see huge megastructures in the early Universe. The cosmological principle occurs during the matter-dominant part of our Universe. C-neutralinos create cosmic strings in the early Universe. Huge filaments created by these cosmic strings led to the development of the megastructure that we see in the early Universe. The Universe then became homogenous after the radiation era. If a universe with an equation of state,

$$p= ce, \tag{2}$$

has a numerical factor c in the range,

$$0 \leq c \leq 1 \tag{3}$$

So then, the probability of forming a Primordial black hole is,

$$W_{pbh}\, \alpha\, e(-\frac{c^2}{2<\sigma^2>}). \tag{4}$$

Superheavy particles with a short lifetime result in the formation of a primordial black hole. After reheating,

$$T< T_0 = rm \tag{5}$$

Particles with a heavy mass, m, must dominate in the early Universe before some decay. So then,

$$t_0 = m_{pl}/T^2 \ . \tag{6}$$

If p = 0 then,

$$\delta(t) = \frac{\delta_p}{\rho}\alpha\ + t^{2/3} \tag{7}$$

Gravitational instability gives way to the formation of gravitationally bound systems, then

$$t\sim t_f \sim t_i\ \delta(t_i)^{-3/2}. \tag{8}$$

Primordial Black Holes form after the system decouples from expansion. If the density fluctuation grows to 1 and the system decouples from expansion, you can collapse into a Primordial Black Hole. In the period $t \sim t_f$, we have

$$rain \sim sr, \tag{9}$$

then,

$$s = \max \{\ |c_1 - c_2|, |c_1 - c_3|, |c_3 - c_2|\}, \tag{10}$$

where c_1, c_2, c_3 can be defined as a deformation of configuration along its principal orthogonal axes. To form a Primordial Black Hole, then

$$r_{min} \sim r_g \sim t_i \sim \sigma\ (t_i)r, \tag{11}$$

if,

$$s\leq \sigma\ (t_i), \tag{12}$$

If it is concentration, then it implies non-homogeneity of configuration. A product of probability can mathematically determine direct Primordial Black Holes. All this means that the phase space for each configuration can determine initial sphericity Ws and the non-homogeneity Wn. When we calculate W_s, one needs to use equation 12, which implies equation 4 for independent components of tenser deformation. Of course, we then need to use diagonalization. So then,

$$W_s \sim \sigma(t_i)^5 \qquad (13)$$

, η

together with the probability of sufficient non-homogeneity,

$$W_n \sim \sigma(t_i)^{3/2} \qquad (14)$$

Both of these condition leads to the probability of Primordial Black Hole formation,

$$W_{pmb} = W_s \cdot W_n \sim \sigma(t_i)^{13/2}. \qquad (15)$$

The interval for the formation of Primordial Black Holes can be written as,

$$M_0 < M < M_{pmb\ max}. \qquad (16)$$

During this period, particles began the state to dominate the early Universe. We then have,

$$M_0 = 4/3\ \rho t_0^3. \qquad (17)$$

The following equation can find the maximal mass,

$$\tau = t(M_{pmb})\delta(M_{pbm})^{-3/2}. \qquad (18)$$

This condition leads one to the scale-invariant $\delta(M) = \delta_0$, so then we can rewrite the maximal mass equation as,

$$M_{pmb} = M_{pl}^2 \tau \delta_0^{3/2} \qquad (19)$$

One can use equation 15 to find the probability for Primordial Black Holes to form in the inflation era. A massive scalar field can be used at this stage. Every galaxy that forms in the Universe starts with a Primordial Black Hole. With this condition in mind, the maximal mass is found by realizing that the fluctuation grows and collapses before the scalar field can decay and reheat the early Universe. The probability can then be written as,

$$\beta\ (M) \sim W_{pmb}(M), \qquad (20)$$

which determines the fractional total density of Primordial Black Holes with mas M. For $\delta M \sim 1$, the bulk of the Particles can collapse directly into Primordial Black Holes[10][11][12]. The number of Primordial Black Holes also depends on the particles in the early Universe. Primordial Black Holes can form with small time scales in the early Universe. This occurs because of superheavy particles that are interacting with light relativistic particles. Also, remember that cosmic strings play a part in developing Primordial Black Holes and galactic structures in the early Universe. These structures can become huge in the inflation era. Scale noninvariant spectrum of fluctuations can increase the amplitude of small-scale fluctuations, which increases the changes in the formation of Primordial Black Holes. The existence of other scalar fields with inflation during the inflation era gives rise to spectra with individual scales. These can find the parameters of fields and their interactions. In the inflation era, the Higgs field can give rise to phase transitions. This interaction gives the positive mass term $\upsilon^2/2\eta^2\zeta^2$. During the inflation era, if inflation decreases below the critical value, then the higgs potential can be written as,

$$V(\zeta,\eta) = -\ M_\zeta^2/2\ \zeta^2 + \alpha_\zeta/4\ \zeta^4 + \upsilon^2/2\eta^2\zeta^2, \qquad (21)$$

during this value, if the sign changes, then a phase transition occurs. This kind of phase transition leads to a characteristic spike. These spike perturbations reenter the horizon and lead to the collapse that allows a Primordial Black Hole to form. If the phase transition happens before the end of inflation, it forms a Primordial Black hole with the mass

$$M \sim M_{pl}^2 / H_0\ e^{4N} \qquad (22)$$

where H_0 is the Hubble constant in the inflation era of the Universe; during the inflation era, a Primordial Black Hole led to the enormous structure that the James Webb Telescope is seeing in the new images of the early Universe. The formation of unstable topological defect structures in our early Universe can be understood by the pseudo-Nambi-Goldstone field. This results in the degeneracy of vacua. The explicit symmetry breaking happens continuously by vacuum degeneracy[13][14]. This leads to two phase transitions. At very high temperatures, symmetry breaking leads to a second-order phase transition. In the first phase transition, the dependency of vacua starts the beginning of topological defects that lead to spring formation. This is also the origin of the cosmic strings. In the second phase, transitions in the area between degenerated vacua start to develop surfaces. This develops into domain walls that are surrounded by strings. These structures are not stable. This situation leads to energy density related to the initial phase value. The phase changes by a value of 2π around each string. This strong non-homogeneity of phase is generally essential only at this scale. This condition is vital to the new distance between the strings. This distance is minimal when the field oscillations begin. This creates large string loops. Therefore, energy density persists on a large scale. These large-scale correlations are an indirect situation, which is inflation. Phase transitions happen after the reheating of our Universe, and inflation happens in disconnected areas. During this period, ultra-huge structures of galaxies started to form. At this time, new forms of primordial large-scale correlations occur. The value of phase that occurs after the first phase transition is inflated. It is inflated across an area corresponding to the inflationary era in our Universe. These fluctuations of the phase changes happen in tiny areas. These fluctuations occur in the part of the Universe with the modern cosmological horizon. The second phase changes happen after the reheating of our Universe. This transition creates massive walls. These huge walls form at the border between the two vacua. These regions are confined, and so the domain walls become closed. If their sizes equal the horizon, these closed walls collapse into Primordial Black Holes. A Primordial Black Hole of a huge mass can form through this process. All the galaxies in our Universe have a Primordial Black Hole at their centers. They would be the seeds that develop our galaxies within our Universe. If one continues looking at the closed walls, one has to develop a complex scalar field with a potential,

$$V(\zeta) = \alpha(|\zeta|^2 - g^2/ 2)^2 + \delta V(\theta), \tag{23}$$

where $\zeta = re^{i\theta}$. The last term in equation 23 is a term that contributes to the Lagrangian renormalization. The last term is emitted at very high temperatures. The radical field component is significant when compared to the Hubble constant. This means that the complex field is in the ground state [15][16][17][18]. During this period, the behavior of the Quantum field varies. This leads to the scalar field growing experimentally. During this time, the average amplitudes become fixed at values above zero. All of this happens because of a significant friction term that happens in the equation of motion of the scalar field. A situation with a frozen fluctuation leads to a classical field. In a region like that, the vacuum fluctuates at every wavelength. During the inflationary period, this causes the development of more and more areas with a scale greater than H^{-1}. If one takes a look at a massless Nambu-Goldstone field, then each e-fold is written as

$$\delta\theta = H/ 2\pi f. \tag{24}$$

During the inflationary era, after one e-fold, the universal volume increases by e^3. The wavelength generated by one e-fold is equal to H^{-1}. So then, the domain H^{-1}, after each e-fold, becomes divided into e^3 separately. As time goes on, more and more domains appear. The most critical domains have a phase $\theta > \pi$. After a certain period, the domains become surrounded by phases $\theta < \pi$. However, there are still more phases where $\theta < \pi$. This leads to the development of large-scale structures with topological defects. The potential in equation 23 is broken when inflation begins. The first e-folds that developed into the fluctuations led to cosmic microwave radiation. During this time, any motion inside or outside the domain passes through a point where $\theta = \pi$. This means that a closed surface $\theta_{vac} = \pi$ must exist. How large the surface becomes depends on the moment of domain formation. The shape is generally arbitrary. Domains with a phase $\theta > \pi$ continue on the background of Friedmann expansion. The use of the relativistic equation of state describes these. Two vacuum states are developed if the temperature goes below T~ €. If the two adjacent vacua are in equilibrium, a closed wall develops in the region where $\theta = \pi$. This process leads to closed spherical walls. The wall energy is related to the area when it crosses the horizon. At maximum contraction, the energy is mainly converted into kinetic energy. A Primordial Black Hole is created when the wall is localized within the gravitational radius. Primordial Black holes give off gravitational wave signals that we should be able to detect in the future [19][20].

In conclusion, the C-Neutralino is the central particle that drives the beginning of our Universe. It decays into other particles, including protons and electrons. Primordial Black Holes are also crucial in the development of our Universe. They connect astrophysical constraints on sources of cosmic rays. Primordial Black Holes play a role in element abundance and the spectrum of the CMB. They are particle and matter creators. Primordial Black Holes can be a major source of any species of particles in our spacetime. In the end, they can shed new light on problems in Cosmology. Primordial Black Holes are the solution to inhomogeneous primordial structures in the early Universe. Primordial Black Holes generate a very powerful magnetic field in the early universe. They make violent inactions happen in the early universe by ejecting plasma and acting as particle creators. C-Neutralinos are the particles that contribute to our Universe's creation and dark matter. It is the primary source of dark matter in our Universe. In the early Universe, the cosmological principle did not exist. The homogenous Universe we see today evolved about 1 billion years after the creation of our Universe [21][22][23][24][25].

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