A Thesis on the Structure of the Universe

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The Big Bang theory describes the universe as having formed from a tremendous explosion. The matter and energy released from this explosion evolved into the present stars and galaxies. Edwin Hubble provided the foundation for the Big Bang theory by showing that the universe is expanding from a common origin.

This theory in turn spawned an analogous theory called the Big Crunch theory, which proposes that gravity in a closed universe will eventually pull all this material back together to recreate this original massive dense object.

When scientist looked for evidence to support the Big Crunch theory, what they discovered was that the stars and galaxies instead of slowing down were actually accelerating outward from the origin. As a result, the existence of invisible dark matter, whose gravitational force caused this acceleration, was theorized.

In order to understand the structure of the universe, it is important to understand the evolutionary cycle of a black hole.

A black hole forms at the end of the life of a very massive star. When a large star has burnt all its fuel, it explodes into a supernova. The material that remains collapses down to an extremely dense object, known as a neutron star. If the neutron star is large, it becomes a black hole. A black hole produces a gravitational force so strong that it fractures atomic structure. A black hole can become very large with the mass of million or more suns. These can be found at the center of galaxies.

Now we'll examine the other extreme of the universe: the subatomic world. The classical "atomic structure" theory describes atoms as composed of fundamental elementary particles (protons, neutrons, and electrons). Within the atomic structure, the nucleus comprises a tightly packed ball of protons and neutrons while the electrons spin around the nucleus within cloud-like electron shells at distinct distances from the nucleus and at separate energy levels. At the subatomic level, vast emptiness exists between the electron shells and the nucleus, just like the vast emptiness between the planets and the sun.

In 1964, Murray Gell-Mann and George Zweig proposed that nuclear particles are composed of smaller fundamental particles called quarks. A neutron is composed of one “Up” quark and two “Down” quarks. A proton is composed of two “Up” quarks and one “Down” quark. The transfer medium within protons and neutrons is a strong interactive force carrier called gluons. Nuclear particles can break down into quark-gluon plasma (QGP) under extreme temperatures and pressures.

Splitting the atom (restructuring the atoms via fission/fusion) can release a vast surge of energy. The atomic bomb is a typical example of the energy released from this transformation. But the force that holds atoms together is very weak in comparison to the force that binds quarks into stable nuclear particles.

Returning to the large scale again, a supernova occurs as a star transitions from an atomic structure into nuclear particle structure. After a supernova, the nuclear particles (protons and neutrons) that remain collapse down into a massive dense core similar to a single atom. The gravitational forces are sufficiently strong to force protons and electrons to combine into neutrons. Thus the inner core of a black hole is comprised of primarily neutrons.

As a black hole evolves, it continues to absorb matter and energy. It grows until it reaches a critical limit where the pressure and temperature cause the nuclear particles to break down into quarks. The breakdown of the neutrons and protons in the nucleus of a black hole produces several effects. The breakdown turns off the gravity switch. Gravity is a function of mass. The mass of a proton is 938 MeV whereas after the breakdown, the total mass of the triplet of quarks that remain is approximately 20 MeV. What happens to the missing mass? It is converted into a tremendous quantity of energy. This energy sets off a cascading chain reaction that produces quark-gluon plasma. This plasma in effect rips the black hole apart and produces what is referred to as the Big Bang.

The universe stretches to infinity and is populated by very ancient, very massive black holes (dark matter). Periodically a black hole will reach a critical mass and explode into a Big Bang that flings matter and energy out into the far reaches of the universe. This material over time is reabsorbed by other massive black holes and the process continues for all time.

Since the process is similar to exploding kernels of popcorn, I like to think of this hypothesis as the **Popcorn Theory of the Universe**.