The end

Business

Since the dawn of time, civilizations seek to get as much knowledge as they can. We think that reaching the complete knowledge would be to know the ultimatefate of the universe. This would force humanity to accept their fate. For centuries, anyone who opposed the idea that earth was the center of the universe was encountered by the Catholic church. For example based on CSmonitor, Galileo, who was put on house arrest for believing this. But as time passed, the church had to accept earth was not the center of the universe, this way it may not be the end of civil morality and create chaos.

Getting to an answer may be hard, but could potentially be the most satisfying achievement that humans have ever accomplished. The journey to the end of the universe may terrify some while thrill others. We embarked in this journey to explore the different theories that are out there hoped it led us to the truth. The origins of the universe. According to Space, everything started approximately 13.

7 billion years ago. The universe first started as one whole. Based on Einstein’s theory on general relativity, our universe began with a point of indefinite density & temperature. It is said that the point of indefinite density underwent a dramatic period of inflation, expanding much faster than the speed of light. The universe grew up to 100 times, perhaps even more.

All this underwent in some fractions of a second. As Filippenko told SPACE “ Inflation was the ‘ bang’ of the Big Bang, before inflation, there was just a little bit of stuff, quite possibly, expanding just a little bit. We needed something like inflation to make the universe big.”(FIlippenko) Adding on, while the inflation was in process, dark energy was present in the universe

for the purpose of accelerating the process and smoothing it out . Years after, it disappeared. Since that point of time, the universe keeps expanding more every second that passes.

This dramatic event billions of years after it happened is now called “ The Big Bang Theory.” To understand how the universe might end, one must first learn the physics behind them, however broadly. Hubble’s constant is the rate at which the universe is expanding. Its calculated thanks to the difference in energy from distance stars and the red shift in light waves. Edwin Hubble came to the conclusion that the universe is expanding and accelerating.

The critical density of the universe is proportional to hubble’s constant and is defined as the density required for the universe to stop expanding. Another thing to consider before you hop into the theories is to stop worrying so much about what happened before the big bang. One must only focus on what happened fractions of a second after the Big Bang because of a paradox suggested. The paradox arises when one considers the question of whether the universe has always existed or if it popped into existence in a single event. The thought of the universe always exiting is absurd, because it implies infinite time to have existed to the past. However, if the universe began at one particular instance as the Big Bang Theory believes, this would mean that infinite time to the past existed where nothing existed, not even time.

This makes everything that happened before the Big Bang completely irrelevant aside from impossible to know. With that said, its only right to

continue our curiosity forward towards the ultimate fate of existence. As mentioned before, the universe is estimated to be around 13. 7 billion years old. The universe is still young, as well as the sun, with approximately 4.

6 billion years since it was created. According to RedShift Magazine, the sun is also known as a red giant. But in some couple of billion years, the red giant is going to run out of energy. It’ll turn slowly into a white dwarf, which the sun without any energy left & collapse itself into something smaller. But this is not how our galaxy will end, it will probably end before and by other means. Causes that are not yet 100% proven, but have a big theory to back them up.

These consist on the two theories on Critical density, & the Big Rip theory. There are basically two theories that are most plausible & accepted by most scientists. These are the Critical density theories. The first one, “ The big Crunch”. This theory explains that the universe is expanding since the moment that the Big Bang happened.

But due to the equation of… ds2 = e 2? v (d? 2)/(d? 1)d? 2 + e ? 2?/v (d? 2) (d? 1)g (d) μ? dxμ dx? developed by Einstein & Maxwell scientists have a idea of when will this catastrophe happen. This equation was generated by Einstein, and many other scientists. It represents the Kaluza-Klein model which relates the space & time.

In other words, it estimates the time until the universe gets its final fate. The way it is going to happen is that the earth as well as the rest of the universe is accelerating & getting away from each other. This satisfies the law of Universal gravitation. But what will happen once there is too much radius for

little mass in the universe? The big Crunch theory explains that once this happens, the law will reverse itself, & instead of continuing accelerating outwards, it will start to accelerate towards itself attracting everything together. It is said that at some point, everything will come together, & that is when we will see, the Big Crunch.

Everything crashing together, this is how our universe will end. The heat death or big freeze is where the level of entropy, the ability to cause disorder, in the universe reaches its maximum levels and there is no dissipated energy for anything to move. The universe is a pulp of nothingness at this point. For infinite time, the universe will expand infinitely. It will come to a point that nothing will happen. No planets, no stars and definitely no life will be present at this moment.

The universe won’t come to an end. This theory suggests that the universe will simply always exist but there will be nothing that will define it. Atoms will disintegrate into its fundamental parts as the strong forces that once kept them together will be released into atomic blasts and nothing but radiation will exists. This theory will only occur if the critical mass of the universe, the mass proportional to hubble’s constant, is greater than the actual mass, this means the gravitational pull of the actual mass won’t be enough to stop the universe’s expansion and hence it will expand forever, allowing for the previous scenario to occur. The main theories that explain the fate of our universe are these two; the Big freeze and the Big Crunch.

They both rely on the critical density of the universe compared to the mass. But these are not the only theories. Other theories exists that, however

unlikely they may seem, are plausible scenarios nonetheless. The Big Rip is based off of the density of dark energy and that dark energy can’t travel faster than the speed of light. Ever since the big bang, matter has become less dense due to the increasing volume cause by the expansion. Despite its uncommon properties, physics states it’s completely possible for new dark energy to be created.

This allows the density of dark energy to be constant. The theory explore scenario were the density would increase in what is called “ phantom dark energy”. If the ever increasing density of this phantom dark energy becomes greater than the density of any form of matter, this matter will be shattered apart. In less than a second, the whole universe would rip apart, hence its name. The other alternative theory is called the Big Change or Big Slurp.

This theory implies that the Higgs boson, a theoretical particle that is said to give matter its mass, exists everywhere in the universe make no place truly a vacuum. This also means the universe is in very unstable state because any “ bubble” of close to complete vacuum where no Higgs boson is present were to appear, it would rapidly expand at the speed of light to create an ever increasing bubble of low energy. The reason this theory is called the Big Change is due to the drastic comparison it would have to our laws of the universe. The physics we know today wouldn’t apply and particles would behave much differently. Although how this might be is still uncertain, physicists like Michael Turner and Frank Wilczek believe this universe could be worse than the Big Freeze as little would be able to happen thanks to dissipated energy, but what little does happen would be unpredictable if this

BIg Change were to occur. How the universe will end is a hard question to answer as it may not have a definitive one afterall.

The theories explored merely cover the surface of the truth. As long as humans live, they will continue to aspire knowledge however difficult achieving it may be. Scientists all around the world continue to investigate this and other questions about the nature of our universe, but as paradigm shifts go, we may be looking at this the wrong way. If we don’t accept our fate and dive into the unknown, then our knowledge is nothing far from some of these theories. Humans have proven themselves capable of living their lives in a bubble and have waited for time to implode their curiosity into nothingness. But the few brave men who aren’t afraid of facing reality can come close to achieving one of humanity’s greatest accomplishments, If we ever do find an answer to this century-old question, civilisation will have reached true enlightenment. THE END.