The Evolution of the Universe and the formation of Black Holes

Evolution implies a gradual transition from one state to another, from the simple towards the complex, from the lower towards the higher and vice versa. In the universe, that would presume the transfer of mass into energy and the other way around. Such a process takes place when all forms of energy and mass in a certain part of the universe gather at the same place, in a so-called black hole, which due to strong gravitational attraction absorbs everything in its surroundings, be it stars, planets or other space objects. The consequence of this is the highest possible temperature, as a result of which all the matter inside the black hole turns once again to gaseous or clean energy which is the basis for creating a universe, where, during the course of several billion years, everything else emerges as well. This occurrence, turning mass into energy, is accompanied by a huge explosion, which is in modern science referred to as the Big Bang.

The possibility of this sequence of events is confirmed by Einstein's famous formula $E=mc^2$, which was also the foundation for the development of the atomic bombs dropped on Japan. One of the effects of the explosions was the emergence of extremely high temperatures, which caused the volume of mass to increase by several times. The same occurred after the Big Bang, during the formation of our galaxy.

After the explosion of a black hole, gaseous or clean energy begins its long circular journey which lasts for billions of years. During that time, it begins to cool and condense into so-called dark matter. The smallest particles of mass, thions and tachyons, which due do its high energy potential and their speed which is faster than the speed of light chaotically move around the entire universe. There is only a weak gravitational attraction between them and they still do not form anything resembling an organized physical world.

Due to a further expansive impact of the gaseous or clean energy, the universe gradually expands after the Big Bang and as a result of this expansion its temperature steadily decreases. This decrease of temperature affects the first mass particles, thions and tachyons by reducing their thermal energy level. The reduced amount is equal to the increase of their mass. This leads to the emergence of larger particles of mass which no longer move randomly across the universe but form particles of mass at rest that continue to vibrate at a specific place around its central value.

Further particle fusion through a long period of time results in increasingly complex forms of mass which become building blocks for atoms, molecules and finally chemical elements.

Out of all these clusters of mass, hydrogen and helium atoms are prevalent in our part of the universe. Hydrogen and helium amount to roughly 85 and 14%, respectively. All other elements add up to only one percent. Among those elements, oxygen dominates with 0.66%, followed by carbon (0.21%), nitrogen (0.02%), silicon (0.02%) and sulphur and iron in even smaller quantities.

It is presumed that heavy elements are concentrated exclusively inside superstars, which makes them extremely rare across the universe. Gold is very scarce, not just on Earth, but in other known parts of the universe as well. The rarest heavy element that has been discovered is tantalum.

During the evolution of the universe, wherever favorable conditions were present, which generally means liquid water, certain effects of life emerged as well. Our civilization still is not sufficiently familiar with them, but invests vast resources in order for that to change. It is speculated that there is around 10 million civilizations similar or different to ours in each galaxy, which contains several billion stars.

If these civilizations are much more advance than ours, which can only control certain natural occurrences, they are certainly already able to tame winds and volcanoes, prevent earthquakes and direct ocean currents. Civilizations that are even more developed are probably able to affect processes that take place on every individual star. This includes changing positions of surrounding planets, as well as controlling entire stellar systems.

Such civilizations would be masters of the universe and virtually without limits. However, this would require enormous amounts of almighty energy, which can also be found in our large oceans covering more than 70% of the Earth's surface. If science could find a way to separate one atom of oxygen from two atoms of hydrogen, such immense energy at our disposal would make us equal to them. In that case we too could create things that go beyond our wildest imaginations.

The question of the formation of black holes is often raised and investigated. Can they jeopardize our planet? In our galaxy, and probably in every other galaxy as well, black holes are formed due to the collapse or explosion of giant stars called supernovas. These stars have a mass three to five times the mass of our Sun.

How come that such enormous stars turn into black holes? Just like in the Sun, a nuclear process takes place at the core, which releases a force directed towards the surface of the star, while simultaneously a gravitational force acts from the surface towards the core. As long as these two forces are in balance, the star is in stable condition.

When a star has depleted its nuclear fuel, the force that counteracts the gravitational force diminishes and the star begins to shrink. In the end, the whole star is reduced to a microscopic dot where the immensely dense matter is also the center of the black hole, whose gravity is so strong it attracts all forms of matter within its range.

In order for an object to escape from a black hole it would have to move faster than light. This is why light itself cannot escape it, which makes locating black holes in any part of the universe difficult. In spite of this, scientists have discovered a black hole in the centre of our galaxy. It has absorbed so much matter that its mass is two million times the mass of the Sun.

It is still unknown when a black hole will come close to Earth. This certainly will not happen soon, but it is crucial that not even a small black hole with the potential of growing and absorbing matter appears anywhere in the vicinity of the Solar System. But we should not think about that just yet, but rather guard our planet much better than we have so far in order to make life more beautiful and harmonious.

Many physicists disagree on what happens to matter upon the formation of the black hole and what occurs inside of it. It is known that by absorbing new amounts of matter drawn by the black hole gravitational pressure increases, which results in higher temperatures.

When the temperature inside the black hole increases up to several trillion degrees, all the matter that is found inside begins to melt and turns into gas. The pressure inside keeps increasing because of this and leads to the explosion of the black hole, which is in modern science referred to as the Big Bang.

After the Big Bang, the matter in gaseous state, which is in this book referred to as clean energy, is the building block of universe. Gaseous or clean energy gradually begins to cool and condense into dark energy. The smallest particles of mass are the first ones to take shape in the dark energy and by evolution ever more complex shapes of matter are created. They form stars, planets and other stellar objects.

This circular path of energy and mass is constantly repeated not only in our galaxy but in every other part of the universe.

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