

Into the Depths of A Black Hole

Everyday we look out upon the night sky, wondering and dreaming of what lies beyond our planet. The universe that we live in is so diverse and unique, and it interests us to learn about all the variance that lies beyond our grasp. Within this marvel of wonders our universe holds a mystery that is very difficult to understand because of the complications that arise when trying to examine and explore the principles of space. That mystery happens to be that of the ever clandestine, black hole.

This essay will hopefully give you the knowledge and understanding of the concepts, properties, and processes involved with the space phenomenon of the black hole. It will describe how a black hole is generally formed, how it functions, and the effects it has on the universe.

In order to understand what exactly a black hole is, we must first take a look at the basis for the cause of a black hole. All black holes are formed from the gravitational collapse of a star, usually having a great, massive, core. A star is created when huge, gigantic, gas clouds bind together due to attractive forces and form a hot core, combined from all the energy of the two gas clouds. This energy produced is so great when it first collides, that a nuclear reaction occurs and the gases within the star start to burn continuously. The Hydrogen gas is usually the first type of gas consumed in a star and then other gas elements such as Carbon, Oxygen, and Helium are consumed.

This chain reaction fuels the star for millions or billions of years depending upon the amount of gases there are.

The star manages to avoid collapsing at this point because of the equilibrium achieved by itself. The gravitational pull from the core of the star is equal to the gravitational pull of the gases forming a type of orbit, however when this equality is broken the star can go into several different stages.

Usually if the star is small in mass, most of the gases will be consumed while some of it escapes. This occurs because there is not a tremendous gravitational pull upon those gases and therefore the star weakens and becomes smaller. It is then referred to as a White Dwarf. If the star was to have a larger mass however, then it may possibly Supernova, meaning that the nuclear fusion within the star simply goes out of control causing the star to explode. After exploding a fraction of the star is usually left (if it has not turned into pure gas) and that fraction of the star is known as a neutron star.

A black hole is one of the last option that a star may take. If the core of the star is so massive (approximately 6-8 solar masses; one solar mass being equal to the sun's mass) then it is most likely that when the star's gases are almost consumed those gases will collapse inward, forced into the core by the gravitational force laid upon them.

After a black hole is created, the gravitational force continues to pull in space debris and other type of matters to help add to the mass of the core, making the hole stronger and more powerful.

Most black holes tend to be in a consistent spinning motion.

This motion absorbs various matter and spins it within the ring (known as the Event Horizon) that is formed around the black hole. The matter keeps within the Event Horizon until it has spun into the centre where it is concentrated within the core adding to the mass. Such spinning black holes are known as Kerr Black Holes.

Most black holes orbit around stars due to the fact that they once were a star, and this may cause some problems for the neighbouring stars. If a black hole gets powerful enough it may actually pull a star into it and disrupt the orbit of many other stars. The black hole could then grow even stronger (from the star's mass) as to possibly absorb another.

When a black hole absorbs a star, the star is first pulled into the Ergosphere, which sweeps all the matter into the Event Horizon, named for its flat horizontal appearance and because this happens to be the place where mostly all the action within the black hole occurs. When the star is passed on into the Event Horizon the light that the star endures is bent within the current and therefore cannot be seen in space. At this exact point in time, high amounts of radiation are given off, that with the proper equipment can be detected and seen as an image of a black hole.

Through this technique astronomers now believe that they have found a black hole known as Cygnus X1. This supposed black hole has a huge star orbiting around it, therefore we assume there must be a black hole that it is in orbit with.

The first scientists to really take an in depth look at black holes and the collapsing of stars, were a professor, Robert Oppenheimer and his

student Hartland Snyder, in the early nineteen hundreds. They concluded on the basis of Einstein's theory of relativity that if the speed of light was the utmost speed over any massive object, then nothing could escape a black hole once in its clutches. ⁽¹⁾

The name "black hole" was named such, because of the fact that light could not escape from the gravitational pull from the core, thus making the black hole impossible for humans to see without using technological advancements for measuring such things like radiation. The second part of the word was named "hole" due to the fact that the actual hole, is where everything is absorbed and where the centre core presides. This core is the main part of the black hole where the mass is concentrated and appears purely black on all readings even through the use of radiation detection devices.

Just recently a major discovery was found with the help of a device known as The Hubble Telescope. This telescope has just recently found what many astronomers believe to be a black hole, after being focused on an star orbiting empty space. Several picture were sent back

to Earth from the telescope showing many computer enhanced pictures of various radiation fluctuations and other diverse types of readings that could be read from the area in which the black hole is suspected to be in.

Several diagrams were made showing how astronomers believe that if somehow you were to survive through the centre of the black hole that there would be enough gravitational force to possibly warp you to another end in the universe or possibly to another universe. The creative ideas that can be hypothesized from this discovery are endless.

Although our universe is filled with much unexplained, glorious, phenomenons, it is our duty to continue exploring them and to continue learning, but in the process we must not take any of it for granted.

As you have read, black holes are a major topic within our universe and they contain so much curiosity that they could possibly hold unlimited uses. Black holes are a sensation that astronomers are still very puzzled with. It seems that as we get closer to solving their existence and functions, we just end up with more and more questions.

Although these questions just lead us into more and more unanswered problems we seek and find refuge into them, dreaming that maybe one day, one far off distant day, we will understand all the conceptions and we will be able to use the universe to our advantage and go where only our dreams could take us.

References For Into The Depths of a Black Hole

** (1): Parker, Barry. Colliding Galaxies. PG#96