

Extraction of Electrons Traveling Faster Than Light From Micro Black Holes

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ABSTRACT. We explore the creation of “micro black holes” and their properties inside particle accelerators such as the LHC. A methodology is presented for utilizing the micro black holes for acceleration of electrons to superluminal speeds inside the event horizons. Subsequently, methods for extraction of the superluminal electrons are presented. Concepts are defined as to be accessible to a general audience.

Concepts are introduced from the ground up to ensure this work is accessible to a general readership. If something in this text seems obvious, just keep reading.

A black hole is a collection of matter that forms an event horizon around it. The event horizon of a black hole is a distance from the center of a black hole's mass that nothing, not even light, can escape from. The event horizon forms a sphere, which has a perimeter a certain distance away from the black hole's center. The event horizon is due to the high magnitude of gravitational force of the matter that forms the black hole's center. The high magnitude of gravitational force of a black hole is due to a) the amount of mass of the center, and b) how tightly packed the mass is at the center.

Speed is a change in distance over a length of time. Speed is formalized as meters per second. Acceleration is a change in speed over a length of time. So acceleration is formalized as meters per second, per second. The speed of light is 299,792,458 meters per second. We can say that the acceleration from gravity of a black hole, inside the event horizon, is greater than the speed of light per second, which is 299,792,458 meters per second, per second. We can say this because otherwise, in the

time of one second, light would travel through and out of the event horizon of most black holes. Most black holes have an event horizon that is *a lot* less than 299,792,458 meters across. This means that any object pulled past the event horizon of a black hole, toward the core, is accelerating by an amount *a lot* more than the speed of light with every second that passes.

The LHC (Large Hadron Collider) is a particle accelerator near Geneva, Switzerland that may be capable of creating micro black holes. It is the largest (27 kilometers in circumference) and most powerful particle accelerator today. A particle accelerator uses electromagnetic forces to accelerate charged particles around pipes usually in a circular design.

Micro black holes in the LHC¹ could be created by colliding particles at very fast speeds, which cause the particles to condense their masses enough to form event horizons. An event horizon is the distance from the central, concentrated mass of the micro black hole where not even light can escape.

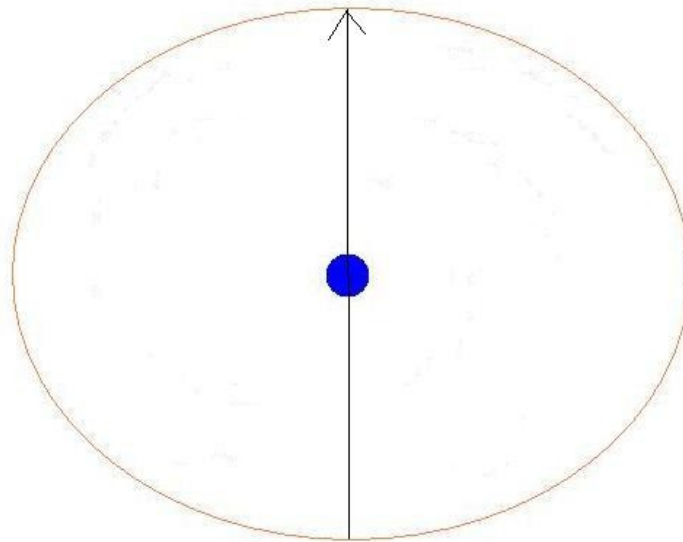


Figure 1: The blue dot is the core of the micro black hole. The orange is the event horizon. Not even light, on the black path, can escape the acceleration by the gravity of the micro black hole's core.

In the area of the particle accelerator where you will be colliding the particles to form the micro black holes, I suggest saturating that space with electrons. Electrons are the ideal candidate for the particles to be accelerated inside of the micro black holes because they are small enough to fit inside the event horizons. Electrons are considered “point-like particles” because they are so small and may only have the illusion of mass due to their energy (Einstein's Energy-Mass Equivalence equation²,

1 Kanti, Panagiota. (9/26/2008.) Black Holes at the LHC (Online), Date Retrieved: 5/15/2010. arXiv.org. http://arxiv.org/PS_cache/arxiv/pdf/0802/0802.2218v2.pdf

2 Einstein, A. and Lawson, R. (2005). Relativity: The Special and the General Theory. New York, NY: Pi Press.

$E=mc^2$). An electron that is not moving will probably go right to the center of a micro black hole when one is created near by. Therefore, you want to have electrons following closely behind the particles that are going to be forming the micro black holes. This way, the electrons have the momentum needed to form spiral paths inside the event horizons of the micro black holes. The spiral paths ensure that the electrons will, for as long as possible, not become part of the mass at the center of the micro black hole. Becoming part of the mass at the center of the micro black hole would stop the electrons from moving.

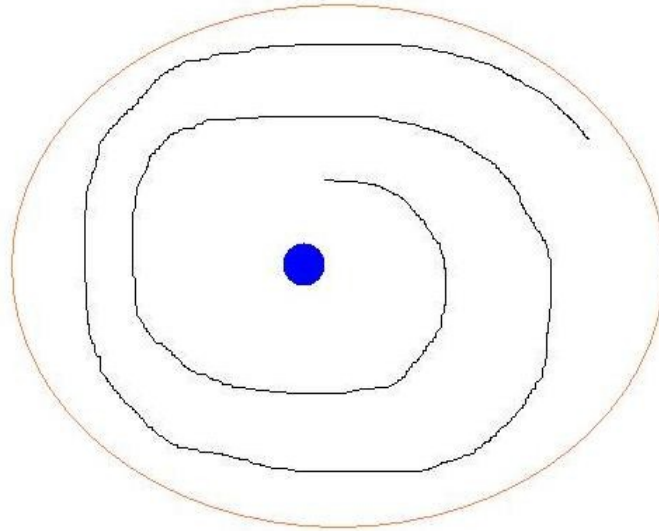


Figure 2: The blue dot is the core of the micro black hole. The orange circle is the event horizon. The black spiral is the path of the electron spiraling inside the event horizon toward the core of the micro black hole.

This gives enough time for another micro black hole to come near to the first micro black hole that already has an electron inside the event horizon. The two micro black holes exert gravity on each other, shrinking the lengths across of their event horizons. Each micro black hole has less of an ability to pull things towards it because the gravitation from one micro black hole negates part of the other's gravitation. When this happens, the electron that was inside the event horizon of the first micro black hole is allowed to escape because of the shrinkage of the event horizon. That micro black hole, while the electron was inside its event horizon, accelerated the particle at much faster than the speed of light per second. Therefore, if the particle was inside the event horizon long enough, and was on a trajectory that made it spiral without becoming part of the micro black hole's mass before it could be released by the presence of the second micro black hole, then the particle will emerge from the micro black hole at a speed that is faster than light.

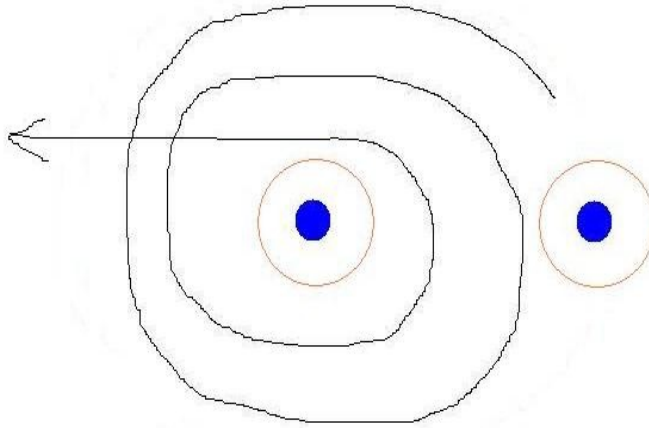


Figure 3: There is a second micro black hole. The two shrink each others orange event horizons. The electron is allowed to escape the micro black hole, traveling faster than light since it is no longer within an event horizon.

With enough micro black holes formed near enough to each other, the shrinkage of the event horizons, due to micro black holes getting closer to each other, will release some of the electrons. Protons, particles with a positive charge, are the best candidate for forming the micro black holes. Some electrons will shoot off when released and collide with the interior pipe of the accelerator. However, some will go in a straight enough path, in-line with the particle accelerator's piping, in order to be steered around the accelerator by the accelerator's electromagnetic fields. Making the electrons that do this go through an energy spectrometer will measure the energy of the electrons and you will be able to tell if there is an amount of energy indicative of faster than light travel.

Micro black holes could be very short lived due to Hawking Radiation, a theoretical emission from black holes that would cause them to lose their mass and gravity. Therefore, the micro black holes may evaporate before the electrons have spiraled into the central mass of the micro black hole. If this happens then there is no need for another micro black hole to come near in order to shrink the event horizon. The electron would escape as the event horizon and core of the micro black hole evaporate.

Since Hawking Radiation is theoretical, the micro black holes may not go away. If they do not go away, that would necessitate other micro black holes coming near to the ones that contain electrons, in order to free the electrons before they become part of the core of the micro black hole.

If micro black holes do not go away, then the success rate of extraction is very low. However, when it does occur, even one electron traveling faster than light, by the amount expected for spending virtually any amount of time within an event horizon, would produce such a high amount of energy for

that electron that it would be noticed in the energy spectrometer.

According to Einstein's Theory of Relativity³, as something nears the speed of light, time slows for it. What happens beyond the speed of light is a mystery. Faster than light travel would not make something travel back in time or else it would disappear from our world, into the past. Black holes have been experimentally observed to grow, so whatever goes into a black hole's core is still in our present and future.

A statistical prediction of how many electrons will hit the side of the particle accelerator and how many will be able to be steered into the energy spectrometer is important. It is also important to repeat this experiment under the same conditions many times in order to get an average energy amount from multiple measurements by the energy spectrometer. This average should be compared with the predicted statistical amount of electrons that will reach the energy spectrometer. If the average energy is higher than statistically expected for electrons moving at less than the speed of light, then you know some of the electrons are moving faster than the speed of light.

References:

Kanti, Panagiota. (9/26/2008.) Black Holes at the LHC (Online), Date Retrieved: 5/15/2010. arXiv.org. http://arxiv.org/PS_cache/arxiv/pdf/0802/0802.2218v2.pdf

Einstein, A. and Lawson, R. (2005). Relativity: The Special and the General Theory. New York, NY: Pi Press.

³ Einstein, A. and Lawson, R. (2005). Relativity: The Special and the General Theory. New York, NY: Pi Press.