Black Holes – The New Paradigm

Abstract:

In the formulations of Schwarzschild Geometry for black holes are certain embedded complications. Zeros and infinities are encountered at the event horizon. Special Relativity is stretched in ways that Albert Einstein never envisioned. Components of the metric reverse signs leaving the interpretation of what happens up to the physicist or interpretive philosopher.

The "New Paradigm" accepts the literal interpretation of the Schwarzschild formulations. The infinities and zeros of the event horizon are real. Inside the event horizon the radial and time metrics reverse signs changing the direction of motion and flow of time. All aspects of Special Relativity are preserved including the inability of matter to move at the velocity of light. Acceleration at the event horizon is instantaneous for the only surviving form of energy to reach it – light.

The result is that the event horizon becomes a hard barrier and the inherent conflicts in the existing paradigm are resolved.

The Event Horizon Is an Unsurpassable Hard Barrier

If a particle is accelerated in a synchrotron from 99.990% of the velocity of light to 99.999% of *c*, to the lab technician that is only a 0.009% increase in velocity, but to the particle, due to the significant slowing of time flow, that is a 316% acceleration. This shows up as a 316% increase in the energy of the particle to the lab technician.

The same experience occurs within General Relativity. In this case the lab technician is a resident of a fixed shell, and the freefall mass is the relativistic mass. If one shell witnesses a 99.999990% velocity of a passing freefall mass, and if that mass accelerates to 99.999999%, the mass experiences a 316% acceleration.

In the same way that a spacecraft with an unlimited source of energy can be accelerated forever and never reach the velocity of light, a freefall mass accreted by a black hole will never survive being accelerated to the horizon's mandatory velocity of light. Matter must never survive the accretion process.

1) **Acceleration** – For every incremental increase in freefall velocity there is a Special Relativity slowdown of time relative to each passing shell. Acceleration goes to infinity at the event horizon. The only thing that has instantaneous acceleration is light itself. Time stops at the horizon relative to time flow in the host universe according to the formula:

   $$d\tau^2 = \left(1 - \frac{R_S}{r}\right) dt^2$$

   When $r = R_S, d\tau^2 \to 0$. The only form of energy to not experience proper time is light itself.

2) **Tidal Forces** – As the event horizon is approached, there is a progressive proportional change in the layering of radial shells, i.e., new spacetime shells occur at a geometrically faster pace. For each incremental radial decrease, shell layering is compressed until the change in shells approaches infinity at the event horizon. A one vertical meter mass encompasses more radial and time shells when in freefall at $1.2 \times R_S$ shell than $3 \times R_S$ shell, tidal forces likewise increase. Since acceleration increases to infinity at the horizon, so do tidal forces.

   It has been long considered that tidal forces for a large black hole are significantly less than for a small black hole due to the relative compressions of proportional radial shells. The "New Paradigm" shows that when the time-slowing Special Relativity effects for a freefall mass are considered that tidal forces are equated for any specific radial distance above the event horizon. Tidal forces for a freefall mass at 100 meters above a one light year black hole is the same as it is for 100 meters above a 10,000-meter black hole.

3) **De Broglie Radiation** – Matter, when accelerated by any means, radiates energy. This radiation is minimal until that acceleration approaches relativistic proportions. When gravity accelerates a mass in freefall, that mass emits electromagnetic radiation in a process similar to synchrotron or Bremsstrahlung radiation. This process is named De Broglie Radiation. The power drained from the tidally-dissociated

particles increases geometrically until all energy is converted to electromagnetic radiation immediately before the event horizon is encountered. No matter survives the final assault on the horizon. Since matter cannot be accelerated to the velocity of light, de Broglie radiation ensures that its structure does not survive the horizon barrier, which mandates freefall at *c*.

Since no particles reach the event horizon, then no anti-particles reach this limit. Therefore, Hawking radiation is negated since light only has positive energy.

4) **Light's Velocity** – The velocity of light slows relative to that of flat spacetime when proximate to a large mass. That slowing increases with each incremental shell. Although the changing velocity cannot be measured locally, it continues unimpeded until at the horizon it freezes relative to the only reference frame that counts, i.e., the host universe. Not only has all mass been converted to electromagnetic radiation, but the velocity of that radiation slows to zero.

   To illustrate this, if light is viewed from the closest possible shell ($1.616 \bullet 10^{-35}$m) or Planck's distance for a 100,000-meter black hole, it would observe light's velocity to be $3 \bullet 10^{8}$ ms^{-1}. But that velocity as seen from flat spacetime would be relative local time multiplied by flat spacetime's *c*. Since a second in flat spacetime would be equivalent to $1.271 \bullet 10^{-20}$ local seconds, then the velocity of light would be this time flow multiplied by $c_{\,flat\ spacetime}$ or $3.814 \bullet 10^{-10} ms^{-1}s_{\,flat\ spacetime}$.

Light Geometry

Gravitation's curvature not only affects the movement of matter, it also modifies the movement of light. If light approaches a black hole tangentially at 1.5 × the event horizon radius it can enter a knife's-edge orbit around the black hole. If an observer could stand at this radial shell, one could see their own back if the black hole was small enough. This means that half of the field of view at this margin would be the starscape and half would be the black hole. The straight path becomes that of light as it curves through the radially oriented gravitational contours.

1) **Direction of Force** – The direction of light's path is not only perceptive. It becomes the direction of force. As the black hole rolls up around a mass as it freefalls toward the event horizon, the tidal forces change from compressing outside the 1.5 margin to non-existent at 1.5 R_S, to tangential stretching beyond this point.

2) **Precession of Gyroscopes Changes** – Precession of an onboard gyroscope becomes progressively less when orbiting in close proximity to a black hole. At 1.5 × the Schwarzschild radius that precession stops. Beyond this margin tangential movement results in a reversal of precession's direction. The rate of precession increases until at Planck's distance above the horizon it reaches Planck's angular momentum or $\hbar$ for the surviving quanta.

3) **Angular Momentum Reverses Direction** – Beyond the 1.5 × margin angular momentum redirects its influence and starts to unwind tangential movement. At the event horizon tangential movement stops altogether. A consequence of this unwinding is that black holes don't rotate even though their progenitor star might have had significant angular momentum.

4) L**oss of a Spatial Dimension** – Below the 1.5 × level the aperture through which one could view stars shrinks and the view of the black hole expands. This occurs because light's path curves inward until at the event horizon the only approach for light is completely vertical. This causes the aperture to continue to decline with each passing shell until at the horizon the starscape becomes a single point.

   The loss of a dimension outside of the black hole and its replacement with a dimension within the black hole not only enables the black hole to envelop the radial location, it establishes the dimensional structure for a universe within as is the case for our Universe.

The Zero Layer

Light's velocity slows to zero at the event horizon. A unique occurrence happens at the one Planck layer above the horizon. Light can no longer complete a waveform shorter than 10^{-35} meters. This results in what can be called the "zero layer". The zero layer is a standing wave that becomes the final resting place of light's unrealized potential.

This means that light's potential is frozen there for eternity. As mass is added to the black hole, its radius increases, and the zero layer moves outwards one discrete Planck radius at a time.

The zero layer is a standing wave with Planck radii surrounding the entire black hole. It carries its potential to the separate thermodynamic system within.

1) **The Zero Layer Separates the Universe's Thermodynamic System from that Contained Within** – The cause and effect of our universe terminates at the zero layer of the event horizon. All event formation ceases since time stops here. This enables the domain within to form a separate universe with its own unique laws of physics.

2) **Entropy Finds Its Completion in the Zero Layer** – Light is the only form of energy to reach the zero layer, and its wavelength is limited to Planck's length. It finds itself locked into a quantum dot. The temperature of the event horizon for the outer Universe is absolute zero. Its ability to interact is limited to its gravitational influence. It drifts into the past at an infinite rate. Therefore, heat entropy, time entropy and statistical entropy all reach their termination at the zero layer.

3) **Space Is All That Is Left** – The zero layer defines space contained within. This space has a duel character, it contains the black hole, and it is merged to the Universe's space particle. Space is a boson that shares the identity as a Bose-Einstein condensate.