THE ZERO POINT NON-LOCAL FRAME AND BLACKHOLES

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Abstract: I will show that my own zero point Model supports not only the no-hair proposals, but also the Bekenstein bound on information from an event horizon. This model, based upon a static case also supports the cosmic censorship proposal.

Blackholes are not elementary particles. This is shown by(1)(2), that they possess no Baryon number, and only the static gravitation and electromagnetic fields do not go to zero outside the horizon. Also under gauge theory symmetries the gauge field vanished and the proposed Higg's field went to constant value outside the horizon.

The Horizon of a blackhole is a null surface $F(x^i)=0$ and the normal to it is $n_\mu=\delta_\mu F(x^i)$ with the surface element being $ds_\mu=\sigma\eta_\mu$ with σ being an invariant. In the static blackhole case it can be shown that the scalar fields, such as that of the Higg's field, are bounded at the Horizon. In my own model there is a scalar like effect once we encounter the brane itself starting at the Plank scale and proceeding upward in scale which is brought about by the compaction or limiting of the lightcone of information transfer. So if this holds true then the event horizon's null surface forces this effect at that range from the center of the blackhole to zero. This translates to anything inside of the blackhole not having a limited lightcone state. As such by the difference in information types that my own model pointed out(3) there should only exist quantum information on the inside of a blackhole. The problem is quantum information due to the wavefunction spread to infinity has no amplitude and therefore should by rights display no information on mass at least internally.

So the question remains how does the blackhole still display information on mass?

The solution is that this information is display or projected outside of the event horizon itself where in the scalar like effects once again come into play. The gravity field of a blackhole only exists external to the null surface of its event horizon. So in effect a blackhole is nothing more than an enlarged zero point. Internally one has stored quantum information on not only the original matter that collapsed to form the blackhole, but, also any matter that after that point enters the blackhole.

Normally, as I pointed out in my article a zero point can only store 1 ebit of information in the form of encoded quantum information. However, this is based on Bekenstein's formula on area which in the normal case is that of one Plank unit. In this case an expanded zero point has far more area and as such can store far more information. Internally within the Blackhole you'd encounter a stacked frames similar to that I introduced in my model this stacked frame is actually what is commonly referred to as a singularity. But all the information on what is stored within can be read from the event horizon surface itself. This implies at least in principle that anytime there is an attempt made to compact information on more than one particle state into a zero point or the brane that the brane itself increases in both volume and area to incorporate this added information. This effect in turn creates a null surface that expands outward as the surface area is increased that can be determined by the Schwarzschild formula

$R_{sch} = (2GM)/c^2$

which describes its size.

A surface is trapped if $\theta_+\theta_+ > 0$ everywhere. For a Blackhole the condition $\theta_+ < 0$ holds and as such the information inside of a blackhole is future trapped, because the information in such a trapped region will never be able to leave it again unless some mechanism for its release can be shown.

Suppose we have a black hole space-time described in general relativity by some set of coordinates $\{x^a\}$ and some metric tensor g_{ab}. The paths of light rays are described by null (i.e. lightlike) geodesics, which are computed using the geodesic equation

$$\xi^a D_a \xi^b = 0, \quad \xi^a \xi_a = 0$$

where D_a is the covariant derivative for the metric g_{ab} and

$$\xi^a = \frac{dx^a}{d\tau}$$

is the tangent vector to the null geodesic in question, and t is the distance parameter along the geodesic, the analog of time along a ray of light.

The possible transverse (orthogonal to the propagation direction) deformations of a bundle of null geodesics can be reduced to three types: the expansion q, rotation w_{ab} and shear s_{ab}, computed as the trace, antisymmetric part and symmetric part, respectively, of the covariant derivative of the geodesic tangent vector

$$\theta = \operatorname{Tr} D_a \xi_b, \quad \omega_{ab} = D_{[a}\xi_{b]}, \quad \sigma_{ab} = D_{(a}\xi_{b)}$$

Taking the derivative of the expansion q along a null geodesic leads to what is called the **focusing equation**

$$\xi^a D_a \theta = \frac{d\theta}{d\tau} = -\frac{1}{2}\theta^2 - \sigma_{ab}\sigma^{ab} + \omega_{ab}\omega^{ab} - R_{ab}\xi^a\xi^b$$

If we're in a space-time with no rotation, and the matter and energy density is positive, then we arrive at a **very important inequality for** q **that is the key to all the mysterious and interesting properties of black holes**:

$$\frac{d\theta}{d\tau} + \frac{1}{2}\theta^2 \le 0 \rightarrow \frac{1}{\theta} \ge \frac{1}{\theta_0} + \frac{1}{2}\tau$$

The quantity q measures how light rays expand or converge, in other words q measures the focusing of light by gravity. According to our sign convention, if q is negative, it means the light rays are being focused together instead of spread apart by the space-time geometry. The above inequality tells us that once light rays start being converged by gravity with some value $q_0<0$, then in a finite distance along the light ray, nearby light rays will be focused to a point, such that they cross each other with zero transverse area A

$$\theta \sim \frac{1}{A}\frac{dA}{d\tau}, \quad \theta \rightarrow -\infty \Rightarrow A \rightarrow 0$$

This is bad news if these light rays all emanated from a single source, because it means the light is being infinitely focused into a singularity, and the concept of a geodesic has broken down. When q turns negative for both "incoming" and "outgoing" light rays, it means that the light has been **trapped**, that the escape velocity from that gravitational field has become greater than the speed of light.

The problem with the type of focusing of light that defines the presence of a black hole is that once it starts, the focusing equation says that it ends in utter disaster. Once a bundle of null geodesics becomes trapped by crossing to $q<0$, within a finite distance along each geodesic, q> -Infinity, the geodesics will cross at a point, and the transverse area of the bundle will go to zero. When this happens, the necessary conditions for the existence and uniqueness of these geodesics are violated, and it's no longer possible to use the geodesic equations to predict what happens to the geodesics after they cross.

The space-time will then exhibit one of the two possible behaviors:

1. The space-time curvature in this region remains finite for all observers, but notion of predictability for the space-time breaks down, and evolution of the space-time can no longer be uniquely predicted from a set of initial data.
2. The space-time curvature in this region becomes infinite for all or some observers, so that there simply is no possibility of extending geodesics past the point where they cross, they simply end there. The space-time as a whole retains its predictability but the region contains a space-time singularity where the paths of observers simply end their existence, and space-time itself can no longer be defined.

The "standard form" of Penrose's conjecture holds for an asymptotically flat Riemannian 3-manifold on which the constraints of General Relativity hold, and which contains a trapped surface (a "black hole"). It reads that the total energy (the "ADM-mass") is bounded from below by the square root of (16 pi times) the area A of the outermost trapped surface (the apparent horizon). This result was conjectured by Roger Penrose who also pointed out that his inequality supports the so-called "cosmic censorship conjecture".

Following my proposed zero point model one would find that condition one is meet:

1. The space-time curvature in this region remains finite for all observers, but notion of predictability for the space-time breaks down, and evolution of the space-time can no longer be uniquely predicted from a set of initial data.

In essence as the internal information is compacted by the external effects of gravity even though the internal space-time curvature remains finite(actually zero in this case) due to the altering of information from classical to quantum states and the included change in lightcone states(expansion to infinity) we do encounter a break down of the fabric of space-time and due to uncertainity one cannot fully predict uniquely from a set of initial data. However, the second case does not hold.

So in essence one finds that this Zero Point Model supports not only the no-hair proposals, but also the Bekenstein bound on information from an event horizon, and the cosmic censorship proposal. This Model also in general sets some strong bounds upon the ability of matter or classical energy of any type to escape off the brane or through wormholes since if we assume as classical cosmology does that the center of our galaxy contains a Blackhole and that state has remained nearly stable for the lifetime of the galaxy(about 14 Billion years) in question then no evidence exists within known observational limits for the rapid collapse of a Blackhole which would be required if information could escape off the brane through them to either hyper-space or some other region within the brane world itself as proposed in some brane models(4).

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Author’s note.

Generally, a single object in the world exists continuously in time and travels along continuous paths in space is described by classical information and is subject to the rules of classical information transfer. An object that exists at zero time and exists along all paths in space is described by quantum information. The primary difference is that SR and its limitations on information transfer only applies to classical information. Quantum information, because its manifold of transfer is devoid of time is not effected by the classical limits on information transfer. When observers sample from the world at different times, from different spatial vantage points, and through different sense modalities, the samples that result are often discontinuous. This discontinuous nature results in the outward appearance of casualty violations when it comes to quantum information. But the difference vanishes when one considers such in respect to its natural manifold and not to the manifold of classical information transfer.

So in essence we have a universe with two speed limits, so to speak. One limit applies to classical information and the other limit applies to quantum information. The real variable speed issue is centered on quantum information transfer and not actually upon particle transfer, which is actually C limited in general.