

The Black Hole Catastrophe And the Collapse of Spacetime

Stephen J. Crothers

Australia

thenarmis@gmail.com

23 Sept. 2008

The notion of black holes voraciously gobbling up matter, twisting spacetime into contortions that trap light, stretching the unwary into long spaghetti-like strands as they fall inward to ultimately collide and merge with an infinitely dense point-mass singularity, has become a mantra of the astrophysical community, so much so that even primary-school children know about the sinister black hole. There are almost daily reports of scientists claiming that they have again found black holes here and there. It is asserted that black holes range in size from micro to mini, to intermediate and on up through to supermassive behemoths. Black holes are spoken of as scientific facts and it is routinely claimed that they have been detected at the centres of galaxies. Images of black holes having their wicked ways with surrounding matter are routinely included with reports of them. Some physicists even claim that black holes will be created in particle accelerators, such as the Large Hadron Collider, potentially able to swallow the Earth. Despite the assertions of the astronomers and astrophysicists, nobody has ever found a black hole, anywhere, let alone “imaged” one. The pictures adduced to convince are actually either artistic impressions (i.e. drawings) or photos of otherwise unidentified objects imaged by telescopes and merely asserted to be due to black holes, *ad hoc*.

1 Introduction

Although this article contains a number of mathematical expressions, everything can be understood with nothing more than elementary high school algebra. Most of it can be understood without any mathematics at all.

2 Special and General Relativity

An inertial frame is just somewhere Newton’s First Law holds:

A body will remain at rest or move in a straight line with a constant velocity unless acted upon by an outside force.

Einstein’s postulates for Special Relativity are:

- (a) *The speed of light in vacuo is the same for all inertial frames;*
- (b) *The laws of physics are the same for all inertial frames.*

It follows from these postulates that infinite density is forbidden because infinite energy is forbidden, or equivalently, because no material body can acquire the speed of light in vacuo. General Relativity cannot violate Special Relativity by

definition, so it too forbids infinite density. That infinite density is forbidden by the Theory of Relativity is easily proven with nothing more than simple high school algebra.

Recall that according to Einstein absolute motion does not exist. Only the relative motion between bodies is meaningful. Consider two masses M_o and m_o at rest, i.e. their relative velocity is zero. These masses are therefore called ‘rest masses’. Let both masses be cuboid in shape, sides L_o and X_o respectively. The rest volumes are just L_o^3 and X_o^3 respectively. Now if the relative velocity has magnitude $v > 0$, from the perspective of mass M_o the other mass increases by

$$m = \frac{m_o}{\sqrt{1 - \frac{v^2}{c^2}}} \quad (1)$$

where c is the speed of light in vacuo. In addition, from the perspective of mass M_o the length of the side of the other mass, in the direction of motion, is decreased by

$$X = X_o \sqrt{1 - \frac{v^2}{c^2}}. \quad (2)$$

The other sides of the mass m_o do not change. So mass M_o sees a volume $V = X_o^3 \sqrt{1 - \frac{v^2}{c^2}}$.

Now recall that density D is the mass divided by the volume. Hence, the density mass M_o sees is,

$$D = \frac{m}{V} = \frac{m_o}{X_o^3 \left(1 - \frac{v^2}{c^2}\right)}. \quad (3)$$

These three relations are reciprocal, i.e. the perspective of m_o is described by the same equations except that M_o and L_o replace m_o and X_o in them. So it doesn't matter who watches whom: the results are the same.

Now note that according to eq.(3), as $v \rightarrow c$, $D \rightarrow \infty$. But no material body can acquire the speed c . So infinite density is forbidden by Special Relativity, and therefore also by General Relativity.

3 The Signatures of a Black Hole

The black hole is allegedly predicted by Einstein's General Theory of Relativity. The alleged signatures of the black hole are an infinitely dense point-mass singularity and an event horizon. But we have already seen that infinite density is forbidden by the Theory of Relativity. So the claim for an infinitely dense point-mass singularity is false. This result is sufficient to prove that black holes are not predicted by General Relativity at all. It is an attempt to escape this dilemma, when cornered, astrophysical scientists are quick to resort to the argument that at the 'singularity' General Relativity "breaks down", and so it cannot describe what happens there, so that some kind of 'quantum theory of gravity' is needed. Nonetheless, the black hole singularity is still said to be infinitely dense. If General Relativity breaks down at the alleged singularity, as they claim, then General Relativity cannot say anything about the singularity, let alone that it is infinitely dense. And there is no 'quantum theory' of gravity to describe it or anything else gravitational. So the 'singularity' is either infinitely dense, as they claim, or it cannot be described by General Relativity, which "breaks down" there, as they also claim. It can't be both, either at the same time or at different times, according to fancy. But in either case it is inconsistent with the Theory of Relativity since infinite density is strictly forbidden by the Theory.

It is noteworthy at this point that Newton's theory of gravitation does not predict black holes either, although it is often claimed that it does, in some form or another: we will come back to this point later.

What about the event horizon of the black hole? According to the theory of black holes it takes an infinite amount of time for an observer to watch an object (via the light from that object, of course) to fall down to the event horizon. So it therefore takes an infinite amount of time for the observer to verify the existence of an event horizon and thereby confirm the presence of a black hole. However, nobody has been and nobody will be around for an infinite amount of time in order to verify the presence of an event horizon and hence the

presence of a black hole. Nevertheless, scientists claim that black holes have been found all over the place. The fact is nobody has assuredly found a black hole anywhere - no infinitely dense point-mass singularity and no event horizon. Some black hole proponents are more circumspect in how they claim the discovery of their black holes. They instead say that their evidence for the presence of a black hole is indirect. But such indirect "evidence" cannot be used to justify the claim of a black hole, in view of the fatal contradictions and physically meaningless properties associated with infinitely dense point-mass singularities and event horizons. One could just as well assert the existence and presence of deep space unicorns on the basis of such indirect "evidence".

Some claim that the energy of a black hole of finite mass m is $E = mc^2$. But then they have an infinite density associated with a finite energy, which violates Special Relativity once again.

It is also of great importance to be mindful of the fact that no observations gave rise to the notion of a black hole in the first place, for which a theory had to be developed. The black hole was wholly spawned in the reverse, i.e. it was created by theory and observations subsequently misconstrued to legitimize the theory. Reports of black holes are just wishful thinking in support of a belief; not factual in any way.

4 Einstein's Field Equations

According to Einstein, matter is the cause of the gravitational field and the causative matter is described in his theory by a mathematical object called the energy-momentum tensor, which is coupled to geometry (i.e. spacetime) by his field equations, so that matter causes spacetime curvature (his gravitational field). Einstein's field equations

*"... couple the gravitational field (contained in the curvature of spacetime) with its sources."**

Qualitatively his field equations are:

$$\text{Spacetime geometry} = -\kappa \times \text{matter}$$

where matter is described by the energy-momentum tensor and κ is a constant. The spacetime geometry is described by a mathematical object called Einstein's tensor, $G_{\mu\nu}$, ($\mu, \nu = 0, 1, 2, 3$) and the energy-momentum tensor is $T_{\mu\nu}$. So Einstein's full field equations are:

$$G_{\mu\nu} = -\kappa T_{\mu\nu}. \quad (4)$$

5 The Physical Foundations of Gravity

Einstein asserted that his 'Principle of Equivalence' and his laws of Special Relativity must hold in his gravitational field

*Foster, J. & Nightingale, J.D., A short course in General Relativity, 2nd Ed., 1995, p.99

(at least in a sufficiently small part of it). His ‘Principle of Equivalence’ states that the mass of an object under the influence of a gravitational field and the mass of the same object moving under the influence of a force other than gravity, are the same. This just means that if you were standing in a closed box without windows, in deep space, there is no experiment that you can do to enable you to tell if you are acted upon by gravity or if the box in which you are standing is being pushed upward or pulled upward by some other force, such as that due to a winch. Note that the ‘Principle of Equivalence’ involves at least two masses: that causing the gravitational field and that under the influence of the field. Similarly, the laws of Special Relativity involve the presence of at least two masses; for otherwise relative motion between two bodies cannot manifest. We have already seen, in **Section 2** above, that the two postulates of Special Relativity are couched in terms of inertial systems, which are in turn defined in terms of mass via Newton’s First Law of motion. Here is what Einstein himself expounded (see his book *The Meaning of Relativity*, Science Paperbacks and Methuen & Co. Ltd., 1967, pp. 56-57, which Einstein revised in 1954, the year before his death):

“Let now K be an inertial system. Masses which are sufficiently far from each other and from other bodies are then, with respect to K , free from acceleration. We shall also refer these masses to a system of co-ordinates K' , uniformly accelerated with respect to K . Relatively to K' all the masses have equal and parallel accelerations; with respect to K' they behave just as if a gravitational field were present and K' were unaccelerated. Overlooking for the present the question as to the ‘cause’ of such a gravitational field, which will occupy us later, there is nothing to prevent our conceiving this gravitational field as real, that is, the conception that K' is ‘at rest’ and a gravitational field is present we may consider as equivalent to the conception that only K is an ‘allowable’ system of co-ordinates and no gravitational field is present. The assumption of the complete physical equivalence of the systems of coordinates, K and K' , we call the ‘principle of equivalence’; this principle is evidently intimately connected with the law of the equality between the inert and the gravitational mass, and signifies an extension of the principle of relativity to co-ordinate systems which are in non-uniform motion relatively to each other. In fact, through this conception we arrive at the unity of the nature of inertia and gravitation. For, according to our way of looking at it, the same masses may appear to be either under the action of inertia alone (with respect to K) or under the combined

action of inertia and gravitation (with respect to K').

“Stated more exactly, there are finite regions, where, with respect to a suitably chosen space of reference, material particles move freely without acceleration, and in which the laws of special relativity, which have been developed above, hold with remarkable accuracy.”

In their textbook*, J. Foster and J. D. Nightingale succinctly state the ‘Principle of Equivalence’ thus:

“We may incorporate these ideas into the principle of equivalence, which is this: In a freely falling (nonrotating) laboratory occupying a small region of spacetime, the laws of physics are the laws of special relativity.”

Taylor and Wheeler state in their book†:

“General Relativity requires more than one free-float [i.e. inertial] frame.”

In the space of Newton’s theory of gravitation, one can simply put in as many masses as one pleases. Although solving for the gravitational interaction of these masses rapidly becomes beyond our capacity, there is nothing to prevent us inserting masses conceptually. This is essentially the ‘Principle of Superposition’. However, one cannot do this in General Relativity, because Einstein’s field equations are non-linear. In General Relativity, each and every configuration of matter must be described by a corresponding energy-momentum tensor and the field equations solved separately for each and every such configuration, because matter and geometry are coupled, as eq. (4) describes. Not so in Newton’s theory where geometry is independent of matter. The ‘Principle of Superposition’ does not apply in General Relativity.

Now Einstein and his followers assert that the gravitational field “outside” a mass contains no matter. In other words they assert that there is only one mass in the whole Universe with this particular problem statement. In eq. (4) they then set the energy-momentum tensor to zero. But this means that there is no matter present by which the gravitational field can be caused! Nonetheless, it is so claimed, and it is also claimed that the field equations then reduce to the much simpler form,

$$Ric = R_{\mu\nu} = 0. \quad (5)$$

$Ric = R_{\mu\nu}$ is called the Ricci tensor. So this is a statement that spacetime is devoid of matter. It is from the solution to this set of field equations that the black hole was spawned.

*A short course in *General Relativity*, 2nd Ed., 1995, p.2

†*Exploring Black Holes*, 2000

However, since this is a spacetime that *by definition* contains no matter, Einstein's 'Principle of Equivalence' and his laws of Special Relativity cannot manifest, thus violating the physical requirements of the gravitational field that Einstein himself laid down. Despite the claims made for $Ric = 0$, it therefore fails to describe Einstein's gravitational field. Consequently, one cannot get a black hole from $Ric = 0$.

Since $Ric = 0$ cannot describe Einstein's gravitational field, Einstein's field equations cannot reduce to $Ric = 0$ when $T_{\mu\nu} = 0$. In other words, if $T_{\mu\nu} = 0$ (i.e. there is no matter) then there is no gravitational field. Consequently Einstein's field equations must take the form,

$$\frac{G_{\mu\nu}}{\kappa} + T_{\mu\nu} = 0. \quad (6)$$

This is an identity (i.e. the left *and* right sides of the equation are *always* zero). The $G_{\mu\nu}/\kappa$ are the components of a gravitational energy tensor. Thus the total energy of Einstein's gravitational field is *always* zero; the $G_{\mu\nu}/\kappa$ and the $T_{\mu\nu}$ *must vanish identically* (i.e. when $T_{\mu\nu} = 0$ then $G_{\mu\nu} = 0$ and vice-versa); there is no possibility for the localization of gravitational energy (i.e. no Einstein gravitational waves). This also means that Einstein's gravitational field violates the usual conservation of energy and momentum. Since there is no experimental evidence that the usual conservation of energy and momentum is invalid, Einstein's General Theory violates the experimental evidence, and so it is invalid.

It was early pointed out to Einstein by a number of his contemporaries that his General Theory violated the usual conservation of energy and momentum. So Einstein, to save his Theory, did something very unscientific: he invented something to get what he wanted. His invention had a two-fold purpose (a) to bring his theory into line with the usual conservation of energy and momentum, (b) to enable him to get gravitational waves that propagate with speed c . In other words, Einstein just made things up. His invention was his pseudo-tensor. First, it is not a tensor, and therefore not in keeping with his theory that all equations be tensorial. Second, he concocted his pseudo-tensor in such a way that it behaves like a tensor in one particular situation, that in which he could get gravitational waves with speed c . Thus, he invented to satisfy his objectives, and because his Theory failed otherwise. But Einstein (and his followers) did not realise that his invention, as well as being simply unscientific augmentation to satisfy a desire, is nonsense, for the following reason: his pseudo-tensor is in fact just a meaningless concoction of mathematical symbols and so describes nothing. The technical reason is this: Einstein's pseudo-tensor implies the existence of what is called by the pure mathematicians, a 1st-order intrinsic differential invariant which depends only upon the components of the metric tensor and their 1st-derivatives. But the pure mathematicians G. Ricci-Curbastro (after whom $Ric = R_{\mu\nu}$ is named) and T. Levi-Civita proved, in 1900, that such invariants **do not exist!** Thus, Einstein's pseudo-tensor

is just meaningless, and consequently everything built upon it also meaningless.

6 Black Hole Interactions

It is routinely claimed that black holes can exist in binary systems as two holes or a hole and a star, can merge or collide, or interact with other matter. But $Ric = 0$, from which the black hole was originally conjured, defines a spacetime (a Universe) that contains no matter. One cannot apply the 'Principle of Superposition' so that a black hole (obtained from $Ric = 0$) can persist in the spacetime of a given black hole (obtained separately from $Ric = 0$) so that the two alleged black holes can persist in and mutually interact in a mutual spacetime that by definition contains no matter. Multiple black holes and their interactions with matter cannot be asserted by an analogy with Newton's theory via the 'Principle of Superposition', because the latter does not apply in General Relativity. Not only that, there are no known solutions to Einstein's field equations for the interaction of two or more bodies and no existence theorem has been proven by which it can even be claimed that his field equations contain latent solutions for such configurations of matter, so all claims for black hole interactions are patently false. Indeed, General Relativity cannot account for the simple experimental fact that two fixed bodies will attract one another upon release. Furthermore, the claim that black holes consume matter requires that matter be present for them to consume. This is impossible in any empty spacetime (e.g. $Ric = 0$). But since Einstein's gravitational field violates the usual conservation of energy and momentum anyway, black holes (and big bangs) are meaningless from that deeper level.

Notwithstanding the absence of two (or more) body solutions or an existence theorem, physicists frequently claim that they have solutions for black holes interacting with some other matter (small quantities), by means of numerical methods. However, one can propose numerical methods on next to anything. The resulting numerical analysis does not mean that the problem is theoretically well-posed. Just because a numerical investigation has been constructed does not mean that the field equations contain solutions for two or more bodies. This issue must be settled by either an exact solution or an existence theorem for such configurations of matter. Only then might numerical investigations have meaning. This is not the case with General Relativity. The numerical methods have been applied in the total absence of any security at all that the field equations admit of solutions for two or more bodies. In other words, the numerical methods are just numerical games based upon whims.

7 The Schwarzschild Solution

The solution for $Ric = 0$ is called ‘Schwarzschild’s solution’. However, it is not Schwarzschild’s solution at all, and Schwarzschild’s actual solution, which is a solution for $Ric = 0$, forbids black holes. This is easily verified by reading Schwarzschild’s original paper,

www.sjcrothers.plasmaresources.com/schwarzschild.pdf

Schwarzschild did not breathe a single word about black holes at all; nothing about event horizons and nothing about the ‘Schwarzschild radius’. Believe it or not, it is a fact that most scientists who think that black holes exist don’t even know Schwarzschild’s solution.

Now in the so-called ‘Schwarzschild solution’ for black holes there is a quantity designated by the pronumeral ‘ r ’. In the treatment of black holes it is claimed that a particular value of ‘ r ’ gives the ‘Schwarzschild radius’ or ‘gravitational radius’, the radius of the event horizon. It is also claimed that at $r = 0$ there is an infinitely dense point-mass singularity (in violation of the Theory of Relativity, as we have previously noted). The proponents of the black hole have never properly identified what their ‘ r ’ denotes, but in all cases they effectively treat their ‘ r ’ as not only a distance in the associated spacetime but as a radial distance in the spacetime (recall ‘Schwarzschild radius’). They claim that at the ‘Schwarzschild radius’ there is a ‘removable’ mathematical singularity and at $r = 0$ there is the ‘physical’ singularity of the black hole. However, they have never given a proof that their ‘ r ’ can go down to zero in their expression. They just say it is so and then concoct a method to make it so, the Kruskal-Szekeres coordinates.

But their arguments are fallacious for the following reason: their quantity ‘ r ’ is not even a distance in the associated spacetime, let alone a radial distance, because it is easily proven that their ‘ r ’ actually denotes the inverse square root of the Gaussian curvature of a spherically symmetric surface embedded in the space, and this has nothing to do with radial distance in the spacetime. In other words, the proponents of the black hole don’t even use a distance in the spacetime, but they think they do, and in consequence thereof they make all sorts of calculations and claims in violation of the rules of differential geometry. Thus, all their claims are demonstrably false. The mathematical proofs, somewhat complicated, can be obtained at

www.ptep-online.com/index_files/2007/PP-09-14.PDF

www.ptep-online.com/index_files/2008/PP-12-11.PDF

8 The Newtonian Approximation

In order to get a ‘Newtonian approximation’ from his Theory, Einstein made another fatal mistake; a fatal fudge (repeated ad infinitum by his followers). His field equations

are highly non-linear, and so he proposed a linearization of his field equations so that he could solve them for a potential function, which he approximated to Newton’s potential function. This is inadmissible actually, on physical grounds, but I will leave this aside for the time being and concentrate on the mathematical issue; linearisation. It is always a dangerous thing to linearise a non-linear system of equations because one cannot be certain that the original non-linear system can be approximated by a linear system (mathematicians are well aware of this). But this is precisely Einstein’s blunder, because his field equations cannot be approximated by a linear system, for the following reason: linearisation of Einstein’s field equations implies the existence of a tensor which, except for the trivial case of being precisely zero, **does not otherwise exist!** This was proven by the celebrated applied mathematician Hermann Weyl, in 1944.

In the space of Newton’s theory of gravitation, one can simply put in as many masses as one pleases. Although solving for the gravitational interaction of these masses rapidly becomes beyond our capacity, there is nothing to prevent us inserting masses conceptually. This is essentially the Principle of Superposition. However, one cannot do this in General Relativity, because Einstein’s field equations are non-linear. In General Relativity, each and every configuration of matter must be described by a corresponding energy-momentum tensor and the field equations solved separately for each and every such configuration, because matter and geometry are coupled. Not so in Newton’s theory where geometry is independent of matter. Nonetheless it is routinely alleged that General Relativity contains Newton’s theory of gravity as an approximation, in the case of a weak gravitational field. This is incorrect.

Newton’s theory of gravitation is based upon the interaction of two bodies. Recall that Newton’s force of gravitation is described by the equation,

$$F = G \frac{Mm}{r^2}, \quad (7)$$

where F is the force of gravitation between the two masses M and m , separated by a distance r between their ‘centres of mass’ and G is Newton’s gravitational constant. His potential function is obtained by dividing through by one of the masses and multiplying through by the radial distance moved by a mass against the field of a given mass. For example, the gravitational potential due to mass M is

$$\text{Potential} = \Phi = \frac{Fr}{m} = \frac{GM}{r}. \quad (8)$$

His gravitational potential equation, although apparently containing only one mass (it’s on the far right side of the equation), does not eliminate the two-body basis in view of the definition of his gravitational potential (Fr/m contains the other mass). His gravitational potential is defined as the work done (force \times distance) per unit mass against the gravitational

field of a given mass on a mass in the gravitational field of the given mass. In other words, the potential is the work per unit mass (or energy per unit mass). Thus, with a Newtonian potential, the gravitational energy associated with a mass in the field of a given mass is obtained by multiplying the potential equation by the mass in the field of the given mass. This is reciprocal for the two masses. Notice that the whole concept involves the interaction of two masses. There is no meaning to Newton's theory of gravitation if there is only one alleged mass in the Universe.

Now recall that the proponents of the black hole, following Einstein, linearise his field equations in order to get themselves a Newtonian approximation. We already know that linearisation is inadmissible. On top of that fatal error, they also introduce the Newtonian potential function, *post hoc*, into the so-called 'Schwarzschild solution', and then claim that General Relativity contains Newton's theory as an approximation (in a weak gravitational field). That is clearly wrong. Newton's potential implicitly contains two masses interacting, yet the 'Schwarzschild' black hole allegedly produces a gravitational field for just one mass in an otherwise empty Universe ($Ric=0$), into which, nevertheless, the physicists arbitrarily stick in other matter in violation of $Ric=0$. $Ric=0$ is therefore incompatible, in principle, with a Newtonian potential function. It is noteworthy that Karl Schwarzschild did not arbitrarily introduce a Newtonian potential function into his real solution, because he knew that it was inadmissible. It is also clear that the claim that Einstein's theory reduces to Newton's theory in the case of a weak field is false, because the Newtonian potential did not fall out of the so-called 'Schwarzschild solution' it was just put in by Einstein and his followers. The argument that the Schwarzschild black hole relies upon is therefore circular, and so it is false. One cannot get a two-body concept from a solution for an alleged one body problem. Of course, $Ric=0$ is not even a one body problem, because there is no matter present by definition (no sources), and Einstein's Principle of Equivalence and his laws of Special Relativity cannot manifest in an empty spacetime. And so to get matter the physicists simply put it in at the end of their calculations, in the form of a Newtonian potential which is actually a two-body concept, and then claim that they got a Newtonian approximation!

We already know that the quantity 'r' in the so-called 'Schwarzschild solution' is not even a distance let alone a radial distance in the alleged gravitational field thereof. It is the inverse square root of the Gaussian curvature of a spherical surface embedded in the spacetime. Now Newton's theory forbids infinite density too. In his theory of gravity a material body is described in terms of its 'centre of mass' in that the distance between two separate bodies is that between their centres of mass. The centre of mass is not a physical object; it is a geometric point (zero volume) at which all the mass is taken as concentrated, by mathematical artifice. Nobody claims that Newton's centre of mass is a physical object, and

rightly so. However, the proponents of the black hole treat their point-mass 'singularity', a centre of mass, as a real object, mistaken as well that there is matter present (in violation of $Ric=0$) to which the 'center of mass' could apply.

9 The Newtonian 'Black Hole'

Black holes are not predicted by Newton's theory of gravitation either, despite the claims of the astrophysical scientists that the theoretical Michell-Laplace dark body is a kind of black hole. The Michell-Laplace dark body possesses an escape velocity, whereas the black hole has no escape velocity; it does not require irresistible gravitational collapse, whereas the black hole does; it has no infinitely dense point-mass singularity, whereas the black hole does; it has no event horizon, whereas the black hole does; there is always a class of observers that can see the dark body, but there is no class of observers that can see the black hole; the Michell-Laplace dark body can persist in a space which contains other matter and interact with that matter, but the spacetime of the 'Schwarzschild' black hole (and variants) is devoid of matter and so it cannot interact with any matter. Thus the Michell-Laplace dark body does not possess the signatures of the alleged black hole and so it is not a black hole. Interested readers are referred for further information on this issue to a lucid article by the late and celebrated British astronomer George C. McVittie, which can be obtained as cited below in the references section.

10 The Basic Geometrical Error

The fundamental geometrical error in the genesis of the black hole is very simple, yet it has gone unrecognised by the physicists. Consider a circle of radius $r > 0$ in the $x - y$ plane. Let the centre of the circle coincide with the origin of the $x - y$ coordinate system. The intrinsic geometry of the circle is independent of where it is located in the $x - y$ plane. We can move the circle so that it is centred at any point in the $x - y$ plane. We don't have to keep it centred of the origin of the $x - y$ system of coordinates, i.e. we don't have to keep it centred at $x=0, y=0$. Now if we move the circle to some other place in the $x - y$ plane the centre of the circle goes with it. It is meaningless to suggest that although the circle has been shifted to some other place in the $x - y$ plane that its centre remains at the origin of the $x - y$ coordinate system. Now one can do the same with a sphere in $x - y - z$ space. If a sphere of radius $r > 0$ is initially located so that its centre is at the origin of the $x - y - z$ coordinate system (i.e. at $x=0, y=0, z=0$), when it is shifted to some other place in the $x - y - z$ coordinate system, its centre is shifted with it.

The error in the black hole geometry is essentially this: a sphere is unwittingly shifted by the mathematical gymnastics associated with the so-called 'Schwarzschild solution',

from its initial centre at the origin of a parametric coordinate system to a centre somewhere else in the parametric coordinate system. Then oblivious to this shift, it is thought that the parametric centre of the sphere is still at the origin of the parametric coordinate system, at $r = 0$, when in fact it is not. With this misconception, the physicists think that they have to get down to $r = 0$ to locate their mass there, and so devise a complicated method to do so, creating thereby their point-mass singularity at parametric $r = 0$ and event horizon at the parametric ‘Schwarzschild radius’, when in fact the centre of their sphere is at a point at a parametric distance from the parametric origin at $r = 0$ given by the value of their ‘Schwarzschild radius’. So their ‘Schwarzschild radius’ is not a radius at all, but a parametric point at the centre of a sphere in a parametric coordinate system. They then think that this point denotes an event horizon, because it is some ‘distance’ from $r = 0$ at which they think their sphere is centred, where their point-mass ‘singularity’ is located. The parametric nature of their quantity ‘ r ’ is also unrecognised. This involves what mathematicians call a ‘mapping’, and so in the ‘Schwarzschild solution’ the quantity ‘ r ’ plays a somewhat different rôle, strictly related to Gaussian curvature. In the parametric space, ‘ r ’ plays a dual rôle - it is both a radial distance and the inverse square root of the Gaussian curvature, because the parametric space is Euclidean. But the ‘Schwarzschild space’ of $Ric = 0$ is non-Euclidean, and so Euclidean relations do not hold there.

11 More On Event Horizons

According to the theory of black holes, a fixed external observer watches a material object in free fall towards the black hole. The alleged observer sees the alleged freely falling material object by the light emitted from it or reflected from it, of course. But we now ask, in the spacetime of $Ric = 0$, from where did the observer, the freely falling object and the light by which the latter is seen, all come from? Recall that $Ric = 0$ is a statement that there is no matter in the Universe, and recall that the ‘Principle of Superposition’ does not apply in General Relativity. Clearly, it is impossible for an observer (which must consist of matter), a freely falling material object and light to be present in the empty spacetime of $Ric = 0$, by definition. The physicists, by thoughtless application of the Principle of Superposition (an inadmissible application of Newtonian principles to a non-Newtonian theory), merely insert the observer, the freely falling object and the light into the empty spacetime of $Ric = 0$, *post hoc*, in violation of the field equations $Ric = 0$. Recall further that all matter present must be described by the energy-momentum tensor because all matter present contributes to the geometry (to the curvature of spacetime, i.e. Einstein’s gravitational field) by the geometry/matter coupling defined by Einstein’s full field equations. But as we have already seen, in the case of $Ric = 0$

the energy-momentum tensor is zero (no matter) by initial hypothesis.

Here is another curious claim made by the astrophysical scientists: the escape velocity of a black hole is the speed of light in vacuo. But they also claim that nothing at all can even leave a black hole. But if the escape velocity of the black hole is the speed of light in vacuo, then light can escape according to the very definition of escape velocity. Not only that, material bodies could leave the black hole, but not escape, because they would eventually fall back to the black hole since no material body can acquire the speed of light in vacuo.

12 Other ‘Empty’ Spacetimes

It is also alleged by most astrophysicists and astronomers that spacetimes described by the field equations

$$Ric = \lambda g_{\mu\nu}, \quad (9)$$

where λ is the so-called ‘cosmological constant’, describe gravitational fields in the absence of matter; that the spacetimes are curved by themselves, without the causative influence of matter; in other words that a gravitational field can exist in the complete absence of matter as a causative agent. However, there is not a single shred of physical evidence to suggest that a gravitational field can be generated without a material cause. Curiously, the astrophysical scientists allege on the one hand that although this expression contains no sources for the gravitational field, because the energy-momentum tensor is zero, on the other hand they also allege, in contradiction, that $Ric = 0$ contains a source even though the energy-momentum tensor is zero there too. In the latter case the massive source is inserted *post hoc* into the solution, as we have seen, and hence inadmissible.

Many astrophysical scientists have claimed that spacetimes of the form described by eq.(9) are gravitational fields generated by “the vacuum” (since in this case there is no material cause present), in violation of the very bases of Einstein’s General Theory of Relativity. Furthermore, it is a concept that also has absolutely no basis whatsoever in any experiment or observation.

According to Einstein, matter is the cause of the curvature of spacetime, i.e. of the gravitational field, and the causative matter must manifest mathematically in a non-zero energy-momentum tensor in his field equations. The late American theoretical physicist John A. Wheeler has reasserted Einstein’s geometrodynamics thus, “*Matter tells spacetime how to curve and spacetime tells matter how to move*”. The fact that Einstein’s field equations violate the usual conservation of energy and momentum also means that $Ric = \lambda g_{\mu\nu}$ is a physically meaningless expression to begin with.

13 Recent Developments

The Special Theory of Relativity has been subjected to serious criticism in recent years. A very recent and important paper (September 2008) that is of great interest is one by Professor Reginald T. Cahill of Flinders University. His technical paper can be obtained here:

www.ptep-online.com/index_files/2008/PP-15-04.PDF

Professor Cahill adduces both theoretical and experimental evidence for the anisotropy of the speed of light in vacuo, and reassesses a number of older experiments, such as the Michelson and Morley experiment, showing clearly that they too, besides not being null as usually reported, actually detected light anisotropy. Professor Cahill's own recent experiments with modern technology detected the anisotropy of the speed of light to first order accuracy. His theoretical work extends, in part, earlier theoretical work by the late British scientist Dr. Charles Kenneth Thornhill, whose relevant papers can be obtained here:

www.etherphysics.net/

An extension of Einstein's basic ideas to include what is called 'torsion' is currently being investigated by a number of scientists. One particular theoretical scientist working in this area is Professor Myron W. Evans of Wales. His writings on this subject can be obtained here:

www.aias.us

Plasma scientists and engineers have been working quietly for many years, investigating the rôle of electricity in astrophysics, with much success, both in theory and in the laboratory. Gravitation astrophysical scientists have largely ignored this research, despite the Universe being, as far as we know, actually composed mostly of plasma (clouds, streams and filaments of energetic charged particles). In recent years however, they have become more vocal in their opposition to the quite phantastic notions that astronomers and physicists have come up with to explain and justify themselves. The interested reader is referred to the books by Donald E. Scott, Wallace Thornhill and David Talbot (see references herein) for a lucid introduction to this fascinating and important branch of physical science.

No amount of experimentation can prove a theory, but it only takes one experiment to falsify a theory. This paper is a recent report on the failure of the LIGO project to detect Einstein's gravitational waves:

www.iop.org/EJ/abstract/1742-6596/122/1/012033/

LIGO's international counterparts have also failed to detect the alleged gravitational waves. We have however seen that they are destined to detect nothing, being as they are, founded on false theory. LIGO alone has cost hundreds of millions

of dollars to date, and it was recently granted another \$450 million US to continue its unaccountable extravagance.

It is alleged that General Relativity predicts that a rotating body such as the Earth, drags spacetime around with it. This is called 'frame dragging' or the 'Lense-Thirring effect'. The Gravity Probe B was launched into Earth orbit to detect this alleged effect. It did not detect the effect, despite exceedingly high precision gyroscopes designed for the purpose. In fact, NASA has cancelled the project, as this article reports:

www.binaryresearchinstitute.org/bri/research/findingit/gravprobek-update.shtml

Gravity Probe B cost the taxpayer in excess of \$750 million US. The Large Hadron Collider (LHC) in Europe has cost in the vicinity of \$9 billion US to date, and counting.

Of course, those with vested interests in black holes, big bangs and gravitational waves are not eager for these facts to become common knowledge. There are many academic jobs and reputations at stake, and billions of taxpayer dollars to be accounted for.

14 Epilogue

Science can only advance in an environment of free and open exchange of ideas. Unfortunately, modern science, physics and astronomy in particular, is very big business. Interests other than science consequently hold sway over what is and what is not published in science journals and otherwise reported, what is taught to students at universities and high schools, and what research money goes where. Inconvenient truths are deliberately and systematically suppressed. NASA has openly stated* that it will not fund any research which impinges adversely upon the dogma of Big Bang Cosmology, despite a plethora of both physical and theoretical evidence for its falsity.

The editorial boards of the major science journals now routinely suppress papers that are adverse to black holes, big bangs, gravitational waves, and indeed any other cherished theory by which reputations have been built, jobs acquired and lucrative research grants obtained. A very penetrating and sober account of what has been happening in contemporary physics and astronomy has been written by mathematician and physicist Dr. Jeremy Dunning Davies. Any concerned person would do well to read his revealing book.

The astrophysical scientists all too often entreat the layman to just take them at their word, without analysis of their claims or verification of their data, on the basis that the layman cannot hope to understand theories such as General Relativity, owing to their mathematical complexity. This little article is clear testimony that this is just not true. Anybody with even a nodding acquaintance with high school algebra and physics

*Scott, Donald E. *The Electric Sky*, 2006, pp.226-227

can understand all the salient facts and features and can come to a logical conclusion, provided none of the facts and figures are withheld from their consideration. Unfortunately, the astrophysical scientists not only try to tell the public what is and what is not, they have also withheld the facts from the public at large, facts which invalidate the claims they have made and rely upon for their continued employment.

Whatever ideas we utilise to model and describe the physical Universe they are neither pre-ordained nor permanent. Contemporary astronomers and physicists would have us believe otherwise, with their theories of everything, now, or just around the corner. Their's is not a scientific method, but an obstruction to progress and truth.

Acknowledgement

My thanks to Mr. Axel Westrenius for proof-reading this article.

References

- [1] Abrams L. S. Black Holes: The Legacy of Hilbert's Error. *Can. J. Phys.*, v. 67, 919, 1989, www.sjcrothers.plasmareources.com/Abrams1989.pdf
- [2] Antoci S. David Hilbert and the origin of the "Schwarzschild" solution. 2001, www.sjcrothers.plasmareources.com/hilbert.pdf
- [3] Brillouin M. The singular points of Einstein's Universe. *Journ Phys. Radium*, v. 23, 43, 1923, www.sjcrothers.plasmareources.com/brillouin.pdf
- [4] Cahill R. T. www.scieng.flinders.edu.au/cpes/people/cahill_r/processphysics.html
- [5] Crothers S. J. On the geometry of the general solution for the vacuum field of the point-mass. *Progress in Physics*, v. 2, 3–14, 2005, www.ptep-online.com/index_files/2005/PP-02-01.PDF
- [6] Crothers S. J. Black Holes, Unicorns and All that Jazz, 2008, www.sjcrothers.plasmareources.com/Unicorns.pdf
- [7] Droste J. The field of a single centre in Einstein's theory of gravitation, and the motion of a particle in that field. *Ned. Acad. Wet., S. A.*, v. 19, 197, 1917, www.sjcrothers.plasmareources.com/Droste.pdf
- [8] Dunning-Davies, J. Exploding A Myth, 'Conventional Wisdom' or Scientific Truth?, Horwood Publishing Limited, West Essex, England, 2007, ISBN: 978-1-904275-30-5
- [9] Einstein A. The Meaning of Relativity, Science Paperbacks and Methuen & Co. Ltd., pp.56–57, 1967.
- [10] Evans M. W. Alpha Institute of Advanced Studies, www.aias.us/
- [11] Foster J., Nightingale J.D. A short course in General Relativity, Springer-Verlag, New York, Inc., 1995, ISBN: 0-387-94295-5
- [12] Levi-Civita T. Mechanics. - On the Analytical Expression that must be given to the Gravitational Tensor in Einstein's Theory. www.sjcrothers.plasmareources.com/Levi-Civita.pdf
- [13] Levi-Civita T. The Absolute Differential Calculus, Dover Publications Inc., New York, 1977.
- [14] Loinger A. On black holes and gravitational waves. La Goliardica Paves, Pavia, 2002.
- [15] McVittie, G.C. Laplace's alleged "black hole". *The Observatory*, v.98, 272, 1978, www.sjcrothers.plasmareources.com/McVittie.pdf
- [16] Schwarzschild K. On the gravitational field of a mass point according to Einstein's theory. *Sitzungsber. Preuss. Akad. Wiss., Phys. Math. Kl.*, 189, 1916, www.sjcrothers.plasmareources.com/schwarzschild.pdf
- [17] Schwarzschild K. On the Gravitational Field of A Sphere of Incompressible Fluid According to Einstein's Theory. *Sitzungsber. Preuss. Akad. Wiss., Phys. Math. Kl.*, 1916, www.sjcrothers.plasmareources.com/Schwarzschild2.pdf
- [18] Scott, Donald E. The Electric Sky, (A Challenge to the Myths of Modern Astronomy), Mikamar Publishing, Portland, Oregon, 2006, ISBN: 0-9772851-1-1
- [19] Talbot D., Thornhill, W. Thunderbolts of the Gods, Mikamar Publishing, Portland, Oregon, 2005, ISBN: 0-9772851-0-3
- [20] Taylor E.F., Wheeler J.A., Exploring Black Holes, Addison Wesley Longman, (Preprint: Version of January 1, 2000).
- [21] Thornhill C. K. www.etherphysics.net/
- [22] Thornhill W., Talbot D. The Electric Universe, Mikamar Publishing, Portland, Oregon, 2007, ISBN-13 978-0-9772851-3-6
- [23] Weyl H. How far can one get with a Linear Field Theory of Gravitation in Flat Space-Time?. *Amer. J. Math.*, 66, 591, 1944, www.sjcrothers.plasmareources.com/weyl-1.pdf