

The Non-Existence of the Black Hole and The Total Failure of General Relativity

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The Black Hole is Not Consistent with GR

Proof 1.

Einstein's field equations,

“... couple the gravitational field (contained in the curvature of spacetime) with its sources.”

(Foster, J. & Nightingale, J.D., A Short Course in General Relativity, Springer-Verlag, New York, 1995)

Thus

Spacetime geometry = $-\kappa$ x causative matter (i.e. sources)

$$G_{uv} = -\kappa T_{uv} \quad u, v = 0, 1, 2, 3$$

Some simple tensor terminology: $T_{subscripts}$ is called covariant, $T^{superscripts}$ is called contravariant, $T^{superscripts}_{subscripts}$ is called mixed.

Order of a tensor = the total number of suffixes.

The Black Hole is Not Consistent with GR

Proof 1. cont'd.

Einstein says if $T_{uv} = 0$, G_{uv} reduces to R_{uv} for '*empty space*' so "*outside a body*"

$$Ric = R_{uv} = 0$$

What then is the **SOURCE** of the gravitational field "*outside a body*"? Einstein says in relation to Hilbert's solution for $Ric = 0$,

"... M denotes the sun's mass centrally symmetrically placed about the origin of coordinates."

(Einstein, A., *The Meaning of Relativity*, Science Paperbacks, Methuen & Co., 1967)

This is a subtle circular play on the words "*outside a body*" and is therefore **INVALID**. $Ric = 0$ contains **NO MATTER** by mathematical construction and hence **THERE IS NO BLACK HOLE!**

NOTE: The black hole was obtained from Hilbert's solution, **NOT** Schwarzschild's.

The Black Hole is Not Consistent with GR

Proof 2.

Einstein asserted that his **Principle of Equivalence** and his laws of **Special Relativity** must hold in sufficiently small finite regions of his gravitational field, and that these regions can be located anywhere in his ‘*gravitational field*’.

(Einstein, A. *The Meaning of Relativity*, Science Paperbacks and Methuen & Co. Ltd., 1967)

Now both the Principle of Equivalence and Special Relativity are **DEFINED** in terms of the **A PRIORI** presence of multiple arbitrarily large finite masses and photons. But $Ric = 0$ contains **NO MATTER** by mathematical construction!

“Black holes were first discovered as purely mathematical solutions of Einstein’s field equations. This solution, the Schwarzschild black hole, is a nonlinear solution of the Einstein equations of General Relativity. It contains no matter, and exists forever in an asymptotically flat space-time.”

(Dictionary of Geophysics, Astrophysics, and Astronomy; Edited by Richard A. Matzner, CRC Press LLC, Boca Raton, USA, 2001)

THUS, THERE IS NO BLACK HOLE.

The Black Hole is Not Consistent with GR

Proof 3.

The Principle of Superposition **DOES NOT** apply in General Relativity because Einstein's field equations are **highly nonlinear**.

Mathematically: if **X** and **Y** are separate solutions, the *linear* combination $a\mathbf{X} + b\mathbf{Y}$, where 'a' and 'b' are scalars, is **NOT** a solution.

Physically: one **CANNOT** pile up matter into any given spacetime (solution) to obtain additional masses, charges, photons, and electromagnetic fields etc. as desired.

But $Ric = 0$ is a spacetime that by mathematical construction contains no matter.

SO THERE IS NO BLACK HOLE!

The Black Hole is Not Consistent with GR

Proof 3 cont'd. Note:

- There are no known solutions to Einstein's field equations for two or more masses and
- No existence theorem by which it can even be asserted that his field equations contain latent solutions for two or more masses.
- So all talk of multiple black holes is totally meaningless!
- And all talk of multiple masses is also totally meaningless.

ALL 'black hole' solutions pertain to a Universe that allegedly contains only **ONE** mass, and so they are **invalid models** once again.

The Black Hole is Not Consistent with GR

Proof 4.

Newton's expression for escape velocity appears in Hilbert's metric by means of a false analogy with Newton's theory, to insert a mass into an **EMPTY SPACE TIME**, and **division by zero is permitted therein** in violation of elementary mathematics. Consider Hilbert's metric (distance formula) with c and G written explicitly so that **NOTHING IS DISGUISED**:

$$ds^2 = c^2 \left(1 - \frac{2Gm}{c^2 r} \right) dt^2 - \left(1 - \frac{2Gm}{c^2 r} \right)^{-1} dr^2 - r^2 (d\theta^2 + \sin^2 \theta d\phi^2)$$

$$0 \leq r < \infty$$

The components of the **METRIC TENSOR** are easily read off:

$$g_{00} = \left(1 - \frac{2Gm}{c^2 r} \right) \quad g_{11} = \frac{-1}{\left(1 - \frac{2Gm}{c^2 r} \right)} \quad g_{22} = -r^2 \quad g_{33} = -r^2 \sin^2 \theta$$

FIRST, WHAT IS THE IDENTITY OF THE QUANTITY 'r'?

The Black Hole is Not Consistent with GR

Proof 4 cont'd.

The quantity ' r ' has been variously and vaguely called

“a distance”, *“the radius”*, *“the radius of a 2-sphere”*,

“the coordinate radius”, *“the radial coordinate”*,

“the Schwarzschild r -coordinate”, *“the radial space coordinate”*,

“the areal radius”, *“the reduced circumference”*,

“the shortest distance a light ray travels to the centre”,

and even *“a gauge choice: it defines the coordinate r ”*.

In the particular case of $r = 2Gm/c^2$ it is invariably called *“the Schwarzschild radius”* or *“the gravitational radius”* for *“the radius”* of the event horizon of the black hole.

The Black Hole is Not Consistent with GR

Proof 4 cont'd.

In his paper ‘On a Stationary System With Spherical Symmetry Consisting of Many Gravitating Masses’, *The Annals of Mathematics*, Second Series, Vol. 40, No. 4 (Oct., 1939), pp. 922-936, Einstein uses the Hilbert metric, written in the so-called isotropic coordinates, and continually and incorrectly refers to r as “*the radius*”.

Thus there is utter confusion - Einstein and his followers **DON'T KNOW WHAT 'r' IS!**
But they always **TREAT** it as the radius.

**THE CORRECT IDENTIFICATION OF 'r' COMPLETELY
INVALIDATES THE BLACK HOLE ONCE AGAIN.**

The Black Hole is Not Consistent with GR

Proof 4 cont'd. WE NOW IDENTIFY 'r'.

Consider the spatial section of Hilbert's metric:

$$ds^2 = \left(1 - \frac{2Gm}{c^2 r}\right)^{-1} dr^2 + r^2 (d\theta^2 + \sin^2 \theta d\phi^2)$$

The surface in the spatial section is given by:

$$ds^2 = r^2 (d\theta^2 + \sin^2 \theta d\phi^2)$$

Gaussian curvature K is an **INTRINSIC PROPERTY OF A SURFACE**, independent of any embedding space. It is calculated by:

$$K = \frac{R_{1212}}{g}$$

The Black Hole is Not Consistent with GR

Proof 4 cont'd.

For Hilbert's metric the calculation gives,

$$K = \frac{1}{r^2} \quad \text{so} \quad r = \frac{1}{\sqrt{K}}$$

Consider now the terms,

$$g_{00} = \left(1 - \frac{2Gm}{c^2 r}\right) \quad g_{11} = \frac{-1}{\left(1 - \frac{2Gm}{c^2 r}\right)} \quad \text{where the relativists say} \\ 0 \leq r < \infty.$$

$$\text{When } r = \frac{2Gm}{c^2} \quad g_{00} = 0 \quad \text{and} \quad g_{11} = \frac{-1}{0}.$$

The Black Hole is Not Consistent with GR

Proof 4 cont'd.

When $r = 0$,

$$g_{00} = \left(1 - \frac{2Gm}{0}\right) \quad \text{and} \quad g_{11} = \frac{-1}{\left(1 - \frac{2Gm}{0}\right)}$$

In his book **'The Theory of Everything, The Origin and Fate of the Universe'**, **New Millennium Press, Beverly Hills, CA., 2002**, Stephen Hawking says, *"The work that Roger Penrose and I did between 1965 and 1970 showed that, according to general relativity, there must be a singularity of infinite density, within the black hole."*

In their book **'Tensor Geometry -- The Geometric Viewpoint and its Uses'**, **2nd Ed., Springer--Verlag, 1991**, Dodson and Poston say, *"Once a body of matter, of any mass m , lies inside its Schwarzschild radius $2m$ it undergoes gravitational collapse . . . and the singularity becomes physical, not a limiting fiction."*

The Black Hole is Not Consistent with GR

Proof 4 cont'd.

But by Special Relativity density is:

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

WHICH FORBIDS INFINITE DENSITY!

The Black Hole is Not Consistent with GR

Proof 4 cont'd. What then is the actual radius R_p in Hilbert's metric?

$$R_p = \int_0^{R_p} dR_p = \int \left(1 - \frac{\alpha}{r}\right)^{-\frac{1}{2}} dr \quad \text{where} \quad \alpha = \frac{2Gm}{c^2}$$

Carrying out the calculation and evaluating the constant of integration for $R_p = 0$ gives,

$$R_p = \sqrt{r(r - \alpha)} + \alpha \ln \left(\frac{\sqrt{r} + \sqrt{r - \alpha}}{\sqrt{\alpha}} \right)$$

When $r = \alpha$, $R_p = 0$, and Hilbert's metric is undefined due to division by zero! $0 \leq r < \alpha$ is **prohibited!**

But $Ric = 0$ contains **no matter** by mathematical construction in any event and is therefore physically meaningless. So Hilbert's solution is also physically meaningless!

The Black Hole is Not Consistent with GR

Proof 4 cont'd. Solving the so-called ‘Schwarzschild radius’ term $r = 2Gm/c^2$ for c we get Newton’s expression for escape velocity, an implicit **two-body relation**,

$$c = \sqrt{\frac{2Gm}{r}}$$

In his book ‘**The Theory of Everything, The Origin and Fate of the Universe**’, **New Millennium Press, Beverly Hills, CA., 2002**, Hawking says,

“I had already discussed with Roger Penrose the idea of defining a black hole as a set of events from which it is not possible to escape to a large distance. It means that the boundary of the black hole, the event horizon, is formed by rays of light that just fail to get away from the black hole. Instead, they stay forever hovering on the edge of the black hole.”

Thus, there is no black hole!

The Black Hole is Not Consistent with Newton

In their paper ‘Astrophysical evidence for the existence of black holes’ (1999), <http://arxiv.org/abs/astro-ph/9912186> , Celotti, Miller and Sciama say,

“In his famous article of 1784, which is seen as being the beginning of the story of black holes, John Michell wrote:

‘If there should really exist in nature any [such] bodies, . . . we could have no information from sight; yet, if any other luminous bodies should happen to revolve about them we might still perhaps from the motions of these revolving bodies infer the existence of the central ones with some degree of probability, as this might afford a clue to some of the apparent irregularities of the revolving bodies, which would not be easily explicable on any other hypothesis.’

“There at the very beginning, the theoretically-predicted properties of (Newtonian) black holes were discussed together with a carefully-worded statement about how it might be determined observationally whether such objects do in fact exist.”

But the theoretical Michell-Laplace Dark Body does not possess the signatures of the alleged black hole and so it is **NOT A BLACK HOLE**.

Thus $r = \frac{2Gm}{c^2}$ has **NOTHING** to do with the **BLACK HOLE!**

The Big Bang

Big Bang Cosmology was first conjured up by the **Belgian mathematician and priest Georges Lemaître**.

Hannes Alfvén reported:

“I was there when Abbe Georges Lemaître first proposed this theory”.

Lemaître was, at the time, both a member of the Catholic hierarchy and an accomplished scientist. Alfvén reported that Lemaître said in private that this theory was a way to reconcile science with St. Thomas Aquinas' theological dictum of *creatio ex nihilo* or creation out of nothing.

In January 1933, Georges Lemaître travelled with Albert Einstein to California for a series of seminars. After Lemaître detailed his Big Bang theory, Einstein stood up, applauded, and said, *“This is the most beautiful and satisfactory explanation of creation to which I have ever listened.”*

Thus Big Bang is theology, not science. Lemaître allowed his theological convictions to **PREDETERMINE** the outcome of a scientific inquiry. This violates scientific method.

The Big Bang

The Big Bang creationism treats the Universe as entirely filled by a continuous homogeneous indivisible distribution of matter of uniform macroscopic density and pressure, in violation of the physical principles of General Relativity,

**AND SO IT IS TOTALLY
MEANINGLESS.**

Gravitational Waves

The speed of propagation of Einstein's gravitational waves is alleged to be c , that of light in vacuum. This is **NOT TRUE** because the speed is **COORDINATE DEPENDENT**.

“It is not possible to obtain an expression for the energy of the gravitational field satisfying both the conditions: (i) when added to other forms of energy the total energy is conserved, and (ii) the energy within a definite (three dimensional) region at a certain time is independent of the coordinate system. Thus, in general, gravitational energy cannot be localized. The best we can do is to use the pseudo-tensor, which satisfies condition (i) but not condition (ii). It gives us approximate information about gravitational energy, which in some special cases can be accurate.”

“Let us consider the energy of these waves. Owing to the pseudo-tensor not being a real tensor, we do not get, in general, a clear result independent of the coordinate system. But there is one special case in which we do get a clear result; namely, when the waves are all moving in the same direction.”

(Dirac, P. A. M. General Theory of Relativity, Princeton Landmarks in Physics Series, Princeton University Press, Princeton, New Jersey, 1996)

GR violates the usual conservation of energy and momentum

Let's now consider Einstein's pseudo-tensor.

To satisfy the requirement of the usual conservation of energy and momentum Einstein introduced his 'pseudo-tensor', given by the symbol:

$$t_{\nu}^{\mu}$$

He calls the components of his pseudo-tensor

'the "energy components" of the gravitational field.'

(Einstein, A. The Foundation of the General Theory of Relativity, *Annalen der Physik*, 49, 1916, section 15)

GR violates the usual conservation of energy and momentum

Einstein writes the total energy and momentum of this gravitational field as

$\mathcal{L} = \left(t_{\mu}^{\sigma} + T_{\mu}^{\sigma} \right)$ and his conservation thereof as the **ORDINARY** divergence,

$$\frac{\partial \left(t_{\mu}^{\sigma} + T_{\mu}^{\sigma} \right)}{\partial x_{\sigma}} = 0$$

and says, *“Thus it results from our field equations of gravitation that the laws of conservation of momentum and energy are satisfied.”*

He also says of this equation that, *“... we have to introduce the totality of the energy components of matter and gravitational field.”*

(Einstein, A., *The Foundation of the General Theory of Relativity*, *Annalen der Physik*, **49**, 1916, section 17)

GR violates the usual conservation of energy and momentum

Einstein's pseudo-tensor is defined by this expression,

$$\sqrt{-g} t_v^u = \frac{1}{2} \left[\delta_v^u L - \left(\frac{\partial L}{\partial g_{,u}^{sb}} \right) g_{,v}^{sb} \right]$$

where

$$L = -g^{\alpha\beta} \left(\Gamma_{\alpha\kappa}^{\gamma} \Gamma_{\beta\gamma}^{\kappa} - \Gamma_{\alpha\beta}^{\gamma} \Gamma_{\gamma\kappa}^{\kappa} \right)$$

$$g_{,v}^{sb} = \frac{\partial g^{sb}}{\partial x^v}$$

$$\Gamma_{bc}^a = \frac{1}{2} g^{ad} \left(\frac{\partial g_{dc}}{\partial x^b} + \frac{\partial g_{bd}}{\partial x^c} - \frac{\partial g_{bc}}{\partial x^d} \right)$$

We can **CONTRACT** a mixed tensor (and this pseudo-tensor) by setting $v = u$.

GR violates the usual conservation of energy and momentum

Contracting Einstein's pseudo-tensor gives an invariant 't', thus:

$$\sqrt{-g} t_u^u = \frac{1}{2} \left[4L - \left(\frac{\partial L}{\partial g_{,u}^{sb}} \right) g_{,u}^{sb} \right] \quad \text{where} \quad t = t_u^u$$

Performing now the calculation of the second part inside the brackets gives:

$$\left(\frac{\partial L}{\partial g_{,u}^{sb}} \right) g_{,u}^{sb} = 2L$$

Substituting this result into the expression above and rearranging gives the invariant:

$$t = \frac{L}{\sqrt{-g}}$$

GR violates the usual conservation of energy and momentum

Bearing in mind the definitions of L and g we see that the invariant

$$t = \frac{L}{\sqrt{-g}}$$

is composed **SOLELY** of the components of the metric tensor and their first derivatives.

But such invariants **DO NOT EXIST!**

(Ricci-Curbastro, G., Levi-Civita, T., *Méthodes de calcul différentiel absolue et leurs applications*,
Matematische Annalen, B. 54, 1900, p. 162).

Thus Einstein's expressions for the total energy and momentum, and conservation thereof:

$$\mathcal{E} = \left(t_{\mu}^{\sigma} + T_{\mu}^{\sigma} \right) \quad \frac{\partial \left(t_{\mu}^{\sigma} + T_{\mu}^{\sigma} \right)}{\partial x_{\sigma}} = 0$$

ARE TOTALLY MEANINGLESS!

GR violates the usual conservation of energy and momentum

Thus Einstein's field equations must take the following form,

$$\frac{G_{uv}}{\mathcal{K}} + T_{uv} = 0 \quad \text{or} \quad \frac{G_v^u}{\mathcal{K}} + T_v^u = 0 \quad \text{Compare with} \quad \left(t_{\mu}^{\sigma} + T_{\mu}^{\sigma} \right) = \mathcal{E}$$

According to Pauli (Pauli, W., 'The Theory of Relativity', Dover Publications, New York, 1981) Einstein:

"... raised the objection that, with this definition of the gravitational energy, the total energy of a closed system would always be zero, and the maintenance of this value of the energy does not require the continued existence of the system of one form or other. The usual kind of conclusions could not then be drawn from the conservation laws."

EINSTEIN'S OBJECTION IS FUTILE. THUS, GENERAL RELATIVITY IS INVALID AND HENCE SPACETIME ENTIRELY MEANINGLESS!

Inclusion of the 'Cosmological Constant' makes no difference.

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Solar Physics

(Kozyrev, N. ‘**Sources of Stellar Energy and the Theory of the Internal Constitution of Stars**’, *Progress in Physics*, Vol. 3, pp. 61-99, 2005),
www.ptep-online.com/index_files/2005/PP-03-11.PDF

Professor Pierre-Marie Robitaille of Ohio State: series of papers on a liquid plasma model of the Sun,
www.ptep-online.com/index_files/issues.html
Scroll down to 2011, Volume 3, Special Issue.