On the Alleged "Black Hole" Binary in Nova Scorpii

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Schmidt et al. authored the paper 'Formation of the Black Hole in Nova Scorpii', *The Astrophysical Journal*, 567:491-502, 2002 March 1. Professor Brian Schmidt is an American astronomer at the Australian National University and is a joint Nobel Prize winner for physics in 2011.

Now I remark that all alleged 'black hole solutions' to Einstein's field equations pertain to a universe that contains only one mass, namely, the mass of the black hole itself. There are no known solutions to the field equations for two or more masses and there is no existence theorem by which it can even be asserted that the field equations contain latent solutions for two or more masses.

In the model and analysis for Nova Scorpii the authors have inadvertently applied the Principle of Superposition where the Principle of Superposition does not apply. In Newton's theory of gravitation the Principle of Superposition applies and so one can simply pile up masses in space at will, although the gravitational interaction of these masses soon becomes intractable. In Einstein's theory the gravitational field, manifest in the curvature of spacetime, is coupled to its sources by the field equations [1], the sources being described by an appropriate energy-momentum tensor, and so the Principle of Superposition does not apply. This means that one cannot simply pile up masses in any given spacetime because the field equations must be solved separately for each and every configuration of matter proposed. The proposed model for Nova Scorpii has not done this. For instance, upon what energy-momentum tensor do the authors rely for the black hole close binary system, and hence upon what solution to the field equations do they rely for this binary system? There is in fact no known set of field equations and hence no known solution to the field equations for the model proposed by the authors for the black hole binary system in Nova Scorpii.

The authors' model begins with a Newtonian universe and ends with a non-Newtonian universe, manifest as an inadvertent blending of two different and incompatible theories, by means of an inappropriate application of the Principle of Superposition; a Newtonian universe containing a non-Newtonian entity (a black hole), which is impossible; or conversely, a Relativistic universe that contains additional masses besides that of the black hole, which is also impossible, as paragraphs two and three above show.

Owing to the foregoing one cannot, by an analogy with Newton's gravitational theory, assert that black holes can exist in multitudes, merge or collide, suck in other matter, or that a black hole can be a component of a binary system.

According to Einstein his Principle of Equivalence and his Special Relativity must hold in sufficiently small regions of his gravitational field and that these regions can be located anywhere in his gravitational field [2]. Now a simple calculation proves that Special Relativity forbids infinite densities [3]. Thus an infinitely dense point-mass singularity is forbidden by the Theory of Relativity no matter how it is alleged to be formed. It is worth noting that infinitely dense point-mass singularities occur in Newton's gravitational theory too; they are merely 'centres of masses'. But a centre of mass is not a physical object – it is a mathematical artifice, nothing more. In the case of the black hole the infinitely dense point-mass singularity is claimed to be a real object, which is impossible. Yet, according to Hawking [4], "*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*." According to Dodson and Poston [5], "*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*." And according to Carroll and Ostlie [6], "*A nonrotating black hole has a particularly simple structure. At the center is the singularity, a point of zero volume and infinite density where all of the black hole's mass is located. Spacetime is infinitely curved at the singularity. . . . The black hole's singularity is a real physical entity. It is not a mathematical artifact . . .*"

The subject paper does not clearly specify what type of black hole is allegedly formed in Nova Scorpii. The signatures of the simplest black hole, whether or not it is rotating, are an infinitely dense point-mass singularity and an event horizon. Now it is an irrefutable fact that nobody has ever found an infinitely dense point-mass singularity or an event horizon and so nobody has ever assuredly found a black hole. This is not surprising owing to paragraphs two to six above. Additionally, all reports of black holes being found in multitudes is wishful thinking due to a misapplication of the Principle of Superposition.

As mentioned above, according to Einstein [2] his Principle of Equivalence and his Special Relativity must hold in sufficiently small regions of his gravitational field. Now the Principle of Equivalence is defined in terms of the *a priori* presence of multiple arbitrarily large finite masses and Special Relativity is defined in terms of the *a priori* presence of multiple arbitrarily large finite masses and photons. Since all black hole 'solutions' to Einstein's field equations describe a universe that contains only one mass, that of the alleged black hole itself, it is impossible for the Principle of Equivalence and Special Relativity to hold in the spacetime of a black hole. Thus, the black hole violates the physical principles of General Relativity and so it is again invalid.

The so-called 'Schwarzschild solution' upon which black hole theory mostly relies is in actual fact not Schwarzschild's solution at all. Schwarzschild's actual solution forbids the black hole. One can easily confirm this by a reading of Schwarzschild's [7] original paper on the subject.

Unfortunately most astronomers and astrophysicists are completely unaware of Schwarzschild's actual paper because it has become buried and all but forgotten in the literature, and the metric which bears his name has thereby become incorrectly associated with him. The 'Schwarzschild solution' is due to David Hilbert and is a corruption of the original solution by Schwarzschild. It is from Hilbert's corruption that the black hole was incorrectly spawned, as pointed out by the late American theoretical physicist Dr. Leonard S. Abrams [8]. Now the black hole is incorporated into Hilbert's solution by means of a circular argument and so it is invalid. It is done as follows. First, Einstein sets the energy-momentum tensor to zero and thereby removes all sources for a gravitational field (recall that his field equations couple his gravitational field to its sources, the sources being described by the energy-momentum tensor). Einstein calls this situation that for the static empty spacetime. Then, in contradiction to the removal of all sources thereby producing a static empty spacetime, Einstein asserts that the resulting set of field equations describes the gravitational field "outside a body". When one inquires then as to what is the source of the gravitational field "outside" this body we are told that it is the body outside of which the gravitational field exists [1, 2]. But since all sources have been removed by setting the energy-momentum tensor to zero the argument is circular and therefore invalid. Furthermore, to satisfy the words "outside a body" the black hole mass is inserted into Hilbert's solution *post hoc* by means of the square of Newton's expression for escape velocity, by which it is next asserted that the escape velocity of a black hole is that of light in vacuum. But although Newton's expression for escape velocity contains only one mass term it is an implicit two-body relation: one body escapes from another body. But the black hole is, as shown above, the only mass in its universe. So it is patently impossible for an implicit Newtonian two-body relation to be present in an expression that allegedly describes a non-Newtonian universe that contains only one body, but which in fact contains no bodies. The appearance of a mass in Hilbert's solution is effected by means of a play on the words "outside a body" introduced by Einstein and his followers. Thus Hilbert's solution is completely meaningless. A similar situation exists for Schwarzschild's actual solution and so too his solution contains no black hole. "*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.*" [9]

As an aside, paragraphs four and five above raise some other interesting and relevant issues. Scientists frequently assert that the escape velocity of a black

hole is that of light in vacuum and that nothing, not even light, can escape from the black hole. In fact, according to the same scientists, nothing, including light, can even leave the black hole. But there is already a serious problem with these claims. If the escape velocity of a black hole is that of light in vacuum, then light, on the one hand, can escape. On the other hand, light is allegedly not able to even leave the black hole; so the black hole has no escape velocity. If the escape velocity of a black hole is that of light in vacuum, not only can light both leave and escape, material objects can also leave the event horizon, but not escape, because, according to the Theory of Special Relativity, they can only have a velocity less than that of light in vacuum. This just means that if the black hole has an escape velocity then material bodies can in fact leave the black hole and eventually stop and fall back to the black hole, just like a ball thrown into the air here on Earth with an initial velocity less than the escape velocity for the Earth. But from where do such material bodies come given that the black hole is the only mass in its universe? Similarly, how can the black hole suck in matter when it is in a universe that contains no matter other than that of the black hole itself? So the properties of the alleged black hole event horizon are irretrievably contradictory. It has also become commonplace in the literature, and in textbooks for students, to claim that Newton's theory predicts the existence of a kind of black hole. But the black hole is 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 to form, 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 (as the late British astronomer G. C. McVittie [10] pointed out), 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 Michell-Laplace dark bodies and other masses and can interact with each other and with those other masses, but the spacetime of the black hole is devoid of masses other than that of the alleged black hole itself, by mathematical construction, and so it cannot interact with any other masses; observers can exist in the space of a Michell-Laplace dark body but they cannot exist in the (empty) spacetime of a black hole assuming that observers are material. Thus the Michell-Laplace dark body does not possess the signatures of the alleged black hole and so it is not a black hole. Additionally, as pointed out above, escape velocity is a two-body concept; one body escapes from another body. But as again pointed out above there are no known solutions to Einstein's field equations for two or more bodies and no existence theorem by which it can be asserted that his field equations contain latent solutions for two or more masses. A very simple mathematical proof that the Michell-Laplace dark body is not a black hole is given by G. C. McVitte [10].

It is clear from the foregoing that there is in fact no black hole and no close black hole binary system in Nova Scorpii. Moreover, it is also clear from the foregoing arguments that there is in fact no such thing as a black hole.

Incidentally, it is now also clear that the current popular allegations appearing in the literature that black holes are responsible for the formation of galaxies and are the engines of star birth are also false, as too are the claims that black holes are located at the centres of galaxies.

An alternative version of this article [11], which is embellished with some first year undergraduate calculus and some first year undergraduate physics, reinforces the arguments in this article.

Finally, some additional closing comments are in order. An even more general argument that proves General Relativity is itself invalid because it violates the usual conservation of energy and momentum and is therefore in conflict with experiment on the deepest of levels is to be found in [3]. This result not only invalidates the concept of the black hole, and consequently the claim by Schmidt et al. of a black hole binary in Nova Scorpii, but also Einstein's gravitational waves, the Big Bang cosmology with its expansion of the Universe (and the associated Doppler interpretation of the red-shift in light as recessional velocity) and hence the associated claim that the Cosmic Microwave Background is the afterglow of the Big Bang.

DEDICATION

I dedicate this article to my late brother:

Paul Raymond Crothers

12th May 1968 – 25th December 2008

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