

# Confusion and crackpottery by Mr. Stephen J. Crothers

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## Abstract

This is a short rebuttal to the “paper” of Mr. Stephen J. Crothers in  
viXra:1602.0221.

In [1] Mr. Crothers claims that my paper [2] is a copy of Schwarzschild’s original derivation [3] with only changes in notation and equation numbering. This is a very false and dishonest claim. In fact, on one hand, as the title of my work [2] is “A clarification on the debate on “the original Schwarzschild solution””, it is obvious that I had, not only to write down, explicitly, the original Schwarzschild’s metric, that is [2, 3]

$$ds^2 = \left[ 1 - \frac{r_g}{(r^3+r_g^3)^{\frac{1}{3}}} \right] dt^2 - (r^3+r_g^3)^{\frac{2}{3}} (\sin^2 \theta d\varphi^2 + d\theta^2) +$$
$$-\frac{d(r^3+r_g^3)^{\frac{2}{3}}}{1 - \frac{r_g}{(r^3+r_g^3)^{\frac{1}{3}}}}. \quad (1)$$

but also to resume how Schwarzschild derived it in [3]. Actually, in my paper [2] I verbatim wrote: “Historically, the line-element (30) represents “the original Schwarzschild solution” to Einstein field equations as it has been derived for the first time by Karl Schwarzschild in [3] with a slight different analysis.” Hence, there is no plagiarism as Mr. Crothers insinuates. It is correct that the equations

are the same, but the starting hypotheses, the discussion throughout the paper and the final derivation, which is based on the weak field approximation whereas Schwarzschild used mathematical conditions, are quite different. In other words, in my paper [2] I reviewed the original Schwarzschild solution by using modern language. It is evident that Mr. Crothers uses a dirty trick in order to accuse me of plagiarism and to distract the readers by his errors that have been revealed in [2]. On the other hand, in [1] Mr. Crothers stresses ONLY the similarities between my paper [2] and the paper of Schwarzschild [3], but he does NOT stress the differences between the two papers. The fundamental differences between my paper [2] and the original paper of Schwarzschild [3] are the following, and they are the real, fundamental clarifications for deserving the publication in EJTP:

- I started from *an apparently different physical assumption*, i.e. that arches of circumference *are deformed* by the presence of the mass of the central body  $M$ .
- I clarified that this apparently different physical hypothesis permits to apparently circumnavigate the Birkhoff Theorem [4] which guarantees the uniqueness of the “*standard Schwarzschild solution*”, that is

$$ds^2 = \left(1 - \frac{r_g}{r}\right)dt^2 - r^2(\sin^2\theta d\varphi^2 + d\theta^2) - \frac{dr^2}{1 - \frac{r_g}{r}} \quad (2)$$

as it was originally derived by J. Droste [5] and, independently, by H. Weyl [6]. The line element (2) was ultimately endorsed like correct solution by D. Hilbert [7].

- I showed that the origin of the coordinate system in Schwarzschild’s original metric is NOT a single point, but it is, instead, the surface of a sphere having the gravitational radius, i.e. the surface of the Schwarzschild sphere [3]. This was realized NEITHER by Schwarzschild in [2], NOR by Mr. Crothers in [1]. Mr. Crothers indeed insists in his ridiculous crackpottery.
- I showed that Schwarzschild’s original solution is consistent with the gravitational collapse.
- I showed that, in agreement with general covariance (that means that the formulation of physical laws must be invariant under arbitrary transformations of coordinates), there is a transformations of coordinates which permits to obtain eq. (2) from eq. (1). In fact, by putting

$$\hat{r} \equiv (r^3 + r_g^3)^{\frac{1}{3}}, \quad (3)$$

eq. (1) becomes

$$ds^2 = \left(1 - \frac{r_g}{\hat{r}}\right)dt^2 - \hat{r}^2(\sin^2\theta d\varphi^2 + d\theta^2) - \frac{d\hat{r}^2}{1 - \frac{r_g}{\hat{r}}}, \quad (4)$$

which is exactly the “*standard Schwarzschild solution*” (2). General covariance means that, a priori, there are no different coordinate systems in the universe. Instead, coordinates are only artifices used to describe the universe. Hence, coordinates do not play role in formulating fundamental physical laws.

Thus, let us ask, which is the reason for which Mr. Crothers stresses ONLY the similarities between my paper [2] and the paper of Schwarzschild [3], but he does NOT stress the differences between the two papers? The reason is very simple. The elementary misunderstandings of Mr. Crothers on the classical black hole physics are EXACTLY in those differences. In particular:

1. Mr. Crothers does NOT understand that the origin of the coordinate system in Schwarzschild’s original metric is NOT a single point, but it is the surface of a sphere having the gravitational radius instead.
2. Mr. Crothers does NOT understand that Schwarzschild’s original metric is consistent with the gravitational collapse.
3. Finally, but extremely important, Mr. Crothers does NOT understand the physical meaning of general covariance, and this is a very elementary flaw, as it has been emphasized in other papers which describe Mr. Crothers’ mistakes, see for example [8].

**Then, it is clear that Mr. Crothers stresses ONLY the similarities between my paper [2] and the paper of Schwarzschild [3], but he does NOT stress the differences between the two papers because he wants to hide his elementary mistakes.**

### Acknowledgements

I strongly thank Mr. Crothers for inserting my name in the title of his “paper” [1]. The previous 2 contemporary physicists having their names inserted in the titles of Mr. Crothers’ “papers” were two Nobel Laureates, Professors Schmidt and t’ Hooft. I am very honoured by this. I hope to arrive to their level in the future. I will insert Mr. Crothers’ criticizing my research work in my CV...

### References

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