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# Rebuttal to : "Finite Gravitational Time Dilation in Black Holes Using Dynamic Newtonian Advanced Gravity (DNAg) By Andrew Worsley, Joseph Worsley

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## ABSTRACT

In this short note we rebut the claims made by Andrew and Joseph Worsley. They claim that they "introduce the generic equations for gravitational time dilation" when, in reality they simply copied over the predictions of General Relativity without any derivation. In addition, many errors were introduced. We will point out those errors.

**Keywords :** DNAg, General Relativity, Time Dilation, Perihelion Advancement, Black Holes
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## I. INTRODUCTION

In the introduction of their paper [1] the authors claim that :

*"It is however, essential to have an understanding of time dilation and black hole gravitational physics and in particular the effects of gravitational time dilation in the vicinity of black holes. The generic equations for time dilation for this model have not previously been published. Here we present original equations for gravitational time dilation."*

In reality, the authors copy the formulas of general relativity with no derivation:

$$1+z=1\bigg/\sqrt{1-\frac{2GM}{Rc^2}} \quad (1)$$

where M is the gravitational mass, c is the speed of light and G the gravitational constant, R is the radius for space.

For space, the perihelion advance, in Straumann [6] is given by:

$$\Delta\varphi \approx \tan\Delta\varphi = \frac{6\pi m^2}{L^2} \quad (2)$$

where m= $GM/c^2$ and $L^2/m = a(1- e^2)$, a is the semi-major axis and e is the eccentricity.

The authors contradict themselves by claiming

Here we introduce the generic equations for gravitational time dilation.

For Gravitational Time Dilation (t')

$$t' = t_0\ (1 + GM/Rc^2) \quad (5)$$

where $t_0$ is the time measured in a zero gravitational field, M is the major mass, c is the speed of light and G the gravitational constant, and R is the radius.

Eq. (5) not only contradicts (1) but it is not derived from the theory claimed by the authors and it is also incomplete. The complete description of gravitational time is much more complex and can be found in any paper on GPS [2]. Next, the authors introduce a couple of errors, neither expression has dimensions of time:

Calculation of Gravitational Time Dilation relative to GPS satellites (worked example).

$$\Delta_t = \frac{GM}{R\,c^2}$$

For Earth bound observers:

$$\Delta_t = \frac{GM_E}{R_E\,c^2} = 6.96107 \times 10^{-10}$$

Next, the authors put by hand, with no derivation, the incomplete time dilation formulas:

For the Event Horizon ($t'_{Rs}$)

$$R_S = \frac{2GM}{c^2} \qquad (7)$$

and as

$$t' = t_0\,(1 + GM/R_S\,c^2) \qquad (8)$$

Finite time dilation at the Schwarzschild radius of the black hole ($t_{Rs}$).

$$t'_{Rs} = t_0\,1.5 \qquad (9)$$

where $t_0$ is the time measured in a zero gravitational field, M is the mass of the black hole, c is the speed of light and G the gravitational constant, $R_S$ is the distance, (taken as the Schwarzschild radius).

In low and medium gravitational fields the results of current classical models and dynamic gravity presented here are technically exactly the same

This is because the authors copy (incomplete) predictions of General Relativity and present no derivation from their theory.

## II. CONCLUSIONS

The authors presented no valid theory and no derivation. Whatever formulas they put in, were put in by hand and, in many instances, they were incorrect.

## III. REFERENCES

[1]. A. Worsley, Can. J. of Phys., 94 (3): 279-282 (2016)
[2]. N. Ashby, Living Reviews in Relativity, (2003)