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Calculating the Radius of a Non-Spinning Blackhole Singularity

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***Abstract*: This research paper proposes a Mathematical equation to calculate the radius of the singularity of a non-spinning blackhole. This equation which is termed as the "Solanki Singularity Equation" will not be a very accurate representation of the radius of the blackhole singularity. But will be approximation of it's actual size and the equation will also account for the error caused due to quantum fluctuations and also Hawking Radiation.**

***Keywords*: Radius, Blackhole, Singularity.**

1. Introduction

The Singularity of a non-spinning blackhole as we know is a one-dimensional object. But this formula will prove that the singularity will have the x, y and z dimensions while also accelerating in the time dimension. The formula as stated has slightly different measurement than the radius of that singularity. The formula is:

$$\lambda - \Phi = R_{sch} * \rho/E.F * G * t * Temp$$

The formula is explained in the next part of the paper.

The equation uses only S.I (Standard International) units to measure the radius of the singularity. The phi (Φ) in the equation accounts for the error caused due to activities happening inside the Schwarzschild radius such as Hawking radiation.

2. Explanation/Analysis

The formula in place is $\lambda - \Phi = R_{sch} * \rho / E.F * G * t * Temp$. The λ (Lambda) symbol is the actual size measured. The Φ (phi) stands for the other anonymous anomalies that could be happening in the blackholes. Which accounts for all the things which we have not measured in the formula. This is all for the L.H.S. Now the first term in the R.H.S we have is the symbol R_{sch} which is the Schwarzschild radius of the non-spinning blackhole. The we multiply it by the density of the blackhole which we can take as an approximation since finding the density of the blackhole is not the easiest to do. Then we divide it by the E.F which stands for the external forces for example if a star or any other celestial body gets absorbed this will affect the rate of contraction of the blackhole singularity. We can use the simple formula of M_1*M_2*G/r^2 formula to accomplish this. We will account for the force it will exert on the blackhole in Newtons. Next we multiply it by G which stands for Newton's gravitational constant ($6.67 * 10^{-11}$). Next we multiply it by the time since the blackhole was formed in Seconds. And we finally multiply it by the temperature of the blackhole since it will act as an agent which will affect the rate of contraction of the blackhole. This hopefully provides mathematical evidence that the singularity is not a one dimensional object. Thus any solution to this equation which is termed as the "Solanki Singularity Equation" will be given as $\chi + \Phi$. Where χ is the measurement produced. Also any error while calculating the temperature of the blackhole, time of survival, or the can lead to huge differences in the results obtained. Thus extreme precision is needed in all the terms except the density. And omega as stated accounts for the various anomalies that can be caused which we do not account for in the place of E.F in the formula. The Φ. In formula can also account for the anomalies cause due to quantum mechanics thus the formula formed will be unaffected even if apply the laws of Quantum Mechanics to it. This equation can assume that the singularity taken into account can be a sphere or a cube, although any other shape will not make much of a difference. The way in which the equation is layed about makes it so that no harm will be caused to the equation if some of the constants used in here are modified or completely changed in the future.

A. Explanation on the symbols used

L.H.S:

The L.H.S consists of the answer obtained by the symbol λ and the symbol Φ to calculate the measurements not taken into account. Thus we add it up because the Φ symbol is added to the λ so the Omega is just this formula all over again. So the answer found will be $\chi + \Phi$. Where χ stands for the answer that we get in place of the lambda

R.H.S:

The R.H.S consists of the R_{sch} which is the Schwarzschild radius of the blackhole this can be done using the simple formula made by Karl Schwarzschild which is $2GM/c^2$. Next we have d which stands for the density of the blackhole. Then we divide it by E.F which are the external forces other than the gravity. Next we multiply it with Newton's gravitational

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constant which stands for ($6.67 * 10^{-11}$). Then we multiply it by the time since the blackhole was formed. And finally multiply it by the temperature of the blackhole. By multiplying and dividing this we will get the radius of the singularity of a non-spinning blackhole.

B. Explanation on the symbols and the terms involved in the equation

The Schwarzschild radius is used just to display the size from which the initial contraction takes place and the maximum size that the singularity can be in at that time. Then the ρ is used since the density of the object will greatly affect the way it behaves when subjected to external forces. Then these two terms have been divided by E.F which is added because it will increase the force acting on the singularity at a given time. And the term will be defaulted to one if there is no external force because if it is put down to zero it will cause the formula to break to infinity since anything divided by zero is undefined. The gravitational constant is also a part of the formula because it gravity which actually acts as a force on the singularity. Then the time and temperature symbols are added because more the time the blackhole has been formed the less will be the size of the singularity. And the temperature of an object as we know it accounts for the hardness and density of the object so it is also an important part of the equation.

C. Mathematical Analysis

The Solanki Singularity Equation uses the current principles of non-spinning blackholes to form the equation in it's current state. The R_{sch} is just used to get the current radius of the blackhole as a whole using the accepted formula. Thus A solved version of this equation will include a number of formulas all come together into one equation. The formula for the temperature of the blackhole is $T = \hbar c^3 / (8 * \pi * G * M * K_b$.

Thus the temperature is a very important parameter to take into account. The compression rate taken into account is derived from the force on an object formula which is $G * M_1 * M_2 / r^2$. This will be used to calculate the external forces on the blackhole with mathematical evidence.

D. Solving the equation roughly with data

The equation as we know is $\lambda - \Phi = R_{sch} * \rho / E.F * G * t * Temp$. The Schwarzschild radius will be calculated by the equation $2GM/c^2$. So $2\{(6.67 * 10^{-11}) * (6 * 10^{24})\} / (3 * 10^8)^2$.

The answer will be 10^{-3}m. The formula of density is M / V. The formula for the volume that we will be using is $4/3 * pie * r^3$. So the answer is $4 / 3 * 22 / 7 * 10^{-3}$. Then we will divide it by the mass of the blackhole. The density of blackholes of this size can be approximately $4 * 10^{14}$ g/cm^3. Now the answer can be obtained by simply plugging in and multipling the correct values. So the equation will be $10^{-3} * \rho$ which is $4 * 10^{14}$g/cm^3. Then we divide it by E.F which we will get by $G * M_1 * M_2 / r^2$. And then simply multiply it with the Newton's Gravitational constant G. The time can be assumed as χ seconds. And the temperature can be calculated by the formula $T = \hbar c^3 / (8 * \pi * G * M * K_b$.

Given alongside. By solving for each of these terms the answer will be obtained in place of the λ and the answer will be $\lambda m - \Phi$. Since the anomalies would further decrease the size of the blackhole singularity.

3. Blackhole Merging

When two or more Blackholes will combine we can just add up both of their Solanki Singularity Equations and get the size of the new blackhole. Note that both of them should be non-spinning.

4. Observation

The Solanki Singularity Equation also can be used along with other equations which involve the use of General Relativity, Schwarzschild metric and many other principles. The smaller the measure the more will be the bending thus allowing us to unveil many more mysteries that lie behind the Schwarzschild radius. This formula can also be used to show how the supermassive blackhole's singularities behave.

5. Conclusion and Result

This research has unveiled a secret that we had not an answer to for years. This equation also shows how the singularity contracts in a non-spinning blackhole and how much part of the black hole is occupied by the singularity. I hope this will help us solve many other mysteries. It will also help us to find out how the singularity behaves when matter falls into it due to the immense gravitational pull and other fundamental principles that make blackholes the mystery they are. This formula can also be modified to work with rotating blackholes so that we can get the size of the singularity in the form of a ring which can be the next topic of interest of many physicists.

This paper presented an equation to measure the radius of a non-spinning blackhole singularity.

References

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