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A Comparative Study on Black Holes

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Abstract:

Black holes is defined as the region of the space time from which nothing can escape not even light. The present study deals with the formulae of eth gravitational forces which are acting between the black hole and light particle which is passing near the radius of the event of the horizon of black holes as well also to calculate their values for the different test of eth black holes. The review paper also comprises with the extract method of the thermodynamic quantities of eth solution of the Einstein equation is developed. Hence these strongly supports the validity and the comparative study of the black holes. The present paper deals with the entire comparison of the techniques and the method of the derived formulae used for the gravitational force and the existence of black hole.

Keyword: Black holes, Einstein Equation, Thermodynamics, Gravitational force

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Introduction

The black hole or the neutron star is defined as the formation which is complicated as more complicated than any other physics. It is supposed that in the process the core of the star i.e. a giant star collapses from the original radius of a few thousand km to a compact object with the radius of few tens of kilometers. The material of the star that start moving internal initially slowly and the then later more rapidly with the featured speed of time less than a tenth of a second. Later the substantial portion of this mass as the inner part of the core contracts suitably to increase the strength of the gravitational fields drawing the inner core together.

The two different outcome follow depending upon the core mass and its kinetic energy of the implosion that may or may not be suffice to drive the system out of the nuclear densities at the complete gravitational collapses. Hence this complete collapse is known as Black hole.

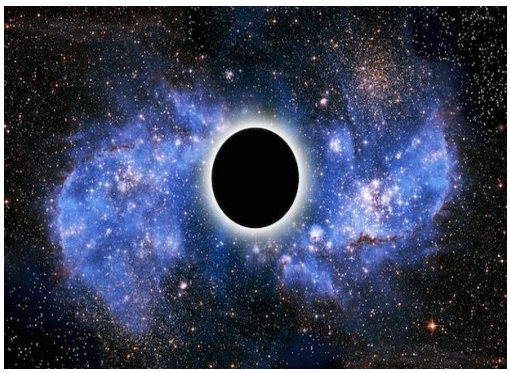

Figure 1 – Black Hole

History of Black holes

The black hole word termed by the Wheeler in 1967 but the possibility of the black hole existence was discussed before a long time. At the end of the 18th century the two scientist Michell and Laplace which was independently came to the conclusion that if star were large enough its gravity would not allow the light to escape. Hence, it was depend on the Newtonian theory that obtained the conclusion for the size of such 'dark stars' i.e. the gravitational radiuses which overlaps with the later prediction of the Einstein theory of the gravity.

Formation of the Black hole

The three process suggested the formation of the black hole:

- The direct catastrophic collapse of a star with a defined white dwarf core, and hence collapse is going through neutron star densities without a stop.
- The two step of process i.e. the collapse of a star with a white dwarf core to a hot neutron star which is continue by cooling and collapse to a black hole.
- Then the multi-step with the first formation of a stable neutron star and the slow accretion of enough matter so as to raise mass above the critical value of collapse.

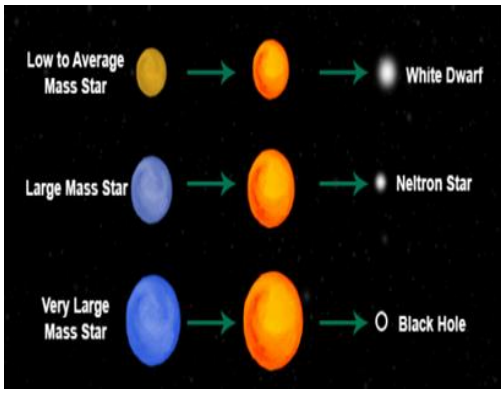

Figure 2. Formation of black hole

Review of Literature

Singh (1999) stated about the elementary review of the gravitational collapse and the very importantly cosmic censorship hypothesis. They also summarized the known models of the collapse conclusive give the formation of black holes and the naked singularities. The nature of the quantum process that take place around the naked singularity and the possible implication for the observation.

Gallo and Marolf (2009) stated in their resource letter so as to guide the researchers and educators with the help of literature on the black holes. In the present recourse work both the physics and astrophysics were discussed. The resources include the ranging from the technical and non-technical discussion. It consist of production of gravity waves, black hole thermodynamics, stability of black holes, quantum treatment of black holes etc. Astronomically, they also cover the gas accretion physics onto black holes, merging history of supermassive black hole etc.

Mahto et al. (2013) stated about the formulae used for the gravitational forces acting between the black holes and the other light particle which passes near the radius of the event horizon of the black holes. This also comprises of the calculation of their values of the different test black holes which exist only in X-ray binaries i.e. XRBs. The study focus on the

gravitational forces which later shows that gravitational forces and light are inversely proportional to that of the wavelength of the radiations for the continuous surface gravity. It is also conclusively stated that the light particle of the shorter wavelength shows more attraction as that of the longer wavelength.

Nadeem (2013) stated about the use of the formulae of gravitational forces which is performing between the light particle and black hole passing near the radius of the event horizon of black holes. This is used to calculate the values of them by applying different test of the existing black holes in Active galactic Nuclei (AGN) as well as the comparison of them with that of the black holes in XRBs.

Abbott et al. (2016) conferred about the Laser Interferometer Gravitational Wave Observatory two detectors were observed at the same time on the basis of transient gravitational wave signal. In their research work, the LIGO detectors is helpful of the observation. The observation later demonstrate the presence of binary stellar-mass black hole system. This research work significant because of the first direct detection of gravitational waves as well as the first observation of the binary black hole merger.

Valtonen (2016) discussed about the OJ 287 as a quaisi-periodic quasar with around 12 year optical cycles. It shows the prominent outbursts that are predictable in the binary black hole model. It is analyzed that the expected time range is crossed which peak to 2015 December. The present study define the outburst that confirms the established general relativistic properties of such system. The study also give the possibility of testing of black-hole no-hair theorem with the accuracy of 10% at the present time.

Kurihara (2018) detailed about the method of extract thermodynamics quantities with the use of solutions of Einstein Solution. In this paper, Wald's method is used including the geometrical language like differential forms defined as local space time manifold. The use of new method i.e. Schwarzschild, Kerr and Kerr-Newman Black holes and De Sitter space. The conclusion discussed by purely dependence on the thermodynamics without any statistical ensembles. This paper had a great support towards the validity of the area of theorem of black holes.

Conclusion

In the present study one can deal with the various aspects of gravitational forces acting between the black hole and light. The paper characterized on the basis of spinning and non-spinning of black holes. The paper conclusively represent the role of gravitational force which decreases between the black holes which increases with the radius of horizon, with the use of various techniques and instrumental method. The present paper reviews the comparative study of the different aspect of black holes and its consequences effecting in the space.

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