Review of: "Re-Examination of Penrose's and Kerr's Singularities and the Origin of Protons in Astrophysical Jets"

Hossein Ghaffarnejad[1]

1 Semnan University

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The author, Mr. Dr. Sorli, objects to Penrose's singularities, which are mathematical, not physical, entities. It must be said that this is not a new thing, and in physics, scientists have already encountered infinities and singularities and have proposed meaningful solutions to treat them. For example, when we want to take radiation corrections into account in the Feynman`s diagrams of fundamental particle interactions, we eliminate the infinite contributions with the re-normalization theory, which was first proposed by Richard Feynman himself. Although it is only a mathematical method to match the results of theoretical predictions of physical quantities with the corresponding quantities measured in experiments.

Regarding the Penrose singularities of space and time, I must also say that these conclusions are obtained in general relativity only in the approximation of geometrical optics, and if wave optics (quantum behavior of rays) is considered, Heisenberg's uncertainty principle for elementary particles or photons shows that a geometrical place does not exist at zero radius, or at least no observer can measure it. Of course, if we accept the Copenhagen interpretation of quantum mechanics with the tool of Fourier transforms between the Hilbert space of space and momentum as the correct mathematical tool to describe the physical reality of the subatomic and, in Albert Einstein's words, we don't look for another undiscovered mathematics that wants to directly determine the position and momentum of a quantum particle with full certainty. Without considering the interaction of the observer, he described the identified object (see the Bohemian theory of quantum mechanics and hidden variables such as references: [1,2,3,4,5]).

Consider another example, i.e., the quantum dots. Are they really geometric points with zero radius? Obviously not. Rather, they are as wide as Heisenberg's uncertainty. Why not describe the Penrose singularities with the quantum wave theory of geodesics? In this case, it will look like quantum dots that are as thick as the uncertainty. Should the Penrose singularity still be considered a mathematical entity? If the esteemed author talks about the existence of a proton (quantum) particle that can exist inside a black hole or a dark star, why doesn't he consider its location, space-time, as quantum? This requires the presentation of quantum gravity, and it is obvious that neither Newton's theory of gravity nor general relativity will give the correct answer. In the same way, general relativity does not give a reasonable prediction about the Big Bang theory, that is, the beginning of the expansion of the universe with infinite density at a (classical point) with zero radius. For an acceptable explanation from the perspective of common sense, it is natural that quantum gravity should be considered, in which the zero-point space-time is also similar to `quantum dots`. It has a width of the Heisenberg uncertainty scale.

My question and suggestion to improve the article from the respected author is why he compares his model only with

general relativity, which is itself an incomplete theory in the field of quantum micro-scale universes. Why doesn't he compare newer (imperfect) models that are at least integrated with quantum concepts, i.e., loop quantum gravity theories or string theory, etc.? Although, for example, string theory's biggest problem is that its predictions have not been observed with any physical tools, Yaid admitted that it is a comprehensive and complete model, at least theoretically.

My next question is about the nature, gender, and dynamics of the global super-fluid proposed by the respected author. In the current edition of the article, what I found is only a qualitative description of an entity called the global super-fluid, which is supposed to explain the bending of the light beam and removing the singularities, and etc. . While in the formalism of theoretical physics, every theory must have three characteristics in order to be accepted by all scientists – the previous theory must be modified and experimentally adapted, and it must have predictions for the future that can be tested with future experiments. In this edition of the article, I do not see this trend regarding the global super-fluid, and I was not convinced when I saw the relevant references such as 6.

Regarding the time machine and corresponding closed time-like paths in general relativity, I must add that in the absence of gravity or curvature of space-time, i.e., in Minkowski's flat space-time, time travel can only take place at speeds higher than the speed of light in a vacuum (i.e., jumping out of the light cone). Unless we consider again the light wave behavior instead of the geometric behavior of the light beam, in this latter case, tunneling in time without going outside the light cone and without the need for speeds higher than the constant speed of light (in vacuum) can happen at the same place where the reciprocating waves meet, i.e., the tip of the cone. Because Heisenberg's uncertainty does not show the tip of the cone as a point-like space with zero scale, but it is similar to a quantum dot with a width equal to the uncertainty. Regarding curved space-times, when we consider closed time-like geodesics instead of geometrically closed curved lines with wave paths, this can be understood in terms of quantum probabilities because it resembles the double wave packets of the hydrogen atom in the Bohr circular orbit model. Because a standing wave created on a time-like circle interferes with itself, and its nodes and abdomens define the probability distribution of the time machine. In any case, only by introducing the concept of quantum and wave behavior instead of beam geometry can we talk about the possibilities of quantum tunneling, and classically, this is impossible or at least non-physical, that is, it is not visible. Therefore, the quantum behavior of objects should be considered in the explanation of this prediction.

Most of the materials that have been said about the interaction of fundamental particles and conversion to other materials have a qualitative aspect in the paper, while the expression of such processes, if they have a theoretical aspect, must be accurately calculated, such as theoretical calculations in the theory of quantum or classical fields, and if they have an experimental aspect, they must describe how to measure and describe. The test and statement of accuracy and error should be stated precisely. The descriptive statement of the article reduces its credibility from the experts' point of view, and to strengthen and improve it, it should be written in a specialized manner. It is better to separate the presented many and varied topics into several articles. They should be reported in an `experts` manner but not as only `descriptive`. In an expert report, each of them should be presented in the form of a detailed mathematical analysis or experimental test report, detailing how to measure and announce the collected data.

For example, the following report in the article is just a piece of news and has no scientific structure:

((In the model presented in this article, stellar objects are not curved space, but reduce the energy density of space. In the center of a black hole, the energy density of space is so low that atoms become unstable. They decay into fundamental particles. The conversion of matter into new energy in the form of fundamental particles creates high pressure, and the black hole can explode in a supernova. The pressure force of fresh energy in the chamber where atoms break down into fundamental particles decays is greater than gravitational forces, see Figure 2 below.))

The dynamics of this change should be investigated and its extent expressed quantitatively, or if an experiment has been carried out, it should be reported accurately, and only a descriptive presentation will not satisfy the expert reader.

As another example, the conclusion of general relativity in the article is incorrect and should be improved:

((The idea that inside black holes, the high curvature of space defines gravity is a working hypothesis that has not been proven yet))

In fact, due to its high energy, the matter inside the black hole causes a homogeneous distribution of matter/energy, and it leads to a decrease in curvature. In general relativity, the metric inside the black hole is usually obtained with a good approximation of the Minkowski flat. At least in the central areas and in the internal border areas, it is similar to de Sitter. This is shown analytically in many relativity books. As an example, see chapter 11 of Weinberg's book Cosmology [6], which examines the contraction of a dust with a constant density and shows that its external metric is Schwarzschild, but the internal metric of the dust reads to the Robertson-Walker metric after contraction for a certain period of time. This metric is converted to the de Sitter world by an appropriate coordinate transformation. De Sitter's universe is actually a Minkowski universe with a constant (cosmic) energy density. It means a Minkowski flat world but bounded.

But my last word regarding the contents of Mr. Dr. Sorli's article is that I agree with the author's opinion that singularities are not visible in the physics of physical beings, but not with the way of explaining and interpreting it by global super-fluid. In my opinion, faced with infinities or corresponding singularities in physics are the closed doors of the gates of natural science, which should be opened in a dignified and reasonable manner and not left aside. As I mentioned above at the beginning of Feynman's proposed work in the theory of re-normalization of quantum fields. In fact, the principle of uncertainty is always associated with a cut-off length, which is called the cut-off frequency, and it actually depends on our measuring instrument. If we want to observe a physical point of zero length with an interferometric instrument, we need a pulse of infinite frequency or zero wavelength, which is beyond the current technology. Because the basis of interferometry is wave behavior and its explanation along with Heisenberg's uncertainty principle. However, I must emphasize that I do not reject the concept of a hypothetical global super-fluid, but because its experimental confirmations have not yet been clear to me, I cannot accept it.

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Sincerely yours,

Hossein Ghaffarnejad

Prof. of Physics

Faculty of Physics,

Semnan University

Semnan, Iran

P.O. Box: 35131-19111