JOJ Sciences
ISSN: 2641-8290

Juniper PUBLISHERS key to the Researchers

Mini Review
Volume 3 Issue 4- May 2024
DOI: 10.19080/JOJS.2024.03.555620

JOJ scin

The Big Bang reviewed by quantum mechanics

Pascal Wery*

Department of Physics, Catholic University of Louvain, Walloon Brabant, Belgium

Submission: May 17, 2024; **Published:** May 22, 2024

***Corresponding author:** Pascal Wery Department of Physics, Catholic University of Louvain, Walloon Brabant, Belgium

Abstract

Thanks to Edwin Hubble's observations we know that universal expansion unfolds the cosmos. Going back in time, we think the universe was more concentrated. Here comes the amalgam between concentration and volume: because the universe was more concentrated, we think it was also smaller. But the size of the universe is a big unknown. Its limits could never be established. What is established are human errors: at first, it was thought that the universe was limited to Earth. Then it was the sun that became the center of the cosmos. Then we thought the universe was limited to our galaxy. Today, despite James Webb, the limits of the universe are still not found! In short, what makes us think that the universe has limits? Arbitrariness: the human has its limits. Territorial boundaries, among other things. Like its home, its garden or its country. So, when humans interpret their environment, they automatically look for limits. However, it is not the human who created space. He just interprets it… in his own way: with automatic limits! Limits that could never be established. What is established, on the contrary, is the immensity of space!

Keywords: Big Bang, inflation; gravitational singularity; quantum mechanics; exclusion of Pauli; EPR paradox; immensity of space; black holes; heisenberg uncertainty principle; exclusion of Pauli; quantum fields of fermions; the principle of locality of Albert Einstein; general relativity.

Introduction

Nevertheless a very concentrated cosmos speaks of a high level of potential mass/energy as in black holes. Thus general relativity seems to be adapted to describe the beginnings of the universe. However, this leads to divisions by zero that give infinite gravity and where space-time is lost. These are the famous «gravitational singularities». But it is hard to believe that such a big universe comes from such a tiny point !

Literature Review

However, we cannot explain physical phenomena with general relativity alone. To understand phenomena, we must apply the 4 fundamental forces and not just one of them. Unfortunately, the mathematics associated with general relativity are highly accurate in space-time while those associated with quantum mechanics display just probabilities. Mathematics is not the same, so it is difficult to associate them. General relativity speaks of a division by zero, which gives an infinite gravity that swallows everything while quantum mechanics speaks of a mathematical impossibility, the exclusion of Pauli. Thus some thinks that singularity prevails over the exclusion of Pauli or even the heisenberg uncertainty principle. In short, that gravitational singularities change the laws of physics! Which is impossible since everything is causality in this universe. It is the laws of physics (cause) that generate gravitational phenomena (consequences) and not the reverse. However, both disciplines are composed of mathematics. General relativity is based on a division by zero which gives infinity and quantum mechanics speaks of an impossibility. So, who's the winner in a black hole?

Discussion

To understand, we must distinguish between causes and consequences. The laws of physics are causes, and the use made of them by the fundamental forces are consequences. Thus the exclusion of Pauli brings a pressure of degeneration. With electromagnetism, it resists gravity, even in a white dwarf. With the strong force, it resists it in a neutron star. It's the degenerative pressure that changes, not Pauli's exclusion that is constant. Also it must still be found in another form in a black hole. At least in the fields of material particles, the quantum fields of fermions. It is therefore important to clearly distinguish the laws of physics from the phenomena that use them: the former are universal, the latter are local! Thus the glass breaks under certain conditions, but these conditions depend on the events, so the way it breaks differs locally. Therefore the laws of physics are causes while the resulting phenomena are consequences.

To be clearer: the laws of physics are universal, they do not depend on the locality, they are timeless and therefore do not vary with time. Finally, they are immutable, we cannot transform them and therefore we cannot avoid them! This makes it impossible to travel beyond c. The phenomena, however, are local and depend on circumstances. These being variable, the phenomena that are linked to them also. They are therefore local, temporal and limited!

The best example to distinguish the laws and their consequences is the EPR paradox: an electromagnetic phenomenon that generates the creation of a pair of attributes: a spin. Indeed, Alain Aspect has managed to entangle photons whose spin are linked, even at a distance. This is against the principle of locality of Albert Einstein: «two distant objects cannot have an instantaneous influence on each other». This is the case of phenomena arising from fundamental forces, such as quantum entanglements, but not those required by the laws of physics, in this case, a creation of attribute pairs. These are universal and immediate, since they do not depend on locality or time. In other words ; nothing can escape the laws of physics and therefore the exclusion of Pauli, not even under the influence of overwhelming gravity. Thus it remains, even in a black hole, which is an extreme spatiotemporal phenomenon. Therefore, we must admit that the principle of singularity is doubtful. In short, that general relativity alone solves nothing.

Now if we turn to the quantum fields of Niels Bohr, it becomes more interesting: we are talking about an environment that has no beginning, no end and no limits! An environment made up of many virtual fields and in which disturbances move by obeying the laws of energy conservation. Thus a photon that travels 13.8 billion years/light (cosmic microwave background) is a disturbance that moves for 13.8 billion years in an infinite field, that of electromagnetism! A field that is itself composed of other fields such as magnetic or electric. The whole defines the space, that is to say the decor that hosts the action: the disturbances in movements in the different fields and that interact with each other. And everything that exists interacts with one field or another. In this vision, the universe has no limits, but the energy that interacted with it has a beginning: 13.8 billion years ago!

Findings

In the first vision, the energy that touched the universe, a universe limited by a singularity, is local. In the second, the universe has no limit. Nevertheless, its fields can be charged with energy ($E=mc^2$). From then on, what was virtual becomes real! However, it takes infinite energy to light infinite fields. This is possible since the nature of the energy that touched our universe is unknown to us. We just know that it has broken all the laws on energy conservation and therefore the laws of physics related to it and whose properties are universal. However, this is inconceivable for the human who loves his imaginary limits and not what exceeds it!

In the version of relativity, the universe has limits, so a size that continues to grow. Therefore, the density of the universe and its temperature decrease. Similarly, in a volume, the universe has a center.

In a state of extreme compactness, the universe tends to collapse towards this center. To counter it, we must call on a mysterious scalar field that seems to have all the powers: exceed the speed of light, make a space-time homogeneous and isotropic starting from a single point and finally create the matter of the universe… A vast universe for such a small point!

In the version of quantum fields, the universe has no beginning, no end, no limits. It is simply there, like an eternal decor that fluctuates slightly (vacuum pressure) and in which the action takes place: an energy that comes from nowhere! The energy has no coordinates, it is uniform, that is to say everywhere. Just activate the virtual fields with energy ($E=mc^2$) and what is virtual becomes real, that is to say… all fields! This state of the universe offers the highest level of mass/energy potential per cm^2. It is also uniform and isotropic at all points (KMS state).

However, an infinite KMS cosmos does not offer a center to the universe. A center to which particles can drift. Without this center, the universe may be in a state of extreme compactness (black hole), but general relativity no longer applies! Indeed, the spatiotemporal curvatures neutralize all themselves! As long as the quantum fluctuations of the cosmic microwave background are inoperative, the universe, seen by the quantum, has no center! And without this centre, there is no collapse from gravity. However, there is a terrible pressure from dynamism. A dynamism that needs space to express itself, … in a universe that no longer has one because the whole space is filled with particles!

Then come the different fundamental forces: electromagnetism should release repulsive fields away from the magnetic leptons (electrons and positrons) coexisting in the same space (spin up and down). As these are probably conveyed by GUT (Grand Unified Theory) bosons, the intensity of their interaction is the same as that of the strong force. These repulsive fields are therefore extreme and universal! Similarly, the strong force will seek to join particles (quarks) to make large volumes consisting mainly of quantum vacuum, the hadrons! This too will force the space to suddenly expand… All this to end up with a universe consisting mainly of protons! So, once again, the repulsive magnetic field engages with the same violence. In this version, the universe is also compact (a high level of mass/energy potential) but there is no collapse. On the contrary, there is a powerful inflation of space due to extreme repulsive fields… in addition to the dynamism of particles!

Conclusion

General relativity speaks of a gravitational singularity whose very nature leads to collapse and not expansion. To counter this

How to cite this article: Pascal W. The Big Bang reviewed by quantum mechanics. JOJ scin. 2024; 3(4): 555620. DOI: 10.19080/JOJS.2024.03.555620

phenomenon, we need space inflation faster than light itself… In order to make a space-time homogeneous and isotropic starting from a single point. This frantic expansion would be explained by a mysterious scalar field that creates matter at the end of life. But none of these phenomena has been observed. They are purely theoretical and therefore doubtful in reality.

Quantum mechanics, on the other hand, more easily explains the cosmic background: already uniform fields remain uniform when they extend. Even more so when they fill the whole universe. Indeed, if they are «lit» by energy, all fields materialize to infinity! This also offers a high mass/energy potential but no center pushing towards collapse. The other forces interacting, this universe expands violently! Thus between the principle of the locality of Albert Einstein, which is his true greatest error (but he could not know it), and the principle of universality of quantum fields, the most obvious way to explain the Big Bang is through quantum mechanics and not through general relativity which is neutralized in an infinite KMS universe! So why is everyone following Albert Einstein and his mistake instead of focusing on Niels Born: «quantum mechanics is self-sufficient»… even to explain the Big Bang? Because we like it or not, the human always remains what it is: relative!

Conflict of interest:

This theory is related to a French book : “L’origine de la matière”. This book belongs to a catalogue named “Les Enseignements de l’Ange”. This collection got a lot of theories including the start of life in the second tome (Les origines de la vie). So, there is conflict of interest: being right makes sales while being wrong makes idiots! This can lead to human blunders. This is why we must exercise caution: because conflict is unavoidable, information can only be validated if it is confirmed by a computer simulation. A simulation of the expansion starting with the electronic field. It should give the first repelling field due to electromagnetic forces.

The debate:

Science is strange: We make extraordinary discoveries but since we do not understand them, we often miss out on little wonders. Here is an example: $E=mc^2$ + quantum fields = Big Bang!

References

1. Hawking SW (1971) Gravitational singularities. Phys. Rev. Lett 26(21): 1344.
2. Penrose R (1965) Gravitational collapse and space-time singularities. Phys. Rev. Lett 14(3): 57.
3. Thorne KS (1974) Black holes and time warps: Einstein’s outrageous legacy. W. W. Norton & Company
4. Bekenstein JD (2003) Information in the holographic universe. Scientific American 289(2): 61-69.
5. Bardeen JM, Carter B, Hawking SW (1973) The four laws of black hole mechanics. Communications in Mathematical Physics, 31(2): 161-170.
6. Schmidt M, Hu W, Scott D (1998) “The origin and evolution of galaxies, dark matter, and voids.” The Astrophysical Journal 493(1): 5-12.
7. Colgate S, Dicus R (1998)”Is the Big Bang model in conflict with observation?,” The Astrophysical Journal 503(2): 57-L60.
8. Riess AG, Filippenko AV, Challis P, Clocchiatti A, Diercks A, et al, (1998) “Observational evidence from supernovae for an accelerating universe and a cosmological constant.” The Astronomical Journal116(3): 1009-1038.
9. Krauss LM, Turner MS (1995) “The cosmological constant is back.” General Relativity and Gravitation 27(11): 1455-1466.
10. Kiritsis E, Obers NA, Perelstein M (2006) “Holographic models of the big bang.” Journal of Cosmology and Astroparticle Physics 2006(6): 039.

DOI: 10.19080/JOJS.2024.03.555620