

Review

Not peer-reviewed version

Hypothesis in Contemporary Astronomy: An Incoming Interaction Between the Milky Way and Another Galaxy?

[Theodor-Nicolae Carp](#) *

Posted Date: 24 April 2025

doi: 10.20944/preprints202504.2030.v1

Keywords: Earth; Solar System; Milky Way; Sagittarius; Andromeda; time; space; matter; multi-galactic interaction; clash; UV light; acceleration; time; dilation; contraction; Albert Einstein; Stephen Hawkins; Isaac Newton; Relativity; Thermodynamics; interest; amplification; electromagnetic influence; gravity; interconnection; correlation; implication; causation; Gutenberg; Richter; equation; earthquake; magnitude; aftershock; frequency; NASA; planetary; stellar; alignment; evidence; ethics; GDPR



Preprints.org is a free multidisciplinary platform providing preprint service that is dedicated to making early versions of research outputs permanently available and citable. Preprints posted at Preprints.org appear in Web of Science, Crossref, Google Scholar, Scilit, Europe PMC.

Copyright: This open access article is published under a Creative Commons CC BY 4.0 license, which permit the free download, distribution, and reuse, provided that the author and preprint are cited in any reuse.

Review

Hypothesis in Contemporary Astronomy: An Incoming Interaction Between the Milky Way and Another Galaxy?

Theodor-Nicolae Carp

Independent Academic Researcher, Master's in Science Student, University of Westminster, Watford, Hertfordshire, UK; theodore.nicholas100@gmail.com

Abstract: Throughout the second part of the Modern Era, leading researchers in astronomy, physics and applied statistics into astrophysics have brought a novel hypothesis, in which it was speculated that the Milky Way will experience a clash with another galaxy as a result of an intersection in their motion. Currently, such a statement is purely speculative in nature, although specific signs that such a hypothesis reflects real-world phenomena have started appearing, which cover seemingly increased frequencies and extents of planetary and stellar alignments within the Milky Way. Any occurrence of such a phenomenon may be probable due to increased electromagnetic and gravitational influences from outside the galaxy, which may hint at an existing approach of a different galaxy towards the Milky Way. It may be important to mention that potential effects of a multi-galactic crash would involve a general polarisation of natural and spatial phenomena, given that a multi-galactic interaction and clash would involve a sharp, unprecedented increase in the extent of electromagnetic and gravitational fluctuations of influences toward the Earth, which would affect all natural phenomena upon it, including the climate, the weather, human and animal psychology and wellbeing, as well as the effects of seas and oceans upon nearby shores. Furthermore, if the hypothesis in which major electromagnetic and gravitational influences toward specific, earthquake-prone geographical areas of the Earth would increase the probability of the occurrence of novel earthquakes and aftershocks in such areas is proven to be evidence-based, then a multi-galactic clash involving the Milky Way could also result in a sharp increase in both the frequency and extent of earthquakes throughout the Earth. Furthermore, it could be that the increasing number of people “bumping” into numerical and geometrical coincidences of symmetry at random (i.e., an increasing number of people bumping into “angel numbers”) is a sign of existing increases in electromagnetic and gravitational influences from the cosmos, which may very well reflect a scenario of an approaching multi-galactic interaction that may in a lower probability scenario even implicate the Milky Way (i.e., perhaps with Andromeda in approximately 4.5 billion years). Effects of such a multi-galactic interaction implicating the Milky Way may accelerate the production of more stars and planetary systems, and preserve existing forms of life, given that a clash between Sagittarius and the Milky Way may have resulted in the creation of the Solar System. Or, such an interaction deemed to probably occur, and in the distant future, could describe religious passages in which a phenomenon of “star falling” is mentioned, which could also involve an increasing number of asteroids falling upon Earth, given that fluctuations in gravitational influences could cause asteroids from the great belt nearby Jupiter to change their direction, leading to increased statistical probabilities that more asteroids will change their direction and be headed toward the Earth. Such a phenomenon could be deemed as “beyond monumental” in nature and even impact the state of time within the interacting galaxies, given its relative nature - potentially accelerating it considerably as the galaxies approach one another, in proportion with the level of fluctuations in electromagnetic influences toward the Solar System. Overall, the effects of a multi-galactic clash could either create more life or be catastrophic for human and animal life, potentially resulting in a phenomenon of unprecedented population loss in all life forms. Likewise, it may be important for research efforts to continue in order to determine whether the Milky Way is indeed in the course of experiencing an unprecedented intersection with a different galaxy, as well as for scientists, local and international authorities to devise plans of preparation for

the purpose of precaution and ensuring that all guidelines of Health & Safety are met in case of any increased frequency and extent of natural disasters throughout the Earth, whilst keeping academic and scientific perspectives in an optimistic realm, based on the available evidence.

Keywords: Earth; Solar system; Milky Way; Sagittarius; Andromeda; time; space; matter; multi-galactic interaction; clash; UV light; acceleration; time; dilation; contraction; Albert Einstein; Stephen Hawkins; Isaac Newton; Relativity; Thermodynamics; interest; amplification; electromagnetic influence; gravity; interconnection; correlation; implication; causation; Gutenberg; Richter; equation; earthquake; magnitude; aftershock; frequency; NASA; planetary; stellar; alignment; evidence; ethics; GDPR

Introduction

A concept of galaxy clashes has emerged and been distributed by the scientific communities worldwide, in which it was proposed that galaxies throughout the Universe occasionally interact and even clash with one another, leading to the production of various types of phenomena that are often catastrophic in nature for the movement and integrity of various celestial bodies that include planets, satellites, asteroids, and also whole stars from time to time. Such a theory would logically make sense, as any interaction between distinct galaxies would severely change the patterns of electromagnetic and gravitational influences upon such celestial bodies, causing significant change in the direction of trajectories, polarisation of their movements, resulting in a serious increase of fluctuations in various subordinate phenomena, and consequently, in rising levels of instability and movement between extreme states of matter, whose extremities would continuously rise in the process. Any interaction and clashing between various galaxies would result in a subsequent loss of material stability within the areas of influence between the two intersecting galaxies. Henceforth, stars within such areas would undergo increased rates of explosions, planets would have their trajectories influenced, their tectonic plates would become less stable with time, extreme natural phenomena would gradually become the norm, the thermal states of the planetary atmospheres and surfaces would become more polarised, any belts of asteroids would experience changed gravitational influences that would result in a significant number of asteroids having their trajectories altered and several of such bodies headed for a planetary or stellar clash as a result. Intergalactic clashes would result in severely disrupted electromagnetic and even gravitational influences within the space of their interaction, ultimately making any form of life either highly difficult or impossible, mainly due to the exponential increase in the frequency and extent of natural disasters that would be resulted from a “chain reaction of phenomenal causations”. Such a set of phenomena would be explained by the fact that physics and metaphysics represent the foundational layers of material sciences, which means that any visible changes in their patterns could substantially change the quality of life thereof. An involvement of the Milky Way in any such intergalactic clashes would not spare the Earth from such consequences, as the rates of natural disasters covered by all areas of material, human, social and economical sciences would be affected by a “chain reaction of causational events”. Furthermore, multi galactic clashes may also influence the trajectory of various planets and stars toward black holes, potentially increasing statistical probabilities that various celestial bodies would unexpectedly become swallowed by such points of spatial void. Recently, astrophysicists have been exposed to a novel hypothesis in which planetary and stellar alignments toward the Earth and specifically toward its earthquake-prone areas would increase the statistical probability that moderate or major forms of seismic events will occur in rather proximal points of the future, and the examples of the Sun and the Moon influencing the sea levels may have influenced the development of such hypotheses. Furthermore, it may be that the increasing number of people coincidentally “bumping” into numerical and geometrical forms of symmetry for an increasing number of times per given weeks worldwide constitutes a sign of increasing frequencies of planetary and stellar alignments toward the Earth and overall, another sign of an approaching multi galactic intersection that could even involve

the Milky Way, if not at least a galaxy neighbouring it. Whilst scientists ought to base their research on available evidence, it may be important for novel hypotheses to be tested with utmost consideration and with an open intellectual approach. It may also be that increasing rates of planetary and stellar alignments toward the Earth represent a sign of an approaching multi galactic interaction, given the rise of frequency in such multi-celestial body alignment phenomena, which may be due to increased polarisation in rates of electromagnetic and gravitational influences throughout numerous planetary systems.

Methodology

To assess any novel hypothesis in astrophysics, it may be important to first perform in-depth scientific literature review, to ensure that any process of data collection is performed accurately. Throughout the initial process of literature review, all important points of statistical data applied into astrophysics are collected and various forms of probability calculation are performed again to observe the manner the data was determined. Afterward, more practical steps may be taken, which would involve the utilisation of spatial scopes, rockets and satellites, with the purpose of investigating real-world data, under real-world conditions. Any detection of changes in patterns of astronomical phenomena, which could involve a rise in the statistical occurrence of sudden discoveries, as well as a rise in the development of extreme Earthly and spatial phenomena, within all areas of material sciences, could become markers of such developments within the Milky Way. Furthermore, it may be important to investigate any novel polarisations of patterns observed behind human and animal psychology and social evolutionary processes, as it has been observed that large-scale spatial events considerably impact levels of psychology via unexpected and sudden changes in electromagnetic influences toward the brains of living organisms. Throughout such investigations, Chi-Squared tests, T-tests and ANOVA can be used when applicable, with the purpose of clearly distinguishing between random events with no causal relationships, and correlational events that visibly display a relationship of causation. It may be important to emphasise upon the fact that numerical sciences that include mathematics and statistics constitute the foundation of all material sciences. All the rules, guidelines and regulations of GDPR, informed consent and accurate data reporting should be respected in any process of testing hypotheses against available forms of scientific scrutiny and existent evidence.

Discussion

Astrophysical events have continuously displayed various degrees of influence upon natural phenomena upon various planets, and even having displayed various forms of impact upon the quality of life. Albert Einstein has explained the existence of a mysterious “principle of the interest”, in which any phenomenon leads to a various form of amplification that is proportional with its intensity, with an example representing the relationship between the magnitudes of earthquakes that were originally scaled by Richter, and the statistical probability that a number of aftershocks will occur afterward, with both the number and the magnitude values of the aftershocks being proportional with the magnitude of the original earthquake, which altogether have originally been scaled by Gutenberg. The principle of the interest seems to cover all areas of science (knowledge of patterns observed in the entire existence) - from meta-physical philosophy and psychology, to organic chemistry, geology and astrophysics. In other words, any changes within the environment are statistically probable to be met with proportional, further changes within it, and their amplitude are also proportional with the number and amplitudes of any “responses” to such changes, as mentioned also by Isaac Newton’s Third Law of Thermodynamics. The entire physical existence lies in the continuous and proportional exchange of energy that does not have any physical point of beginning to be ever discovered. Albert Einstein’s Theory of Relativity and “Principle of Interest” explain the impossibility of the human, logical mind to ever discover the point of zero of all physical existence, just as it explains the impossibility of the logical mind to “calculate” the position of the

“edge” of the Universe. Furthermore, the $e = m \cdot c^2$ formula, in which e stands for energy, m for mass and c for the speed of light, also explains that the “edge” of the Universe is actually the light, as “reaching” the speed of light is equivalent to “reaching” the state of atemporality. It has been stated that light cannot escape a black hole, but what if a layer of immaterial philosophy is reached, in which the black hole unsuccessfully “attempts” to absorb the very element it lacks - light, without ever reaching a point of “satisfaction”, given that the Universe lacks a physical edge? Or, what if a black hole actually does not constitute a “point of void”, but a “window” to a distant point of physical existence, since light constitutes the “edge” of the entire physical existence? Ultimately, it may even be that Albert Einstein’s unofficial “Principle of Interest” is in fact a “portal” to a different dimensionality of continuous change of the state of matter.

A hypothesis has emerged in which the Biblical prophecies of the Old Earth being swallowed into fire would match a scenario in which a black hole would swallow the entire solar system, as it would cause the sun to burst and have its flames spreading throughout the entire planetary system before it would vanish into a point of spatial singularity which even light itself is physically deemed as unable to escape from. Furthermore, if such a scenario is combined with the one of an intergalactic clash involving the Milky Way, then it would logically make even more sense that all areas of natural and psychological phenomena would eventually have their patterns substantially disrupted and increasingly polarised, as all effects that include climate change, geological disasters, increasing clashes of astronomical hazards into the Moon’s and the Earth’s surfaces, elevating levels of radiological hazards upon the Earth, increasing global socio-economic instabilities, as well as a progressive loss of an overall balance within the physical realm contained within the solar system, which would lead into an utter state of chaos and physical agony. Philosophically speaking, a scenario in which the Earth and the solar system would be swallowed into a black hole in the last day of the Earth’s existence would reflect the journey performed by Jesus Christ through His Death through Crucifixion and Resurrection, as He was killed and went to the midst of Hades to preach the Gospel for the salvation of the people who believed. In the same manner, mankind would be headed for a physical point of agony that is characterised by a complete lack of light and overall existence - a black hole - since the lack of light ultimately implies a lack of existence, which brings utmost fear and trembling. Perhaps, such a point resembles the described, utmost feared Last Day of Universal Judgment by a Divine Creator. It may be that the only form of state that could ever exceed the “influence” of a spatial point of singularity, is unconditional love, whose indication of realness is the existence of a state of humility. It is interesting to note Albert Einstein’s words in which His Excellency deemed works of a Universal Creator as activities performed behind the curtains of coincidence, which tends to prove the statements of religious books that free will is an absolute principle of the physical existence, making it completely autonomous, despite the stated paradox in which it was created by a Divinity. The principle of the paradox that is displayed through the example of the Gabriel’s Horn (also known as Evangelista Torricelli’s Trumpet), in which the surface of the structure is deemed as infinite, whilst the volume of the liquid that fills its interior space is deemed as finite, may ultimately make it impossible for scientific forms of measurements to ever “disprove” the existence of a Universal Creator, just as it will never be able to disprove the existence of metaphysics and parallel “realms” of existence.

The current pattern of climate change is estimated to involve the change of the Northern Atlantic current, which could result in a drastic change of weather systems within Western and Central Europe, with unusually hot summers and cold winters, as the current from the Gulf of Mexico would have its course changed toward Eastern Canada, allowing Easterly, Continental influences from to influence Western parts of Europe as well. Any changes as such would cause areas of Southeastern Europe to experience unusually hot summers, potentially causing Western Europe to experience summers as dry and warm as Eastern European countries normally do. Coincidentally, an increasing number of Eastern European nationals have relocated to Western European territories, which may suggest the validity behind the principles of coincidences and paradoxes, just as in any effective communication level, it is not the verbal communication that makes the grand picture of qualitative

human connection, but non-verbal communication that involves body language, facial expression and look, as the eyes are deemed as “mirrors of the human soul”. In a similar manner, it seems that it is always the little, subtle factors that ultimately make the significant changes in the grand picture of physical existence. It may be that several geographical areas of a lower hemisphere that have drier climates will become hotter than average, with some places eventually becoming uninhabitable by humans. At the same time, some high-hemisphere areas of the world may eventually become warmer and more habitable by humans. The issue arising from such changes would be the rising of the sea levels due to an ongoing process of glacier melting around the Poles, which could result in large cities and megalopolises situated nearby shores and at low altitudes becoming flooded and uninhabitable. Various projections indicate that the sea level will rise by an average of 1-2 metres by 2100, meaning that hydrological plans need to be carefully developed and implemented to avoid phenomena of urban flooding as much as possible. Ultimately, astronomical factors may severely impact the extent of climate change, with an increase in the frequency and extent of solar explosions representing a viable example of such an influence.

Time has been shown to be relative in nature, meaning that states of speed change the perception of time in relation to objects situated in existing motions in opposite directions. Some hypotheses propose that the beginning of the Earth’s existence had a different state of time, with some philosophers suggesting that time was in a “state of maturation” during the mentioned “Seven Days of Creation”, potentially meaning that the beginning of time is impossible to determine using the logical mind, just as it is incapable of detecting the exact moment of one’s own fertilisation. It may be that human perception and real-world phenomena are actually interconnected in the spatio-temporal plane, given that it is as impossible to physically determine the beginning of the physical existence as it is impossible to detect the “physical edge” of the Universe. The Theory of Relativity has also been named the Theory of Everything, given that such a discovery has radically changed the perception of scientific approaches in physics, giving way to the discovery of quantum physics, which underwent particular contributions by Nikola Tesla. With regards to any hypothesis of a multi-galactic interaction implicating the Milky Way, it may be important to hypothesise that even the state of time on Earth and within the Solar System could be impacted by such a phenomenon, which would only point to Biblical passages in which it was said that time will be “shortened” in the last days. Given that even the state of time itself could be affected in such a scenario, the states of various celestial bodies that include stars and planets could become affected as well, and the process of a solar growth in volume could become accelerated in the process, just like processes of black hole growth. In other words, such a multi-galactic phenomenon would have beyond “monumental” effects for all the implicated galaxies.

There is an existing, voluminous probability that interacting galaxies will not be harmful, but actually bring highly benefactory effects upon their components, which would involve accelerated processes of stellar generation. It is important to note that a galactic clash between the Sagittarius galaxy and the Milky Way may have created the Solar System. The purpose of the study is not to bring alarmist perspectives or induce sentiments of fear, but rather stimulate the development of cautious scientific and infrastructure maintenance-based approaches whilst remaining in a state of “scientific optimism”. Furthermore, current theories developed in astrophysics and astronomy mention that an alleged end of the world and of the solar system as they are currently known will occur in several billions of years via lengthy processes of change in planetary, stellar and galactic states. The current study acknowledges existing scientific evidence and encourages researchers to consider novel points of hypothesis for testing that are as rigorous as possible, for the purpose of filtering fabricated “data” and “forced statistics” from real-world, evidence-based scientific data. Existing guidelines of scientific ethics strongly recommend scientific theorists and researchers to ensure all their collected data respects the GDPR regulations, that they are derived from ethical procedures, that any participant of experiments has explicitly given their informed consent, and that viable efforts are made to ensure the collected numerical and categorical data is accurate in nature, even if the purpose of the research is to support interdisciplinary arguments. With such rules,

regulations and guidelines being respected throughout the process, scientists ensure their research remains ethical and trusted throughout their entire process of data reporting.

Conclusions

Given the current level of astrophysical research with regards to even remote possibilities of an unprecedented multi galactic interaction that could even implicate the Milky Way, it may be important for scientific researchers to stay reserved and remain prudent in their observations and projections, given that phenomena of multi galactic interactions pose the highest risks of catastrophic implications for any celestial body and planetary system located within such an area of conjunction. Even areas neighbouring such interactive points could be considerably affected and have multiple layers of physical phenomena altered visibly. Likewise, such a scientific scenario would request experts in the astrophysical field to express utmost prudence even if they may still be situated in profound hypothetical areas. It may likewise be essential for scientific agencies like the National Aeronautics and Space Administration (abbreviated as NASA) to begin more intensive procedures of astronomical and astrophysical research aiming at detecting any unusual patterns of influence toward the solar system and even the Milky Way, as even the most neighbouring galaxies are situated at colossal distances from our galaxy, potentially making any incoming conjunction with our galaxy incredibly hard to predict given the still limited availability of scientific resources designed to study such distant phenomena. Likewise, processes known in layman terms as “thinking outside the box” is necessary to stay in the line with unexpected astronomical events, and such an approach is explained by Albert Einstein’s proposed method of scientific research, to remain in a psychological state where a continuous, healthy change of mind occurs to ensure that problems become solvable as quickly as humanly possible. Likewise, it is not the sentiment of pride that scientific advancement has covered increasing proportions of the unknown that ensures scientific progress, but the active engagement to humility, for the proportions of the unknown still remain infinite, and the words of wisdom shared by Plato that the more human beings learn, the broader the understanding that they know nothing, have an applicability that cross the barrier of physical time. Likewise, it is a continuous state of humility that helps people to think outside of their dimension of perception, for the perception of healthy scientific research is situated in a constant interdimensional movement, ultimately covering an increasing number of dimensions from the infinite pool of dimensions. It may only be the moment of such an acquisition of a mental and emotional state when scientists will be able to detect unexpected phenomena - emerging from outside of their original perception - by default, effectively changing the “gear” of intellectual perception of real-world phenomena from a “manual” setting to an “automatic” one. Furthermore, the effects of the principles of “interdependency” and “correlational relationships” often prove to be more profound in their nature than previously expected, which tends to reflect the state of continuous scientific and philosophical development of the human bright minds, and ultimately the highlight of the need for the human bright mind to actively embrace humility, uncertainty and any existing possibility of being proven wrong at any time, given that Science may occasionally disprove hypotheses and borderline theories that were once deemed as notably credible within broad areas of scientific expertise. Ultimately, the “domino effect” seems to be a colossal factor to the production of the substantial changes within the grand image of physical existence, just as it has been physically demonstrated that it is the changes within micro-dimensions (“fractals”) that ultimately result in changes within whole dimensions. Such overall phenomena are covered by Albert Einstein’s principle of the interest, which describes an automatic process of amplification of produced phenomena, in accordance with their dimension and intensity.

References

1. Ryden, B. (2017). *Introduction to cosmology* (2nd ed.). Cambridge University Press.
2. Wheeler, J. A. (1990). *A journey into gravity and spacetime*. Scientific American Library.

3. Geller, M. J., & Huchra, J. P. (1989). Mapping the universe. *Science*, 246(4932), 897–903. <https://doi.org/10.1126/science.246.4932.897>
4. Press, W. H., & Schechter, P. (1974). Formation of galaxies and clusters of galaxies by self-similar gravitational condensation. *The Astrophysical Journal*, 187, 425–438. <https://doi.org/10.1086/152650>
5. Capaccioli, M., & Caon, N. (1992). The morphology of galaxy interactions. *Memorie della Società Astronomica Italiana*, 63, 345–356.
6. Cole, S., Lacey, C. G., Baugh, C. M., & Frenk, C. S. (2000). Hierarchical galaxy formation. *Monthly Notices of the Royal Astronomical Society*, 319(1), 168–204. <https://doi.org/10.1046/j.1365-8711.2000.03891.x>
7. Christensen, L., Hjorth, J., & Gorosabel, J. (2004). UV star-formation rates of high-redshift galaxies. *Astronomy & Astrophysics*, 425(3), 913–926. <https://doi.org/10.1051/0004-6361:20041202>
8. Bullock, J. S., & Johnston, K. V. (2005). Tracing galaxy formation with stellar halos. I. Methods. *The Astrophysical Journal*, 635(2), 931–949. <https://doi.org/10.1086/497422>
9. Steinmetz, M., & Navarro, J. F. (2002). The hierarchical formation of the Milky Way. *New Astronomy*, 7(4), 155–160. [https://doi.org/10.1016/S1384-1076\(02\)00102-3](https://doi.org/10.1016/S1384-1076(02)00102-3)
10. Kragh, H. (1996). *Cosmology and controversy: The historical development of two theories of the universe*. Princeton University Press.
11. Ruiz-Lara, T., Gallart, C., Bernard, E. J., Cassisi, S., Monelli, M., Skillman, E. D., Stetson, P. B., Weisz, D. R., Aparicio, A., Carini, R., Cole, A. A., Dolphin, A. E., Hidalgo, S. L., Martínez-Vázquez, C. E., Pietrinferni, A., & Tolstoy, E. (2020). The recurrent impact of the Sagittarius dwarf on the star formation history of the Milky Way. *Nature Astronomy*, 4(10), 965–973. <https://doi.org/10.1038/s41550-020-1097-0>
12. Malhan, K., Ibata, R. A., Carlberg, R. G., Bellazzini, M., Famaey, B., & Martin, N. F. (2019). Phase-space Correlation in Stellar Streams of the Milky Way Halo: The Clash of Kshir and GD-1. *The Astrophysical journal letters*, 886(1), L7. <https://doi.org/10.3847/2041-8213/ab530e>
13. Trinchera, A. (2024). On the Andromeda-Milky Way Future Encounter: Thrice Faster Over Time. *International Journal*, 12(1), 17–36. <https://doi.org/10.11648/j.ijass.20241201.12>
14. Cox, T. J., & Loeb, A. (2008). The collision between the Milky Way and Andromeda. *Monthly Notices of the Royal Astronomical Society*, 386(1), 461–474. <https://doi.org/10.1111/j.1365-2966.2008.13048.x>
15. Hammer, F., Puech, M., Flores, H., Yang, Y., Athanassoula, E., & Rodrigues, M. (2024). Apocalypse when? No certainty of a Milky Way – Andromeda collision. *arXiv*. <https://arxiv.org/abs/2408.00064>
16. Struck, C. (2006). Galaxy collisions. In NED Level 5. NASA/IPAC Extragalactic Database. <https://ned.ipac.caltech.edu/level5/Struck/St1.html>
17. Katz, N., Weinberg, D. H., & Hernquist, L. (1996). Cosmological simulations with TreeSPH. *The Astrophysical Journal Supplement Series*, 105(1), 19–36. <https://doi.org/10.1086/192305>
18. Lynden-Bell, D., Faber, S. M., Burstein, D., Davies, R. L., Dressler, A., Terlevich, R. J., & Wegner, G. (1988). Spectroscopy and photometry of elliptical galaxies. V. Galaxy streaming toward the new supergalactic center. *The Astrophysical Journal*, 326, 19–49. <https://doi.org/10.1086/166071>
19. Besla, G., Kallivayalil, N., Hernquist, L., Robertson, B., Cox, T. J., van der Marel, R. P., & Alcock, C. (2007). Are the Magellanic Clouds on their first passage about the Milky Way? *The Astrophysical Journal*, 668(2), 949–967. <https://doi.org/10.1086/521385>
20. Gnedin, O. Y., & Ostriker, J. P. (1997). Destruction of the Galactic Globular Cluster System. *The Astrophysical Journal*, 474(1), 223–255. <https://doi.org/10.1086/303435>
21. Binney, J., & Tremaine, S. (2008). *Galactic dynamics* (2nd ed.). Princeton University Press.
22. Misner, C. W., Thorne, K. S., & Wheeler, J. A. (1973). *Gravitation*. W. H. Freeman.
23. Bland-Hawthorn, J., & Gerhard, O. (2016). The Galaxy in context: Structural, kinematic, and integrated properties. *Annual Review of Astronomy and Astrophysics*, 54(1), 529–596. <https://doi.org/10.1146/annurev-astro-081915-023441>
24. Einstein, A. (1916). The foundation of the general theory of relativity. *Annalen der Physik*, 354(7), 769–822. <https://doi.org/10.1002/andp.19163540702>
25. Peebles, P. J. E. (1993). *Principles of physical cosmology*. Princeton University Press.
26. Carroll, S. M. (2019). *Spacetime and geometry: An introduction to general relativity*. Cambridge University Press.

27. Zeldovich, Y. B., & Novikov, I. D. (1983). *Relativistic astrophysics, Volume 2: The structure and evolution of the universe*. University of Chicago Press.
28. Dehnen, W., & Binney, J. J. (1998). Local stellar kinematics from Hipparcos data. *Monthly Notices of the Royal Astronomical Society*, 298(2), 387–394. <https://doi.org/10.1046/j.1365-8711.1998.01600.x>
29. Dierckx, R. A. (1993). *An introduction to Newton's laws of motion and energy*. Springer.
30. Famaey, B., & McGaugh, S. S. (2012). Modified Newtonian dynamics (MOND): Observational phenomenology and relativistic extensions. *Living Reviews in Relativity*, 15(1), 10. <https://doi.org/10.12942/lrr-2012-10>
31. Loeb, A., & Waxman, M. E. (2000). Cosmic γ -ray background from structure formation in the intergalactic medium. *Nature*, 405(6783), 156–158. <https://doi.org/10.1038/35012024>
32. McGaugh, S. S. (2011). The baryonic Tully-Fisher relation of gas-rich galaxies as a test of Λ CDM and MOND. *The Astronomical Journal*, 143(2), 40. <https://doi.org/10.1088/0004-6256/143/2/40>
33. Alcoforado, F. (2020). The Future of Universe, Sun, Earth and Humanity. *HSOA Journal of Atmospheric & Earth Science*, 4(1), 1-12. <https://doi.org/10.24966/AES-8780/100021>
34. Belokurov, V., Erkal, D., Evans, N. W., Koposov, S. E., & Deason, A. J. (2018). Co-formation of the disc and the stellar halo. *Monthly Notices of the Royal Astronomical Society*, 478(1), 611–619. <https://doi.org/10.1093/mnras/sty982>
35. D'Onghia, E., & Fox, A. J. (2016). The Magellanic Stream: Circumnavigating the Galaxy. *Annual Review of Astronomy and Astrophysics*, 54(1), 363–400. <https://doi.org/10.1146/annurev-astro-081915-023251>
36. Penrose, R. (1965). Gravitational collapse and space-time singularities. *Physical Review Letters*, 14(3), 57–59. <https://doi.org/10.1103/PhysRevLett.14.57>
37. Hawking, S. W. (1975). Particle creation by black holes. *Communications in Mathematical Physics*, 43(3), 199–220. <https://doi.org/10.1007/BF02345020>
38. Falcke, H., & Hehl, F. (Eds.). (2002). *The galactic black hole: Lectures on general relativity and astrophysics*. CRC Press.
39. Randall, I. (2022). Concerning primordial black holes. *Physics World*, 35(5), 33. <https://doi.org/10.1088/2058-7058/35/05/27>
40. Thorne, K. S. (1994). *Black holes and time warps: Einstein's outrageous legacy*. W. W. Norton & Company
41. Di Matteo, T., Springel, V., & Hernquist, L. (2005). Energy input from quasars regulates the growth and activity of black holes and their host galaxies. *Nature*, 433(7026), 604–607. <https://doi.org/10.1038/nature03335>
42. Abbott, B. P., Abbott, R., Abbott, T. D., Abernathy, M. R., Acernese, F., Ackley, K., ... & Adhikari, R. X. (2016). Observation of gravitational waves from a binary black hole merger. *Physical Review Letters*, 116(6), 061102. <https://doi.org/10.1103/PhysRevLett.116.061102>
43. Helmi, A., Babusiaux, C., Koppelman, H. H., Massari, D., Veljanoski, J., & Brown, A. G. A. (2018). Gaia Data Release 2: The kinematics of globular clusters and dwarf galaxies around the Milky Way. *Astronomy & Astrophysics*, 616, A12. <https://doi.org/10.1051/0004-6361/201832698>
44. Laporte, C. F. P., Minchev, I., Johnston, K. V., & Gómez, F. A. (2019). Footprints of the Sagittarius dwarf galaxy: The structure of the Galactic disc from 6 to 4 Gyr ago. *Monthly Notices of the Royal Astronomical Society*, 485(3), 3134–3150. <https://doi.org/10.1093/mnras/stz533>
45. Ruiz-Lara, T., Gallart, C., Bernard, E. J., Cassisi, S., Monelli, M., Skillman, E. D., Stetson, P. B., Weisz, D. R., Aparicio, A., Carini, R., Cole, A. A., Dolphin, A. E., Hidalgo, S. L., Martínez-Vázquez, C. E., Pietrinferni, A., & Tolstoy, E. (2020). The recurrent impact of the Sagittarius dwarf on the star formation history of the Milky Way. *Nature Astronomy*, 4(10), 965–973. <https://doi.org/10.1038/s41550-020-1097-0>
46. Ward, P. D., & Brownlee, D. (2000). Messengers from the Stars. Rare Earth: Why Complex Life is Uncommon in the Universe, 277-287. https://doi.org/10.1007/0-387-21848-3_13
47. Falcke, H., & Hehl, F. (Eds.). (2002). *The galactic black hole: Lectures on general relativity and astrophysics*. CRC Press. https://books.google.co.uk/books?hl=en&lr=&id=0jBIBovLV5YC&oi=fnd&pg=PR9&dq=Milky+Way+clash+impact+on+Earth&ots=OV5iVA43ln&sig=sYhEiL5FaefW1xhxifLgXIyCNv8&redir_esc=y#v=onepage&q&f=false

48. Haehnelt, M. G., & Kauffmann, G. (2000). The correlation between black hole mass and bulge mass. *Monthly Notices of the Royal Astronomical Society*, 318(4), L35–L38. <https://doi.org/10.1046/j.1365-8711.2000.03984.x>
49. Ferrarese, L., & Merritt, D. (2000). A fundamental relation between supermassive black holes and their host galaxies. *The Astrophysical Journal Letters*, 539(1), L9–L12. <https://doi.org/10.1086/312838>
50. Kormendy, J., & Ho, L. C. (2013). Coevolution (or not) of supermassive black holes and host galaxies. *Annual Review of Astronomy and Astrophysics*, 51(1), 511–653. <https://doi.org/10.1146/annurev-astro-082708-101811>
51. Sanders, R. H. (2014). *Revealing the Heart of the Galaxy*. Cambridge University Press. https://books.google.co.uk/books?hl=en&lr=&id=6bLCAQAAQBAJ&oi=fnd&pg=PR9&dq=Milky+Way+clash+impact+on+Earth&ots=Hb0pMBGyus&sig=BqNF8Hey5qqz683TpokTTkSH_Ro&redir_esc=y#v=onepage&q=Milky%20Way%20clash%20impact%20on%20Earth&f=false
52. Franco-Paredes, C. (2013). Illness and Death in the Universe. *The Permanente Journal*, 17(4), 90. <http://dx.doi.org/10.7812/TPP/13-073>
53. Hutton, A. N. (2009). *Climate Change V: Here Comes the Sun*. By Dr. A. Neil Hutton, 21. <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=6c01bfb27ac2a052e6dd7ce16084931e28d81abe#page=21>
54. Frenk, C. S., & White, S. D. M. (2012). Dark matter and cosmic structure. *Annalen der Physik*, 524(9–10), 507–534. <https://doi.org/10.1002/andp.201200212>
55. Navarro, J. F., Frenk, C. S., & White, S. D. M. (1996). The structure of cold dark matter halos. *The Astrophysical Journal*, 462, 563–575. <https://doi.org/10.1086/177173>
56. Spier, F. (2015). *Big history and the future of humanity*. John Wiley & Sons. https://books.google.co.uk/books?hl=en&lr=&id=I9D0BgAAQBAJ&oi=fnd&pg=PA8&dq=Milky+Way+clash+impact+on+Earth&ots=gfnHpfVea3&sig=ZyvzhzFK1r9u-P3iW5W18ziHwnM8&redir_esc=y#v=onepage&q&f=false
57. Gutenberg, B., & Richter, C. F. (1944). Frequency of earthquakes in California. *Bulletin of the Seismological Society of America*, 34(4), 185–188. <https://doi.org/10.1785/BSSA0340040185>
58. Gutenberg, B., & Richter, C. F. (1954). *Seismicity of the Earth and associated phenomena* (2nd ed.). Princeton University Press.
59. Kanamori, H., & Brodsky, E. E. (2004). The physics of earthquakes. *Reports on Progress in Physics*, 67(8), 1429–1496. <https://doi.org/10.1088/0034-4885/67/8/R03>
60. Ammon, C. J., Lay, T., & Simpson, D. W. (2010). Great earthquakes and global seismic networks. *Annual Review of Earth and Planetary Sciences*, 38(1), 349–374. <https://doi.org/10.1146/annurev-earth-040809-152414>
61. Beroza, G. C., & Kanamori, H. (2007). Earthquake seismology: An overview and some recent advances. *Annual Review of Earth and Planetary Sciences*, 35(1), 1–31. <https://doi.org/10.1146/annurev.earth.35.031306.140223>

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.