



REVIEWER'S REPORT

Manuscript No.: IJAR-57100

Title: Chronicle of Contemporary Development of Cosmology and Understanding of Universe

Recommendation:

Accept after minor revision.....

Rating	Excel.	Good	Fair	Poor
Originality		(✓)		
Techn. Quality	(✓)			
Clarity	(✓)			
Significance	(✓)			

Reviewer Name: Abdul Haseeb Mir

Detailed Reviewer's Report

The article titled "Chronicle of Contemporary Development of Cosmology and Understanding of Universe" provides a sweeping historical and theoretical survey of humanity's attempt to map the origins, evolution, and ultimate fate of the cosmos. The author begins by situating cosmology as a discipline that bridges ancient philosophical inquiry—from Democritus to Newton—with the high-precision technological advancements of the 21st century. Central to the article's thesis is the persistent tension between General Relativity, which governs the large-scale structure of space-time, and Quantum Mechanics, which dictates the behavior of subatomic particles. The text effectively argues that the current "Standard Model" of cosmology is at a critical juncture, as groundbreaking data from the James Webb Space Telescope (JWST) and other next-generation observatories expose deep incompatibilities between these two pillars of physics.

A significant portion of the manuscript is dedicated to the "Hubble Tension" and the "Cusp-Core Problem," which the author identifies as the primary discrepancies challenging the Lambda Cold Dark Matter (ΛCDM) model. The narrative details how simulations of galaxy formation predict steep "cusps" of dark matter in galactic centers, whereas direct observations reveal flat "cores," suggesting that our understanding of dark matter scattering or its temperature may be fundamentally incomplete. Furthermore, the author explores the late-20th-century discovery of accelerating cosmic expansion, attributing this phenomenon to dark energy. A provocative highlight of the article is the recent data from the Dark Energy Spectroscopic Instrument (DESI), which hints that dark energy may not be a constant

REVIEWER'S REPORT

value but could be weakening over time, potentially leading to a "Big Crunch" rather than the traditionally predicted "Heat Death".

The article also provides a historical account of the "Space Age," tracing the evolution of rocketry from the instability of early F-1 engines to the current era of commercial dominance led by entities like SpaceX. The author frames this technological progression as a necessary "stepping stone" into the cosmic ocean, emphasizing that modern exploration is increasingly a collaborative marriage between national agencies like NASA and private aerospace firms. However, the most theoretically ambitious section of the paper introduces the "Dead Universe Theory". This framework posits that the current accelerated expansion is a residual effect of the destruction of a prior cosmos, suggesting a cyclical model where dark energy is an "energetic vestige" of a cosmic transition. This view aligns with the concept of the universe as a complex information processor, where data is continuously exchanged between the defunct cosmos and the present one.

While the article is a robust synthesis of diverse fields—ranging from particle physics to aerospace engineering—it requires minor revisions to strengthen its academic rigor. First, the introduction of the "Dead Universe Theory" needs more explicit grounding in existing cyclical or "Conformal Cyclic Cosmology" (CCC) models to clarify its unique contribution to the field. Second, the transition between the historical analysis of NASA's 1960s workforce and the technical discussion of quantum vacuum fluctuations is occasionally abrupt; a more seamless narrative bridge would enhance the paper's flow. Additionally, the author should expand on the "public policy exception" mentioned in the context of space risk management to provide a clearer link between engineering failures and government funding shifts. Finally, ensuring consistent terminology when discussing the "Hubble Tension" across different chapters will consolidate the article's central argument. Addressing these points will elevate the manuscript from a high-quality survey to a definitive reference for contemporary cosmological study.

Recommendations and publication decision

Subject to these minor revisions, the article is suitable for publication.