New Observational Evidence Confirms Prediction from Dual-Energy Theory of Older Age of the Universe, Disproof of Lambda-CDM Model

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Abstract

New Dual-Energy physics of a universe of positive and negative energy has been proposed as the result of the identification of a specific Dual-Energy mechanism in gravity since 9-2019. Dual-Energy theory has already demonstrated evidence based on fundamental physics of energy in gravity and its ability to naturally predict the fundamental cosmological behavior of our universe. It sweepingly resolves dark energy and other fundamental physical problems in current theory. Dual-Energy theory has also predicted that the universe is much older than the age predicted by the Lambda-CDM model of around 13.8 billion years. It relates to an extended cosmic time period leading up to the formation of first galaxies. It is now reported that clear observational evidence has emerged that confirms the prediction of an older universe and for which no other realistic explanation exists. A regularly rotating disk galaxy, ALESS 073.1, has been observed in the early universe with a structural maturity that cannot be explained within the timeline under the Lambda-CDM model. An introduction to Dual-Energy theory is provided and its evolving revolutionary consequences for cosmology are addressed. A stunning extent of the current crisis in cosmology emerges.

1. Introduction

I have proposed Dual-Energy theory of a universe of positive and negative energy as the result of the identification of a specific Dual-Energy mechanism in gravity since 9-2019 [1] [2] [3]. The identified new Dual-Energy physics naturally define a comprehensive bottom-up physical model of both the expansion and the origin of our universe. The new physics come with direct evidence from fundamental physics of energy in gravity and from their ability to naturally explain the fundamental cosmological behavior of our universe. Dual-Energy theory sweepingly resolves dark energy and other problems of fundamental physics in current cosmology from an initial big bang singularity to the lack of definable direction for its kinetic model of expansion. The new Dual-Energy theory also allows for a testable prediction which I first made in 11-2020 [2]. The prediction is that the universe is much older than the age predicted by the current standard Lambda-CDM model of around 13.8 billion years. It relates to a much-extended cosmic time period leading up to the formation of first galaxies. The prediction has recently been confirmed by clear observational evidence for which no other realistic explanation exists.

2. The new observation and its interpretation

As reported by Federico Lelli et al. in 2-2021, a regularly rotating disk galaxy, ALESS 073.1, has been observed at a redshift which according to the current standard model suggests an observation from when the universe was only 1.2 billion years old [4]. Its observed structural maturity is unpredicted and cannot be explained with existing models of galaxy formation within a cosmic time frame of 1.2 billion years after the big bang [4]. Dynamic processes that are characteristic for disc galaxies are exceedingly time consuming. According to a 2018 study just one complete rotation was found to take right around 1 billion years with a surprising uniformity across the sample [5]. The evolution of ALESS 073.1 must have gone through a vastly extended time period of more chaotic movement before settling into a regularly rotating galaxy. A time period of only 1.2 billion years for this process is unrealistic. The observation provides clear evidence for the prediction of Dual-Energy theory for an older age of the universe.

It also provides observational disproof of the Lambda-CDM model. This needs to be considered in the wider context of Dual-Energy theory which has already demonstrated disproof of the standard model from hard contradictions with fundamental physics and key characteristics of cosmological behavior [2][3]. The implications of the new fundamental theory of energy are highly complex and just emerging [2]. In 3. an introduction is presented into the basis and the evolving cosmological consequences of Dual-Energy theory in the context of the current discussion about a crisis in cosmology.

3. Introduction to Dual-Energy Cosmology - Crisis in cosmology a problem of fundamental physics

3.1 Current discussion

Quantitative inconsistencies within the standard Lambda-CDM cosmological model have increasingly raised concern about a crisis in cosmology. It has not been possible to demonstrate agreement for the value of the Hubble constant H_0 between calculations based on the Cosmic Microwave Background (CMB) and based on the observation of objects in the more recent universe. May these quantitative inconsistencies be only the tip of the iceberg of a deeply rooted problem of fundamental physics that govern the expansion and origin of the universe? With 'dark energy' unexplained, is our theory of energy incomplete? The specific new physics I have identified since 9-2019 [1][2][3] clearly suggest this. The new Dual-Energy physics naturally define a new bottom-up physical understanding of both the origin and the expansion of the universe. The new physics come with evidence from both fundamental considerations of energy in gravity and from the stunning ability to naturally and comprehensively explain the fundamental cosmological behavior of our universe. The new Dual-Energy theory naturally resolves hard physical impossibilities in the current standard model from an initial singularity that should never expand to the lack of definable direction for its kinetic model of expansion. The new theory also makes the testable prediction of a universe much older than the around 13.8. billion years assumed under the method and the assumptions of the current standard model. As reported here, clear observational evidence is now available confirming this prediction.

3.2 Energy in gravity holds the key

I have identified the new physics from realizing that a specific Dual-Energy mechanism acts as the physical energy source in gravity. This comes with its own proof based in fundamental physics that demonstrates that neither gravitational potential energy nor any energy from the gravitational field can be the energy source. The pivotal conclusion is that in gravitational acceleration the energy is generated at the expense of negative energy in space. This one realization unleashes a cascade of ensuing insights that define a comprehensive new cosmology which coherently explains the fundamental cosmological behavior of the universe. It directly establishes the reality of negative energy in space. Its repulsive gravitational effect on positive mass-energy follows naturally from Newton's law of universal gravitation where the direction of the attractive gravitational force reverses when one of the two masses considered is negative. The conclusion about energy in gravity directly demonstrates that gravity is a fundamental mechanism for origin of corresponding positive and negative energies. It demonstrates that negative and positive energies evolve dynamically over cosmic times. As a consequence, the dark energy mystery is naturally resolved: Effects associated with dark energy under the standard model are effects of the effective presence of negative energy spread evenly across the vacuum of space. 'Dark energy' has been a place holder term for a hypothetical type of positive energy that acts like negative energy in the Lambda-CDM model. As this model is invalidated, the contrived assumption of dark energy falls away. It is negative energy in space that continues to be generated in ongoing gravitational mass aggregation in the universe, contributing to a dynamically evolving expansion parameter. Whereas dark energy is directly resolved by thew Dual-Energy physics, dark matter is indirectly impacted. Repulsive gravitational effects pushing in on massive clusters from surrounding areas of space dominated by negative energy may falsely project as evidence for the presence of attractive dark matter around massive clusters in single-energy models. This suggests that models be re-evaluated to determine remaining requirements for dark matter presence.

3.3 Fundamental cosmological behavior now in agreement with fundamental physics

With the new Dual-Energy physics the fundamental physical cause for the expansion of the universe can finally be identified: The expansion of our universe is driven by the repulsive gravitational forces between positive masses in galaxy filaments and surrounding voids dominated by negative mass-energy. This new understanding naturally provides directional definition for the physical action responsible for expansion. The significance of this should not be underestimated as the current kinetic model is fundamentally unfit to define direction. It implies that expansion is an effect of the inertia of positive masses that were somehow accelerated in the big bang. The fundamental problem is that the individual directions of accelerated positive masses cannot all point away from each other in 3D space, some would have to point towards others. The laws of physics require definable direction for acceleration and inertial motion. The standard model is based on undefinable physics. This does not mark the only physical impossibility in the current model of a universe of positive mass-energy only. In its implied initial big bang singularity, as well as in any subsequent ultra-dense states, positive mass-energy should be kept together by overwhelming gravity, not expand. These are characteristic impossibilities in the physical representation of a universe based on positive mass-energy only. As they are naturally resolved under Dual-Energy theory, these problems signify hallmarks for the reality of a Dual-Energy universe. Spatial flatness of the universe is another example. Under the standard model the observation of a spatially flat universe is not predicted but requires deliberate, exceedingly fine-tuned assumptions in the standard model. In a Dual-Energy universe it is the natural result of the presence of corresponding amounts of positive and negative mass-energy. The most interesting hallmark for Dual-Energy physics is their unique ability to predict an origin of our universe of energy without violating a symmetry of energy. The Dual-Energy model predicts a 'not quite so big' bang where a net value of zero energy is conserved as positive energy emerges along with corresponding negative energy. The hard to contemplate problem of a universe of matter and energy emerging from 'nothing', a physical state of zero energy, is as comprehensible as the term 0 = -1 +1. No initial singularity existed, repulsive forces between positive and negative mass-energy became effective from the very beginning. The need to resort to hypothetical chance events for energy to pop up in a big bang falls away. The beginning of our universe of energy is brought within the reach of known and knowable physics.

3.4 Unfolding consequences for cosmology

3.4.1 The kinetic model of expansion that shaped cosmology for generations

For cosmology moving forward the most dramatic consequence of Dual-Energy physics goes beyond a new qualitative physical understanding of expansion and origin. It is the invalidation of its kinetic model of expansion. This kinetic model of expansion had been formulated already in the early 1920's by Alexander Friedmann's equations. After his death in 1925 and following the realization of cosmic expansion in the wake of Edwin Hubble's discovery in 1929, cosmology has been heavily relying on Friedmann's equations. However, beyond its incompatibilities with fundamental physics which are now overtly exposed by Dual-Energy theory, the model has a history of not predicting the actual behavior of the expanding universe. Where the model did not fit observation, deliberate add-ons have been introduced to make it fit such as a cosmological constant, dark energy and specific amounts of dark matter. The model has shaped key questions deemed relevant in modern cosmology, such as the type of curvature of space and whether the universe will re-collapse under its own gravity. It has also shaped methodology as its application invited a wide range of speculative assumptions that would be tested for quantitative agreement with the model. The model has been thought to realistically describe the evolution of the universe. Its suggested high precision for the determination of the age of the universe and other quantitative cosmological parameters has been seen as strong evidence while its contradictions with fundamental physics have been tolerated. This confidence, however, has been shaken by the inability to demonstrate agreement in the determination of the value of the Hubble constant.

3.4.2 The invalidity of the kinetic model of expansion and its quantitative promise

The reason for the quantitative inconsistency in the standard model can now be revealed. It is not possible to extrapolate the expansion history of the universe from the CMB as the validity of the Friedmann equations falls away. In the kinetic model described by the Friedmann equations the inertia of accelerated masses provides the steady base component for an expansion subject to additional accelerating effects from dark energy and the slowing effects from attractive gravity. Accordingly, the history of the universe has been modeled as a steady process that can be readily calculated from set parameters all the way back to the CMB and an initial singularity. Unfortunately, this convenient model does not hold under Dual-Energy theory as expansion is not a kinetic process of masses accelerated in the big bang. Expansion instead depends on actual dynamically evolving processes over the history of our universe in which positive energy is generated along with corresponding negative energy of space. In the modern universe the relevant dynamic process that increases positive and negative energies is the growing gravitational concentration of masses. In the predicted 'not quite so big' bang the dynamic process is the initial emergence of positive mass-energy generated with corresponding negative energy of space in a process fundamentally akin to gravity. At least at this point there is no apparent math that predicts the expansion history. A plausible scenario for the early expansion history looks like this: Rapid expansion from an initial onset of energy and matter generation slows to near halt. In a subsequent era of gravitational matter aggregation/collapse in clouds, black holes, stars and galaxies the expansion gradually resumes as new positive-negative energies are generated. The elapse of cosmic times in the dark ages and through an early era of formation of the oldest stars and galaxies is expected to be much longer than currently assumed. It allows for longer cosmic times for stars, pre-galactic structures and the first galaxies to form and the need for excessive dark matter assumptions vanishes.

A signature for the this may be detected from the observation and analysis of the following elements and/or a combination of these: i) Luminosity distance to redshift relationship of high redshift objects, ii) astrophysical age determination of objects observed at any redshift, iii) modeling of time requirement for evolution from smooth energy distribution in CMB to first observable galaxies. As reported here, clear observational evidence is now available for iii) with the regularly rotating galaxy ALESS 073.1. Signatures for ii) have been observed for many years, they just have not been interpreted in this way. Astrophysical considerations have long pointed to the presence of stars older than 13.8 billion years. However, the high level of confidence in the current model of expansion has put modeling assumptions into focus that allow for the possibility of a younger age for these stars. An assessment of the age of nearby star HD 140283 by Bond et. al. resulted in 14.46 billion years with an uncertainty of ± 0.8 billion years [6].

3.4.3 Impact on expectations, priorities and methodology in cosmology

The emerging Dual-Energy cosmological model provides a new bottom-up physical description of the origin and expansion of the universe. At least at this point there is no apparent math that predicts the expansion history. The quantitative precision that the standard model has been suggesting has been unreal. The determination of actual quantitative parameters will require substantial new efforts. The observation of high redshift objects is becoming ever more crucial to explore the history of the universe. The determination of an upper limit for the age of the universe is particularly challenging. A new type of cosmological survey may eventually explore correlations between a measured evolution of the Hubble parameter and the estimated generation of positive-negative energies from gravitational mass aggregation in the universe over cosmic time periods. To this end, further advances in gravitational wave astronomy would be necessary to provide data for an assessment of the abundance of black holes classes, the growth and merger of which are a significant contributor to positive/negative energies generated. In Dual-Energy cosmology expectations for new insights shift from ultimate precision in quantitative determination of parameters towards direct new insights into the fundamental behavior and fundamental nature of our universe. Contrived hypothetical assumptions that merely suggest quantitative agreement become increasingly questionable. With the new Dual-Energy physics we can begin to draw direct conclusions about cosmological characteristics from fundamental physics. We can conclude that there is no reason to expect the universe to ever re-collapse. We can conclude that the universe necessarily is spatially flat. We can begin to understand the actual physical mechanism responsible for the origin of our universe of energy in a 'not quite so big' bang. Fundamental mysteries of the nature of dark energy and an initial singularity are directly resolved. The validity of a significant part of research in cosmology is impacted. A major overhaul of theory is needed. Biases that may have built up to bring observational data and models in line with the standard model need to be identified.

3.5 Conclusion

The new Dual-Energy physics are identified from fundamental physics for energy in gravity. The surprising result that a principle identified as the energy source for gravity also provides a coherent and comprehensive model for the origin and expansion of the universe points to the presence of a fundamental principle of nature. As the qualitative and quantitative validity of the current model of expansion falls away, the current model can only demonstrate its own falsification as evidence for its quantitative inconsistencies is hardening with further improved observational data. At this juncture evidence and guidance from fundamental physics is needed to identify the crucial way forward. The standard model had always involved physical impossibilities that have been largely ignored or worked around with additional hypothetical assumptions. These problems are now shown to be directly related to a pivotal physical flaw of the model. This flaw is the omission of the role of negative energy. We need Dual-Energy theory to understand 'dark energy'. We need Dual-Energy theory to understand the repulsive forces at work in expansion. We need Dual-Energy theory to understand direction in cosmic expansion. We need Dual-Energy theory to understand an origin of energy without an initial singularity. We need Dual-Energy theory to understand spatial flatness. Dual-Energy physics comprehensively resolve the widespread physical impossibilities and near impossibilities of the standard model from one principle. Dual-Energy theory demonstrates a comprehensive alternative to current 'single-energy' theory of a universe of positive energy only. The characteristic physical impossibilities disproving single-energy theory serve as proof for a universe of both positive and negative energy.

References

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