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Eternal Inflation and Non-Gaussian Tails

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About the Study

Non-trivial inflationary self-interactions can produce predictable signs of primitive non-Gaussianness that can be measured by space exploration. Surprisingly, it turns out that the same model often cannot calculate the phase transition to eternal slow roll inflation. Instead, this transition is sensitive to non-Gaussian tails of scalar fluctuation distributions that study physics within the horizon, perhaps beyond the limits of inflation's effective field theory. We show this fact directly by calculating the non-Gaussian correction of stochastic inflation within the framework of the soft de sitter effective theory. From this theory, we derive the probability distribution associated with scalar variation. Find the parameter space according to the current observations and the weak coupling when crossing the horizon. There, large fluctuations associated with eternal inflation can only be determined with reference to UV completion. Also, the breakdown of this disturbance description shows that de-jitter entropy is needed to reflect the number of de-jitter microstates.

The development of the complete picture of physics in the de Sitter space continues to be one of the major unsolved problems of theoretical physics. Problems come in many forms. In practice, there is no strict (non-perturbative) definition of cosmological observables. Conceptually, there is a lot of confusion when trying to characterize a permanent inflation stage. On the other hand, these important challenges do not seem to impede our ability to make quantitative predictions about the universe in which we live. Weak coupling allows the structure of the observable correlation function to be calculated and understood as a controlled approximation. But the purpose of this study is to show for the first time that we have some basic questions about our own parts of the universe. The answer cannot be calculated by perturbation theory. The possibility that our universe will expand forever.

Cosmological observations suggest that the large-scale structure of our universe was sown during inflation, a stage of quasi-idle sitter expansion. The observable effects of inflation can be captured by the Effective Field Theory (EFT) framework. Much progress has been made in understanding how to perturbate statistical inflation forecasts. A notable new advance is the cosmological bootstrap aimed at reconstructing inflation observables directly from locality and causality. Much of the interest in the structure of cosmological correlators focuses on possible features of the original non-Gaussian nature. This is to provide an observation window for the content and interaction of the particles that played a role during inflation.

Conclusion

Light scalar fields in quasi-de Sitter space, such as inflation, are affected by random quantum fluctuations. In perturbation theory, these fluctuations result in a large infrared (IR) effect that can be resumed within the framework known as stochastic inflation. This gives you a Fokker-Planck equation that determines the expansion of the probability distribution of the field's local values. The ward ID associated with these symmetries imposes a limit on the correlation function. This is also known as a single field integrity condition. Similar to the black hole entropy, it is clear to interpret this entropy as a finite degree of freedom representing the microphysics of the (quasi) de Sitter space. A rough test of this hypothesis is to compare de Sitter entropy with the entropy of fluctuations observed after the end of inflation.

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