Planck's Constant h, in The Beginning of Cosmological Expansion

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Abstract

We look at a non-singular universe representation of entropy, based in part on what was brought up by Muller and Lousto.This is a gateway to bringing up information and computational steps. The ZPE formalism is modified as due to Matt Visser's alternation of k (maximum) ~ 1/(Planck length), with a specific initial density giving rise to initial information content which may permit fixing the initial Planck's constant, h

Introduction

First of all we wish to ascertain if there is a way to treat entropy in the universe , initially, by the usual black hole formulas. Our derivation takes advantage of work done by Muller, and Lousto [1] which have a different formulation of entropy cosmology, based upon a modified event horizon, which they call the Cosmological Event Horizon. i.e. it represents the distance a photon emitted at time t can travel. Afterwards, we give an argument, as an extension of what is presented by Muller and Lousto [1], which we claim ties in with Cai [2], as to a bound to entropy, which is stated to be S (entropy) less than or equal to N, with N, in this case, a microstate numerical factor. Then, a connection as to Ng's infinite quantum statistics [3] is raised. i.e. afterwards, we are then referencing C.S. Camara a way to ascertain a non-zero finite, but extremely small bounce and then we use the scaling, as given by Camara [4], that a resulting density, is scaled as by $\rho : a^{-4}$. In addition we will set this scaling as a way to set minimum magnetic field values, commensurate to the modified ZPE density value, as given by Visser [5] , with $\rho : a^{-4}$ paired off with [5]'s $\rho \sim mass(planck)/(length[Planck])^3$, so then the magnetic fields as given by [4] can in certain cases be estimate. In addition, comparing the results of [4] and [5] permit us to use Waleka's [6] result of a time step ~ 1/ square root of $\rho \sim mass(planck)/(length[Planck])^3$ versus a time step ~ 1/ square root of $\rho : a^{-4}$, with equality giving further constraints upon magnetic fields and a cosmological "constant" Λ. Doing so, will then permit us to make further use of [7] and its relationship between and a cosmological "constant" Λ and an upper bound to the number of produced gravitons. Isolating N (the number of gravitons) and if this is commensurate with entropy due to [2] amd [3] will allow us to use Seth Lloyd supposition of [8] as to the number of permitted operations in quantum physics may be permitted. This final step will allow us to go to the final supposition, as to what number of operations / information may be needed to set a value of h (Planck's constant) in the beginning of the universe, or given in [9] with value, h invariant over time.

$$\hbar(initial) = E(initial) \cdot t\left(initial\right) = \rho(initial) \cdot V\left(initial\right) \cdot t\left(initial\right) \qquad (1)$$

Please see the rest of the document as given in reference [10]. We have jumped to the conclusion.

Conclusion. Order of magnitude estimate as to necessary and sufficient conditions as to calculation of h bar in the early Universe. Leading to effective initial time not zero.

We will now give a first order estimate as to calculation of h bar, i.e. Eq.(1). i.e. isolatethe actual spatial length, for the creation of a present-day h bar Planck's constant.

$$\Delta x \Delta p \geq \hbar + \frac{l_{Planck}^{2}}{\hbar} \cdot \left(\Delta p\right)^{2} \qquad (2)$$

Then THE FOLLOWING ARE EQUIVLENT

. The idea would be that the Planck constant, h bar would be formulated as of the present day value ,. Also, the modification for the string length, would have $\Delta x\big|_{\min} \sim 10^{\beta} l_{Planck}$, so then

$$\& \Delta x\big|_{\min} \Delta p \approx \hbar + \frac{l_{Planck}^{2}}{\hbar} \cdot \left(\Delta p\right)^{2}$$

$$\& \hbar^{2} - \hbar \Delta x\big|_{\min} \Delta p + l_{Planck}^{2} \cdot \left(\Delta p\right)^{2} \approx 0$$

$$\hbar \approx \frac{\Delta x\big|_{\min} \Delta p}{2} \cdot \left(1 + \sqrt{1 - 4\frac{l_{Planck}^{2}}{\left(\Delta x\big|_{\min}\right)^{2}}}\right) \qquad (3)$$

$$\hbar \approx \frac{\Delta x\big|_{\min} \Delta p}{2} \cdot \left(1 + \sqrt{1 - 4 \cdot 10^{-2\beta}}\right)$$

$$\approx \Delta x\big|_{\min} \Delta p \cdot \left(1 - \frac{2}{10^{2\beta}}\right)$$

Then,

$$if \, \Delta p \sim N_{graviton} \cdot m_{graviton} \cdot c$$

$$\hbar \approx \Delta x\big|_{\min} \cdot N_{graviton} \cdot m_{graviton} \cdot c \cdot \left(1 - \frac{2}{10^{2\beta}}\right) \qquad (4)$$

$$\Delta x\big|_{\min} \approx \frac{\hbar}{N_{graviton} \cdot m_{graviton} \cdot c \cdot \left(1 - \frac{2}{10^{2\beta}}\right)}$$

This should be greater than a Plank length, mainly due to the situation of

$$\left(1 - \frac{2}{10^{2\beta}}\right)^{-1} \sim 1 + \frac{2}{10^{2\beta}} \qquad (5)$$

We assume, here that this will be occurring in an interval of time approximately the value of Planck time given by

$$t\left(initial\right) \sim \hbar / \rho(initial) \cdot V\left(initial\right) \sim \frac{\hbar}{\left(\frac{m_{Planck}}{l_{Planck}^{3}}\right)} \left(\frac{\hbar}{N_{graviton} \cdot m_{graviton} \cdot c \cdot \left(1 - \frac{2}{10^{2\beta}}\right)} \right)^{-3} \quad (6)$$

Here, the number, N, is given as the number of gravitons, and the important factor is that Eq.(6) is non zero.Whereas this will then lead to a fixed magnetic field behavior as to N being defined above, by Eq. (6) and the N so being defined, leading to a bound on Λ

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