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Peer Review

Review of: "Dirac's Large Number Hypothesis: An Ongoing Quest for Correlations Between the Infinitesimal and the Infinite"

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This review paper constitutes a useful guide to those interested in the intriguing subject, raised so many years ago by Dirac (1937), about the possible variation of some Nature "constants". It provides the reader with a balanced account of the development of this idea and a comprehensive list of references for those willing to pursue the matter. I am in favor of publication, but in my view, there are some points that most likely the authors would like to correct:

1.- The abstract and the introductory section suffer from a grandiloquent style, more suitable for an epic story than for a scientific work.

2.- In equation (2), the authors introduce the "temperature of the universe". I do not think this concept makes much sense. The Universe does not have a well-defined temperature. Some authors take it to be the temperature of cosmic microwave background radiation, but the latter is not at equilibrium with that of matter (while the first decreases as 1/(a(t)), the second decreases as the square of that expression (here a(t) is the scale factor introduced in equation (1)).

3.- The need for matter creation, to account for the temporal variation of the fundamental constants, loosely described by equations (10)-(12), introduces new constants, namely, alpha, beta, and Gamma. So this solves nothing because there is no guarantee that neither of the three new "constants" are truly constants. The authors should take this into consideration.

I am afraid that to have a successful physical theory free of constants lies far away from our time.

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Declarations

Potential competing interests: No potential competing interests to declare.