A MYOPIC VIEW OF THE UNIVERSE AND ITS EVOLUTION

Ph.D. Thesis

by

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A Myopic View of the Universe and its Evolution

Thesis

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Physics

by

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New Delhi

DECLARATION

I, **Mast Maula**, student of Ph.D. hereby declare that the thesis titled **"A Myopic View of the Universe and its Evolution"** which is submitted by me to the Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi in partial fulfilment of the requirement for the award of the degree of Doctor of Philosophy has not previously formed the basis for the award of any Degree, Diploma, Associateship, Fellowship or other similar title or recognition. This is to declare further that I have also fulfilled the requirements of Para 11 ((b) and (g)) of the Ph.D. Ordinance, the details of which are enclosed at the end of the Thesis, and that there is no plagiarism.

New Delhi
Date: (**Mast Maula**)

CERTIFICATE

On the basis of declaration submitted by **Mast Maula**, student of Ph.D., I hereby certify that the thesis titled **"A Myopic View of the Universe and its Evolution"** which is submitted to the Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi in partial fulfilment of the requirement for the award of the degree of Doctor of Philosophy, is an original contribution with existing knowledge and faithful record of research carried out by him/her under my guidance and supervision.

To the best of my knowledge this work has not been submitted in part or full for any Degree or Diploma to this University or elsewhere, and that it is plagiarism free.

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I thank the University administration for regularly rejecting my (honest) contingency bills, and making me wait for months for my fellowship, thus forcing me to learn to work without money. This will undoubtedly help me survive in the bleak job-market.

I thank the coffee shop in the university where I did my original thinking and many coffee shops across the city where I did most of my work.

Abstract

Without a doubt many problems in physics arise as a consequence of our philosophical conception of the world. In this contribution however we endeavor to alleviate this scenario by putting forward a philosophical approach under which some of the most fundamental problems in modern physics might turn out to be fictitious. To accomplish such task we propound that everything that exists must be made up of *matter* which not only makes up space and the universe but also is in constant change. For such reason the existence of total emptiness and material discontinuity are rejected. Here physical fields are assumed as a particular state of matter. And time is understood as the result of the intrinsic dynamics of the universe. Furthermore, the infiniteness of the universe is also discussed and its implications are briefly mentioned, e.g., the laws of conservation. Finally, the regularity of the physical laws is questioned. In summary four great problems (from the perspective of physics) are suggested to be deeply studied: (1) What is matter?, (2) Why does the universe change? (3) is the universe infinite in extension? and (4) are there really regular (invariant) laws of physics?

Contents

Chapter 1

Introduction

1.1 What is Life?

If we're trying to build an image which reflects "all aspects of reality", how do life and consciousness fit into this picture? Erwin SchrÃűdinger's definition of life is that it's "a unique process which creates pockets of negative entropy". Physicists talk about the beginning of the universe being the most highly ordered/lowest entropy version of our universe, and how the "arrow of time" represents an overall

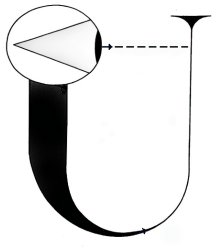

Figure 1.1: Wheeler created this figure showing a "U" (standing for universe), incorporating an eyeball representing the quantum observer, looking at its "tail" that represents the "information" side of the "information equals reality" concept.

climb in the amount of entropy, despite the efforts of life within these little pockets where (as Dylan Thomas put it so beautifully) it 'rages against the dying of the light'. This theme of life and consciousness being like a fire, a spark, that somehow engages with space-time and our fifth-dimensional probability space to keep itself moving forward is the theme of a number of the 26 songs I created for this project. I talked about those songs and this way of thinking about life and creativity in a blog entry called Novelty.

The phrase "self-excited circuit" comes from a paper published in 1979 by physicist John Wheeler, you can read about it in the wikipedia article on Digital Physics. As part of his "Cognitive-Theoretic Model of the Universe (CTMU)", Christopher Langan (who some readers will know as "the smartest man in America") has published an animated version of the simple drawing Wheeler created for his paper on the self-excited circuit, showing a "U" (standing for universe), incorporating an eyeball representing the quantum observer, looking at its "tail" that represents the "information" side of the "information equals reality" concept that we talk about regularly with this project. Wheeler also coined the phrase "'it' from 'bit'"which ties nicely to these discussions.

So is the universe itself a self-excited circuit, that was most excited at the big bang and is slowly winding down from there? Or was the universe in a superposition of possible states until life first emerged somewhere, and began observing more organized versions of the universal wave function from that point on in the world line? The Biocentric Universe theory supports the latter idea. Perhaps Stuart Kauffman's God 2.0 supports the former? I think there's interesting evidence for both ideas, but ultimately I lean more towards the idea that there are organizing patterns in the extra dimensions which exist outside of time and space which have selected this (or any other) universe, and which

keep the universe from dissolving into chaos. Love and Gravity is a blog entry from a year ago which takes this idea out to a more metaphysical level if you're interested. I have used similar logic to argue for dark matter and dark energy as evidence of extra dimensions.

Chapter 2

Physicist's View of the Universe

This chapter is just lifted from a paper by Peres [1], in order to fill up pages.

2.1 Successful theory

As it is well known, in order for a physical theory to be successful certain requirements must be fulfilled [2]. (a) A theory must not only be as simple as possible (Occam's razor) but also (b) must be founded on an axiomatic formulation. (c) Mathematical elegance is another desired quality that might stem from the previous items; by this we also mean that theories must be mathematically consistent. (d) However, according to Popper [2], a hypothesis can be considered as scientific

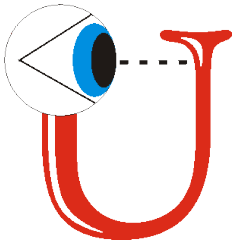

Figure 2.1: A color version of Wheeler's "U"

only if it is falsifiable. (e) But above all, the new theory must not only explain the phenomena that the old theory explains but further make new predictions. Such predictions must be, in the particular case of physics, experimentally testable and when this process is carried out we must avoid, again according to Popper, evading and deceiving the falsifiable criteria. In practice, such criteria are not only hard to carry out but also difficult to identify because most of the times the objects of study in physics can only be scrutinized by indirect methods of observation (measurements), that is, by the analysis of the correlations among the different physical quantities (variables, observables, parameters). In essence, the theory of relativity and quantum mechanics gained their status complying some of the above virtues. Thus, for if unified theories, such as M-theory, are to be successful they must not only comprehend or encompass the latter theories but also make new predictions. (f) Another important factor that is commonly ignored by physicists and eclipsed by the above items is the coherence in the physical interpretation, by this I mean, the epistemological coherence that appears when we try to decode the mathematical language and put it into ordinary and intuitive language; Max Tegmark refers to this as *baggage* [3], but I would rather punctually say *natural philosophy*.

Very recently, as a consequence of the popular unified theories [4, 5, 6], the latter factor has regained major importance. To make my view clearer, let us consider the case of M-theory which requires, to be mathematically consistent, the existence of ten dimensions. Being honest we should admit that it is very difficult to reconcile ourselves with the idea that there are more than three spatial dimensions. So, one may ask: what physical evidences support their existence? What powerful epistemological [1] reasons do we have to believe in extra dimensions? Yet I am

[1]Obviously, many metaphysical arguments can be raised to justify n-dimensional universes.

far from agreeing with all those physicists who favor the feeble argument of the cable that is seen from a very far distance and appears to be of one dimension, the closer we look at the cable the more dimensions we observe, they say. For if the incorporation of dimensions is just a mere mathematical artifice that only frees us from major complications of the same nature, it seems to me more plausible that we reanalyze our intuitive vision of the universe and put the feet on the ground before accepting such proposals that, in spite of that such theory widely fulfills the expectations of items (b), (c) and (e), they leave much to be desired from items (a), (d) and (f).

2.2 Physics and Mathematics

Besides, one should recall that physics is not pure mathematics, physics makes the connection between the abstract universe and the real one (or the measurable universe if you wish), physicists grant tangible sense to mathematics and, at the same time, describe the real universe by means of sets of mathematical symbols, that is, by physical laws. Thus, if our mathematical theories are to describe the real universe we should acknowledge that mathematics is an experimental science, otherwise the practice of math is mere metaphysics without pragmatic usage for real life.

In order to carry out such a task, we must, it seems to me, renew the epistemology of physics, revive the philosophical spirit and, thus, recover the tradition practiced by the physicists of the previous centuries. The way physics is carried out today is so abstract that the physical sense and the intuitive notions are almost lost. And I think that another way of growing our understanding of the universe cannot only be attained by abstract theories and experimental observations but

by philosophical reasoning as well. Hence, if the reader has captured my sketch he will realize that that is the aim of the present contribution. I must make clear that my objective is not to establish precise physical or mathematical definitions of what we shall treat here, but, departing from physical and philosophical principles, to put on the table, based on logic, problems that, under the judgment of the author, are some of the most essential that contemporary physics must profoundly understand if great advances upon the knowledge of the universe are desired. I must warn the reader that the proposal to be developed in the following pages does not stand somewhat allied to the established corpus of physics, but, however, it can be of great aid to get to the bottom of some of the most fundamental puzzles in physics.

One of the main aims of this work is to expose the intuitive perspective that I envisage of the cosmos based on my own experience in physics and on "common sense". Thus, I shall endeavor to show that from some natural assumptions and reasonings valuable physics can be extracted eluding the complications of the mathematical approaches.

Chapter 3

Myopic View of the Universe

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3.1 Trend of Short-Sightedness

As it is well known, in order for a physical theory to be successful certain requirements must be fulfilled [2]. (a) A theory must not only be as simple as possible (Occam's razor) but also (b) must be founded on an axiomatic formulation. (c) Mathematical elegance is another desired quality that might stem from the previous items; by this we also mean that theories must be mathematically consistent. (d) However, according to Popper [2], a hypothesis can be considered as scientific only if it is falsifiable. (e) But above all, the new theory must not only explain the phenomena that the old theory explains but further make new predictions. Such predictions must be, in the particular case of physics, experimentally testable and when this process is carried out we must avoid, again according to Popper, evading and deceiving the falsifiable criteria. In practice, such criteria are not

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3.2 Myopic Models

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Chapter 4

Short-Sightedness and the Deflating Universe

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4.1 Deflation and evolution of Universe

As it is well known, in order for a physical theory to be successful certain requirements must be fulfilled [2]. (a) A theory must not only be as simple as possible (Occam's razor) but also (b) must be founded on an axiomatic formulation. (c) Mathematical elegance is another desired quality that might stem from the previous items; by this we also mean that theories must be mathematically consistent. (d) However, according to Popper [2], a hypothesis can be considered as scientific only if it is falsifiable. (e) But above all, the new theory must not only explain the phenomena that the old theory explains but further make new predictions. Such predictions must be, in the particular case of physics, experimentally testable

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List of Publications

The thesis is based on the following publications:

1. *Myopic View of Curved Space-Time*

   Mast Maula, Nikat Drishti, Remote Control

   J. Mock. Phys. Vol. 45, Pages 125-142 (2013).

2. *Universe Deflation in a Myopic View*

   Nikat Drishti, **Mast Maula**

   arXiv:1006.0000 [astro-ph.CO].

3. *Dynamics of the Universe: A Short-Sighted Approach*

   Mast Maula, Remote Control

   arXiv:1211.0000 [astro-ph.CO].

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