Reality from its Basics

by J.A.J. van Leunen

May 3, 2018

Abstract

Building a physics theory from the basics of physical reality is not a costly enterprise and can be realized with some determination. Finding the basic structure is essential. Quite peculiar enough, the discovery of that structure occurred long ago. Current physics does not yet exploit this knowledge.

Introduction

The private practicing of theoretical physics is an almost free activity. It takes time, and some quirks and tenacity are needed to get far enough. Above all, a good dose of curiosity is a good starting point. Some skill with the mathematics behind theoretical physics is also a requirement.

Search

The reality seems to be very complicated, and yet the reality seems to own a strong coherence that to a certain extent renders it comprehensible. A quick investigation shows that physical reality owns a fairly hidden structure. If we look further, it appears, that if we dive deeper, then this structure seems to become simpler and gets more exposed. Let us assume that this is a characteristic of the structure of reality. This would mean that if we were to go deep enough, we would end up with the foundations of the structure of reality. That foundation must be very simple.

Discovery

Several smart people must have discovered this simple structure a long time ago, but that happened not during a search for the basis of the structure of reality. They discovered this structure during their quest for interesting structures. We earn little by the discovery of a random structure, were it not that the basic structure has the peculiar property to expand automatically to more complex structures. If we are fortunate enough to discover the basic structure, we can auto expand the structure into more complicated and perhaps more interesting layers of the structure of reality. Perhaps the basic structure develops into a structure that is very similar to the structure of reality that we can perceive. This would mean that the basic structure behaves like a seed that is forced to develop into a particular type of plant.

The basic structure

With this hope in mind, we are going to search for the basic structure. As expected, the basic structure is discovered long ago. It is only curious that so little has been done with this discovery. Perhaps this is due to the fact that at the instant of the discovery it was not immediately clear that the basic structure automatically extends into more complicated structures. Curious enough this does not appear to be the reason. The discoverers Garrett Birkhoff and John Von Neumann have immediately mentioned in the publication in which they reported the discovery of quantum logic that this structure almost automatically extends into the then only recently discovered separable Hilbert space. Several scholars immediately plunged on these discoveries. Most of them were confused by the name quantum logic that was given by the discoverer-duo to the basic structure. This happened because the structure of quantum logic closely resembles the relational structure of classical logic. The result was that the scholars tried to interpret quantum logic as a logical system

and not as a possible basic structure of reality. Only much later it became clear that quantum logic acts as a basic structure of reality. It was mainly mathematicians who saw that strong constraints restrict the extension to more complicated structures. For example, Hilbert spaces can only handle certain number systems and separable Hilbert spaces only support countable spaces. Only much later mathematicians added the non-separable Hilbert spaces that could also support continuums as eigenspaces of operators. So, several important mathematical tools arose much later than the discovery of the basic structure. In the meantime, physics developed without worrying about a possible mathematical foundation. All kinds of developments raised that conflict with the derivation from the basic structure of the mathematical model. Examples of this are string theory and Loop Quantum Gravity.

Structure buildup

The discovered basic structure of the physical reality leads quite straightforward to a powerful and flexible development platform. That platform encompasses much more than a simple separable Hilbert space and a corresponding non-separable Hilbert space. It is a completely dynamic model that acts as a flexible storage medium and in which Hilbert space technology merges with function theory and differential and integral calculus. This development platform is not yet in use by common physics. This platform enables to show afterward that common physics has embarked on roads that prove to be erroneous. The constraints imposed by mathematics are still not taken seriously. Students are still trained according to outdated insights.

Existing physics

This may seem disastrous, but it is not. Applied physics performs excellently. This occurs because applied physics mainly relies on an accurate description of perceived properties and behaviors. Often the rationality is contained in formulas. In this way, the description also fits on situations that are not or have not yet been observed. However, the description is incomplete. For example, optics works fine according to the rules laid down in books while the structure of the photons is still unknown. The same situation applies to elementary particles. Their behavior and their properties are accurately known while their structure is a big question mark. The behavior of mass inertia is well known, and yet the origins of this phenomenon are not yet understood.

The alternative path

Only curiosity is a good ground to supplement the missing knowledge. But then we must reject the usually posed demand that everything must be verified experimentally. We have to accept that at least part of our knowledge must be deduced, based on an accepted basic structure. In this research, math and not the result of experiments must become the leading factor. Eventually, the resulting model must in principle lead to an observable equivalent of how we perceive reality.

Such a trip has already been undertaken and comes to revolutionary results. The tour is based mainly on mathematical documents. The trip is documented in a Wikiversity project.

That project provides some surprising results. If this story appeals to you, then look at Https://en.wikiversity.org/wiki/Hilbert_Book_Model_Project or on http://vixra.org/abs/1802.0086.