

Chapter 1

Introduction

It is seldom that we are in a position to actually be able to present to readers a story based largely on mathematics and science facts that cover nearly all the questions we as humanity have been searching answers for, as many philosophers have done before, so also recently Hawking [1.1]. Of course they include the ultimate question: “Are we created by God?” It is to this point, the ultimate question, that an affirmative answer may be found by some of the readers inclined to see the laws of nature intertwined with a creator, particularly since, as we will see, there is a clear beginning out of nothing. We suggest that the question can be approached from purely mathematical and scientific grounds.

We started with a much more modest objective of trying to find an answer to how it is possible to actually mathematically obtain the fractional charged quarks as proposed by Gell-Mann. After-all quarks are not directly observable, but they form a convenient basis set for the construction of the elementary mesons and baryons that are well represented by the SU(3) representations (see examples of the mesons and baryons SU(3) representations in **Figures 1.1** and **1.2**).

It was through this search initially that we found it mathematically natural if we start with a 5D homogeneous space-time, and by applying a simple projection such that we can reduce this 5D space-time to the 4D Lorentz space-time that the motion of all matter satisfy. Namely: “Special Relativity”. We were excited that our modest goal was easily achieved. Moreover, from the mathematical process, we were led to the more fundamental question regarding the fundamental meaning of the 5D homogeneous space-time metric. It was through this investigation that we found that this metric is not merely a pure representation of the measurement relationship between space and time, rather it implies that both space and time have a beginning, and will continue to expand

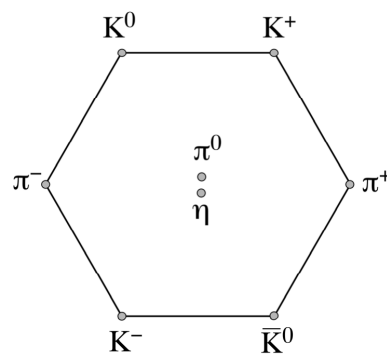


Figure 1.1. Meson octet.

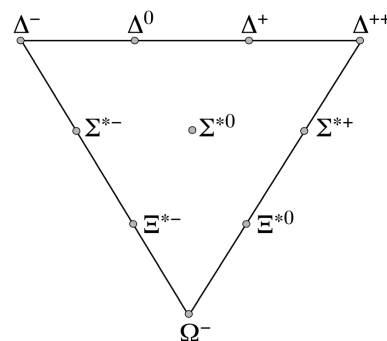


Figure 1.2. Baryon decuplet.

indefinitely. At any time t after the beginning, the volume of the 4D space is determined by t . As the space is finite when t is fixed the dimensions must be closed. If each dimension is measured by light waves, then the dimensions must be multiple integers of the wave length of that wave. Thus in making a measurement we will have an error within a unit of the single wave length, which is non-universal.

This is amazing, because as it forms the basic notion of chronology on which the principle of causality is based and it therefore establishes an act of creation.

Of course, the metric does also relate the measurement of space by light signal, the most important concept in Special Relativity. It is to this measurement and the requirement of an invariant and consistent error irrespective of the wave length which must be imposed that led us to the formation of the uncertainty principle, and the establishment of the single valued Planck's constant.

Thus we obtain the 5D metric operator, and from it the 5 components vector and spinor fields. This Planck's constant is then correlated to the coupling constant "e" between the vector and spinor fields via the gauge transformation. One can, therefore, say that gauge invariance which forms a U(1) group, is a manifestation of quantum physics. In fact based on this point, Yang and Mills proposed the Yang-Mills field as another example to electromagnetism that possesses both classical and quantum pictures [1.2].

Thus with this requirement we were automatically placed into a Quantum domain. Hence even in 5D, we must have quantum fields, both vectors and spinors that are solutions to the 5D metric operator. Actually because of that we see immediately that the vector potentials give the Maxwell potentials if the 5D Hilbert Space is given by $4D \otimes 1D$. A result Maxwell suggested back in 1864. In fact, he identified the extra 1D vector component as that of the magnetic monopole. This result was truly beyond our original expectation, and pushed us to look further and search into other puzzling questions including an attempt to reestablish Einstein's General Relativity, and try to resolve the mathematical questions in regard to the possible existence of a Schwarzschild singularity inside planets and stars. In reviewing the origin of this problem, we came to the conclusion that it was mainly due to Einstein's choice of compactification of the 5th dimension inside the spherical mass distribution, which had been first proposed by Kaluza as a means of obtaining the Newtonian law of gravity. This mathematical difficulty had led to speculations that in space there might exist black holes that could suck in all matter. Obviously if such black holes were to exist it would be very scary. Mathematically, Wheeler had advanced the idea of its removal in a mass by imposing a finite 5D void inside, which he calls "worm hole". In contrast, from our projection model for a 3D spherical mass distribution based on our derivation of the Riemannian curvature, such a worm hole results automatically. Thus for our model of General Relativity, there is no mathematical singularity.

Since that beginning of our investigation, one topic led to another and we end up with what we are now presenting to you in this book, results, which were quite unexpected and overwhelming even to us.

We are able to state that the book covers all the fundamental laws in physics, ultimately also including Gravity as presented by Einstein's General Relativity, and extending it to the worm hole modification as presented by Wheeler. In fact we also found that the Riemannian Space of General Relativity can be extended to give us a Galaxy model based on Perelman's work on the Poincaré Conjecture as the 3D space doughnut structure can be mapped into a 3D sphere in 5D space-time, and with it we can better describe the dark matter galactic core. Perhaps even more surprising is that due to the field solutions allowed in the 5D homogeneous space-time, this galactic core which can contain charged mass-less spinors which must travel at light speed in closed loops can emit tremendous gamma rays. Furthermore, through Perelman's work on the Poincaré Conjecture, such gamma rays will necessarily form two spheres, above and below the galactic plane. The recently observed giant gamma ray bubbles may serve as the evidence for this concept. For stability and the outward spiral motion of stars from the galactic center, we deduced that this charged mass-less spinor field which exists in the homogeneous 5D space-time, is a natural solution of the 5D homogeneous metric operator, and that it is these charged mass-less spinors (we coined as e-trinos and anti-e-trinos) that provide the outward electromagnetic pressure on all the stars and thus produce their outward spiral motion. These mass-less spinors, being charged obviously act as the emitters of the observed Giant Gamma Ray Bubbles (**Photo 1.3**).

On the microscopic quantum scale, we concluded that 5D void cores can also exist inside a complex nucleus. Thus the same mass-less charged e-trinos and anti-e-trinos should exist in nuclei. In fact it is relatively easy to see by using a static dense packing model of identical hard spheres to describe for example the nucleus of carbon 12, and that the 5D void core is the removal of just one such hard sphere from the dense packing of 13 spheres. A more sophisticated nuclei shell model can provide a similar structure, as according to the Einstein compactification of the 4th space dimension, the requirement for General Relativity, and our homogeneous 5D