

OUR FUNDAMENTAL BASIS OF NATURE

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1. FOUR-SPHERE IS GEOMETRY OF EXISTENCE

We posit that the universe is governed exactly as specified by my Four-Sphere Theory. Time is separated from space and is linear. Space is a four-sphere of fixed radius $R = 3069.75 Mpc$ approximately. The single macroscopic force is S4 Electromagnetism, and primary objects are spinor fields which localise by geometric constraints and spectral theory of Dirac operator on the four-sphere.

We want to assume that this is what Nature is not just in this note but in all notes unless otherwise specified.

For Universal Noise, we believe that Barndorff-Nielsen Distributions are empirically correct as universal noise. We seek to understand if they arise naturally from Four-Sphere geometry. We believe that the answer will be positive and it will be possible to prove this the case. However, today, on May 20 2021, this remains an open problem.

The resolution of the problem, we conjecture, would provide deeper insight regarding the geometric effects on all noise in the actual universe. In other words, we assume certainty regarding knowledge of four-sphere geometry of Nature. And we know empirically that Barndorff-Nielsen Distributions fit all known noise densities. We would like to understand if the geometry of Four-Sphere *forces* the particular precise analytic form of Barndorff-Nielsen.

In order to see how it might have an effect, we embed \mathbf{CP}^1 into the four-sphere as a slice of \mathbf{HP}^1 the quaternionic projective line and attempt to understand whether natural stochastic processes on \mathbf{CP}^1 then map to \mathbf{C} by stereographic projection or other means. This is for me an achievable goal for Four-Sphere Theory. If we succeed, then we will simultaneously vindicate Four-Sphere Theory more as well as have vast benefit to Science and Probability Theory both for the theory of Levy Processes as a generalisation of Brownian Motion is not the right point of view. Rather, Brownian motion was always a toy model for nature, and Barndorff-Nielsen is much more likely an exact law (modulo parameters) for noise in actual universe.

You see, I believe in the end Paul Levy had natural genius in issues of actual Nature and did not devote his efforts without it. Levy Processes showed efficacy in Finance, but the ones that matter are surely constrained by geometry of Nature (Four-Sphere) and for this reason seems esoteric to an Age that sees Brownian motion as natural. This is not even remotely right to me. Beauty of Brownian motion is not as deep as that of Barndorff-Nielsen Processes. For Beauty is the beginning of terror that we can still endure and that serenely disdains to destroy us. Barndorff-Nielsen himself showed some analytical approaches that are sophisticated and beautiful, but the true beauty here is to see beyond the physical

world altogether into the structure of all of existence and seeing each part of the Barndorff-Nielsen distribution as sacred resonance of the music of all of Existence.