A Possible Cosmological Paradigm?

Around the start of this century I remember there was a great deal of excitement regarding the possibility of developing a “Theory of Everything” (ToE). The likes of String Theory, Quantum Loop Gravity and Super-Symmetry were subjects of popular science books by Brian Green, Lee Smolin, Roger Penrose et al that were very optimistic that a ToE was within sight.

Great experimental advances have been made since then e.g. discovery of the Higgs particle and gravitational waves but these discoveries seem to have just confirmed current theories without hinting at “new physics” and the popular science books on the topic have dried up. Despite the earlier optimism the incompatibility of Quantum Mechanics (QM) and General Relativity (GR) remains, which I find frustrating as I’m “getting on a bit” now and unless I find a fast spaceship to carry me into the future I’m running out of time to learn how the universe really works.

Currently the “Multiverse” seems to be the favored paradigm but to me it seems incredibly extravagant. Also it is assumed that Quantum Mechanics (QM) is the “deeper” theory and that classical General Relativity (GR) must be quantized. So, driven by frustration and a belief that we should be able to understand how QM and GR could be fused together, I wondered if there was anything in my scientific experience that could be brought to bear on the problem.

I am a retired industrial physicist and the most enjoyable period of my career was spent in the field of numerical modeling of power semiconductor devices. In semiconductor device modelling a problem is posed on a discrete (not continuous) space and boundary conditions applied. Then the solution is “converged” to a predetermined sufficient accuracy. “The” solution is approached but never attained, so could “converged to sufficient accuracy” be equated to the uncertainty principle of QM? If so my suggested creation myth would be:-

Before the beginning there existed an initial state and a form of “time” that allowed change to occur in that initial state. This time is not our time as our spacetime has not yet formed rather it is external and analogous to the computer clock of my numerical simulations further, it does not stop when our spacetime comes into existence.

At some point a “phase change” occurs in this initial state and our spacetime appears as a bubble within the initial state with as many dimensions as are required to express the physics we experience. The interior of the bubble is not compatible with the boundary conditions so large currents flow (geometrical and particle) throughout the whole of the spacetime bubble driven by the ticking of the external computer clock analogue. These currents lead to large fluctuations in the particle and geometric fields at any given point in the bubble and the size of those fluctuations can be measured by a parameter H with units Joule Seconds.

A dissipation process exists to extract energy from the currents by inflating the bubble so that the interior “solution” approaches compatibility with the boundary conditions. This dissipation process is the analogue of “Newton Linearisation” which is used in numerical simulation to approach the solution from an “initial guess”.

At some point within the spacetime bubble the H becomes approximately equal to h (Plancks constant) and our “Big Bang” occurs. Our universe then grows as a wave of convergence travelling through the larger bubble. Our past evolves to smaller values of H which is incompatible with our conscious existence and our future condenses ahead of us from a neighbouring region with H >≈ h. An analogy would be that of a growing snowflake with our present corresponding to a liquid layer forming on the solid ice (past) from the water vapour (future).

That’s it, short on math’s I’m afraid but there are interesting possibilities for explaining a lot of the problems in modern physics:-

1. It would be neat if the -ve sign for the time component of our observed spacetime metric could arise naturally from the advancing convergence wavefront through a purely spacelike 4 dimensional space. Perhaps the presence of “energy” locally slows the rate of convergence.
2. Entanglement: In the paradigm the past is not static it is evolving with each tick of the external clock, changes in the past will affect the present and future but not at a level above the convergence level h.
3. Anthropic Principle: “Now“ will have a duration determined by the range of H (approximately equal to h) that is compatible with our conscious existence.
4. Dark Energy: H will be decreasing over the duration of “Now” due to the dissipation process, and as h has units of Joule Seconds its rate of change in measured in Joules. Could this be the source of Dark Energy?
5. Arrow of time: this will point up the H gradient.
6. Holographic Principle: the bubble interior solution is driven by the bubbles boundary conditions.
7. Dark Matter: Our present is condensing from a more “fuzzy” future with a larger value of H could the gravitational influence of this fuzzy future manifest itself as Dark Matter?
8. Hubble constant: There is a tension between the Hubble constant as measured by “standard candles” within our observable universe and the properties of the “Big Bang” surface of last scattering. In the proposed paradigm there are two “Big Bangs” and so possible wiggle room for reconciling the measurements.
9. Free will: As what happens in our immediate future depends on more than what we can see in the “here and now” an illusion of free will could exist.