Feynman Summed Futures, Not Universes [+ Quantum Rescaling]

Terry Bollinger
2023-02-12.21:02 EST Sun
Email Excerpt

Date: Sun, 12 Feb 2023 21:02:27 -0500
Subject: Re: Some musings on Feynman's path integral and where it can be applied

Roger, Jack,

https://www.quantamagazine.org/how-our-reality-may-be-a-sum-of-all-possible-realities-20230206/

Roger, thanks. The first two-thirds of this article is an excellent summary of Feynman's path integral work. Feynman beautifully captured these concepts in his non-mathematical book QED. The integral of all possible histories has always been my favorite part of his perspective on quantum mechanics.

The first two-thirds do a pretty good job of capturing the key ideas, right down to Feynman's comment that even straight lines and the speed of light are integrals of all possible loop-de-loops and complicated paths. The way the phases cancel out and add to produce the path of least action is delightful.

Unfortunately, the last third of the article is something Feynman never endorsed and almost certainly would not have endorsed if he had seen it. While Feynman had no problem speculating ways to make gravity into a particle-based force, I do not recall even one sentence in which you contemplated spacetime as a composite of anything. All of his integrals seem firmly based on the idea that spacetime has infinite resolution and is fundamental.

Regarding this concept of preexisting infinite spacetime resolution, in the last three or four years, I've moved away from Feynman's perspective into thinking space must also be emergent. That makes it sound like I would support the ideas in the last third of this article, but I emphatically do not. Applying the integral concept directly to spacetime plays the two against each other, creating chaos that undermines both.

Feynman resolutely believed that particles ultimately were point-like, and by his assertion, he failed after a lifetime to find a way to make that view self-consistent. He was always scrupulously honest about ideas that did not work out, especially his own.

There's a different path available, one softer and less likely to generate infinite chaos. It is to stop accepting the mathematical abstraction of perfect points as the ultimate nature of particles and realize instead that point-like behaviors are the asymptotic limits of generative processes that nicely mimic, but never actually instantiate to full resolution, all those possible futures. With that approach, you can construct particles and emergent spacetime in a mutually compatible and complementary fashion.

Even as I'm writing this... yes: Penrose's concept of scale indifference somehow works into this. Interesting. Penrose applies rescaling only at the universe level, but what's going on is that it applies at all scales, all the way down to the particle level, where it loses resolution and ceases to produce any further detail. Particles don't acquire scale until they interact with other particles, producing a mutual agreement on how to relate to each other.

Again... interesting. If rescaling occurs at multiple scales, not just the universe level, it likely has some connection with the quantum collapse issue. Spin as self-observation is the starting point since acceleration is identical to wave-collapsing mutual observation, and spinning systems continually self-accelerate and thus "know" themselves to exist. But they have no external scale in that self-observation process. As a hypothesis, the desire for momentum to "move outwards" continues, so a spin system expands relative to its initial size but otherwise has no "idea" how big it should be.

This situation would resolve abruptly with even a modest acceleration from an outside body. The resulting rescaling would be what we call quantum wave collapses.

There should be some limits on this, too. The collapse process likely would have weird, superluminal, but ultimately finite velocities. Most likely, it would be some variant of the *cR* vs. *c/R* light-speed pair issue, with the *cR* side of the pair enabling indefinitely rapid collapse but never infinitely rapid collapse.

Enough. Roger, again, thanks.

Cheers,
Terry

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PDF: https://sarxiv.org/apa.2023-02-12.2102.pdf