On Energy Conservation in Many-Worlds

Terry Bollinger
2022-05-10.1245 Tue
https://www.youtube.com/watch?v=6gOozlRspF4&lc=UgzXKxpzCvuu4HI6BPJ4AaABAg

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Looking Glass Universe, May 7, 2022 - How is energy conserved in Many Worlds?
https://youtu.be/6gOozlRspF4

Hi Mithuna: YouTube offered up your well-done video, in which you've done a great job of navigating an inherently paradoxical framework. In the last second or so, I suspect that you realized your argument does not answer the question. The problem is that your non-collapsing version of a pilot wave generates and saves infinite precise details at every point in space, much like a cosmic-scale Mandelbrot deep-dive. Alas, that level of detail requires infinite data storage, infinite information, and an infinitely wide band of wave harmonics, all at zero energy cost. No experimentally accessible waves do this, so this is where all MWI variants detach from observable physics and instead begin invoking entities with infinite memories and infinite processing capacities.

There is a more profound irony there. Quantum physics arose from musings about why infinitely perfect electromagnetic waves do not, over time, acquire infinite complexity and thus harmonics that correspond to ultraviolet and higher frequencies of light. Everett repeated this classical error using de Broglie's matter waves instead of electromagnetic waves. MWI thus does not qualify in any meaningful way as a quantum theory since it fails to address the very problem for which quantum theory was created.

Niels Bohr helped set all this in motion by polarizing wave functions into two non-physical extrema: Everything was either a _perfect_ wave or a _perfect_ particle. Both ideas are, of course, non-physical concepts involving unreachable infinities. Unfortunately, Bohr's appealing imagery set the stage for generations of both physicists and mathematicians to get astonishingly sloppy about how energy works in real-world Schrödinger wave functions. Such functions are sums of momentums, and momentum always has an energy cost. However odd Schrödinger wave functions may be, they are never "free" and no more capable of infinite detail than electromagnetic waves.

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https://sarxiv.org/apa.2022-05-10.1245.pdf