

Quantum suicide and immortality

In quantum mechanics, **quantum suicide** is a thought experiment, originally published independently by Hans Moravec in 1987^{[1][2]} and Bruno Marchal in 1988,^{[3][4]} and independently developed further by Max Tegmark in 1998.^[5] It attempts to distinguish between the Copenhagen interpretation of quantum mechanics and the Everett many-worlds interpretation by means of a variation of the Schrödinger's cat thought experiment, from the cat's point of view. **Quantum immortality** refers to the subjective experience of surviving quantum suicide regardless of the odds.^[6]

Keith Lynch recalls that Hugh Everett took great delight in paradoxes such as the unexpected hanging. Everett did not mention quantum suicide or quantum immortality in writing, but his work was intended as a solution to the paradoxes of quantum mechanics. Lynch said "Everett firmly believed that his many-worlds theory guaranteed him immortality: his consciousness, he argued, is bound at each branching to follow whatever path does not lead to death";^[7] Tegmark explains, however, that life and death situations do not normally hinge upon a sequence of binary quantum events like those in the thought experiment.^[6]

1 Thought experiment

Unlike the Schrödinger's cat thought experiment which used hydrocyanic acid and a radioactive decay trigger, this version involves a life-terminating device and a device that measures the spin value of protons. Every 10 seconds, the spin value of a fresh proton is measured. Conditioned upon that quantum bit, the weapon is either deployed, killing the experimenter, or it makes an audible "click" and the experimenter survives.

The theories are distinctive from the point of view of the experimenter only; their predictions are otherwise identical.

The probability of surviving the first iteration of the experiment is 50%, under both interpretations, as given by the squared norm of the wave function. At the start of the second iteration, if the Copenhagen interpretation is true, the wave function has already collapsed, so if the experimenter is already dead, there's a 0% chance of survival. However, if the many-worlds interpretation is true, a superposition of the live experimenter necessarily exists, regardless of how many iterations or how improbable the outcome. Barring life after death, it is not possible for

the experimenter to experience having been killed, thus the only possible experience is one of having survived every iteration. Although such an experience remains possible in the Copenhagen interpretation, it gets less and less likely to happen as the number of iterations gets bigger, whereas it always is certain in the many-worlds interpretation, no matter the number of iterations.

2 Max Tegmark's work

In response to questions about "subjective immortality", Max Tegmark made some brief comments: He acknowledged the argument that "everyone will be immortal" should follow if a survivor outcome is possible for all life-threatening events. The flaw in that argument, he suggests, is that dying is rarely a binary event; it is a progressive process. The quantum suicide thought experiment attempts to isolate all possible outcomes for the duration of the thought experiment. That isolation delays decoherence in such a way that the subjective experience of the superposition is illustrated. It is only within the confines of such an abstract quantum scenario that an observer finds they defy all odds. Another possibility is that although an observer does not die, they nevertheless continue to suffer the effects of aging, bringing to mind the legend of Tithonus.^[6]

3 See also

- Multiverse
- Quantum mysticism

4 References

- [1] "The Many Minds Approach". 25 October 2010. Retrieved 7 December 2010. This idea was first proposed by Austrian mathematician Hans Moravec in 1987...
- [2] Moravec, Hans (1988). "The Doomsday Device". *Mind Children: The Future of Robot and Human Intelligence*. Harvard: Harvard University Press. p. 188. ISBN 978-0-674-57618-6. (If MWI is true, apocalyptic particle accelerators won't function as advertised).
- [3] Marchal, Bruno (1988). "Informatique théorique et philosophie de l'esprit" [Theoretical Computer Science

and Philosophy of Mind]. *Acte du 3ème colloque international Cognition et Connaissance [Proceedings of the 3rd International Conference Cognition and Knowledge]* (Toulouse): 193–227.

- [4] Marchal, Bruno (1991). De Glas, M.; Gabbay, D., eds. “Mechanism and personal identity” (PDF). *Proceedings of WOCEAI 91* (Paris. Angkor.): 335–345.
- [5] Tegmark, Max The Interpretation of Quantum Mechanics: Many Worlds or Many Words?, 1998
- [6] Tegmark, Max (November 1998). “Quantum immortality”. Retrieved 25 October 2010.
- [7] See Eugene Shikhovtsev’s Biography of Everett: Keith Lynch remembers 1979–1980

5 External links

- J. Higo: “Does the 'many-worlds' interpretation of quantum mechanics imply immortality?”
- The 'Everything' mailing list (and archives), A “discussion of the idea that all possible universes exist”.
- M. Tegmark: Dying to know

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