An Asymmetry in the Multiverse “Escape” from the Paradoxes of Time Travel

Selmer Bringsjord

AHR?

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“This state of affairs seems to imply an absurdity. For it enables one e.g., to travel into the near past of those places where he has himself lived. There he would find a person who would be himself at some earlier period of his life. Now he could do something to this person which, by his memory, he knows has not happened to him.”

–Kurt Gödel
Story for The Grandfather Paradox

(Underlying graphic extracted from (Deutsch & Lockwood, 1994), modified & animated by S Bringsjord.)
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The “Multiverse Escape”

So does Sonia prevent her own birth or not? That depends on which universe one is referring to. In the universe she leaves, the one she was born in, her grandfather did marry her grandmother because, in that universe, he received no visit from Sonia. In the other universe, the one whose past Sonia travels to, her grandfather does not marry that particular woman, and Sonia is never born. (Deutsch & Lockwood 1994, p. 73)
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E.g.,

But I had seen first one and then another of the rooms in which I had slept during my life, and in the end I would revisit them all in the long course of my waking dream: rooms in winter, where on going to bed I would at once bury my head in a nest, built up out of the most diverse materials, the corner of my pillow, the top of my blankets, a piece of a shawl, the edge of my bed, and a copy of an evening paper, all of which things I would contrive, with the infinite patience of birds building their nests, to cement into one whole; rooms where, in a keen frost, I would feel the satisfaction of being shut in from the outer world (like the sea-swallow which builds at the end of a dark tunnel and is kept warm by the surrounding earth), and where, the fire keeping in all night, I would sleep wrapped up, as it were, in a great cloak of snug and savoury air, shot with the glow of the logs which would break out again in flame: in a sort of alcove without walls, a cave of warmth dug out of the heart of the room itself, a zone of heat whose boundaries were constantly shifting and altering in temperature as gusts of air ran across them to strike freshly upon my face, from the corners of the room, or from parts near the window or far from the fireplace which had therefore remained cold — or rooms in summer, where I would delight to feel myself a part of the warm evening, where the moonlight striking upon the half-opened shutters would throw down to the foot of my bed its enchanted ladder; where I would fall asleep, as it might be in the open air, like a titmouse which the breeze keeps poised in the focus of a sunbeam — or sometimes the Louis XVI room, so cheerful that I could never feel really unhappy, even on my first night in it: that room where the slender columns which lightly supported its ceiling would part, ever so gracefully, to indicate where the bed was and to keep it separate; sometimes again that little room with the high ceiling, hollowed in the form of a pyramid out of two separate storeys, and partly walled with mahogany, in which from the first moment my mind was drugged by the unfamiliar scent of flowering grasses, convinced of the hostility of the violet curtains and of the insolent indifference of a clock that chattered on at the top of its voice as though I were not there; while a strange and pitiless mirror with square feet, which stood across one corner of the room, cleared for itself a site I had not looked to find tenanted in the quiet surroundings of my normal field of vision: that room in which my mind, forcing itself for hours on end to leave its moorings, to elongate itself upwards so as to take on the exact shape of the room, and to reach to the summit of that monstrous funnel, had passed so many anxious nights while my body lay stretched out in bed, my eyes staring upwards, my ears straining, my nostrils sniffing uneasily, and my heart beating; until custom had changed the colour of the curtains, made the clock keep quiet, brought an expression of pity to the cruel, slanting face of the glass, disguised or even completely dispelled the scent of flowering grasses, and distinctly reduced the apparent loftiness of the ceiling.
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6. Contradiction!

7. Hence, backwards time travel in the form of CTCs isn’t possible.
The “Multiverse Escape” Again?

In the art critic, story quantum mechanics allows events, from the participants’ perspective, to occur much as Dummett describes. The universe that the critic comes from must have been one in which the artist did, eventually, learn to paint well. In that universe, the pictures were produced by creative effort, and the reproductions were later taken to the past of another universe. There the paintings were indeed plagiarized—if one can be said to plagiarize the work of another version of oneself—and the painter did get “something for nothing.” But there is no paradox, because now the existence of the pictures were caused by genuine creative effort, albeit in another universe. (Deutsch & Lockwood 1994, p. 74)
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Quantum Reality

If you set up identical experiments on identical particles that have been set up identically, you will generally *not* get identical results!

Instead regularity is found in the *statistical distribution* of the results - the *probability* of finding the electron at any particular location.

The evolution of the *probability wave* is given by *Schrödinger equation*.

\[
\frac{i\hbar}{\partial t} \Psi(r, t) = \left[ -\frac{\hbar^2}{2\mu} \nabla^2 + V(r, t) \right] \Psi(r, t)
\]
To Collapse or Not to Collapse?
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Wave functions are (highly) spiked for macroscopic objects, for which QM tends to NM. They are spread out for microscopic objects.
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**Copenhagen interpretation:** Wave functions *collapse* upon observation. The larger a wave is at a particular location, the larger the change of it collapsing to *that* location.
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This is the *quantum measurement problem.*
Linearity
Linearity & Measurement

What happens when measuring / observing probability waves with multiple spikes?

Bohr: Our equation must then not apply to the act of measurement, since it involves macroscopic bodies.

Everett (1957) was not convinced!
Everett’s Many Worlds
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Measuring a complex wave function doesn’t result in a meter & mind simultaneously registering two locations.
Everett’s Many Worlds

Measuring a complex wave function doesn’t result in a meter & mind simultaneously registering two locations.

*It results in two meters & two minds, each registering a unique location!*
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Anything that is *possible* is *realized* in it’s *own* universe.
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This is the quantum multiverse theory.