Multilevel Quantum-Classical Physics and Schrödinger's Cat

Terry Bollinger — 2023-10-10.12:30 EDT Tue

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A reply on the LinkedIn Quantum Physics post:
Shivali Antin, #QuestionForGroup (Oct 10, 2023)
https://www.linkedin.com/feed/update/urn:li:activity:7117544791793430528

Question: *What is the Schrodinger's cat experiment? How do we visualize superpositioning in the quantum world?*

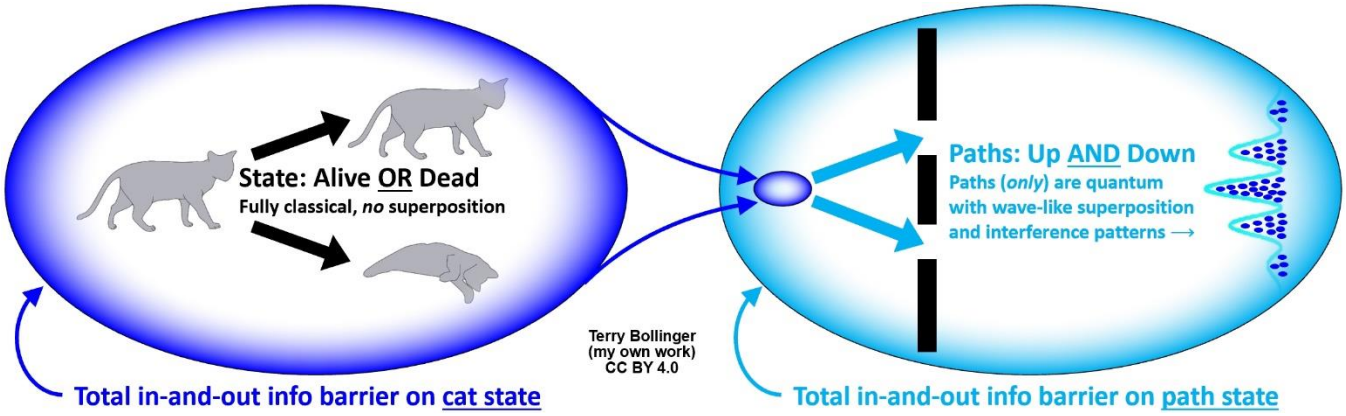

Figure 1. *Multiverses are unnecessary with multilevel quantum-classical mechanics. Quantum mechanics applies when systems are data-isolated from each other. Since information isolation can occur at multiple layers, classical and quantum mechanics can sometimes alternate at different scales, but never in ways that violate causality.*

The simplest way to understand Schrödinger's cat is how Schrödinger intended it: The cat is a self-contained, self-existing system and is always either dead or alive (Fig. 1). For a system as thermodynamically complex as a cat, the only variable that remains sufficiently quantum to permit superposition is the cat's travel path through XYZ space.

That means that if you isolate a cat sufficiently from the outside universe, you can make it interfere when passing through two doors so that you can never tell which door it went through. However, if you send enough cats through enough doors, you find that where they land on the other side produces an interference pattern indicating that the cat went through the doors like a wave.

The cat is dead or alive as it goes through the doors, but its isolation means the outside world cannot know this until data exchanges restart. In contrast, the *paths* through the barrier can stay quantum and superposed as long the cat cannot see which door it uses. While this degree of data isolation is not feasible for cats, interference experiments with large molecules show there is no clearly defined upper limit to how large of an object can experience path (versus internal) quantum superpositions.