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Quantum cognition? The subatomic frontier of brain research

Matthew P. A. Fisher

University of California, Santa Barbara

Abstract

The endeavor to construct a laboratory quantum computer has evolved into a multi-billion-dollar undertaking, marked by remarkable progress. However, an intriguing question arises: could we ourselves be quantum computers?

While maintaining quantum coherence on macroscopic time scales is exceedingly unlikely in the warm wet brain, there is one exception: Nuclear spins.

Our strategy is one of reverse engineering, seeking to pinpoint the biochemical substrate and mechanisms that might underpin the hypothetical quantum processing involving nuclear spins. Seemingly, a specific neural qubit and a unique collection of ions, molecules and organelles can be identified, illuminating an apparently single path towards possible quantum processing in the brain. In this presentation, I will provide an overview of our ongoing efforts to delve into this captivating realm of exploration.