Necessity and Contingency: Quantum Mechanics and Empiricist Modalism

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Abstract

Modality plays a significant role in quantum mechanics. It is invoked in the impossibility of certain quantum configurations, the necessity of certain radioactive decays, or the probability (a modality with degrees) of certain experimental outcomes. What is the source of such modality? (See Hale (2012), pp. 116-164, for the corresponding issue in the context of logic and metaphysics.) Should the necessities involved in quantum mechanics be explained by other necessities or can they be explained by contingencies? Necessity-first approaches take the necessary as basic and use it to explain the contingent (Wilson (2020), p. 14). Contingency-first approaches do the reverse. In this paper, I identify two roles of modality in quantum mechanics: one involved in the characterization of the quantum domain and another regarding the specification of the states a quantum system can be in. I then offer an empiricist modalist approach that insists that the source of modality is found in the relevant properties of the objects under consideration, while resisting several attempts to account for the source of modality that rely on conventions, models, or essences. A contingency-first approach is then favored.

References

Hale, B. (2012): *Necessary Beings: An Essay on Ontology, Modality, and the Relations Between Them*. Oxford: Oxford University Press.

Wilson, A. (2020): *The Nature of Contingency: Quantum Physics as Modal Realism*. Oxford: Oxford University Press.

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