

The Doctrine of Classical Concepts in Historical Perspective

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Abstract:

It is widely recognised that Bohr's view of the indispensability of classical concepts plays a central role in his interpretation of quantum mechanics. This paper provides a new insight into the doctrine of classical concepts and the way it was understood by Bohr and interpreted by other physicists of the Copenhagen school such as Heisenberg, Weizsäcker, Rosenfeld and Petersen. By paying careful attention to the largely neglected disagreement between Bohr and Heisenberg in the 1930s about the nature of the quantum--classical divide, I hope to shed new light on Bohr's notion of classicality in quantum theory. I will also look at the different attempts to provide an epistemological foundation for the indispensability of classical concepts and the pragmatic reinterpretation of the doctrine that emerged in the 1940s. Finally I turn my attention to the attempts of a number of physicists after the Second World War to provide *physical* explanations of the quantum-to-classical transition, or the emergence of classicality in the macroscopic world. Here we find early anticipations of role of entanglement in the quantum--classical transition characteristic of recent decoherence approaches.