

Celebrating the Choi-Jamiołkowski Isomorphism



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The Operational Choi-Jamiołkowski Isomorphism

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I use an operational formulation of the Choi-Jamiołkowski isomorphism to explore an approach to quantum mechanics in which the state is not the fundamental object. I first situate this project in the context of generalized probabilistic theories and argue that this framework may be understood as a means of drawing conclusions about the intratheoretic causal structure of quantum mechanics which are independent of any specific ontological picture. I then give an operational formulation of the Choi-Jamiołkowski isomorphism and show that, in an operational theory which exhibits this isomorphism, several features of the theory which are usually regarded as properties of the quantum state can be derived from constraints on non-local correlations. This demonstrates that there is no need to postulate states to be the bearers of these properties, since they can be understood as consequences of a fundamental equivalence between multipartite and temporal correlations.

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