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Title:	Emergence of classicality in resource theory of coherence
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Keywords:	resource theory of coherence
Issue Date:	May-2023
Publisher:	IISER Mohali
Abstract:	There has been a recent effort to explain the emergence of the classical world from the quantum laws. A major development in this understanding are the recent results which show that if a quantum system deposits information into the large degrees of freedom of the environment, except a region of O(1), the information accessible locally from parts of the environment is approximately classical, i.e in principle, be obtained by a POVM measurement on the system. This result is true for all quantum channels, not just one particular model of evolution. Moreover, this result shows that the POVM measurement is exactly same for all the parts of the environment, which provides support to quantum darwinism as the mechanism for explaining objectivity in the classical world. In this thesis, we look at how such emergence of classicality results can be obtained in the resource theory of coherence. Instead of looking at all quantum channels, we restrict ourselves to the free channels in the resource theory (Dephasing Covariant Incoherent (DIO) channels) and show that if such a channel deposits information into the large degrees of environment, except a region of O(1), the reduced channels to local parts of the environment are coherence-breaking channels. Since these channels are also measure and prepare channels, with the measurement in the incoherent basis, this provides more understanding what POVMs occur in this class of evolutions. We look at the applications of these results to quantum darwinism, and distribution of timing information.
Description:	Embargo period
URI:	http://hdl.handle.net/123456789/5530
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