

Abstract Submitted
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**Redundant imprinting of information in non-ideal environments:
Quantum Darwinism via a noisy channel**¹ MICHAEL ZWOLAK², Los Alamos
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CIECH ZUREK, Los Alamos National Laboratory — Quantum Darwinism provides
an information-theoretic framework for the emergence of the classical world from the
quantum substrate. It recognizes that we - the observers - acquire our information
about the “systems of interest” indirectly from their imprints on the environment.
Objectivity, a key property of the classical world, arises via the proliferation of re-
dundant information into the environment where many observers can then intercept
it and independently determine the state of the system. While causing a system
to decohere, environments that remain nearly invariant under the Hamiltonian dy-
namics, such as very mixed states, have a diminished ability to transmit information
about the system, yet can still acquire redundant information about the system [1,2].
Our results show that Quantum Darwinism is robust with respect to non-ideal initial
states of the environment.

[1] M. Z., H. T. Q., W. H. Z., Phys. Rev. Lett. 103, 110402 (2009)

[2] M. Z., H. T. Q., W. H. Z., Phys. Rev. A 81, 062110 (2010)

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