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# Random unitary evolution model of dissipation, dephasing and quantum Darwinism

**Nenad Balaneskovic**
University of Technology Darmstadt, Germany

We discuss characteristic properties of Quantum Darwinism (QD) when pure decoherence is disturbed by dissipation and dephasing. Based on digraph interaction models of open qubit systems interacting with their respective environment by iterated and randomly applied (controlled-NOT-type) unitary operations, we introduce a unitary two-qubit dissipative-dephased operator. We investigate the QD-appearance of Classicality from the analytically determined asymptotic dynamics of the resulting quantum Markov chain. In addition, we concentrate on interaction digraphs which comprise environmental qubits that do not interact among themselves by unitary quantum operations and are thus suitable to describe physically objective quantum measurements performed on an open system by autonomous observers (environmental qubits). In particular, we investigate whether it is possible to achieve the most efficient storage of classical information about a system into its environment by altering the strength parameters of the dissipative-dephased operator. Furthermore, we discuss the structure of the corresponding dissipative-dephased attractor spaces of our extended qubit-model of QD.

## Biography

Nenad Balaneskovic has completed his PhD from University of Technology Darmstadt. From October 2011 till March 2016, he was a member of a research team focusing on Fundamentals of Quantum Mechanics, Quantum Information and Quantum Computation at the Institute of Applied Physics of the University of Technology in Darmstadt. His research interests include quantum networks and random unitary operations, quantum Darwinism and the emergence of classicality and numerical application of graph theory.

balaneskovic@gmx.net

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