



## INTISARI

### **KAJIAN DARWINISME KUANTUM: DEKOHERENSI, *EINSELECTION* DAN PROLIFERASI INFORMASI SECARA SELEKTIF**

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Telah dilakukan kajian Darwinisme kuantum. Dalam penelitian ini formalisme dasar dan interpretasi fisis dekoherensi yang memandang sistem kuantum sebagai sistem terbuka ditelaah ulang. Pandangan sistem kuantum yang terbuka melahirkan gagasan *einselection* sebagai mekanisme di balik kemunculan keadaan-keadaan penunjuk (*pointer states*). Namun dekoherensi dan *einselection* saja belum cukup untuk menjelaskan kemunculan realitas obyektif, sehingga dibutuhkan interpretasi. Darwinisme kuantum selanjutnya mengambil alih. Kajian Darwinisme kuantum dilakukan dengan menekankan pada proliferasi informasi secara selektif yang menggambarkan bagaimana informasi keadaan sistem disalin dan disebar oleh lingkungan. Dipadukan bersama, dekoherensi, *einselection* dan proliferasi informasi secara selektif mampu menjelaskan kemunculan realitas obyektif dengan mengadopsi mekanisme yang sejalan dengan semangat sintasan yang terbugar (*survival of the fittest*) Darwin. Kajian yang dilakukan juga mencakup evaluasi singkat Darwinisme kuantum sebagai proses Darwinian menurut perspektif Darwinisme universal.

Kata kunci: dekoherensi, *einselection*, proliferasi informasi secara selektif, Darwinisme kuantum, proses Darwinian, Darwinisme universal



## ABSTRACT

### **A STUDY ON QUANTUM DARWINISM: DECOHERENCE, EINSELECTION AND SELECTIVE PROLIFERATION OF INFORMATION**

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A study on quantum Darwinism has been performed. In this research the basic formalism and physical interpretation of decoherence which view quantum system as an open system is studied. The view of quantum system being an open system gives birth to the idea of einselection as the mechanism behind the emergence of pointer states. However, both decoherence and einselection is not sufficient to explain the emergence of objective reality. An interpretation, therefore, is still deemed necessary. Quantum Darwinism subsequently takes over. The study on quantum Darwinism is done by underlining the selective proliferation of information process which describes how the information of the states of the system are copied and spread throughout the environment. Taken together into account, decoherence, einselection and selective proliferation of information may shed a light on the emergence of objective reality by adopting a similar mechanism to that of Darwin's survival of the fittest. This research also briefly studies the evaluation of quantum Darwinism as a Darwinian process according to universal Darwinism's point of view.

**Keywords:** decoherence, einselection, selective proliferation of information, quantum Darwinism, Darwinian process, universal Darwinism