

QUANTUM ORIGINS OF INFORMATION AND IGNORANCE: DERIVING PROBABILITIES FROM THE SYMMETRIES OF ENTANGLEMENT

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I will discuss quantum origin of quantum jumps (which define “events” such as the measurement outcomes). I shall then show that probabilities of events can be deduced from the symmetries of entangled quantum states - form envariance (entanglement - assisted invariance). While derivation of Born's rule for probabilities ($p_k = ||^2$) is the principal result, I shall also note that other symptoms of the quantum - to - classical transition that follow from decoherence can be justified directly using envariance - that is, without invoking decoherence, and without assuming Born's rule.

References:

W. H. Zurek, Phys. Rev. Lett. 90, 120404 (2003); Rev. Mod. Phys. 75, 715 (2003); Phys. Rev. A71, 052105 (2005); Phys. Rev. A76, 052110 (2007); arXiv:0707.2832.