Disappearance of entanglement: a topological point of view\textsuperscript{1}
DONG ZHOU, ROBERT JOYNT, GIA-WEI CHERN, JIANJIA FEI, University of Wisconsin-Madison — We give a topological classification of the evolution of entanglement, particularly the different ways the entanglement can disappear. Four categories exhaust all possibilities given the initial quantum state is entangled and the final one is not. Exponential decay of entanglement, entanglement sudden death and sudden birth can all be understood and visualized in the associated geometrical picture - the polarization vector representation. The entanglement evolution categories of any model are determined by the topology of the state space, the limiting state and the memory effect of the environment. Transitions between these types of behaviors as a function of physical parameters are also possible. These transitions are thus of topological nature. We illustrate the general concepts with a visualizable model.

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