Decoherence Patterns of Topological Qubits from Majorana Modes[1] SUNG PO CHAO, Academia Sinica, SHIH HAO HO, National Center for Theoretical Science, CHUNG HSIEN CHOU, National Cheng Kung University, FENG LI LIN, National Taiwan Normal University — We investigate the decoherence patterns of topological qubits in contact with the environment. Each topological qubit is made of two Majorana modes of a 1D Kitaev's chain. These two Majorana modes weakly interact with the fermionic/bosonic environments. We find the topological qubits decohere completely in the Ohmic and sub-Ohmic environments but not in the super-Ohmic ones. Though the fermion parities of the topological qubits cannot prevent the qubit states from decoherence in the sub-Ohmic environments, it can prevent the qubits turning into Gibbs state. We also study the cases in which each Majorana mode couples to different Ohmic-like environments and the time dependence of concurrence for two topological qubits.

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Date submitted: 10 Nov 2014   Electronic form version 1.4