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Majorana fermion qubit states and non-Abelian braiding statistics in quenched inhomogeneous spin ladders YAN CHEN, YINCHEN HE, Fudan University — In studying Majorana fermions (MFs) in a spin ladder model, we numerically show that their qubit state can be read out by measuring fusion excitations in quenched inhomogeneous spin ladders. We construct an exactly solvable T-junction spin ladder model that can be used to implement MF braid operations. With braiding simulated numerically as non-equilibrium quench processes, we verify that the MFs in our spin ladder model obey non-Abelian braiding statistics. Our scheme provides a promising platform to study exotic properties of MFs and a broad range of applications in topological quantum computation.

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