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Entanglement dynamics in 2d HCFTs on the curved background

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We will explore the dynamical property of non-equilibrium phenomena induced by two-dimensional holographic conformal field theory (2d holographic CFT) Hamiltonian on the curved spacetime by studying the time dependence of the entanglement entropy and mutual information. Here, holographic CFT is the CFT with the gravity dual. We will start from the boundary and thermofield double states, evolve the systems in Euclidean time with the Hamiltonian on the curved background, and then evolve them in real-time with the same Hamiltonian. We found that the early- and late-time entanglement structure depends on the curved background, while the entanglement growth does not, and is linear. Furthermore, in the gravity dual for the thermofield double state, this entanglement growth is due to the linear growth of the wormhole, while in the one for the boundary state, it is due to the in-falling of the end of the world brane to the black hole. We discussed the low temperature system can be regarded as the dynamical system induced by the multi-joining quenches. We also discussed the effective description of the high temperature system, called line tension picture.

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