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Holographic complexity in FLRW universe

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We investigate the holographic complexity growth rate of a conformal field theory in a Friedman-Lemaître-Roberstson-Walker (FLRW) universe. We consider a brane universe moving in the Schwarzschild background. For this case, we compute the complexity growth rate in a closed universe and a flat universe by using both the complexity-volume and complexity-action dualities. We find that there are two kinds of contributions to the growth rate: one is from the interaction among the degrees of freedom, while the other one from the change of the spatial volume of the universe. The complexity-volume and complexity-action conjectures give different results for the closed universe case. A possible explanation of the inconsistency when the brane crosses the black hole horizon is given based on the Lloyd bound.

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