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Geometric corrections to cosmological entanglement

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We investigate entanglement production by inhomogeneous perturbations over a homogeneous and isotropic cosmic background, demonstrating that the interplay between quantum and geometric effects can have relevant consequences on entanglement entropy, with respect to homogeneous scenarios. To do so, we focus on a conformally coupled scalar field and discuss how geometric production of scalar particles leads to entanglement. Perturbatively, at first order we find oscillations in entropy correction, whereas at second order the underlying geometry induces mode-mixing on entanglement production. We thus quantify entanglement solely due to geometrical contribution and compare our outcomes with previous findings. We characterize the geometric contribution through geometric (quasi)-particles, interpreted as dark matter candidates.

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