



Non-Gaussianity from Curvatons Revisited

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We investigate density perturbations sourced by a curvaton with a generic energy potential. The key feature of a curvaton potential which deviates from a quadratic is that the curvaton experiences a non-uniform onset of its oscillation. This sources additional contributions to the resulting density perturbations, and we especially find that the non-Gaussianity parameter f_{NL} can become large with either sign no matter whether the curvaton dominates or subdominates the universe when it decays. Such non-quadratic curvaton potentials are required in order to produce a red-tilted density perturbation spectrum (without invoking large-field inflation), and are also motivated by explicit curvaton models based on microscopic physics. We further apply our generic results to the case where the curvaton is a pseudo-Nambu-Goldstone (NG) boson of a broken U(1) symmetry, and show that the resulting density perturbations are strongly enhanced towards the hilltop region of the energy potential, accompanied by a mild increase of the non-Gaussianity. Such hilltop NG curvatons can produce observationally suggested density perturbations under wide ranges of inflation/reheating scales, and further predict the non-Gaussianity of the density perturbations to lie within the range $10 < f_{\text{NL}} < 30$.

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