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Localized features in non-Gaussianity from heavy physics

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Features in the correlation functions ⟶ Hints for heavy physics?

A heavy scalar field could leave non-negligible signatures in the primordial spectrum by the parametric resonance between its background oscillations and the inflaton fluctuations. (Derivative couplings ⟶ efficient enhancement)

Strength of the derivative couplings

$$\frac{\Delta\mathcal{P}_\zeta}{\mathcal{P}_\zeta} = \mathcal{O}(1)\left(\frac{q}{0.1}\right)\left(\frac{m/H}{10^4}\right)^{1/2} \quad (\text{at } k/a_{\rm osc} \sim m), \qquad = 0 \quad (\text{otherwise}),$$

$$\text{“}\Delta f_{NL}\text{”} = \mathcal{O}(10^2)\left(\frac{\epsilon}{0.01}\right)\left(\frac{q}{0.1}\right)\left(\frac{m/H}{10^4}\right)^{3/2} \quad (\text{at } K/a_{\rm osc} \sim m), \qquad = 0 \quad (\text{otherwise}),$$

$$(K \equiv k_1 + k_2 + k_3)$$