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Consistency relations for features in the primordial spectra

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We discuss the generation of sharp features in the primordial spectra within the framework of effective field theory of inflation, wherein curvature perturbations are the consequence of the dynamics of a single scalar degree of freedom. We identify two sources in the generation of features: the time-variation of the sound speed of curvature fluctuations c_s and the time-variation of the expansion rate H during inflation. We propose a non-trivial relation between these two quantities that allows us to study the generation of features in realistic scenarios where features are the result of the simultaneous occurrence of these two sources. This relation depends on a single parameter with a value determined by the model responsible for the time-varying background. As a consequence, we deduce a one-parameter consistency relation between the shape and size of features in the bispectrum in terms of those of features in the power spectrum. This relation constitutes a powerful tool to parametrize and study the appearance of features in the power spectrum, and offers a concrete prediction for the search of features in future large scale structure. To support this result, we discuss several examples of models where the one-parameter relation between the c_s and H is satisfied. In addition, we discuss the particular case of resonant features, for which Planck is already able to constrain our consistency relation.

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