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Running of the Running and Entropy Perturbations During Inflation

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In single field slow-roll inflation, one expects that the spectral index $n_s - 1$ is first order in slow-roll parameters. Similarly, its running $\alpha_s = dn_s/d \log k$ and the running of the running $\beta_s = d\alpha_s/d \log k$ are second and third order and therefore expected to be progressively smaller, and usually negative. Recent analyses hinting that β_s may actually be positive, and larger than α_s are hence beginning to generate some tension with the simplest models of inflation. We take the first theoretical steps towards addressing the question, then, of what kind of inflationary models could explain such a hint, were it to be confirmed by future experiments, focusing on two-field models of inflation in which the late-time transfer of power from isocurvature to curvature modes allows for a much more diverse range of phenomenology. We calculate the runnings due to this effect and briefly apply our results to assess the feasibility of finding $|\beta_s| > |\alpha_s|$ in some specific models.

Summary

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