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Precision Calculation of Inflation Correlators at One Loop

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We initiate a systematic study of precision calculation of the inflation correlators at the 1-loop level, starting in this paper with bosonic 1-loop bispectrum with chemical-potential enhancement. Such 1-loop processes could lead to important cosmological collider observables but are notoriously difficult to compute due to the lack of symmetries. We attack the problem from a direct numerical approach based on the real-time Schwinger-Keldysh formalism and show full numerical results for arbitrary kinematics containing both the oscillatory "signals" and the "backgrounds". Our results show that, while the non-oscillatory part can be one to two orders of magnitude larger, the oscillatory signal can be separated out by applying appropriate high-pass filters. We have also compared the result with analytic estimates typically adopted in the literature. While the amplitude is comparable, there is a non-negligible deviation in the frequency of the oscillatory part away from the extreme squeezed limit. See [arXiv:2109.14635] for more details.

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