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## Loop contributions to the scalar power spectrum due to quartic order action in ultra slow roll inflation

Recently, there have been efforts to examine the contributions to the scalar power spectrum due to the loops arising from the cubic order terms in the action describing the perturbations, specifically in inflationary scenarios that permit a brief epoch of ultra slow roll (USR). A phase of USR inflation leads to significant observational consequences, such as the copious production of primordial black holes and generation of gravitational waves of observable amplitudes. In this talk, I shall discuss the loop contributions to the scalar power spectrum in scenarios of USR inflation arising due to the quartic order terms in the action describing the scalar perturbations. I shall initially describe the computation of the loop contributions to the scalar power spectrum due to the dominant term in the action at the quartic order. Thereafter, I shall consider a scenario wherein a phase of USR is sandwiched between two stages of slow roll inflation and describe the behavior of the loop contributions in situations involving late, intermediate and early epochs of USR. In the inflationary scenario involving a late phase of USR, for reasonable choices of the parameters, I shall show that the loop corrections are negligible for the entire range of wave numbers. In the intermediate case, the contributions from the loops prove to be scale invariant over large scales, and we find that these contributions can amount to 30% of the power spectrum at the leading order. In the case wherein USR sets in early, we find that the loop contributions could be negative and can dominate the power spectrum at the leading order, which indicates a breakdown of the perturbative expansion. I shall conclude with a brief summary and outlook.

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