Contribution ID: **764** Type: **Talk in the parallel session**

No slow-roll inflation à la generalized Chaplygin gas in general relativity

The Generalized Chaplygin Gas (GCG) model is characterized by the equation of state P = −A ρ^{−α}, where A>0 and α < 1. The model has been extensively studied due to its interesting properties and applicability in several contexts, from late-time acceleration to primordial inflation. Nonetheless we show that the inflationary slow-roll regime cannot be satisfied by most of the parameter space of the GCG model when General Relativity (GR) is considered. In particular, although the model has been applied to inflation with 0 < α < 1, we show that for −1 < α ≤ 1 there is no expansion of the Universe but an accelerated contraction. For α ≤ −5/3, the second slow-roll parameter ηH is larger than unity, so there is no sustained period of inflation. Only for α very close to -1 the model produces enough e-folds, thus greatly reducing its parameter space. Moreover, we show that the model is ruled out by the Planck 2018 results. Finally, we extend our analysis to the Generalized Chaplygin-Jacobi Gas (GCJG) model. We find that the introduction of a new parameter does not change the previous results. We thus conclude that the violation of the slow-roll conditions is a generic feature of the GCG and GCJG models during inflation when GR is considered and that the models are ruled out by the Planck 2018 results.

Primary author: GALLEGO CADAVID, Alexander (Universidad de Valparaíso)

Presenter: GALLEGO CADAVID, Alexander (Universidad de Valparaíso)

Session Classification: The Early Universe

Track Classification: Cosmic Microwave Background: Effects of Primordial Perturbations Enhancement: from Black Holes Formation to CMB Anomalies