Contribution ID: **30** Type: **not specified**

Observational Signatures of Multifield Inflation

Friday, September 11, 2020 3:00 PM (1 hour)

Slow-roll single-field inflation constitutes the main paradigm of the Early Universe. But this model suffers from a number of conceptual issues that naturally lead to the consideration of multifield models of inflation with curved field space, which have recently been under scrutiny as realistic realisations of high-energy physics in the Early Universe. I will show that the non-trivial internal geometry reshuffles observational predictions from inflation, at the level of the background (geometrical destabilisation of inflation), of linear fluctuations (spectral index, tensor-to-scalar ratio) and can lead to exotic type of non-Gaussianities (bispectrum, higher-order correlation functions). This last fact in particular motivates the thorough analysis of non-Gaussianities in this large class of models. For that, we revisit Maldacena's calculation of the bispectrum in a 2-field context. As a byproduct, we also derive the effective single-field theory including interactions, when the fluctuation perpendicular to the trajectory (isocurvature mode) can be integrated out, and explicitly show the effect of the curvature of the field space on the bispectrum. Time permitting I will also mention other projects that might interest the audience, such as multifield stochastic inflation and multifield/multi-fluid reheating after inflation.

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