



Contribution ID: 94

Type: Poster

Field-level BAO inference

The BAO feature is damped by non-linear structure formation, which reduces the precision with which we can infer the BAO scale from standard galaxy clustering analysis methods. A variety of techniques, known as BAO reconstruction, have been proposed to mitigate this damping effect; however, in order to work, these methods need to make assumptions about bias and cosmology as well as to rely on the compression functions. In our study, we combine forward modeling with field-level inference in the goal of extracting the size of BAO scale using HMC sampling. Unlike traditional methods, field-level approach does not require reconstruction and permits full information extraction without relying on n -point functions. To fully gauge the gain of this approach, we are conducting a thorough comparison with n -point functions analysis, employing both standard likelihood-based and simulation-based inference methods.

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Session Classification: Posters

Track Classification: Paris