HAMLET
How to Apply Machine Learning to Experimental & Theoretical PHYSICS
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Decoding the Early Universe: Machine Learning Applications in CMB Analysis

Monday, 19 August 2024 15:35 (25 minutes)

In this presentation, we will explore the application of advanced machine learning techniques in cosmology, focusing on the analysis of Cosmic Microwave Background (CMB) maps. Accurately calculating the tensor-to-scalar ratio from CMB data is a crucial yet challenging task, as it holds the key to understanding primordial gravitational waves and the early universe's inflationary period. I will discuss the use of deep learning and other sophisticated algorithms to extract meaningful features and parameters from CMB maps, which can be readily reapplied in other areas of cosmology and astrophysics studies. These methods offer robust tools for dealing with the complexities and high-dimensional nature of data. By leveraging machine learning, we can enhance our ability to simulate, analyze, and interpret CMB observations, providing deeper insights into the universe's fundamental properties. The versatility and potential of machine learning in advancing our understanding of the cosmos will be highlighted, by showing data analysis techniques applicable in all scientific disciplines.

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Session Classification: Plenaries & Keynotes