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Large Language Models in Fundamental Physics: An Interdisciplinary Roadmap

This talk presents a comprehensive analysis of the potential role of Large Language Models (LLMs) and Question-Answering Machines (QAMs) in augmenting the field of fundamental physics, drawing upon a nuanced synthesis of insights from an interdisciplinary consortium encompassing various sub-disciplines of physics, philosophy of science, and computer science.

The primary objective of this paper is to explore possible advancements of our understanding of complex physical phenomena through the application of LLMs. This endeavour necessitates not only the development of such systems (which are currently lacking) but also their thorough evaluation and the identification of optimal use cases.

To this end, we present a detailed research agenda and roadmap. The talk argues for a collaborative paradigm in which AI development, assessment and reflection come together to critically evaluate and guide the integration of LLMs into physics research. This approach is based on the assertion that a multi-layered perspective is essential to recognize the nuanced capabilities and limitations of LLMs in fundamental physics.

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