Contribution ID: **33** Type: **not specified**

The prospect of quantum machine learning algorithms in High Energy Physics

Tuesday, July 18, 2023 4:10 PM (25 minutes)

Quantum computing has emerged as a promising paradigm that offers potential solutions to complex computational problems intractable for classical computers. Over the last few years, there has been a surge of interest in exploring the application of quantum algorithms in various fields, including High Energy Physics (HEP). This talk aims to provide an overview of quantum machine learning algorithms and their applicability to HEP research. We will discuss the fundamental principles of quantum computing, including quantum superposition, entanglement, and quantum gates. We will then delve into specific quantum algorithms, such as support vector machines, highlighting their potential impact on solving computationally challenging problems in HEP.

Additionally, we will introduce the concept of a quantum particle transformer technology for jet classification, building upon the classical particle transformer framework. We will present an innovative idea for implementing a quantum version of the particle transformer, potentially revolutionising jet classification in HEP. This technology holds promise for improving the accuracy and efficiency of jet identification, a critical component of particle physics experiments.

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Session Classification: Quantum Computing

Track Classification: 分项目报告: 量子计算