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Quantum Tracking for Future Colliders

At the High Luminosity Large Hadron Collider (HL-LHC), we will enter the "exa-byte" era, where the annual computing cost will increase by a factor of 10-20 from the ongoing LHC program. Without various innovations, the experiments will not be able to operate. The Graphical Processing Units (GPU) and other state-of-the-art artificial intelligence technologies will be the baseline at the HL-LHC. Quantum computing may also bring another "leap". Two of the highly CPU consuming components are the track reconstruction in both data/simulation and simulation of shower development in the calorimeter. Tackling these challenges will be useful not just for the HL-LHC, but for other future colliders, such as the Circular Electron Positron Collider (CEPC). In this talk, I will present recent studies on the former topic, namely on an application of quantum machine learning for the track reconstruction.

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Track Classification: Quantum Machine Learning