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Type: **Parallel session talk**

Quantum algorithms for charged particle track reconstruction in the LUXE experiment

Friday 25 August 2023 09:30 (20 minutes)

LUXE (Laser Und XFEL Experiment) is a new experiment in planning in Hamburg, which will study Quantum Electrodynamics at the strong-field frontier. LUXE intends to measure the positron production rate in this unprecedented regime by using, among others, a silicon tracking detector. The large number of expected positrons traversing the sensitive detector layers results in an extremely challenging combinatorial problem, which can become computationally expensive for classical computers. We investigate the potential future use of gate-based quantum computers for pattern recognition in track reconstruction, based on a quadratic unconstrained binary optimisation and a quantum graph neural network. The talk will introduce these approaches and compare their performance with a classical track reconstruction algorithm.

Collaboration / Activity

LUXE

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