A Quantum Graph Neural Network Approach to Particle Track Reconstruction

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Following Hep.TrkX project:

Simple Quantum Edge Network

Training set: 1400 subgraphs, Validation set: 200 subgraphs, using ADAM, binary cross entropy, lr = 0.01, shots =1000. Hidden Dimension Size = 1.

Conclusions:
• Promising results with simple models (the above model has 41 trainable parameters)
• More complex models can perform close to AUC = 1.0
• Simulation times are pretty long.
• No Quantum Advantage is shown.

Very first results were presented at CHEP2019: ArXiv: 2003.08126