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## Quantum-Assisted Generative AI for Simulation of the Calorimeter Response

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As CERN approaches the launch of the High Luminosity-LHC Large Hadron Collider (HL-LHC) by the decade's end, the computational demands of traditional simulations have become untenably high. Projections show millions of CPU-years required to create simulated datasets - with a substantial fraction of CPU time devoted to calorimetric simulations. This presents unique opportunities for breakthroughs in computational physics. We show how Quantum-assisted Generative AI can be used for the purpose of creating synthetic, realistically scaled calorimetry dataset. The model is constructed by combining D-Wave's Quantum Annealer processor with a Deep Learning architecture, increasing the timing performance with respect to first principles simulations and Deep Learning models alone, while maintaining current state-of-the-art data quality.

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