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Generation of High-Fidelity and High-Dimensional Calorimeter Showers Using Normalizing Flows

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Simulation in High Energy Physics places a heavy burden on the available computing resources and is expected to become a major bottleneck for the upcoming high luminosity phase of the LHC and future Higgs factories, motivating a concerted effort to develop computationally efficient solutions. Generative machine learning methods hold promise to alleviate the computational strain produced by simulation while providing the physical accuracy required of a surrogate simulator.

Normalizing flows have shown significant potential in the field of fast calorimeter simulation in simple detector geometries. We expand on this by demonstrating how a normalizing flow setup can be extended to simulate showers in a significantly more complicated highly granular calorimeter.

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