

# Diffusion Models for LHC event generation

*jeudi 26 octobre 2023 09:50 (20 minutes)*

Given the recent success of diffusion models in image generation, we study their applicability to generating LHC phase space distributions. For that purpose two specific models are chosen, which differ in their concrete diffusion architecture, a Denoising Diffusion Probabilistic Model (DDPM) and a model based on Conditional Flow Matching (CFM). We find that both achieve state-of-the-art precision. To further enhance the interpretability of our results we quantify our training uncertainty by developing a Bayesian version. In this talk, both diffusion models are introduced and discussed followed by a presentation of our findings.

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**Classification de Session:** Methods and Tools

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