

Machine-learning HEP fast simulations

Fast, accurate simulations are becoming increasingly necessary for the precision measurements and BSM searches planned by LHC experiments in Run 3 and beyond. The recent breakthroughs in deep generative modelling in computer vision and natural language processing offer a promising and exciting avenue for improving the speed of current LHC simulation paradigms by up to 3 orders of magnitude. We review the landscape of ML-based fast simulation solutions, including different models and data structures. We also discuss recent work on statistical methods for validating such fast simulations, and the outlook for their deployment within Run 3 of the LHC.

Focus areas

HEP

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