

Tilman Plehn – HEP Seminar – 2/9/2021
University of Heidelberg

Title: Generative and Invertible Networks for LHC Theory

Abstract: LHC physics is unique in the sense that we compare vast and highly complex data sets with first-principles predictions. These predictions usually rely on Monte Carlo simulations. I will show how generative neural networks can be used to supplement these simulations and discuss conceptual advantages. I will then show how generative networks can be used to invert event simulation. Flow-based invertible networks allow us to consistently unfold individual detector-level events into probability distributions in parton-level phase space. The same way, they can invert QCD effects like jet radiation to extract the hard-process kinematics. Finally, they can be used to infer the structure of QCD splittings forming jets.