

# An Alternative to Monte Carlo Generators with Deep Generative Models

*Thursday, January 30, 2020 3:05 PM (15 minutes)*

What is typically referred to as the inverse problem in High Energy Physics (HEP) can be described as the use of data to extract key information to build new a theory. The search of new resonances beyond the Standard Model (SM) involves the use of different Machine Learning techniques. For this purpose, based on the recent and major successes in the field of deep learning, particularly Deep Generative algorithms; Generative Adversarial Networks (GANs) which have been developed in less than a decade ago have proven to be of potential. The feasibility of addressing the inverse problem can be achieved via a combination of GANs and weak supervision. Weak supervision provides a way of combining the already known information about the backgrounds with the unknown hidden in the data, it is often used to extract features of the new Beyond the Standard Model signal from the data and with GANs used to create a Monte Carlo (MC) generator of the unknown signals with no significant loss in accuracy which could be better than classic MC.

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**Session Classification:** Session IV