Contribution ID: **17** Type: **not specified**

Continuous Normalizing Flows in Lattice Gauge Theories

Wednesday, 23 October 2024 11:50 (40 minutes)

We have developed continuous normalizing flows for lattice gauge theories, building on Lüscher's perturbative framework of gradient flow and enhancing it through machine learning techniques. This approach offers a highly efficient means of trivializing the theory, as demonstrated in the 2-dimensional SU(3) gauge theory, where our method successfully trivializes the system using only a few hundred parameters. However, trivializing the 4-dimensional theory presents greater challenges due to critical slowing down at large values of β and the inherently non-perturbative nature of strong interactions. While full trivialization of the 4-dimensional theory remains out of reach, I will present a promising application of our machine-learned gradient flow: the computation of gradients of physical observables with respect to action parameters. This method circumvents traditional difficulties and demonstrates the potential of machine learning to advance the study of lattice gauge theories, even in complex, higher-dimensional settings.

Presenter: Dr BACCHIO, Simone