



Contribution ID: 355

Type: **Parallel Talk**

## Multiscale Normalizing Flows for Gauge Theories

*Monday, 31 July 2023 16:20 (20 minutes)*

Scale separation is an important physical principle that has previously enabled algorithmic advances such as multigrid. Previous work on normalizing flows has been able to utilize scale separation in the context of scalar field theories, but mostly not in the context of gauge theories. In this talk, I will give an overview of a new method for generating gauge fields using hierarchical normalizing flow models. This method builds gauge fields from the outside in, allowing different parts of the model to focus on different scales of the problem. In addition I will present numerical results for  $U(1)$  and  $SU(3)$  gauge theories in 2, 3, and 4 spatial dimensions.

### Topical area

Algorithms and Artificial Intelligence

**Primary authors:** HACKETT, Daniel (MIT); URBAN, Julian (MIT); SHANAHAN, Phiala (Massachusetts Institute of Technology); ABBOTT, Ryan (MIT); BOYDA, Denis (IAIFI (MIT)); ROMERO-LOPEZ, Fernando (MIT)

**Presenter:** ABBOTT, Ryan (MIT)

**Session Classification:** Algorithms and Artificial Intelligence