



Contribution ID: 260

Type: **Plenary**

## Loop amplitudes at the precision frontier

*Thursday 27 October 2022 11:30 (30 minutes)*

Precision simulations for collider phenomenology require intensive evaluations of complicated scattering amplitudes. Uncovering hidden simplicity in these basic building blocks of quantum field theory can lead us to new, efficient methods to obtain the necessary theoretical predictions. In this talk I will explore some new approaches to multi-scale loop amplitudes that can overcome conventional bottlenecks in their evaluation. Computational techniques based on evaluations over finite fields are now being used to obtain analytic information from numerical evaluations and can lead to fast and efficient implementations that can be used directly in Monte Carlo simulations. In some cases even the most compact representations of amplitudes can still mean prohibitive evaluation times. Approximating these complicated functions with Machine Learning technology has the potential to provide an order of magnitude improvement in evaluation times yet it remains a challenge to keep deviations from the complete amplitude under quantitative control. I will present some advances in the use of Neural Networks to provide reliable amplitude evaluations.

**Experiment context, if any****References****Significance****Presenter:** BADGER, Simon David (Universita e INFN Torino (IT))**Session Classification:** Plenary