



Contribution ID: 108

Type: not specified

## **NFLikelihood: Unsupervised Machine Learning LHC likelihoods with Normalizing Flows.**

Full statistical models encapsulate the complete information of an experimental result, including the likelihood function given observed data. Their proper publication is of vital importance for a long lasting legacy of the LHC. Major steps have been taken towards this goal; a notable example being ATLAS release of statistical models with the pyhf framework. However, even the likelihoods are often high-dimensional complex functions that are not straightforward to parametrize. Thus, we propose to describe them with Normalizing Flows, a modern type of generative networks that explicitly learn the probability density distribution. As a proof of concept we focused on two likelihoods from global fits to SM observables and a likelihood of a NP-like search, obtaining great results for all of them. As a plus, we showcase that Normalizing Flows can generally scale well to very high dimensions by testing them against generic multi-modal functions.

**Authors:** REYES GONZALEZ, Humberto Alonso (University of Genoa); TORRE, Riccardo (INFN e Universita Genova (IT))

**Presenter:** REYES GONZALEZ, Humberto Alonso (University of Genoa)

**Session Classification:** Results, Observables & Techniques