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Unsupervised Learning Likelihood functions of LHC results

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Due to their undoubting importance, the systematic publication of Full Likelihood Functions (LFs) of LHC results is a very hot topic among the HEP community. Major steps have been taken towards this goal; a notable example being ATLAS release of full likelihoods with the pyhf framework. However, the publication of LFs remains a difficult challenge since they are generally complex and high-dimensional; this leads, for instance, to time consuming maximum likelihood estimations. Alternatively, we propose the unsupervised learning of LFs with Normalizing Flows (NFs), a powerful brand of generative models which include density estimation by construction. In this way, we can obtain compact and precise descriptions of complex LFs that can be efficiently sampled from and used for probability estimations. In this talk, we discuss the capability of NFs for modelling the full-likelihood functions of LHC-New Physics searches and -Standard Model measurements.

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