Contribution ID: **52** Type: **Regular talk**

Conditional Invertible Network for Neutrino Regression

Wednesday, 11 May 2022 09:00 (25 minutes)

The mass of the top quark is of paramount importance as it is a highly sensitive probe of the structure and stability of the Standard Model. The final state of a leptonically decaying top quark contains a neutrino. In collider physics the neutrino escapes detection, leaving only experimental proxies for its momentum in the plane transverse to the beam pipe and no information about its longitudinal momentum. This hinders the full reconstruction of the final state and thus the invariant mass of the top quark. Conventional methods for deriving the neutrino momentum from kinematic constraints sometimes yield no real solutions. We propose a novel method for the estimation of the neutrino kinematics in the single lepton ttbar decay channel using a conditional invertible neural network. This is achieved by viewing the reconstruction process as an inverse problem and thus approach it as a task of conditional inference using the flow. The flow is trained to estimate the conditional probability distribution of the neutrino's 3-momentum conditioned on observed event variables. We present the performance of this method in comparison to standard reconstruction techniques used in analyses.

Primary authors: A. RAINE, John (University of Geneva); Mr LEIGH, Matthew (University of Geneva); GOLLING, Tobias (University of Geneva)

Presenter: Mr LEIGH, Matthew (University of Geneva)

Session Classification: Workshop