

# 31st International Symposium on Lepton Photon Interactions at High Energies



Contribution ID: 215 Contribution code: P7

Type: Poster

## TopicFlow: Disentangling quark and gluon jets with normalizing flows

*Monday, 17 July 2023 17:41 (1 minute)*

The isolation of pure samples of quark and gluon jets is of key interest at hadron colliders. Recent work has employed topic modeling to disentangle the underlying distributions in mixed samples obtained from experiments. However, current implementations do not scale to high-dimensional observables as they rely on binning the data. In this work we introduce TopicFlow, a method based on normalizing flows to learn quark and gluon jet topic distributions from mixed datasets. These networks are as performant as the histogram-based approach, but since they are unbinned, they are efficient even in high dimension. The models can also be oversampled to alleviate the statistical limitations of histograms. As an example use case, we demonstrate how our models can improve the calibration accuracy of a classifier. Finally, we discuss how the flow likelihoods can be used to perform outlier-robust quark/gluon classification.

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**Session Classification:** Reception and poster presentation

**Track Classification:** Collider precision