Contribution ID: **600** Type: **Poster Presentation**

Separating quark and gluon jet distributions in heavy ions

Monday, November 4, 2019 5:40 PM (20 minutes)

Current measurements of the modification of jets in the quark–gluon plasma necessarily average over the quark–gluon composition of the jets in the sample. This introduces substantial complications in measuring differences of energy loss and modification between quark-initiated and gluon-initiated jets. Additionally, even in the absence of jet modification, a modified quark–gluon fraction of jets in heavy-ion collisions could give rise to a substantial apparent modification arising just from differences between the production properties of quark- and gluon-initiated jets. We demonstrate a fully data-driven method for separating contributions to jet observables coming from quark- and gluon-initiated jets using a statistical technique called topic modeling. Assuming that jet observable distributions are a mixture of underlying quark and gluon distributions enables us to extract those distributions and their relative fractions from dijet and photon+jet samples. As a proof of concept, we extract the fractions of quark- and gluon-initiated jets as a function of p_T and separately compute R_{AA} for quark and gluon jets. We furthermore use this method to distinguish between modification of an observable that arises from modification of the quark–gluon fraction versus modification of that observable individually for either quark or gluon jets. We show that this distinction is of central importance to even qualitative interpretations of jet modification observables in heavy-ion collisions.

Primary authors: BREWER, Jasmine (Massachusetts Institute of Technology); THALER, Jesse (MIT); TURNER, Andrew (Massachusetts Institute of Technology)

Presenter: TURNER, Andrew (Massachusetts Institute of Technology)

Session Classification: Poster Session

Track Classification: Jet modifications and medium response