



Contribution ID: 148

Type: Parallel Talk

Spectral clustering for jet physics

Friday, 8 July 2022 14:30 (15 minutes)

We present a new approach to jet definition alternative to clustering methods, such as the anti-kT scheme, that exploit kinematic data directly. Instead the new method uses kinematic information to represent the particles in a multidimensional space, as in spectral clustering. After confirming its Infra-Red (IR) safety, we compare its performance in analysing $gg \rightarrow H_{125\text{GeV}} \rightarrow H_{40\text{GeV}}H_{40\text{GeV}} \rightarrow \bar{b}b\bar{b}b$, $gg \rightarrow H_{500\text{GeV}} \rightarrow H_{125\text{GeV}}H_{125\text{GeV}} \rightarrow \bar{b}b\bar{b}b$ and $gg, q\bar{q} \rightarrow t\bar{t} \rightarrow \bar{b}bW^+W^- \rightarrow \bar{b}bjl_i$ events from Monte Carlo (MC) samples, specifically, in reconstructing the relevant final states, to that of the anti-kT algorithm. Finally, we show that the results for spectral clustering are obtained without any change in the parameter settings of the algorithm, unlike the anti-kT case, which requires the cone size to be adjusted to the physics process under study.

In-person participation

Yes

Primary authors: SHEPHERD-THEMISTOCLEOUS, Claire H. (Rutherford Appleton Laboratory); CERRO, Giorgio (University of Southampton); Dr DAY-HALL, Henry (Czech Technical University, Prague); Prof. DAS-MAHAPATRA, Srinandan (University of Southampton); Prof. MORETTI, Stefano (University of Southampton)

Presenter: CERRO, Giorgio (University of Southampton)

Session Classification: Strong interactions and Hadron Physics

Track Classification: Strong interactions and Hadron Physics