Reconstructed vs Reclustered Jets

André Cordeiro - Rafael Pinto

Laboratório de Instrumentação e Física Experimental de Partículas

8 of August of 2019

Clustering Algorithms

Sequential jet clustering algorithms

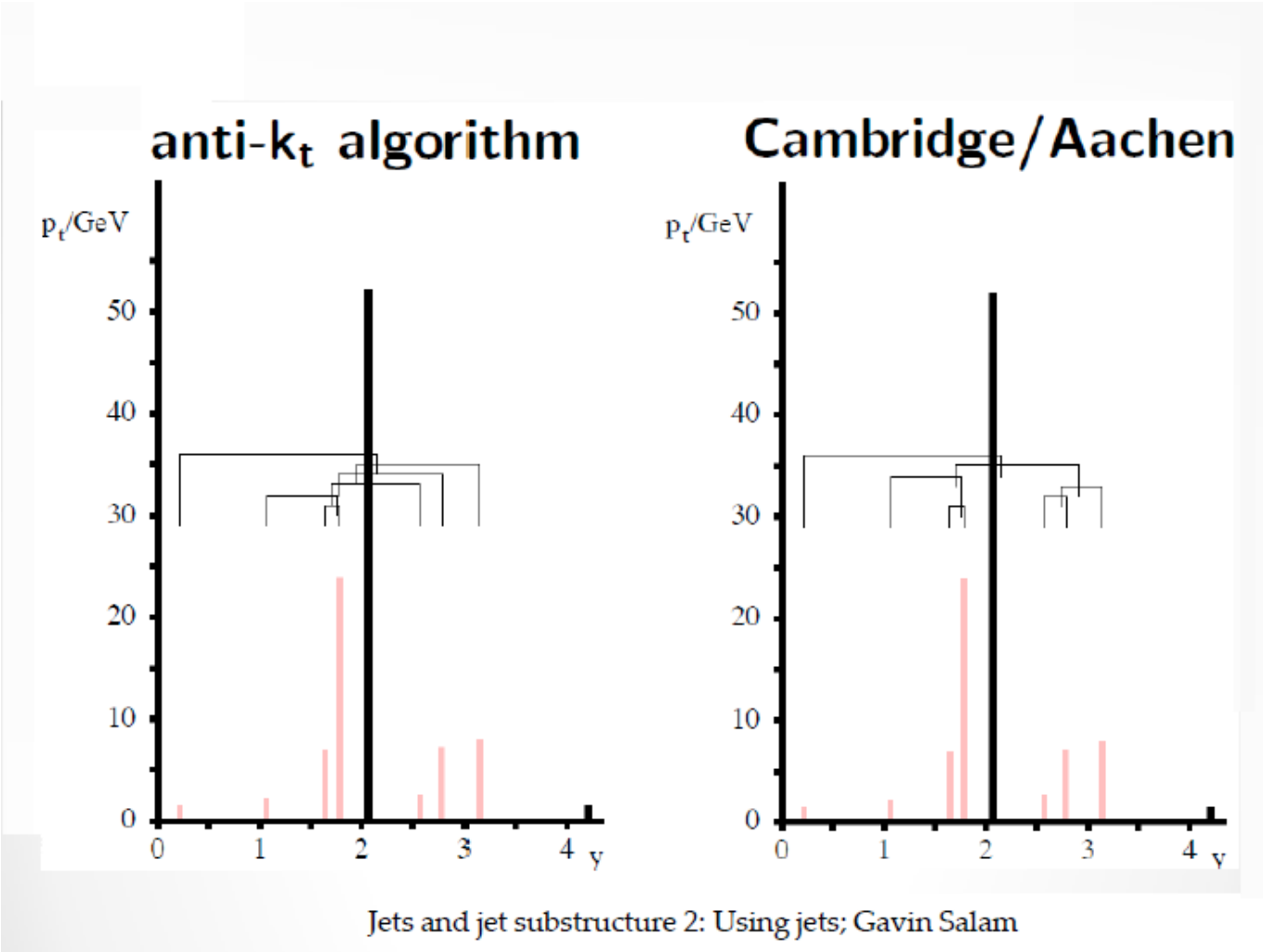
Anti-kt

1. Background suppression - Energy relevant events
2. Poor reclustering results

Cambridge/Aachen (C/A)

1. Angular ordering (without considering energies/momenta) - assertive for pp collisions
2. Heavy Ion (Pb-Pb) - partial angular ordering - parton coherency with the plasma
3. Event history access

Clustering Algorithms



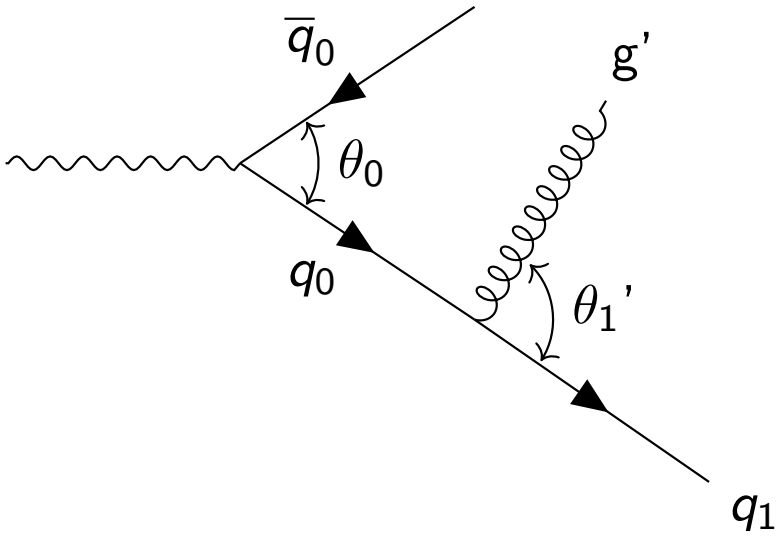
Jets and jet substructure 2: Using jets; Gavin Salam

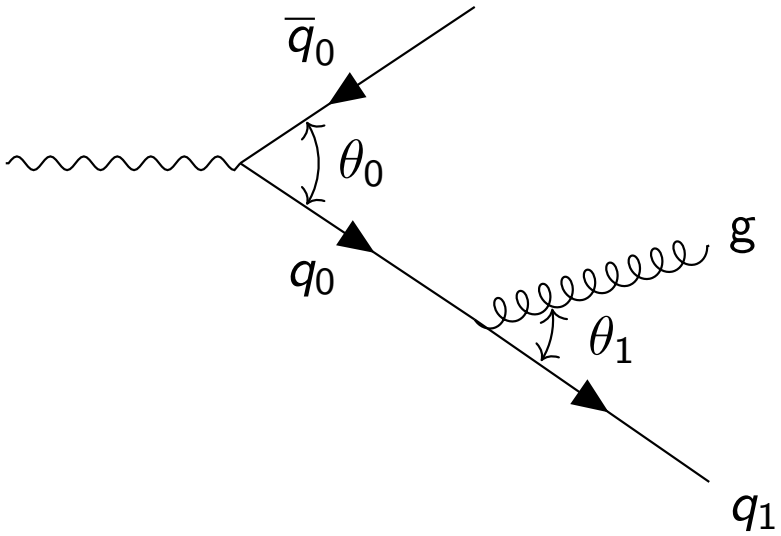
- **Anti-kt**: The soft particles are connected to the hardest particle
- **C/A**: Clustered exclusively based on spatial separation

Angular Ordering in Parton Showers

Coherence and color charge

- At small angles, the emitted gluon can resolve between the particles.
- For large angle *bremsstrahlung*, the emitting particle would be the $q_0\overline{q}_0$ pair, which is colorless $\longrightarrow$ no emission.
- The splitting angle θ is strictly decreasing along the parton shower.

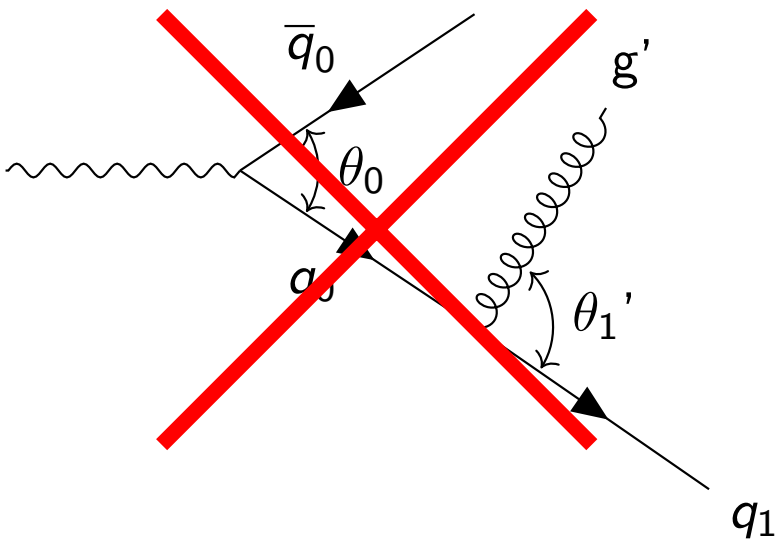


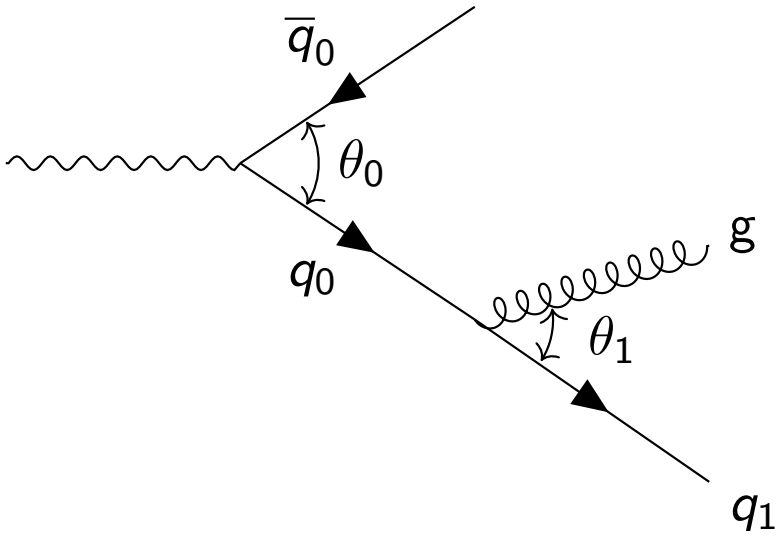


Angular Ordering in Parton Showers

Coherence and color charge

- At small angles, the emitted gluon can resolve between the particles.
- For large angle *bremsstrahlung*, the emitting particle would be the $q_0\overline{q}_0$ pair, which is colorless $\longrightarrow$ no emission.
- The splitting angle θ is strictly decreasing along the parton shower.

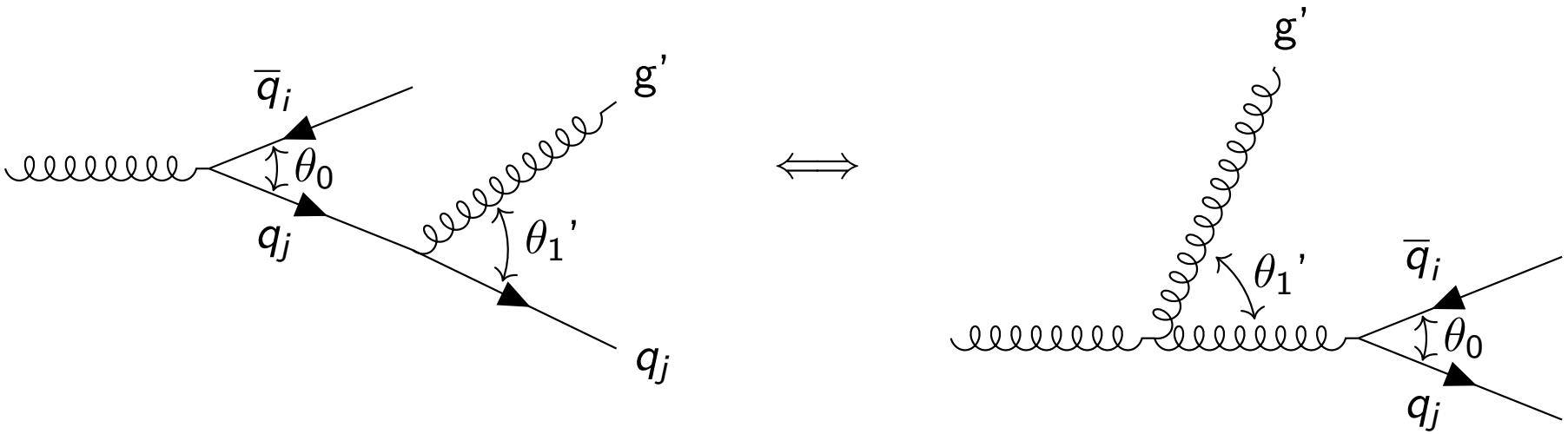




Angular Ordering in Parton Showers

Gluon Induced Showers

- For gluon/quark induced showers, the $q_i\overline{q}_j$ pair isn't colorless.
- In this case, the large angle emissions are reinterpreted as ocurring before the splitting.
- The splitting angle remains a good observable.



Project Objectives

Exploring different observables for jet reconstruction.

Splitting history of the parton shower.

Temporal description of the QGP medium and its evolution.