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## Quark gluon tagging at the LHC

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By measuring the substructure of a jet, one can assign it a quark or gluon tag. In this talk, we confront the challenges faced when going beyond this leading-order understanding, using both parton shower generators and first-principles calculations to assess the impact of higher-order perturbative and nonperturbative physics. Working in the idealised context of electron-positron collisions, where one can define a proxy for quark and gluon jets based on the Lorentz structure of the production vertex, we find a fascinating interplay between perturbative shower effects and nonperturbative hadronization effects. Turning to proton-proton collisions, we highlight a core set of measurements that would constrain current uncertainties in quark/gluon tagging and improve the overall modeling of jets at the Large Hadron Collider.

**Apply to be considered for a student &nbsp; award (Yes / No)?**

No

**Level for award&nbsp;(Hons, MSc,   PhD, N/A)?**

N/A

**Main supervisor (name and email)&nbsp;and his / her institution**

The contributor is an academic staff member.

**Would you like to   submit a short paper   for the Conference   Proceedings (Yes / No)?**

Yes

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