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Jet reconstruction at the LHC (lecture I)

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Abstract content

The main goal of this series of mini-lectures is to provide an inside look at the reconstruction of particle jets in hadronic final states in the proton-proton collisions at the Large Hadron Collider (LHC), which is expected to begin operations for physics end of September 2008 at CERN, the European Center for Particle Physics Research. These jets are produced in basically all collision channels, and their precise reconstruction is often essential to reconstruct a specific interaction or decay with the required precision.

Starting from the signal generated by particle jets in the calorimeters of the multi-purpose ATLAS and CMS detectors, each centered around one of the collision points in the LHC ring, the full chain of reconstruction is introduced. The first of three lectures focuses on the signal extraction and treatment and introduces some of the environmental aspects to be considered for precision physics. In the second lecture the various algorithms employed to reconstruct jets are discussed, and jet calibration strategies are introduced. In addition, techniques to estimate basic jet reconstruction performance parameters are presented. The main subject of the third and final lecture is then the possible refinement of the jet measurement, including the reconstruction of jet shapes and masses. If time permits, a discussion of the other important contribution to the hadronic final state at LHC, the missing transverse momentum reconstruction, is discussed in addition.

Summary

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