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# Fourier Transforms as a tool for Analysis of Hadron-Hadron Collisions.

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Hadronic final states in hadron-hadron collisions are often studied by clustering final state hadrons into jets, each jet approximately corresponding to a hard parton. The typical jet size in a high energy hadron collision is between 0.4 and 1.0 in eta-phi. On the other hand, there may be structures of interest in an event that are of a different scale to the jet size. For example, to a first approximation the underlying event is a uniform emission of radiation spanning the entire detector, colour connection effects between hard partons may fill the region between a jet and the proton remnant and hadronisation effects may extend beyond the jets. We consider the possibility of performing a Fourier decomposition on individual events in order to produce a power spectrum of the transverse energy radiated at different angular scales. We attempt to identify correlations in the emission of radiation over distances ranging from the full detector size to approximately 0.2 in eta-phi.

## Summary

In a sample of Monte Carlo di-jet events we find that taking the Fourier transform of the distribution of radiation in each event shows some interesting features, even in the simplest one-dimensional transformation in the phi direction. Such features include the suppression of certain of the Fourier coefficients when radiation between the di-jets is suppressed and the effect of the underlying event on the smallest of the Fourier coefficients.

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