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Energy Correlators Beyond Angles

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In this talk, we introduce energy-weighted observable correlations (EWOCs): generalizations of the energy-energy correlator (EEC) which use subjets to characterize a wide variety of correlations between collective degrees of freedom in high-energy particle collisions. EWOCs use subjets to produce a manifestly infrared and collinear safe extension of the EEC, which probes energy-weighted angular correlations between particles, to arbitrary energy-weighted correlations between subjets. For concreteness, we focus on the specific example of the mass EWOC – an energy-weighted probe of the mass of subjet pairs. Motivated by recent proposals for the use of the EEC in determining the mass of the top quark, we show that the mass EWOC is an intuitive proxy for the masses of resonances which decay into pairs of energetic subjets produced in electron-positron and proton-proton collisions. As a proof of concept, we show that the mass EWOC outperforms the EEC in the extraction of the W boson mass in samples of W boson pair-production produced in `Pythia 8.244`, and is robust to non-perturbative effects.

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Classifica Sessioni: Novel Techniques

Classificazione della track: Novel Techniques