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Precision boson-jet azimuthal decorrelation at hadron colliders

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The azimuthal angular decorrelation of a vector boson and jet is sensitive to QCD radiation, and can be used to probe the quark-gluon plasma in heavy-ion collisions. By using a recoil-free jet definition, the sensitivity to contamination from soft radiation on the measurement is reduced, and the complication of non-global logarithms is eliminated from our theoretical calculation. Such jet definitions also significantly simplify the calculation for a track-based measurement, which is preferred due to its superior angular resolution. I will discuss the factorization in Soft-Collinear Effective Theory and show that potential glauber contributions do not spoil our factorization formalism, at least up to and including order $^{3}_{s}$. The resummation is carried out using the renormalization group, and all necessary ingredients are collected or calculated. I will also discuss phenomenological studies, finding an enhanced matching correction for high jet pT due to the electroweak collinear enhancement of a boson emission off di-jets. By comparing with the Pythia event generator, I will show that our observable is very robust to hadronization and the underlying event.

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