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Color Matrix Element Corrections in Herwig (12'+3')

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We investigate the effects of keeping the full color structure for parton emissions in parton showers for both LEP and LHC. This is done within the Herwig 7 dipole shower. The subleading N_c terms are included as color matrix element corrections to the splitting kernels by evolving an amplitude-level density operator and correcting the radiation pattern for each parton multiplicity, up to a fixed number of full color emissions, after which a standard leading color shower takes over. Our results are compared to data for both LEP and LHC observables. Typically we find percent level corrections for hard perturbative dynamics, although the corrections occasionally exceed 10%. On soft physics we find significantly larger effects.

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