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Factorization for the light-jet mass and hemisphere soft function

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Many collider observables suffer from non-global logarithms not captured by standard resummation techniques. Classic examples are the light-jet mass event shape in the limit of small mass and the related hemisphere soft function. We derive factorization formulas for both of these and explicitly demonstrate that they capture all logarithms present at NNLO. These formulas achieve full scale separation and provide the basis for all-order resummations. A characteristic feature of non-global observables is that the soft radiation is driven by multi-Wilson-line operators, and the ones arising here map onto those relevant for the case of narrow-cone jet cross sections. Numerically, the contributions of non-global logarithms to resummed hemisphere-mass event shapes are sizeable.

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