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Transversity in inclusive deep inelastic scattering

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A new collinear factorization analysis of inclusive DIS scattering with suitable non-perturbative “jet correlators” shows that a novel, non-perturbative spin-flip term associated with the invariant mass of the produced hadrons couples to the target’s transversity distribution function. In inclusive cross sections, this provides a hitherto neglected and large contribution to the twist-3 part of the g_2 structure function, which can explain the discrepancy between recent calculations and fits of this quantity. It also provides an extension of the Burkhardt-Cottingham sum rule, now featuring an interplay between the g_2 and h_1 functions that calls for a re-examination of their small- x behavior, as well as an extension of the Efremov-Teryaev-Leader sum rule, suggesting a novel way to measure the tensor charge of the proton. As part of the calculation leading to these results, novel TMD sum rules are derived.

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