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## Collins-Soper kernel from lattice QCD at the physical pion mass

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This work presents a determination of the quark Collins-Soper kernel, which relates transverse-momentum-dependent parton distributions (TMDs) at different rapidity scales, using lattice quantum chromodynamics (QCD). This is the first lattice QCD calculation of the kernel at quark masses corresponding to a close-to-physical value of the pion mass, with next-to-next-leading logarithmic matching to TMDs from the corresponding lattice-calculable distributions, and includes a complete analysis of systematic uncertainties arising from operator mixing. The kernel is extracted at transverse momentum scales  $240 \text{ MeV} < \sim q_T < \sim 1.6 \text{ GeV}$  with a precision sufficient to begin to discriminate between different phenomenological models in the non-perturbative region.

### Topical area

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