

From Longitudinal to Transverse Structure: Hadron Tomography from Lattice QCD

Saturday, 10 October 2026 11:00 (30)

Understanding the partonic structure of hadrons from first principles is a major goal of lattice QCD. In this talk, I will review recent progress by the Lattice Parton Collaboration using large-momentum effective theory (LaMET). I will first discuss lattice determinations of longitudinal parton structure, including parton distribution functions and light-cone distribution amplitudes of mesons and baryons, together with recent developments in renormalization, perturbative matching, and large-momentum extrapolation. I will then turn to transverse-momentum-dependent distributions, where lattice calculations have progressed from the soft function and Collins–Soper kernel to TMD wave functions, unpolarized TMDPDFs, and spin-dependent distributions. These developments illustrate the emerging capability of lattice QCD to quantitatively resolve the multidimensional partonic structure of hadrons.

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