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Proton and pion momentum-space 3D structure within basis light-front quantization framework

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Basis Light-front Quantization is a method starting from the first-principle Lagrangian to simultaneously get the mass spectrum and internal information of many bound states within a feasible computation time. Among the internal information of bound states, transverse-momentum-dependent PDFs (TMDs) have received increasing attention recently because they provide a full momentum space 3D structure of the bound state and are one of the motivations of many planned EIC. In my report, I will first focus on the results of quark TMDs of the proton and pion, both within the BLFQ framework. This shows BLFQ as a very effective and unified framework for investigating the momentum space 3D structure of both spin-zero and spin-half hadrons. Second, I will start with TMDs to investigate single-spin asymmetry (SSA) of some collisions and compare our calculations with some experimental results or model calculations.

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