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Gluon distributions in the proton in a light-front spectator model

I will present a light-front spectator model for the proton that incorporates the gluonic degree of freedom. The model is based on light-front wave functions modeled from the soft-wall anti–de Sitter/QCD prediction, which allows us to explore the gluonic structure within the proton. Using this model, we have successfully predicted key results for gluon transverse momentum distributions (TMDs) and generalized parton distributions (GPDs), providing valuable insights into the behavior of gluons. In this talk, I will discuss gravitational form factors, which are essential for understanding the internal distributions of mass, energy, pressure, and shear within the proton. These form factors offer important information about the mechanical properties of the proton, particularly those related to gluonic interactions. This talk will demonstrate how our model contributes to a deeper understanding of the fundamental forces and distributions that define hadronic matter.

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