

Abstract Submitted
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Studying the Puzzle of the Pion Nucleon Sigma Term¹ CHRISTOPHER KANE, State Univ of NY - Syracuse, HUEY-WEN LIN, Michigan State University — The pion nucleon sigma term ($\sigma_{\pi N}$) is a fundamental parameter of QCD and is integral in the experimental search for dark matter particles as it is used to calculate the cross section of interactions between potential dark matter candidates and nucleons. Recent calculations of this term from lattice-QCD data disagree with calculations done using phenomenological data. This disparity is large enough to cause concern in the dark matter community as it would change the constraints on their experiments. We investigate one potential source of this disparity by studying the flavor dependence on LQCD data used to calculate $\sigma_{\pi N}$. To calculate $\sigma_{\pi N}$, we study the nucleon mass dependence on the pion mass and implement the Hellmann-Feynman Theorem. Previous calculations only consider LQCD data that accounted for 2 and 3 of the lightest quarks in the quark sea. We extend this study by using new high statistic data that considers 2, 3, and 4 quarks in the quark sea to see if the exclusion of the heavier quarks can account for this disparity.

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