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Nucleon transverse densities from Dispersively Improved Chiral EFT CHRISTIAN WEISS, Jefferson Lab, JOSE MANUEL ALARCON, Universidad Complutense de Madrid and IPARCOS, Madrid, Spain — The transverse densities describe the distribution of charge and current at fixed light-front time and connect the nucleon's elastic form factors with its partonic structure. We compute the transverse densities at peripheral distances $b = O(M_\pi^{-1})$ in a novel approach combining dispersion theory and chiral EFT. The densities are obtained from the dispersive representation of the electromagnetic form factors and expressed as a superposition of t-channel hadronic exchanges. The spectral functions on the two-pion cut are constructed using elastic unitarity, πN amplitudes from chiral EFT, and the pion timelike form factor data. Our formulation incorporates $\pi\pi$ rescattering in the t-channel and gives realistic spectral functions including the ρ resonance. Accurate transverse densities are obtained down to distances $b \sim 0.5$ fm with controlled uncertainties. Our results allow us to identify the region of distances where transverse nucleon structure is governed by two-pion exchange, and to predict the spin and flavor structure of the peripheral densities. The methods can be extended to generalized parton distributions and other nucleon form factors.

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