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Forward-limit generalized parton distributions of the η_c -meson

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The formalism of short-distance factorization allows to connect light-cone correlators with spacelike ones. The later being directly accessible in Euclidean lattices, and the former being the key objects for all of parton physics, the possibility of studying hadron structure in the framework of lattice QCD is opened. In this work we take advantage of this formalism –conveyed through the pseudo-distribution approach– to compute, for the first time, the generalized parton distributions (GPDs) of the η_c -meson. To this end we use CLS ($n_f = 2$) ensembles of gauge configurations to evaluate the η_c -meson’s pseudo-GPD for a number of t -values. We study the continuum– and light-cone–limit of our results. Finally, relying on analytic properties of Ioffe-time distributions, we achieve a model-independent extraction of the η_c -GPD. The η_c being a heavy pseudo–scalar meson, direct comparison with similar results available for lighter ones –say, pions– allows for a pioneering analysis of the effect of quark masses on the structure of hadrons.

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