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POLE APPROXIMATION FOR PSEUDOSCALAR PARTICLES

Exploring the quantum field theory within light-front dynamics, the work
carefully studies the electromagnetic form factors of pseudoscalar mesons using a symmetric vertex function and the pole approximation approach. Furthermore, other observables can be built from these electromagnetic form factors studies, for example, the mean-square charge radius and decay constant. Moreover, this work investigates the reliability of the pole approximation approach to the exact values of electromagnetic form factors using only a few poles of the Feynman amplitudes, simplifying the calculations without the direct dependence of external propagators. The consequences of that approach for all the observables are also compared with the experimental data.
Once calculations of the observables and the pole approximation approach
studies have been satisfactory for the pion experimental data, the work is implemented for other more complex meson structures. In this way, the pole approximation approaches can simplify calculations of electromagnetic form factors, at first, for more complex pseudoscalar meson structures, other types of regulator vertex functions, or more sophisticated dynamical models based on solutions of a Bethe-Salpeter equation.

Keywords: Form Factors, Decay Constant, Light-Front Dynamics, Charge
Radius, Bethe-Salpeter equation.

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