

Pion elastic and pi-gamma form factors at large momentum transfers

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We study the pion elastic and the pi-gamma transition form factors at large values of the momentum transfers making use of the existing experimental data and two theoretical approaches: (i) the local-duality QCD sum rules and (ii) quantum-mechanical potential models with an interaction consisting of Coulomb and confining parts in which case the ground-state form factors satisfy factorization theorems similar to those in QCD. For the pion elastic form factor, we show that the existing data at $Q^2=1-6 \text{ GeV}^2$ lead to important consequences for the behaviour of the form factor at larger momentum transfers, up to asymptotically large values. For the pi-gamma form factor, we discuss possible dynamical mechanisms which could explain mysterious BaBar data for this form factor at $Q^2=10-30 \text{ GeV}^2$.

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