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Resolving the puzzle of the pion-photon transition form factor

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Making use of dispersive QCD sum rules, we analyze the pseudoscalar meson–photon transition form factors. We show that most of the existing measurements –the BaBar results for η , η' , and η_c and the Belle results for π^0 –are well compatible with each other and with the saturation predicted by pQCD factorization theorems and give a hint that the saturation is effective already at relatively low momentum transfers. The existing well-measured data for the pion elastic form factor at $Q^2 \sim 4 \text{ GeV}^2$ also support this observation. The only exception is the BaBar data for the π^0 -gamma transition form factor which lie beyond this nice picture. We point out that the expected results from CLAS12 at JLab on the pion form factor in the region $Q^2 \sim 5\text{--}8 \text{ GeV}^2$ will provide an ultimate test of saturation and pQCD factorization and will have strong impact on the general picture of the form factors up to infinitely large momentum transfers.

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