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$N\pi$ excited state contamination in nucleon 3-pt functions using ChPT

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The $N\pi$ state contribution to nucleon 3-pt functions involving the pseudoscalar density $P(x)$ and the time component $A_4(x)$ of the axial vector current are computed to LO in ChPT. In case of the latter the $N\pi$ contribution is $O(M_N)$ enhanced compared to the single nucleon ground state contribution. In addition, a relative sign in two terms of the $N\pi$ -state contribution leads an almost linear dependence on the operator insertion time, as it is observed in lattice data. In case of the pseudoscalar density the $N\pi$ contribution is strongly dependent on the momentum transfer, leading to a sizeable distortion of the pseudoscalar nucleon form factor. The role the $N\pi$ excited states play in violating the PCAC form factor relation is also discussed.

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