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Isvector axial and pseudoscalar form factors from twisted mass lattice QCD at the physical point

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We present the isovector axial, induced pseudoscalar, and pseudoscalar form factors of the nucleon using three twisted-mass fermion ensembles with degenerate up- and down-, strange-, and charm-quarks with masses tuned to their physical values (physical point). The three ensembles have lattice spacing $a=0.08, 0.068,$ and 0.057 fm and approximately equal physical volume allowing for the continuum limit to be taken at the physical point. Excited-state contributions to the matrix elements are evaluated using several sink-source separations from 0.5 fm to 1.5 fm and multistate fits. We check the partially conserved axial-vector current (PCAC) hypothesis and the pion pole dominance (PPD) and show that in the continuum limit both relations are satisfied. We provide results at the continuum limit for the isovector nucleon axial charge, axial radius, pion-nucleon coupling constant, and for the induced pseudoscalar form factor at the muon capture point.

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