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Scalar and vector form factors of $D \rightarrow \pi \ell \nu$ decays with $N_f = 2 + 1 + 1$ Twisted fermions

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We present lattice results for the form factors relevant for $D \rightarrow \pi \ell \nu$ decays, obtained from simulations performed by the European Twisted Mass Collaboration with $N_f = 2 + 1 + 1$ flavors of dynamical quarks, at three values of the lattice spacing and pion masses as low as 210 MeV.

We computed both the vector and the scalar form factors, studied their dependence on the momentum transfer and compared our results with the experimental ones. Specifically, by combining our determination of $f_+(0)$ with the experimental result for $|f_+(0)V_{cd}|$ we are able to determine the CKM matrix element.

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