

# Hypercubic effects in semileptonic decays of heavy mesons, toward $B \rightarrow \pi \ell \nu$ with $N_f=2+1+1$ Twisted fermions

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We present a preliminary study toward a lattice determination of the vector and scalar form factors of the  $B \rightarrow \pi \ell \nu$  semileptonic decays.

We compute the form factors relative to the transition between pseudo-scalar heavy mesons, with masses above the D-mass, and the pion. We simulate the valence heavy quark with a mass in the range  $m_c < m_h < 2m_c$ .

Lorentz symmetry breaking due to hypercubic effects is clearly observed in the data and included in the decomposition of the current matrix elements in terms of additional form factors. We discuss the size of this breaking as the parent-meson mass increases.

Our analysis is based on the gauge configurations produced by the European Twisted Mass Collaboration with  $N_f = 2 + 1 + 1$  flavors of dynamical quarks.

We simulated at three different values of the lattice spacing and with pion masses as small as 210 MeV.

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