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B-meson semileptonic form factors on (2+1+1)-flavor HISQ ensembles

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We report updates to an ongoing lattice-QCD calculation of the form factors for the semileptonic decays $B \to \pi\ell\nu$, $B_s \to K\ell\nu$, $B \to \pi\ell^+\ell^-$, and $B \to K\ell^+\ell^-$. The tree-level decays $B_{(s)} \to \pi(K)\ell\nu$ enable precise determinations of the CKM matrix element $|V_{ub}|$, while the flavor-changing neutral-current interactions $B \to \pi(K)\ell^+\ell^-$ are sensitive to contributions from new physics. This work uses MILC's (2+1+1)-flavor HISQ ensembles at approximate lattice spacings between 0.057 and 0.15 fm, with physical sea-quark masses on four out of the seven ensembles. The valence sector is comprised of a clover b quark (in the Fermilab interpretation) and HISQ light and s quarks. We present preliminary results for the form factors f_0, f_+, and f_T, including studies of systematic errors and z-expansion methods.

Author: Dr GELZER, Zechariah (University of Illinois at Urbana-Champaign)

Co-authors: DETAR, CARLETON (University of Utah); EL-KHADRA, Aida (UIUC); GAMIZ, Elvira (University of Granada); GOTTLIEB, Steven (Indiana University); KRONFELD, Andreas (Fermilab); Dr LIU, Yuzhi (Indiana University); MEURICE, Yannick (University of Iowa); Dr SIMONE , James (Fermilab); TOUSSAINT, doug (University of Arizona); VAN DE WATER, Ruth (Fermilab)

Presenter: Dr GELZER, Zechariah (University of Illinois at Urbana-Champaign)

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