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Nonperturbative determination of form factors for semileptonic B_s meson decays

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Investigating the phenomenology of semileptonic B_s meson decays allows to further constrain the Standard Model and explore new, independent channels to determine important parameters, like the CKM matrix elements $|V_{ub}|$ and $|V_{cb}|$. Given different systematics of B_s decays w.r.t. B decays, this may help to shed light on the long-standing discrepancy between inclusive and exclusive determinations of CKM matrix elements, on recently reported anomalies like in ratios of branching fractions, or on rare, GIM suppressed decays.

Here we report on our lattice calculation based on the set of 2+1 flavor domain-wall Iwasaki gauge field configurations generated by the RBC-UKQCD collaboration using domain-wall light, strange, and charm quarks, and bottom quarks simulated with the relativistic heavy quark action. We present new results for semileptonic form factors for $B_s \rightarrow D_s \ell \nu$ and $B_s \rightarrow K \ell \nu$ as well as for $B_s \rightarrow \phi \ell^+ \ell^-$ and will give an outlook on determining the ratios $R(D_s)$ and $R(D_s^*)$ as well as on form factors for $B_s \rightarrow K^{(*)} \ell^+ \ell^-$ decays.

Experimental Collaboration

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