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Determination of charm quark mass from temporal moments of charmonium correlator with Mobius domain-wall fermion

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We extract the charm quark mass and the strong coupling
constant
by using the charmonium current correlators with $n_f = 2 + 1$ Mobius
domain
wall fermions. The temporal moments of the correlators are sensitive to
short-distance physics, and could be also calculated in the
continuum theory by perturbative expansion, which is known up to four-
loop order.We match our lattice calculation with perturbative result, and extract the charm quark mass with the uncertainty less than 1%.
We also confirm the correlators in the vector channel to be consistent with experimental data for R-ratio.
We used the ensembles by the JLQCD collaboration at lattice spacings a = 0.083 fm, 0.055 fm and 0.044 fm, are extrapolated to the continuum limit.

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