



Contribution ID: 205

Type: Talk

Discrete β -function of the $SU(3)$ gauge theory with 10 massless domain-wall fermions

Tuesday, 26 July 2016 15:20 (20 minutes)

I present the updated results of the discrete β -function of the $SU(3)$ gauge theory with $N_f = 10$ massless optimal domain-wall fermions in the fundamental representation.

The renormalized coupling is obtained by the finite-volume gradient flow scheme on L^4 lattices, for seven lattice sizes: $L/a = 8, 10, 12, 16, 20, 24, 32$;

and each with 11 – 17 different lattice spacings parametrized by $6/g_0^2$.

The discrete β -function is extrapolated to the continuum limit using four lattice pairs $(L, 2L)/a = (8, 16), (10, 20), (12, 24)$ and $(16, 32)$.

This provides stronger evidence of the infrared fixed point at $g_c^2 \simeq 7$, which was first reported in arXiv:1603.08854, based on the continuum extrapolation of the discrete β -function obtained with three lattice pairs.

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Session Classification: Physics Beyond the Standard Model

Track Classification: Physics Beyond the Standard Model