

Quark mass effects in the gradient flow at higher orders in perturbation theory

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Calculations in the perturbative approach to the short-flow time expansion of the gradient flow have typically been completed for systems with massless quarks, simplifying computations and allowing for application of the method of projectors. However, processes such as vacuum expectation values can be considered without this method. For example, the condensate of the quark kinetic operator is known to the three loop level in the massless case. It has been suggested by Hiromasa et. al. that the gradient flow with massive quarks can be utilised in a precision determination of the values of the quark masses. Processes such as the flowed quark condensate have already been computed to the two loop level in the small- and large-mass limits. In this talk we discuss current progress in calculating the effect of the full mass dependence numerically up to the three loop level using `ftint` and to which processes these methods can be applied.

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