

Contribution ID: 16

Type: **not specified**

Using Gradient Flow to renormalise Matrix Elements for B Meson Mixing and Lifetimes

Monday, 20 March 2023 14:10 (30 minutes)

Neutral B meson mixing and B meson lifetimes are theory-side parametrised in terms of $\Delta B = 2$ and 0 four-quark operators which can be determined by calculating weak decay matrix elements using lattice QCD. While calculations of $\Delta B = 2$ mixing matrix elements are standard, matrix elements with $\Delta B = 0$ for extracting lifetimes suffer from complications in standard renormalisation procedures. Here dimension-6 four-quark operators mix with operators of lower mass dimension using standard renormalisation procedures and, moreover, quark-line disconnected diagrams contribute.

We present work detailing the idea to use fermionic gradient flow to non-perturbatively renormalise $\Delta B = 0, 2$ matrix elements, later to be combined with perturbative input in order to develop renormalisation+matching-to- $\overline{\text{MS}}$ procedures for these operators.

The well-studied $\Delta B = 2$ matrix elements governing B mixing are first considered to test and validate the method before turning the focus to the quark-line connected $\Delta B = 0$ matrix elements.

Presenter: BLACK, Matthew (University Siegen)