

Isospin breaking corrections to leptonic decay rates on the lattice

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Lattice QFT is a method for calculating non-perturbative physics and has been used extensively to calculate properties of low energy QCD. Over the last decade calculation's of a number of non-perturbative QCD quantities have reached a good precision, with agreement from across the lattice community.

In general isospin breaking (IB) effects have not been included in these calculations because until now IB effects have not been a limiting source of systematic error. Isospin breaking effects enter in two ways, the difference in the mass of the up and down quark (strong IB) and the difference in the QED charge of up and down type quarks (QED IB). Considering power counting these effects are expected to be of the order 1% of the decay rate. Due to the introduction of QED effects, we must calculate the full QCD + QED path integral on the lattice and this introduces a number of complications.

In this presentation, I will introduce Lattice QCD+QED as a calculation method for flavour physics observables and discuss how leptonic decay rates are calculated on the lattice with the inclusion of isospin breaking effects.

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