The 38th International Symposium on Lattice Field Theory

LATTICE 21

JULY 26-30 2021, ZOOM/GATHER@MIT

Contribution ID: **375** Type: **Oral presentation**

Hadronic light-by-light contribution to $(g-2)_\mu$ from lattice QCD: a complete calculation

Tuesday 27 July 2021 07:00 (15 minutes)

The tension between theory and experiment for the anomalous magnetic moment of the muon (a_μ) is one of the long-standing puzzles of modern particle physics. After the update by the Fermilab E989 experiment in April 2021, the discrepancy between both sides lies at the 4.2-sigma level, as of the consensus made in the 2020 muon g-2 theory White Paper. The theory error is entirely dominated by the hadronic contributions, which can be calculated using lattice QCD. The order $\alpha^3_{\rm QED}$ hadronic light-by-light (hlbl) contribution $a_\mu^{\rm hlbl}$ admits a large relative uncertainty and represents a non-negligible source of uncertainty for the total error budget. In this talk, the Mainz approach and result for $a_\mu^{\rm hlbl}$ computed with $N_f = 2+1$ lattice ensembles [arXiv:2104.02632] will be presented. We obtain a value of $a_\mu^{\rm hlbl} = 106.8(14.7) \times 10^{-11}$ after a chiral, continuum and infinite-volume extrapolation. This result contains all five Wick-contraction topologies needed for a complete lattice determination of $a_\mu^{\rm hlbl}$.

Primary authors: CHAO, En-Hung (Johannes Gutenberg University Mainz); HUDSPITH, Renwick (Johannes Gutenberg University Mainz); GÉRARDIN, Antoine (Aix Marseille Univ, Université de Toulon); GREEN, Jeremy (CERN); MEYER, Harvey (Johannes Gutenberg University Mainz); Dr OTTNAD, Konstantin (Johannes Gutenberg University Mainz)

Presenter: CHAO, En-Hung (Johannes Gutenberg University Mainz)

Session Classification: QCD in searches for physics beyond the Standard Model

Track Classification: QCD in searches for physics beyond the Standard Model