Contribution ID: **348**   Type: **Talk**

Lattice calculation of the pion transition form factor $\pi^0 \to \gamma^*\gamma^*$

Friday, 29 July 2016 18:10 (20 minutes)

We report on the lattice QCD calculation of the $\pi^0 \to \gamma^*\gamma^*$ form factor using two flavors of O(a)-improved Wilson fermions with photon virtualities in the range $Q^2 \in [0 - 1.5]$~GeV^2. Different lattice spacings and pion masses are used to extrapolate our result to the physical point.

First, we check that our results, once extrapolated to the chiral and continuum limit, are compatible with the chiral anomaly. Then, the shape of the form factor is compared to different phenomenological models proposed in the literature and to experimental data in the single-virtual case when one photon is on-shell. From a phenomenological point of view, this form factor determines the π^0 pole contribution to hadronic light-by-light (HLbL) scattering in the muon $g - 2$,thought to be dominant.

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Session Classification: Hadron Structure

Track Classification: Hadron Structure