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Eta pole contributions to HLbL at the physical point

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We report on our computation of the eta transition form factor $\mathcal{F}_{\eta \rightarrow \gamma^* \gamma^*}$ from twisted mass lattice QCD at physical quark masses and at a single lattice spacing. On the lattice, we have access to a broad range of (space-like) photon momenta and can therefore produce data complementary to the experimentally accessible singly virtual case. We use the form factor to determine the eta pole contribution to the hadronic light-by-light scattering in the muon $g - 2$, leading to a first lattice QCD estimate. Our estimate of $a_\mu^{\eta-pole}$ obtained at a single lattice spacing achieves an accuracy of below 40%. Since so far there are no determinations of this contribution from first principles, even such a crude determination is interesting from a phenomenological point of view.

Primary authors: BURRI, Sebastian Andreas (University of Bern); KANWAR, Gurtej (University of Bern); PETSCHLIES, Marcus (Helmholtz-Institut für Strahlen- und Kernphysik); WENGER, Urs (University of Bern)

Presenter: BURRI, Sebastian Andreas (University of Bern)

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